



South Carolina Department of Health
and Environmental Control

1996
NRC/SOUTH CAROLINA
ENVIRONMENTAL RADIATION
MONITORING REPORT



2600 Bull Street
Columbia, SC 29201-1708

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To: US Nuclear Regulatory Commission
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From: Albert A. Craft, Lab Director *Albert Craft*
Radiological Environmental Monitoring Laboratory
Bureau of Environmental Services
SC DHEC

Subject: Annual Report for period January 1, 1996 to December 31, 1996.

Date: March 28, 1997

CONTRACT #NRC-29-83-624

The enclosed data reports are for environmental surveillance measuring concentrations of radioactivity and radiation levels in the environment of commissioned licensed activities within the state.

Data reports are from the following operation nuclear facilities:

H.B. Robinson Nuclear Station, Hartsville.

Oconee Nuclear Station, Seneca.

V.C. Summer Nuclear Station, Jenkinsville.

Catawba Nuclear Station, Rock Hill.

Westinghouse Electric Corporation Nuclear Fuels Division, Columbia.

SOUTH CAROLINA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL CONTROL
BUREAU OF EQC LABS
DIVISION OF RADIOLOGICAL ENVIRONMENTAL
MONITORING AND SURVEILLANCE LABORATORY

QUALITY ASSURANCE OUTLINE

<u>Test Variable</u>	<u>Q.A Activity</u>	<u>Frequency</u>
Gross Alpha/Beta	Participation in ENSL-LV Quality Analysis Program.	4 times/year
	Two (2) batches of water are analyzed weekly.	2 times/week
	Samples are analyzed with spike, duplicate, and blank weekly.	1 time/year
Radium 226/228	Participation in EMSL-LV Quality Analysis Program.	5 times/year
	Radium samples are batch analyzed.	Batch work dictated by gross alpha results.
Gamma Spectroscopy	Participation in EMSL-LV Quality Assurance Program.	5 times/year
	Gamma analyses are run continuously on four (4) Germanium detectors.	Analyses dictated by work load.
Tritium	Participation in EMSL-LV Quality Assurance program.	3 times/year
	Samples are analyzed continuously.	Analyses dictated by work load.
Strontium 89, 90	Participation in EMSL-LV Quality Assurance Program.	5 times/year

PERFORMANCE EVALUATION STUDIES

It is critical that the precision and accuracy of radiological monitoring data be ensured so that decisions concerning environmental quality or impacts are based on data of known reliability. To assist laboratories in attaining this goal, the EPA has assigned responsibility for a nationwide Quality Assurance Program to the Nuclear Radiation Assessment Division of the EPA at the Environmental Monitoring Systems Laboratory - Las Vegas (EMSL-LV) in Las Vegas, Nevada. An essential element of the nationwide QA Program is the coordination of extensive laboratory performance evaluation (PE) studies involving environmental media and a variety of radionuclides with activities at or near environmental levels.

Simulated environmental samples containing known amounts of one or more radionuclides are prepared and are periodically distributed to laboratories according to their need. These laboratories perform the required analyses and return their data to the Nuclear Radiation Assessment Division for statistical analysis and comparison with known values, as well as with analytical values obtained by other participating laboratories. A report is returned to each participant. The Program then enables each laboratory to document the precision and accuracy of its radiation data to identify instrumental and procedural problems and to compare its performance with that of other laboratories.

Participation in a laboratory performance evaluation study does not automatically ensure the precision and accuracy of the data generated by the laboratory and should not be considered as a substitute for the continuous quality control program in place within the laboratory. However, the laboratory's participation in the EPA-sponsored performance evaluation studies is useful in augmenting the quality control program of the laboratory by serving as a check on the internal quality control efforts of the laboratory.

Any laboratory involved in or concerned with environmental radiation monitoring and surveillance must participate in one or more performance evaluation studies as required to maintain its certification to perform testing for the analyses of interest. Currently, there is no cost to participating laboratories. Laboratories that fail to report results for specific parameters for two consecutive studies will no longer receive PE samples for the affected parameter(s) on subsequent studies.

The EPA assigns each participating laboratory its own laboratory identification code. The codes consist of one or two letters. The code assigned to SC DHEC Radiological Monitoring Laboratory is "M". Lab codes are assigned for purposes of laboratory certification and are not divulged to anyone other than the affected state and/or regional EPA officials that are responsible for certifying the laboratory.

At present, the SC DHEC Radiological Laboratory is participating in the following EPA-sponsored PE studies:

<u>Study</u>	<u>PE Samples Received</u>	<u>Must Pass For Continued Certification</u>
Gamma in Water	June, November	Two of Two
Iodine-131 in Water	February, October	Two of Two
Gross Alpha/Beta in Water	January, July, October	Two of Three
Tritium in Water	March, August	Two of Two
Uranium-Radium in Water	February, June, September	Two of Three
Strontium-89 & 90 in Water	January, July	Two of Two
Blind	April, October	One of Two
Radionuclides in Milk	September	One of One
Air Filter	August	One of One

Results of performance on the EPA-sponsored PE Studies by the SC DHEC Radiological Laboratory are kept on file in a separate notebook for the above-mentioned parameters. Examples follow.

If any PE results are outside the EPA 2 sigma warning limits the following steps will be taken:

1. The results are to be reported to the lab director the same day the results are made known and an investigation will start within 2 working days.
2. New standards of the questioned isotopes will be ordered from EPA (if none are available in the lab) within 5 working days and used to help identify the problem.
3. A written report stating the cause of the problem and steps taken to correct it along with all documentation will be submitted to the lab director within 30 calendar days of EPA's reporting deadline for the results of the out of limits PE study.

**RESULTS OF EPA PERFORMANCE
EVALUATION STUDIES**

BLIND-A WATER pCi/LITER										GROSS ALPHA/BETA IN WATER						
DATE OF STUDY	GROSS ALPHA			Ra-226			Ra-228			DATE OF STUDY	GROSS ALPHA			GROSS BETA		
	CALC	KNOWN	SIG. DIFF.	CALC	KNOWN	SIG. DIFF.	CALC	±1/	SIG. DIFF.		CALC	KNOWN	DIFF. SIG.	CALC	KNOWN	SIG. DIFF.
										1/28/94	18	15	1.3	38	62	-4.0
4/19/94	78	86	-0.7	24	20	2.3	21	20.1	0.3	7/22/94	*62	32	6.4	50	10	13.8
10/18/94	41.3	57	-1.2	10.9	9.9	1.2	10.8	10.1	0.5	10/28/94	68	57	1.4	35	23	4.2
4/19/95	75.7	47	4.1	16.1	14.9	0.8	17.0	15.8	0.52	1/27/95	8	5	1.0	65	5	20.0
10/17/95	124.7	99.4	1.76	21.4	24.8	-1.6	23.0	20.7	0.8	2/10/95	15.3	20.0	-2.0	17.0	14.6	1.9
4/16/96	83.0	75.0	+0.75	18.3	3.0		18.3	5.0	+17.3	7/21/95	38.3	25.5	2.72	18.0	19.4	-0.5
10/5/96	93.7	59.0	+4.06	9.67	9.9	-0.26	7.33	5.1	+2.98	10/27/95	19.7	51.2	-4.2	9.6	24.8	-5.2
										1/26/96	14.0	12.1 ± 2.7	0.7	7.7	7.0 ± 8.7	0.24
										7/21/96	25.3	24.4 ± 8.7	0.3	40.7	44.8 ± 8.7	-1.4
										10/25/96	17.7	10.3 ± 8.7	+2.55	36.0	34.6 ± 8.7	+0.5
										11/31/97	08.2	5.2 ± 8.7	1.6	17.7	14.7	1.03

DUE

11/24/95
2/23/96

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**SAMPLE COLLECTION, HANDLING
AND PREPARATION**

SAMPLE COLLECTION, HANDLING, AND PRESERVATION

This section describes the general sampling protocols employed by the SC DHEC Radiological Laboratory when collecting environmental samples. Information on sampling and preservation techniques associated with specific radionuclides may be found in the **Standard Operating Procedure (SOP)** for the radionuclide of interest. Sample collectors receive appropriate training in the proper collection and handling of samples when hired.

The objective of sampling is to collect a portion of material small enough in volume to be transported conveniently and handled in the laboratory while still accurately representing the material being sampled. It is impractical to list instructions that cover all situations that may be encountered in the field. Therefore, the choice of techniques for collecting a homogenous sample must often be left to the collector's judgement. Once taken, the sample must be handled in a way that it does not deteriorate or become contaminated before it is analyzed by the laboratory.

Sample collectors routinely make a record of each sample that is collected. Each associated sample container is identified by attaching an appropriately inscribed tag or label. Sufficient information is recorded in the field to provide positive sample identification at a later date without reliance on the memory of the collectors. This information includes, but is not limited to, the location of the sampling point, date and time of collection, sample identification number, signature of the collector, and signatures of persons involved in the chain of possession and the associated dates and times of possession.

Samples are assigned identification numbers in the field according to a standard protocol. A sample site book is kept in each vehicle and in the lab. A six-digit identification number that is hyphenated after the first two digits is assigned to each sample. The first two digits indicate the type of sample (**See Sample Station Prefix List - Attachment 1**). Together, the last four digits pinpoint the exact sample location. The first two digits after the hyphen indicate the project. The last two digits of the number indicate the specific sampling site. The project and site prefixes are also referenced by separate prefix lists (**Attachment 2**).

Analysts may refer to the "Form Selection Chart" (**Attachment 3**) to determine the proper forms to complete and the "Analysis to be Performed" chart (**Attachment 4**) to determine which samples need preservation and which analysis is to be performed on each type of sample.

I. Sampling Surface Waters

A. Equipment Required

- 1) 1.5 gallon bucket - Galvanized
- 2) Nylon Rope (\approx 30 ft.) - Attach to Bucket
- 3) Plastic funnel
- 4) Plastic collection bottle with leak-proof screw-cap
- 5) Labels and/or tags
- 6) Marking pens (indelible ink)

B. Sample Collection Procedure

- 1) Verify the location of the sampling point by referencing the sample site book before collecting the sample.
- 2) Use marking pen to write the sample I.D. number, either directly on the bottle or the tag/label.
- 3) Lower bucket into the main channel of the stream. Always collect the sample on the downstream side of a bridge or structure.
- 4) When filled, haul the bucket up and use the collected water to rinse the sample container and plastic container. Swirl the remaining water around in the bucket to rinse it out.
- 5) Collect another bucketful of water and fill the sample collection bottle using the plastic funnel. Do not fill the collection bottle completely.
- 6) Do not collect sediment from the stream bed or floating material (surface scum) if possible.
- 7) Fill in the pertinent information on the sample chain of custody form after the sample is collected.

II. Sampling Potable Water

A. Equipment Required

- 1) Plastic collection bottle with leak-proof screw-cap.
- 2) Tags or labels
- 3) Marking pens (indelible ink)

B. Sample Collection Procedure

- 1) Verify the location of the sampling point by referencing the sample site book before collecting the sample.
- 2) Use marking pen to write the sample I.D. number, either directly on the bottle or the tag/label.
- 3) Turn on faucet and rinse container twice. Let the faucet run for two minutes.
- 4) Reduce flow to prevent splattering and fill the sample container.
- 5) Fill in the pertinent information on the sample chain of custody form after the sample is collected.

III. Ambient Air Sampling

A. Equipment Required

- 1) "Bendix" Air Sampler - 0.17 HP
- 2) "Thomas" Air Sampler - #1
- 3) "Thomas" Air Sampler - #2
- 4) Flow Meter - Rockwell International or equivalent (These are converted gas meters that have been calibrated to monitor air flow.)
- 5) Ziploc bags (6 x 6 and 12 x 16 inches)
- 6) Gelman Glass Fiber Filters - 47 mm - 0.3 micron
- 7) "Scott" TEDA Charcoal Canister or equivalent
- 8) Quick Release Filter Head

B. Sample Collection Procedure

- 1) Verify the location of the sampling point by referencing the sample site book before collecting the sample.
- 2) Use marking pen to write the sample identification number directly on the TEDA canister and the Ziploc bags that will house the filter, canister, and field data sheet.
- 3) Load the TEDA canister into the quick release filter head.
- 4) Load the glass fiber filter directly in front of the TEDA canister.
- 5) In most cases, flow meters cannot be zeroed, therefore, the number indicated on the meters before the sampler is turned on must be recorded into the field logbook.
- 6) Turn the sampler on and begin pulling air through the filter and canister.
- 7) Turn the sampler off.
 - A) If using the "Thomas #1" sampler in conjunction with the MR-4 flow meter, record the volume of air sampled in cubic meters (M^3) and the elapsed time (Attachment 5).
 - B) If using the "Thomas #2" sampler in conjunction with the S-200 flow meter, record the volume of air sampled in cubic feet (ft^3) and the elapsed time (Attachment 6).
 - C) If using the "Bendix" air sampler, record the air flow in cubic feet per minute (cfm) and the elapsed time. (Attachment 7)
- 8) Remove the glass fiber filter from the quick release filter head and place it into a 6 X 6 inch Ziploc bag.
- 9) Remove the TEDA canister from the quick release filter head and place it into a 6 x 6 inch Ziploc bag.
- 10) Place the bags containing the filter and canister into a larger (12 x 16 inch) Ziploc bag along with the pertinent field data sheet for transport to the laboratory.

- 11) Insert a fresh canister and filter into the quick release filter head.
- 12) Fill in the pertinent information on the sample chain of custody form after the sample is collected.

IV. Sampling of Soils, Ashes, and Sludges

A. Equipment Required

- 1) Trowel, spoon, and/or shovel
- 2) Marking pens (Indelible ink)
- 3) Labels - Self adhesive
- 4) 400 cc sample containers with plastic lids

B. Sample Collection Procedure

- 1) Verify the location of the sampling point by referencing the sample site book before collecting the sample.
- 2) Attach a label to a 400 cc container. Use a marking pen to record the sample identification number on the label and/or directly on the container.
- 3) Select a site that best represents the average soil conditions at that location. Sites having poor drainage or that are exposed to surface run-off should be avoided. If possible, the site should not be near buildings or other structures or dense vegetation which might shelter it from wind and rain.
- 4) With a small trowel or spoon, sample the top centimeter of soil. Include any leaves, grass, etc. that may be present.
- 5) Using a ruler, estimate the number of square centimeters sampled and record the estimate on the sample container label.
- 6) Fill in the pertinent information on the sample chain of custody form after the sample is collected.

V. Sediment Sampling

A. Equipment Required

- 1) Ekman Sediment Sampler or equivalent - used for "soft" sediments
- 2) Ponar "Petite" Grab Sampler or equivalent - used for "hard" sediments
- 3) Shovel - Used for shallow (< 3 ft.) sampling
- 4) Nylon Rope - 50 ft. x 3/8 inch
- 5) Labels - Self adhesive
- 6) Marking Pens (Indelible ink)
- 7) 400 cc sampling containers - plastic lid
- 8) Trowel or spoon

B. Sample Collection Procedure

- 1) Verify the location of the sampling point by referencing the sample site book before collecting the sample.
- 2) Attach a label to a 400 cc container. Use a marking pen to record the sample identification number on the label and/or directly on the container.
- 3) Select a site with a smooth bottom. Avoid rocky areas and areas containing a high density of bottom-rooted vegetation.
- 4) Allow the sampler to free-fall to the bottom and secure sediment sample.
- 5) Retrieve sample slowly. Allow excess water to drain from the sampler. Tilt the sampler to expunge the last volume of water.
- 6) Use a trowel or spoon to transfer the sediment from the sampler to the sample container.
- 7) Fill the container completely, put on the lid, and wash the container off with natural water.
- 8) Fill in the pertinent information on the sample chain of custody form after the sample is collected.

VI. Vegetation Sampling

A. Equipment Required

- 1) Work gloves - Reusable cotton or plastic
- 2) Labels - Self adhesive
- 3) Marking pens (Indelible ink)
- 4) 400 cc sample containers - plastic with lid

B. Sample Collection Procedure

- 1) Verify the location of the sampling point by referencing the sample site book before collecting the sample.
- 2) Attach a label to a 400 cc container. Use a marking pen to record the sample identification number on the label and/or directly on the container.
- 3) Select green (living) vegetation from representative flora at the site. Vegetation may include leaves from trees, bushes, and ornamental plants, grasses, aquatic plants, Spanish Moss, or vegetables. Refer to the Sample Station Prefix List - Numbers 50 - 58 for the appropriate sample prefixes.
- 4) Pack as much of the selected type of vegetation as possible into the sample container and close the lid.
- 5) Fill in the pertinent information on the sample chain of custody form after the sample is collected.

VII. Milk Sampling

A. Equipment Required

- 1) Stainless steel dipper or ladle - furnished by dairy personnel
- 2) One-gallon plastic container with leakproof lid
- 3) Plastic funnel
- 4) Labels - Self adhesive
- 5) Marking Pens (Indelible ink)

B. Sample Collection Procedure

- 1) Verify the location of the sampling point by referencing the sample site book before collecting the sample.
- 2) Attach a label to a 400 cc container. Use a marking pen to record the sample identification number on the label and/or directly on the container.
- 3) It is essential that the sampling process not introduce contamination into the milk storage tank. If possible, ask a dairy worker to collect the sample in the presence of the SC DHEC sample collector.
- 4) When possible, fill the sample container directly from the storage tank drain. Otherwise, use a clean stainless steel dipper or ladle to collect the milk from the storage container and fill the sample container with the assistance of a plastic funnel.
- 5) An effort must be made to obtain the most recently collected supply of milk when sampling.
- 6) Fill in the pertinent information on the sample chain of custody form after the sample is collected.
- 7) Return sample to lab within 24 hours or refrigerate.

VIII. Sampling of Fish and Shellfish

A. Equipment Required

- 1) Boat, motor, and trailer
- 2) Gas generator - Must be capable of generating 230 V AC.
- 3) Electrofisher Shocking Unit - Must be capable of converting AC input to 600 V of DC output.
- 4) Positive and Negative Electrodes - Electrodes are boom-mounted approximately six feet apart and attached to the Electrofisher Shock Unit.
- 5) Ziploc bags (12 x 16 inch)
- 6) Marking pens (Indelible ink)
- 7) Ice chest(s) - 60 quart
- 8) Dip net(s) - Must have six foot insulated handle.
- 9) Rubberized gloves

B. Sampling Procedure

- 1) Verify the location of the sampling point by referencing the sample site book before collecting the sample.
- 2) Upon site verification, the electrodes are placed into the water and the Electrofisher Unit is turned on.
- 3) Fish that swim into the zone affected by the electric current are temporarily paralyzed and float to the surface.
- 4) The sample collectors, using the dip nets with insulated handles and rubber gloves, scoop the fish into the nets. Approximately two pounds of tissue per species is desired. One or more fish can suffice.
- 5) The fish are placed into a labeled Ziploc bags and placed in the ice chest for transport to the laboratory.
- 6) Fill in the pertinent information on the sample chain of custody form after the sample is collected.
- 7) At the laboratory, the fish are frozen. They are later beheaded and eviscerated before proceeding with the analysis regimen.

NOTE: On infrequent occasions, shellfish, game birds, game animals, beef, and pork samples are analyzed by the laboratory. Like the fish samples, the animals are eviscerated, skinned or plucked and beheaded before analysis. As these types of samples represent less than one percent of the samples collected by the laboratory, no additional information regarding sampling for these animals will be discussed. However, it can be stated that these types of samples are commonly received into the laboratory in the condition that is needed for analysis (tissue and bone only).

IX. Thermoluminescence Detector (TLD) Sampling

A. Equipment Required

- 1) TLD cards
- 2) Cable ties or staple gun
- 3) Knife or scissors
- 4) Survey tape - fluorescent
- 5) Marking pens (indelible ink)

B. Sample Collection Procedure

NOTE: TLDs are prepared by the SC DHEC Radiological Laboratory and consist of three detectors (Lithium Fluoride) and an information card that are laminated in plastic. The Station I.D. number, date posted, and date removed is recorded on the card in indelible ink. The rear of the card identifies it as a research tool and asks that it not be tampered with. Holes are punched in the laminate coat to facilitate the hanging of the card.

- 1) Write the date and time posted on each card.
- 2) Record the date and time posted in the field log.
- 3) Hang the "new" TLD at/near the "existing" TLD if at an "established" TLD station. Established stations may or may not need to be marked with survey tape.

NOTE: When selecting new TLD sites, establish a site I.D. number for the new location using accepted protocols (Refer to Sample Collection and Handling Procedures). Select a spot about eye level or slightly higher, exposed to the air, and located so that it is not readily visible to the public. Fasten the TLD to inherent structure with a cable tie (trees, fence posts, telephone poles, etc.). Attach survey tape near the TLD so that a follow-up team may easily find the card. If possible, avoid potential high gamma background structures such as stone, concrete block buildings, and some steel structures (buildings, fence posts, etc.).

- 4) Routine TLD sites are monitored for a three (3) month period. The detectors are laminated in color-coded construction paper that correspond to the seasons/quarters of the year:
 - (a) Blue for Winter
 - (b) Green for Spring
 - (c) Yellow for Summer
 - (d) Orange for Fall
- 5) If TLDs are placed in an area in response to an accident or another emergency situation, the TLDs that may already be present in that area should not be removed or tampered with.
- 6) At the end of the 90-day exposure period, the TLDs are collected and transported to the laboratory. They are kept in a lead-shielded storage area until they are analyzed.
- 7) Fill in the pertinent information on the sample chain of custody form after the TLD's are collected.

RADIOLOGICAL LABORATORY COUNTING SYSTEMS

The counting systems used by the Radiological Environmental Monitoring Division for radiological analyses are briefly described :

GROSS ALPHA AND BETA

A Protean and Tennelec gas flow alpha/beta proportional system uses a 2.25 inch detector having an 80 microgram/cm detector window and an automatic changer with a capacity of 50 samples. The system has a typical background of 0.08 cpm in the alpha channel and 0.88 cpm in the beta channel. The typical detector efficiencies are 21% for Am-241 and 41% for Cs-137.

TRITIUM

The Packard TRI CARB 2300 Liquid Scintillation System is an ambient temperature spectrometer with a 100 sample capacity. The automatic quench calibration in this system is performed by the combined External Standards Ratio Method. The counting efficiency of tritium in quenched samples is about 44.0%

GAMMA SPECTROSCOPY

The Radiological Lab uses a Canberra Gennie Alpha Station gamma spectroscopy system. This system is interfaced with four Germanium detectors with counting efficiencies of 54%, 42.0%, 90.0% and 40.0%.

The second system is installed in the Mobile Radiological Laboratory and consists of a Nuclear Data 66 Multi-channel analyzer, a computer, and a 20.0% Germanium detector.

AMBIENT RADIATION

A Panasonic UD-716AGL thermoluminescence dosimeter (TLD) reader system is used in our lab. Panasonic UD-814 badges are used to monitor environmental ambient radiation.

B. Sample Collection Procedure

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- 1) Write the date and time posted on each card.
- 2) Record the date and time posted in the field log.
- 3) Hang the "new" TLD at/near the "existing" TLD if at an "established" TLD station. Established stations may or may not need to be marked with survey tape.

NOTE: When selecting new TLD sites, establish a site I.D. number for the new location using accepted protocols (Refer to Sample Collection and Handling Procedures). Select a spot about eye level or slightly higher, exposed to the air, and located so that it is not readily visible to the public. Fasten the TLD to inherent structure with a cable tie (trees, fence posts, telephone poles, etc.). Attach survey tape near the TLD so that a follow-up team may easily find the card. If possible, avoid potential high gamma background structures such as stone, concrete block buildings, and some steel structures (buildings, fence posts, etc.).

- 4) Routine TLD sites are monitored for a three (3) month period. The detectors are laminated in color-coded construction paper that correspond to the seasons/quarters of the year:
 - (a) Blue for Winter
 - (b) Green for Spring
 - (c) Yellow for Summer
 - (d) Orange for Fall
- 5) If TLDs are placed in an area in response to an accident or another emergency situation, the TLDs that may already be present in that area should not be removed or tampered with.
- 6) At the end of the 90-day exposure period, the TLDs are collected and transported to the laboratory. They are kept in a lead-shielded storage area until they are analyzed.
- 7) Fill in the pertinent information on the sample chain of custody form after the TLD's are collected.

ANALYTICAL PROCEDURES USED

<u>Analysis</u>	<u>Procedure</u>
Tritium	EPA 906.0
Gamma in Liquids & Solids	EPA 901.1
Gross Alpha & Beta in Water	EPA 900.0
Tritium in Milk	EPA 906.0
Uranium	EPA 901.1 and Alpha Spectroscopy
Gross Alpha & Beta in Air	EPA 900.0 adapted to air filters
Iodine 131 In Air	EPA 901.0 adapted to charcoal canisters

TWO SIGMA DETECTON LIMITS

.....**WATER SAMPLES**.....

<u>ANALYSIS</u>	<u>SAMPLE SIZE</u>	<u>COUNTING TIME</u>	<u>MINIMUM DETECTABLE LIMIT</u>
Gross Alpha	1 liter	50 minutes	0.1 pCi/liter
Gross Beta	1 liter	50 minutes	0.3 pCi/liter
Tritium	2 ml	300 minutes	200 pCi/liter
Co-57	3 liter	1000 minutes	0.5 pCi/liter
Cr-51	3 liter	1000 minutes	7.0 pCi/liter
I-131	3 liter	1000 minutes	1.2 pCi/liter
Be-7	3 liter	1000 minutes	1.3 pCi/liter
Cs-137	3 liter	1000 minutes	1.2 pCi/liter
Cs-134	3 liter	1000 minutes	1.1 pCi/liter
Co-58	3 liter	1000 minutes	1.1 pCi/liter
Co-60	3 liter	1000 minutes	1.1 pCi/liter
Mn-54	3 liter	1000 minutes	1.2 pCi/liter

By eluting 19.0 liters of water through a 50.0 mixed bed resin and counting for 1000 minutes, the minimum detectable concentrations are lowered by a factor of 10.

.....**AIR SAMPLES**.....

<u>ANALYSIS</u>	<u>SAMPLE SIZE</u>	<u>COUNTING TIME</u>	<u>MINIMUM DETECTABLE LIMIT</u>
Gross Alpha	200 M ³	50 minutes	.001 pCi/M ³
Gross Beta	200 M ³	50 minutes	.005 pCi/M ³
I-131	200 M ³	200 minutes	.02 pCi/M ³
Ce-144	200 M ³	1000 minutes	.03 pCi/M ³
Ce-141	200 M ³	1000 minutes	.005 pCi/M ³
Ru-103	200 M ³	1000 minutes	.005 pCi/M ³
Ru-106	200 M ³	1000 minutes	.05 pCi/M ³
Cs-137	200 M ³	1000 minutes	.005 pCi/M ³
Zr-95	200 M ³	1000 minutes	.007 pCi/M ³
Nb-95	200 M ³	1000 minutes	.004 pCi/M ³
Cs-134	200 M ³	1000 minutes	.004 pCi/M ³
Co-58	200 M ³	1000 minutes	.004 pCi/M ³
Co-60	200 M ³	1000 minutes	.004 pCi/M ³

.....**VEGETATION**.....

<u>ANALYSIS</u>	<u>SAMPLE SIZE</u>	<u>COUNTING TIME</u>	<u>MINIMUM DETECTABLE LIMIT</u>
Tritium	2 ml	300 minutes	200 pCi/liter
I-131	50 gm	200 minutes	0.07 pCi/gm
Cs-137	50 gm	200 minutes	0.07 pCi/gm
Cs-134	50 gm	200 minutes	0.07 pCi/gm
Co-58	50 gm	200 minutes	0.06 pCi/gm
Mn-54	50 gm	200 minutes	0.06 pCi/gm
Co-60	50 gm	200 minutes	0.06 pCi/gm

.....SOIL.....

<u>ANALYSIS</u>	<u>SAMPLE SIZE</u>	<u>COUNTING TIME</u>	<u>MINIMUM DETECTABLE LIMIT</u>
Tritium	2 ml	300 minutes	200 pCi/liter
I-131	400 gms	100 minutes	0.01 pCi/gm
Cs-137	400 gms	100 minutes	0.01 pCi/gm
Cs-134	400 gms	100 minutes	0.01 pCi/gm
Co-58	400 gms	100 minutes	0.01 pCi/gm
Mn-54	400 gms	100 minutes	0.01 pCi/gm

VC SUMMER NUCLEAR STATION
JENKINSVILLE, SC

<u>LOCATION NAME</u>	<u>PATHWAY</u>	<u>DISTANCE & DIRECTION</u>
10/0735	Surface Water	Broad River @ Parr Shoals 2.0 miles downstream.
10/0741	Surface Water	Broad River @ Carlisle, SC 20 miles upstream.
21/0731	Air	SCE & G Plot #12, 1 mi SE
21/0319	Air	24.7 miles Southeast.
40/4022	Milk	Shealy Dairy, 5.0 mi W of VC Summer Nuclear Station.
36/0740	Fish (bass)	Monticello Reservoir.
51/0731	Vegetation	1.0 mi ESE of VC Summer Nuclear Station.
71/0747	Sediment	Monticello Reservoir 0.5 mi East of VC Summer Nuclear Station at Discharge.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED JAN

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile ESE

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (JAN 4)	8.0 ± 1.0 E3	1.24E-02 ± 2.90E-03
I-131	< 1.0 E-3	< 1.16E-02
Gross Beta (JAN 11)	NO SAMPLE	2.73E-02 ± 4.93E-03
I-131	NO SAMPLE	< 1.40E-02
Gross Beta (JAN 18)	1.4 ± 0.2 E-2	2.69E-02 ± 4.86E-03
I-131	< 2.0 E-3	< 1.39E-02
Gross Beta (JAN 25)	1.2 ± 0.2 E-2	1.51E-02 ± 3.20E-03
I-131	< 4.0 E-3	< 1.31E-02
Gross Beta (FEB 01)	1.0 ± 0.2 E-2	2.28E-02 ± 4.24E-03
I-131	< 3.8 E-3	< 1.47E-02
<u>Gamma Composite</u>		
Be-7	9.0 ± 1.0 E-2	1.19E-01 ± 2.332E-02
Cs-137	< 3.0 E-3	< 1.61E-03

*PLEASE DO NOT WRITE IN LEFT COLUMN

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED FEB

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile ESE

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (FEB 8)	NO SAMPLE	2.87E-02 ± 5.00E-03
I-131	NO SAMPLE	< 1.17E-02
Gross Beta (FEB 15)	1.0 ± 0.1 E-2	1.12E-02 ± 2.69E-03
I-131	< 2.0 E-3	< 1.26E-02
Gross Beta (FEB 22)	1.0 ± 0.1 E-2	1.19E-02 ± 2.83E-03
I-131	< 2.0 E-3	< 9.99E-03
Gross Beta (FEB 29)	1.1 ± 0.2 E-2	7.72E-03 ± 2.13E-03
I-131	< 4.0 E-3	< 1.12E-02
<u>Gamma Composite</u>		
Be-7	1.1 ± 0.2 E-1	1.70E-01 ± 2.48E-02
Cs-137	< 3.0 E-3	< 1.32E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED MAR

LOCATION#6/21-0731 DISTANCE & DIRECTION 1mile ESE

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (MAR 7)	9.0 ± 1.0 E-3	2.18E-02 ± 4.06E-03
I-131	< 4.1 E-3	< 1.26E-02
Gross Beta (MAR 14)	9.0 ± 1.0 E-3	1.73E-02 ± 3.56E-03
I-131	< 2.0 E-2	< 1.43E-02
Gross Beta (MAR 21)	NO SAMPLE	1.15E-02 ± 2.69E-03
I-131	NO SAMPLE	< 1.37E-02
Gross Beta (MAR 28)	9.0 ± 1.0 E-3	1.55E-02 ± 3.26E-03
I-131	< 1.0 E-2	< 1.16E-02
<u>Gamma Composite</u>		
Be-7	1.2 ± 0.2 E-1	1.56E-01 ± 2.57-02
Cs-137	< 2.0 E-2	< 1.85E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED April

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (April 4)	5.0 ± 1.0 E-3	1.23E-02 ± 2.84E-03
I-131	< 1.0 E-2	< 1.05E-02
Gross Beta (April 11)	8.0 ± 1.0 E-3	1.54E-02 ± 3.21E-03
I-131	< 5.0 E-2	< 1.26E-02
Gross Beta (April 18)	1.0 ± 0.1 E-2	2.50E-02 ± 4.47E-03
I-131	< 1.0 E-2	< 9.72E-03
Gross Beta (April 25)	9.0 ± 0.9 E-3	1.58E-02 ± 3.33E-03
I-131	< 1.0 E-2	< 1.24E-02
Gross Beta (May 2)	8.0 ± 0.8 E-3	1.47E-02 ± 3.16E-03
I-131	< 3.0 E-2	< 1.26E-02
<u>Gamma Composite</u>		
Be-7	1.3 ± 0.1 E-1	1.62E-01 ± 2.47E-02
Cs-137	< 3.0 E-3	< 1.52E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED MAY

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile ESE

ANALYSIS OR ISOTOPE STATE RESULTS* LICENSEE RESULTS

Gross Beta (May 9)	9.0 ± 1.0 E-3	1.76E-02 ± 3.50E-03
I-131	< 1.0 E-3	< 8.96E-03
Gross Beta (May 16)	NO SAMPLE	1.78E-02 ± 3.55E-03
I-131	NO SAMPLE	< 1.22E-02
Gross Beta (May 23)	1.1 ± 0.1 E-2	2.59E-02 ± 4.66E-03
I-131	< 1.0 E-2	<1.24E-02
Gross Beta (May 30)	9.0 ± 1.0 E-3	1.37E-02 ± 3.11E-03
I-131	< 1.0 E-3	<1.40E-02
<u>Gamma Composite</u>		
Be-7	7.0 ± 1.0 E-2	1.44E-01 ± 2.33E-02
Cs-137	< 2.0 E-3	< 1.36E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED JUNE

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (June 6)	NO SAMPLE	1.93E-02 ± 3.76E-03
I-131	NO SAMPLE	< 1.00E-02
Gross Beta (June 13)	9.0 ± 1.0 E-3	1.35E-02 ± 2.99E-03
I-131	< 1.0 E-3	< 1.17E-02
Gross Beta (June 20)	6.0 ± 1.0 E-3	1.27E-02 ± 2.89E-03
I-131	< 1.0 E-2	< 1.40E-02
Gross Beta (June 27)	1.5 ± 0.2 E-2	2.63E-02 ± 4.70E-03
I-131	< 1.0 E-3	< 1.42E-02
<u>Gamma Composite</u>		
Be-7	8.0 ± 1.0 E-2	1.51E-01 ± 2.48E-02
Cs-137	< 1.0 E-3	< 1.38E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
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LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED JULY

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (July 3)	1.3 ± 0.1 E-2	2.37E-02 ± 4.55E-03
I-131	< 1.0 E-3	< 1.33E-02
Gross Beta (July 11)	NO SAMPLE	1.85E-02 ± 3.43E-03
I-131	NO SAMPLE	< 1.08E-02
Gross Beta (July 18)	1.1 ± 0.2 E-2	1.63E-02 ± 3.38E-03
I-131	< 1.0 E-3	< 1.12E-02
Gross Beta (July 25)	1.0 ± 0.3 E-2	1.46E-02 ± 3.13E-03
I-131	< 2.0 E-3	< 1.21E-02
Gross Beta (AUG 1)	7.0 ± 2.0 E-3	1.74E-03 ± 3.58E-03
I-131	< 1.0 E-3	< 1.28E-02
<u>Gamma Composite</u>		
Be-7	8.0 ± 1.0 E-2	1.61E-01 ± 2.53E-02
Cs-137	< 1.0 E-3	< 1.38E-03

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HEC 816 (10/82)

ACTIVITY: pCi/M3

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: Y.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED AUG

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Aug 8)	1.2 ± 0.2 E-2	9.90E-03 ± 2.51E-03
I-131	< 1.0 E-3	< 1.06E-02
Gross Beta (Aug 15)	1.2 ± 0.2 E-2	1.49E-02 ± 3.24E-03
I-131	< 1.0 E-3	< 1.41E-02
Gross Beta (Aug 22)	1.7 ± 0.1 E-2	2.78E-02 ± 4.88E-03
I-131	< 1.0 E-3	< 1.27E-02
Gross Beta (Aug 29)	5.0 ± 1.0 E-3	2.51E-02 ± 6.53E-03
I-131	< 1.0 E3	< 2.15E-02
<u>Gamma Composite</u>		
Be-7	7.0 ± 1.0 E-1	1.47E-01 ± 2.93E-02
Cs-137	< 1.0 E-3	< 2.63E-03

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DHEC 816 (10/82)

ACTIVITY: pCi/M3

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED SEPT

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Sept 5)	1.5 ± 0.2 E-2	1.82E-02 ± 3.84E-03
I-131	< 8.0 E-3	< 1.33E-02
Gross Beta (Sept 12)	2.9 ± 0.3 E-2	2.56E-02 ± 4.59E-03
I-131	1.0 E-3	< 1.24E-02
Gross Beta (Sept 19)	NO SAMPLE	1.67E-02 ± 3.44E-03
I-131	NO SAMPLE	< 1.38E-02
Gross Beta (Sept 26)	5.0 ± 2.0 E-3	3.01E-02 ± 5.27E-03
I-131	< 1.0 E-3	< 1.23E-02
Gross Beta (Oct 3)	NO SAMPLE	1.80 E-02 ± 3.56E-03
I-131	NO SAMPLE	< 1.34E-02
<u>Gamma Composite</u>		
Be-7	7.0 ± 1.0 E-2	1.33E-01 ± 2.26E-02
Cs-137	< 1.0 E-3	< 1.39E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED OCT

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile ESE

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Oct 10)	7.0 ± 3.0 E-3	1.39E-02 ± 3.06E-03
I-131	< 1.0 E-3	< 1.39E-02
Gross Beta (Oct 17)	1.0 ± 0.3 E-2	NO SAMPLE
I-131	< 3.0 E-3	NO SAMPLE
Gross Beta (Oct 24)	6.0 ± 1.0 E-3	2.20E-02 ± 4.17E-03
I-131	< 2.0 E-3	< 1.11E-02
Gross Beta (Oct 231	1.0 ± 0.2 E-2	2.63E-02 ± 4.70E-03
I-131	< 3.0 E-3	< 8.36E-02
		-
<u>Gamma Composite</u>		
Be-7	8.0 ± 1.0 E-2	1.64E-01 ± 3.41E-02
Cs-137	< 2.0 E-3	< 2.23E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED NOV

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile ESE

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Nov 7)	8.0 ± 1.0 E-3	1.97E-02 ± 3.86E-03
I-131	< 2.0 E-3	< 1.41E-02
Gross Beta (Nov 14)	6.0 ± 1.0 E-3	1.81E-02 ± 3.60E-03
I-131	< 1.0 E-3	< 1.26E-02
Gross Beta (Nov 21)	NO SAMPLE	1.73E-02 ± 3.43E-03
I-131	NO SAMPLE	< 1.25E-02
Gross Beta (Nov 27)	2.1 ± 0.1 E-2	1.81E-02 ± 3.81E-03
I-131	< 1.0 E-3	< 1.36E-02
<u>Gamma Composite</u>		
Be-7	7.0 ± 1.0 E-2	1.08E-01 ± 1.99E-02
Cs-137	< 1.0 E-3	< 1.80E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
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LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED DEC

LOCATION#6/21-0731 DISTANCE & DIRECTION 1 mile ESE

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Dec 5)	2.1 ± 0.1 E-2	1.73E-02 ± 3.29E-03
I-131	< 1.0 E-3	< 9.04E-03
Gross Beta (Dec 12)	NO SAMPLE	2.09E-02 ± 3.99E-03
I-131	NO SAMPLE	< 1.21E-02
Gross Beta (Dec 19)	7.0 ± 1.0 E-3	1.19E-02 ± 2.72E-03
I-131	< 1.0 E-3	< 1.27E-02
Gross Beta (Dec 26)	1.0 ± 0.1 E-3	2.18E-02 ± 4.00E-03
I-131	< 1.0 E-3	< 1.24E-02
<u>Gamma Composite</u>		
Be-7	6.0 ± 1.0 E-2	1.04E-01 ± 1.53E-02
Cs-137	< 1.0 E-3	< 1.48E-03

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DHEC 816 (10/82)

ACTIVITY: pCi/M3

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED JUL

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (July 3)	NO SAMPLE	2.73E-02 ± 5.05E-03
I-131	NO SAMPLE	< 1.33E-02
Gross Beta (July 11)	1.2 ± 0.2 E-2	1.63E-02 ± 3.16E-03
I-131	< 1.0 E-3	< 1.15E-02
Gross Beta (July 18)	1.7 ± 0.2 E-2	1.79E-02 ± 3.52E-03
I-131	< 1.0 E-2	< 1.15E-02
Gross Beta (July 25)	1.3 ± 0.2 E-2	1.65E-02 ± 3.36E-03
I-131	< 1.0 E-2	< 9.99E-03
Gross Beta (Aug 1)	NO SAMPLE	1.80E-02 ± 3.60 E-03
I-131	NO SAMPLE	< 1.04E-02
<u>Gamma Composite</u>		
Be-7	9.0 ± 0.8 E-2	1.31E-01 ± 2.29E-02
Cs-137	< 2.0 E-3	< 1.69E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
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LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED AUG

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Aug 8)	1.1 ± 0.1 E-2	1.30E-02 ± 2.91E-03
I-131	< 1.0 E-3	< 1.55E-02
Gross Beta (Aug 15)	NO SAMPLE	1.83E-02 ± 3.66E-03
I-131	NO SAMPLE	< 1.42E-02
Gross Beta (Aug 22)	1.6 ± 0.2 E-2	2.61E-02 ± 4.60E-03
I-131	< 2.0 E-3	< 8.76E-03
Gross Beta (Aug 29)	2.3 ± 0.3 E-2	2.75E-02 ± 4.80E-03
I-131	< 1.0 E-2	< 1.40E-02
<u>Gamma Composite</u>		
Be-7	8.0 ± 1.0 E-2	1.04E-01 ± 2.29E-02
Cs-137	< 2.0 E-3	< 1.27E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED SEPT

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Sept 5)	1.3 ± 0.2 E-2	1.91E-02 ± 3.66E-03
I-131	< 8.0 E-3	< 1.17E-02
Gross Beta (Sept 12)	1.2 ± 0.2 E-2	2.00E-02 ± 3.75E-03
I-131	< 2.0 E-3	< 1.23E-02
Gross Beta (Sept 19)	1.1 ± 0.2 E-2	1.91E-02 ± 3.71E-03
I-131	< 3.0 E-3	< 9.58E-03
Gross Beta (Sept 26)	NO SAMPLE	3.36E-02 ± 5.62E-03
I-131	NO SAMPLE	< 1.05E-02
Gross Beta (Oct 3)	1.4 ± 0.2 E-2	2.20E-02 ± 4.10E-03
I-131	< 1.0 E-3	1.23E-02
<u>Gamma Composite</u>		
Be-7	1.0 ± 0.1 E-1	1.25E-01 ± 2.22E-02
Cs-137	< 2.0 E-3	< 1.27E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED APR

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Apr 4)	7.0 ± 0.9 E-3	1.05E-02 ± 2.56E-03
I-131	< 1.0 E-3	< 8.47E-03
Gross Beta (Apr 11)	NO SAMPLE	1.77E-02 ± 3.46E-03
I-131	NO SAMPLE	< 1.18E-02
Gross Beta (Apr 18)	1.7 ± 0.2 E-2	2.16E-02 ± 3.98E-03
I-131	< 1.0 E-3	< 1.18E-02
Gross Beta (Apr 25)	1.3 ± 0.2 E-2	1.61E-02 ± 3.28E-03
I-131	< 1.0 E-3	< 8.64E-03
Gross Beta (May 2)	9.0 ± 1.0 E-3	1.92E-02 ± 3.70E-03
I-131	< 1.0 E-3	< 7.92E-03
<u>Gamma Composite</u>		
Be-7	1.0 ± 0.2 E-1	1.53E-01 ± 1.79E-02
Cs-137	< 1.0 E-3	< 1.04E-03

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LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED MAY

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (May 9)	1.1 ± 0.2 E-2	1.84E-02 ± 3.56E-03
I-131	< 3.0 E-3	< 1.34E-02
Gross Beta (May 16)	NO SAMPLE	1.87E-02 ± 3.68E-03
I-131	NO SAMPLE	< 9.21E-03
Gross Beta (May 23)	1.4 ± 0.1 E-2	2.03E-02 ± 3.89E-03
I-131	< 3.0 E-3	< 8.92E-03
Gross Beta (May 35)	1.3 ± 0.2 E-2	1.34E-02 ± 2.99E-03
I-131	< 3.0 E-3	< 1.49E-02
<u>Gamma Composite</u>		
Be-7	8.0 ± 1.0 E-1	1.44E-01 ± 2.78E-02
Cs-137	< 1.0 E-3	< 1.88E-03

*PLEASE DO NOT WRITE IN LEFT COLUMN

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED JUN

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (June 6)	1.0 ± 0.1 E-2	1.86E-03 ± 3.59E-03
I-131	< 3.0 E-3	< 9.98E-03
Gross Beta (June 13)	1.8 ± 0.1 E-3	1.68E-02 ± 3.40E-03
I-131	< 1.0 E-3	< 8.91E-03
Gross Beta (June 20)	1.0 ± 0.1 E-3	1.44E-02 ± 3.13E-03
I-131	< 9.0 E-3	< 1.60E-02
Gross Beta (June 27)	NO SAMPLE	2.15E-02 ± 4.07E-03
I-131	NO SAMPLE	< 1.34E-02
<u>Gamma Composite</u>		
Be-7	1.4 ± 0.1 E-1	1.44E-01 ± 1.95E-02
Cs-137	< 1.0 E-3	< 1.37E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED OCT

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Oct 10)	1.4 ± 0.7 E-2	1.19E-02 ± 2.71E-03
I-131	< 1.0 E-3	< 1.39E-02
Gross Beta (Oct 17)	1.2 ± 0.2 E-2	2.42E-02 ± 4.44E-03
I-131	< 1.0 E-3	< 9.36E-03
Gross Beta (Oct 24)	NO SAMPLE	2.33E-02 ± 4.30E-03
I-131	NO SAMPLE	< 7.54E-03
Gross Beta (Oct 31)	1.5 ± 0.4 E-2	2.81E-02 ± 4.86E-03
I-131	< 1.0 E-3	< 1.18E-02
<u>Gamma Composite</u>		
Be-7	0.6 ± 0.2 E-1	1.36E-01 ± 2.24E-02
Cs-137	< 1.0 E-3	< 1.72E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED NOV

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Nov 7)	1.1 ± 0.2 E-2	2.14E-02 ± 4.09E-03
I-131	< 2.0 E-3	< 7.82E-03
Gross Beta (Nov 14)	7.3 ± 0.4 E-2	1.98E-02 ± 3.79E-03
I-131	< 1.0 E-3	< 9.62E-03
Gross Beta (Nov 21)	NO SAMPLE	1.81E-02 ± 3.32E-03
I-131	NO SAMPLE	< 8.60E-03
Gross Beta (Nov 27)	NO SAMPLE	1.55E-02 ± 3.40E-03
I-131	NO SAMPLE	< 8.31E-03
<u>Gamma Composite</u>		
Be-7	4.5 ± 0.9 E-2	1.28E-01 ± 2.24E-02
Cs-137	< 1.5 E-3	< 1.66E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED DEC

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Dec 5)	1.5 ± 0.1 E-2	2.42E-02 ± 4.24E-03
I-131	< 1.0 E-3	< 9.51E-03
Gross Beta (Dec 12)	1.1 ± 0.31E2	2.21E-02 ± 4.51E-03
I-131	< 1.4 E-3	< 9.11E-03
Gross Beta (Dec 19)	9.0 ± 1.0 E-3	1.93E-02 ± 3.78E-03
I-131	< 2.0 E-3	< 8.90E-03
Gross Beta (Dec 26)	NO SAMPLE	2.23E-02 ± 4.10E-03
I-131	NO SAMPLE	< 1.23E-02
<u>Gamma Composite</u>		
Be-7	7.0 ± 1.0 E-2	9.58E-02 ± 2.14E-02
Cs-137	< 1.5 E-3	< 1.09E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED JAN

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Jan 4)	1.1 ± 0.1 E-2	1.31E-02 ± 2.87E-03
I-131	< 4.0 E-3	< 1.00E-02
Gross Beta (Jan 11)	1.6 ± 0.2 E-2	2.72E-02 ± 4.80E-03
I-131	< 4.0 E-3	< 9.11E-03
Gross Beta (Jan 18)	1.6 ± 0.2 E-2	2.74E-02 ± 4.81E-03
I-131	< 8.0 E-3	< 1.25E-02
Gross Beta (Jan 25)	1.1 ± 0.2 E-2	2.05E-02 ± 3.94E-03
I-131	< 4.0 E-3	< 1.26E-02
Gross Beta (Feb 1)	NO SAMPLE	2.15E-02 ± 4.06E-03
I-131	NO SAMPLE	< 1.45E-02
<u>Gamma Composite</u>		
Be-7	9.0 ± 1.0 E-2	9.48E-02 ± 1.88E-02
Cs-137	< 4.0 E-3	< 1.38E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED FEB

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Feb 8)	4.3 ± 0.4 E-2	2.60E-02 ± 4.59E-03
I-131	< 5.0 E-3	< 8.53E-03
Gross Beta (Feb 15)	1.3 ± 0.2 E-2	1.30E-02 ± 2.90E-03
I-131	< 2.0 E-3	< 1.21E-02
Gross Beta (Feb 22)	NO SAMPLE	1.83E-02 ± 3.63E-03
I-131	NO SAMPLE	< 1.27E-02
Gross Beta (Feb 29)	1.8 ± 0.2 E-2	2.48E-02 ± 4.48E-03
I-131	< 2.0 E-3	< 1.40E-02
<u>Gamma Composite</u>		
Be-7	1.3 ± 0.2 E-1	1.61E-01 ± 2.35E-02
Cs-137	< 2.0 E-3	< 1.70E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Air SPLIT OR DUPLICATE Duplicate DATE COLLECTED MAR

LOCATION#17/21-0319 DISTANCE & DIRECTION 24.7 miles Southeast

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Gross Beta (Mar 7)	1.4 ± 0.2 E-2	1.52E-02 ± 3.17E-03
I-131	< 3.0 E-3	< 8.95E-03
Gross Beta (Mar 14)	1.5 ± 0.2 E-2	1.50E-02 ± 3.20E-03
I-131	< 2.0 E-3	< 1.19E-02
Gross Beta (Mar 21)	6.0 ± 2.0 E-3	1.03E-02 ± 2.50E-03
I-131	< 2.0 E-3	< 1.43E-02
Gross Beta (Mar 28)	NO SAMPLE	1.99E-02 ± 3.82E-03
I-131	NO SAMPLE	< 1.15E-02
<u>Gamma Composite</u>		
Be-7	1.2 ± 0.2 E-1	1.69E-01 ± 2.74E-02
Cs-137	< 2.0 E-3	< 1.73E-03

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1995

PATHWAY Surface Water SPLIT OR DUPLICATE Duplicate DATE COLLECTED JAN 17

LOCATION#21/10-0735 DISTANCE & DIRECTION Broad River 2 miles Downstream

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

H-3	< 200	< 4.74E+02
Cs-137	< 2.3E-1	< 2.01E+00

FEB 21

H-3	NO SAMPLE	< 4.63E+02
Cs-137	NO SAMPLE	< 1.16E+00

MAR 20

H-3	< 200	< 4.61E+02
Cs-137	< 2.3E0	< 1.44E+00

APR 19

H-3	3.2 ± 2.6E2	< 4.65E+02
Cs-137	< 2.0 E-1	< 1.33E+00

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FRIDAY COLLECTION
 DHEC 816 (10/82)

ACTIVITY: pCi/l

OUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Surface Water SPLIT OR DUPLICATE Duplicate DATE COLLECTED MAY 22

LOCATION#21/10-0735 DISTANCE & DIRECTION Broad River 2 miles Downstream

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

H-3	< 200	< 4.42E+02
Cs-137	< 1.0 E-1	< 1.44E+00

JUNE 21

H-3	3.9 ± 2.7E2	< 4.55E+02
Cs-137	< 7.0 E-2	< 1.43E+00

JULY 22

H-3	< 200	< 4.61E+02
Cs-137	< 1.0 E-1	< 1.52E+00

AUG 21

H-3	< 250	< 4.67E+02
Cs-137	< 2.0 E-1	< 1.08E+00

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FRIDAY COLLECTION

DHEC 816 (10/82)

ACTIVITY: pCi/l

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Surface Water SPLIT OR DUPLICATE Duplicate DATE COLLECTED SEPT 23

LOCATION#21/10-0735 DISTANCE & DIRECTION Broad River 2 miles Downstream

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

H-3	< 200	< 4.64E+02
Cs-137	< 2.0 E-1	< 1.20E+00

OCT 21

H-3	4.0 ± 2.6E+2	< 4.80E+02
Cs-137	< 9.0 E-2	< 1.39E+00

NOV 21

H-3	3.95 ± 2.35E2	< 4.63E+02
Cs-137	< 2.4 E-1	< 1.83E+00

DEC 20

H-3	5.7 ± 2.6E2	< 4.68E+02
Cs-137	< 1.0 E-1	< 1.34E+00

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FRIDAY COLLECTION
 DHEC 816 (10/82)

ACTIVITY: pCi?L

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Surface Water SPLIT OR DUPLICATE Duplicate DATE COLLECTED JAN 3

LOCATION#22/10-0741 DISTANCE & DIRECTION Broad River 20 miles upstream

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

H-3	< 200	< 4.63E+02
Cs-137	< 2.4 E-1	< 1.88E+00

FEB 2

H-3	6.1 ± 3.0 E2	< 4.52E+02
Cs-137	< 2.7 E-1	< 1.19E+00

MAR 6

H-3	< 200	< 4.51E+02
Cs-137	< 1.0 E0	< 1.42E+00

APRIL 8

H-3	< 200	< 4.65E+02
Cs-137	< 2.0 E-1	< 1.43E+00

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FRIDAY COLLECTION

DHEC 816 (10/82)

ACTIVITY: pCi/l

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Surface Water SPLIT OR DUPLICATE Duplicate DATE COLLECTED MAY 7

LOCATION#22/10-0741 DISTANCE & DIRECTION Broad River 20 miles upstream

ANALYSIS OR ISOTOPE STATE RESULTS* LICENSEE RESULTS

H-3	< 200	< 4.77E+02
Cs-137	< 2.0 E-1	< 1.35E+00

June 4

H-3	4.3 ± 2.6 E2	< 4.63E+02
Cs-137	< 2.0 E-1	< 1.73E+00

JUL 3

H-3	< 200	< 4.71E+02
Cs-137	< 1.0 E-1	< 1.44E+00

Aug 2

H-3	< 200	< 4.72E+02
Cs-137	< 5.0 E-1	< 1.21E+00

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FRIDAY COLLECTION

DHEC 816
(10/82)

ACTIVITY: pCi/l

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Surface Water SPLIT OR DUPLICATE Duplicate DATE COLLECTED SEPT 3
 LOCATION#22/10-0741 DISTANCE & DIRECTION Broad River 20 miles upstream

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

H-3	5.0 ± 2.7 E2	< 4.57E+02
Cs-137	< 1.0 E-1	< 1.19E+00

OCT 2

H-3	< 200	< 4.54E+02
Cs-137	< 2.0 E-1	< 1.6E+00

NOV 4

H-3	< 200	< 4.59E+02
Cs-137	< 2.0 E-1	< 1.53E+00

Dec 3

H-3	< 200	< 4.69E+02
Cs-137	< 2.0 E-1	< 1.35E+00

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FRIDAY COLLECTION
 DHEC 816 (10/82)

ACTIVITY pCi/l

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Vegetation DUPLICATE Duplicate DATE COLLECTED May 20

LOCATION#6/51-0731 DISTANCE & DIRECTION 1 mile E.S.E. of VCSNS

ANALYSIS OR ISOTOPE STATE RESULTS* LICENSEE RESULTS

Cs-137	< 2.6 E1	< 1.47E+01
K-40	5.87 ± 0.40E3	5.09E+03 ± 3.36E+02

COLLARDS

Nov 18

Cs-137	< 1.4 E0	< 1.27E+01
K-40	< 3.0 E2	4.04E+03 ± 2.95E+02

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FRIDAY COLLECTION

DHEC 816 (10/82)

ACTIVITY: pCi/l

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Sediment DUPLICATE Duplicate DATE COLLECTED APRIL 1

LOCATION#23/71-0740 DISTANCE & DIRECTION Monticello Reservoir

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Cs-137	1.09 ± 0.08 E2	2.77E+02 ± 1.22E+01
K-40	3.6 ± 0.1 E3	1.07E+04 ± 2.57E+03
Co-60	2.5 ± 1.8 E1	8.66E+01 ± 1.37E-00
Cs-134	< 2.0 E1	< 9.85E+00
Mn-54	< 2.0 E1	< 1.27E+01

Oct 22

CS-137	5.4 ± 0.3 E2	1.72E+02±1.70E+01
K-40	2.1 ± 0.3 E3	9.51E+03 ± 3.33E+02
Co-60	2.0 ± 0.2 E1	6.47E+01 ± 1.55E+01
Cs-134	< 2.0 E0	< 1.30E+01
Mn-54	< 2.0 E1	< 1.72E+01

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FRIDAY COLLECTION

DHEC 816 (10/82)

ACTIVITY: pCi/l

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
 BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
 UNITED STATES NUCLEAR REGULATORY COMMISSION FORM

LICENSEE: V.C. SUMMER NUCLEAR STATION, JENKINSVILLE, S.C.

YEAR 1996

PATHWAY Fish (Bass) DUPLICATE Duplicate DATE COLLECTED April 17

LOCATION#23/36-0740 DISTANCE & DIRECTION Monticello Reservoir

ANALYSIS OR ISOTOPE

STATE RESULTS*

LICENSEE RESULTS

Cs-137	3.0 ± 1.5 E-0	6.05E-00 ± 5.35E+00
Cs-134	< 1.5 E-0	< 7.54E+00
K-40	2.0 ± 0.1 E3	3.71E+03 ± 2.30E+02

#21/36-0735

Oct 2

Cs-137	< 2.5 E0	< 9.04E+00
Cs-134	< 2.5 E0	< 1.22E+01
K-40	2.75 ± 0.25 E3	3.97+03 ± 2.74E+02

WESTINGHOUSE NUCLEAR FUEL DIV.
COLUMBIA

<u>LOCATION NAME</u>	<u>PATHWAY</u>	<u>DISTANCE & DIRECTION</u>
10-0301	Surface Water	10 miles NW, from Congaree River, Upstream.
10-0311	Surface Water	500 yards downstream of discharge on Congaree River.
13-0322	Well water	S, test well on site.
21-0317	Air	0.3 miles N.
36-0330	Fish (Bass)	5 miles SE, downstream, from the Congaree River
51-0317	Vegetation	0.3 miles N.
70-0317	Soil	0.3 miles N.
71-0330	Sediment	5 miles SE, downstream, Congaree River

**BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL**

Name of Facility:

Westinghouse Electric Corporation - CNFD

Description & Location of Sample Station:

Surface Water from Congaree River 500 yds South of Discharge

SAMPLE IDENTIFICATION

Date Collected: 03/96 - 12/96

Facility ID #: 05-77-106

State Lab ID #: 10-0311

Split or Duplicate Sample	Aliquot	Date Collected	WNF Date Analyzed	Analysis or Isotope	ANALYSIS RESULTS	
					Facility Laboratory	State Laboratory
Split		03/03/96	04/5/96	Total U	<0.2 ± 0.2 pCi/l	< 0.5 pCi/L
		06/03/96	06/18/96	Total U	0.5 ± 0.2 pCi/l	< 0.5 pCi/L
		09/02/96	10/30/96	Total U	0.3 ± 0.1 pCi/l	< 0.5 pCi/L
		12/02/96	01/14/96	Total U	<0.2 ± 0.2 pCi/l	< 0.5 pCi/L

**BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL**

Name of Facility:

Westinghouse Electric Corporation - CNFD

Description & Location of Sample Station:

Groundwater South of the Plant (Well #4)

SAMPLE IDENTIFICATION

Date Collected: 03/96 - 12/96

Facility ID #: 05-77-106

State Lab ID #: 13-0322

Split or Duplicate Sample	Aliquot	Date Collected	Date Analyzed	Analysis or Isotope	ANALYSIS RESULTS	
					Facility Laboratory	State Laboratory uCi/mL
Duplicate		03/27/96	04/16/96	Gross Alpha	0.003 ± 0.001 uCi/ml E-06	< 0.003 E-6
		06/26/96	07/15/96	Gross Alpha	0.002 ± 0.001	< 0.003 E-6
		09/25/96	11/01/96	Gross Alpha	≤ 0.002 ± 0.001	< 0.003 E-6
		12/31/96	02/04/97	Gross Alpha	0.004 ± 0.001	< 0.003 E-6

**BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL**

Name of Facility:

Westinghouse Electric Corporation - CNFD

Description & Location of Sample Station:

Congaree River Sediment Downstream of Westinghouse Discharge

SAMPLE IDENTIFICATION

Date Collected: 09/96

Facility ID #: 05-77-106

State Lab ID #: 71-0313

Split or Duplicate Sample	Aliquot	Date Collected	Date Analyzed	Analysis or Isotope	ANALYSIS RESULTS	
					Facility Laboratory	State Laboratory
Split		09/25/96	10/25/96	Gross Alpha	1.1 ± 0.1 pCi/g	NA
				Gross Beta	0.6 ± 0.1 pCi/g	NA
				U-234	0.13 ± 0.01 pCi/g	< 0.2 pCi/g
				U-235	<0.05 ± 0.05 pCi/g	< 0.2 pCi/g
				U-238	0.10 ± 0.01 pCi/g	< 0.2 pCi/g

**BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL**

Name of Facility:

Westinghouse Electric Corporation - CNFD

Description & Location of Sample Station:

Ambient Environmental Air Sample (Air Station 1 North of the Plant)

SAMPLE IDENTIFICATION

Date Collected: 01/96 - 12/96

Facility ID #: 05-77-106

State Lab ID #: 21-0317

Split or Duplicate Sample	Aliquot	Date Collected	Date Analyzed By WNF	Analysis or Isotope	ANALYSIS RESULTS	
					Facility Laboratory	State Laboratory uCi/ml
Duplicate		01/03/96	01/16/96	Gross Alpha	1.00E-15 ± 2.57 E-15 uCi/ml	1.0 ± 1.0 E-15
		01/10/96	02/21/96	Gross Alpha	1.00 E-15 ± 1.70 E-15	1.0 ± 1.0 E-15
		01/17/96	02/21/96	Gross Alpha	1.00 E-15 ± 2.11 E-15	2.0 ± 1.0 E-15
		01/24/96	02/21/96	Gross Alpha	1.82 E-15 ± 2.49 E-15	1.0 ± 1.0 E-15
		01/31/96	02/21/96	Gross Alpha	3.03 E-15 ± 2.67 E-15	NO SAMPLE
		02/07/96	02/28/96	Gross Alpha	1.00 E-15 ± 1.56 E-15	1.0 ± 1.0 E-15
		02/14/96	02/28/96	Gross Alpha	1.00 E-15 ± 2.15 E-15	1.0 ± 1.0 E-15
		02/21/96	02/28/96	Gross Alpha	1.00 E-15 ± 1.63 E-15	NO SAMPLE
		02/28/96	04/15/96	Gross Alpha	1.00 E-15 ± 1.74 E-15	1.0 ± 1.0 E-15
		03/06/96	04/15/96	Gross Alpha	1.00 E-15 ± 1.90 E-15	2.0 ± 1.0 E-15
		03/13/96	04/15/96	Gross Alpha	3.32 E-15 ± 2.92 E-15	2.0 ± 1.0 E-15
		03/20/96	04/15/96	Gross Alpha	1.00 E-15 ± 2.51 E-15	1.0 ± 1.0 E-15
		03/28/96	04/15/96	Gross Alpha	1.00 E-15 ± 2.47 E-15	NO SAMPLE

ANALYSES COMPARISION REPORT

**BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL**

Name of Facility:

Westinghouse Electric Corporation - CNFD

Description & Location of Sample Station:

Ambient Environmental Air Sample (Air Station 1 North of the Plant)

SAMPLE IDENTIFICATION

Date Collected: 01/96 - 12/96

Facility ID #: 05-77-106

State Lab ID #: 21-0317

Split or Duplicate Sample	Aliquot	Date Collected	Date Analyzed By WNF	Analysis or Isotope	ANALYSIS RESULTS	
					Facility Laboratory	State Laboratory uCi/ml
Duplicate		04/03/96	04/16/96	Gross Alpha	1.49 ± 2.10 E-15 uCi/ml	NO SAMPLE
		04/10/96	05/10/96	Gross Alpha	1.00 ± 1.36 E-15	1.0 ± 1.0 E-15
		04/17/96	05/10/96	Gross Alpha	2.72 ± 2.27 E-15	1.0 ± 1.0 E-15
		04/24/96	05/10/96	Gross Alpha	2.43 ± 2.24 E-15	1.0 ± 1.0 E-15
		05/01/96	06/06/96	Gross Alpha	2.39 ± 2.71 E-15	1.0 ± 1.0 E-15
		05/08/96	06/06/96	Gross Alpha	3.92 ± 3.21 E-15	1.0 ± 1.0 E-15
		05/15/96	06/06/96	Gross Alpha	1.00 ± 2.86 E-15	NO SAMPLE
		05/22/96	06/06/96	Gross Alpha	1.00 ± 2.29E-15	1.0 ± 1.0 E-15
		05/29/96	06/06/96	Gross Alpha	2.72 ± 3.09 E-15	1.0 ± 1.0 E-15
		06/05/96	06/27/96	Gross Alpha	2.11 ± 2.84 E-15	2.0 ± 1.0 E-15
		06/12/96	06/29/96	Gross Alpha	1.00 ± 2.63 E-15	1.0 ± 1.0 E-15
		06/19/96	07/07/96	Gross Alpha	1.00 ± 2.14 E-15	1.0 ± 1.0 E-15
		06/26/96	07/23/96	Gross Alpha	1.00 ± 1.87 E-15	NO SAMPLE

ANALYSES COMPARISON REPORT

**BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL**

Name of Facility:

Westinghouse Electric Corporation - CNFD

Description & Location of Sample Station:

Ambient Environmental Air Sample (Air Station 1 North of the Plant)

SAMPLE IDENTIFICATION

Date Collected: 01/96 - 12/96

Facility ID #: 05-77-106

State Lab ID #: 21-0317

Split or Duplicate Sample	Aliquot	Date Collected	Date Analyzed By WNF	Analysis or Isotope	ANALYSIS RESULTS	
					Facility Laboratory	State Laboratory uCi/ml
Duplicate		07/03/96	08/06/96	Gross Alpha	1.00 ± 2.14 E-15 uCi/ml	NO SAMPLE
		07/10/96	08/06/96	Gross Alpha	1.51 ± 2.33 E-15	1.0 ± 1.0 E-15
		07/17/96	08/06/96	Gross Alpha	2.70 ± 2.52 E-15	1.0 ± 1.0 E-15
		07/24/96	08/06/96	Gross Alpha	2.18 ± 2.43 E-15	3.0 ± 1.0 E-15
		07/31/96	08/28/96	Gross Alpha	4.54 ± 2.62 E-15	NO SAMPLE
		08/07/96	08/28/96	Gross Alpha	1.21 ± 2.10 E-15	3.0 ± 1.0 E-15
		08/14/96	08/28/96	Gross Alpha	1.21 ± 2.00 E-15	NO SAMPLE
		08/21/96	08/28/96	Gross Alpha	1.00 ± 2.05 E-15	3.0 ± 1.0 E-15
		08/28/96	09/17/96	Gross Alpha	3.01 ± 2.38 E-15	2.0 ± 1.0 E-15
		09/04/96	09/17/96	Gross Alpha	1.21 ± 2.10 E-15	2.0 ± 1.0 E-15
		09/11/96	10/02/96	Gross Alpha	2.42 ± 1.88 E-15	3.0 ± 1.0 E-15
		09/18/96	10/02/96	Gross Alpha	3.93 ± 2.15 E-15	5.0 ± 1.0 E-15
		09/25/96	10/02/96	Gross Alpha	3.92 ± 2.14 E-15	NO SAMPLE
		10/02/96	10/18/96	Gross Alpha	2.41 ± 2.45 E-15	3.0 ± 1.0 E-15

ANALYSES COMPARISON REPORT

**BUREAU OF ENVIRONMENTAL SERVICES RADIOLOGICAL LABORATORY
S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL**

Name of Facility:

Westinghouse Electric Corporation - CNFD

Description & Location of Sample Station:

Ambient Environmental Air Sample (Air Station 1 North of the Plant)

SAMPLE IDENTIFICATION

Date Collected: 01/96 - 12/96

Facility ID #: 05-77-106

State Lab ID #: 21-0317

Split or Duplicate Sample	Aliquot	Date Collected	Date Analyzed By WNF	Analysis or Isotope	ANALYSIS RESULTS	
					Facility Laboratory	State Laboratory uCi/ml
Duplicate		10/09/96	08/06/96	Gross Alpha	3.59 ± 2.62 E-15 uCi/ml	5.0 ± 1.0 E-15
		10/16/96	08/06/96	Gross Alpha	3.01 ± 2.45 E-15	NO SAMPLE
		10/23/96	08/06/96	Gross Alpha	2.72 ± 2.42 E-15	2.0 ± 1.0 E-15
		10/30/96	08/06/96	Gross Alpha	1.20 ± 2.15 E-15	1.0 ± 1.0 E-15
		11/06/96	08/28/96	Gross Alpha	1.82 ± 2.39 E-15	1.0 ± 1.0 E-15
		11/13/96	08/28/96	Gross Alpha	2.11 ± 2.69 E-15	5.0 ± 1.0 E-15
		11/20/96	08/28/96	Gross Alpha	2.12 ± 2.70 E-15	NO SAMPLE
		11/27/96	08/28/96	Gross Alpha	2.12 ± 2.70 E-15	NO SAMPLE
		12/04/96	09/17/96	Gross Alpha	1.00 ± 2.52 E-15	1.0 ± 1.0 E-15
		12/11/96	09/17/96	Gross Alpha	1.00 ± 2.47 E-15	3.0 ± 1.0 E-15
		12/18/96	10/02/96	Gross Alpha	1.00 ± 2.44 E-15	2.0 ± 1.0 E-15
		12/25/96	10/02/96	Gross Alpha	1.51 ± 2.60 E-15	NO SAMPLE

ANALYSES COMPARISON REPORT

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