3. ENVIRONMENTAL PROGRAM INFORMATION

3.1. Environmental Programs

DOE and ANL-E policies require that all operations be conducted in compliance with applicable environmental statutes, regulations, and standards, and that environmental obligations be carried out consistently across all operations and organizations. Protection of the environment and human health and safety are always given the highest priority. A number of programs and organizations exist at ANL-E to ensure compliance with these authorities and to monitor and minimize the impact of ANL-E operations on the environment.

The site remediation, environmental compliance, and environmental monitoring programs are within the Environment, Safety and Health (ESH) Division. The ANL-E Remedial Actions Project is responsible for achieving compliance with all applicable environmental authorities related to assessing and cleaning up releases of hazardous materials from inactive waste sites. The primary regulatory vehicle is the corrective action requirements specified in the RCRA Part B Permit. The environmental compliance and environmental monitoring programs are responsible for the actions conducted at ANL-E to ensure the safety of the public; protection of the environment; and compliance with applicable federal, state, and local environmental regulations and DOE orders.

3.2. Remedial Actions Progress in 1999

In 1999, ANL-E continued implementing its plan for accelerated remediation of waste management units. The current plan calls for completion of the planned remedial actions by the end of Fiscal Year (FY) 2003. The current plan for the ANL-E site is described in the document entitled *Environmental Restoration Program (EM-40) Baseline for Argonne National Laboratory-East.*[6] In early 1999, ANL-E completed the 1999 baseline document. This document describes in detail the activities required to complete the planned actions by the end of FY 2003.

Several significant remedial actions were completed in 1999. The most significant involved deployment of a state-of-the-art remediation technology to clean up soil and groundwater in the 317 Area French Drain. In the 1950s, spent solvents were poured into a gravel-filled trench (French drain) as a means of disposal. These solvents did not evaporate or degrade, as intended, but slowly were released to underlying soil and groundwater. To remove this accumulation of solvent, in 1997 and 1998, ANL-E deployed a process known as soil mixing with thermally enhanced soil vapor extraction. A specially designed soil auger assembly was used to break up and blend a column of soil while a stream of steam, hot air, and zero-valent iron was injected into the column. Some of the VOCs were stripped from the soil and captured in an off-gas treatment system, while others reacted with the iron particles and were decomposed. This process was successful in removing about 80% of the source of soil and groundwater contamination in the 317 French Drain area. However, a significant volume of contaminated groundwater and some untreated soils were left in place.

The remaining contamination is being treated with a newly developed remediation technology known as phytoremediation. This technology uses trees and other deep-rooted plants to extract contaminants from the groundwater and soil and processes them in the plant's tissue to render them harmless. In 1999, over 800 poplar and willow trees were planted in the 317 French Drain area to remove contamination from groundwater and soil. Tree roots planted to remediate groundwater were planted at depths up to 11 m (35 ft), while tree roots planted to treat soil were planted up to 6 m (20 ft) deep. ANL-E estimates that it will require about three growing seasons until the trees are mature.

A second remedial action project completed in 1999 involved placing an engineered cap over the 319 Area Landfill and upgrading the landfill's leachate and groundwater extraction system to function over the long term. The landfill cap work included placing a geosynthetic clay liner (equivalent in effectiveness against water intrusion to 0.61 m [2 ft] of compacted clay), an impervious geomembrane, a drainage medium, and 0.91 m (3 ft) of clay and top soil to support a vegetative cover over the waste mound. Native grasses then were planted over the cap surface.

Other work included consolidating scattered debris next to the 800 Area Landfill and extending the existing cap north of the landfill to cover the exposed debris on the landfill's north slope. The new cap extension received 0.61 m (2 ft) of compacted clay and 0.15 m (0.5 ft) of top soil. The top soil was seeded with a mixture of grasses similar to that used on the remainder of the 800 Area Landfill cover.

Four other SWMUs were remediated in 1999 in the 100 Area; these SWMUs were associated with the Building 108 Boiler House operations. They were remediated by excavating the contaminated soil and gravel, thus demonstrating that the IEPA Tier 1 cleanup objectives had been met; the previously contaminated soil area was then replaced with a layer of concrete. The concrete then was sealed to prevent ongoing operations from recontaminating the underlying soils. As a result of these actions, ANL-E submitted a request to the IEPA for No Further Action.

Routine operation and maintenance (O&M) of two groundwater extraction systems, one south of the 319 Landfill and the second south of the 317 Area French Drain, was carried out. Monitoring of these systems has indicated that they are capturing the groundwater as intended.

3.3. Environmental Support Programs

3.3.1. Self-Assessment

In line with the principles of Integrated Safety Management (ISM), line management is responsible for internal self-assessment. The process focuses on the activities of an individual organization, and the results are reported to those who have the authority and responsibility for the organization's performance. At the beginning of each calendar year, each organization develops an agenda of activities to be reviewed that year. A schedule is prepared, and assignments are made to manage the organization's self-assessment program. The results and conclusions of the assessment program are summarized annually and submitted to the Director of ESH/Quality Assurance Oversight (EQO). The actual performance during the year is monitored by oversight organizations to assist senior management in fulfilling its responsibilities.

For 1999, the annual summary self-assessment was documented in the form of an ISM gap analysis. The overall ANL-E self-assessment combined the division analyses that identified specific gaps between expectations and actual execution, as well as corrective actions to address these gaps.

3.3.2. Environmental Training Programs

ANL-E has a comprehensive environmental protection training program that includes mechanisms to identify, track, and document requirements for every employee. Environmental protection training for ANL-E personnel is provided primarily by the ESH Training Section, although some training may be delivered by subject-matter experts from other organizations. Personnel training requirements address various requirements, such as those contained in DOE Orders, or EPA or U.S. Department of Transportation regulations. These requirements are identified by a Job Hazards Checklist form that is completed by every employee and that is reviewed by each employee's supervisor. A positive answer to any one of a battery of specific questions triggers the training requirements specific to that question. Options also exist for division-required training, recommended training, and elective training.

Activities are managed through the Training Management System, an on-line computer-based system that tracks the training status of each employee. Environmental protection training courses and course descriptions are listed in the Training Course Catalog available from divisional representatives, the ESH Training Section, or Human Resources.

3.3.3. Waste Minimization and Pollution Prevention

During 1999, ANL-E received two prestigious pollution prevention awards. In April, ANL-E received the DOE 1999 Pollution Prevention Award for Waste Reduction and Recycling. In November, ANL-E received the Illinois Governor's Pollution Prevention Award for Continuous Improvement.

ANL-E has a formal Waste Minimization and Pollution Prevention (WM&PP) Program. The program's long-term strategy is identified in the ANL-E WM&PP Strategic Plan dated

November 1995. In April 1997, ANL-E finalized a Pollution Prevention Program Plan that identifies ANL-E's short-term (three-year cycle) pollution prevention goals and describes the strategies that will be employed to achieve those goals. The pollution prevention goals outlined in the ANL-E Pollution Prevention Program Plan are the same as the 1999 DOE Pollution Prevention Goals that were established in 1996, which were derived from the 1993 baseline.

The following paragraphs present the seven DOE Pollution Prevention Goals, brief descriptions of ANL-E's progress toward each goal in 1999, and future strategies for achieving each goal.

Goal 1. Reduce by 50% the generation of radioactive waste.
Annual Radioactive Waste Generation, 1993–1999 (ft^3 [1,000])

	1993	1994	1995	1996	1997	1998	1999
Generation	10.5	16.9	19.5	12.3	9.1	10.9	2.5
Goal							5.2

In 1999, generation of LLW at ANL-E decreased compared with 1998. ANL-E experienced an increase in LLW in 1998 because a waste management strategy was implemented that focuses on more expedient identification and removal of waste from the facility. This strategy is being carried out in an effort to avoid the extended accumulation and deferred disposal of archived wastes and represents a proactive approach to waste management activities.

During the past year, PFS-WMO developed data management tools that improved the tracking of "routine" and "nonroutine" LLW. Through the use of these tools, PFS-WMO can track the amount of routine LLW disposed of by ANL-E more accurately.

Depletion of existing LLW, in conjunction with the implementation of proactive waste management activities, is projected to result in the continued reduction of ANL-E LLW in the future.

Goal 2. Reduce by 50% the generation of radioactive mixed waste. Radioactive Mixed Waste Generation 1993 –1999 (ft^3 [1,000])

	1993	1994	1995	1996	1997	1998	1999
Generation	5.0	0.67	0.71	0.16	0.3	0	0.44
Goal							2.5

Generation of mixed waste at ANL-E has continued to remain below the 1999 DOE Pollution Prevention Goal established from the 1993 baseline. The goal of reducing mixed wastes by 2.5 ft^3 has been surpassed. This goal for mixed waste has been achieved through a combination of treatment and source reduction. Current generation levels should be maintained by continuing to execute and improve current waste reduction activities and by implementing additional planned activities.

Goal 3. Reduce by 50% the generation of hazardous waste.
Annual Hazardous and State-Regulated Special Waste Generation (metric tons)

	1993	1994	1995	1996	1997	1998	1999
Generation	5,588	2,509	1,246	1,226	1,452	396	46.7
Goal							1,842

Hazardous waste generation levels in 1999 continue to be well below the 1999 DOE Pollution Prevention Goals derived from the 1993 baseline. ANL-E continues to encourage the use of microscale techniques within laboratories as a waste prevention strategy. In addition, ANL-E has reduced the volume of RCRA-related waste by implementing more efficient packaging procedures for chemical wastes and by implementing a proactive waste management strategy that incorporates alternatives to disposal, such as recycling and reuse of materials and chemicals.

ANL-E also has addressed state-regulated waste by taking advantage of new IEPA regulations that allow waste streams, such as wastewater sludges and coal combustion fly ash, to be certified as “nonspecial” waste. These waste streams are now tracked under the sanitary waste category. In addition, all coal combustion fly ash generated at ANL-E is being recycled at this time.

Goal 4. Reduce by 33% the generation of sanitary waste.
Annual Sanitary Waste Generation, 1993 –1999 (metric tons)

	1993	1994	1995	1996	1997	1998	1999
Generation	1,260	2,670	1,753	1,228	970	804	539
Goal							870

During 1999, ANL-E continued the downward trend of routine sanitary waste generation, with levels below the 1999 DOE Pollution Prevention Goals. ANL-E has developed and is implementing aggressive waste prevention and recycling programs that will be used to maintain and improve upon these levels. Through the continuous improvement of recycling programs and improved data management, ANL-E will continue to achieve this goal.

Goal 5. Reduce by 50% total releases and off-site transfers for treatment and disposal of toxic chemicals. Annual Toxic Release Inventory, 1993 –1999 (metric tons)

	1993	1994	1995	1996	1997	1998	1999
Treatment or Disposal	1.78	0	0	0	0	0	0
Goal							0.89

Since 1993, when 1.78 t (1.96 tons) of toxic releases was recorded, ANL-E has focused on eliminating all forms of toxic releases. From 1994 through 1999, ANL-E has maintained zero generation levels.

Goal 6. Recycle 33% of sanitary waste from all operations, including cleanup and stabilization activities.

During 1999, ANL-E generated a total of 7,799 t (8,579 tons) of sanitary waste and materials from all operations, including cleanup and stabilization activities. ANL-E was able to recycle (reuse) 5,699 t (6,269 tons) of these materials. This amounts to a 73% level of recycling of sanitary waste from all ANL-E operations. To improve this recycling level, ANL-E is developing and implementing a variety of additional recycling programs for sanitary waste and materials originating from environmental restoration, D&D, and facility construction and demolition activities. Programs have been successful in recycling fill material, roadway materials, and wood and scrap metal from routine and nonroutine activities. ANL-E will continue to work to develop, implement, and document waste stream diversion, material recycling, and other pollution prevention initiatives.

Goal 7. Affirmative Procurement: Increase procurement of EPA-designated recycled products to 100%, except where they are not commercially available competitively at a reasonable price or do not meet performance standards.

As a result of 1999 ANL-E Affirmative Procurement Program efforts, purchasing of recycled-content products has been made easier for employees, tracking purchases is less difficult, and the overall awareness level for buying recycled material products is at an all-time high. As evidence of the effectiveness of the ANL-E Affirmative Procurement Program, the ANL-E percentage for purchases of EPA-designated recycle-content products dramatically increased during FY 1999 to 70%, as compared with 42% in FY 1998, and 31% in FY 1997. Justification for the balance of product purchases was based on their not being available competitively within a reasonable time frame, not meeting appropriate performance standards, or being available but only at an unreasonable price. ANL-E is working toward this goal through a combination of an Affirmative Procurement Awareness Program, the development of an upgraded procurement tracking system, and the development and execution of ANL-E recycled product procurement procedures.

3.3.4. Site Environmental Performance Measures Program

Effective June 1, 1995, the prime contract between DOE and the University of Chicago to operate ANL-E made provisions for a performance fee, based on the performance of various research and operations activities, including ESH and Projects and Infrastructure Management performance. Performance objectives and supporting metrics have been developed to administer the contract and determine the performance fee. Each performance expectation is weighted; at the end of the performance period, a rating (outstanding, excellent, good, or marginal) is assigned for each. The performance fee is based on these ratings.

For the period of the performance-based contract October 1998 to September 1999, the environmental measurements were included in two Critical Few categories. One category was identified as the ESH category, and the other as Projects and Infrastructure Management. The ratings of the measurements in the Critical Few categories directly affected the performance-based fee. The environmental measurements included improvements in the environmental review process (outstanding), compliance with environmental permit conditions (outstanding), compliance with air and water effluent limits (outstanding), compliance with environmental project schedule (excellent), compliance with environmental project cost (outstanding), and waste minimization/pollution prevention (outstanding), for an overall rating of outstanding. This rating was later lowered to excellent in the final rating. In addition, the overall rating of the Projects and Infrastructure Management categories within Critical Few, based on a roll-up of the individual expectation performance ratings during the contract period, also was outstanding.

3.3.5. Environmental Management System

It is ANL-E policy to conduct its operations in an environmentally safe and sound manner. Protection of the environment and the public are responsibilities of paramount importance and concern to ANL-E. To that end, ANL-E is firmly committed to ensuring the incorporation of national environmental protection goals in the formulation and implementation of ANL-E programs. It is committed as well to the goals of restoring and enhancing environmental quality and protecting public health. Accordingly, it is ANL-E policy to conduct its operations in compliance with the letter and spirit of applicable environmental statutes, regulations, and standards. To manage these commitments, ANL-E has structured its activities to focus on these goals. Line organizations have primary responsibility for environmental management and are supported by professional staff from the core ESH organizations, including specialists in air, water, RCRA, CERCLA, and NEPA. The ESH/QA organization provides oversight.

3.3.6. Ecological Restoration Program

DOE and ANL-E recognize the importance of enhancing and preserving biodiversity and have committed to supporting the Biodiversity Recovery Plan prepared by Chicago Wilderness partnership organizations. Ongoing ecological restoration activities include enhancing oak woodland, savanna, wetland, and prairie habitats in the undeveloped areas on the ANL-E site. Six acres of vacant land that was formerly occupied by Quonset huts has been converted to prairie. Controlled burns and hand clearing of invasive shrubs are restoring sunlight to oak woodlands so that native flowers and grasses can grow. The upland area around a site wetland has been planted with prairie species to cleanse water feeding the wetland. The area surrounding a man-made pond outside the main administrative building is being used to demonstrate the use of native plants for landscaping after invasive weedy plants have been removed and replaced by native species.

ANL-E is implementing, where practical, Executive Order 13112 (Invasive Species) and Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds (60 FR 40837).

3.4. Environmental Monitoring Program Description

As required by DOE Orders 5400.1[1] and 231.1, ANL-E conducts a routine environmental monitoring program. This program is designed to determine the effect of ANL-E operations on the environment surrounding the site. This section describes this monitoring program. In 1999, a total of 1,962 samples were collected and 22,489 analyses were performed. A general description of the techniques used to sample each environmental medium is provided. This is followed by the collection procedures, the sampling schedule, and the analytical techniques used. Greater detail is provided in the ANL-E Environmental Monitoring Plan.

3.4.1. Air Sampling

ANL-E uses continuously operating air samplers to collect samples for the measurement of concentrations of airborne particles contaminated by radionuclides. Currently, nonradiological air contaminants in ambient air are not monitored. Particle samplers are placed at 14 locations around the ANL-E perimeter and at 6 off-site locations, approximately 8 km (5 mi) from ANL-E, to determine the ambient or background concentrations.

Airborne particle samples for measurement of total alpha, total beta, and gamma-ray emitters are collected continuously at 12 perimeter locations and at 5 off-site locations on glass fiber filter media. Average flow rates on the air samplers are about 70 m^3/h (2,472 ft^3/h). Filters are changed weekly. The filters on perimeter samplers are changed by ANL-E staff, and the filters on off-site samplers are changed and mailed to ANL-E by cooperating local agencies. Additional samples of particles in air, used for radiochemical analysis of plutonium and other radionuclides, are collected at two perimeter locations and at one off-site location. These samples are collected on special filter media that are changed every 10 days by ANL-E staff. The sampling units are serviced every six months, and the flow meters are recalibrated annually.

At the time of sample collection, the date and time when sampling was begun, the initial flow rate, the date and time when the sample was collected, and the final flow rate are recorded on a label attached to the sample container. The samples are then transported to ANL-E where this information is then transferred to the Environmental Protection Data Management System (EMS).

Each air filter sample collected for alpha, beta, and gamma-ray analysis is cut in half. Half of each sample for any calendar week is combined with all the other perimeter samples from that week and packaged for gamma-ray spectrometry. A similar package is prepared for the off-site filters for each week. A 5-cm (2-in.) circle is cut from the other half of the filter, mounted in a 5-cm (2-in.) low-lip stainless-steel planchet, and counted to determine alpha and beta activity. The remainder of the filter is saved.

The air filter samples collected for radiochemical analysis are composited by location for each month. After the addition of appropriate tracers, the samples are ashed, then sequentially analyzed for plutonium, thorium, uranium, and strontium.

Stack monitoring is conducted continuously at those emission points that have a probability of releasing measurable radionuclides. The results of these measurements are used for estimating the annual off-site dose using the required EPA CAP-88 (Clean Air Act Assessment Package-1988)[7] atmospheric dispersion computer code and dose conversion method.

3.4.2. Water Sampling

Water samples are collected to determine what, if any, radionuclides or selected hazardous chemicals used or generated at ANL-E enter the environment by the water pathway. Surface water samples are collected from the wastewater outfall and from Sawmill Creek below the point at which ANL-E discharges its treated wastewater. The results of radiological analysis of water samples at these locations are compared with upstream and off-site results to determine the ANL-E contribution. The results of the chemical analyses are compared with the applicable IEPA stream quality standards to determine whether the site is degrading the quality of the creek. These results are discussed in more detail in Chapters 4 and 5.

Surface water samples are collected from Sawmill Creek and combined into a single weekly composite sample. A continuous sampling device has been installed at this location to improve sample collection representativeness. To provide control samples, Sawmill Creek is sampled upstream of ANL-E once a month. The Des Plaines River is sampled twice a month below, and monthly above, the mouth of Sawmill Creek to determine whether radionuclides in the creek are detectable in the river.

In addition to surface water, subsurface water samples also are collected at 41 locations. These samples are collected from monitoring wells located near areas that have the potential for adversely impacting groundwater. These areas are the 800 Area Landfill, the 317/319 waste management area, and the site of the inactive CP-5 reactor. Samples from the three on-site wells that formerly provided domestic water also are collected and analyzed for hazardous and radioactive constituents.

Subsurface water samples are collected quarterly from the monitoring wells located in the 317/319 Area, the 800 Area Sanitary Landfill, and the CP-5 reactor. The monitoring wells are purged, and samples are collected from the recharged well water. These samples are analyzed for both chemical and radiological constituents, as discussed in Chapter 6. Samples are collected quarterly from the wellheads of the three ANL-E wells that formally provided the domestic water supply. The water is pumped to the surface and collected in appropriate containers, depending on the required analysis.

At the time of sample collection for radiological analysis, the sampling location, time, date, and collector identification number are recorded on a label attached to the sample container. Upon return to the laboratory, the information is transferred to the EMS system. Each sample is assigned a unique number that accompanies it through all analyses. After the sample has been logged in, an aliquot is removed for hydrogen-3 analysis; 20 mL (1 oz) of concentrated nitric acid is added per gallon of water as a preservative, and the sample is filtered through Whatman No. 2 filter paper to remove any sediment present in the sample. Appropriate aliquots are then taken, depending on the analysis.

For nonradiological analysis, samples are collected and preserved using EPA-prescribed procedures. Cooling is used for organic analysis, and nitric acid is used to preserve samples to be analyzed for metals. Specific collection procedures are used for other components, and EPA methods are used. All samples are analyzed within the required holding period, or noncompliance is documented. The quality control requirements of either SW-846[8] or the Contract Laboratory Program (CLP) must be met, or deviations are documented. All samples are assigned a unique number that serves as a reference source for each sample. When duplicate samples are obtained, unique numbers are assigned, and an indication that duplicates exist is entered in the data management system.

3.4.3. Bottom Sediment

Bottom sediment accumulates small amounts of radionuclides that may be present from time to time in a stream and, as a result, acts as an accumulator of the radionuclides that were present in the water. The sediment provides evidence of radionuclides in the surface water system. These samples are not routinely analyzed for chemical constituents. Bottom sediment samples are collected annually from Sawmill Creek above, at, and from several locations below the point at which ANL-E discharges its treated wastewater. Sediment is collected from each location with a stainless-steel scoop and is transferred to a glass bottle.

At the time of sample collection, the date, time, and sample collector identification are recorded on sample labels affixed to the sample container. Upon return to the laboratory, the information is transferred to the EMS system. Each sample is assigned a unique number that accompanies it through the process.

Each sample is dried for several days at 110ºC (230ºF), ball milled, and sieved through a No. 70 mesh screen. The material that does not pass the No. 70 screen is discarded. A 100-g (4-oz) portion is taken for gamma-ray spectrometric measurement, and other appropriate aliquots are used for specific radiochemical analyses.

3.4.4. External Penetrating Radiation

Measurements of direct penetrating radiation emanating from several sources within ANL-E are taken by using aluminum oxide thermoluminescent dosimeters (TLDs) provided by a commercial vendor. Each measurement is the average of two chips exposed in the same packet. Dosimeters are exposed at 17 locations at the site perimeter and on site and at five off-site locations. All dosimeters are changed quarterly. At the time of dosimeter collection, the date, time, and collector identification number are recorded on a preprinted label affixed to the container. Each sample is assigned a unique number that accompanies it through the process. After completion of the exposure period, the TLDs are mailed to the vendor for reading. When the dose information is provided to the on-site laboratory by the vendor, it is entered into the EMS system.

3.4.5. Data Management

ANL-E manages the large amount of data assembled in the environmental monitoring program in a structured manner that allows a number of reports to be generated. Basic data management, including sample record keeping, is implemented with the EMS computerized record-keeping system. All sample and analytical data are maintained in the EMS for eventual output in formats required for either regulatory compliance reports or for annual reports. In addition, reports are provided for trend analysis, statistical analysis, and tracking.

The ANL-E–developed EMS is the basic data management tool; it generates sampling schedules, all other tracking and calculation routines, and the final analytical result tabulations. The EMS is set up for the radiological portion of the monitoring program and for nonradiological monitoring for groundwater and NPDES surface water effluents.

The starting point for effluent monitoring and environmental surveillance is establishing a set of sampling locations and a sample schedule. On the basis of regulatory parameters, pathway analysis, or professional judgment, sample locations for the various media are identified and entered into the EMS. For each sample location, nine categories of data are entered into the EMS: geographic code, location description, sampling frequency, sample type, exact sampling position, last date sampled, sampling priority (same location with multiple samples), size of sample to collect, and analytes.

Once the data are entered, the EMS is used to generate a sampling schedule. Every week a schedule for the next week is printed out, along with uniquely numbered, preprinted labels for the sample containers. These items are provided to the staff who conduct the sampling in the field. Field data are entered into the EMS. At the time the samples are submitted to the analytical laboratory, chain of custody documents are generated. The EMS distributes sample data electronically (via diskette) to the ESH data management system and accepts back the analytical data (via diskette or e-mail).

As the laboratory results are compiled, the data are entered into the EMS. This permits up-to-date tracking of all samples currently in process. When the analysis for each sample is completed and the results electronically entered into the EMS, the completed final results sample card is retained in a file as an additional QA measure.

Complete data sets for all samples are maintained by the EMS. When all results have been completed and entered into the EMS, a final result card is generated that lists all data related to each sample. The electronic files are backed up by the ESH computer network server. The printed final result card is filed after review, then ultimately put in DOE's archives in Chicago. Final results are thus available both on line via the network and in hard copy.

3.5. Compliance with DOE Order 5820.2A

DOE Order 5820.2A, "Radioactive Waste Management," Section III-3 (k),[9] requires that an environmental monitoring and surveillance program be conducted to determine any releases or migration from LLW treatment, storage, or disposal sites. Compliance with these requirements is an integral part of the ANL-E sitewide monitoring and surveillance program. Waste management operations in general are covered by relying on the perimeter air monitoring network and monitoring of the liquid effluent streams and Sawmill Creek. The analytical results are presented in Chapter 4 of this report.

Of particular interest is monitoring of the waste management activities conducted in the 317 Area. These include air monitoring for total alpha, total beta, and gamma-ray emitters and radiochemical determinations of plutonium, uranium, thorium, and strontium-90; direct radiation measurements with TLDs; surface water discharges for hydrogen-3 and gamma-ray emitters; and subsurface water samples at all the monitoring wells with analyses for hydrogen-3, strontium-90, and gamma-ray emitters, plus selected monitoring for VOCs. The results are presented in Chapters 4 and 6 of this report.