APPENDIX E
EFFLUENT AND ENVIRONMENTAL MONITORING

A. ENVIRONMENTAL MONITORING IN THE VICINITY OF THE SAVANNAH RIVER PLANT

A continuous monitoring program has been maintained since 1951 (before plant startup) to determine the concentrations of radioactive materials in a 1200-square-mile area outside the Savannah River Plant. Included are parts of Aiken, Barnwell, and Allendale counties in South Carolina and Richmond, Burke, and Screven counties in Georgia.

Results from the monitoring program are accumulated in a comprehensive summary report of the Savannah River Plant's monitoring effort. The report is distributed to the public annually (*Environmental Monitoring in the Vicinity of the Savannah River Plant - Annual Report*[1]). Results of the environmental monitoring program are reviewed frequently with the S. C. Department of Health and Environmental Control.

The offsite monitoring program measures contributions to offplant exposure, i.e., direct radiation, breathing air, deposited radioactivity, and radioactivity in consumed materials (water, milk, fruit, vegetables, grain, fish, fowl, etc.).

1. Atmospheric Monitoring

Atmospheric radioactivity is measured at twelve monitoring stations near the plant perimeter and twelve stations around a circle of about 25-mile radius from the center of the plant (Figure E-1). All monitoring stations operate continuously and are located to afford a high probability of detecting significant releases of airborne activity for any prevailing wind direction.

Four additional air monitoring stations at Savannah and Macon, Georgia, and at Columbia and Greenville, South Carolina, are so distant from SRP that the effect of SRP operations is negligible; these serve as reference points for determining background activity levels (Figure E-2). This system permits comprehensive surveillance of atmospheric radioactivity and also makes it possible to differentiate between fallout and SRP releases.

At all these stations, particulate airborne radioactivity and radioiodine are monitored. Tritium oxide is monitored continuously at all stations except the four distant stations, which are monitored intermittently. Particulate airborne radioactivity is sampled continuously by drawing air through 2-inch-diameter high-efficiency asbestos paper filters that are collected weekly. A cartridge of activated coconut charcoal for collection of gaseous radioiodine is located down-line from each paper filter. Moisture is concentrated from the atmosphere for determination of its tritium oxide content by pumping air through a silica gel column. The column contains nonindicating silica gel; a backup column of indicating silica gel is used for evidence of any saturation of the desiccant. The concentration of tritium oxide in the air is calculated from the concentration in atmospheric moisture and the absolute humidity.

Deposition rates of radioactive materials are also determined by monthly analyses of rainwater ion exchange columns (fallout collectors) at plant perimeter and 25-mile-radius air-monitoring stations. Rain is collected in a fallout collection pan (2 ft x 2 ft) and flows by gravity through an ion exchange column (cation and anion resin). The columns are analyzed directly by gamma spectrometry for gamma emitters. Alpha and beta emitters are removed from the column with acid and analyzed by chemical methods. The rainwater passing through the ion exchange column is collected in a plastic jug for tritium analyses by liquid scintillation counting every two weeks.

Quarterly measurements of cumulative gamma radiation are made with thermoluminescent dosimeters at one mile intervals on the plant perimeter and at all air monitoring stations.

2. Aqueous Monitoring

a. Savannah River

To evaluate the effects of SRP discharges, the Savannah River is sampled at various locations to determine concentrations of radioactive and nonradioactive constituents, river flow and temperature, and biological indicators of river health.

Radioactivity. Continuous sampling of the Savannah River water is accomplished with a sampler consisting of a water wheel suspended on two pontoons. As the water wheel is turned by flowing water, a small cup (or cups) on one paddle picks up a sample of water and deposits it into a trough. The sampled water flows by gravity from the trough through connecting tubing into a large polyethylene jug which trails the sampler. The sampled water (up to six gallons) is collected weekly at river locations above and below SRP. Increased analytical sensitivity for water

samples (containing insufficient radioactivity for direct processing) is achieved through concentration of radionuclides by ion exchange. The water is analyzed for tritium by liquid scintillation counting.

Nonradioactive Materials. The Savannah River is sampled and analyzed periodically for nonradioactive constituents upstream near Jackson, S. C., (Station 2) and below the plant at the US Highway 301 bridge (Station 10). Comparisons of the analytical data for these two locations will show any changes that might be the result of activities at this site.

Monthly grab samples are obtained from Stations 2 and 10. The temperature and dissolved oxygen is determined immediately, and further chemical analyses are performed by the plant laboratories. The analyses made are listed below:

Temperature	Surfactant
pH	Ammonium
Alkalinity	Calcium
Dissolved Oxygen	Sodium
Sulfide	Total Iron
Hardness	Aluminum
Conductivity	Mercury
Suspended Solids	Chloride
Total Dissolved Solid	Nitrite
Volatile Solids	Nitrate
Fixed Residue	Sulfate
Biochemical Oxygen Demand (BOD)	Phosphate
Lignin	

Weekly grab samples are also collected from Stations 2 and 10 and analyzed for temperature, dissolved oxygen, and fecal coliform.

An automatic device collects a portion of river water, on ten minute intervals, in River Pumphouse 681-3G. The portions form a monthly composite and are analyzed by the plant laboratories for the same variables as the monthly grab samples from Stations 2 and 10, omitting temperature, dissolved oxygen, and BOD.

Flow and Temperature. The United States Geological Survey (USGS) maintains temperature and flow recorders at the plant boat dock downstream from River Pumphouse 681-1G at river mile 156.75. The USGS also maintains temperature recorders at the following locations (see Figure E-3):

River Mile	Locations
∿152	In Beaver Dam Creek
∿151	In Four Mile Creek
∿142	In Steel Creek
138.80	Near Millett, SC

Biological Measurements. The Limnology Department of the Academy of Natural Sciences of Philadelphia (ANSP) has performed a continuing survey of the aquatic environment and water quality of the Savannah River upstream and downstream from SRP since 1951. The purpose of this survey is to determine the effect, if any, of SRP effluent discharges on general river health.

Diatometers are positioned in the river at three locations (one above and two below the SRP site) to provide a continuous monitor of the effects of plant effluents on one major group of river organisms. The diatometers contain glass slides on which diatoms accumulate. The slides are replaced biweekly, and the slides containing dried diatoms are sent to ANSP for analysis.

Quarterly surveys of algae, insects, invertebrates, and fish are also conducted by ANSP. Specialists in entomology, algology, invertebrate zoology, and ichthyology sample river biota during times of the year most suitable to their specialty. An algologist or entomologist accompanies every survey to provide continuity of collecting and methodology and to observe environmental conditions. Results of the quarterly surveys are summarized and published annually.

Periodically, or as a result of major changes in the physiography of the river, ANSP makes comprehensive surveys of the biota and chemical water quality above, adjacent to, and below SRP to ascertain effects of SRP operations on river conditions.

b. Drinking Water

Communities near SRP get drinking water from deep wells or surface streams. Public water supplies from fourteen surrounding towns are collected in April and October of each year and analyzed for tritium, alpha activity, and nonvolatile beta activity (Figure E-1).

The Beaufort-Jasper Water Authority operates a treatment facility to furnish drinking water, partially obtained from the Savannah River, to most of Beaufort County, South Carolina. Water is supplied through a canal from the river at a location about 90 miles below the Savannah River Plant. A water treatment plant at Port Wentworth, Georgia, supplies water to a business-industrial complex near Savannah, Georgia. These two water supplies are analyzed monthly for tritium content.

3. Vegetation and Food Monitoring

a. Vegetation

Radioactive contamination of growing plants may result from sorption of radioactive materials from the soil or from foliar deposition. Bermuda grass is selected for analysis because of its importance as a pasture grass for dairy herds and its availability during all seasons of the year.

Grass samples are routinely collected and analyzed monthly for tritium at seven locations along the plant perimeter and at seven other locations along a 25-mile-radius route (Figure E-12). Samples are composited for analysis of gross alpha activity and specific gamma emitters. Samples are also collected semiannually from four 100-mile control stations.

b. Milk

Milk is sampled at large dairies and distributors as available within a 25-mile-radius of SRP (Figure E-11). Samples are collected every two weeks and analyzed for tritium and radioiodine. Analyses are made quarterly for strontium-90 and monthly for cesium-137.

c. Farm Produce

Sixty samples of farm produce representing four food categories (grain, fruit, poultry, and leafy vegetables) are collected at fourteen localities in the six counties surrounding SRP (Figure E-11) during the summer and fall of each year. Samples of local beef are also collected. All samples are analyzed by gamma spectrometry for gamma-emitting radionuclides. Radiochemical analyses are used for strontium-90 and alpha emitters (uranium and plutonium), and liquid scintillation counting for tritium. With the exception of grains, all foods are prepared for analysis in a manner similar to that used to prepare them for human consumption. Peelings, seeds, and other nonedible parts are removed. Wheat containing the whole grains only and oats containing both grains and husks are processed unwashed.

d. Fish

Fish traps are maintained in the Savannah River, upstream, adjacent to, and downstream from the SRP effluents. Individual whole fish are analyzed by gamma spectrometry for cesium-137 and other gamma-emitting radionuclides; bone from each specimen is composited monthly for strontium-89,90 analysis. Fish are also analyzed for mercury content.

e. Deer

Concentrations of cesium-137 in about 1000 deer and several hogs killed each autumn in on-site public hunts are measured with a portable, single-channel scintillation instrument before release of the animals to the hunters. The estimated cesium-137 content is verified by gamma spectrometric analysis of muscle tissue of any deer exceeding an apparent 25 x 10^{-6} μCi/g.

B. EFFLUENT MONITORING ON THE PLANTSITE

All plant process effluents (air and water) are monitored for radioactivity to ensure that emission control systems are functioning properly. Appropriate collection devices and/or sensitive detection equipment are installed at the point of release to the environment. Release points may be stacks or ducts for air emissions and pipes or basins for liquid discharges. Monitoring frequencies depend on the magnitude of normal releases or the potential for abnormal releases and range from continuous, on-line monitoring or sampling to periodic, scheduled sampling ("grab samples").

1. Emission Monitoring of Radioactivity in Air

Emission points where radioactivity is released to the air are identified in Tables E-1 through E-5 together with the type of radioactivity released and the current monitoring schedule.

2. Emission Monitoring of Radioactivity in Water

Emission points in the various plant areas where radioactivity is released in liquids to streams or basins are identified in Tables E-6 through E-11 together with the type of radioactivity released and the current monitoring program.

C. ENVIRONMENTAL MONITORING ON THE PLANTSITE

Sample collection and analyses of air, water, vegetation, fish, and animals within the plantsite are similar to those described in Section A of this appendix for offsite monitoring. In addition, the onsite monitoring program includes studies of radionuclide migration from seepage basins or stream beds, and surveillance of potential migration from the burial ground, waste storage tanks, and areas where spills have occurred in the past. Results of the onsite monitoring program are reported annually in *Environmental Monitoring at the Savannah River Plant - Annual Report.*[2]

1. Atmospheric Monitoring

Air monitoring stations are located at 200-F Area, 200-H Area, the 700-A Area, the 735-A Environmental Monitoring Laboratory, Par Pond, 400-D Area, Williston Gate, and the Dunbarton Fire Tower. These provide samples of airborne particulates for weekly analyses of alpha activity, filterable beta activity, and radioiodine. The particulate sample at 735-A is analyzed for gross alpha and beta activity daily, Monday through Friday. These samples are composited monthly and analyzed for specific gamma emitters and plutonium. Rainwater activities are analyzed monthly. Tritium in air (as DTO or HTO) is analyzed every two weeks.

Monthly measurements of cumulative gamma radiation are made with thermoluminescent dosimeters at all air monitoring stations and at four corners of each of the operating separations and reactor areas, and the raw materials and laboratory areas.

2. Aqueous Monitoring

a. Drinking Water

Samples of the drinking water supplies for each of the plant areas are analyzed semiannually for alpha activity, nonvolatile beta activity, and tritium.

b. Plant Stream Water

The plant streams leading from the operating areas to the Savannah River are sampled continuously. Samples are collected weekly at the locations shown in Figure E-3 and analyzed for alpha activity, nonvolatile beta activity, tritium, and, where appropriate, ^{137}Cs and $^{89,90}Sr$.

The effluent streams are sampled at several locations for nonradioactive constituent analyses: monthly for many of the parameters listed for the Savannah River in Section A of this appendix, and weekly for fecal coliform analyses.

c. Seepage Basin Water and Wells

Monthly samples are taken from the water in the seepage basins located in 200-F, 200-H, 700-A, 300-M, and CMX-TNX areas and analyzed for alpha activity, nonvolatile beta activity, and tritium; the samples for 200-F and H areas are also analyzed for radiostrontium and specific gamma emitters. Wells are located around the 200 Area seepage basins for surveillance of radionuclide migration to Four Mile Creek (Figures E-4 and E-5). Certain of these wells are sampled monthly and analyzed for specific nuclides; others are sampled three times per year for alpha activity, nonvolatile beta activity, and tritium analyses.

d. Wells Near Abandoned R-Area Seepage Basins

Five of the six seepage basins located in R Reactor area were backfilled and then capped and diked with clay in 1960. These basins contain about 600 curies of ^{137}Cs and 125 curies of ^{90}Sr resulting from their use in 1957-1959 to dispose of radioactivity in the fuel storage basin water after the failure of an experimental fuel assembly in the basin. The wells used for surveillance of potential activity migration from these basins are shown in Figure E-6. Some are sampled monthly and others three times per year; all are analyzed for alpha and nonvolatile beta activity and for radionuclide identification as required.

e. Other Surveillance Wells

Wells for monitoring radioactivity movement in ground water from storage facilities and other operations are shown in Figure E-7 for the burial ground, in Figure E-8 for general separations areas ("Z" and "ZW" wells), and in Figures E-9 and E-10 for the tank farms. The latter wells are used to detect activity resulting from the Tank 16 leak. The burial ground and tank farm wells are sampled quarterly for alpha activity, nonvolatile beta activity, and tritium; others are sampled annually for tritium.

Other wells (FTF 1-14 and HTF 1-17) in the waste tank farms are analyzed monthly for alpha, beta and tritium activity.

3. Vegetation, Fish, and Animal Monitoring

a. Vegetation

Grasses are sampled around F and H areas for comparison with

similar grasses sampled at the plant perimeter and off-site locations. Grasses near the burial ground are sampled to evaluate the deposition of particles from waste handling operations. The F and H samples are taken monthly for alpha activity, nonvolatile beta activity, and specific nuclide analyses.

Grasses inside the burial ground and at other waste handling facilities are sampled annually to evaluate uptake of radionuclides. Vegetation in Steel Creek is routinely analyzed for ^{137}Cs at ten stations during the growing season.

b. Algae

Monthly composite samples of algae from Steel Creek and Lower Three Runs are analyzed for $^{89,90}Sr$, and gamma emitters for comparison with Savannah River samples.

c. Animals and Waterfowl

A variety of wildlife, including deer, opossum, hog, raccoon, rat, and duck, are analyzed for $^{89,90}Sr$ in bone and ^{137}Cs in flesh. Selected samples are analyzed for plutonium in bone.

d. Fish

Bream, catfish, and bass from the plant effluent streams and Par Pond are analyzed for mercury, $^{89,90}Sr$, and ^{137}Cs.

REFERENCES FOR APPENDIX E

1. *Environmental Monitoring in the Vicinity of the Savannah River Plant, Annual Report for 1975.* ERDA Report DPSPU-76-30-1, E. I. du Pont de Nemours & Co., Savannah River Plant, Aiken, SC (1976).
2. C. Ashley and C. C. Zeigler. *Environmental Monitoring at the Savannah River Plant, Annual Report for 1975.* ERDA Report DPSPU-76-302, E. I. du Pont de Nemours & Co., Savannah River Plant, Aiken, SC (1976).

TABLE E-1

REACTOR AREAS AIR RELEASES (105-C,-K,-P)

Emission Point	Type of Release	Current Monitoring
200-ft Stack	Tritium	Continuous sampling for tritium using dehumidifier to collect moisture sample. Sample taken daily for lab analysis.
	Noble gases	Continuously monitored with Ge(Li) system.
	Activation Product and Fission Products Alpha	A continuous filter paper sample taken for lab analysis.
	Radioiodine	A continuous charcoal filter sample taken for lab analysis.
Disassembly Bay (Exhaust Vent in 105-P)	Tritium Iodine	Once a week grab sample taken for lab analysis. Continuous sampling.
Heat Exchanger Decontamination Facility (105-C)	Activation Products and Fission Products	Continuous sampling.
Heat Exchanger Repair Facility	Activation Products and Fission Products Alpha	Grab sampling during operation.
Contaminated Equipment Workshop	Activation Products and Fission Products Alpha	Grab sampling.

TABLE E-2

SEPARATIONS AREAS AIR RELEASES

Emission Point	Type of Release	Current Monitoring
200-ft Stack (F Area)	Fission Product	Continuous monitoring of filter paper sample. Filter paper analyzed in lab for certain radionuclides.
	Radioiodine	Continuous charcoal collector with monitoring.
	Alpha	Continuous monitoring of filter paper sample. Filter paper analyzed in lab for certain radionuclides.
	Noble gases	Calculated.
Dissolver Stacks	Alpha and Fission Product	Continuous filter paper sampling except during cladding removal. Filter paper taken to lab for analysis.
	Radioiodine	Continuous Molecular Sieve sampling except during cladding removal. Molecular Sieve samples analyzed in lab.
	Noble gases	Calculated.
235-F Stack	Alpha and Fission Product	Continuous filter paper sampling. Filter paper analyzed in lab for certain radionuclides.
772-F Stack	Alpha and Fission Product	Continuous filter paper sampling. Filter paper analyzed in lab for certain radionuclides.
JB-Line Stack	Alpha	Continuous filter paper sample analyzed in lab.
242-F Concentrate Transfer Syatem (Cell Exhaust)	Alpha and Fission Product	Continuous filter paper sample analyzed in lab.
241-F Waste Tanks (Vent Filter and Annuli Exhaust)	Alpha and Fission Product	Continuous filter paper sample collected for Tanks 18 and 20 vent. Paper sent to lab for analysis.
200-ft Stack (H Area)	Fission Product	Continuous monitoring of filter paper sample. Filter paper analyzed in lab for certain radionuclides.
	Radioiodine	Continuous charcoal collector with continuous monitoring.
	Alpha	Continuous monitoring of filter paper sample. Filter paper analyzed in lab for certain radionuclides.
	Noble gases	Calculated.
242-H Concentrate Transfer System Cell Exhaust	Alpha and Fission Product	Continuous filter paper sampling. Sample sent to lab for analysis.
241-H Diversion Box 2 Pump Pits Exhaust	Alpha and Fission Product	Continuous filter paper sample analyzed in lab.
244-H Main Building Exhaust	Alpha and Fission Product	Continuous filter paper sample analyzed in lab.
	Tritium	Continuous Kanne Chamber monitor.
244-H Vessel Vent Exhaust	Alpha and Fission Product	Continuous filter paper collected and sent to lab for analysis.
	Tritium	Continuous Kanne Chamber monitor.
	Radioiodine	Charcoal collector used continuously when handling material with potential for iodine release. Sent to lab for analysis.
232, 234-H 200-ft stacks (3) 238-H 75-ft stack	Tritium	Continuous monitoring with Kanne Chambers.

TABLE E-3

RAW MATERIALS AREA AIR RELEASES

Emission Point	Type of Release	Current Monitoring
321-M A, B, and C Furnaces	Alpha	Continuous sampling. If radioactivity is detected, sample is analyzed in lab.
320-M Exhaust Hood	Alpha	Continuous sampling. If radioactivity is detected, sample is analyzed in lab.
322-M Stacks	Alpha	Continuous sampling. If radioactivity is detected, sample is analyzed in lab.
313-M Autoclave Area	Alpha	Continuous sampling. If radioactivity is detected, sample is analyzed in lab.

TABLE E-4

SAVANNAH RIVER LABORATORY AIR RELEASES

Emission Point	Type of Release	Current Monitoring
Building 773-A B Section 75-ft Stack	Alpha and Fission Product	Continuous monitoring.
	Radioiodine	Continuous monitoring.
	Tritium	Continuous Kanne Chamber monitoring.
C Section 75-ft Stack	Alpha and Fission Product	Continuous monitoring.
	Radioiodine	Continuous monitoring.
	Tritium	Continuous Kanne Chamber monitoring.
D Section 37-ft Stack (Glove Box and Machine Shop Exhaust)	Alpha	Continuous monitoring.
D Section 35-ft Stack (Uranium Oxide Exhaust)	Alpha	Continuous monitoring.
794-A Sand Filter, 100-ft Stack	Alpha and Fission Product	Continuous filter paper sampling; removed to lab for analysis.
	Radioiodine	Continuous charcoal monitoring.
	Tritium and Noble Gases	Continuous Kanne Chamber monitoring (after radioiodine removal) at potential feeder lines.
735-A 31-ft Stack	Alpha and Fission Product	Continuous filter paper sampling.
774-A Off-Gas Exhaust (12-ft) Stack	^{60}Co	Continuous filter paper sampling.
	Radioiodine	Continuous charcoal sampling.
Building Exhaust	Tritium	Continuous Kanne Chamber monitoring.
776-A	Alpha	Continuous monitoring.
	Fission Product	Continuous sampling.
	Radioiodine	Continuous sampling.
Low Level System Vent	Alpha and Fission Product	Continuous sampling.
677-G 50-ft Stack	Tritium	Continuous tritium monitor.

TABLE E-5

HEAVY WATER PRODUCTION AREA AIR RELEASES

Emission Point	Type of Release	Current Monitoring
772-D Stack	Tritium	Continuous monitoring with Kanne Chamber.
420-D Rework Pump Room Stack	Tritium	Continuous monitoring with Kanne Chamber.
Evaporator Pad Exhaust Stack	Tritium	The general work area is monitored by a Kanne Chamber with readout in the control room.
421-2D Drum Wash Hood Exhaust	Tritium	Four 15-minute grab samples per month.
Technical Purification Facility Hood Exhaust	Tritium	Four 15-minute grab samples per month.

TABLE E-6

REACTOR AREAS RELEASES TO STREAMS OR BASINS

Emission Point	Type of Release	Current Monitoring
Disassembly Basin Water	Activation Products Fission Products Alpha	Grab sample daily when not purging; continuous sampling during basin purge with lab analysis for radionuclides.
	Tritium	Once per day a portion of sample sent to lab for analysis.
Thermal Shield and Top and Bottom Shield System	Activation Products Fission Products Tritium	Grab sample sent to lab for complete isotopic analyses before pumping.
Dry Cave Floor Drain	Activation Products Fission Products Tritium	Grab sample.
Heat Exchanger Cooling	Activation Products Fission Products	Continuously monitored by in-line cooling water gamma monitor.
	Tritium	Grab sample once per week during normal operation and once per day during startup.
Moderator Spillage	Activation Products Fission Products Alpha Tritium	Sumps sampled before pump out; analyzed in lab.
Deuterization Waste Water (K only)	Activation Products Fission Products Alpha	Grab sample of each drum; analysis before release.
Heat Exchanger Repair Facility	Activation Products Fission Products Alpha	Grab sample of tank prior to dumping.
Miscellaneous Contaminated Drains (including tool, mask, and personnel decontamination and H.P. Lab waste)	Activation Products Fission Products	Grab sample daily.
Disassembly Deionizer Leaks and Heat Exchanger Leak-through	Activation Products Fission Products Alpha	Grab sample daily when not pumping. Continuous sampling during basin purge.
	Tritium	Portion of daily grab sample sent to lab for analysis.
Process Area Floor Decontamination Water and Inhibitor Waste Water	Activation Products Fission Products Alpha Tritium	Grab sample sent to lab for analysis before release.
Distillation Cooling Water	Activation Products Fission Products Alpha Tritium	Grab sample daily. Analyzed for non-volatile beta and alpha by HP.
Cask Decontamination Water and Drainage from Scrap Casks	Activation Products Fission Products	Grab sample daily when not purging disassembly basins. Continuous sampling during basin purge.

TABLE E-7

SEPARATIONS AREAS RELEASES TO SEEPAGE BASINS[a]

Emission Point	Type of Release	Current Monitoring
211-F, 211-H, and A-Line	Alpha Fission Product	Grab samples taken from tanks and/or emission source during release. Samples sent to lab for analysis.
244-H and 245-H Hold Tank	Alpha Fission Product	Grab samples of each batch sent to lab for analysis prior to release.
242-F and 242-H Evaporator Overheads (^{137}Cs Removal Column)	^{137}Cs	Grab sample analyzed prior to release.
234-H Cooling Water	Alpha Fission Product Tritium	Weekly grab sample analyzed in lab.
232-H Lab Drain	Alpha Fission Product Tritium	Grab sample once per week or whenever releases are occurring.
232-H Line 3 Floor Drain	Tritium Activation Products and Fission Products	Grab sample whenever releases are occurring.

a. All these streams converge into a common header which is sampled in proportion to the flow. The samples are collected in a tank which is sampled daily for gross activity and dumped to a hold tank which is sampled weekly. The weekly sample is analyzed for gross activity and for specific radionuclides by PHA and radiochemical procedures.

TABLE E-8

SEPARATIONS AREAS RELEASES TO STREAMS

Emission Point	Type of Release	Current Monitoring
221-F and 242-F Segregated Cooling Water	Alpha Fission Product	Continuous monitoring and recording. Grab samples on 221-F only collected twice per shift, and analyzed by lab.
723-F Laundry	Alpha Fission Product	Drip sample.
221-H and 242-H Segregated Cooling Water	Alpha Fission Product	Continuous monitoring and recording. Grab sample on 221-H only and analyzed by lab prior to basin release.
Storm Sewers		
Waste Tank Farm	Fission Product	Grab samples.
A-Line, 211-F	Fission Product	Grab samples.
Other	Fission Product	Grab samples.
232-H and 238-H Cooling Water and Floor Drains	Alpha Fission Product Tritium	Weekly grab samples sent to lab for gross activity analysis.
234-H Cooling Water	Alpha Fission Product Tritium	Weekly grab sample from effluent outfall sent to lab for analysis.
236-H Floor Drain	Alpha Fission Product Tritium	Weekly grab sample from effluent outfall sent to lab for analysis.
281-8F and 281-8H Basins	Alpha Fission Product	Grab sample prior to basin pumpout.

TABLE E-9

RAW MATERIALS AREA RELEASES TO STREAMS OR BASINS

Emission Point	Type of Release	Current Monitoring
321-M Chemical Milling Tank	Alpha Fission Product	Grab sample of tank contents analyzed by lab prior to release.
321-M, 322-M Building Effluent	Alpha Fission Product (Uranium and Enriched Uranium)	Grab sample monthly at seepage basin. Analyzed by lab.
313-M, 320-M Lab Building Effluent	Alpha Fission Product (Uranium and Enriched Uranium)	Continuous proportional sampler analyzed by lab.

TABLE E-10

SAVANNAH RIVER LABORATORY RELEASES TO STREAMS OR BASINS

Emission Point	Type of Release	Current Monitoring
776-A Low Level System Hold Tank	Alpha Fission Product	Grab sample before discharge analyzed in lab.
	Tritium	Monthly composite analyzed but not prior to release.
773-A Building Cooling Water	Alpha Fission Product	Some grab sample monitoring during high potential release periods.
677-G and 678-G	Alpha (Uranium and Enriched Uranium)	Monthly grab sample at seepage basin analyzed by lab.
679-G	Alpha	Weekly grab sample at outfall to river.

TABLE E-11

HEAVY WATER PRODUCTION AREA RELEASES TO STREAMS OR BASINS

Emission Point	Type of Release	Current Monitoring
772-D	Activation Products and Fission Products Tritium	A continuous audit sample is taken in the stream and analyzed in the lab once per month for specific radionuclides.
420-D	Activation Products and Fission Products Alpha Tritium	Waste water drummed and sample from each drum is analyzed in lab for isotopic analyses.
421-2D	Activation Products and Fission Products Alpha Tritium	Grab sample from hold tank is analyzed by lab. Prior to release a portion of each sample is saved for monthly isotopic analysis.

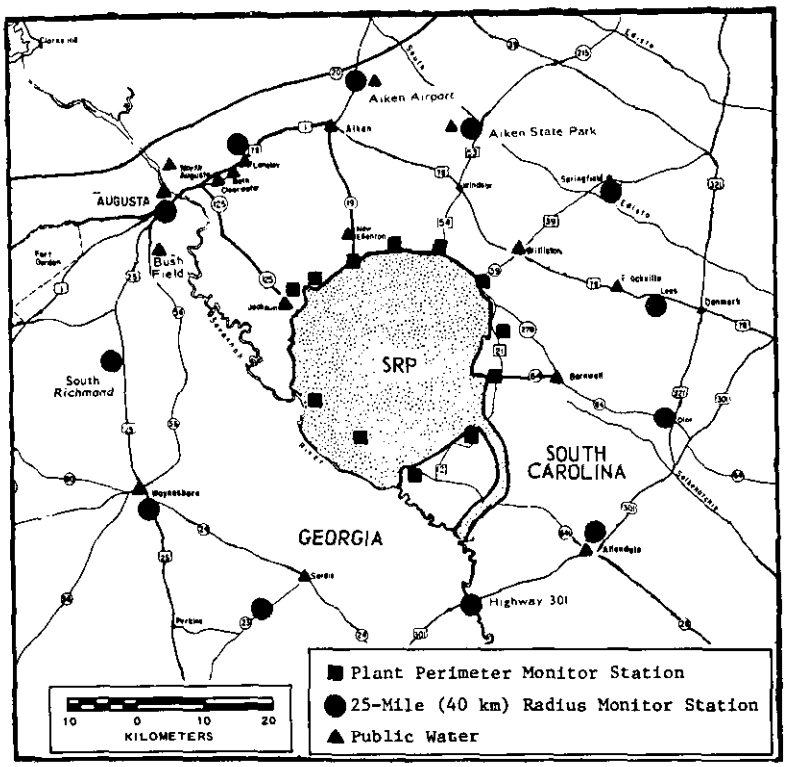

FIGURE E-1. CONTINUOUS AIR MONITORING STATIONS AND PUBLIC WATER SAMPLE LOCATIONS

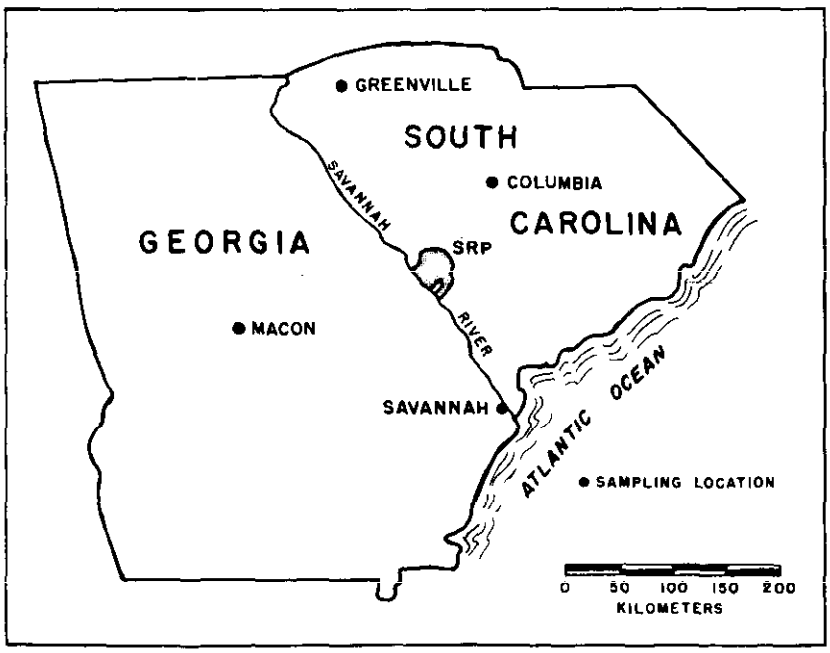

FIGURE E-2. DISTANT AIR MONITORING STATIONS

Location	
Tims Branch	
2	700 Area effluent
2A	Downstream of 700-Area Seepage Basins
3	300 Area effluent
5	Road C
Upper Three Runs	
2	F-Area storm sewer
3	Road C
4	Road A
400-D Effluent	
Four Mile Creek	
1B	Upstream of H Area
1C	H-Area effluent
2	Road 4
2B	Upstream of F-Area effluent
3	F-Area effluent
4	Downstream of F and H Areas
7A	Road A-7
6	Road A
Pen Branch	
3	Road A
Steel Creek	
4	Road A
5	2 miles below Road A
Par Pond	
2	Pump House
3	P-Area cooling water
Lower Three Runs	
2	Patterson's Mill
3	Road A
Savannah River	
2R	1 mile upstream of SRP
8R	Downstream of Steel Creek
9R	Downstream of SRP Lower Three Runs
10R	Downstream of SRP at Highway 301

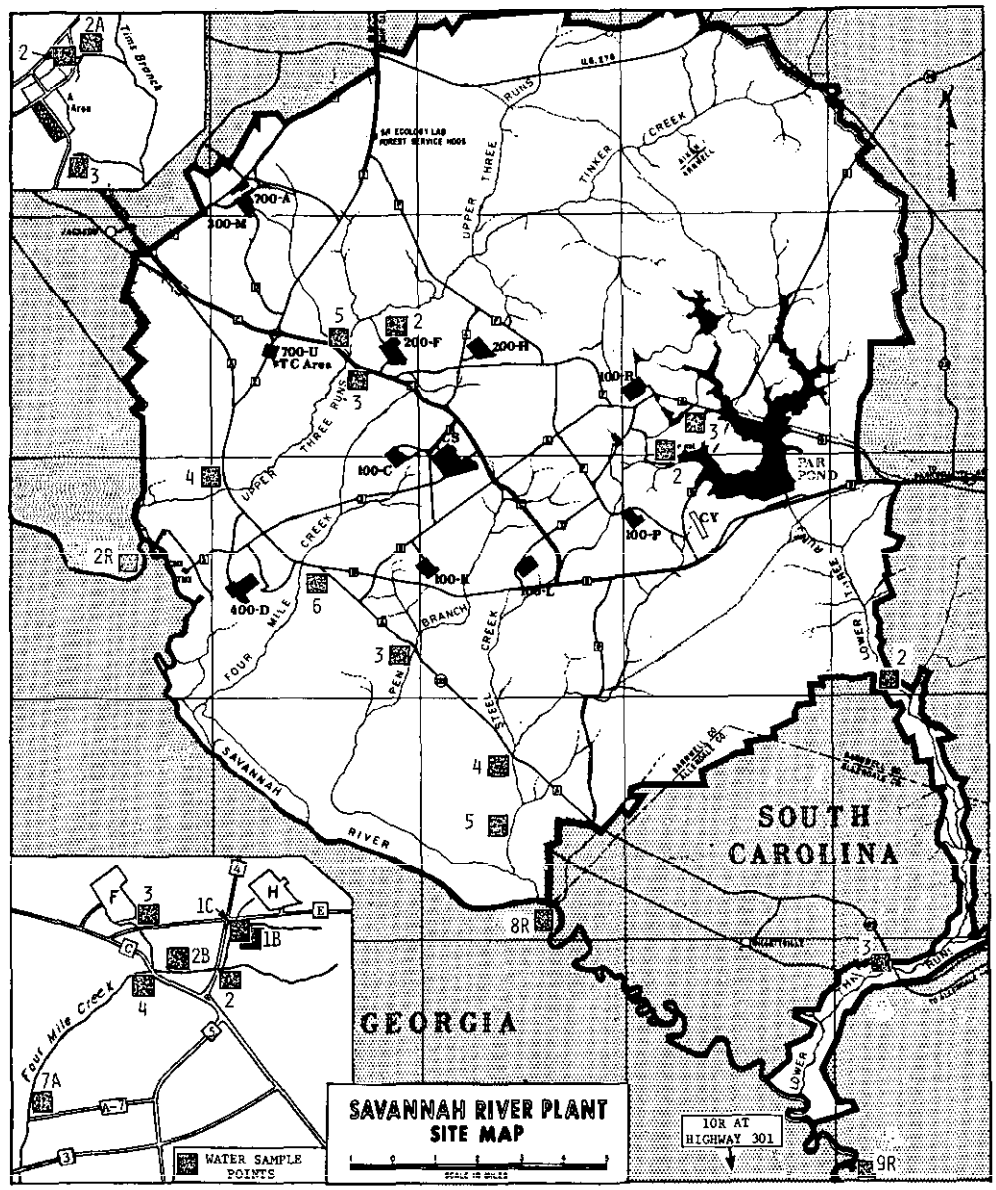

FIGURE E-3. Stream and River Sample Points

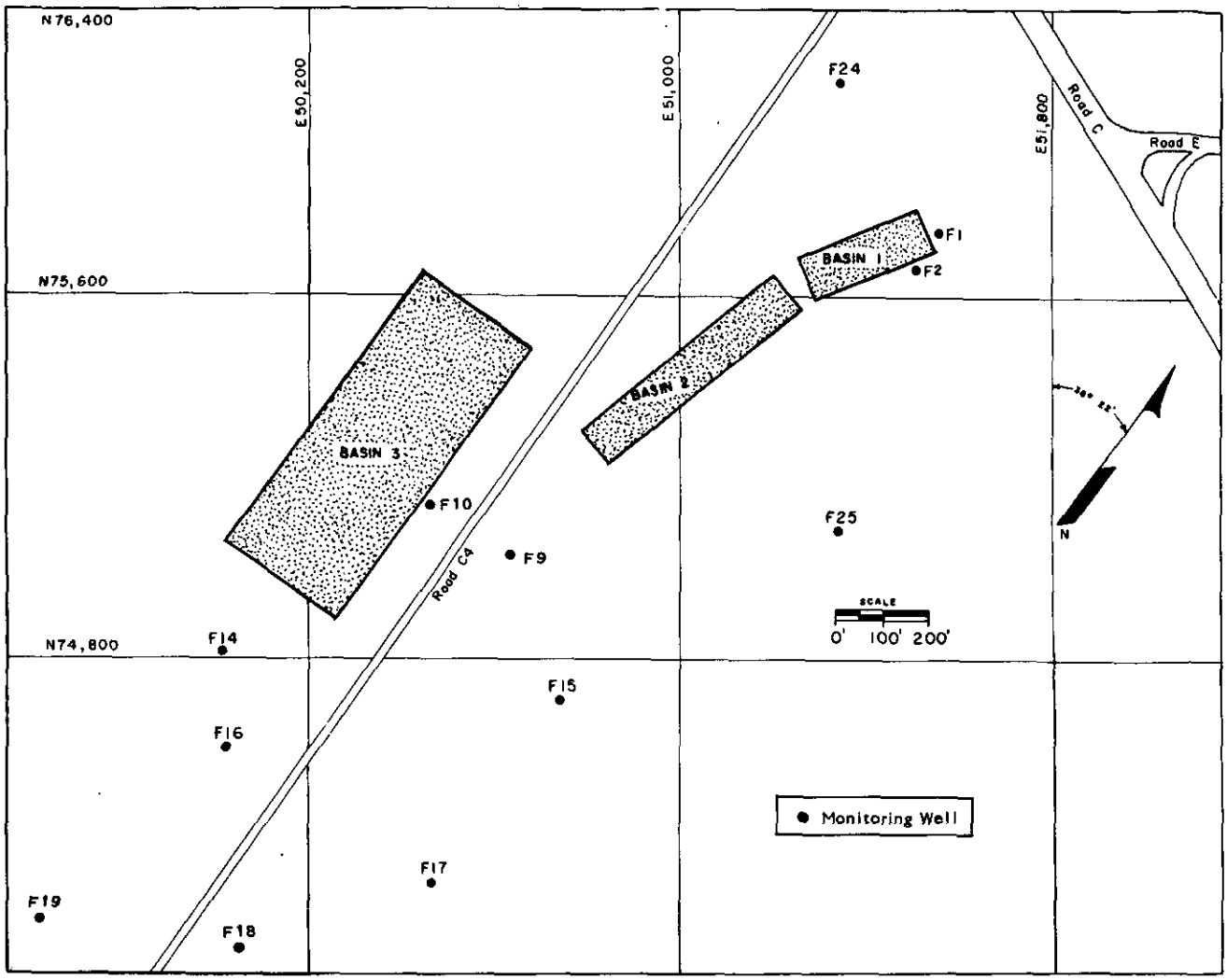

FIGURE E-4. Seepage Basins and Monitoring Wells in F Area

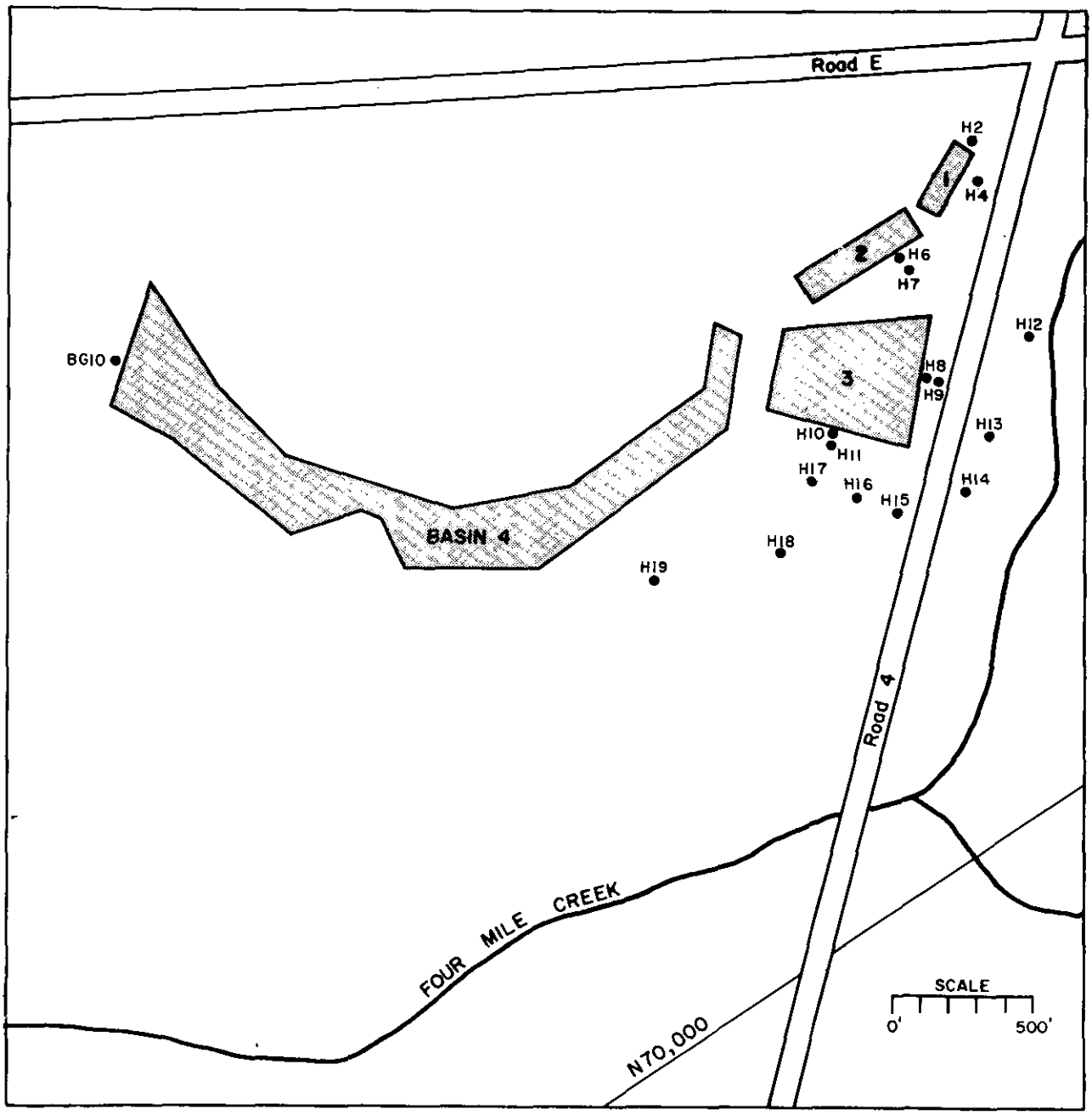

FIGURE E-5. Seepage Basins and Monitoring Wells in H Area

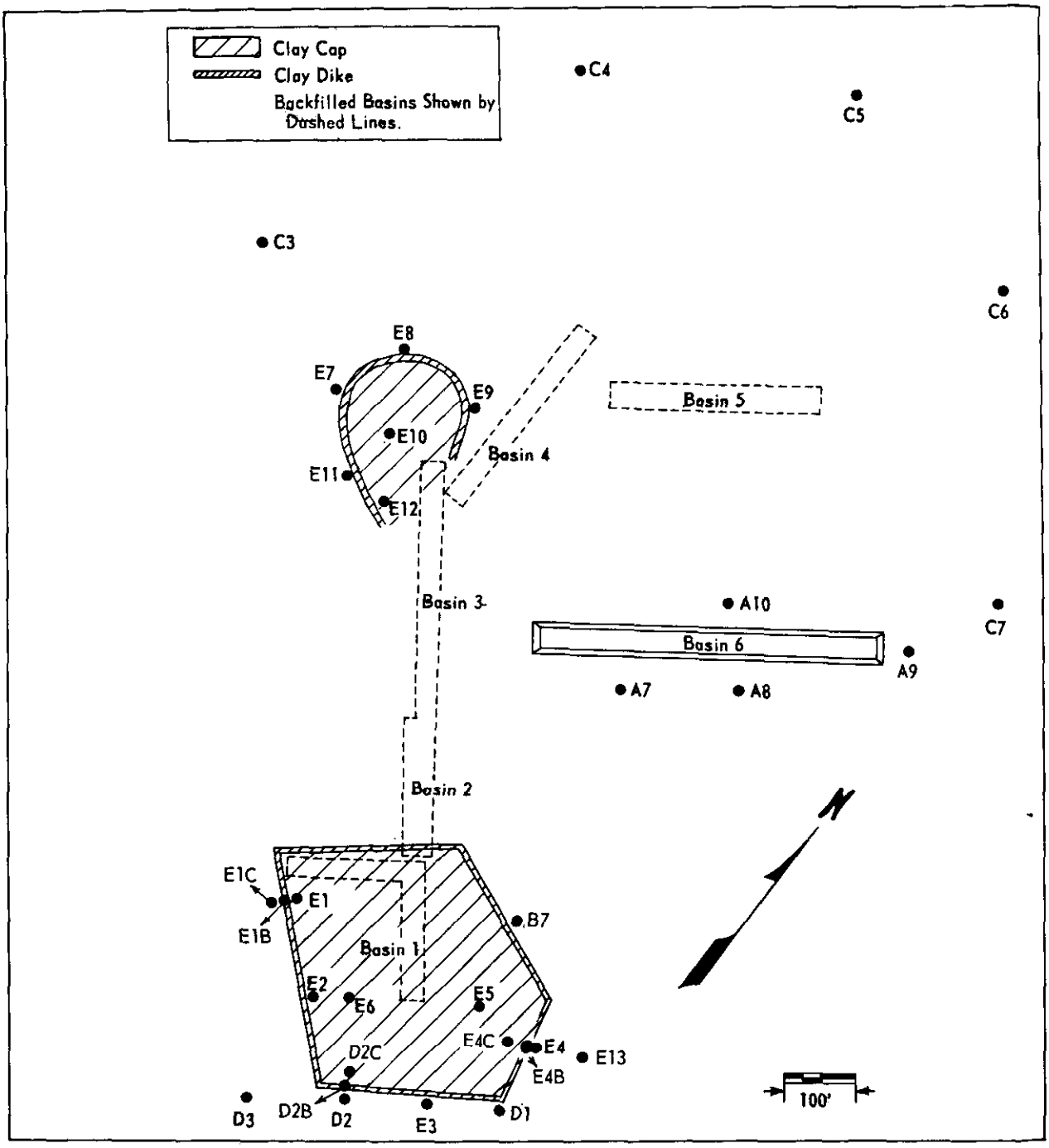

FIGURE E-6. R-Area Seepage Basin Wells

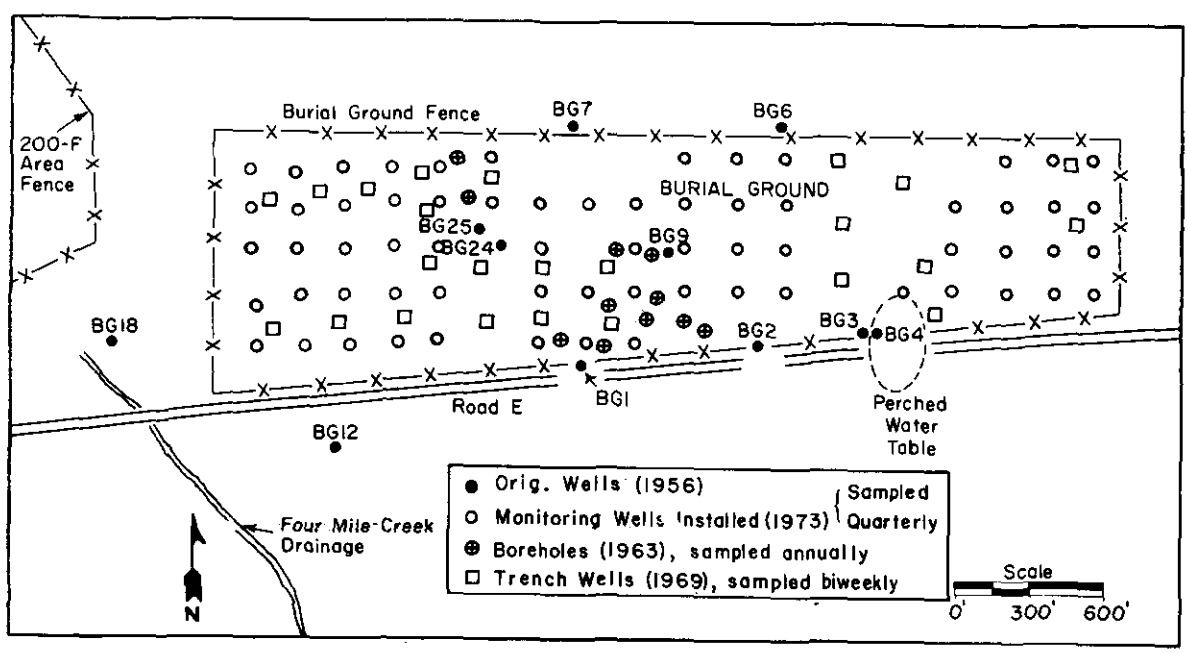

FIGURE E-7. Burial Ground Wells

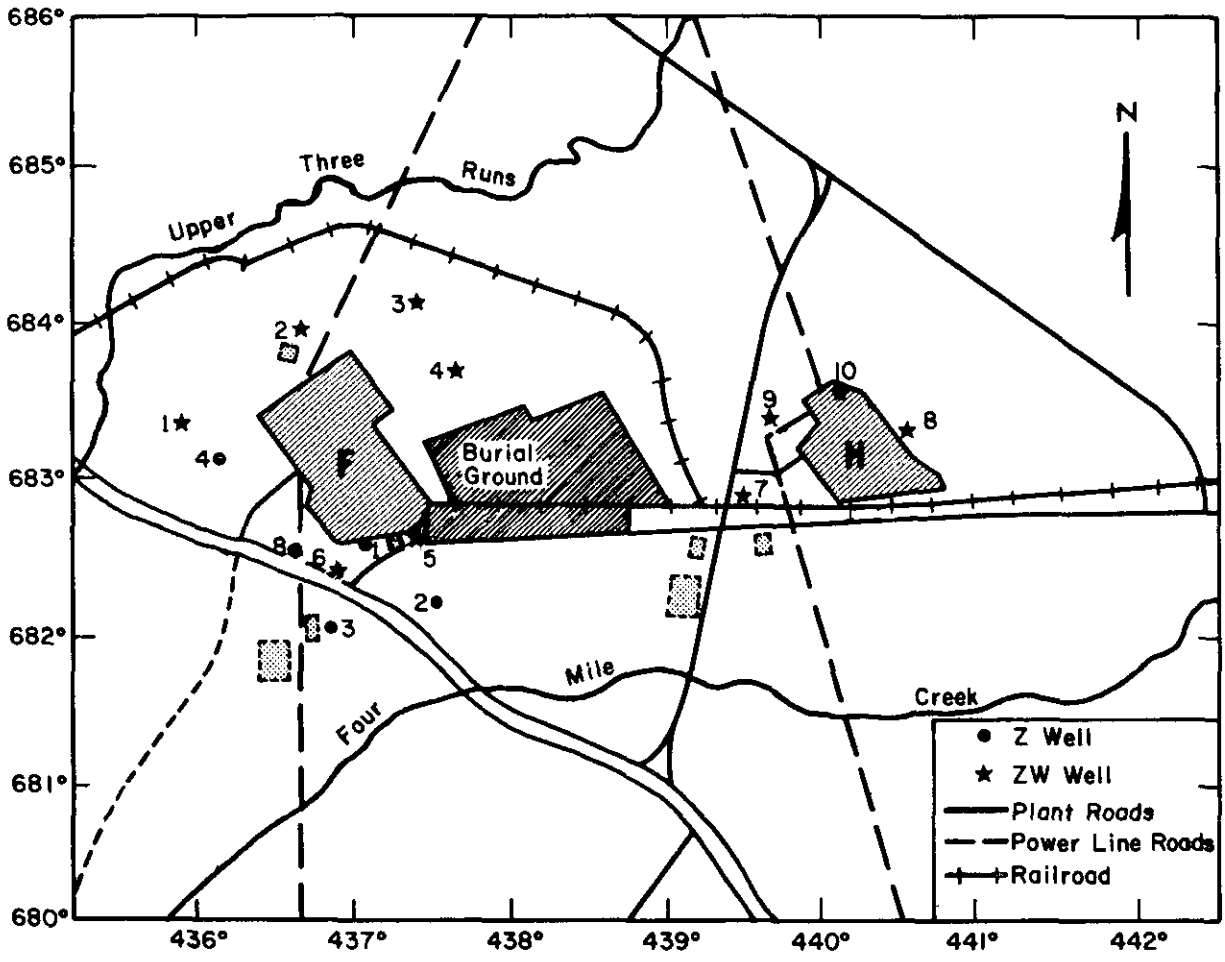

FIGURE E-8. Ground Water Surveillance Wells

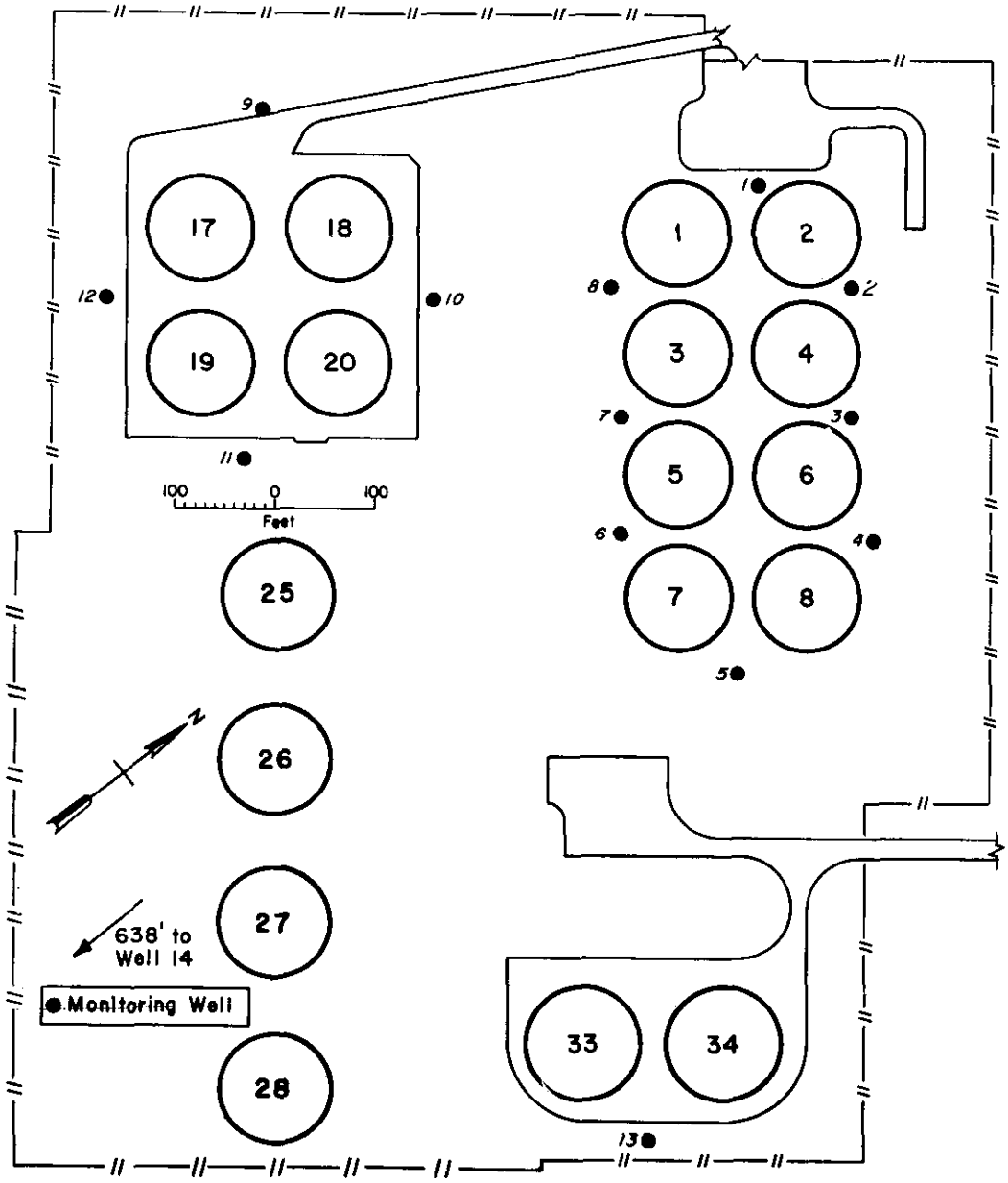

FIGURE E-9. F-Area Tank Farm Ground Water Monitoring Wells

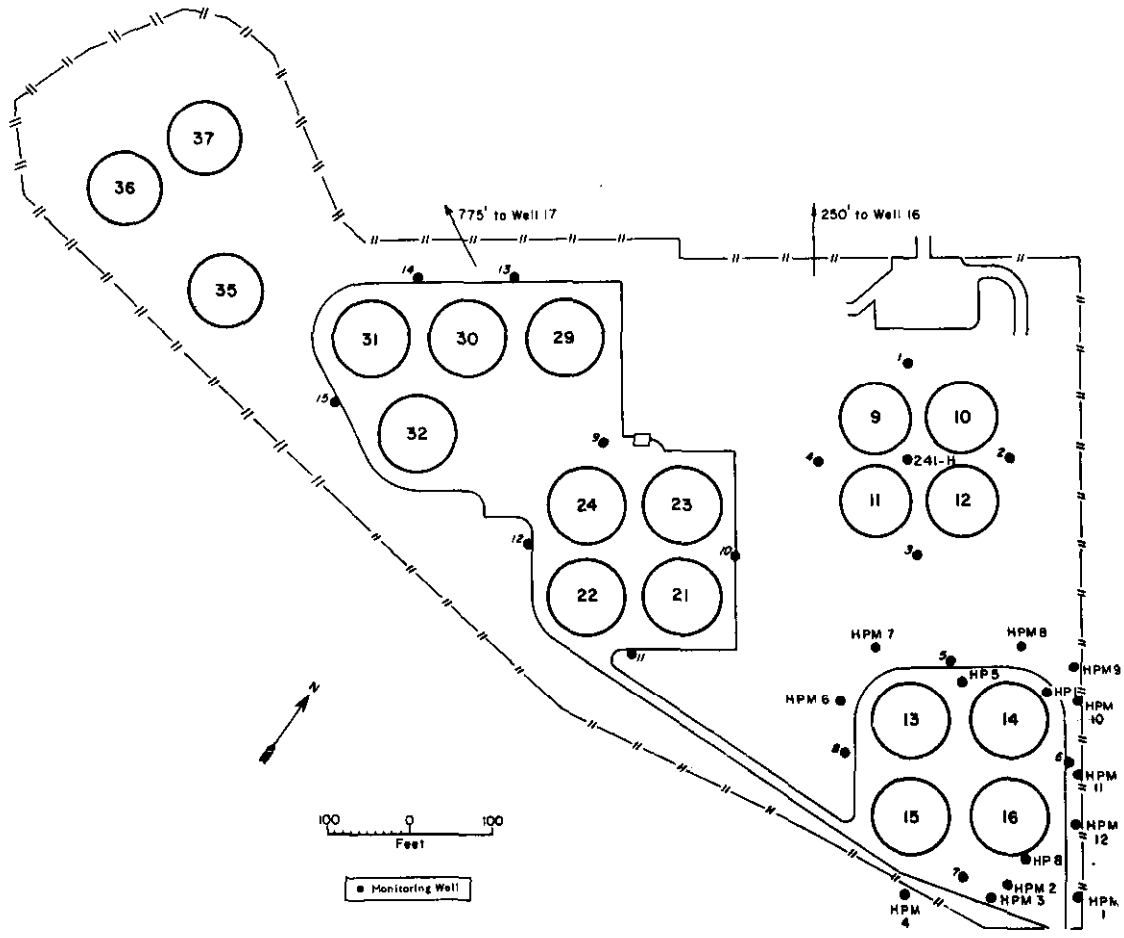

FIGURE E-10. H-Area Tank Farm Ground Water Monitoring Wells

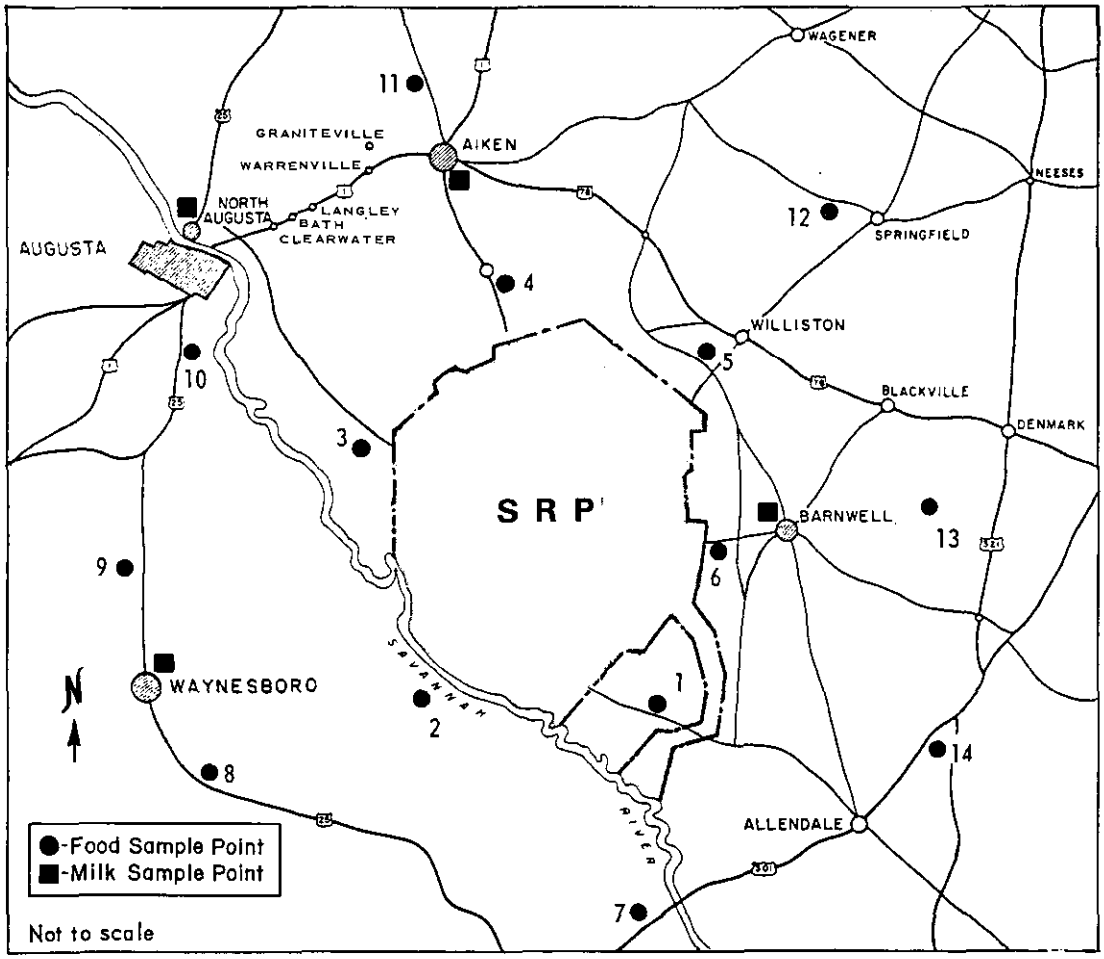

FIGURE E-11. Agricultural Products Sample Locations

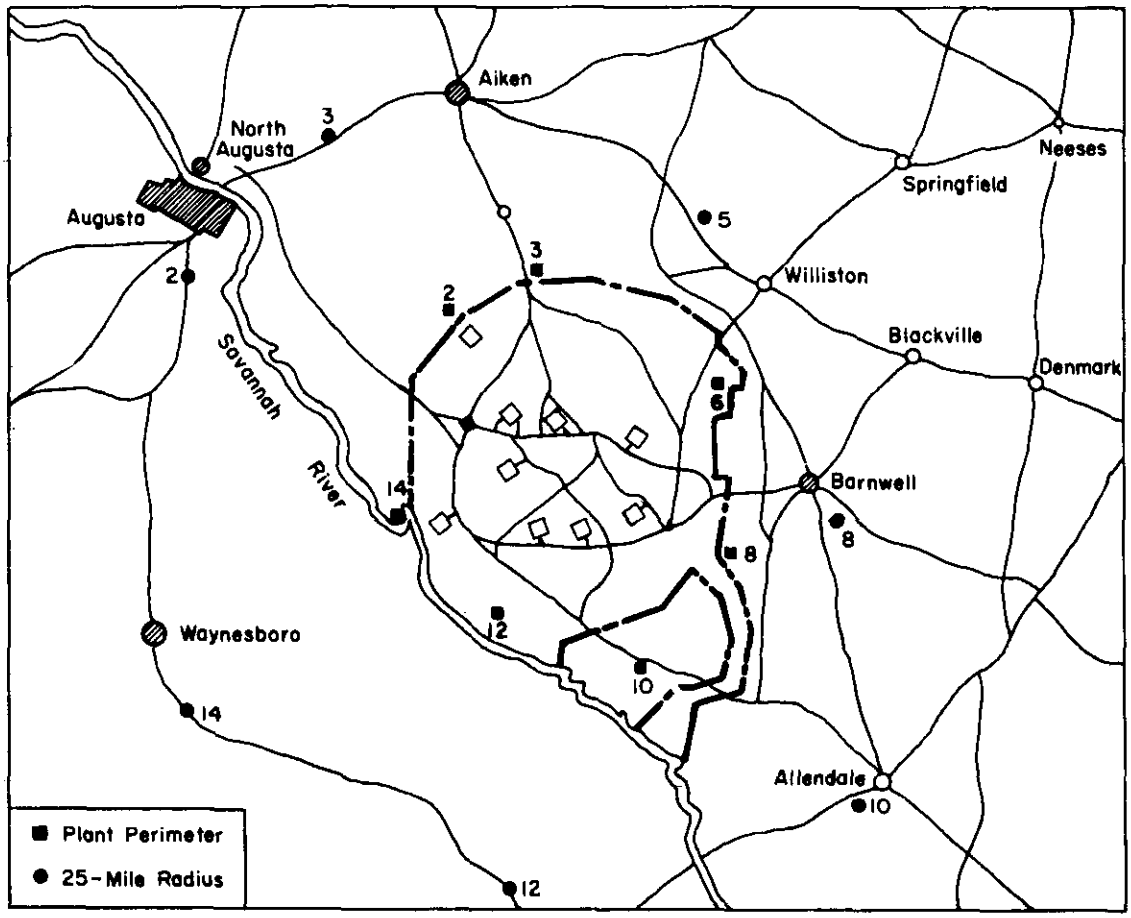

FIGURE E-12. Vegetation Sample Locations