Enclosure 28 to
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Enclosure 28

Response to Request for Additional Information

Westinghouse Nuclear Fuel Columbia Site Evaluation Report March 1975 Section 6

SECTION 6.0
EFFLUENT AND ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

The operational radiological, chemical, meteorological, aquatic, terrestrial and related environmental measurement and monitoring programs are discussed in this section. Most of these programs have been in existence since the plant became operational in 1969. All of the monitoring programs have been recently reviewed and upgraded to reflect the latest environmental requirements. As new information becomes available and/or as changes to the operation develop, the program will be changed to take advantage of better monitoring procedures. Consequently in some areas of the program, sampling may be intensified while in other areas sampling may be deemphasized.

6.1 RADIOLOGICAL MONITORING

6.1.1 EFFLUENT MONITORING SYSTEMS

6.1.1.1 LIQUID WASTE SYSTEMS

A description of the liquid waste system is given in Section 3.3.2. Before liquid wastes are discharged to the Congaree River, a composite sample of the discharges is analyzed for gross α, β and γ activity.

6.1.1.2 PROCESS AIR WASTE SYSTEMS

Descriptions of the process gas waste systems and flow sheets are provided in Section 3.3.1.2. Most of these gaseous waste streams are HEPA filtered before exiting to the environment.

Airborne sources of release which are not presently being filtered with HEPA filters include: calciner combustion gas, air compressor room, boiler room exhaust, Chem Lab exhausts, and Health Physics Lab exhausts. However, all potential sources of radioactive discharge are monitored. Locations of the exhaust air samplers are shown in Figure 3.3-1.

6.1.1.3 SOLID WASTES

Solid wastes are accumulated in specially designated containers which are placed throughout the work area. Waste consists of paper, wood, plastics, metals, floor sweepings and similar material which is contaminated by, or contains, radioactive materials.

Contents of filled containers are transferred to the waste processing area. Compressible solid wastes are baled and loaded into DOT Specification 12B fiberboard boxes for storage prior to disposal. Filled boxes are normally stored in a designated area inside the plant, but they may be stored outdoors if adequately protected from the environment.

Disposal of combustible wastes is accomplished by on-site incineration. Gaseous effluents from the incinerator are passed through a water scrubber and HEPA filters prior to discharge to the environment. Noncombustible wastes are shipped to an off-site licensed burial facility. Shipments are made in compliance with all applicable AEC and DOT regulations and license requirements.

6.1.2 ENVIRONMENTAL MONITORING

The purpose of the environmental radiation surveillance program at the Columbia plant is (1) to assure compliance with state and federal regulations and standards, (2) to evaluate possible buildup of radioactivity in the environment and (3) to provide information for public distribution.

The operational surveillance program includes sampling sites considered to be beyond the influence of plant discharges. Areas considered to be beyond the influence of the plant include those areas greater than several miles from the site (air and land effects) and upstream of plant discharges (Congaree River) or not on a body of water directly connected to plant discharges (water route effects). The surveillance program emphasizes sampling and measurement of the environmental media with the greatest potential for contributing

exposure to the public. A preoperational survey is currently being conducted for Pu in the environment prior to handling fuel containing plutonium. This preoperational plutonium monitoring program will be conducted over 1 full year according to the frequency and locations established for the operational monitoring program described below.

6.1.2.1 SAMPLING MEDIA, LOCATIONS AND FREQUENCY

The detailed features of the radiological monitoring program were developed on the basis of the following:

1. Existing data on background alpha, beta and U concentration levels
2. Discussions with knowledgeable radiation monitoring experts from both government and private industry
3. Monitoring programs established for similar facilities
4. Probable exposure pathways for uranium and plutonium movement through the environment as indicated by semiquantitative estimates for probabilities of plant, food, animal and human uptake of uranium and plutonium (Sections 4.2.1.1 and 4.2.1.2.1)

The types of radiological sampling in the environment within the vicinity of the NFCS include air particulates, fallout, soil, vegetation, well water and surface water in on-site lakes, Mill Creek and the Congaree River. Analyses on these samples include gross alpha and gross beta (long-lived),* total uranium, isotopic uranium and plutonium. The locations of the recommended sampling points are shown in Figures 6.1-1 and 6.1-2. The frequencies for each type of measurement are given in Table 6.1-1. The radiological monitoring program as summarized in Table 6.1-1 will be initiated in 1975. Prior to this, the environmental monitoring program being followed

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* A minimum of 24 hours between sample collection and analysis will be utilized to minimize the contribution from naturally occurring isotopes such as radon and thoron.

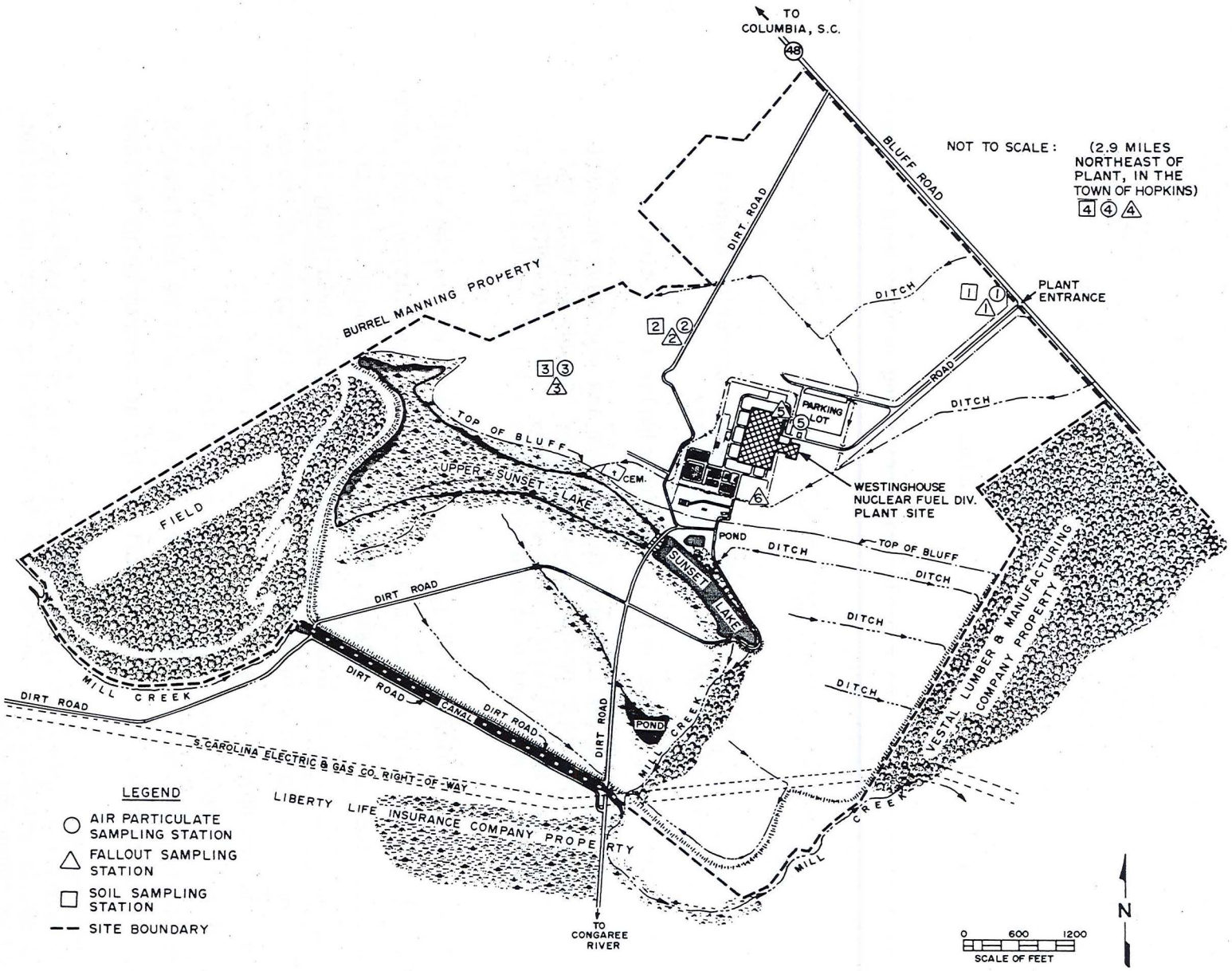

Figure 6.1-1. Locations of Proposed Air, Fallout and Soil Monitoring Stations

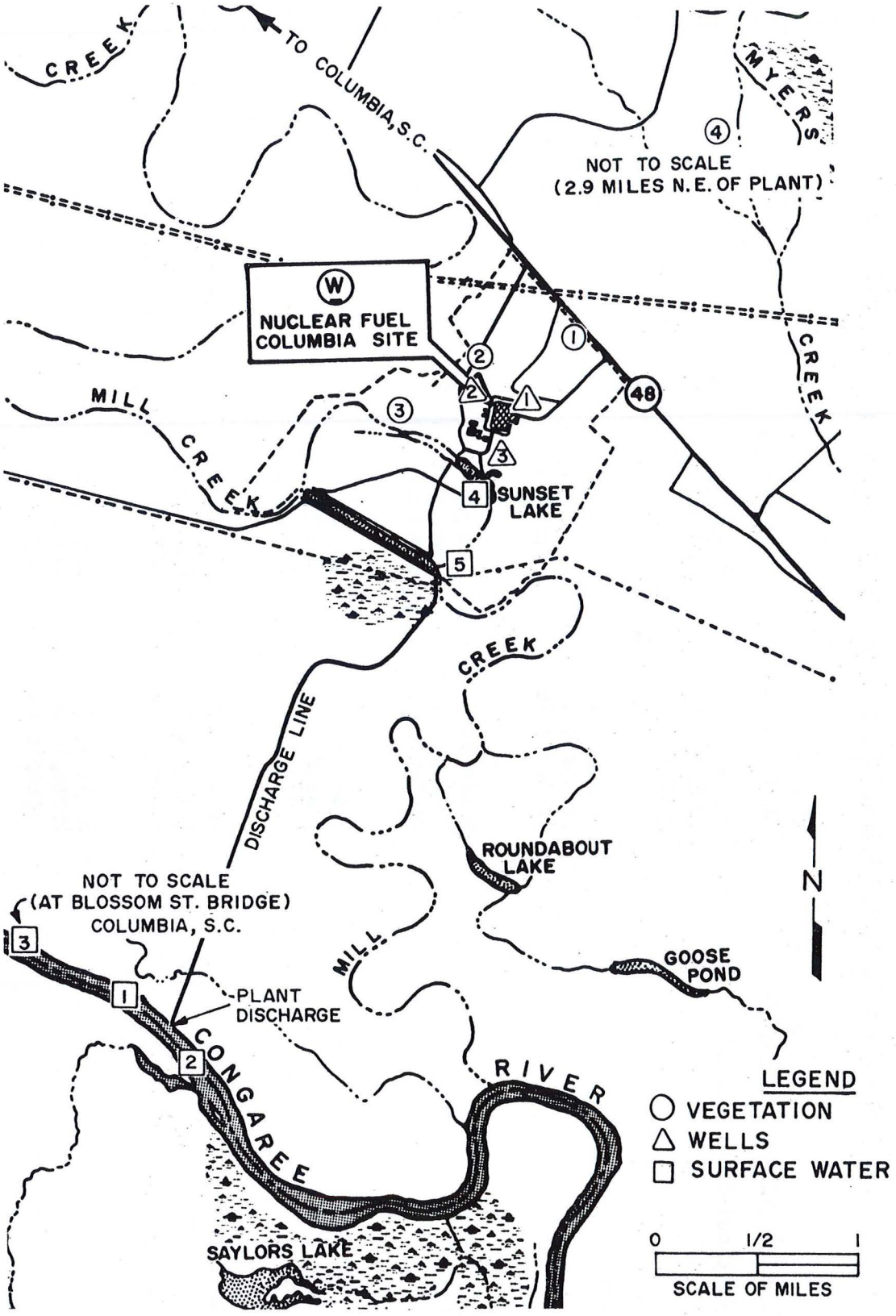

Figure 6.1-2. Locations of Proposed Vegetation, Wells and Surface Water Monitoring Stations

TABLE 6.1-1

COLUMBIA SITE PROPOSED RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Types of Samples	No. of Locations*	Type of Analysis	Frequency	Total No. Per Year
Air Particulate	5	Gross α, β	Monthly	60
		Isotopic U	Quarterly	20
		Isotopic Pu	Annually	5
Fallout	6	Gross α, β	Monthly	72
		Isotopic U	Quarterly	24
		Isotopic Pu	Annually	6
Vegetation (Crops)	4	Gross α, β	Semi-annually	8
		Isotopic U	Semi-annually	8
		Isotopic Pu	Semi-annually	8
Well Water	3	Gross α, β	Monthly	36
		Isotopic U	Quarterly	12
		Isotopic Pu	Annually	3
Surface Water	5	Gross α, β	Monthly	60
		Isotopic U	Quarterly	20
		Isotopic Pu	Annually	5
Fish	2	Gross α, β	Annually	2
		Isotopic U	Annually	2
		Isotopic Pu	Annually	2

(Continued)

TABLE 6.1-1 (Continued)

Types of Samples	No. of Locations*	Type of Analysis	Frequency	Total No. Per Year
Soil	4	Gross α, β	Semi-annually	8
		Isotopic U	Semi-annually	4
		Isotopic Pu	Semi-annually	4
Sediment	1	Gross α, β	Annually	2
		Isotopic U	Annually	1
TLD	5	Gamma Dose	Quarterly	60
			Totals - Gross α + β	248
			Isotopic U	91
			Isotopic Pu	33
			Gamma Dose	60

* Sampling locations shown on Figures 6.1-1 and 6.1-2.

is described in the environmental impact evaluation (Sections 4.1, 4.2 and 4.3). These data are presented in Section 2.8. Locations of samples required and a brief description of the sampling, instrumentation and analyses to be used follows.

6.1.2.1.1 AIR PARTICULATE SAMPLING AND ANALYSIS

Air sampling stations for air particulate monitoring will be located as follows:

1. Nearest site boundary in prevailing wind direction (3000 feet NE of the center of the manufacturing building)
2. Nearest site boundary (1800 feet NNW)
3. Near the meteorological tower (1950 feet WNW)
4. In the town of Hopkins (2.9 miles NE) (nearest town as well as nearest town located downwind in the prevailing wind direction)
5. At employee front parking lot (450 feet NE) where concentration is expected to be maximum

Locations are also shown in Figure 6.1-1.

These air monitors will continuously accumulate air particulates by use of an air sampler which pumps air through a filter. The filters will be analyzed with the following frequencies: monthly for gross alpha and gross beta activity, quarterly, a composite will be analyzed for isotopic uranium activity and annual, a composite will be analyzed for isotopic plutonium.

6.1.2.1.2 FALLOUT SAMPLING AND ANALYSIS

Monitoring for wet fallout will be performed at six stations (Figure 6.1-1). Fallout stations 1 through 5 will be located near the five air monitoring stations as described in Section 6.1.2.1.1. Fallout station 6 will be located approximately 150 feet SE from the southeast corner of the manufacturing building.

Frequencies of analysis will be the same as for the air particulates, i.e., monthly for gross α, quarterly for isotopic U, and annually for isotopic Pu. Composite aliquot samples will be utilized for the U and Pu analyses.

6.1.2.1.3 VEGETATION SAMPLING AND ANALYSIS

Sampling and analysis of vegetation samples will be performed at four locations as follows:

1. Near air monitoring station 1 (3000 feet NE)
2. Near air monitoring station 2 (nearest site boundary)
3. Near air monitoring station 3 (meteorological tower)
4. Near air monitoring station 4 (nearest town of Hopkins)

Locations are also shown in Figure 6.1-2.

Either grass (hay) or another agricultural crop as appropriate for the growing season will be collected and analyzed on a semiannual basis for gross α, β, and isotopic U and Pu.

6.1.2.1.4 WELL WATER SAMPLING AND ANALYSIS

Well water samples will be taken from the three on-site wells located as follows:

1. Directly in front of the manufacturing building ($\sim$ 200 feet E of building)
2. Behind the manufacturing building (1030 feet WNW of building)
3. South of manufacturing building towards the Mill Creek overflow from the NFCS site (1240 feet S of building)

The well locations are depicted in Figure 6.1-2. Well water samples will be analyzed monthly for gross α and β activity, quarterly for isotopic U, and annually for isotopic Pu.

6.1.2.1.5 SURFACE WATER SAMPLING AND ANALYSIS

Surface water samples will be taken monthly by collecting one liter grab samples from each of five locations. These locations are:

1. Congaree River, 500 yards upstream from the discharge
2. Congaree River, 500 yards downstream from the discharge
3. Congaree River, upstream near the Blossom Street bridge
4. Sunset Lake, near the causeway
5. Mill Creek, near the southwest property boundary

Locations are shown in Figure 6.1-2.

Comparison of location 2 with locations 1 and 3 above will provide a measurement of possible river contamination from plant discharges. Locations 4 and 5 will indicate possible contamination from accidental releases of radioactivity from holdup pond overflow or leaks.

Analyses should be performed with the following frequencies: monthly for gross α and β, quarterly for isotopic U activity and annually for isotopic Pu activity.

6.1.2.1.6 FISH SAMPLING AND ANALYSIS

Samples of fish will be taken on an annual basis and will be analyzed for gross α and β activity, and isotopic U and Pu activity.

The fish samples will be obtained from two locations: (1) the Congaree River downstream of the plant discharge and (2) in Sunset Lake.

6.1.2.1.7 SOIL SAMPLES AND ANALYSIS

Soil samples will be collected semiannually at the following four locations:

1. Near air monitoring station 1 (at site boundary in predominant wind direction)
2. Near air monitoring station 2 (nearest site boundary)
3. Near air monitoring station 3 (near the meteorological tower)
4. Near air monitoring station 4 (in the town of Hopkins, the nearest town)

Locations are also shown in Figure 6.1-1.

Analyses will be performed on these samples for gross α and β and isotopic U and Pu activity.

6.1.2.1.8 SEDIMENT

Sediment samples will be collected annually in the Congaree River at approximately 500 feet downstream of the discharge. These samples will be analyzed for gross α, β, isotopic U and Pu.

6.1.2.1.9 BACKGROUND EXPOSURE DOSE RATE

TLD dosimeters will be placed at designated air monitoring sampling stations to monitor exposure dose rate. Although it is expected that these dosimeters would measure only the inherent background from naturally occurring radioactivity in the area, in the extremely unlikely event of a criticality incident these dosimeters could provide an indication of the exposure dose caused by the accident. Three TLD's will be placed at each designated location and will be collected and read on a quarterly basis.

6.1.2.2 ANALYTICAL SENSITIVITY

Table 6.1-2 lists analytical sensitivities for the radiological monitoring program as outlined in Section 6.2.2.1. Typical sample sizes are given for the requirements for gross alpha, gross beta and for uranium and plutonium analyses for the NFCS radiological monitoring program.

6.1.2.3 DATA ANALYSIS AND PRESENTATION

Data gathered in accordance with the above outlined program are compiled and maintained on file by the NFCS. These files are periodically audited by AEC inspectors to determine the degree of compliance with all applicable AEC regulations. Information contained in these files include: the specific gross alpha and beta activities and the uranium and plutonium concentrations in each of the samples, where available. Also included is the locations of sample sites, identification of persons or vendors performing the sample analyses, sample collection dates, sampling period duration for continuous collection samples, sample analysis techniques where appropriate, types of analyses performed and any known events that may have affected the results.

6.1.2.4 MONITORING SENSITIVITY

The minimum detectable dose to man that can be determined by a radiological monitoring program is a function of the measurement sensitivity and natural background variations. Further, the minimum detectable dose is also affected by location of monitoring points, meteorological parameters and major contributing radionuclides.

Table 6.1-2 gives minimum detection limits which show the air particulate sampling to be the most sensitive. Since the inhalation of U-containing air particulates is believed to be one of the most critical exposure pathways, the overall dose sensitivity is largely determined by this analysis. As shown in Table 6.1-2, the minimum detectable level of 8×10^{-3} pCi/m^3

TABLE 6.1-2

TYPICAL ANALYTICAL SENSITIVITIES

Sample	Analysis	Typical Sample Size	Minimum Detectable Level (MDL)
Air Particulates	Gross Alpha	571 m^3	8×10^{-15} µCi/ml
	Gross Beta	571 m^3	1.6×10^{-15} µCi/ml
	Uranium	1700 m^3	3.0×10^{-17} µCi/ml
	Plutonium	5000 m^3	1.0×10^{-17} µCi/ml
Fallout (wet) and water	Gross Alpha	1 liter	1.0×10^{-8} µCi/ml
	Gross Beta	1 liter	2.5×10^{-8} µCi/ml
	Uranium	1 liter	5.0×10^{-7} µCi/ml
	Plutonium	1 liter	5.0×10^{-7} µCi/ml
Fish	Gross Alpha	30 g	1.0 pCi/g
	Gross Beta	30 g	3.0 pCi/g
	Uranium	1 g	0.02 pCi/g
	Plutonium	1 kg	0.02 pCi/g
Soil and Sediment	Gross Alpha	1000 g	1.0 pCi/g (dry)
	Gross Beta	100 g	3.0 pCi/g (dry)
	Uranium	10 g	0.02 pCi/g (dry)
	Plutonium	100 g	0.02 pCi/g (dry)
Vegetation	Gross Alpha	100 g	1.0 pCi/g (dry)
	Gross Beta	100 g	3.0 pCi/g (dry)
	Uranium	100 g	0.02 pCi/g (dry)
	Plutonium	100 g	0.02 pCi/g (dry)
TLD	Gamma Dose	1/4" x 1/4" x 0.035"	5 mr

(8×10^{-15} μCi/ml) gross alpha activity is well below the MPC for uranium concentration limits to the off-site population of 4×10^{-12} μCi/ml.

Thus the minimum detectable level is $\geq$ 500 times lower than the MPC. Other pathways to man provide a similar margin of safety between the MPC and the minimum detectable levels.

6.2 CHEMICAL MONITORING

In this section, the present monitoring programs of air and water are described. Modifications introduced by NFCS to detect any unusual occurrences are also described. These modifications will be introduced to reduce the chances of environmental hazards caused by accidents as described in Section 5.0.

6.2.1 MONITORING OF CHEMICALS EMITTED TO THE AIR

The conversion process is constantly monitored for radioactivity and fluoride and intermittently for ammonia emissions. Results of this monitoring system are reported in monthly "effluent and environmental monitoring reports." Average and maximum fluoride and ammonia effluent concentrations are listed in Section 2.8.2.1, Background Chemical Characteristics in Air.

Particulate fluoride concentrations are monitored daily in process gas effluent using Gelman glass fiber type filters. Since process scrubbers are operated with excess ammonia, it is assumed that during normal operation this filter will trap stack gas particulate as ammonium fluoride. Periodically, more efficient impinger tests are run in dilute sodium hydroxide to detect both gaseous and particulate fluoride emissions. Values of fluoride listed in the table in Section 2.8.2.1 were determined using the impinger method. Ambient air at the site boundary is monitored periodically using accumulated glass fiber filter papers. Routine fluoride ambient air monitoring is performed using CaO fallout papers.

Ammonia in process gas is analyzed on a non-routine basis using impinger testing. At the site boundary, ambient ammonia measurements are taken with a universal sampling pump and detector tube.

6.2.2 MONITORING OF WATER SYSTEMS

A monthly composite sample of plant discharges is sent to Control for Environmental Pollution Inc. at Santa Fe, New Mexico to perform a complete

chemical analysis that includes major, minor and trace elements as well as organic compounds, algicides and coliform counts. Table 6.2-1 is a summary of these data.

Three water quality monitoring programs are conducted by the Columbia health physicists: (1) monitoring of the Congaree River, (2) monitoring of surface water on Westinghouse property and (3) monitoring of groundwater on Westinghouse property.

6.2.2.1 CONGAREE RIVER MONITORING PROGRAM

Congaree River waters are monitored for fluoride, ammonia, calcium and pH at six stations: (1) Blossom Street Bridge at Columbia, (2) 500 yards upstream from the discharge point, (3) at the discharge point, (4) 500 yards downstream of the discharge point, (5) 1000 yards downstream from the discharge point and (6) at 601 Bridge, approximately 35 river miles downstream.

The U.S. Geological Survey is monitoring the Congaree River for many chemical parameters at several stations including Blossom Street Bridge and 601 Bridge, and the South Carolina Pollution Control Authority is also monitoring this river as discussed and described in Section 2.5, Hydrology (Table 2.5-1 through 2.5-5).

As discussed in that section, there are no major differences in the water quality between the upstream and downstream stations nor are there any significant differences with time that can be attributed to the NFCS plant.

6.2.2.2 MONITORING PROGRAM OF WATER BODIES ON THE NFCS

Fluoride, ammonia and pH are monitored on a weekly basis at five stations: (1) entrance to the Westinghouse property, (2) exit from the Westinghouse property, (3) causeway station, (4) spillway station and (5) road station.

TABLE 6.2-1

AVERAGE WATER CHEMICAL EFFLUENT DATA, FOR 400 MTU/YEAR OPERATION

Parameter	Discharged to River	
	Quantity, (lb/day)	(Concentration, (mg/l)
Silver (Ag)	0.075	0.15
Iron (Fe)	0.52	1.03
Sodium (Na)	30	60
Calcium (Ca)	293	584
Magnesium (Mg)	1.38	2.75
Manganese (Mn)	0.035	0.07
Molybdenum (Mo)	0.095	0.19
Nickel (Ni)	0.5	1.
Boron (B)	0.22	0.43
Chloride (Cl)	24.8	49.5
Phosphorus as -P	0.75	1.5
Kjeldahl -N	244	488
Ammonia* (NH_3)	200**	399
Fluoride (F)	122.8	61.5
Sulfate (SO_4)	42.6	85
Sulfite (SO_3)	0.63	1.26
Sulfide (S)	trace	
COD	58	116
BOD_5	10.9	21.5
Phenols	trace	
Surfactants	0.035	0.07
Oil and Grease	4.3	8.67
Hardness (as $CaCO_3$)	293	583.5
Total Suspended Solids	8.0	15.8
Total Volatile Solids	310	619
Total Solids	281	560.8
Total Dissolved Solids	273	544
pH		8.9 pH units

* Ammonia discharges were for May 1974.

** This value is believed to be much lower than for other months, but it is in compliance with the May 1, 1974 permit of an average and maximum discharge of 231 lb/day. W Columbia has applied for a variance to this NPDES permit for an average of 1700 lb/day and a maximum of 4000 lb/day until June 30, 1975.

"French Drains" located beneath the holding lagoons drain any leaks to the road station, and fluoride and ammonia concentrations at this station are generally higher than at any other monitoring station on Westinghouse premises. Fluoride concentrations under normal conditions ranged during 1973 (a typical complete year) between <0.2 to 19.2 mg/l at the road station (average: 4.7 mg/l) while at the entrance station concentrations were usually below 0.2 mg/l and at the other stations they were generally below 1 mg/l. Ammonia concentrations at the road station ranged during 1973 between <1 to 60 mg/l (average: 22.4 mg/l) and at the other stations generally less than 1 mg/l except some values that reached up to 18 mg/l. During 1973, pH values at the road station were generally close to 9 (average: 8.6 $\pm$ 0.9 pH units) while at the other stations they were generally close to 7.

To detect any possible entry of process waste materials into upper Sunset Lake, the road-dike environmental station will be manually monitored three times per week.

A continuous pH recording system is planned for installation at the road-dike environmental station. The system will consist of a pH electrode installed at the road-dike. It has to be continuously immersed in a liquid weir-box configuration. The pH signal will be transmitted to a continuous recorder installed in the Health Physics Waste Water Monitoring Building. The recording unit will be monitored daily. In addition, an alarm will be installed in the Process Waste Treatment Building. Should the recorder exceed a preset value and the alarm initiated, the Health Physics Department will be notified immediately. Appropriate actions will be taken to minimize the impact of any releases on the ecosystem.

6.2.2.3 GROUNDWATER MONITORING

Three on-site wells are monitored for fluoride, ammonia and pH. The wells were at the site as part of the existing irrigation program before the Columbia facility was constructed. Concentrations of fluoride at

these wells are generally below 0.2 mg/l, ammonia values are generally less than 1.0 mg/l and pH values generally range between 5.8 and 7.4.

6.2.2.4 MONITORING OF FLUORIDE

Semiannually fish, vegetation and soils are analyzed for their fluoride content.

6.3 METEOROLOGICAL MONITORING

An on-site meteorological program is accumulating data during plant operation, as well as obtaining the necessary data to define the diffusion characteristics of the site. This on-site data will provide a data bank for future evaluations, a base-line of data to compare changes against and a source for data in any legal actions that may be taken.

A 50-foot meteorological tower has been installed on the site at a location sufficiently far enough from the building to eliminate any wake effects. The site is west-northwest of the building in a clearing surrounded on three sides by trees of 40 to 50 feet in height. The tree line is about 400 feet from the tower.

Instrumentation at the 50-foot level of the tower will consist of an MRI model 1074 wind set which has a starting speed of 0.75 mph and a distance constant for the direction vane of 8 feet. An MRI Sigma meter will continuously calculate the standard deviation of the horizontal wind direction for use in classifying wind data into the seven Pasquill stability classes.

Data are recorded as pulses on magnetic tape with the capability to record on strip-chart recorders as backup. Each month the data recorded on the magnetic tape are translated into engineering units and printed out at 15 minute averages of the variables. These data are scrutinized for consistency and accuracy and reprocessed to form the joint frequency distribution of wind speed and wind direction for a sixteen point compass, six wind speed groups and the seven Pasquill stability classes. Additional data runs generate frequency tables, wind directions and atmospheric stability persistence.

A comparison of on-site and off-site data reveals the following features: on-site data contain more neutral and stable cases and less unstable cases

compared to off-site data. Consequently, the dilution factors (χ/Q) obtained using the on-site data are conservative estimates. The differences in the stability criteria of the two sets of data may be due to the following reasons:

1. On-site data consisted of only 1 year's duration (August 1972 through July 1973), while the off-site data from the Columbia Airport was over a 3-year period (1967-1971).

2. On-site data was collected from a 50-foot high tower, whereas the data off-site, at Columbia International Airport, was collected at the 20-foot level which partly explains the large number of unstable cases in the off-site data.

3. The criteria used for stability classification of on-site data is based on wind direction fluctuations σ_θ (standard deviation of the wind direction), whereas the classification of off-site data was done according to Pasquill's Stability Criteria.

To make statistically valid comparisons, on-site data will be collected and processed for at least one more year and off-site data for the period August 1972 through July 1973 will be obtained to compare with the on-site data for the same period.

6.4 AQUATIC BIOTA MONITORING

A survey of the aquatic biota in the Congaree River in the vicinity of the NFCS waste discharge, Lower Sunset Lake and selected areas of Mill Creek was conducted from September 30 to October 9, 1974. The results of this survey are presented in Section 2.7.2. This survey gave a general indication of the organisms inhabiting these areas in late summer. None of these organisms appeared to be affected by the present facility operation.

A multi-phased facility waste discharge program is being implemented in conjunction with NPDES permit requirements. This program is directed toward nearly complete process wastewater recycling by July 1, 1976. Consequently, chemical and radioactive discharges to the Congaree River will be even less than at present.

Additional monitoring of the aquatic biota is not considered to be necessary at this time. However, as presented in Section 6.1.2.1, fish samples will be taken on an annual basis and analyzed for gross α and β activity, and isotopic uranium and plutonium in the Congaree River downstream of the plant discharge and in Sunset Lake. In addition, a fluoride analysis will be performed and the general physical condition of the fish will be ascertained.

6.5 TERRESTRIAL BIOTA MONITORING

Field studies were completed in the spring of 1974 to characterize the biota of the plant site and the surrounding property. The results of this survey are reported in Section 2.7.1.

None of these biota appeared affected by the NFCS. However, a program has been established to monitor the extent of pollutants, radiological and chemical, that may enter the food chain. Most of this monitoring program is discussed in Section 6.1.2.1 where sampling and analysis of vegetation samples will be performed semiannually at four site locations. Gross α and β activity, and uranium and plutonium analysis will be performed. In addition, terrestrial biota monitoring will include samples of common browse that will be sampled for leaf and/or twig tissue and fluoride content.

If no significant accumulations are detected during the first year of sampling, the monitoring program will be discontinued until plant capacity reaches 1,600 MTU/year.

6.6 RELATED ENVIRONMENTAL MEASUREMENT AND MONITORING PROGRAMS

6.6.1 METEOROLOGY

The National Weather Service maintains a first-order weather station at the Columbia Metropolitan Airport that records meteorological parameters on a 24-hour a day basis. This station is located ∿16 miles northwest of the NFCS.

As part of the National Weather Service, the National Oceanic and Atmospheric Administration obtains precipitation data through a nationwide network of rainfall gauges. Within the South Carolina area, there are eighty-six rainfall gauges. The following stations are located near the NFCS:

St. Matthews: 18 miles southeast of the site, Recording Precipitation Gauge

Tilghman Forest Nursery: 10 miles northeast of the site, Non-Recording Precipitation and Maximum and Minimum Temperature Gauges

Columbia University of South Carolina: 8 miles northwest of the site, Non-Recording Precipitation

Pelion: 12 miles west-southwest of the site, Non-Recording Precipitation and Maximum and Minimum Temperature Gauges.

6.6.2 HYDROLOGY

There are several agencies that monitor water in the vicinity of the NFCS. These include: the U.S. Department of the Interior Geological Survey, South Carolina State Pollution Control Authority, the South Carolina Department of Health and Environmental Control and the Environmental Protection Agency.

6.6.3 BIOTA

There is no known monitoring of terrestrial biota in the vicinity of the NFCS. The South Carolina Department of Health and Environmental Control does, however, routinely monitor aquatic biota at selected stations throughout the state. One of these stations is located at the Route 601 Bridge downstream of the NFCS on the Congaree River.

6.6.4 RADIATION

The Division of Radiological Health of the South Carolina Department of Health and Environmental Control conducts a comprehensive radiation surveillance and monitoring program for the State of South Carolina. Included in this monitoring program is the Westinghouse Nuclear Fuel Division Plant at Columbia, South Carolina. The monitoring program for the Westinghouse Columbia Plant includes surveillance of: ambient air sampling, surface water, groundwater, potable water, soil, fish, vegetation, milk and direct exposure TLD.

6.6.5 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

The United States Environmental Protection Agency (EPA) maintains a liaison with many states, whereby data are periodically transferred from the states to certain regional offices of the agency. Once collected, these data are filed with an automated data processing system called STORET (acronym for Storage and Retrieval System) of the federal EPA. As a result of the STORET System, data are available in a convenient and flexible manner upon request.

Some of the routine sampling data obtained by the EPA includes the Radiation Alert Network which provides data on air particulate, gross alpha, beta and plutonium activity at stations located throughout the United

States. The RAN stations located closest to the NFCS are at Columbia, South Carolina and Gastonia, North Carolina.

6.6.6 EXCHANGE OF INFORMATION

The Westinghouse Nuclear Fuel Division has committed itself to work with local, state and federal agencies in the development and exchange of environmental monitoring data.

6.6.7 RELEVANCE OF RELATED ENVIRONMENTAL MEASUREMENT AND MONITORING PROGRAMS

Data collected by the various agencies mentioned above can be obtained for comparison with data obtained from the environmental monitoring programs carried on by the NFCS. This comparison will lend insight to the general ecological condition of the area both within and beyond the sphere of influence of the NFCS and will help determine whether any changes in environmental parameters measured in the immediate vicinity of the NFCS have also occurred beyond the sphere of influence of the NFCS.