ALABAMA POWER COMPANY

ANNUAL ENVIRONMENTAL OPERATION REPORT

PART B: RADIOLOGICAL

JOSEPH M. FARLEY NUCLEAR PLANT

UNIT NO. 1

LICENSE NO. NPF-2

AND

UNIT NO. 2

LICENSE NO. NPF-8

PERIOD ENDING DECEMBER 31, 1982

IE25 1/1

This annual report is submitted pursuant to Sections 6.9.1.6 and 6.9.1.7 of the Technical Specifications to Operation License NPF-2 and NPF-8. This report summarizes the Offsite Radiological Environmental Monitoring Program for the Joseph M. Farley Nuclear Plant, Units 1 and 2 for the period January 1, 1982 through December 31, 1982.

RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

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JOSEPH M. FARLEY NUCLEAR PLANT

UNITS 1 AND 2

I. Introduction

The Joseph M. Farley Nuclear Plant, owned and operated by Alabama Power Company (APCo), located in Houston County, Alabama is approximately fifteen miles east of Dothan, Alabama on the west bank of the Chattahoochee River. Unit 1, a Westinghouse Electric Corporation Pressurized Water Reactor (PWR) with a rated power output of 860 megawatts electrical (MWe) achieved initial criticality on August 9, 1977. The unit was declared "commercial" on December 1, 1977. Unit No. 2, also a 860 MWe Westinghouse PWR, achieved initial criticality on May 8, 1981 and was declared "commercial" on July 30, 1981.

During 1982, Unit No. 1 was shut down for a scheduled refueling outage from January 1 to March 3. Unit No. 2 was shut down for a scheduled refueling outage on October 22, 1982 and remained shut down to November 30, 1982.

The sample collection and analysis schedule for the operational off-site radiological environmental monitoring program implemented in May 1977 and as modified on July 1, 1980 with the addition of 14 TLD stations was continued during 1982 for both Units No. 1 and 2. The program was further modified effective April 1982 to reflect Amendment No. 26 to the Unit 1 Technical Specifications issued March 1, 1982. This program was designed to monitor any radioactivity contribution to the environs from the plant through either the airborne or waterborne pathways. The type of samples monitored, and number and type of sampling stations are shown in Table 1. Indicator sampling stations were located, where practical, at locations where detection of the radiological effects of the plant's operation was thought to be most likely, where the samples collected should provide a significant indication of potential dose to man, and where an adequate comparison of predicted radiological levels might be made with measured levels. The control stations were placed at locations where radiological levels were not expected to be significantly influenced by plant operation, i.e., at background locations. For some airborne radioactivity samples, community stations were located at the principal population centers between the indicator and the control stations (3-8 miles). These in normal operation could be used, if desired, as additional control stations, and alternatively, as indicator stations in the nearest population centers in the event of a major airborne release of radioactivity from the plant.

II. Radiological Sampling and Analysis

A detailed outline of the operational radiological sampling and analysis activities for the off-site environmental program to meet the requirements of the Unit 1 and 2 Technical Specifications is given in Table 2. For each parameter only one sample was collected and one analysis performed to meet the specifications for both Units No. 1 and 2.

The samples were collected by APCo's technical staff except for the in situ Ge(Li) gamma-ray spectroscopy measurements of soil. The latter were made by staff members of the University of Georgia, Center for Applied Isotope Studies. All sample analyses were contracted to either the University of Georgia (U.Ga.) or the Eberline Instrument Corporation (EIC) Santa Fe Facility. The minimum detectable concentration (MDC), specified for the various samples and their respective analyses are given in Table 3.

A number of sampling problems and/or deviations from the sampling schedule were encountered during 1982. These are listed in Table 5. Aside from the usual occasional air sampling station pump problems and non-availability of forage at the prepared plots during the winter months, there were no major deviations.

A. Airborne Particulates and Iodine

All of the airborne particulates and iodine monitoring stations shown in Figures 3.12-1, and 3.12-3 and the community stations listed in Table 2 were equipped with Bell and Gossett vacuum pumps which operate continuously at a flow rate of about 0.04/m^3/min (1.5 ft^3/min). The particulates were collected on Gelman Metricel 50 mm filters. In series with, but downstream of the particulate filters, Gelman 50 mm activated charcoal cartridges (or equivalent) were used for collection of iodine. The latter were mounted horizontally to the ground to insure uniform airflow through the filter. The accumulative air flows were measured with Rockwell Gas Meters which were calibrated against a certified flow meter. Both the particulate filters and charcoal cartridges were collected weekly and were sent to U. Ga. for radioactivity analysis.

Gross beta radioactivity measurements were made on each air particulate filter using a Tenelec low background alpha-beta counting system. The filters from each station were composited and at the end of each quarter were analyzed for gamma emitters using an eighteen percent relative efficiency low background Ge(Li) detector and a Canberra 4096 channel computer-based multichannel analyzer (MCA).

All the air monitoring station locations shown in Figures 3.12-1 and 3.12-3 have the capability of monitoring airborne iodine. Weekly routine samples were collected and were analyzed for iodine-131 by U. Ga. using a Canberra 1024 channel MCA and a special counter designed and built by U. Ga. for counting iodine-131 activity in charcoal cartridges, using two 1 x 3 NaI(Tl) detectors and matched photomultiplier tubes.

B. External Radiation

For the continuous measurement of environmental gamma radiation, natural LiF (TLD-100) chips were supplied and read by Eberline Instrument Corporation. TLD packets each containing five ultrasonically cleaned and annealed LiF chips were supplied on both a quarterly and an annual basis. The chips were first sealed in opaque polyethylene to give a packet that was light-tight, weather-proof, and which had a low mass attenuation for radiation (approximately 50mg/cm^2).

Two control TLD packets were shipped with each quarterly and annual batch of TLD's as an indicator of any unusual exposure during transit, and at the plant site prior to, or after field exposure. On the plant site, all TLD packets were kept in a lead safe with 2-inch walls except for those receiving field exposure or in the process of being exchanged. Control Packet No. 1 which had been received with the new batch of TLD's and Control Packet No. 2 received with the previous batch of TLD's were returned with the field exposed TLD's for a reading of their respective doses. The new Control Packet No. 2 remained in the safe until the next TLD exchange and the above procedure was repeated.

At each external radiation monitoring station, shown in Figures 3.12-1, 3.12-2, and 3.12-3, two TLD packets, one changed and read quarterly and one changed and read annually, were exposed side-by-side on metal stakes at a height of one meter above the ground. For the computation of the net field doses, a log of all exposure periods was maintained for each TLD packet.

C. Milk

Milk samples were collected semi-monthly (bi-weekly after April 1, 1982) at the location shown in Figure 3.12-3 and were analyzed by U. Ga. for iodine-131 and gamma emitters. As a preservative during shipment, 1 ml of a 25 percent (by weight) merthiolate (Thimerasol) solution and 4 ml of a 6N NaOH solution were added to each 2.5 gallon sample.

The iodine-131 concentration in each sample was determined by collection on anion exchange resin, elution with sodium hypochlorite, followed by organic extraction and counting by beta-gamma coincidence the resultant toluene-iodine solution in a special design (UGA) low level liquid scintillation counter. Stable iodine carrier was added to each sample for determination of the radiochemical yield.

Once each month (each sample after April 1, 1982), a 1 liter sample was placed in a marinelli beaker and was then analyzed for gamma emitters using an 18 percent relative efficiency low background Ge(Li) detector and a Canberra 4096 channel computer based MCA.

Also, once each month (January through March 1982) for each sampling station, a 1.5 liter aliquot of milk was taken for radiostrontium analysis. Following an EDTA separation of calcium, the single separation dual count technique, using a Tenelec LB5100 automatic low background alpha-beta counting system was used for beta measurements. Following the second count, the in-growth of yttrium-90 was determined and stable strontium carrier was added for determination of radiochemical yield. From these data, the strontium-90 and strontium-89 concentrations were calculated.

D. Vegetation

1. Forage

Once each month, forage was collected from indicator grass plots located near the air monitoring stations at the plant site perimeter in sectors 7 (SSE) and 16 (N), and from a control grass plot located near the air monitoring station in Dothan. After drying and pulverizing the samples were analyzed by U. Ga. for gamma emitters using an 18 per cent relative efficiency low background Ge(Li) detector and a Canberra 4096 channel computer based MCA.

2. Vegetables and Fruits

a. Green leafy vegetables

During the growing season, January through March, green leafy vegetables were obtained monthly as available from gardens in the vicinity of the plant (1-3 miles) and from gardens in the Dothan area (> 10 miles) and were analyzed by U. Ga. for gamma emitters using an 18 per cent relative efficiency low background Ge(Li) detector, and a Canberra 4096 channel computer-based MCA. (Sampling of green leafy vegetables was discontinued after March 31, 1982).

b. Other Vegetables and Fruits

Sampling of other vegetables and fruits was discontinued after March 31, 1982.

E. Soil

Annual in situ gamma-ray spectroscopy measurements were made by U. Ga. using a 10 per cent relative efficiency high purity germanium detector and gamma-ray spectroscopy system specially designed for field use, at the 7 indicator locations and at the 5 community and control (background) locations listed in Table 2. A 1024 channel Canberra MCA was interfaced to a Hewlett-Packard 9825A calculator for data storage and analysis.

F. Surface Water (River)

Samples of water from the Chattahoochee River, above and below the plant site at the locations shown in Figure 3.12-4 were collected on a semi-continuous basis with Instrumentation Specialties Company (ISCO) samplers. Monthly composites were sent to U. Ga. for radioactivity analysis. Two liter aliquots from each monthly composite were placed in trays lined with plastic film and evaporated to dryness at 100°C. The residue and plastic film was folded to fit a petri-dish and analyzed for gama emitters using an 18 per cent relative efficiency Ge(Li) low background detector and a Canberra 4096 channel computer-based MCA.

At the end of each quarter, for each sampling location, the balance of the three monthly composites were combined to give a quarterly composite sample. Approximately 50 ml from each quarterly composite sample was distilled and a 25 ml aliquot taken for tritium analysis using a large volume (100 ml) low background liquid scintillation counter specially designed and built by U. Ga.

G. Groundwater (Well)

In the Farley Plant area, there are no indicator sources of groundwater in the true sense of the definition. A well which serves the Great Southern Paper as a source of potable water, located on the east bank of the Chattahoochee River about four miles south-southeast of the plant, was sampled on a quarterly basis and designated as an indicator station. A deep well which supplies water to the Whatley Residence located about 1.2 miles southwest of the center of the plant was sampled on a quarterly basis and designated as a control (background) station. Samples from both were sent to U. Ga. for radioactivity analysis. An aliquot from each sample was taken for tritium analysis. After distillation, 25 ml samples were analyzed using a large volume (100 ml) low background liquid scintillation counter specially designed and built by U. Ga. From the remainder of each sample, a two liter aliquot was taken and evaporated to dryness at 100°C in a tray lined with plastic film. The residue and film was folded to fit in a petri dish and analyzed for gamma emitters using an 18 relative per cent Ge(Li) detector and a Canberra 4096 channel computer-based MCA.

H. Fish (River)

On a semi-annual basis, two types of fish - game and bottom feeding were collected from the Chattahoochee River at the locations shown in Figure 3.12-4, and were sent to U. Ga. for gamma-ray spectroscopy analysis. The edible tissue was removed, dried, pulverized and analyzed for gamma emitters using an 18 per cent relative efficiency low background Ge(Li) detector and a 4096 channel Canberra computer-based MCA.

I. Sediment (River)

On a semi-annual basis sediment samples were collected from the Chattahoochee River below the plant site at the location shown in Figure 3.12-4. Approximately 1 kg was sent to U. Ga. for gamma-ray spectroscopy analysis. The samples were dried, mixed, and analyzed using an 18 per cent relative efficiency low background Ge(Li) detector and a Canberra 4096 channel computer-based MCA.

III. Results and Discussion

During the operational period, no known atmospheric nuclear tests were conducted. Identifiable radioactivity effects from the last test conducted by the Poeples Republic of China on October 16, 1980 were essentially non-existent during 1982.

For measurements involving radioactivity concentrations by volume or mass the designation "minimum detectable concentration" (MDC) is used to denote the limit of detection applicable at the 95 per cent confidence level. The MDC is defined as "the smallest concentration of radioactive material in a sample that will be detected with 95 per cent probability with only 5 per cent probability of falsely concluding its presence". For a particular measurement, which may include radiochemical separation:

$$MDC = \frac{4.66\ Sb}{2.22\ EMY} \qquad (1)$$

where

MDC is the estimated minimum detectable concentration as defined above (pCi per unit mass or volume)
Sb is the standard deviation of the background counting rate for the sample being analyzed (a posteriori) or of a blank sample (a priori) as appropriate (counts per minute)
2.22 is the number of transformations per picocurie per minute
E is the counting efficiency (counts per transformation)
M is the weight of sample in kilogram or volume of sample in liters, as applicable
Y is the fractional radiochemical yield (when applicable)

For measurements involving a quantity of radioactivity or radiation that is independent of the sample volume or mass the designation "lower limit of detection" (LLD) is used to denote the limit of detection applicable at the 95 per cent confidence level. The LLD is defined as "the smallest amounts of sample activity that will yield a net count for which there is confidence at a predetermined level that activity is present". It's applications are limited to measurement systems which denote a limiting detection capability without respect to the size of sample and/or radiochemical yield and to measurements which by their nature do not involve concentrations, such as radiation dose rates (mrad/hr., mrad/qtr., etc.)

A. Airborne Particulates and Iodine

The results of the radioactivity analyses of airborne particulate filters and iodine charcoal cartridges are shown in Table F06-1. The mean gross beta activity value for the indicator sampling locations was slightly lower than the community and control sampling locations. The average mean gross beta values for all sampling locations were lower by a factor of four to five than the respective 1981 and pre-operational values.

The gamma-ray spectroscopy data for the air particulate filter composites did not show the presence of fission product fallout as was seen in 1981 and during the preoperational period. Only traces of cesium-137 were found in a few samples. All iodine-131 values were below the measurement MDC as was found in 1981 and during the preoperational period.

B. External Radiation

The results of the external radiation measurements using TLD packets, each containing five LiF chips, are shown in Table FO6-2. As found during the preoperational measurement period and during 1981, the data reflects the differences in site specific soil radioactivity, with the average indicator values higher than for the community and control values. All the averages were lower than found in 1981, but were higher than found during the preoperational period. The sums for the four quarterly measurements were higher than the averages for the annual TLD's as was found in 1981. During the preoperational period that average values for the annual TLD's was slightly higher than the respective sums of the four quarterly measurements which is the reverse of that found in 1981 and 1982.

C. Milk

The results from the analysis of milk for radioactivity are shown in Table FO6-3. Milk from the Brooks-Silcox Dairy was sampled as the control. No indicator milk locations were available for comparison during 1982. Other than natural radioactivity and a low level of zinc-65 in one sample only strontium-89 and strontium-90 were found as detectable levels. The average strontium-89 value was about one half that found in 1981 and slightly lower than the value for the preoperational period. The average strontium-90 value was slightly lower than for 1981 and lower by a factor of three than for the preoperational period.

D. Vegetation

The vegetation sampled during this operational period included forage and green leafy vegetables. The radioactivity analysis results for this operational period are shown in Table FO6-4.

Forage, as during the preoperational period, continued to be a very effective and sensitive indicator of airborne radioactivity. The specific activity values for the various gamma emitting radionuclides were not significantly different for the indicator locations and the control location. A low level of iodine-131 was found in one indicator sample at the south perimeter sampling station during November 1982, but was not found in the north perimeter sample. No man-made radioactivity was found in the green leafy vegetable samples. During 1981 and the preoperational period, a number of fissions product radionuclides were found in the samples.

E. Soil

The results of the one in situ Ge(Li) gamma-ray spectroscopy analysis of soil during this operational period are shown in Table F06-5. The only man-made radioactivity found at low levels in all measurements was cesium-137. During the measurements in and during the pre-operational period, the fission products zirconium, niobium-95 and cesium-134 were seen at most of the locations in addition to cesium-137. The levels of cesium-137 were about the same as for the 1980 and pre-operational periods.

F. Waterborne: Surface and Ground Water

The results of radioactivity analyses of surface water from the Chattahoochee River and ground water from wells are shown in Table F06-6. In a few surface water samples very low levels of cesium-134 and cesium-137 were seen in both the indicator and control samples. The values were slightly higher for the control sampling location. The average tritium levels for the surface water indicator location downstream of the plant was about a factor of two higher than the average for the upstream control location, but is not considered significant since the average value is only about the same as those found in 1981 and does not represent a significant increase from the pre-operational period.

Again as in 1981, no detectable gamma radioactivity was found in the ground water samples. However, two of the indicator samples from other Great Southern Paper Company Well indicated tritium at an average level only slightly lower than that for the surface water from the river. Tritium was also found in two samples from the well during 1981 and in one sample during the preoperational period.

G. Sediment: River

The results of radioactivity analysis of sediment samples from the Chattahoochee River are shown in Table F06-7. Manmade radioactivity was not found at detectable levels during 1982 which is in agreement with that found during 1981 and during the preoperational period.

H. Fish: River

The results of gamma-ray spectroscopy analysis of the edible portions of three types of fish taken from the Chattahoochee River are shown in Table F06-8. In addition to cesium-137 which was found at low levels in both the indicator and control samples, niobium-75 at close to the limit of detection was found in one indicator sample. The average cesium-137 values were about one half that found in 1981 and about the same as during the preoperational period.

I. Sampling and Analysis Deviations

The sampling and analysis deviations listed in Table 5 were chiefly mechanical problems such as failure of the air or water samplers. During the winter months, grazing by deer and rabbits resulted in inadequate forage at established forage sampling plots thus samples were taken at alternate locations on some occasions. Several TLDs were missing, but the number was not excessive compared with prior years. No analysis deviations were noted.

IV. Land Use Census and Interlaboratory Comparison Program

A. Land Use Census

The results of the June 1982 Land Use Census are given in Attachment 1 to this report.

B. Interlaboratory Comparison Program

During 1982, the University of Georgia Center for Applied Isotope Studies was a participant in the EPA Crosscheck Program. The U. Ga. EPA Program code designation is EA.

V. Data Trends and Conclusion

Review of the analysis data against the 1981 and the preoperational periods revealed no trends indicating changes in radioactivity levels in the environs of the Farley Nuclear Plant as the result of its operation. This is supported by the low levels of radioactivity measured in plant effluents discharged to the environment, as reported in the semi-annual radioactive effluent release reports for 1982.

Based on information supplied in this report, there is no significant evidence to indicate any increase in airborne or waterborne environmental radioactivity as the result of plant operations.

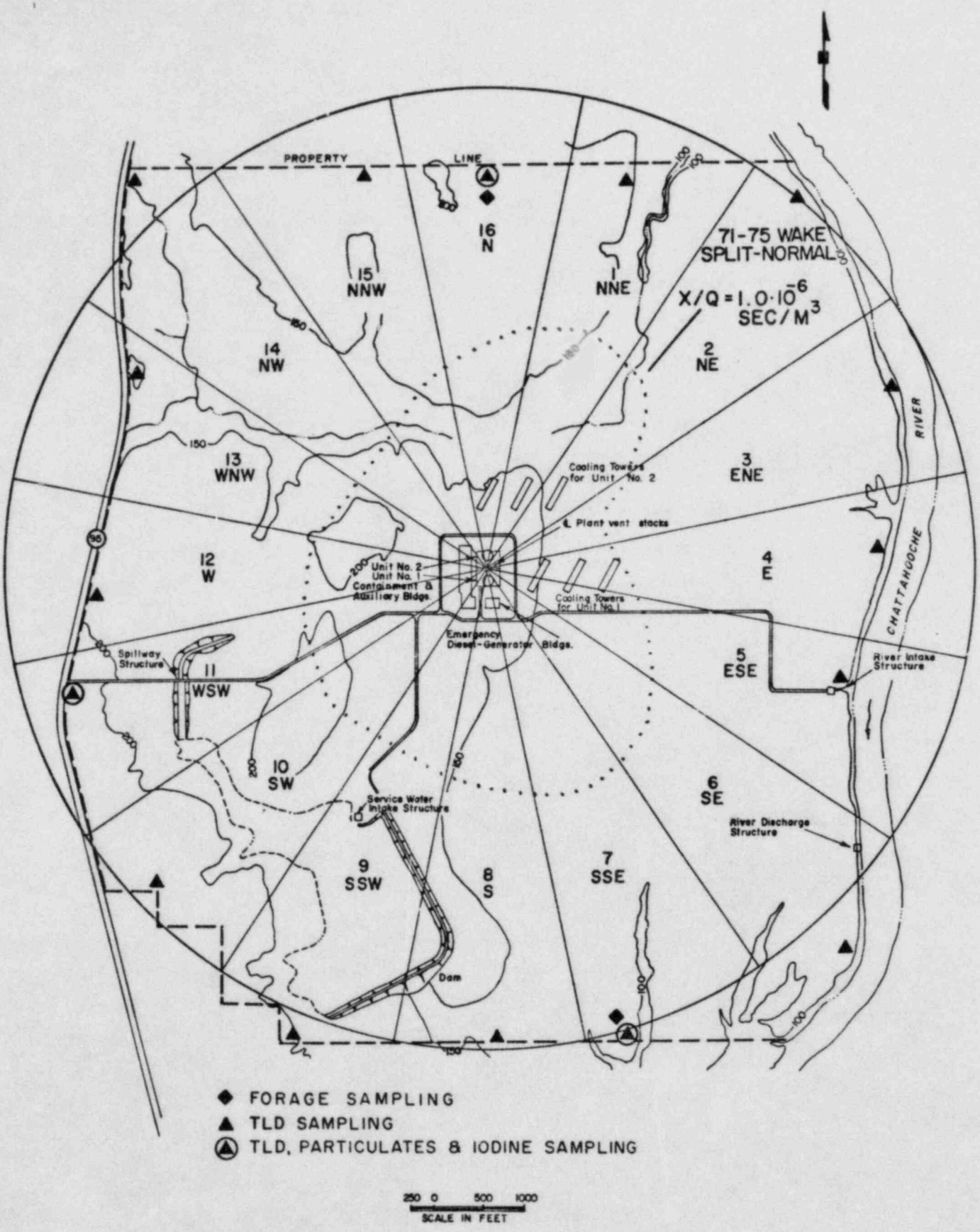


FIGURE 3.12-1 INDICATOR SAMPLING LOCATIONS FOR AIRBORNE ENVIRONMENTAL RADIOACTIVITY AT THE FARLEY NUCLEAR PLANT.

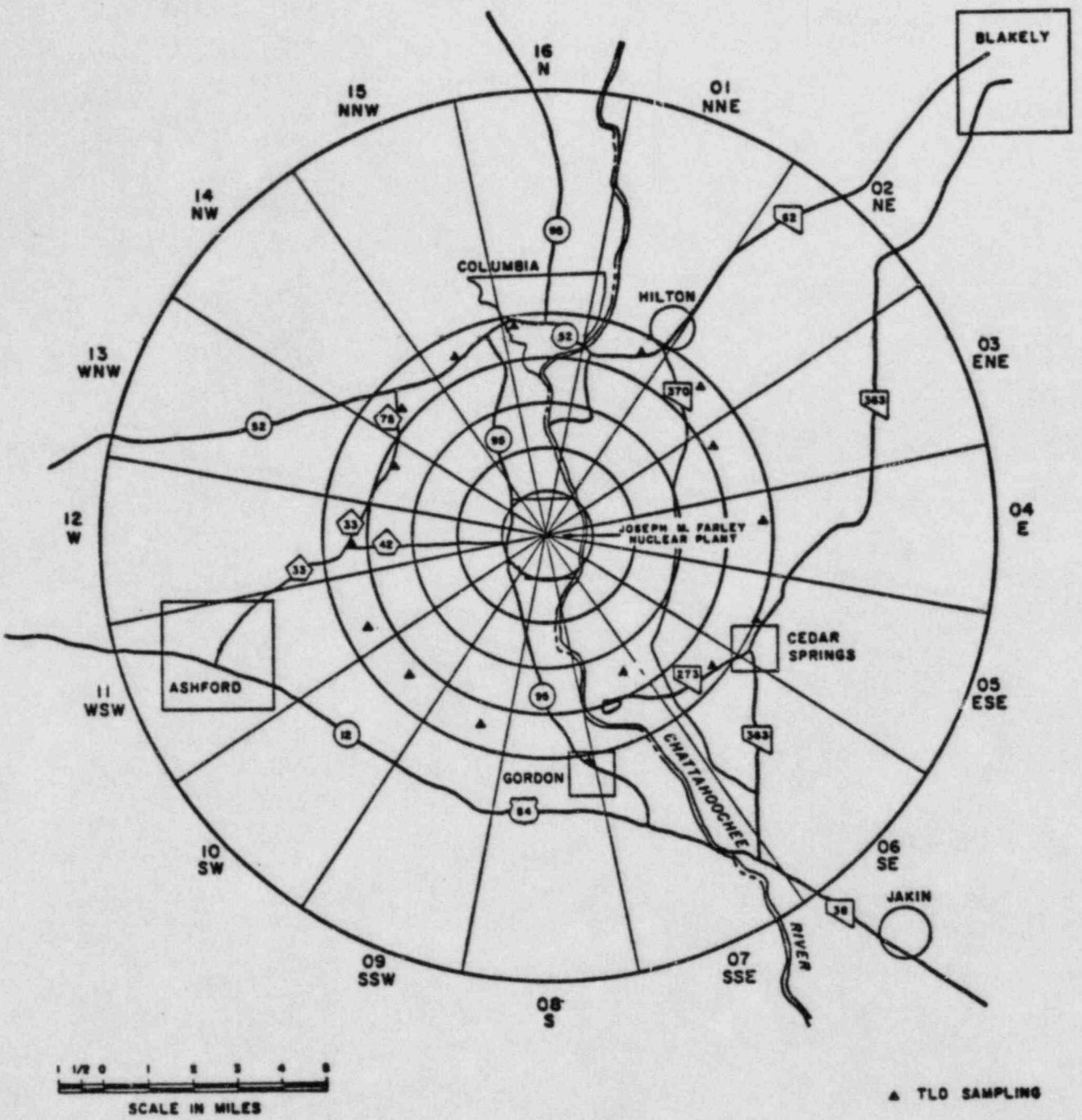


FIGURE 3.12-2 COMMUNITY (INDICATOR II) SAMPLING LOCATIONS FOR AIRBORNE RADIOACTIVITY IN THE FARLEY NUCLEAR PLANT AREA.

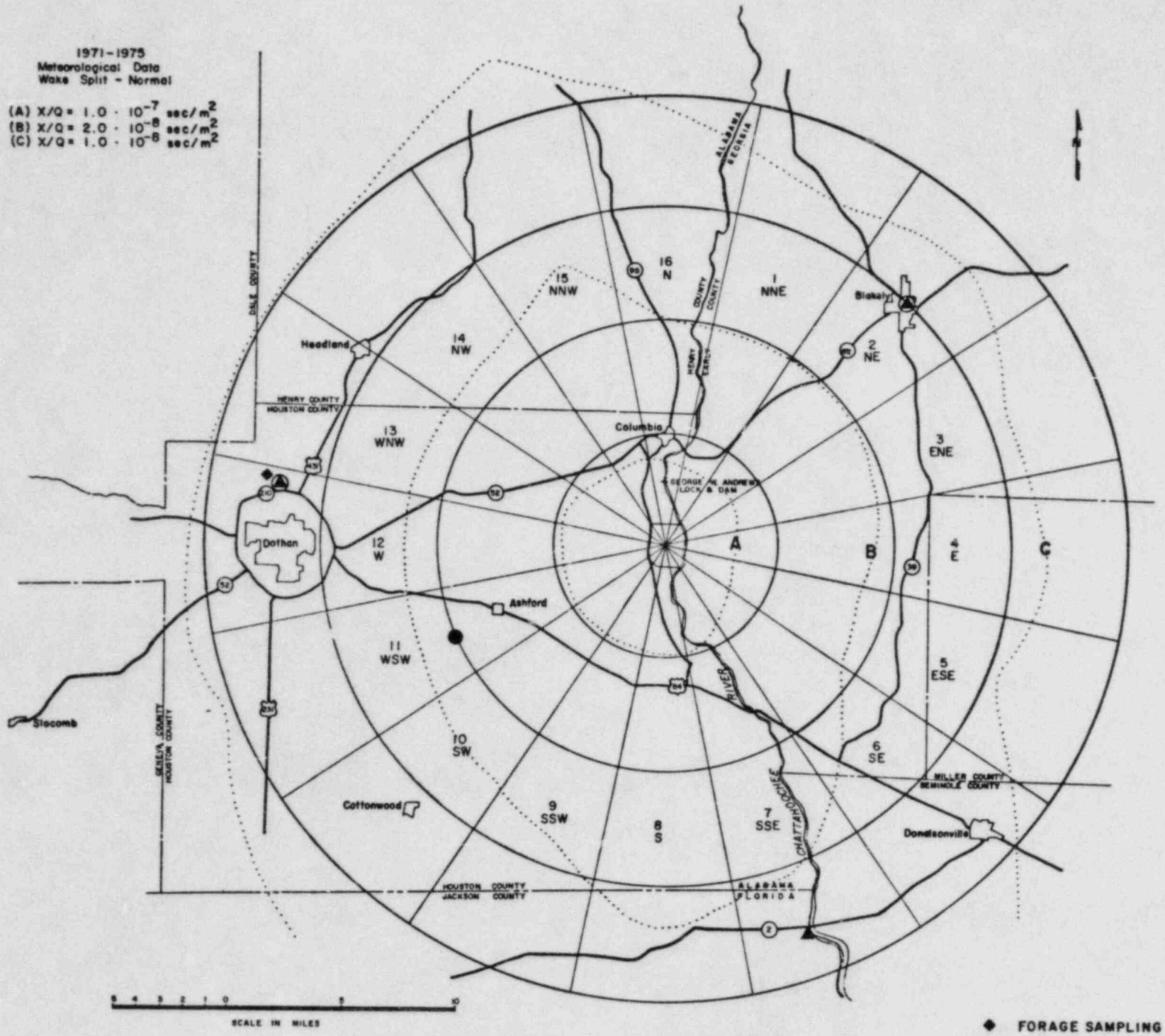
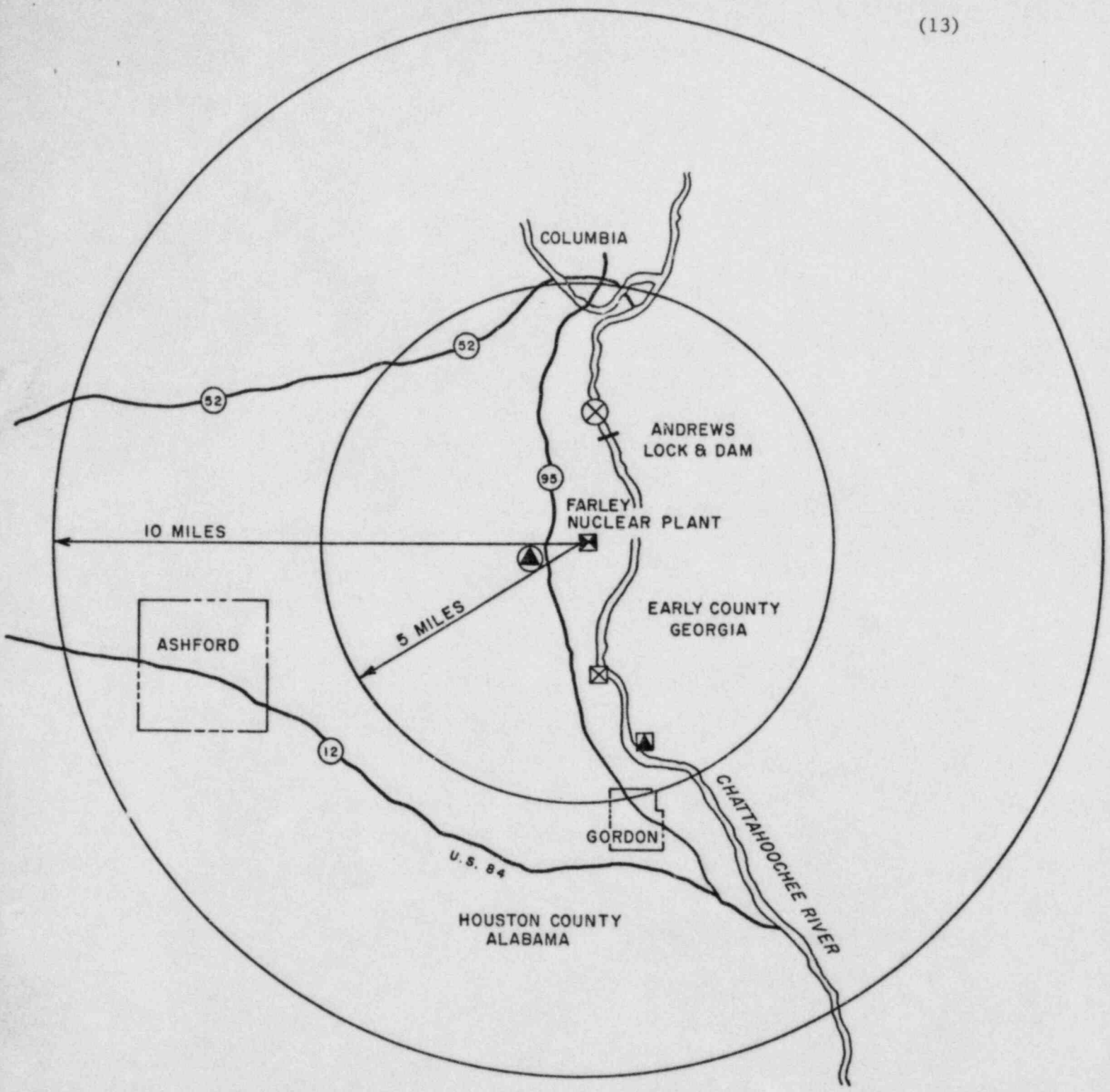


FIGURE 3.12-3 CONTROL SAMPLING LOCATIONS FOR AIRBORNE ENVIRONMENTAL RADIOACTIVITY IN THE FARLEY NUCLEAR PLANT AREA.

- ◆ FORAGE SAMPLING
- ▲ TLD SAMPLING
- ⓐ TLD, PARTICULATES AND IODINE SAMPLING
- ● MILK SAMPLING



INDICATOR STATIONS

- SURFACE AND GROUND WATER
- FISH AND SEDIMENT

CONTROL STATIONS

- SURFACE WATER AND FISH
- GROUND WATER

FIGURE 3.12-4 INDICATOR AND CONTROL SAMPLING LOCATIONS FOR WATERBORNE ENVIRONMENTAL RADIOACTIVITY IN THE FARLEY NUCLEAR PLANT AREA.

TABLE 1

SCOPE OF OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM AT THE FARLEY NUCLEAR PLANT DURING 1982

Principal Pathway	Type of Samples	Number of Sampling Stations		
		Indicator	Community	Control
Airborne	Airborne Particulates	3	3	2
	Airborne Iodine	3	-	2
	External Radiation	16	17	6
	Milk	1[a]	-	1
	Forage[b]	2	-	1
	Vegetables and Fruits[c]	1	-	1
	Soil[d]	7	3	2
Waterborne	River Water	1	-	1
	Groundwater	1	-	1
	River Fish	1	-	1
	River Sediment	1	-	-

[a] If available.

[b] Forage sampling in lieu of vegetable and fruit.

[c] Vegetable and fruit sampling discontinued with implementation of Unit 1 Technical Specification Upgrade (Amendment No. 26, issued March 1, 1982).

[d] Annual In Situ Gamma Measurements continued by choice of licensee during 1982.

TABLE 2

OUTLINE OF OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM FOR FARLEY NUCLEAR PLANT DURING 1982

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
AIRBORNE	Continuous operation of sampler with sample collection as required by dust loading but at least once per 7 days.	Particulate sampler.
Particulates		Analyze for gross beta radioactivity ≥ 24 hours following filter change. Perform gamma isotopic analysis on each sample when gross beta activity is > 10 times the yearly mean of control samples. Perform gamma isotopic analysis on composite (by location) sample at least once per 92 days.
Indicator Stations:		
North Perimeter (N-0.8) South Perimeter (SSE-1.0) Plant Entrance - Nearest Residence (WSE-0.9)		
Community Stations:		
Columbia, Al.(N-5) Great Southern Paper Co., (SSE-3) Ashford, Al.(WSW-8)		
Control Stations:		
Blakely, Ga.(NE-15) Dothan, Al. (W-18)		
Iodine	Continuous Sampler operation with charcoal canister collection weekly.	Radioiodine canister. Analyze at least once per 7 days for I-131.
Indicator Stations:		
North Perimeter (N-0.8) South Perimeter (SSE-1.0) Plant Entrance - Nearest Residence (WSW)-0.9		

TABLE 2 (CONT'D)

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
Control Stations: Blakely, Ga. (NE-15) Dothan, Al. (W-18)		
Soil	Annual *in situ* Ge(Li) gamma-ray spectroscopy measurements.	Gamma Isotopic - annually.
Indicator Stations: Seven Stations along the plant perimeter (N-0.8, NE-1.0, E-0.8, SSE-1.0, SSW-1.0, WSW-0.9, and NNW-0.8)		
Community Stations: Columbia, Al. (N-5) Great Southern Paper Co., Ga. (SSE-3) Ashford, Al. (WSW-8)		
Control Stations: Blakely, Ga. (NE-15) Dothan, Al. (W-18)		
DIRECT RADIATION	At least once per 92 days	Gamma dose. Readout at least once per 92 days
Indicator I Stations: Sixteen stations, one in each meteorological sector, along the plant perimeter. (N-0.8, NNE-0.9, NE-1.0, ENE-0.9, E-0.8, ESE-0.8, SE-1.1, SSE-1.0, S-1.0, SSW-1.0, SW-0.9, WSW-0.9, W-0.8, WNW-0.8, NW-1.1, and NNW-0.9)		

TABLE 2 (CONT'D)

Table of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
Indicator II (Community) Stations: Sixteen stations, one in each meteorological sector at a distance of 4-5 miles. (NNE-4, NE-4, ENE-4, E-5, ESE-5, SE-5, SSE-3, S-5, SSW-4, SW-5, WSW-4, W-4, WNW-4, NW-4, NNW-4, and N-5) Additional station at Ashford, Al. (WSW-8).		
Control Stations: Blakely, Ga. (NE-15) Georgia Rt. 39 (ENE-15) Neals Landing, Fl. (SSE-18) ALA Rt. 52 (WSW-26) Dothan, Al. (W-18) Dothan, Al. (W-15)		
WATERBORNE		
Surface Water		
Indicator Station: Great Southern Paper Co., (3 miles below plant discharge)	Composite taken with proportional semi-continuous sampler, having a minimum sampling frequency not exceeding two hours collected over a period $\leq$ 31 days.	Gamma isotopic analysis of each composite sample. Tritium analysis of composite sample at least once per 92 days.
Control Station: Upstream of Andrews Lock and Dam ($\sim$ 3 miles above plant intake)		

TABLE 2 (CONT'D)

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
Ground Water		
Indicator Station:	Grab sample taken at least once per 92 days.	Gamma isotopic and tritium analyses of each sample.
Great Southern Paper Co., Well (SSE-4)		
Control Station:		
Whatley Residence, Well (SW-1)		
River Sediment		
Indicator Station:	Grab sample taken at least once per 184 days.	Gamma isotopic analysis of each sample.
Downstream of plant discharges at Smith's Bend (∿ 2 miles)		
INGESTION		
Milk		
Indicator Stations:	At least once per 16 days when animals are on pasture; at least once per 31 days at other times.	Gamma isotopic and I-131 analysis of each sample.
Not Available		
Control Station:		
Brooks-Silcox Dairy, Ashford, Al. (WSW-10)		

TABLE 2 (CONT'D)

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
Fish		
Indicator Station: Downstream of plant discharge in vicinity of Smith's Bend (∿ 2 miles) Control Station: Upstream of Andrews Lock and Dam	One sample of the following species at least once per 184 days: 1. Game Fish 2. Bottom Feeding Fish	Gamma isotopic analysis on edible portions.
Forage		
Indicator Stations: North Perimeter (N-0.8) South Perimeter (SSE-1.0) Control Station: Dothan, Al. (W-18)	Grab sample cut from green forage at least once per 31 days.	Gamma isotopic analysis which includes I-131 analyses of each sample.

TABLE 3

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS
FARLEY NUCLEAR PLANT

Analysis	Water (pCi/l)	Airborne Particulate or Gas (pCi/m^3)	Fish (pCi/kg.wet)	Milk (pCi/l)	Food Products (pCi/kg. wet)	Sediment (pCi/kg. dry)
gross beta	4	1×10^{-2}	NA	NA	NA	NA
H-3	2000	NA	NA	NA	NA	NA
Mn-54	15	NA	130	NA	Na	NA
Fe-59	30	NA	260	NA	NA	NA
Co-58, 60	15	NA	130	NA	NA	NA
Zn-65	30	NA	260	NA	NA	NA
Zr-95	30	NA	NA	NA	NA	NA
Nb-95	15	NA	NA	NA	NA	NA
I-131	1[b]	7×10^{-2}	NA	1	60	NA
Cs-134	15	5×10^{-2}	130	15	60	150
Cs-137	18	6×10^{-2}	150	18	80	180
Ba-140	60	NA	NA	60	NA	NA
La-140	15	NA	NA	15	NA	NA

TABLE 3 (CONT'D)

[a]The MDC is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

$$MDC = \frac{4.66\ s_b}{E \cdot V \cdot 2.22 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where:

MDC is the "a priori" lower limit of detection as defined above (as picocurie per unit mass or volume),

s_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute),

E is the counting efficiency (as counts per transformation),

V is the sample size (in units of mass or volume),

2.22 is the number of transformation per minute per picocurie,

Y is the fractional radiochemical yield (when applicable),

λ is the radioactive decay constant for the particular radionuclide, and

Δt is the elapsed time between sample collection (or end of the sample collection period) and time of counting (for environmental samples, not plant effluent samples).

The value of s_b used in the calculation of the MDC for a detection system shall be based on the actual observed variance of the background counting rate or of the counting rate of the blank samples (as appropriate) rather than on an unverified theoretically predicted variance. In calculating the MDC for a radionuclide determined by gamma-ray spectrometry, the background shall include the typical contributions of other radionuclides normally present in the samples (e.g., potassium-40 in milk samples). Typical values of E, V, Y and Δt shall be used in the calculations.

[b]MDC for drinking water.

TABLE 4

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

	Reporting Levels				
Analysis	Water (pCi/l)	Airborne Particulate or Gases (pCi/m^3)	Fish (pCi/Kg, wet)	Milk (pCi/l)	Food Products (pCi/Kg, wet)
H-3	2×10^4[a]	N.A.	N.A	N.A	N.A.
Mn-54	1×10^3	N.A.	3×10^4	N.A.	N.A.
Fe-59	4×10^2	N.A.	1×10^4	N.A.	N.A.
Co-58	1×10^3	N.A.	3×10^4	N.A.	N.A.
Co-60	3×10^2	N.A.	1×10^4	N.A.	N.A.
Zn-65	3×10^2	N.A.	2×10^4	N.A.	N.A.
Zr-Nb-95	4×10^2	N.A.	N.A.	N.A.	N.A.
I-131	2	0.9	N.A.	3	1×10^2
Cs-134	30	10	1×10^3	60	1×10^3
Cs-137	50	20	2×10^3	70	2×10^3
Ba-La-140	2×10^2	N.A.	N.A.	3×10^2	N.A.

[a]For drinking water samples.

TABLE 5

SAMPLING AND ANALYSIS DEVIATIONS DURING 1982

WEEK STARTING	LOCATION AND NATURE OF DEVIATION
1/4/82	Dothan Air Sampling Station: Low volume due to pump failure.
1/11/82	Dothan Air Sampling Station: No sample, pump out of service for repair.
1/18/82	Dothan Air Sampling Station: Low volume due to pump out of service for repair during a portion of the week.
	All Forage Sampling Locations: Forage was unavailable from sample plots, thus forage was collected from alternate locations.
1/25/82	Green Leafy Vegetable Sampling Locations: No samples collected for month of January due to ice storm damage to gardens.
2/1/82	Milk Sampling: New sample of milk taken due to bus transportation loss of sample during prior week.
2/8/82	Green Leafy Vegetable Control Location: No turnip sample available.
	All Forage Sampling Locations: Forage was unavailable from sample plots, thus forage was collected from alternate locations.
2/15/82	Andrews Dam Water Sampling Station: Continuous sampler timer out of service, thus grab sample taken.
	North Perimeter Air Sampling Station: Low volume due to power failure.
2/22/82	North Perimeter Air Sampling Station: Low volume due to power failure.
	Andrews Dam Water Sampling Station: Continuous sampler timer out of service, thus grab sample taken.
3/8/82	All Forage Sampling Locations: Forage was unavailable from sample plots, thus forage was collected from alternate locations.
	Dothan Air Sampling Station: Low volume due to mechanical failure of pump.
3/22/82	Dothan Air Sampling Station: Low volume due to very dirty filter. Fire in area suspected as cause of dirty filter.
	Andrews Dan Water Sampling Station: Continuous pump timer out of service, thus grab water wamples were taken during March.

TABLE 5 (CONT'D)

WEEK STARTING	LOCATION AND NATURE OF DEVIATION
4/5/82	Direct Radiation Monitoring Station: First quarter and annual TLDs at location RC-0405 were damaged by fire.
5/17/82	Dothan Air Sampling Station: Low volume due to pump problem.
7/5/82	Andrews Dam Water Sampling Station: No sample taken during the period 7/1/82 through 7/8/82 due to a blown fuse.
	Direct Radiation Monitoring Station: Annual TLD at location RC-1104 missing.
8/2/82	North Perimeter Air Sampling Station: No sample due to loss of power during the entire sample period.
8/16/82	Ashford Air Sampling Station: Low flow - cause unknown.
10/18/82	Direct Radiation Monitoring Stations: Third quarter TLD at location RC-1104 and annual TLD at location RC-1605 were found missing.
11/8/82	All Forage Sampling Locations: Supply of green forage limited, thus sample sizes were about half the normal amount.
11/15/82	All Air Sampling Stations: Eight day collection period due to holiday.
11/22/82	Milk Sampling Station: Sample inadvertently taken from wrong dairy which was not raw milk. Analysis was voided.
	All Air Sampling Stations: Six day sampling period due to eight day period during the prior week.
11/29/82	Milk Sampling Station: New sample taken for analysis from the Silcox Dairy.
	Direct Radiation Monitoring Station: Fourth quarter TLD missing from location RC-1104.
	Dothan Air Sampling Station: Low volume due to mechanical pump problems.

TABLE FO6-1

AIRBORNE: PARTICULATES AND IODINE - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8, HOUSTON COUNTY, ALABAMA
January - December, 1982 (a)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED		NOMINAL MDC(b)	ALL INDICATOR LOCATIONS MEAN (f) (c) RANGE(c)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (f)(c) RANGE (c)	COMMUNITY LOCATIONS MEAN (f) (c) RANGE (c)	CONTROL LOCATIONS MEAN (f)(c) RANGE (c)
Air Particulates (pCi/m3)	Gross Beta	(d) 441	0.0014	0.0200 (169/169) (0.0080 - 0.0340)	River Intake Structure 0.8 Miles - ESE	0.0207 (14/14) (0.0120 - 0.0270)	0.0210 (156/156) (0.0080 - 0.0360)	0.0204 (116/116) (0.0080 - 0.0370)
	Gamma Spec	(d) 34						
	Be-7		0.0125	0.0462 (13/13) (0.0340 - 0.0640)	South Perimeter 1.0 Miles - SSE	0.0490 (4/4) (0.0400 - 0.0620)	0.0490 (12/12) (0.0300 - 0.0720)	0.0524 (9/9) (0.0350 - 0.0780)
	Cs-137		0.0014	0.0017 (3/13) (0.0010 - 0.0020)	North Perimeter 0.8 Miles - N	0.0020 (1/4) ----	0.0010 (1/12) ----	< MDC
	Bi-214		0.0025	0.0030 (2/13) (0.0030 - 0.0030)	North Perimeter 0.8 Miles - N	0.0030 (1/4) ----	0.0030 (3/12) (0.0030 - 0.0030)	< MDC
	Ac-228		0.0040	----	----	----	0.0055 (2/12) (0.0030 - 0.0080)	0.0050 (1/9) ----
Air Charcoal Cartridges (pCi/m3)	Radioiodine	256						
	I-131		0.0548	< MDC	----	----	< MDC	< MDC

(a) No Nonroutine Anamalous Measurements Reported During This Period.
(b) Mean Minimum Detectable Concentrations Calculated Per Equation 1 of This Report. The MDC's for Gross B and Iodine were Obtained Using Blank Background (A Priori), Whereas, for Gamma-Ray Spectroscopy Actual Sample Backgrounds were Used (A Posteriori).
(c) Mean and Range Based Upon Detectable Measurements Only. Fraction of Detectable Measurements at Specified Locations in Parenthesis (f).
(d) Air Sampling Stations at River Intake Structure (Indicator) and Neals Landing, Fla. (Control) Dropped From Monitoring Program With Implementation of Amendment No. 26 to the Unit 1 Technical Specifications Effective April 1, 1982.

TABLE F06-2

EXTERNAL RADIATION - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8, HOUSTON COUNTY, ALABAMA
January - December, 1982 (a)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED		NOMINAL LLD(b)	ALL INDICATOR LOCATIONS MEAN (f)(c) RANGE (c)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (f)(c) RANGE (c)	COMMUNITY LOCATIONS MEAN (f)(c) RANGE (c)	CONTROL LOCATIONS MEAN (f) (c) RANGE(c)
TLD - Quarterly (MRAD)	Gross Gamma	169	10.0	15.5 (72/72) (10.1 - 24.6)	East Perimeter 1.0 Miles - NE	21.6 (4/4) (19.9 - 24.6)	13.0 (69/69) (7.60 - 17.6)	14.7 (28/28) (10.7 - 20.9)
TLD - Annual (MRAD)	Gross Gamma	39	10.0	56.7 (18/18) (41.7 - 93.9)	East Perimeter 1.0 Miles - NE	93.9 (1/1) ----	46.4 (15/15) (41.3 - 54.2)	50.3 (6/6) (41.8 - 63.2)
TLD - Annual[d] (MRAD)	Gross Gamma	41	10.0	61.9 (18/18) (49.7 - 86.5)	East Perimeter 1.0 Miles - NE	86.5 (1/1) ----	51.4 (16/16) (43.7 - 58.8)	58.9 (7/7) (50.3 - 71.4)

(a) No Nonroutine Anomalous Measurements Reported During This Period.
(b) Lower Limit of Detection as Defined in HASL-300, for LiF TLDs as Achieveable in Practice.
(c) Mean and Range Based on Detectable Measurements Only. Fraction of Detectable Measurements at Specified Location in Parenthesis (f).
(d) Sum of Four Quarters for Comparative Purposes.

TABLE FO6-3

MILK - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8, HOUSTON COUNTY, ALABAMA
January - December, 1982 (a)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED	NOMINAL MDC (b)	ALL INDICATOR LOCATIONS (d) MEAN (f) (c) RANGE (c)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN MEAN (f) (c) RANGE (c)	COMMUNITY LOCATIONS MEAN (f)(c) RANGE (c)	CONTROL LOCATIONS MEAN (f)(c) RANGE (c)
Milk (pCi/l)	Gamma Spec 25						
	K-40	155.	----	----	----	----	1340. (25/25) (1080. - 1610.)
	Zn-65	48.0	----	----	----	----	92.0 (1/25) ----
	Bi-214	24.0	----	----	----	----	35.5 (2/25) (35.0 - 36.0)
	Pb-214	31.0	----	----	----	----	34.0 (1/25) ----
	Radiostrontium (e) 3						
	Sr-89	2.00	----	----	----	----	4.30 (2/3) (3.80 - 4.80)
	Sr-90	1.00	----	----	----	----	1.90 (2/3) (1.30 - 2.50)
	Radioiodine 25						
	I-131	0.190	----	----	----	----	< MDC

(a) No Nonroutine Anomalous Measurements Reported During This Period.
(b) Mean Minimum Detectable Concentrations Calculated Per Equation 1 of This Report Using Blank Backgrounds (A Priori) for Radiostrontium and Radioiodine. For Gamma-Ray Spectroscopy Actual Sample Backgrounds Were Used (A Posteriori).
(c) Mean and Range Based on Detectable Measurements Only. Fraction of Detectable Measurements at Specified Locations in Parenthesis (f).
(d) No Available Indicator Milk Sampling Locations.
(e) Radiostrontium Analysis of Milk Discontinued with Implementation of Amendment No. 26 to the Unit 1 Technical Specifications Effective April 1, 1982.

TABLE FO6-4

VEGETATION: FORAGE, VEGETABLES AND FRUITS - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8, HOUSTON COUNTY, ALABAMA
January - December, 1982 (a)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED	NOMINAL MDC (b)	ALL INDICATOR LOCATIONS MEAN (f) (c) RANGE (c)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (f) (c) RANGE (c)	COMMUNITY LOCATIONS MEAN (f) (c) RANGE (c)	CONTROL LOCATIONS MEAN (f) (c) RANGE (c)
Forage (d) (pCi/kg - Dry)	Gamma Spec 36						
	Be-7	915.	5150. (24/24) (911. - 12600.)	Plant Entrance (e) 0.9 Miles - WSW	8860. (3/3) (6410. - 12600.)	----	4930. (12/12) (2350. - 8550.)
	K-40	740.	22200. (24/24) (7500. - 55500.)	Plant Entrance (e) 0.9 Miles - WSW	37600. (3/3) (30700. - 41900.)	----	28000. (12/12) (7570. - 63000.)
	I-131	123.	195. (1/24) ----	South Perimeter 1.0 Miles - SSE	195. (1/9) ----	----	----
	Cs-137	84.5	105. (9/24) (70.0 - 157.)	South Perimeter 1.0 Miles - SSW	157. (1/3) ----	----	139. (7/12) (81.0 - 207.)
	Pb-212	140.	151. (1/24) ----	South Perimeter 1.0 Miles - SSE	151. (1/9) ----	----	----
	Bi-214	262.	657. (12/24) (202. - 1980.)	South Perimeter 1.0 Miles - SSW	1280. (2/3) (573. - 1980.)	----	574. (5/12) (176. - 1200.)
	Pb-214	316.	483. (7/24) (226. - 775.)	North Perimeter 0.8 Miles - N	720. (1/9) ----	----	728. (2/12) (703. - 753.)
	Ac-228	443.	508. (7/24) (255. - 810.)	Plant Entrance (e) 0.9 Miles - WSW	632. (1/3) ----	----	727. (2/12) (534. - 919.)
Green Leafy Vegetables (b) (pCi/kg - Wet)	Gamma Spec 3						
	Be-7	364.	1280. (1/2) ----	North Perimeter 0.8 Miles - N	1280. (1/2) ----	----	----

TABLE FO6-4 (Cont'd)

VEGETATION: FORAGE, VEGETABLES AND FRUITS - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8, HOUSTON COUNTY, ALABAMA
January - December, 1982 (a)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED	NOMINAL MDC (b)	ALL INDICATOR LOCATIONS MEAN (f) (c) RANGE (c)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (f) (c) RANGE (c)	COMMUNITY LOCATIONS MEAN (f)(c) RANGE (c)	CONTROL LOCATIONS MEAN (f) (c) RANGE (c)
	K-40	390.	12000. (2/2) (9720. - 14200.)	North Perimeter 0.8 Miles - N	12000. (2/2) (9720. - 14200.)	----	9380. (1/1) ----
	Bi-214	45.0	----	----	----	----	88.0 (1/1) ----
	Ac-228	131.	305. (1/2) ----	North Perimeter 0.8 Miles - N	305. (1/2) ----	----	93.0 (1/1) ----

(a) No Nonroutine Anomalous Measurements Reported During This Period.
(b) Mean Minimum Detectable Concentrations Calculated Per Equation 1 of This Report Using Actual Sample Backgrounds (A Posteriori).
(c) Mean and Range Based on Detectable Measurements Only. Fraction of Detectable Measurements at Specified Locations in Parenthesis (f).
(d) Mean Wet/Dry Ratio for 1982 was 4.2.
(e) Substitute Location Due to Unavailability of Forage at Forage Plot on South Perimeter During Some Sampling Periods.
(f) Green Leafy Vegetable Sampling Was Discontinued With Implementation of Amendment No. 26 to the Unit 1 Technical Specifications Effective April 1, 1982.

TABLE F06-5

SOIL - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8, HOUSTON COUNTY, ALABAMA
January - December, 1982 (a)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED	NOMINAL MDC (b)	ALL INDICATOR LOCATIONS MEAN (f) (c) RANGE (c)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN		COMMUNITY LOCATIONS MEAN (f) (c) RANGE (c)	CONTROL LOCATIONS MEAN (f) (c) RANGE(c)
				NAME DISTANCE AND DIRECTION	MEAN (f) (c) RANGE (c)		
Soil (In Situ) (pCi/kg - Dry)	Gamma Spec 12						
	K-40	373.	4210. (7/7) (783. - 12400.)	East Perimeter 0.8 Miles - E	12400. (1/1) ----	962. (3/3) (595. - 1470.)	1790. (2/2) (1020. - 2570.)
	Cs-137	60.6	405. (7/7) (190. - 666.)	West Perimeter 0.8 Miles - WNW	666. (1/1) ----	298. (3/3) (180. - 497.)	419. (2/2) (359. - 478.)
	Tl-208	93.6	543. (7/7) (282. - 1000.)	East Perimeter 1.0 Miles - NE	1000. (1/1) ----	329. (3/3) (278. - 401.)	461. (2/2) (377. - 545.)
	Bi-212	923.	1500. (7/7) (850. - 2660.)	East Perimeter 1.0 Miles - NE	2660. (1/1) ----	931. (2/3) (728. - 1130.)	1370. (2/2) (1190. - 1550.)
	Pb-212	481.	1670. (7/7) (702. - 3560.)	East Perimeter 1.0 Miles - NE	3560. (1/1) ----	1480. (3/3) (1180. - 1700.)	1130. (2/2) (909. - 1360.)
	Bi-214	163.	1260. (7/7) (844. - 1950.)	East Perimeter 1.0 Miles - NE	1950. (1/1) ----	873. (3/3) (811. - 931.)	1280. (2/2) (1050. - 1510.)
	Pb-214	230.	1290. (7/7) (882. - 1990.)	East Perimeter 1.0 Miles - NE	1990. (1/1) ----	851. (3/3) (793. - 929.)	1090. (2/2) (838. - 1340.)
	Ra-226	1380.	----	----	----	----	909. (1/2) ----
	Ac-228	229.	1540. (7/7) (885. - 2950.)	East Perimeter 1.0 Miles - NE	2950. (1/1) ----	973. (3/3) (774. - 1200.)	1340. (2/2) (1030. - 1660.)

(a) No Nonroutine Anomalous Measurements Reported During This Period.
(b) Mean Minimum Detectable Concentrations Calculated Per Equation 1 of This Report Using Actual Sample Backgrounds (A Posteriori).
(c) Mean and Range Based on Detectable Measurements Only. Fraction of Detectable Measurements at Specified Locations in Parenthesis (f).

TABLE FO6-6

WATERBORNE: SURFACE AND GROUND WATER - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8, HOUSTON COUNTY, ALABAMA
January - December, 1982 (a)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED	NOMINAL MDC (b)	ALL INDICATOR LOCATIONS MEAN (f) (c) RANGE (c)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN MEAN (f) (c) RANGE (c)	COMMUNITY LOCATIONS MEAN (f) (c) RANGE (c)	CONTROL LOCATIONS MEAN (f) (c) RANGE (c)
Surface Water (River) (pCi/l)	Gamma Spec 24						
	Cs-134	4.50	10.0 (1/12)	Great Southern Paper River Mile, 40	10.0 (1/12)	----	17.0 (1/12)
	Cs-137	5.40	13.5 (2/12) (5.00 - 22.0)	Great Southern Paper River Mile, 40	13.5 (2/12) (5.00 - 22.0)	----	19.0 (2/12) (15.0 - 23.0)
	Tritium 8						
	H-3	95.8	300. (4/4) (131. - 502.)	Great Southern Paper River Mile, 40	300. (4/4) (131. - 502.)	----	132. (1/4)
Ground Water (Well) (pCi/l)	Tritium 8						
	H-3	87.3	240. (2/4) (182. - 297.)	Great Southern Paper Well 4 Miles - SSE	240. (2/4) (182. - 297.)	----	< MDC
	Gamma Spec (d) 8	----	----	----	----	----	----

(a) No Nonroutine Anomalous Measurements Reported During This Period.
(b) Mean Minimum Detectable Concentrations Calculated Per Equation 1 of This Report. The MDC's for Tritium was Obtained Using Blank Backgrounds (A Priori), Whereas, for Gamma-Ray Spectroscopy Actual Sample Backgrounds Were Used (A Posteriori).
(c) Mean and Range Based Upon Detectable Measurements Only. Fraction of Detectable Measurements at Specified Locations in Parenthesis (f).
(d) No Detectable Gamma Activity.

TABLE F06-7

SEDIMENT: RIVER - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8, HOUSTON COUNTY, ALABAMA
January - December, 1982 (a)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED	NOMINAL MDC (b)	ALL INDICATOR LOCATIONS MEAN (f) (c) RANGE (c)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN		COMMUNITY LOCATIONS MEAN (f) (c) RANGE (c)	CONTROL LOCATIONS MEAN (f) (c) RANGE (c)
				NAME DISTANCE AND DIRECTION	MEAN (f) (c) RANGE (c)		
Sediment (River) (pCi/kg - Dry)	Gamma Spec 2						
	K-40	194.	1300. (2/2) (1170. - 1420.)	Smith's Bend River Mile, 41-42	1300. (2/2) (1170. - 1420.)	----	----
	Tl-208	21.0	70.5 (2/2) (29.0 - 112.)	Smith's Bend River Mile, 41-42	70.5 (2/2) (29.0 - 112.)	----	----
	Pb-212	39.5	206. (2/2) (87.0 - 324.)	Smith's Bend River Mile, 41-42	206. (2/2) (87.0 - 324.)	----	----
	Bi-214	35.0	177. (2/2) (95.0 - 259.)	Smith's Bend River Mile, 41-42	177. (2/2) (95.0 - 259.)	----	----
	Pb-214	40.0	184. (2/2) (114. - 253.)	Smith's Bend River Mile, 41-42	184. (2/2) (114. - 253.)	----	----
	Ra-226	452.	604. (1/2) ----	Smith's Bend River Mile, 41-42	604. (1/2) ----	----	----
	Ac-228	66.0	216. (2/2) (112. - 319.)	Smith's Bend River Mile, 41-42	216. (2/2) (112. - 319.)	----	----

(a) No Nonroutine Anomalous Measurements Were Reported During This Period.
(b) Mean Minimum Detectable Concentrations Calculated Per Equation 1 of This Report Using Actual Sample Backgrounds (A Posteriori) For Gamma-Ray Spectroscopy.
(c) Mean and Range Based Upon Detectable Measurements Only. Fraction of Detectable Measurements at Specified Locations in Parenthesis (f).

TABLE F06-8

FISH: RIVER - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8, HOUSTON COUNTY, ALABAMA
January - December, 1982 (a)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED	NOMINAL MDC (b)	ALL INDICATOR LOCATIONS MEAN (f) (c) RANGE (c)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN		COMMUNITY LOCATIONS MEAN (f) (c) RANGE (c)	CONTROL LOCATIONS MEAN (f) (c) RANGE (c)
				NAME DISTANCE AND DIRECTION	MEAN (f) (c) RANGE (c)		
Fish (Game) (pCi/kg - Wet Tissue)	Gamma Spec (d)						
	K-40	264.	4810. (3/3) (4190. - 5180.)	Smith's Bend River Mile, 41-42	4810. (3/3) (4190. - 5180.)	----	3820. (2/2) (3770. - 3860.)
	Nb-95	29.0	31.0 (1/3) ----	Smith's Bend River Mile, 41-42	31.0 (1/3) ----	----	----
	Cs-137	43.0	76.0 (3/3) (53.0 - 112.)	Smith's Bend River Mile, 41-42	76.0 (3/3) (53.0 - 112.)	----	77.0 (2/2) (70.0 - 84.0)
	Tl-208	20.0	----	----	----	----	23.0 (1/2) ----
Fish (Bottom Feeding) (pCi/kg - Wet Tissue)	Gamma Spec 4						
	K-40	299.	3610. (2/2) (2880. - 4340.)	Smith's Bend River Mile, 41-42	3610. (2/2) (2880. - 4340.)	----	4430. (2/2) (3810. - 5040.)
	Cs-137	32.5	51.5 (2/2) (25.0 - 78.0)	Smith's Bend River Mile, 41-42	51.5 (2/2) (25.0 - 78.0)	----	39.0 (1/2) ----

(a) No Nonroutine Anomalous Measurements Were Reported During This Period.
(b) Mean Minimum Detectable Concentrations Calculated Per Equation 1 of This Report Using Actual Sample Backgrounds (A Posteriori).
(c) Mean and Range Based Upon Detectable Measurements Only. Fraction of Detectable Measurements at Specified Locations in Parenthesis (f).
(d) Two Game Fish Samples Were Analyzed During the Fall 1982 Sampling Period.

ATTACHMENT 1

LAND USE SURVEY
FOR
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
JOSEPH M. FARLEY NUCLEAR PLANT
JUNE 14-16, 1982

This Land Use Survey was performed to meet the requirements of the Farley Units 1 and 2 Technical Specifications, Section 3.12.2 and 4.12.2.

A. Houston County, Alabama

Mr. A. M. Mathews, Houston County Extension Agent was contacted for the purpose of reviewing known locations of milk animals in the county and discussion of any changes since the last milk animal survey (December, 1981). Mr. Mathews stated that the Hollis Dairy (west of Dothan) was no longer producing milk and should be dropped from the list shown on Figure 1. He said that the Silcox Dairy was the closest to the plant and that he was not aware of any individually owned milk animals in the county.

A house-to-house canvas of residents along Alabama 95 for a distance of about three miles from the plant entrance and for about a mile east on Houston County 42 revealed no milk animals. Individuals at the following residences were questioned: M. R. Culpepper, Walter Whatley, Tommy Repas and Manford Miller.

Simultaneous with the house-to-house milk animal canvas, the nearest residence in each of the meteorological sectors was identified.

B. Early County, Georgia

Mr. Wayne Tankersley, Early County Extension Agent, was contacted to determine if any milk animals were currently present in the county. He stated that to his knowledge there were no milk cows or goats in Early County.

A house-to-house canvas of residents in the area across the Chattahoochee River east of the plant was negative with respect to the presence of milk animals. Individuals at the following residences were questioned: Henry Perry, Jim Donaldson, F. D. Freeman, and Ruth Kulvi.

Simultaneous with the house-to-house milk animal canvas, the nearest residence in each meteorological sector was identified.

C. Results and Conclusions

The results of the Land Use Survey are shown in Table 1. Based on the survey results, no change in the present milk sampling program is required.

W. M. Jackson
June 18, 1982

TABLE I
OF
ATTACHMENT 1

JOSEPH M. FARLEY NUCLEAR PLANT
RADIOLOGICAL ENVIRONMENTAL MONITORING SURVEY
JUNE 14-16, 1982

	(DISTANCE MILES TO NEAREST)	
RADIAL SECTORS (22½ DEGREES)	RESIDENT	MILK ANIMAL
North Northeast (01)	2.4	> 5
Northeast (02)	2.6	> 5
East Northeast (03)	2.4	> 5
East (04)	2.8	> 5
East Southeast (05)	2.8	> 5
Southeast (06)	3.4	> 5
South Southeast (07)	> 5	> 5
South (08)	4.3	> 5
South Southwest (09)	2.9	> 5
Southwest (10)	1.2	> 5
West Southwest (11)	0.9	> 5
West (12)	1.3	> 5
West Northwest (13)	2.1	> 5
Northwest (14)	2.4	> 5
North Northwest (15)	2.8	> 5
North (16)	2.6	> 5

Alabama Power Company
600 North 18th Street
Post Office Box 2641
Birmingham, Alabama 35291
Telephone 205 250-1000

F. L. CLAYTON, JR.
Senior Vice President

Alabama Power
the southern electric system

February 25, 1983

Docket Nos. 50-348
50-364

Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region II
Suite 3100
101 Marietta Street, N.W.
Atlanta, GA 30303

Re: Joseph M. Farley Nuclear Plant
Annual Environmental Operating Report

Gentlemen:

The attached "Annual Environmental Operating Report, Part B: Radiological" for the period ending December 31, 1982 is transmitted in accordance with the Joseph M. Farley Nuclear Plant Unit 1 and Unit 2 Technical Specifications Sections 6.9.1.6 and 6.9.1.7.

If you have any questions, please advise.

Yours very truly,

F. L. Clayton, Jr.

FLC,Jr/WMJ:cl
Attachment

cc: Office of Nuclear Reactor Regulation (W/Attachment)
U.S. Nuclear Regulatory Commission

Director, Division of Radiological Health (W/Attachment)
State of Alabama

Director, Environmental Protection Division (W/Attachment)
State of Georgia

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