

APPENDIX A
1987 EFFLUENT, ON-SITE, AND OFF-SITE
MONITORING PROGRAM

1987 EFFLUENT, ON-SITE, AND OFF-SITE MONITORING PROGRAM

The following schedule represents the WVDP routine Environmental Monitoring Program which was developed for and implemented in 1987. The current schedule as modified provides the basis for the 1988 calendar year program. A summary of changes implemented in 1987 is provided on page A-4 and the changes are marked in the schedule with a heavy vertical line. Except for those sample locations noted as not yet activated, this schedule is the minimum program needed to meet the requirements of DOE Order 5484.1, Chapter III. Specific methods and recommended monitoring program elements are referenced in DOE/EP-0096 (Effluent Monitoring) and DOE/EP-0023 (Environmental Surveillance), and are the bases for selecting most of the schedule specifics. Additional monitoring is mandated by Operational Safety Requirements (OSRs) and air and water discharge permits (40 CFR 61 and SPDES), which also require formal report generation. These specific cases are identified in the schedule under Monitoring/Reporting Requirements. Samples designated as "shared with NYSDOH" are collected in replicate or duplicate to support the New York State Department of Health monitoring program where it overlaps or interfaces with the WVDP program.

Locations of the sampling points are shown on Figures A-1 through A-5 included at the end of this appendix.

Sample Location and I.D. Code - The physical location where the sample is collected is described. The I.D. is a seven-character code which identifies the sample media as Air, Water, Soil/Sediment, Biological, or Direct Measurement, On- or Off-site, and the specific location (e.g., AFGRVAL is Air Off-site at Great Valley).

Monitoring/Reporting Requirements - The basis for monitoring that location and any additional references to permits or Operational Safety Requirements are noted.

Sampling Type/Medium - Describes collection method, and the physical characteristics of the media.

Collection Frequency - Sample collection frequency.

Total Annual Samples - Discrete physical samples collected annually, not including composites of collected samples.

Analysis Performed/Composite Frequency - Describes the individual analyses on the samples or composites of samples, and the frequency analysis.

SUMMARY OF MONITORING PROGRAM CHANGES IMPLEMENTED IN 1987

The following is a summary of the significant environmental monitoring program modifications which were implemented in 1987. Some of the changes reflect readjustments due to plant process improvements and new facilities, and others are a result of program evaluation and long-term planning. The description and results of most of the on-site monitoring are not included in the scope of this report, but the following summary schedule is provided for information.

| <u>Location I.D.</u> | <u>Description of Changes Implemented</u> |
|-----------------------|---|
| AFDNKRK | Placed in operation |
| AFBOEHN | Placed in operation |
| BFFCATD | Collected part of semi-annual samples from creek portion downstream of Gowanda |
| DFTLD Series | Added drum cell and inner facility monitoring points and Dunkirk location |
| ANCSRFK | Added new effluent monitoring point for contact size reduction facility ventilation |
| ANSUPCV | Added supercompactor effluent monitoring point (intermittent) |
| ANSTSTK | Added supernatant treatment system ventilation monitoring system |
| WNDCELD | Added drum cell drainage sampling point in south Frank's Creek |
| WNSP001 | Added C-14 to routine analysis, changed composite from quarterly to monthly |
| WNSP006 | Added C-14, Pu/U, and Am-241 to quarterly composite, changed collection to weekly |
| Onsite Groundwater | Added Total Organic Halogen (TOH) |
| WNNDADR | Changed scheduled analyses to monthly |
| WNSP003 | Added sampling location |
| Deer Collection | Increased samples from 2 to 6 |
| DFTLD | Added background and onsite locations |

1987 EFFLUENT AND ON-SITE MONITORING PROGRAM

| <u>SAMPLE LOCATION AND I.D. CODE</u> | <u>MONITORING/REPORTING REQUIREMENTS</u> | <u>SAMPLING TYPE/MEDIUM</u> | <u>COLLECTION FREQUENCY</u> | <u>TOTAL ANNUAL SAMPLES</u> | <u>ANALYSES PERFORMED/ COMPOSITE FREQUENCY</u> |
|---|---|--|--|---------------------------------|--|
| Main Plant Ventilation Exhaust Stack ANSTACK | Airborne radioactive effluent point including LWTS and Vitrification Off-Gas | Continuous off- line air particulate monitor | Continuous measurement of fixed filter, replaced weekly | 104 | Real time alpha and beta monitoring |
| | | Continuous off- line air particulate and iodine sampler | Weekly collection of filter paper, charcoal absorber, and desiccant | 156 | Filters for gross alpha/ beta, gamma isotopic and H-3 weekly Quarterly composites: filters for Sr-90, Pu/U isotopic, Am-241, gamma isotopic; charcoal for I-129 |
| | <u>Required by:</u> OSR M.11.5.2.4.B OSR M.11.5.2.1.B 40 CFR 61 <u>Reported:</u> Monthly Environmental Monitoring Trend Analysis Annual Effluent and Onsite Discharge Report Annual Environmental Monitoring Report Air Emissions Annual Report | Continuous off- line tritium (as water vapor) sampler | | | |
| Supernatant Treatment System (STS) Ventilation Exhaust ANSTSTK | ----- Same as for ANSTACK ----- | | | | |

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|--|---|---|---|---------------------------------|---|
| Supercompactor Exhaust ANSUPCV | Airborne radioactive effluent point <u>Required by:</u> OSR M.11.5.2.4.B OSR M.11.5.2.1.B 40 CFR 61 <u>Reported:</u> Annual Effluent and Onsite Discharge Report Air Emissions Annual Report | Continuous off- line air particulate monitor during operation (maximum of 26 operating weeks expected) | Continuous measurement of fixed filter, collected and replaced every seven operating days, or at least monthly when unit is operated | 26 | Real time beta monitoring Filters for gross alpha/ beta, gamma isotopic upon collection Quarterly composites: filters for Sr-90, Pu/U isotopic, Am-241, gamma isotopic |

Analytical Lab
Ventilation
System Exhaust
ANANLBV

Same as ANSUPCV

(Operation not
probable in
1988, enhanced
monitoring may
be indicated
during startup
evaluations)

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|--|--|---|--|-----------------------------|--|
| Cement Solidification System (CSS) Ventilation Exhaust AMCSSTK | Airborne radioactive effluent point <u>Required by:</u> OSR M.11.5.2.1.B OSR M.11.5.2.4.B 40 CFR 61 <u>Reported:</u> Monthly Environmental Monitoring Trend Analysis Annual Effluent and Onsite Discharge Report Annual Environmental Monitoring Report Air Emissions Annual Report | Continuous off-line air particulate monitor Continuous off-line air particulate and iodine sampler | Continuous measurement of fixed filter, replaced weekly Weekly collection of filter paper and charcoal absorber | 104 104 | Real time alpha and beta monitoring Filters for gross alpha/beta, gamma isotopic weekly Quarterly composites: filters for Sr-90, Pu/U isotopic, Am-241, gamma isotopic; charcoal for I-129 |

Contact Size Reduction
Facility Exhaust
AMCSRFK

Same as for ANCSSTK

Vitrification Cell Ventilation Exhaust
AMCTSTK

Same as for ANCSSTK

(Operation not planned for 1988)

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|--|---|---------------------------------|---|---------------------------------|---|
| Lagoon 3 Discharge Weir WNSP001 | Primary point of liquid effluent batch release | Grab Liquid | Daily, during Lagoon 3 discharge | 40-80 | Daily: gross beta, conductivity, pH. Every sixth daily sample: gross alpha/beta, H-3, Sr-90, gamma isotopic. Weighted monthly composite of daily samples: gross alpha/ beta, H-3, C-14, Sr-90, I-129, gamma isotopic, Pu/U isotopic, Am-241. |
| | <u>Required by:</u> OSR M.11.5.2.5.B SPDES Permit | | | | |
| | <u>Reported:</u> Monthly SPDES DMR | | | | |
| | Annual Effluent and Onsite Discharge Report | | | | |
| | Annual Environmental Monitoring Report | Composite Liquid | Twice during discharge, near start, and near end | 8-10 | Two 24 hour composites for Al, NH ₃ , As, BOD-5, Fe, Zn, pH, suspended solids; |
| | | Grab Liquid | Twice during discharge, same as composite | 8-10 | Settleable solids, pH, cyanide, oil and grease |
| | | Composite Liquid | Annually | 1 | Annually, a 24 hour composite for: Cd, Cr, Cu, Pb, Ni, Se |

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|---|---|---|---------------------------------|---------------------------------|--|
| Erdman Brook at Security Fence WNSP006* | Combined facility liquid discharge <u>Required by:</u> OSR M.11.5.2.5.8 <u>Reported:</u> Monthly Environmental Monitoring Trend Analysis Annual Environmental Monitoring Report | Continuous proportional sample liquid | Weekly | 52 | Gross alpha/beta, H-3, pH, conductivity, Quarterly composite: gamma isotopic, C-14, Sr-90, I-129, Pu/U isotopic, Am-241 |
| Sanitary Waste Discharge WNSP007 | Liquid effluent point for sanitary and utility plant combined discharge <u>Required by:</u> SPDES Permit <u>Reported:</u> Monthly SPDES DMR Monthly Environmental Monitoring Trend Analysis Annual Effluent and Onsite Discharge Report Annual Environmental Monitoring Report | 24 hr composite liquid Grab | 3/month Annually | 132 1 | Gross alpha/beta, pH, H-3, settleable solids, suspended solids, NH ₃ , BOD-5, Fe Chloroform |

*Samples to be split (shared with NYSDOH)

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|--|---|---------------------------------|---------------------------------|---------------------------------|--|
| N.E. Swamp Drainage UNSUAMP* | Site surface drainage | Grab liquid | Monthly | 24 | Gross alpha/beta, H-3, pH |
| North Swamp Drainage UNSU74A | <u>Reported:</u> Annual Effluent and Onsite Discharge Report | | | | |
| French Drain UNSP008 | Drains subsurface water from LLWT lagoon area | Grab liquid | 3/month | 36 | pH, conductivity, BOD-5, Fe |
| | <u>Reported:</u> Monthly SPDES DMR | | Monthly | 12 | Gross alpha/beta, H-3 |
| | Annual Effluent and Onsite Discharge Report | | Annually | 1 | Ag, Zn |

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|--|--|---------------------------------|---------------------------------|---------------------------------|--|
| On-site ground- water | Groundwater monitoring wells around site waste management units | Grab liquid | Semiannual | 144 | Gross alpha/beta, H-3, gamma isotopic, pH conductivity, chloride, sulfate, phenols, nitrate, TOC, TOH, As, Ba, Cd, Cr, Fe, Pb, Mn, Hg, Se, Ag, Na |
| HLW Tank GW Monitoring Unit - Wells: <u>WNU</u> 80-2 86-7 86-8 86-9 86-12* Surface: <u>WINDPNE*</u> | <u>Reported:</u> Annual Environmental Monitoring Report | | | | |
| Lagoon GW Monitoring Unit - Wells: <u>WNU</u> 86-6 86-3 86-4 86-5 80-5 80-6 Surface: <u>WNGSEEP</u> <u>WNSPO08</u> | | | | | |
| NDA GW Monitoring Unit - 83-10 86-10 86-11 82-10 | | | | | |

*Serves former Cold Dump

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|---|---|---------------------------------|---------------------------------|---------------------------------|---|
| On-site ground- water Facility/Plant Area Wells: WMM 80-3 80-4 | Groundwater monitoring wells around site facilities <u>Reported:</u> Annual Environmental Monitoring Report | Grab liquid | Semiannual | 88 | Gross alpha/beta, H-3, gamma isotopic, pH conductivity |
| NDA Area Wells: WMM 82-1A 82-1B 82-1C 82-2B 82-2C 82-3A 82-4A1 82-4A2 82-4A3 | | | | | |
| Gas Tank Subsurface Monitoring Well: WMM 86-13 | | | | 4 | Gross alpha/beta, H-3, gamma isotopic, pH, conductivity, phenols, TOC, benzene, toluene, xylene |

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|--|---|-----------------------------------|---------------------------------|---------------------------------|---|
| Franks Creek E of SDA WNFRC67* | Drains NYS Low-Level Waste Disposal Area <u>Reported:</u> Internal review NYSERDA | Grab liquid | Monthly | 12 | Gross alpha/beta, H-3, pH |
| Erdman Brook N of Disposal Areas WNER653* | Drains NYS and WVDP disposal areas <u>Reported:</u> Internal Review NYSERDA | Grab liquid | Weekly | 52 | Gross alpha/beta, H-3, pH |
| Ditch N of WVDP NDA & SDA WNNDADR | Drains WVDP disposal and storage area <u>Reported:</u> Internal Review | Composite continuous liquid | Weekly | 104 | Monthly gross alpha/beta composite - gamma isotopic, H-3, pH, quarterly composite: Sr-90, I-129 |
| Drainage S of Drum Cell WMDCELD | Same as WNNDADR, except sample collection is weekly grab ----- | | | | |

*Samples to be split (shared with NYSDOH), WNFRC67 collected weekly.

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|---|--|---------------------------------|---------------------------------|---------------------------------|--|
| On-site Standing Water (ponds not receiving effluent)* | Water within vicinity of plant airborne or ground water effluent | Grab liquid | Annually | 7-10 | Gross alpha/beta, H-3, pH, conductivity, chloride, Fe, Mn, Na, phenols, sulfate |
| | <u>Reported:</u> Internal Review | | | | |
| Test Pit N of HLW Area UNSTAM1 Slough SW of RTS Drum Cell UNSTAM2 Pond SE of Heinz Road UNSTAM3 Border Pond S of AFRT240 UNSTAM4 Border Pond SW of DFTLD13 UNSTAM5 Borrow Pit NE of Project Facilities UNSTAM6 Pond SW of Project Facilities W of Rock Springs Road UNSTAM7 Slough N of Quarry Creek UNSTAM8 North Reservoir Near Intake UNSTAM9 Background Pond at Sprague Brook Maintenance Building UNSTAMB | | | | | |

*Number of points sampled will depend upon on-site ponding conditions during the year.

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|---|---|---------------------------------|---------------------------------|---------------------------------|---|
| Condensate and Cooling Water Ditch WNSPO05 | Combined drainage from facility yard area <u>Reported:</u> Internal Review | Grab liquid | Monthly | 12 | Gross alpha/beta, H-3, pH |
| Cooling Tower Basin WNCOOLW | Cools plant utility steam system water <u>Reported:</u> Internal Review | Grab liquid | Monthly | 12 | Gross alpha/beta, H-3, pH |
| Site potable water WMDRINK | Source of water within site perimeter <u>Reported</u> Internal Review | Grab liquid | Monthly Annually | 12 2 | Gross alpha/beta, H-3, pH, conductivity Toxic metals, pesticides chemical pollutants |
| SDA Holding Lagoon WNSPO03 | State disposal area holding lagoon <u>Reported:</u> Annual Environmental Monitoring Report NYSERDA | Grab liquid | Annually (as required) | 1 | Gross alpha/beta, H-3, C-14, pH, gamma isotopic, Sr-90, I-129, Pu/U isotopic |

1987 OFF-SITE MONITORING PROGRAM

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|--|---|---------------------------------------|---------------------------------|---------------------------------|--|
| Cattaraugus Creek at Felton Bridge WFFELBR* | Unrestricted surface waters receiving plant effluents <u>Reported:</u> Monthly Environmental Monitoring Trend Analysis Annual Environmental Monitoring Report | Flow weighted continuous liquid | Weekly | 52 | Weekly for gross alpha/beta, H-3, pH; Monthly composite for gamma isotopic and Sr-90 |
| Buttermilk Creek, Upstream of Cattaraugus Creek Confluence at Thomas Corners Road WFBCCB | Restricted surface waters receiving plant effluents <u>Reported:</u> Annual Environmental Monitoring Report | Composite continuous liquid | Biweekly | 26 | Monthly for gross alpha/beta, H-3, pH; Quarterly composite for gamma isotopic and Sr-90 |
| Buttermilk Creek near Fox Valley WFBCBK | Restricted surface water background <u>Reported:</u> Monthly Environmental Monitoring Trend Analysis Annual Environmental Monitoring Report | Composite continuous liquid | Biweekly | 26 | Monthly for gross alpha/beta, H-3; Quarterly composite for gamma isotopic and Sr-90 |

*Samples to be split (shared with NYSDOH)

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|---|---|---------------------------------|---------------------------------|--|---|
| Wells near WVDP outside WYNSC Perimeter | Drinking supply ground water near facility | Grab liquid | Biennially | 6 (5 + Back- ground well each year of collection) | Gross alpha/beta, H-3, gamma isotopic, pH, conductivity |
| 3.0 km WNW WFME01 | <u>Reported:</u> Annual Environmental Monitoring Report | | | | |
| 1.5 km NW WFME02 | | | | | |
| 4.0 km NW WFME03 | | | | | |
| 3.0 km NW WFME04 | | | | | |
| 2.5 km SW WFME06 | | | | | |
| 4.0 km NNE WFME07 | | | | | |
| 2.5 km ENE WFME08 | | | | | |
| 3.0 km SE WFME09 | | | | | |
| 7.0 km N WFME10 | | | | | |

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|--|--|---------------------------------|---------------------------------|---------------------------------|--|
| 3.0 km SSE at Fox Valley AFFXVRD | Particulate air samples around WYNNSC perimeter | Continuous air particulate | Weekly | 660 | Weekly (each filter) gross alpha/beta, H-3 (on 3 stations) |
| 3.7 km NNW at Thomas Corners Road AFTCORD | <u>Required by:</u> DOE 5484.1 | Continuous H-3, charcoal** | | | Quarterly: (Each station) composite filters for Sr- 90, gamma isotopic; I-129 (on 3 stations) |
| 2.0 km NE on Route 240 AFRT240*,** | <u>Reported:</u> Annual Environmental Report | | | | |
| 1.5 km NW on Rock Springs Road AFRSPRD** | Monthly Environmental Monitoring Trend Analysis* | | | | |
| 29 km S at Great Valley (back- ground) AFGRVAL** | | | | | |
| 7 km at Springville AFSPRVL | | | | | |
| 6 km SSE at West Valley AFWEVAL | | | | | |
| 50 km W at Dunkirk (background, added in 1987) AFDMKRK | | | | | |
| 2.3 km SW on Boberg Road (added in 1987) AFBOEIN** | | | | | |

Note: AFRT240 is co-located with NYSDOH air sampler.

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|---|--|---------------------------------|---------------------------------|---------------------------------|--|
| 2.5 km SW AFDHFOP | Collection of fallout particulate and precipitation around WYNASC perimeter | Integrating liquid | Monthly | 48 | Gross alpha/beta, H-3, pH |
| 3.0 km SSE AFFXFOP | | | | | |
| 3.7 km NNW AFTCFOP | <u>Reported:</u> Annual Environmental Report | | | | |
| 2.0 km NE AF24FOP | | | | | |
| Surface soil (at each of nine air samplers plus 26 km SSW at Little Valley) SFSOL-Series | Long-term fallout accumulation <u>Reported:</u> Annual Environmental Monitoring Report | Surface plug composite soil | Triennially | 10 (year of collection) | Gamma isotopic, Sr-90, Pu- 239, Am-241 |
| Buttermilk Creek at Thomas Corners Road SFTCSED** | Deposition in sediment downstream of facility effluents | Grab stream sediment | Semiannually | 10 | Gross alpha/beta, isotopic gamma and Sr-90 |
| Buttermilk Creek at Fox Valley Road (back- ground) SFBCESED*,** | <u>Reported:</u> Annual Environmental Monitoring Report | | Annually** | 2 | U/Pu isotopic, Am-241 |
| Cattaraugus Creek at Springville Dam SFSDESED* | | | | | |
| Cattaraugus Creek at Bigelow Bridge (back- ground) SFBISED | | | | | |

*Samples to be split (shared with NYSDOH)

**Analysis on one of two semiannual collections

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|--|--|---|--|--------------------------------------|--|
| Cattaraugus Creek downstream of the Buttermilk Creek confluence BFFCATC* | Fish in waters downstream of facility effluents <u>Reported:</u> Annual Environmental Monitoring Report | Individual collection, biological | Semiannually | 6 (each sample is 10 fish) | Isotopic gamma and Sr-90 in edible portions of each individual fish. |
| Cattaraugus Creek downstream of Springville Dam BFFCATD* | | | | | |
| Control Sample from nearby stream not affected by WDP (7 km or more upstream of site effluent point) BFFCTRL* | | | | | |
| Dairy Farm, 3.8* km NNW BFMREED | Milk from animals foraging around facility perimeter | Grab biological | Monthly (BFMREED, BFMCOBO, BFMCTLS, BFMCTLN) | 48 | Gamma isotopic, Sr-90, H-3 and I-129 on annual samples and quarterly composites of monthly samples |
| Dairy Farm, 1.9 km WNW BFMCOBO | <u>Reported:</u> Annual Environmental Monitoring Report | | Annual (BFMWIDR, BFMHAUR) | 2 | |
| Dairy Farm SE of site BFMWIDR | | | | | |
| Dairy Farm 2.5 km SSW BFMHAUR | | | | | |
| Control location 25 km S BFMCTLS | | | | | |
| Control location, 30 km N BFMCTLN | | | | | |

*Replicate samples to be collected (shared with NYSDOH)

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|---|---|----------------------------------|----------------------------------|-----------------------------|--|
| (3) Nearby locations BFVNEAR* | Fruit and vegetables grown near facility perimeter downwind if possible | Grab biological | Annually,* at harvest | 6 | Gamma isotopic and Sr-90 analysis of edible portions, H-3 in free moisture |
| (3) Remote locations (16 km or more from facility) BFVCTRL* | <u>Reported:</u> Annual Environmental Monitoring Report | | | | |
| Beef cattle forage from near site location N BFHNEAR | | Grab biological | Annually | 2 | Gamma isotopic, Sr-90 |
| Milk cow forage from control south location or north location BFHCTLS or BFHCTLM | | | | | |
| Beef animal from nearby farm in downwind direction BFBNEAR | Meat-Beef foraging near facility perimeter, downwind if possible | Grab biological | Semiannually* | 4 | Gamma isotopic and Sr-90 analysis of meat |
| Beef animal from control location (16 km or more from facility) BFBCTRL | <u>Reported:</u> Annual Environmental Monitoring Report | | | | |
| In vicinity of the site (3) BFDNEAR | Meat-Deer foraging near facility perimeter | Individual collection biological | Annually, during hunting season* | 3 | Gamma isotopic and Sr-90 analysis of meat |
| Control animals (3) (16 km or more from facility) BFDCTRL | <u>Reported:</u> Annual Environmental Monitoring Report | | During year as available* | 3 | |

*Samples to be split (shared with NYSDOH)

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|---|--|-----------------------------|-----------------------------|-----------------------------|--|
| DFTLD Series Thermoluminescent Dosimetry (TLD) | Direct radiaiton around facility | Integrating LiF TLD | Quarterly | 160 | Quarterly gamma radiation exposure |
| (16) at each of 16 compass sectors, at nearest accessible perimeter point | <u>Reported:</u> Annual Environmental Monitoring Report | | | | |
| (3) at corners of SDA | | | | | |
| (11) at security fence around site | | | | | |
| (3) On-site near operational areas (DNTLD) | | | | | |
| Rock Springs Road 500 m NNW of plant | | | | | |
| 1500 m NW (nearest downwind receptor) | | | | | |
| "5 Points" land-fill, 19 km SW (background) | | | | | |
| Great Valley, 29 km S (background) | | | | | |
| Springville 7 km N | | | | | |
| West Valley 5 km SSE | | | | | |
| Dunkirk, 50 km W (background) | | | | | |

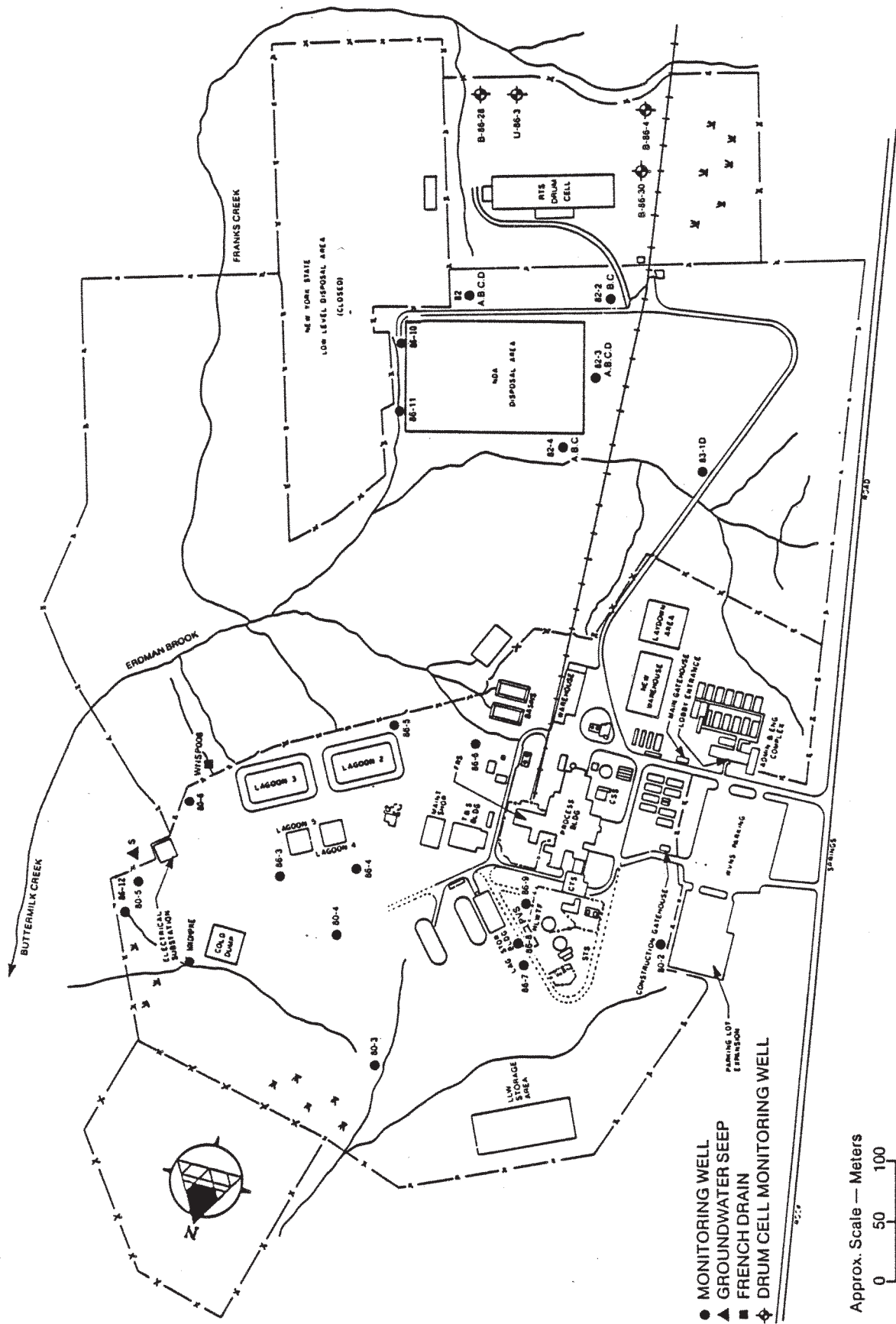


Figure A-2. Location of Groundwater Stations Monitored in 1987.

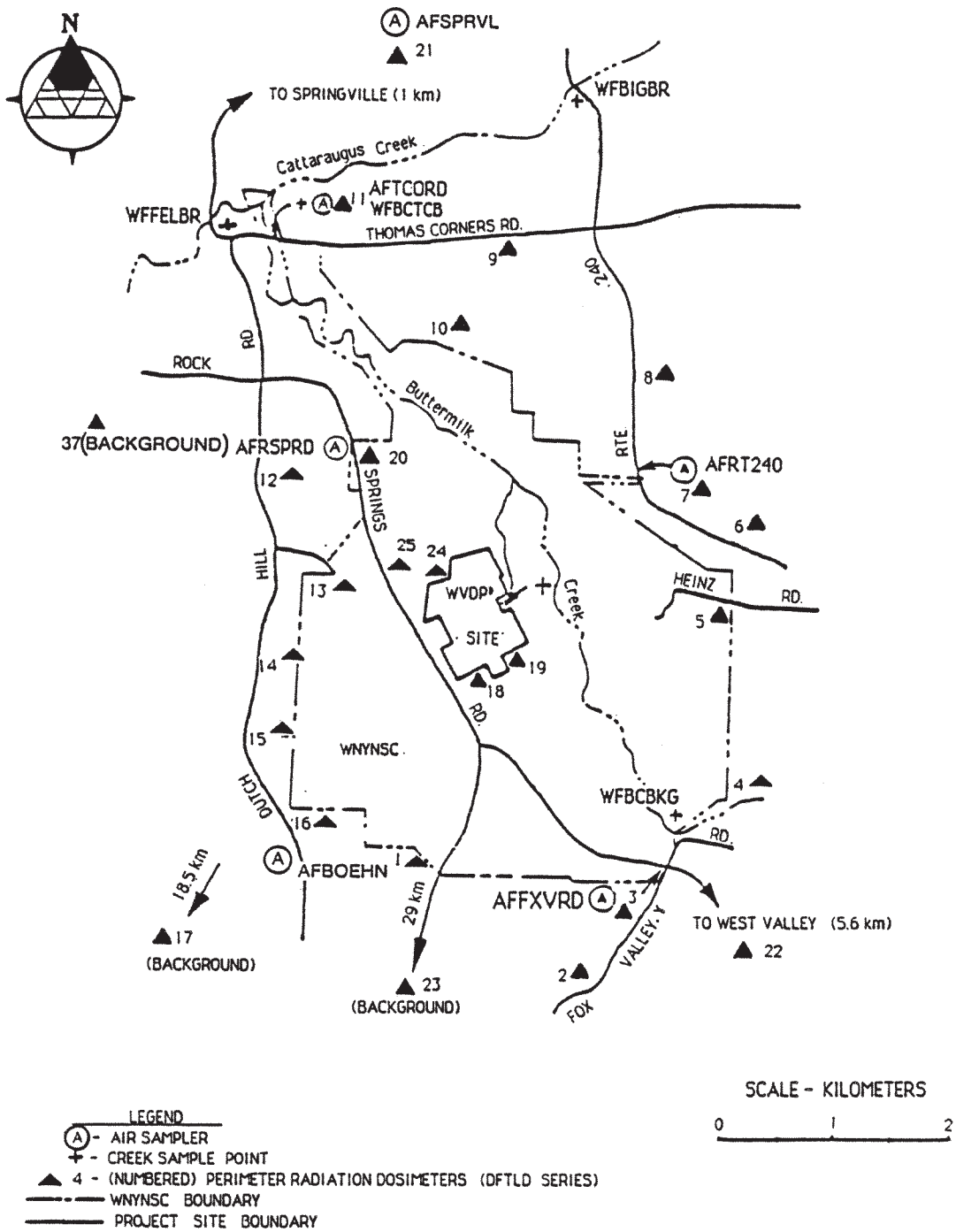


Figure A-3. Locations of Perimeter Environmental Monitoring Stations.

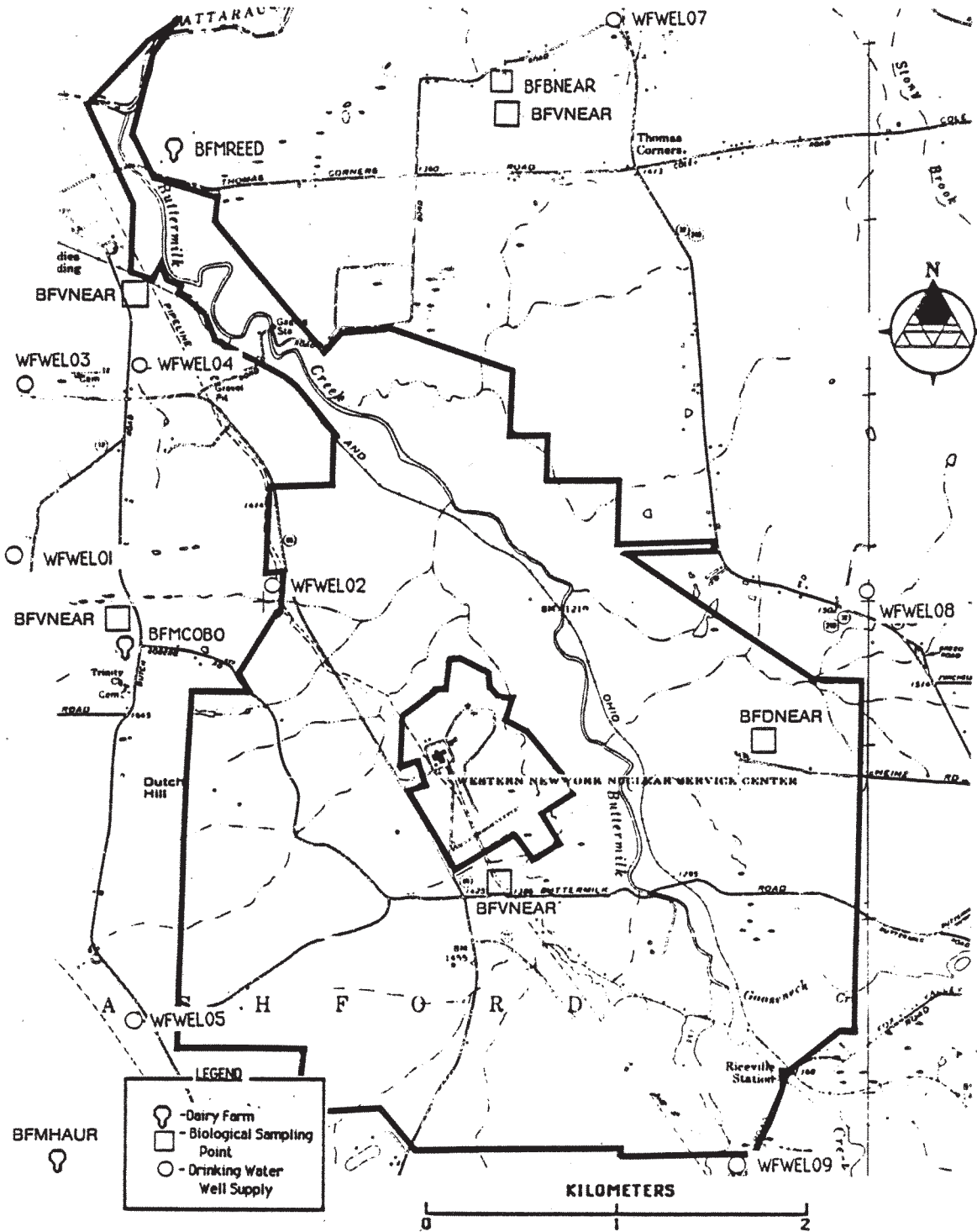


Figure A-4. Near-site Drinking Water and Biological Points - 1987.

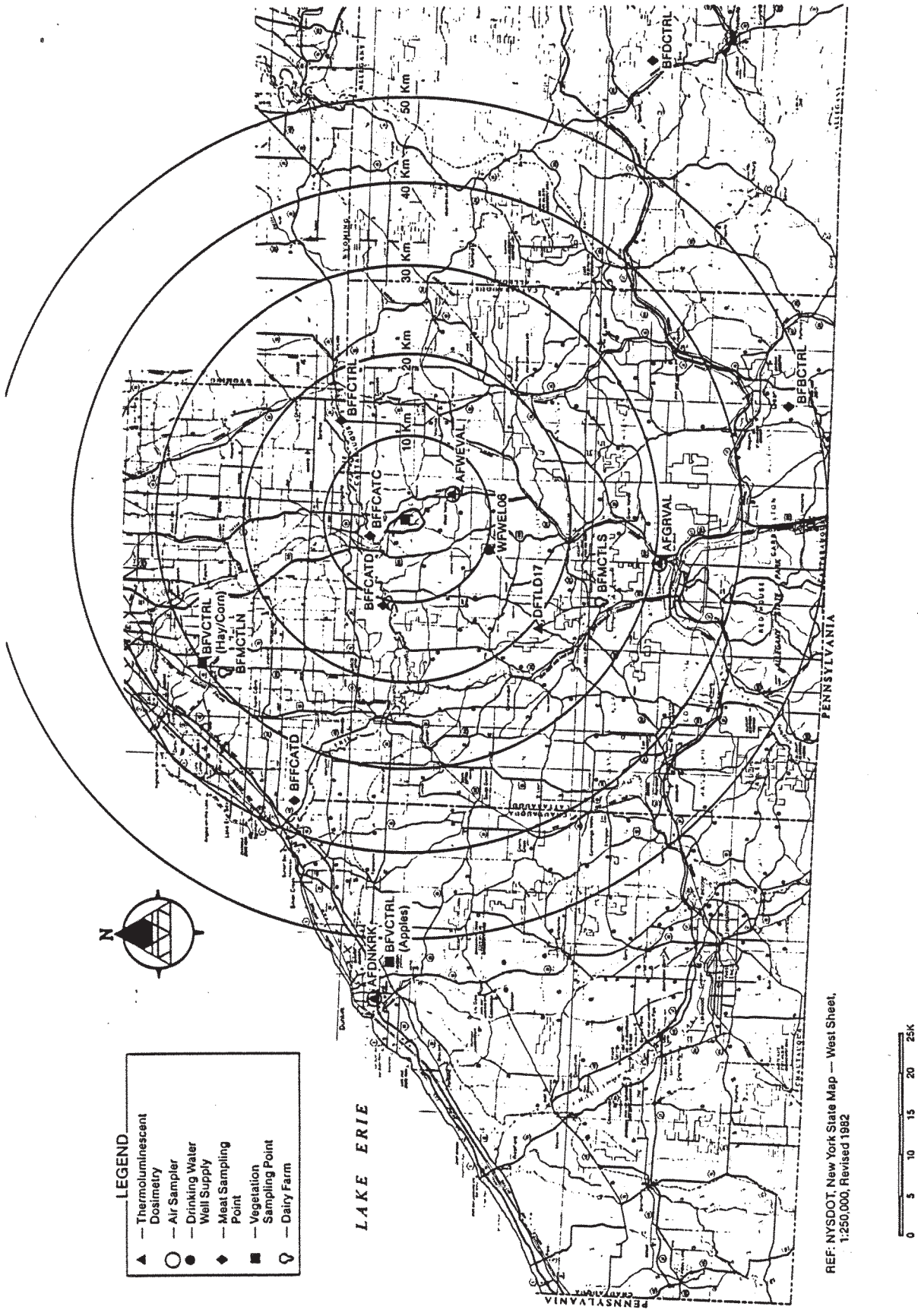


Figure A-5. Environmental Sampling Points More than 5 km from WWDP Site.