# 2. COMPLIANCE SUMMARY

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ANL-E is a government-owned, contractor-operated nonproduction facility that is subject to environmental statutes and regulations administered by the U.S. Environmental Protection Agency (EPA), the Illinois Environmental Protection Agency (IEPA), the Illinois Department of Public Health (IDPH), U.S. Army Corps of Engineers (COE), and the State Fire Marshal, as well as to numerous DOE Orders and Executive Orders. A detailed listing of applicable regulations is contained in DOE Order 5400.1,[1] which establishes DOE's policy concerning environmental compliance. The status of ANL-E during 1999 with regard to these authorities is discussed in this chapter.

To ensure compliance with both the letter and spirit of these requirements, ANL-E has made a commitment to comply with all applicable environmental requirements, as described in the following policy statement:

> It is the policy of Argonne National Laboratory that its activities will be conducted in such a manner that worker and public safety, including protection of the environment, is given the highest priority. The Laboratory will comply with all applicable federal and state environmental laws, regulations, and orders.

## 2.1. Clean Air Act

The Clean Air Act (CAA) is a federal statute that specifies National Ambient Air Quality Standards, sets emission limits for air pollutants, and determines emission limits and operating criteria for certain hazardous air pollutants. The program for compliance with the requirements is implemented by individual states through a State Implementation Plan (SIP) that describes how that state will ensure compliance with the air quality standards for stationary sources.

A number of major changes to the CAA were made with the passage of the Clean Air Act Amendments of 1990. Under Title V of the Clean Air Act Amendments of 1990, ANL-E was required to submit a Clean Air Act Permit Program (CAAPP) application to the IEPA for a sitewide, federally enforceable operating permit to cover emissions of all regulated air pollutants at the facility. This permit will supersede the state air pollution control permits that are currently in effect. All facilities designated as major emission sources for regulated air pollutants are subject to this requirement. ANL-E meets the definition of a major source because of potential emissions of oxides of nitrogen in excess of 22.68 t/yr (25 tons/yr) and sulfur dioxide in excess of 90.72 t/yr (100 tons/yr) at the Building 108 Central Heating Plant (see Table 2.4).

Facilities subject to Title V must characterize emissions of all regulated air pollutants, not only those that qualify them as major sources. In addition to oxides of nitrogen and sulfur dioxide, ANL-E also must evaluate emissions of carbon monoxide, particulates, volatile organic compounds (VOCs), hazardous air pollutants (a list of 188 chemicals, including radionuclides), and

ozone-depleting substances. The air pollution control permit program requires that facilities pay annual fees on the basis of the total amount of regulated air pollutants (except carbon monoxide) they will be allowed to emit.

When the IEPA acknowledges a CAAPP application as timely and complete, the applicant receives an application shield and is in compliance with the CAA. The ANL-E CAAPP application was submitted to the IEPA on September 19, 1995; the IEPA issued a Notice of Completeness on October 26, 1995. The Notice of Completeness also means that current air pollution control permits under which operations remain unchanged do not need to be renewed. Exceptions to this are the open burning permits used for fire training and ecological management, which must be renewed annually.

On September 22, 1999, ANL-E submitted a fifth revision to the CAAPP application. This update incorporated all changes since the prior revision, which was submitted in January 1998. On December 10, 1999, the IEPA notified ANL-E that review of the revised CAAPP application had commenced. It is anticipated that a CAAPP permit will be issued during 2000.

The ANL-E site contains a large number of air emission point sources. The vast majority are laboratory ventilation systems that are exempt from state permitting requirements, except for those systems emitting radionuclides. By the end of 1999, a total of 35 active air pollution control permits were in place, covering all known emission points. Section 2.16 contains a list (Table 2.13) of all of the air pollution control permits at ANL-E. No IEPA air emissions inspection was conducted in 1999.

### 2.1.1. National Emission Standards for Hazardous Air Pollutants

The National Emission Standards for Hazardous Air Pollutants (NESHAP) constitute a body of federal regulations that set forth emission limits and other requirements, such as monitoring, record keeping, and operational and reporting requirements, for activities generating emissions of certain hazardous air pollutants. The only standards affecting ANL-E operations are those for asbestos and radionuclides. By the end of 1999, the IEPA had issued a total of 26 air pollution control permits to ANL-E for NESHAP sources. In 1999, two new NESHAP operating permits were issued for the Building 301 Hot Cell Decontamination and Decommissioning (D&D) project and the Building 306 Chemical Photooxidation Unit.

#### 2.1.1.1. Asbestos Emissions

Many buildings on the ANL-E site contain large amounts of asbestos-containing material (ACM) such as thermal system insulation around pipes and tanks, spray-applied surfacing material for fireproofing, floor tile, and asbestos-cement (Transite) panels. This material is removed as

necessary during renovations or maintenance of equipment and facilities. The removal and disposal of this material are governed by the asbestos NESHAP.

ANL-E maintains an asbestos abatement program designed to ensure compliance with these and other regulatory requirements. In general, ACM is removed from buildings either by specially trained ANL-E crews (for small-scale, short-duration projects) or by outside contractors (for large-scale insulation removal projects). All removal work is performed in accordance with both NESHAP and Occupational Safety and Health Administration requirements governing worker safety at ACM removal sites.

Approximately 170 $m^3$ (6,000 $ft^3$) of ACM was removed from ANL-E buildings during 1999. The 95 small removal projects that were completed generated 48 $m^3$ (1,694 $ft^3$) of ACM waste; the remaining 119 $m^3$ (4,193 $ft^3$) generated resulted from large removal projects. Table 2.1 provides asbestos abatement information for the large removal projects. The IEPA was notified during December 1999 that no more than 100 $m^3$ (3,500 $ft^3$) of ACM waste will be generated from small-scale projects during 2000.

A separate portion of the asbestos removal standards contains requirements for disposing of ACM. Off-site shipments are to be accompanied by completed shipping manifests. Asbestos disposal information is provided in Table 2.2. Until closure of the ANL-E landfill in September 1992, asbestos from small-scale projects was disposed of on site in a designated area of the landfill.

#### 2.1.1.2. Radionuclide Emissions

The NESHAP standard for radionuclide emissions from DOE facilities (40 CFR Part 61, Subpart H) establishes the emission limits for the release of radionuclides other than radon to the air and the requirements for monitoring, reporting, and record keeping. A number of emission points at ANL-E are subject to these requirements. These points include ventilation systems for hot cell facilities for storage and handling of radioactive materials (Buildings 205 and 212), ventilation systems for particle accelerators (Building 375, IPNS facility, and the Building 411 APS linac), and several ventilation systems associated with the Building 350 NBL. In addition, many ventilation systems and fume hoods are used occasionally for processing small quantities of radioactive materials.

The amount of radioactive material released to the atmosphere from ANL-E emission sources is extremely small. The maximum off-site dose to a member of the general public for 1999 was 0.0043 mrem, which, excluding radon-220, is 0.04% of the 10 mrem/yr EPA standard. Section 4.6.1 contains a more detailed discussion of these emission points and compliance with the standard.

**TABLE 2.1**

Large-Scale Asbestos Abatement Projects: IEPA Notification, 1999

| Completion Date | Asbestos Abatement Contractor | Notification Quantity (ft) | Notification Quantity ($ft^2$) | Material | Building | Disposal Quantity ($ft^3$) | Landfill |
|---|---|---|---|---|---|---|---|
| January 25 | Champion Environmental Services | NA[a] | 3,600 | Transite panels | 207 | 350 | Streator[b] |
| April 22[c] | Holian Asbestos Removal Corporation | NA | 2,500 | Transite panels | 108 | 918 | Streator |
| May 12 | Insulco Asbestos Management | NA | 1,165 | Transite panels | 377 | 270 | Streator |
| May 18 | ACS, Inc. | 339 | NA | Pipe insulation | 829 | 63 | Streator |
| May 27[c] | ANL-E PFS-Waste Management | NA | 280 | Floor tile | 350 | 24 | Streator |
| September 17 | National Surface Cleaning | 2,200 | 775 | Pipe and duct insulation | 330 | 1,170 | Streator |
| September 29[c] | ACS, Inc. | NA | 1,100 | Transite panels | 211 | 48 | Streator |
| November 29 | Insul-Control, Inc. | 38 | 310 | Pipe insulation transite panels | 363 | 1,350 | Streator |
| | | | | | Total | 4,193 | |

[a] NA = not applicable.

[b] Streator Area Landfill, Streator, IL.

[c] Courtesy notification, nonfriable material removed intact.

## 2.1.2. Conventional Air Pollutants

The ANL-E site contains a number of sources of conventional air pollutants, including a steam plant; gasoline, methanol/gasoline blend, and ethanol/gasoline blend fuel-dispensing facilities; two alkali metal reaction booths; bulk chemical tanks; a dust collection system; the engine test facility; a medical equipment sterilization unit; and fire training activities. Table 2.13 gives the emission sources that have been granted operating air pollution control permits by the IEPA. During 1999, one new air pollution control permit was issued by the IEPA (see Table 2.13) for VOC emissions from the Building 306 chemical photooxidation unit.

The operating air pollution control permit for the steam plant requires continuous opacity and $SO_2$ monitoring of the smoke stack from Boiler No. 5, the only one of the five boilers equipped to burn coal. The permit requires submission of a quarterly report listing any exceedances beyond emission limits for this boiler [30% opacity averaged over 6 minutes and 0.82 kg (1.8 lb) of sulfur dioxide per million Btu averaged over a 1-hour period]. Table 2.3 gives the hours that Boiler No. 5 operated on low-sulfur coal during 1999, as well as the amount of low-sulfur coal burned. There was one opacity exceedance in 1999. On April 15, 1999, a 12-minute opacity exceedance occurred due to torn filters and a leaking gasket in the steam plant baghouse. The boiler was shut down until all repairs were completed. The IEPA was notified by phone, as required, on April 19, 1999; a written followup report was transmitted on April 30, 1999.

**TABLE 2.2**

Disposal of Asbestos-Containing Materials, 1999

| Project Size | Landfill | Quantity ($ft^3$) |
|---|---|---|
| Small-scale | Streator[a] | 1,694 |
| Large-scale | Streator | 4,301[b] |
| | Total | 5,995 |

[a] Streator Area Landfill, Streator, IL.

[b] Includes 108 $ft^3$ of asbestos-containing floor tile from Building 207. This material was removed in 1998 but not disposed of until 1999. This was not included in Table 2.1.

The ANL-E 800 Area Landfill, which was closed in 1992, was not subject to air pollution control permitting requirements during its operation. It is not subject to 40 CFR Part 60, Subpart WWW (Standards of Performance for Municipal Solid Waste Landfills), or Subpart Cc (Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills), because it does not meet the definition of a municipal solid waste landfill. Because closed landfills are sources of emissions, in 1999, the EPA Landfill Gas Emissions Model (LandGEM)[4] was used to determine levels of methane and Nonmethane Organic Compounds (NMOC) for inclusion in the ANL-E CAAPP application and emissions inventory. For 1999, the model calculated methane emissions of approximately 59 t/yr (64.9 tons/yr) and NMOC emissions (from analysis of samples from gas monitoring wells) of approximately 0.02 t/yr (0.02 ton/yr). On the basis of the timing of initial refuse placement and closure of the landfill, the model predicts that methane emissions will decline over time.

Landfill gas monitoring is conducted quarterly at the 800 Area Landfill via the 12 gas wells placed into the waste area and the 10 gas wells at the perimeter of the 800 Area Landfill. The gas monitoring in the waste area determines the levels of methane, carbon dioxide, nitrogen, and oxygen generated by the landfill. The perimeter gas wells are monitored to determine whether or not methane is migrating from the landfill. Results indicate that methane is being generated; however, no migration of this compound has been noted.

Fuel-dispensing facilities include a commercial service station and the Building 46 Grounds and Transportation facility. Except for methanol and ethanol vapors from alternate fuel usage, these facilities have VOC emissions typical of any commercial gasoline service station. Pursuant to *Illinois Administrative Code*, Title 35, Part 254 (35 IAC Part 254), ANL-E submits an emissions summary to the IEPA each May 1 for the previous year. The summary for 1999 is presented in Table 2.4.

**TABLE 2.3**

Boiler No. 5 Operation, 1999

| Month | Operated (hours) | Low-Sulfur Coal Burned (tons) |
|---|---|---|
| January | 253.5 | 689.8 |
| February | 620.0 | 1,773.3 |
| March | 445.5 | 1,128.6 |
| April | 68.0 | 131.2 |
| May | 0 | 0 |
| June | 0 | 0 |
| July | 0 | 0 |
| August | 0 | 0 |
| September | 0 | 0 |
| October | 0 | 0 |
| November | 0 | 0 |
| December | 198.0 | 564.7 |
| Total | 1,585.0 | 4,287.6 |

### 2.1.3. Clean Fuel Fleet Program

As mandated under the CAA and 35 IAC Part 241, the first annual Clean Fuel Fleet report was submitted timely to the IEPA on October 27, 1999 (September 1, 1998 – August 31, 1999), for ANL-E vehicle acquisitions for Model Year (MY) 1999. Sixteen light-duty vehicles were reported, with nonexempt vehicles exceeding the compliance requirements of at least 30% being EPA clean fuel certified. Two exempt heavy-duty vehicles also were reported. An application was submitted to the IEPA Clean Fuel Fleet credit program for overcompliance in MY 1999 in the light-duty vehicle category. September 1, 1999, marked the beginning of MY 2000; certified light-duty acquisition requirements increased from 30 to 50% for the model year (heavy-duty vehicle acquisitions remain at 50%).

## 2.2. Clean Water Act

The Clean Water Act (CWA) was established in 1977 as a major amendment to the Federal Water Pollution Control Act of 1972 and was modified substantially by the Water Quality Act of 1987. Section 101 of the CWA provides for the restoration and maintenance of water quality in all waters throughout the country, with the ultimate goal of “fishable and swimmable” water quality. The act established the National Pollutant Discharge Elimination System (NPDES) permitting system, which is the regulatory mechanism designed to achieve this goal. The authority to implement the NPDES program has been delegated to those states, including Illinois, that have developed a program substantially the same and at least as stringent as the federal NPDES program.

## TABLE 2.4

1999 Annual Emissions Report: Emissions Summary

| Building No. and Source | CO[a] | $NO_x$ | Particulate | $SO_2$ | VOM | Lead |
|---|---|---|---|---|---|---|
| 46 Ethanol/Gasoline | 0 | 0 | 0 | 0 | 14.6 | 0 |
| 46 Methanol/Gasoline | 0 | 0 | 0 | 0 | 0 | 0 |
| 46 10,000 Gal Gasoline | 0 | 0 | 0 | 0 | 320 | 0 |
| 108 Boiler 1 | 1,701 | 75,766 | 785 | 471 | 366 | 0 |
| 108 Boiler 2 | 5 | 15,771 | 151 | 121 | 70 | 0 |
| 108 Boiler 3 | 46 | 45,249 | 456 | 639 | 213 | 0 |
| 108 Boiler 4 | 82 | 17,334 | 175 | 47 | 82 | 0 |
| 108 Boiler 5 (coal-fired) | 21,388 | 115,584 | 324 | 93,041 | 151 | 0 |
| 108 Boiler 5 (gas-fired) | 2,589 | 7,904 | 112 | 40 | 112 | 0 |
| 108 Sulfuric Acid Tank[b] | 0 | 0 | -[c] | 0 | 0 | 0 |
| 200 M-Wing Hot Cells (R) | 0 | 0 | 0 | 0 | 0 | 0 |
| 201 Ethylene Oxide Sterilizer | 0 | 0 | 0 | 0 | 5.3 | 0 |
| 206 Alkali Reaction Booth (R)[d] | 0 | 0 | <1 | 0 | 0 | 0 |
| 212 Alpha Gamma Hot Cell (R) | 0 | 0 | 0 | 0 | 0 | 0 |
| 212 Building Exhausts[b] | 0 | 0 | - | 0 | 0 | 0 |
| 300 8,000 Gal Gasoline | 0 | 0 | 0 | 0 | 1,148 | 0 |
| 300 10,000 Gal Gasoline | 0 | 0 | 0 | 0 | 286 | 0 |
| 300 6,000 Gal Gasoline | 0 | 0 | 0 | 0 | 331 | 0 |
| 303 Mixed Waste Storage (R) | 0 | 0 | 0 | 0 | 0 | 0 |
| 306 Building Vents (R) | 0 | 0 | 0 | 0 | 0 | 0 |
| 306 Bulking Sheds | 0 | 0 | 0 | 0 | 429 | 0 |
| 306 Vial Crusher/Chemical Photooxidation Unit | 0 | 0 | 0 | 0 | 0 | 0 |
| 308 Alkali Reaction Booth[b] | 0 | 0 | - | 0 | 0 | 0 |
| 315 MACE Project (R) | 100 | 0 | <1 | 0 | 0 | 0 |
| 317 Lead Brick Cleaning (R) | 0 | 0 | 0 | 0 | 0 | <1 |
| 330 CP-5 D&D Project (R) | 0 | 0 | 0 | 0 | 0 | 0 |
| 331 Rad Waste Storage (R) | 0 | 0 | 0 | 0 | 0 | 0 |
| 350 NBL Pu/U Hoods (R) | 0 | 0 | 0 | 0 | 0 | 0 |
| 363 Central Shop Dust Collector[b] | 0 | 0 | - | 0 | 0 | 0 |
| 366 Grieve Oven[b] | 0 | 0 | - | 0 | 0 | 0 |
| 368 Woodshop Dust Collector[b] | 0 | 0 | - | 0 | 0 | 0 |
| 369 Salt Cake/Recov Elec. Plant[b] | 0 | 0 | 0 | 0 | 0 | 0 |
| 370 Alkali Reaction Booth[b] | 0 | 0 | - | 0 | 0 | 0 |
| 375 Intense Pulsed Neutron Source (R) | 0 | 0 | 0 | 0 | 0 | 0 |
| 400 APS Facility (R) | 0 | 69 | 0 | 0 | 0 | 0 |
| 400 APS Generator Caterpillar (1 unit) | 513 | 2,675 | 95 | 221 | 72 | 0 |
| 400 APS Generator Kohler (2 units) | 1,526 | 2,059 | 80 | 423 | 73 | 0 |
| 595 Lab Wastewater Plant (R) | 0 | 0 | 0 | 0 | 85.8 | 0 |
| Lab Rad Hoods (R) | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB Tank Cleanout | 0 | 0 | 0 | 0 | 0 | 0 |
| Torch Cut Lead-Based Paint[b] | 0 | 0 | - | 0 | 0 | 0 |
| Transportation Research Facility | 1,341 | 497 | 34.5 | 32.6 | 99.6 | 0 |
| WMO Portable HEPA - (4) (R) | 0 | 0 | <1 | 0 | 0 | 0 |
| Total (lb/yr) | 29,289 | 282,908 | 2,212 | 95,034 | 3,858 | 0 |
| Total (ton/yr) | 14.6447 | 141.4539 | 1.1062 | 47.5170 | 1.9288 | 0 |
| CAAPP Limit (ton/yr) - Typical | 159.58 | 692.30 | 39.18 | 463.82 | 14.77 | 0.11 |
| CAAPP Limit (ton/yr) - Alt 1 | 243.60 | 1,697.10 | 48.02 | 802.03 | 18.77 | 0.11 |
| CAAPP Limit (ton/yr) - Alt 2 | 307.60 | 1,405.10 | 68.02 | 991.20 | 18.77 | 0.11 |

[a] Abbreviations: CO = carbon monoxide, HEPA = high-efficiency particulate air filter, MACE = melt attack and coolability experiment, $NO_x$ = oxides of nitrogen, PCB = polychlorinated biphenyl, Pu = plutonium, $SO_x$ = sulfur dioxide, U = uranium, and VOM = volatile organic material.

[b] These sources have been designated as insignificant in the CAAPP application.

[c] A hyphen indicates no emissions for this parameter.

[d] (R) = radionuclide source regulated by NESHAP (40 CFR Part 61 Subpart H).

The 1987 amendments to the CWA significantly changed the thrust of regulatory activities. Greater emphasis is placed on monitoring and control of toxic constituents in wastewater, the permitting of outfalls composed entirely of storm water, and the imposition of regulations governing sewage sludge disposal. These changes in the NPDES program resulted in much stricter discharge limits and greatly expanded the number of chemical constituents monitored in the effluent.

### 2.2.1. Liquid Effluent Discharge Permit

The NPDES permitting process administered by the IEPA is the primary tool for enforcing the requirements of the NPDES program. Before wastewater can be discharged to any receiving stream, each wastewater discharge point (outfall) must be characterized and described in a permit application. The IEPA then issues a permit that, for each outfall, contains numeric limits or monitoring frequencies on certain pollutants likely to be present and sets forth a number of additional specific and general requirements, including sampling and analysis schedules and reporting and record keeping requirements. NPDES permits are effective for five years and must be renewed by the submission of a permit application at least 180 days prior to the expiration of the existing permit. Wastewater discharge at ANL-E is permitted by NPDES Permit No. IL 0034592. This permit was renewed during 1994 (effective October 30, 1994), was modified in 1995 (effective August 24, 1995), and was to expire on July 1, 1999. An application to renew the existing permit was submitted timely to the IEPA on December 28, 1998. The IEPA did not act to review the permit renewal application in 1999, and, therefore, as provided for in the IEPA regulations, ANL-E continues to operate under the existing permit until the IEPA issues a renewal permit.

Wastewater at ANL-E is generated by a number of activities and consists of sanitary wastewater (from restrooms, cafeteria sinks and sinks in certain buildings and laboratories, and steam boiler blowdown), laboratory wastewater (from laboratory sinks and floor drains in most buildings), and storm water. Water softener regenerant from boiler house activities is discharged to the DuPage County sewer system. Cooling water and cooling tower blowdown are discharged into storm water ditches that are monitored as part of the NPDES permit. The current permit authorizes the release of wastewater from 40 separate outfalls, most of which discharge directly or indirectly into Sawmill Creek. Two of the outfalls are internal sampling points that combine to form the main wastewater outfall, Outfall 001. Table 2.5 lists these outfalls; Figure 2.1 shows their locations.

#### 2.2.1.1. Compliance with NPDES Permit

Wastewater is processed at ANL-E in two independent treatment systems, the sanitary system and the laboratory system. The sanitary wastewater collection and treatment system collects wastewater from sanitation facilities, the cafeteria, office buildings, and other portions of the site that do not contain radioactive or hazardous materials. This wastewater is treated in a biological

**TABLE 2.5**

Characterization of NPDES Outfalls at ANL-E, 1999

| Outfall | Description | Average Flow[a] |
|---|---|---|
| 001A | Sanitary Treatment Plant | 0.40 |
| 001B | Laboratory Treatment Plant | 0.39 |
| 001 | Combined Outfall | 0.79 |
| 003A | Swimming Pool | 0.0 |
| 003B | 300 Area (Condensate) | 0.028 |
| 003C | Building 205 Footing Tile Drainage | 0.016 |
| 003D&E | Steam Trench Drainage (Condensate) | 0.008/0.004 |
| 003F | Building 201 Fire Pond Overflow Storm Water | 0.005 |
| 003G | North Building 201 Storm Sewer (Condensate) | 0.041 |
| 003H | Building 212 Cooling Tower Blowdown | 0.013 |
| 003I | Buildings 200 and 211 Cooling Tower Blowdown | 0.020 |
| 003J | Building 213 and Building 213 Parking Lot Storm Water | 0.007 |
| 004 | Building 203 Cooling Tower and Building 221 Footing Drainage and Storm Water | 0.020 |
| 005A | Westgate Road Storm Water | Storm Water Only |
| 005B | 800 Area East Storm Water | Storm Water Only |
| 005C | Building 200 West | 0.005 |
| 005D | Storm Water | Storm Water Only |
| 005E | Building 203 West Footing Drainage and Condensate | 0.039 |
| 006 | Cooling Tower Blowdown and Storm Water | 0.053 |
| 007 | Domestic Cooling Water for Compressor and Storm Water | 0.008 |
| 008 | Transportation and Grounds Storm Water | 0.005 |
| 010 | Coal Pile Runoff Emergency Overflow | Storm Water Only |
| 101 | North Fence Line Marsh Storm Discharge | Storm Water Only |
| 102 | 100 Area Storm Water Discharge | Storm Water Only |
| 103 | Southeast 100 Area Storm Water | Storm Water Only |
| 104 | Northern East Area Storm Water Discharge | Storm Water Only |
| 105A&B | Building 40 Storm Water Discharge | Storm Water Only |
| 106A&B | Southern East Area Storm Water Discharge | Storm Water Only |
| 108 | Eastern 300 Area Storm Water and Cooling Water | 0.051 |
| 110 | Shooting Range Storm Water Discharge | Storm Water Only |
| 111 | 319 Landfill and Northeast 317 Area | Storm Water Only |
| 112A&B | Southern and Western 317 Area | Storm Water Only |
| 113 | Southern and Eastern 800 Area Landfill Storm Water Runoff | 0.017 |
| 114 | Northern and Western 800 Area Landfill Storm Water Runoff | 0.013 |
| 115 | 314, 315, and 316 Cooling Water, Eastern and Southern APS Area | 0.006 |
| 116 | Water Treatment Plant and Storm Water | 0.013 |

[a] Flow is measured in million gallons per day, except for outfalls with storm water only.

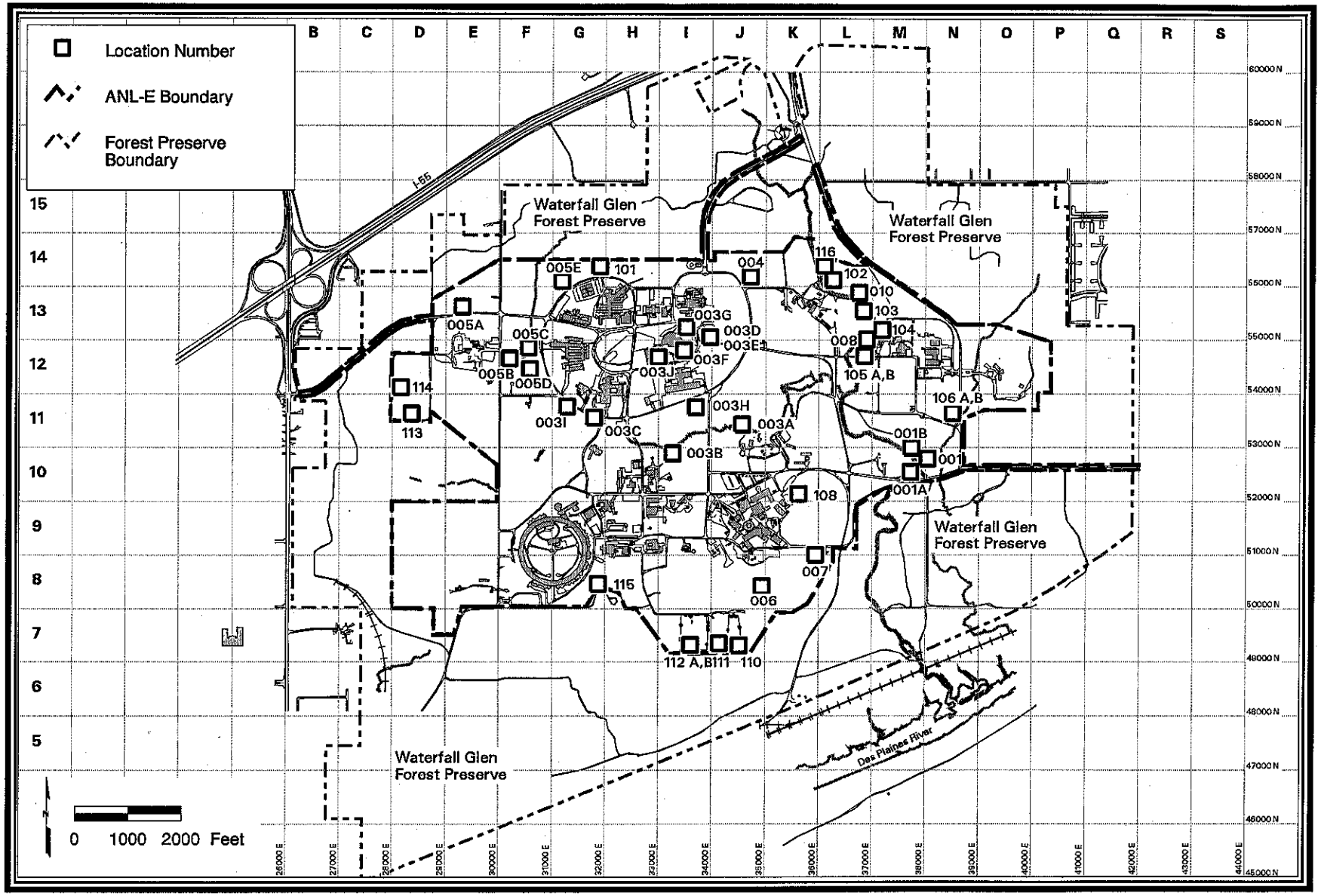


**Figure 2.1** NPDES Permit Locations

wastewater treatment system consisting of primary clarifiers, trickling filters, final clarifiers, and slow sand filters. Wastewater generated by research-related activities, such as the use of laboratories and experimental equipment, flows to a series of retention tanks located in each building and subsequently discharges to the laboratory wastewater sewer after radiological analysis. Treatment in the laboratory wastewater treatment plant (WTP) consists primarily of aeration, solids-contactor clarification, and pH adjustment. Additional steps can be added, as necessary, including powder-activated carbon addition for organic removal, alum addition, and polymer addition or adjustment, if analysis demonstrates that any of these are required.

Figure 2.2 shows the two wastewater treatment systems, which are located adjacent to each other. The volume of wastewater discharged from these facilities in 1999 averaged 1.51 million L/day (0.40 million gal/day) for the sanitary wastewater and 1.48 million L/day (0.39 million gal/day) for the laboratory process wastewater.

Results of the routine monitoring required by the NPDES permit are submitted monthly to the IEPA in a Discharge Monitoring Report (DMR). As required by the permit, any exceedance of permit limits or conditions is reported by telephone to the IEPA within 24 hours, and a written explanation of the exceedance is submitted with each DMR. During 1999, there were eight exceedances of NPDES permit limits out of approximately 1,600 measurements. Total dissolved solids (TDS) and total suspended solids (TSS) permit limits at Outfalls 001 and 006, respectively, are the more persistent exceedances. The TSS limit was exceeded three times at Outfall 006 in July, August, and November. These exceedances probably were caused by summer algae growth, sediment runoff from an upstream construction project, and cooling tower drainage, respectively. The four exceedances of the TDS limit at Outfall 001 were due to road salt associated with snowmelt. A break in a chiller water line caused an unpermitted discharge at Outfall 003I in July.

Figure 2.3 presents the data for the total number of each type of exceedance over the past 10 years. In general, the total number of exceedances per year has declined steadily. The exception is 1995, when the number of exceedances increased. This increase can be attributed to the renewal of the NPDES Permit, effective October 30, 1994, which placed more restrictive limits on ANL-E discharges and increased the number of analyses required each year by approximately 600. The more restrictive limits for copper, TDS, and ammonia nitrogen resulted in a substantial increase in the number of exceedances during 1995, prior to issuance of the modified permit. The permit modification gave ANL-E a provisional variance from the existing limits for ammonia nitrogen, copper, and TDS and included a compliance schedule to bring these discharges under their respective limits. ANL-E met the compliance schedule through the upgrade of the sanitary and laboratory wastewater treatment facilities and the incorporation of Lake Michigan water as the ANL-E source water. ANL-E achieved compliance with the required discharge permit limits by July 1, 1998.

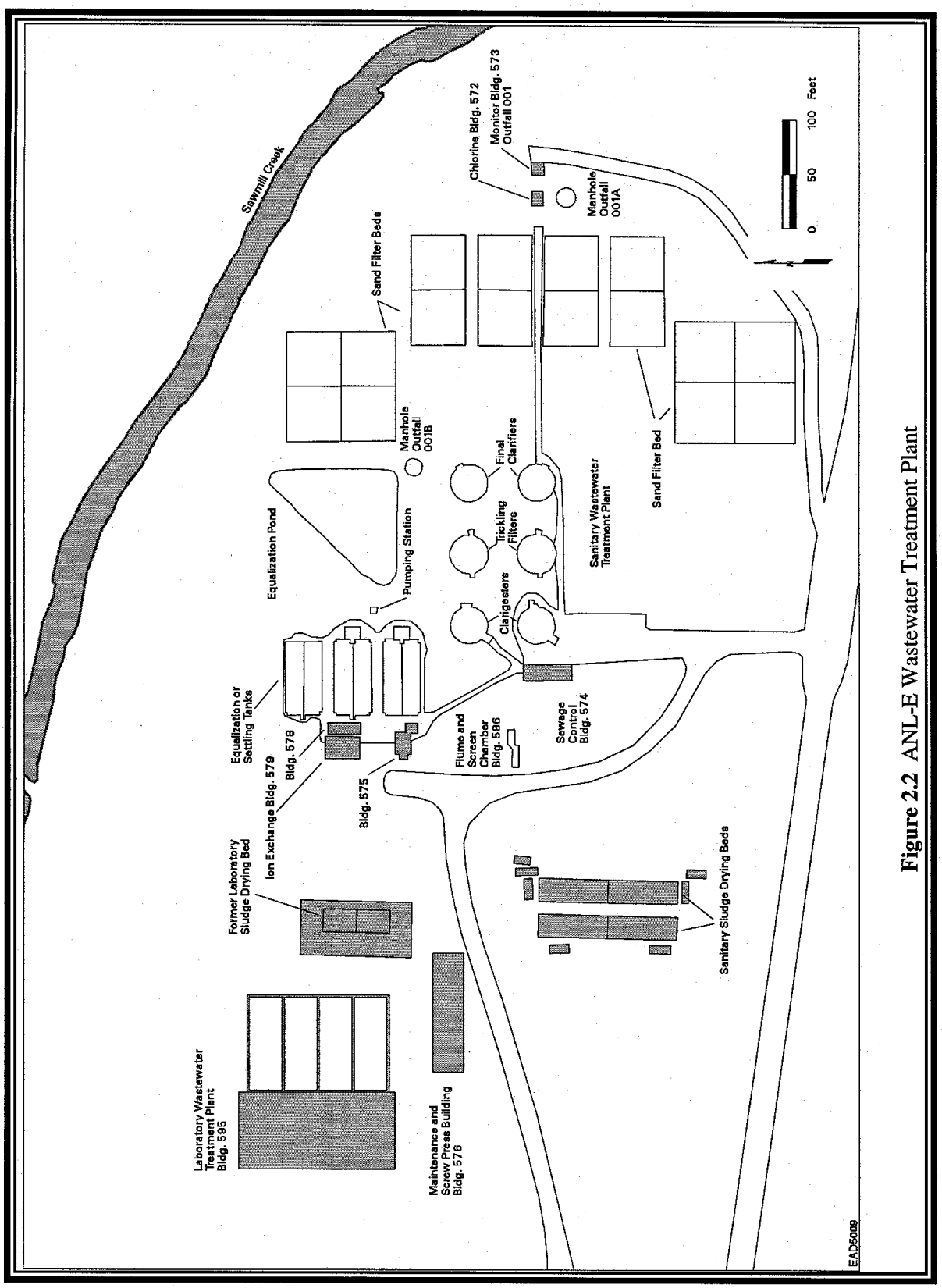


**Figure 2.2** ANL-E Wastewater Treatment Plant

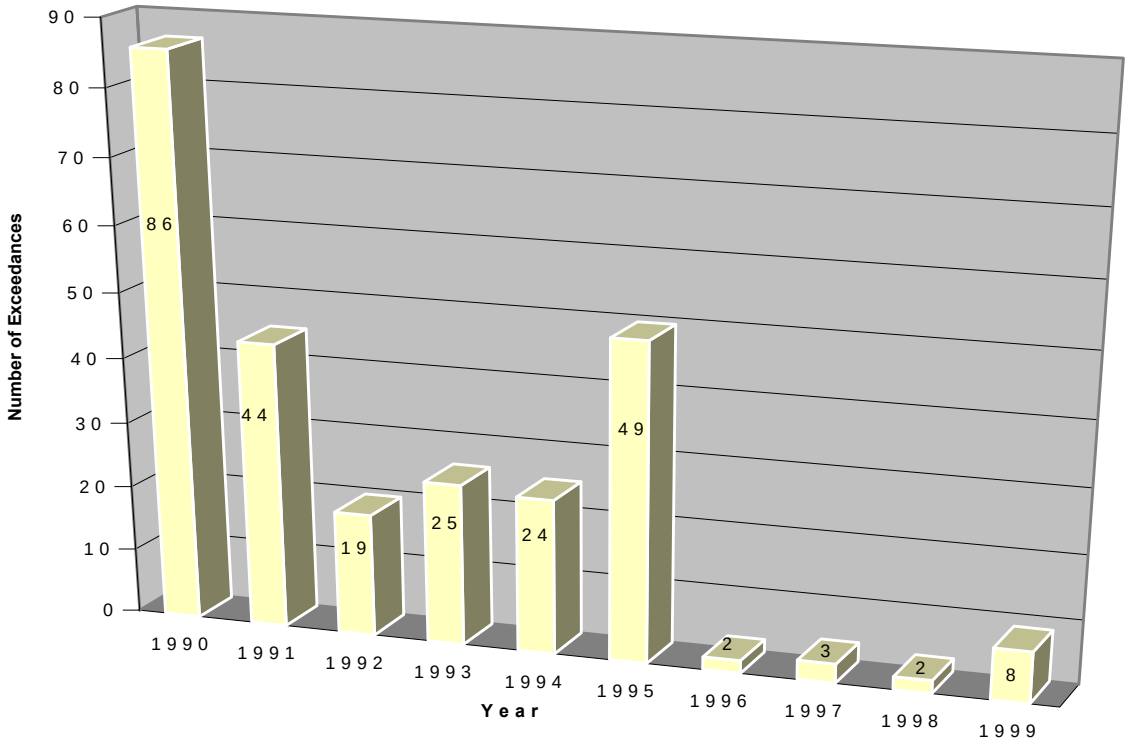


**Figure 2.3** Total Number of NPDES Exceedances, 1990 to 1999

### 2.2.1.2. Priority Pollutant Analysis and Biological Toxicity Testing

The current permit requires semiannual testing of Outfall 001B, the laboratory WTP outfall, for all the priority pollutants — 124 metals and organic compounds identified by the IEPA as being of particular concern. During 1999, this sampling was conducted in June and December. Organic compound concentrations were very low. Chloroform (3 µg/L and 2 µg/L) was detected in both the June and December samples as was bromodichloromethane (1 µg/L and 1 µg/L) and dibromochloromethane (2 µg/L and 1 µg/L). Bromoform (5 µg/L) and methylene chloride (1 µg/L) were noted in the June sample. It is suspected that the sources of chloroform, dibromochloromethane, bromoform, and bromodichloromethane are the result of the contact of chlorinated water with organic chemicals and residues from cooling tower biocide treatment chemicals. The presence of methylene chloride is most likely a result of the discharge of small amounts of chemicals from various research and support operations. All semivolatile concentrations were below the detection limits. Low concentrations of copper (0.019 mg/L), cadmium (0.0003 mg/L), and zinc (0.149 mg/L) were detected. These findings are discussed further in Chapter 5.

In addition to the priority pollutant analysis, the permit requires annual biological toxicity testing of the combined effluent stream, Outfall 001. This testing was conducted June 23 through June 27, 1999. The data indicate that the effluent was not acutely toxic to either the fathead minnow or the water flea. Data from the past six years suggest that cessation of chlorination of ANL-E effluent can be correlated with a beneficial effect on aquatic life in the receiving streams.

Special Condition No. 9 of the NPDES permit requires annual aquatic toxicity testing of Outfalls 003H, 003I, 003J, 004, 006, and 115 during the months of July and August. The samples were collected July 26 – 30, 1999, and August 24 – 28, 1999. In addition, a special set of samples was collected from Outfall 115 from September 27, 1999, to October 1, 1999, to evaluate operational changes instituted at the cooling tower in Building 315.

A review of the data indicates that Outfalls 003I, 003J, 004, and 006 exhibited no toxicity for either the water flea or the fathead minnow. This is generally consistent with the historical data, except for an occasional isolated instance of toxicity. Outfall 003H, which had previously been in complete compliance, showed some toxicity in the July 1999 test. Before the August 1999 test, the biocide-addition procedures at the Building 212 cooling towers, which discharge to Outfall 003H, were reviewed with the operators and adjustments were instituted. The August 1999 test results for Outfall 003H showed no toxicity.

The Building 315 cooling tower discharge to Outfall 115 has exhibited recurring acute toxicity from discharges over the past two years. The water flea appears to be particularly suspectable. This tower historically has used a batch addition of biocide pellets. After the July 1999 testing, discussions with the biocide vendor resulted in the installation of a bromine-based liquid biocide using an automated dispensing system. However, the system may not have been in place in sufficient time to affect the August 1999 sampling results. Consequently, another set of samples was collected from Outfall 115 at the end of September to evaluate the effect of the new biocide system. It appears that changing to a different biocide improved the toxicity to the fathead minnow, but did not improve toxicity to the water flea. As a result of the continued toxicity to the water flea, the discharge was removed from the storm drain and rerouted to the laboratory WTP.

### 2.2.2. Storm Water Regulations

In November 1990, the EPA promulgated new regulations governing the permitting and discharge of storm water from industrial sites. The ANL-E site contains a large number of small-scale operations that are considered industrial activities by these regulations and, thus, are subject to these requirements. An extensive storm water characterization program was initiated in 1991, and a storm water permit application identifying 15 storm water outfalls was submitted to the IEPA in 1992.

The NPDES permit issued in October 1994 includes these 15 outfalls. In addition, the permit breaks up the watersheds for prior Outfalls 003 and 005 into smaller components and requires that their corresponding point-source discharges be analyzed and characterized for submission of a permit application, including characterization of industrial wastewater and storm water runoff discharged from these point sources. Since 1994, three additional storm water outfall locations within the subdivided watersheds were identified as requiring characterization. Wastewater and storm water characterizations were completed in 1996 for the 18 outfalls identified within the subdivided watersheds. The characterization data include quantitative data; flow measurements; analyses for certain specified pollutants; and dates, durations, and precipitation volumes for monitored storm events. The resulting permit application was completed and submitted to the IEPA on September 18, 1996. The IEPA is expected to include these 18 outfalls in the NPDES permit when it is reissued.

The NPDES permit contains two special conditions requiring Storm Water Pollution Prevention Plans (SWPPPs) for the APS construction site (Special Condition No. 12) and for the remainder of the ANL-E site (Special Condition No. 11). Both of these plans were completed by the mandated date, May 1, 1995, which was 180 days after the effective date of the permit. These special conditions also require implementation of the plans by 365 days after the effective date of the permit; this was accomplished on November 1, 1995.

The same special conditions require ANL-E to inspect and report annually on the effectiveness of the sitewide SWPPP. In 1999, the annual inspection was completed on October 29, 1999. The report was submitted to the IEPA on December 30, 1999. Changes to the plan will be required throughout the life of the permit, including any reissue or extension of the permit.

### 2.2.3. NPDES Inspections and Audits

The IEPA Maywood Regional Office conducted an NPDES Compliance Evaluation Inspection at ANL-E on May 19 and 20, 1999. The IEPA inspection noted an issue associated with the laboratory procedure relating to biological oxygen demand ($BOD_5$) holding times. In lieu of a report, the IEPA requested that ANL-E complete a quality assurance review of the laboratory procedure. This was accomplished in July 1999 and resulted in changing the laboratory analysis sheets so that holding times may be ascertained readily.

### 2.2.4. General Effluent and Stream Quality Standards

In addition to specific NPDES permit conditions, ANL-E discharges are required to comply with general effluent limits contained in 35 IAC Part 304. Also, wastewater discharges must be of sufficient quality to ensure that Sawmill Creek complies with IEPA General Use Water Quality

Standards found in 35 IAC Part 302, Subpart B. Chapter 5 of this report, which presents the results of the routine environmental monitoring program, also describes the general effluent limits and water quality standards applicable to the outfalls and discusses compliance with these standards.

### 2.2.5. Spill Prevention Control and Countermeasures Plan

ANL-E maintains a Spill Prevention Control and Countermeasures plan as required by the CWA and the EPA regulations in 40 CFR Part 112. This plan describes the actions to be taken in case of oil or oil product releases to navigable waters of the United States. Persons with specific duties and responsibilities in such situations are identified, as are reporting and record keeping requirements mandated by the regulations. Effective use of this plan is ensured by regular training. This plan is updated every three years and was updated last in 1998. No reportable spills occurred during 1999.

## 2.3. Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) and its implementing regulations are intended to ensure that facilities that treat, store, or dispose of hazardous waste do so in a way that protects human health and the environment. The Hazardous and Solid Waste Amendments of 1984 (HSWA) created a set of restrictions on land disposal of hazardous waste. In addition, the HSWA also require that releases of hazardous waste or hazardous constituents from any Solid Waste Management Unit (SWMU) at a RCRA-permitted facility be remediated, regardless of when the waste was placed in the unit or whether the unit originally was intended as a waste disposal unit. The RCRA program includes regulations governing management of underground storage tanks (USTs) containing hazardous materials or petroleum products. The IEPA has been authorized to administer most aspects of the RCRA program in Illinois. The IEPA issued a RCRA Part B Permit to ANL-E and DOE on September 30, 1997. The permit became effective on November 4, 1997.

In February 1999, the IEPA issued a permit modification. The modification allows ANL-E to receive for storage the ash that results from treatment of the ANL-E mixed waste sent to the Waste Experimental Reduction Facility in Idaho, if that ash otherwise cannot be disposed of following treatment.

### 2.3.1. Hazardous Waste Treatment and Disposal

The nature of the research activities conducted at ANL-E results in the generation of small quantities of a large number of waste chemicals. Many of these materials are classified as hazardous waste under RCRA. A small amount of these wastes also exhibits radioactivity, thereby making them

"mixed waste." The hazardous component of mixed waste is subject to RCRA regulation by the IEPA, while the radioactive component is subject to DOE regulation under the Atomic Energy Act of 1954 (AEA). ANL-E has 25 Hazardous Waste Management Units consisting of 17 container storage units, 4 miscellaneous treatment units, 1 tank storage unit, and 3 tank chemical treatment units. Table 2.6 provides descriptions of all of the units. No RCRA closures were conducted in 1999. Figure 2.4 shows the locations of the major hazardous and nonhazardous waste treatment, storage, and disposal areas at ANL-E.

ANL-E prepares an annual Hazardous Waste Report. The report is submitted to the IEPA by March 1 of each year and describes the activity of the previous year. It is a summation of all RCRA waste activities, including generation, storage, treatment, and disposal. Hazardous and mixed wastes generated, treated, and stored during 1999 are described in Tables 2.7 and 2.8, respectively. ANL-E operates several RCRA-permitted storage and treatment facilities. These facilities, designed and operated in compliance with RCRA requirements, allow for accumulation and storage of waste pending off-site disposal. Off-site treatment and disposal take place at approved hazardous waste treatment and disposal facilities. Off-site treatment options for mixed waste are extremely limited.

Two ongoing treatability studies were conducted at ANL-E during 1999. A description of each study, as well as the amount of waste treated, follows.

The Neutralization of Corrosive Aqueous Waste Contaminated with Spent Solvents Study involves treating corrosive mixed waste by using a caustic solution. This study was conducted during August 1999; a total of 33 kg (73 lb) was treated. Once neutralized, the waste was solidified with sorbents approved by the DOE Waste Isolation Pilot Plant (WIPP). Treatment residues are stored in RCRA-permitted on-site units while arrangements are made to ship them to WIPP. Approximately 50 kg (110 lb) is expected to be treated during 2000.

The Amalgamation of Radioactive Elemental Mercury Waste Stream Study involves combining mercury with various powdered metals to determine the most suitable amalgamation method for ANL-E's mercury waste stream. Zinc, tin, and copper are being evaluated for the amalgams. This study was conducted in January 1999; a total of 4.5 kg (10 lb) was treated. Treatment residues are stored as low-level radioactive waste (LLW), while arrangements are made to ship them to the DOE Hanford site for disposal. Approximately 40 kg (88 lb) is expected to be treated during 2000.

### 2.3.2. Mixed Waste Handling

The hazardous component of mixed waste is governed by RCRA regulations, while the radioactive component is subject to regulation under the AEA as implemented by DOE Orders.

**TABLE 2.6**

Permitted Hazardous Waste Treatment and Storage Facilities, 1999

| Description | Location | Purpose |
|---|---|---|
| *Storage* | | |
| Concrete Storage Pad | 317 Area | Storage of solid radioactive waste and solid mixed waste (MW) in the form of steel-encased lead shielding containers and containerized solid MW. |
| Container Storage Area | Building 325C, East | Storage of liquid and solid bulk or lab-packed flammable and reactive hazardous waste and solid and liquid bulk PCBs and miscellaneous PCB units. |
| | Building 325C, West | Storage of bulk and lab-packed liquid flammable hazardous waste. |
| | Building 303 Mixed Waste Storage Facility | Storage of containers of ignitable, corrosive, oxidizing, reactive, and solid hazardous, radiological, or MW. |
| | Building 331 Radioactive Waste Storage Facility | Storage of containers of flammable, toxic, corrosive, and oxidizing hazardous, radiological, and MW. |
| Dry Mixed Waste Storage Area | Building 374A | Storage of solid MW and radioactively contaminated lead bricks. |
| Mixed Waste Container Storage | Building 329 | Storage of containers of bulk and lab-packed ignitable mixed waste or compatible waste. |
| Portable Storage Units (4) | Building 306 | Storage of hazardous, radiological, or MW (3 of 4 units). |
| | | Bulking operations to consolidate and reduce the volume of lab-packed waste in containers (1 of 4 units). |
| Tank Storage | Building 306 | Storage of corrosive and toxic mixed waste and radiological liquid wastes (4,000 gal; currently not used). |

**TABLE 2.6 (Cont.)**

| Description | Location | Purpose |
|---|---|---|
| Mixed Waste Storage | Building 306 - Storage Room A-142 | Storage of ignitable MW. |
| | Building 306 - Storage Room A-150 | Storage of solid and liquid MW. |
| | Building 306 - Storage Room C-131 | Storage of ignitable, corrosive, and reactive hazardous waste. |
| | Building 306 - Storage Room C-157 | Storage of corrosive and oxidizer MW. |
| | Building 306 - Storage Room D-001 | Storage of solid MW containing toxic metal constituents. |
| *Treatment* | | |
| Alkali Metal Passivation Booth | Building 206 | Destruction of water reactive alkali metals possibly contaminated with radionuclides. |
| Alkali Metal Passivation Booth | Building 308 | Destruction of water reactive alkali metals. |
| Chemical/Photooxidation Unit | Building 306 | Treatment of ignitable liquid MW containing organic contaminants. |
| Dry Ice Pellet Decontamination Unit | 317 Area | Treatment of solid MW having radionuclide and/or RCRA metal surface contamination. |
| Low-Level Waste (LLW) Neutralization/Precipitation System | Building 306 | Treatment of aqueous, corrosive LLW, some of which is contaminated with heavy metals. |
| Mixed Waste Immobilization/ Macroencapsulation Unit | Building 306 | Treatment of solid, semisolid, and organic liquid MW containing RCRA metals. |
| TRU Neutralization/ Precipitation Treatment Unit | Building 306 | Treatment of corrosive, aqueous MW-containing transuranic radionuclides and RCRA metals. |

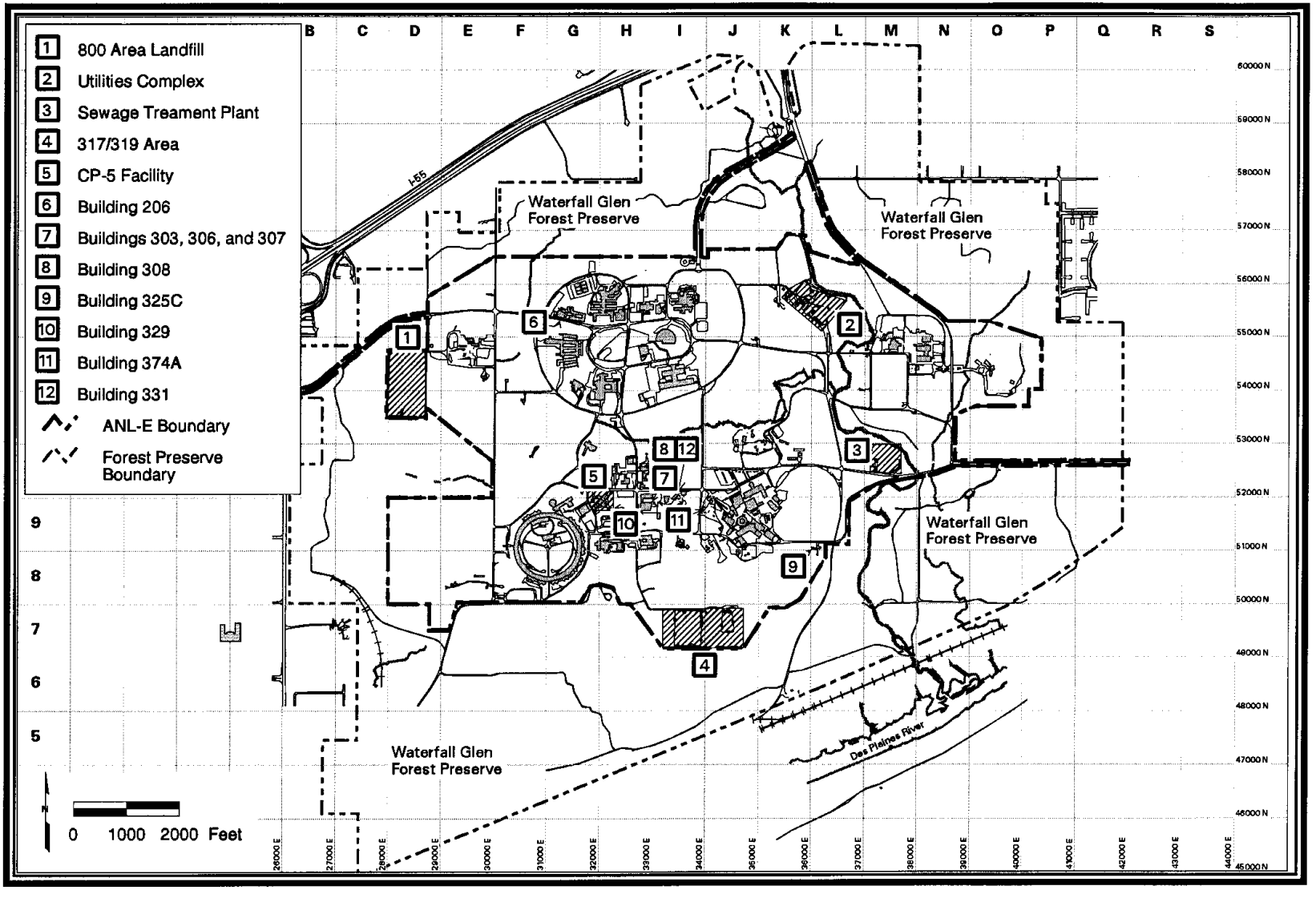


**Figure 2.4** Major Treatment, Storage, and/or Disposal Areas at ANL-E

**TABLE 2.7**

Hazardous Waste Generation, Treatment, Disposal, or Recycle, 1999

| Waste | Volume (gal) | Weight (lb) |
|---|---|---|
| *Generated and Disposed of or Recycled* | | |
| Aerosol cans | 510 | 1,828 |
| Alkali metals[a] | 1,910 | 24,647 |
| Alkali metals | 112 | 895 |
| Alkaline solutions with lead | 40 | 254 |
| Barium-containing wastes | 55 | 135 |
| Brake cleaner fluid[a] | 13 | 110 |
| Bulked laboratory solvents | 855 | 7,402 |
| Cadmium-contaminated debris | 55 | 110 |
| Carbon filter cartridges[a] | 1,000 | 16,200 |
| Compressed gases | 30 | 48 |
| Compressed gases[a] | 60 | 240 |
| Cutting oils with lead and solvents | 165 | 1,445 |
| Ethanol solutions with silver | 385 | 3,415 |
| Ethyl lactate waste solution | 110 | 989 |
| Hydrogen peroxide waste solution | 85 | 1,020 |
| Immersion cleaner fluid[a] | 31 | 248 |
| Labpacks of liquid chemicals | 2,071 | 16,567 |
| Labpacks of solid chemicals | 1,436 | 5,744 |
| Lactic acid waste solution | 110 | 1,100 |
| Lead acid batteries[a] | 720 | 14,400 |
| Lead-contaminated debris | 280 | 699 |
| Mercury-contaminated debris | 220 | 576 |
| Metal scrap containing cadmium and lead | 397 | 4,766 |
| Oil-based paint wastes | 140 | 1,046 |
| Oil-based paint wastes with lead | 85 | 599 |
| Petroleum distillates | 165 | 1,147 |
| Plating wastes containing lead, alkaline | 220 | 2,066 |
| Plating wastes containing lead, acid | 55 | 532 |
| Silver and chromium oxide waste | 30 | 84 |
| Sodium nitrate waste | 30 | 87 |
| Xylene and methyl ethyl ketone-contaminated debris | 30 | 50 |
| Waste oils with solvents | 1,290 | 9,387 |
| Waste acidic cleaning solution | 165 | 1,234 |

**TABLE 2.7 (Cont.)**

| Waste | Volume (gal) | Weight (lb) |
|---|---|---|
| *Generated and Disposed of or Recycled* | | |
| Water treatment chemicals | 110 | 884 |
| Zinc bromide solution with lead | 270 | 3,044 |
| *Treated* | | |
| Alkali metals (passivation) | 14 | 111 |
| *Universal Hazardous Waste* | | |
| Mercury-containing lamps[a] | | 20,651 |

[a] Recycled waste.

Accordingly, facilities storing or disposing of mixed waste must comply with both DOE requirements and RCRA permitting and facility standards. ANL-E generates several types of mixed waste, including acids, solvents, and sludges contaminated with radionuclides. The RCRA Part B Permit provides for on-site treatment in five new mixed waste treatment systems. These systems include neutralization of low-level and transuranic (TRU) corrosive aqueous wastes and the stabilization of sludge and soil. No off-site commercial treatment facility was used during 1999 to treat mixed waste.

### 2.3.3. Federal Facility Compliance Act Activities

The Federal Facility Compliance Act of 1992 (FFCA) amended RCRA to clarify the application of requirements and sanctions to federal facilities. The FFCA also requires that DOE prepare mixed waste treatment plans for DOE facilities that store or generate mixed waste. The Proposed Site Treatment Plan (PSTP) for mixed waste generated at ANL-E was submitted to the IEPA and the Illinois Department of Nuclear Safety (IDNS) in March 1995. Mixed waste at ANL-E has been managed in accordance with the PSTP as of October 1995. During 1999, ANL-E completed the treatment milestone for soil test samples. ANL-E's RCRA Part B Permit provides for on-site treatment of certain mixed waste as required by the PSTP.

**TABLE 2.8**

Mixed Waste Generation, Treatment, Storage, and Disposal, 1999

| Waste | Volume (gal) | Weight (lb) |
|---|---|---|
| *Generated* | | |
| Acidic solutions | 125 | 1,125 |
| Acidic solutions with heavy metals | 21 | 189 |
| Alkali metals | 0.5 | 4 |
| Aqueous solutions with heavy metals | 150 | 1,245 |
| Flammable liquids | 0.1 | 0.7 |
| Metal scrap with cadmium | 425 | 4,500 |
| MW debris with chromium | 55 | 500 |
| MW debris with heavy metals | 350 | 1,400 |
| MW debris with volatile organics | 20 | 80 |
| MW lead articles | 23,000 | 625,000 |
| MW sludge with heavy metals | 15 | 150 |
| MW soil with heavy metals | 20 | 184 |
| TRU acids with heavy metals | 2 | 18 |
| TRU lead articles | 5 | 150 |
| Uranyl nitrate | 11 | 60 |
| *Treated* | | |
| Acidic solutions with heavy metals (neutralized) | 95 | 855 |
| Acidic solutions (neutralized) | 100 | 900 |
| Aqueous solutions with halogenated solvents | 7.5 | 73 |
| Aqueous solutions with heavy metals (neutralized) | 150 | 125 |
| Elemental mercury (amalgamated) | 0.1 | 10 |

**TABLE 2.8 (Cont.)**

| Waste | Volume (gal) | Weight (lb) |
|---|---|---|
| *In Storage* | | |
| Acidic solutions | 85 | 765 |
| Acidic solutions with heavy metals | 352 | 3,175 |
| Alkali metals | 224 | 1,788 |
| Aqueous solutions with heavy metals | 18 | 149 |
| Aqueous solutions with organics | 7.5 | 72 |
| Cyanide solution | 11 | 92 |
| Flammable liquids | 178 | 1,245 |
| Metal scrap with cadmium | 3,951 | 42,000 |
| Metal scrap with heavy metals | 135 | 1,600 |
| MW debris with chromium | 58 | 575 |
| MW debris with heavy metals | 1,164 | 4,656 |
| MW debris with volatile organics | 14.1 | 604 |
| MW lead articles | 23,660 | 650,000 |
| MW sludges with heavy metals | 281 | 2,825 |
| MW soil with heavy metals | 115 | 1,025 |
| TRU acids | 92 | 828 |
| TRU cadmium | 130 | 1,600 |
| TRU lead | 160 | 4,800 |
| TRU sludge | 478 | 4,780 |
| Uranyl nitrate | 173 | 3,300 |
| *In Storage - Toxic Substances Control Act (TSCA)* | | |
| MW PCB sludge and debris | 18,710 | 152,325 |
| MW PCB articles | 5 | 6 |
| *Disposed of* | | |
| MW lead articles | 11,190 | 300,000 |

### 2.3.4. RCRA Inspections: Hazardous Waste

A RCRA Compliance Inspection was conducted by the EPA on July 8 and 9, 1999. No significant issues were identified.

### 2.3.5. Underground Storage Tanks

The ANL-E site currently contains 19 USTs, all of which are in compliance with UST regulations; 39 tanks have been removed over the last several years. Eight of the existing tanks are being used for storage of fuel oil for emergency generators. The on-site vehicle maintenance facilities use underground diesel, gasoline, and methanol/gasoline blend tanks. The ethanol/gasoline blend is stored in an aboveground tank. A UST Compliance Inspection was conducted by the EPA on January 21, 1999. No significant issues were identified. In February 1999, during the removal of UST No. 29 near Building 306, a leak from the UST was discovered. All required notifications and followup reports to state authorities were completed, as well as cleanup of the contaminated area.

### 2.3.6. Corrective Action for Solid Waste Management Units

As mentioned previously, the HSWA requires that any RCRA Part B Permit issued must include provisions for corrective action to address releases of hazardous constituents from any SWMU at the site, regardless of when waste was placed in the unit. Accordingly, the ANL-E Part B Permit issued in September 1997 contains procedures and requirements to govern the corrective action of such units. The Part B Permit identifies 49 SWMUs and 5 Areas of Concern (AOCs). In January 1999, the IEPA approved an ANL-E request for no further action for SWMU Nos. 159, 161, 162, and 163. In February 1999, the IEPA approved an ANL-E request for no further action for SWMU No. 693. The majority of the remaining sites are believed to contain little or no residual contamination; however, a number will undergo some type of corrective action. Prior to issuance of the permit, ANL-E had been working proactively and on a voluntary basis to characterize, investigate, and remediate its SWMUs, with emphasis on the 800 and 317 Areas. This remediation program is continuing under the authority of the Part B Permit. The process of conducting detailed characterization studies to determine whether hazardous materials have been released from these units was begun in 1989. Chapter 3 of this report contains a summary of the characterization and remediation activities currently underway at a number of the SWMUs in accordance with IEPA-approved corrective action work plans.

## 2.4. Solid Waste Disposal

In September 1992, ANL-E ceased operation of its sanitary landfill, which had begun operating in 1966. The original operating permit was issued by the IEPA in 1981 in accordance with 35 IAC Part 807. Supplemental permits addressing final elevations, a groundwater monitoring program, and closure/postclosure requirements, such as gas monitoring, were issued by the IEPA on April 24, 1992; September 15, 1992; January 11, 1995; November 20, 1997; August 25, 1998; and June 16, 1999. Ground Water Quality Standards of some routine indicator parameters have been consistently exceeded. To aid in the determination of the rate and extent of contamination, in 1999, additional groundwater monitoring wells were installed around the landfill. The groundwater monitoring program is discussed in detail in Section 6.3.

ANL-E generates a large volume and variety of nonhazardous special wastes. Some otherwise special waste, such as sanitary sewage sludge, is certified to the IEPA as "nonspecial waste" pursuant to IEPA regulations. Table 2.9 gives the nonhazardous special and nonspecial wastes generated and disposed of during 1999. All nonhazardous special and nonspecial wastes generated at ANL-E in 1999 were disposed of at permitted off-site special waste landfills. The IEPA began requiring annual nonhazardous special waste reporting in 1991. The report is submitted by February 1 of each year and describes the activity of the previous year. It is a summation of all manifested nonhazardous and PCB wastes.

## 2.5. National Environmental Policy Act

The National Environmental Policy Act of 1969 (NEPA) established a national environmental policy that promotes consideration of environmental factors in federal or federally sponsored projects. NEPA requires that the environmental impacts of proposed actions with potentially significant effects be considered in an Environmental Assessment (EA) or Environmental Impact Statement (EIS). DOE has promulgated regulations in 10 CFR Part 1021 that list classes of actions that ordinarily require those levels of documentation or that are categorically excluded from further NEPA review. No EISs were prepared during 1999. Two EA addendums, addressing the 319 Landfill Remediation-Drainage Reroute and the Boiler House SWMU Sampling and Remediation activities, respectively, were completed in 1999.

## 2.6. Safe Drinking Water Act

The Safe Drinking Water Act of 1974 (SDWA) established a program to ensure that public drinking water supplies are free of potentially harmful materials. This mandate is carried out through the institution of national drinking water quality standards, such as Maximum Contaminant Levels and Maximum Contaminant Level Goals, as well as through the imposition of wellhead protection

**TABLE 2.9**

Generation and Disposal or Recycling of Special and Nonspecial Waste, 1999

| Waste | Volume | Weight (lb) |
|---|---|---|
| *Nonhazardous Special* | | |
| Contaminated soil (Bldg. 108) | 448 $yd^3$ | 896,000 |
| Contaminated soil (Bldg. 306 UST) | 270 $yd^3$ | 540,000 |
| Contaminated soil (317 Area) | 10 $yd^3$ | 20,000 |
| Medical waste | 118 $yd^3$ | 609 |
| Nonhazardous liquid chemicals | 3,120 gal | 21,474 |
| Nonhazardous solid chemicals | 5,390 gal | 20,122 |
| Oily water[a] | 800 gal | 6,640 |
| Petroleum naptha[a] (parts washers) | 1,554 gal | 10,434 |
| Used oil[a] | 7,250 gal | 52,265 |
| *Certified Nonspecial* | | |
| Nonspecial fly ash[a] | 1,236 $yd^3$ | 1,236,163 |
| Nonspecial laboratory sewage sludge | 15 $yd^3$ | 30,000 |
| Nonspecial oily rags | 550 gal | 3,278 |
| Nonspecial sanitary sewage sludge | 34 $yd^3$ | 68,000 |
| Sanitary sewage sludge[a] | 20,000 gal | 180,000 |
| *Toxic Substances Control Act Special* | | |
| Asbestos | 252 $yd^3$ | 252,000 |
| PCBs | 1,275 gal | 9,423 |

[a] Recycled waste.

requirements, monitoring requirements, treatment standards, and regulation of underground injection activities. The regulations implementing the SDWA in 40 CFR Parts 141–143 establish Primary and Secondary National Drinking Water Regulations that set forth requirements to protect human health (primary standards) and provide aesthetically acceptable water (secondary standards).

### 2.6.1. Applicability to ANL-E

In January 1997, ANL-E incorporated Lake Michigan water as its domestic source water, thereby replacing the dolomite groundwater that formerly constituted its source of drinking water. The Lake Michigan water is purchased from the DuPage County Water Commission. As such, ANL-E is now a customer rather than a supplier of water. Consequently, on January 23, 1997, the DuPage County Health Department (DPCHD) notified DOE that the federal and state monitoring requirements applicable to a "non-transient, non-community" public water supply no longer are applicable. In addition, sampling, analysis, and reporting of the drinking water data to the DPCHD and the IDPH are no longer required. Nevertheless, ANL-E voluntarily provides to on-site personnel the Consumer Confidence Report on drinking water quality that ANL-E receives as a customer of the DuPage County Water Commission.

### 2.6.2. Water Supply Monitoring

During 1999, ANL-E continued an informational monitoring program at the previously used dolomite domestic wells; quarterly samples were analyzed for radionuclides and VOCs. No radionuclides or VOCs were detected.

## 2.7. Federal Insecticide, Fungicide, and Rodenticide Act

During 1999, all exterior pesticides and herbicides were applied by licensed contractors who provide the chemical used and who remove any unused portions. ANL-E ensures that the chemical is EPA-approved, that it is used properly, and that any residue is disposed of in accordance with applicable regulations. These ANL-E activities are carried out by oversight inspections and maintenance of records.

In addition, routine applications of pesticides are performed within buildings, as needed. Indoor pesticide applications are provided by IDPH-licensed contractors under the direction of Plant Facilities and Services (PFS)-Custodial Services and Marriott Management. The indoor applications involve EPA "Restricted Use" products. In 1999, approximately 16,480 L (4,337 gal) of commercial-grade herbicide and 555 L (146 gal) of pesticide were applied throughout the ANL-E site. Fertilizer with weed control is included in this quantity of herbicide.

## 2.8. Comprehensive Environmental Response, Compensation and Liability Act

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) addresses the cleanup of hazardous waste disposal sites and the response to hazardous substance spills. Under CERCLA, the EPA collects site data regarding sites subject to CERCLA action through generation of a Preliminary Assessment (PA) report, followed up by a Site Screening Investigation (SSI). Sites then are ranked, on the basis of the data collected, according to their potential for affecting human health or causing environmental damage. The sites with the highest rankings are placed on the National Priority List (NPL) and are subject to mandatory cleanup actions. No ANL-E sites are included in the NPL.

On December 21, 1999, the EPA published interim guidance redefining under CERCLA "federally permitted releases." This action may have a significant impact on ANL-E with respect to what types of air emissions will need to be reported under Section 101(10)(H) of CERCLA. The guidance provides an extremely restrictive definition of how CERCLA substances released to the air would be exempted from reporting as a federally permitted release. To date, the EPA has announced it would hold implementation of the guidance in abeyance until the guidance is revised, or until August 25, 2000, whichever comes first.

### 2.8.1. CERCLA Program at ANL-E

In early 1990, the EPA requested that DOE submit SSI reports for 6 of 13 ANL-E sites for which PA reports previously had been submitted. Upon further discussions between the EPA and DOE, one of the six sites was eliminated from consideration, and three adjacent units (317/319/East-Northeast [ENE]) were treated as a single site. As a result, three SSI reports were submitted to the EPA in January 1991. Table 2.10 lists the sites for which a PA report was submitted.

Inquiries into waste disposal practices during the 1950s and 1960s have identified a number of smaller waste disposal sites, some of which could contain hazardous materials. These sites are under investigation; however, their potential to affect groundwater is thought to be minimal.

### 2.8.2. CERCLA Remedial Actions

Remedial actions to clean up any release of hazardous materials from these sites could occur in a number of different ways. All but one of the CERCLA sites (see Table 2.10) are on the ANL-E site, and most are included as SWMUs in the RCRA Part B Permit. The RCRA Part B Permit, effective November 4, 1997, contains procedures and requirements that govern the corrective action of these sites. However, several of these SWMUs also contain radiological contamination that

**TABLE 2.10**

List of Inactive Waste Disposal Sites at ANL-E
Described in Various CERCLA Reports

| Site Name |
|---|
| *On Current ANL-E Property* |
| 319 Area Landfill and French Drain[a,b] |
| 800 Area Landfill and French Drain[a,b] |
| 810 Area Paint Shop |
| Compressed Gas Cylinder Disposal Area, 318 Area[a,b] |
| Decommissioned Reactor CP-5, Building 330[a,b] |
| French Drain, 317 Area[a,b] |
| Gasoline Spill, Gasoline Station |
| Landfill East-Northeast of the 319 Area[a,b] |
| Liquid Waste Treatment Facility, Building 34[b] |
| Mixed Waste Storage Vaults, 317 Area[a] |
| Shock Treatment Facility, 317 Area[a] |
| Wastewater Holding Basin, Sewage Treatment Plant[b] |
| *On Former ANL-E Property, Currently Waterfall Glen Forest Preserve* |
| Reactive Waste Disposal, Underwriters Pond |

[a] SSI report submitted to the EPA in 1991.

[b] RCRA SWMU.

is not regulated under RCRA. Therefore, the SWMUs that are both radiologically and chemically contaminated will be cleaned up under RCRA, as well as other authorities pertinent to radiological contamination, as appropriate.

### 2.8.3. Emergency Planning and Community Right to Know Act (Superfund Amendments and Reauthorization Act, Title III)

Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) amendments to CERCLA is the Emergency Planning and Community Right to Know Act (EPCRA), a free-standing provision. EPCRA requires providing federal, state, and local emergency planning

authorities information regarding the presence and storage of hazardous substances and their planned and unplanned environmental releases, including providing response to emergency situations involving hazardous materials. Under EPCRA, ANL-E may be required to submit reports pursuant to Sections 302, 304, 311, 312, and 313.

| | | |
|---|---|---|
| • EPCRA 302: | Planning Notification | Required |
| • EPCRA 304: | Extremely Hazardous Substances Release Notification | Required |
| • EPCRA 311-312: | Material Data Safety Sheet/Chemical Inventory | Required |
| • EPCRA 313: | Toxic Release Inventory (TRI) Reporting | Required |

Section 302 of SARA Title III requires notification to the State Emergency Response Commission when an extremely hazardous substance is present at a facility in excess of the threshold planning quantity.

Section 304 of SARA Title III requires that the Local Emergency Planning Committee (LEPC) and state emergency planning agencies be notified of accidental or unplanned releases of Section 302 hazardous substances to the environment. The procedures for notification are described in the Argonne Comprehensive Emergency Management Plan. No incidents occurred during 1999 that required notification of the LEPC and the Illinois Emergency Management Agency.

Under EPCRA Section 311, ANL-E is required to provide applicable emergency response agencies with Material Safety Data Sheets (MSDSs), or a list of MSDSs, for each hazardous chemical stored on site. In addition, pursuant to EPCRA Section 312, ANL-E is required to report certain information regarding inventories and the locations of hazardous chemicals to state and local emergency authorities upon request. Petroleum products need to be reported. However, chemicals used in research laboratories under the direct supervision of a technically qualified individual are exempt from reporting. This report was updated and provided to DOE on February 19, 1999. Table 2.11 lists the hazardous chemicals reported.

Section 313 of EPCRA requires facilities to prepare an annual report entitled “Toxic Chemical Release Inventory, Form R” if annual usage quantities of listed toxic chemicals exceed certain thresholds. ANL-E is not within the range of Standard Industrial Codes specified in the statute. ANL-E reports this information, however, because DOE, which is subject to Executive Order 12856 and participates in the EPA 33/50 program, directs ANL-E to do so. No report was filed in 1999 for 1998, because no listed chemicals exceeded reporting thresholds for that year. On the basis of information provided by the ANL-E Chemical Management System (CMS), it is not anticipated that a report will be filed in 2000 for 1999.

**TABLE 2.11**

ANL-E, SARA, Title III, Section 312, Chemical List, 1999

| | Physical Hazard | | | Health Hazard | |
|---|---|---|---|---|---|
| Compound | Fire | Pressure | Reactivity | Acute | Chronic |
| Aluminum sulfate | -[a] | - | - | X | - |
| Chlorodifluoromethane | - | - | - | - | X |
| Diesel fuel/heating oil | X | - | - | - | - |
| Gasoline | X | - | - | - | - |
| Lubricating oils | X | - | - | - | - |
| Methanol/gasoline | X | - | - | - | - |
| NALCO 356 amine corrosion inhibitor | X | - | - | X | - |
| Sulfuric acid | - | - | - | X | - |
| Trichlorofluoromethane | - | - | - | - | X |

[a] A hyphen indicates that the compound does not fall within the particular hazard class.

In October 1999, the EPA issued the final rule on the persistent bioaccumulative toxic (PBT) list developed under Section 313. The rule, which took effect on January 1, 2000, significantly reduces the Section 313 reporting threshold, from 25,000 lb/yr (manufacture or process) or 10,000 lb/yr (otherwise use), to 10 lb/yr or 100 lb/yr, depending upon the chemical or chemical class. Dioxins also were added to the Section 313 list, with a manufacturing reporting threshold of 0.1 g/yr. Furthermore, the *de minimis* exemption, which exempted reporting of listed chemicals in mixtures at less than 1% (0.1% in the case of carcinogens), was eliminated from the PBT list. This change in Section 313 reporting will have a significant impact on how ANL-E tracks PBT chemical usage on a sitewide basis; it may result in reporting on PBT chemicals for activities in 2000.

## 2.9. Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) was enacted to require chemical manufacturers and processors to develop adequate data on the health and environmental effects of their chemical substances. The EPA has promulgated regulations to implement the provisions of TSCA. These regulations are found in CFR Title 40, Protection of the Environment, Chapter I: Environmental Protection Agency, Subchapter R - Toxic Substances Control Act. These regulations provide specific authorizations and prohibitions on the manufacturing, processing, and distribution in commerce of designated chemicals. Of these specially regulated substances, only asbestos and PCBs are found at the ANL-E site. The ANL-E safety training program addresses asbestos handling. Suspect PCB-containing items are identified through the ANL-E PCB Item Inventory Program.

### 2.9.1. PCBs in Use at ANL-E

PCB items in use or in storage for reuse are tracked by the ANL-E PCB Item Inventory Program. All PCB items identified by the PCB Item Inventory Program have been labeled appropriately with a unique number for inventory and tracking purposes. These items are included in the ANL-E Annual PCB Report, which describes the location, quantity, manufacturer, and unique identification number for all PCBs on site. The PCBs in use at ANL-E are contained in capacitators and power supplies. In addition, Waste Management Operations (WMO) still receives PCB-contaminated equipment and oil from unknown sources. The regulations governing the use and disposal of PCBs can be found in 40 CFR Part 761.

### 2.9.2. Disposal of PCBs

Disposal of PCBs from ANL-E operations includes materials lab-packed and bulked and aggregated solids shipped off site through WMO. Table 2.9 gives the amount of PCBs and PCB-contaminated materials shipped by ANL-E during 1999.

### 2.9.3. Storage of Radioactive PCB-Contaminated Material

Contamination from historical PCB spills has resulted in the generation of sludge contaminated by both PCBs and low-level radioactivity from the building retention tanks and holding tanks at the laboratory WTP. Because a disposal option has not been available, it is stored for future disposal. A total of 71,096 L (18,710 gal) of PCB-contaminated sludge and debris is being kept in storage.

## 2.10. Endangered Species Act

The Endangered Species Act of 1973 (ESA) is designed to protect plant and animal resources from the adverse effects of development. Under the Act, the Secretaries of the Interior and Commerce are directed to establish programs to ensure the conservation of endangered or threatened species and the critical habitat of such species. The FWS has been delegated authority to implement the requirements of the ESA.

To comply with the ESA, federal agencies are required to assess the area of a proposed project to determine whether it contains any threatened or endangered species, or critical habitat of these species. If no such species or habitat are present, this fact is to be documented in a letter to the FWS. If such species or habitat are found to exist, the FWS is to be notified, and a series of

consultations and studies then will be carried out to determine the extent of impact and any special actions that must be taken to minimize this impact.

At ANL-E, the provisions of the ESA are implemented through the NEPA project review process. All proposed projects must provide a statement describing the potential impact to threatened or endangered species and critical habitat. This statement is included in the general Environmental Evaluation Notification Form. If the potential exists for an adverse impact, this impact will be assessed further and will be evaluated through the preparation of a more detailed NEPA document, such as an EA or EIS.

No federally listed threatened or endangered species are known to occur on the ANL-E site, and no critical habitat of federally listed species exists on the site. Three federally listed endangered species are known to inhabit the Waterfall Glen Forest Preserve that surrounds the ANL-E property, or to occur in the area otherwise.

The Hine's emerald dragonfly (*Somatochlora hineana*), federally and state listed as endangered, occurs in locations with calcareous seeps and wetlands along the Des Plaines River floodplain. Leafy prairie clover (*Dalea foliosa*), which is federally and state listed as endangered, is associated with dolomite prairie remnants of the Des Plaines River valley; two planted populations of this species occur in Waterfall Glen Forest Preserve. An unconfirmed capture of an Indiana bat (*Myotis sodalis*), which is federally and state listed as endangered, indicates that this species may occur in the area.

Additional state-listed species that occur in the area include the following:

- Endangered
  - Black-crowned night heron (*Nycticorax nycticorax*)
  - Great egret (*Casmerodius alba*)
  - Pied-billed grebe (*Podilymbus podiceps*)
  - Red-shouldered hawk (*Buteo lineatus*)
  - River otter (*Lutra canadensis*)
  - Rough marsh cress (*Rorippa islandica* var. *hispida*)
  - Slender sandwort (*Arenaria patula*)
  - White lady's slipper (*Cypripedium candidum*)

- Threatened
  - Early fen sedge (*Carex crawei*)
  - Kirtland's snake (*Clonophis kirtlandi*)
  - Marsh speedwell (*Veronica scutellata*)

Of these, rough marsh cress, Kirtland's snake, pied-billed grebe, great egret, black-crowned night heron, and red-shouldered hawk have been observed on ANL-E property. Impacts to these species also would be assessed during the NEPA process. No project at ANL-E has ever had to be stopped, delayed, or modified as a result of a potential impact to an endangered species. In February 1997, the FWS concluded that a groundwater remediation project in the 800 and 317/319 Areas most likely would not affect the hydrology of the breeding area of the Hine's emerald dragonfly *(Somatochlora hineana)*. To confirm that a seep in the surrounding Waterfall Glen Forest Preserve had not been contaminated by some other activity at the ANL-E site, or by a third party, the FWS requested that ANL-E take water quality and sediment samples from the seep, a potential breeding area for the Hine's emerald dragonfly. Samples collected in 1998 verified that the seep area was not contaminated.

## 2.11. National Historic Preservation Act

The National Historic Preservation Act (NHPA) requires federal agencies to assess the impact of proposed projects on historic or culturally important sites, structures, or objects within the sites of proposed projects. It further requires federal agencies to assess all sites, buildings, and objects on such sites to determine whether any qualify for inclusion in the NRHP. The Act also requires federal agencies to consult with the Illinois Historic Preservation Agency (IHPA) and the Advisory Council on Historic Preservation, as appropriate, when proposed actions would adversely affect properties that are eligible for listing on the NRHP.

The NHPA is implemented at ANL-E through the NEPA review process, as well as through the ANL-E digging permit process. All proposed actions must consider the potential impact to historic or culturally important artifacts and document this consideration on the Environmental Evaluation Notification Form. If the proposed site has not been surveyed for the presence of such artifacts, a cultural resources survey is conducted, and any artifacts found are documented and removed carefully. Prior to disturbing the soil, an ANL-E digging permit must be obtained from the PFS Division. This permit must be signed by an individual who is familiar with the location of archaeological sites at ANL-E to document the fact that no significant cultural resources will be affected. DOE consults with the IHPA and the Advisory Council on Historic Preservation, as appropriate, if proposed actions would adversely affect properties eligible for listing on the NRHP.

A draft Cultural Resources Management Plan (CRMP) was prepared in 1998 to fulfill DOE's responsibilities under the NHPA. This draft CRMP describes the management of cultural resources at ANL-E pursuant to the NHPA and identifies a strategy toward good faith stewardship of cultural resources. Management goals for cultural resources at ANL-E reflect current issues, interests, and problems identified through internal assessment. They include protecting and preserving significant resources, establishing outreach programs, and continuing the integrity of the Cultural Resource Program.

Cultural resources include both historic structures and archaeological sites. Much of the focus at ANL-E has been on evaluating archaeological sites, rather than structures. Phase I archaeological surveys have been completed for the entire ANL-E facility, and 46 archaeological sites have been recorded. Of these, 23 sites have been tested to determine eligibility for inclusion on the NRHP. Three of these 23 sites tested are potentially eligible for the NRHP. The other 23 recorded sites have not been evaluated formally to determine whether they are eligible for inclusion under the NRHP.

A sitewide inventory of all building structures is necessary to identify those buildings that may have housed activities of historic significance, such that the building potentially may be eligible for listing on the NRHP. This sitewide inventory of building structures was initiated in 1998. DOE has determined that four structures — Buildings 301, 315/316, 330, and 331 — are eligible for listing on the NRHP. The CP-5 reactor, Building 301,and the Argonne Thermal Source Reactor in Building 315/316 were documented.

## 2.12. Floodplain Management

Federal policy on managing floodplains is contained in Executive Order 11988 (May 24, 1977). In addition, 10 CFR Part 1022 describes DOE's implementation of this Executive Order. The Executive Order requires federal facilities to avoid, to the extent possible, adverse impacts associated with the occupancy and modifications of floodplains. To construct a project in a floodplain, DOE must demonstrate that there is no reasonable alternative to the floodplain location.

The ANL-E site is located approximately 46 m (150 ft) above the nearest large body of water (Des Plaines River) and, thus, is not subject to major flooding. A number of small areas associated with Sawmill Creek and other small streams or low-lying areas are subject to local flood conditions following extremely heavy precipitation. To ensure that these areas are not adversely affected, new facility construction is not permitted within these areas, unless there is no practical alternative. Any impacts to floodplains are fully assessed in a floodplain assessment, and, as appropriate, documented in the NEPA documents prepared for a proposed project.

In 1999, an electrical upgrade project involved crossing a creek bed. To accomplish the work, the duct bank was located under the creek bed; additional concrete was placed in the creek bed, which disrupted the normal water course. Initially, this action did not meet the requirements of the applicable COE Nationwide Permit. However, thereafter, corrective actions were taken to restore the intercourse to its original configuration, thereby fulfilling the terms of the Nationwide Permit.

## 2.13. Protection of Wetlands

Federal policy on wetland protection is contained in Executive Order 11990 (May 24, 1977). In addition, 10 CFR Part 1022 describes DOE's implementation of this Executive Order. This Order requires federal agencies to identify potential impacts to wetlands resulting from proposed activities and to minimize these impacts. Where impacts cannot be avoided, action must be taken to mitigate the damage by repairing the damage or replacing the wetlands with an equal or greater amount of a man-made wetland as much like the original wetland as possible. The goal of the current federal policy in the Clean Water Action Plan is to increase the amount of wetlands by 40,486 ha (100,00 acres) each year.

Because of its topography and the nature of the soil at ANL-E, the site contains a significant number of natural and man-made wetlands. These range from small storm water ditches overgrown with cattails to natural depressions, beaver ponds, and man-made ponds. Potential impacts to those areas from proposed actions are assessed in wetlands assessments and NEPA documentation as appropriate.

During 1993, an ANL-E sitewide wetlands delineation was completed. A survey was conducted to identify and delineate all jurisdictional wetlands present on site in accordance with the 1987 U.S. Army *Corps of Engineers Wetlands Delineation Manual.*[5] The results of the survey were delineated on a site map that indicates the aerial extent of all wetlands present at ANL-E down to 500 $m^2$ (1/8th acre). The findings were documented in an accompanying report that describes in detail the soil, vegetation, and hydrology of each wetland area delineated on the map. Thirty-five individual wetland areas were identified; their total area is approximately 18 ha (45 acres). The wetland areas also were digitized onto a computer-aided design file to provide ANL-E engineers with scale maps for planning and designing projects. This delineation also is useful for determining project impacts under NEPA review. The site wetlands map will be updated to reflect significant changes in wetland boundaries that may occur over time.

In February 1989, the COE issued a permit to DOE under Section 404 of the CWA addressing the construction of the APS facility at ANL-E. The permit was required because construction of the APS involved the filling of three small wetland areas, known as Wetlands A, B, and E, which totaled 0.7 ha (1.8 acres) in size. Issuance of the permit had been contingent upon approval of a mitigation plan submitted to the COE by DOE. The plan outlined procedures for the construction of a new wetland area, Wetland R, and also identified actions to be taken to avoid a fourth wetland, Wetland C, during APS construction activities.

The COE inspected Wetlands R and C on October 3, 1996, and on October 10, 1996, issued a cease and desist order alleging that the ANL-E project was in noncompliance with the COE permit. In response to the order, DOE submitted a management plan to the COE for Wetland R and committed to mitigating Wetland C.

In 1999, ANL-E prepared a report identifying mitigation alternatives for Wetland C. Two potential sites were selected as mitigation candidates. These sites will be investigated during 2000.

Acting on ANL-E's COE-approved management plan, several Wetland R management activities were conducted during 1999. A herbicide treatment to control weeds around the wetland was initiated in May 1999. To increase sunlight within the wetland area, cattails in the wetland were removed by treatment with herbicide. Rootstock and seed from natural prairies in the area were planted. In the fall, seeds were purchased, as well as collected on site, and the seeds were planted in the winter. Two burns of the wetland were planned, but could not be performed due to weather conditions. The wetland burn is a priority for spring 2000.

## 2.14. Wildlife Management and Related Monitoring

DOE manages the site white-tailed and fallow deer herds through an interagency agreement with the U.S. Department of Agriculture. Each species is managed to a target density of 20 deer/mi$^2$. DOE began the deer management program in 1995 to alleviate traffic safety hazards and ecological damage caused by extremely high deer densities. More than 600 deer were removed in the winter of 1995 – 1996, and more than 80 deer were removed the following winter. Smaller numbers of deer have been removed each year since 1997. DOE and the Forest Preserve District of DuPage County coordinate deer management efforts in order to preserve and enhance biodiversity at ANL-E and the surrounding Waterfall Glen Forest Preserve.

### 2.14.1. Deer Population Monitoring

The deer population is monitored frequently by spotlight survey to meet the requirements of Deer Population Control Permits and to aid in making deer management decisions. Forty-nine white-tailed deer were removed in November 1999 to achieve a target density of 20 deer/mi$^2$. No fallow deer were removed in 1999.

### 2.14.2. Deer Health Monitoring

The health of the white-tailed deer herd is evaluated by assessing the deer that are removed each year for mean live and dressed weights and the amounts of fat stored in various organs. The health of the white-tailed deer herd has been improving since the deer management program began in 1995.

### 2.14.3. Deer Tissue Monitoring

Samples taken from the muscles of deer are analyzed periodically for radionuclides to verify that deer meat donated to charity does not pose a radiological health hazard. Samples sent to the IDNS radiochemistry laboratory in December 1997 were analyzed for gamma-ray-emitting radionuclides and hydrogen-3. Naturally occurring potassium-40 was the only gamma-ray-emitting radionuclide identified above detection limits. Hydrogen-3 was not detected in any sample.

### 2.14.4. Vegetation Damage

Vegetation is monitored periodically to determine the effects of browsing by deer on woody vegetation. This monitoring is conducted to meet conditions of Deer Population Control Permits and to help make deer management decisions. Horizontal vegetation densities and tree species richness at ANL-E are compared with previous ANL-E data and with data from Herrick Lake Forest Preserve, which has had a lower density of deer than ANL-E. Data collected in 1993 and 1997 indicated very heavy or extremely heavy adverse effects on ANL-E vegetation. Data for 1999 show improved tree species richness.

## 2.15. Current Issues and Actions

The purpose of this section is to summarize the most important issues related to environmental protection encountered during 1999. Table 2.12 lists all air and water effluent exceedances reported during 1999. Ongoing remedial action work is described in Section 3.2. Exceedances of the Ground Water Quality Standards at the 800 Area Landfill Area are discussed in Chapter 6.

### 2.15.1. Clean Water Act - NPDES

The most significant ongoing issue encountered at ANL-E during 1999 involved wastewater discharges at some outfalls, which affects compliance with existing NPDES wastewater discharge permit requirements. ANL-E has not consistently been able to meet the permit limits for TDS at Outfall 001 and for TSS at Outfall 006. With regard to TDS exceedances, plans are underway to evaluate the use of road salt and the final disposition of boiler blowdown during the winter months. With regard to TSS exceedances, plans are also in progress to divert Building 377 cooling tower drainage to the sewage system and to upgrade the Outfall 006 discharge monitoring area to reduce erosion.

**TABLE 2.12**

Summary of 1999 Air and Water Effluent Exceedances

| Month | Location of Exceedance | Parameter | Assessment |
|---|---|---|---|
| January | 001 | TDS | Road salt associated with snowmelt. |
| February | 001 | TDS | Road salt associated with snowmelt. |
| March | 001 | TDS | Road salt associated with snowmelt. |
| March | 001 | TDS | Road salt associated with snowmelt. |
| April | Boiler No. 5 | Opacity | Torn bags and leaking gaskets. |
| July | 006 | TSS | Algae growth. |
| July | 003I | Unpermitted discharge | Break in chiller water line. |
| August | 006 | TSS | Sediment runoff from upstream construction. |
| November | 006 | TSS | Drainage of Building 377 cooling tower. |

### 2.15.2. Solid Waste Disposal

The IEPA-approved sanitary landfill groundwater monitoring program continues to indicate that the Ground Water Quality Standards of some routine indicator parameters are consistently being exceeded. Expansion of the groundwater monitoring well network during 1999 should aid in determining the rate and extent of any contamination. The groundwater monitoring program is discussed in detail in Section 6.3

### 2.15.3. Remedial Actions

Remediation of waste management units is an ongoing compliance issue. These activities are described in detail in Section 3.2.

## 2.16. Environmental Permits

Table 2.13 lists all the environmental permits in effect at the end of 1999. Other portions of this chapter discuss special requirements of these permits and compliance with those requirements. The monitoring results required by these permits are discussed in those sections, as well as in Chapters 5 and 6.

**TABLE 2.13**

ANL-E Environmental Permits in Effect December 31, 1999

| Type | Source | Building | Issued | Expiration Date[a] |
|---|---|---|---|---|
| Air | ALEX Alkali Metal Scrubber[b] | 370 | 12/05/91 | 12/03/96 |
| Air | Alkali Metal Reaction Booth[b] | 308 | 02/15/89 | 11/18/98 |
| Air | APS Emergency Generators (3) | 400 | 05/16/94 | 03/15/99 |
| Air | Argonne Service Station | 300 | 01/09/91 | 10/04/00 |
| Air | Boiler No. 5 Low $NO_x$ Gas Burner[c] | 108 | 06/21/96 | 12/28/98 |
| Air | Central Heating Plant | 108 | 12/28/93 | 12/28/98 |
| Air | Central Shops Dust Collector[b] | 363 | 03/12/91 | 01/08/01 |
| Air | Ethylene Oxide Sterilizer | 201 | 03/27/91 | 01/08/01 |
| Air | Gasoline Dispensing Facility[d] | 46 | 02/01/93 | 05/22/00 |
| Air | Grieve Oven[b,e] | 366 | 08/08/91 | 08/06/96 |
| Air | Hazardous Waste Storage Facility[e] | 307 | 05/24/95 | 04/26/00 |
| Air | Methanol/Gasoline Storage Tank | 46 | 09/24/91 | 09/23/96 |
| Air | Open-Burning Permit - Fire Dept.[b] | 333 | 01/22/98 | 04/16/99 |
| Air | Open Burning - Vegetation | Sitewide | 11/29/99 | 11/29/00 |
| Air | Paint Spray Booth[e,f] | 306 | 07/03/95 | 06/27/00 |
| Air | Salt Cake/Recovery Electrodialysis Plant | 369 | 08/10/98 | 08/10/03 |
| Air | Sulfuric Acid Storage Tank[b] | 108 | 01/17/91 | 12/01/99 |
| Air | Title V (CAAPP) | Sitewide | Pending | -[g] |
| Air | Torch Cutting (Welding) Fumes[b] | Sitewide | 07/20/95 | 07/20/00 |
| Air | Transportation Research Facility | 376 | 07/25/96 | 07/25/01 |
| Air | Wood Shop Dust Collector[b] | 368 | 12/16/93 | 10/17/96 |
| Air | Waste Bulking Sheds[b] | 306 | 06/14/94 | 07/25/96 |
| Hazardous Waste | RCRA Part B | Sitewide | 09/30/97 | 11/04/07 |
| Miscellaneous | Deer Population Control Permit | Sitewide | 11/15/99 | 02/12/00 |
| Miscellaneous | Nuisance Wildlife Control | Sitewide | 01/01/00 | 01/31/01 |
| NESHAP | Advanced Photon Source | 400 | 12/21/93 | 07/26/98 |
| NESHAP | Alkali Metal Reaction Booth | 206 | 06/09/93 | 06/09/97 |
| NESHAP | Alpha Gamma Hot Cell Facility | 212 | 03/25/91 | 08/09/00 |
| NESHAP | Building Exhausts[b,h] | 212 | 07/30/91 | 07/23/96 |
| NESHAP | Building Rehab - Phase 1[i] | 306 | 03/13/95 | 07/25/96 |
| NESHAP | Building Vents | 306 | 08/06/91 | 07/25/96 |
| NESHAP | Chemical Photooxid. Vial Crusher[j] | 306 | 01/06/99 | 01/06/04 |
| NESHAP | Continuous Wave Deuterium Demonstration[e] | 369 | 05/09/91 | 12/28/99 |

**TABLE 2.13 (Cont.)**

| Type | Source | Building | Issued | Expiration Date[a] |
|---|---|---|---|---|
| NESHAP | CP-5 D&D Project | 330 | 05/10/91 | 12/08/96 |
| NESHAP | Cyclotron[e] | 211 | 05/10/91 | 12/01/99 |
| NESHAP | D&D HEPA Filter System[e] | 317 | 05/10/94 | 05/10/99 |
| NESHAP | French Drain Soil Vapor Extraction | 317 Area | 05/08/97 | 05/08/02 |
| NESHAP | Hot Cell D&D Project | 301 | 01/05/99 | 01/05/04 |
| NESHAP | Intense Pulsed Neutron Source | 375 | 03/25/91 | 08/09/00 |
| NESHAP | Janus D&D Project[e] | 202 | 06/12/96 | 06/12/01 |
| NESHAP | Lab Wastewater Treatment Plant | 575 | 08/29/95 | 08/29/00 |
| NESHAP | Lead Brick Cleaning (carbon dioxide) | 200/317 | 06/20/95 | 06/19/00 |
| NESHAP | Melt Attack/Coolability Experiment | 315 | 03/22/96 | 03/22/01 |
| NESHAP | Mixed Waste Storage Facility | 303 | 05/18/95 | 04/26/00 |
| NESHAP | M-Wing Hot Cells | 200 | 03/25/91 | 08/09/00 |
| NESHAP | New Brunswick Lab Hoods | 350 | 04/25/91 | 04/19/96 |
| NESHAP | PCB Tank Cleanout[j] | Sitewide | 08/16/95 | 09/28/99 |
| NESHAP | Rad Hoods | Sitewide | 07/09/92 | 07/09/97 |
| NESHAP | Rad Waste Storage Facility | 331 | 05/18/95 | 04/26/00 |
| NESHAP | WMO HEPA Filter Systems (4) | Sitewide | 09/28/94 | 09/28/99 |
| NESHAP | WMO Portable HEPA Filters[k] | 306 | 06/04/97 | - |
| Solid Waste | Landfill | 800 Area | 03/31/82 | - |
| Solid Waste | Landfill | 800 Area | 03/30/89 | - |
| Solid Waste | Landfill | 800 Area | 04/12/89 | - |
| Solid Waste | Landfill Groundwater Assessment | 800 Area | 09/30/91 | - |
| Solid Waste | Landfill Leachate Characterization | 800 Area | 09/30/91 | - |
| Solid Waste | Landfill Leachate Test Wells | 800 Area | 08/31/90 | - |
| Solid Waste | Landfill Revised Closure Plan | 800 Area | 04/24/92[l] | - |
| Solid Waste | Landfill Supplemental Closure Plan | 800 Area | 09/15/92 | - |
| Solid Waste | Landfill Supplemental Permit Groundwater | 800 Area | 04/19/94 | - |
| Solid Waste | Landfill Supplemental Permit Groundwater | 800 Area | 01/11/95 | - |
| Solid Waste | Landfill Supplemental Permit Groundwater | 800 Area | 11/20/97 | - |
| Solid Waste | Landfill Supplemental Permit Groundwater | 800 Area | 08/25/98 | - |
| Solid Waste | Landfill Supplemental Permit Groundwater | 800 Area | 06/16/99 | - |
| Water | APS Wetland | 400 Area | 02/02/89 | - |
| Water | Landfill Wetlands | 800 Area | 05/20/81 | - |
| Water | Lime Sludge Application - Land Application | Sitewide | 10/30/98 | 10/31/02 |
| Water | NPDES Permitted Outfalls[m] | Sitewide | 10/31/94 | 07/01/99 |
| Water | NPDES Storm Water Outfalls[m] | Sitewide | 10/31/94 | 07/01/99 |

**TABLE 2.13 (Cont.)**

[a] The expiration dates on NESHAP and air pollution permits are no longer valid (except for open burning), since the Notice of Completeness for the CAAPP application was received (see Section 2.1).

[b] These units have been designated as insignificant sources in the ANL-E Title V permit application.

[c] Construction permit issued; operated under Central Heating Plant permit.

[d] Includes ethanol/gasoline tank.

[e] Inactive.

[f] Permit originally issued for Building 815.

[g] A hyphen indicates no expiration date.

[h] Plasma spray booth added to permit 05/27/94.

[i] Construction permit issued; operated under Building 306 permit.

[j] Vial Crusher originally issued under Building 306 permit.

[k] Construction permit issued; operated under WMO HEPA permit.

[l] Revised September 15, 1992, and October 22, 1992.

[m] Revised permit application under IEPA review.