

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT INITIATION

Date: December 31, 1980

Project Title: Analytical Services Related to Environmental Radiological Surveillance
and Radionuclide Assessment of Community Water Supplies

Project No: E-26-666 (Continuation of B-10-669 which began 7/1/80; Follow-on
to B-10-661)

Project Director: Dr. Bernd Kahn

Sponsor: Environmental Protection Division; Georgia Dept. of Natural Resources

Agreement Period: From 12/1/80 Until ~~6/30/81~~ OPEN

Type Agreement: Contract dated 7/1/80

Amount:	\$20,101.91	B-10-669
	<u>54,898.09</u>	E-26-666
	<u>\$75,000.00</u>	TOTAL

Reports Required: Monthly Analysis Results Report; Progress Report

Sponsor Contact Person (s):

Technical Matters

Contractual Matters
(thru OCA)

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Defense Priority Rating: None

Assigned to: Nuclear Engineering (School/Laboratory)

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SPONSORED PROJECT TERMINATION/CLOSEOUT SHEET

Date 3/22/84

Project No. E-26-666

School/~~Box~~ NE

Includes Subproject No.(s) _____

Project Director(s) Dr. B. Kahn

GTRI / ~~X&M~~

Sponsor Environmental Protection Division, GA. Dept. of Natural Resources

Title Analytical Services Related to Environmental Radiological Surveillance &
Radionuclide Assessment of Community Water Supplies

Effective Completion Date: open (Performance) open (Reports)

Grant/Contract Closeout Actions Remaining:

☒ None

☐ Final Invoice or Final Fiscal Report

☐ Closing Documents

☐ Final Report of Inventions

☐ Govt. Property Inventory & Related Certificate

☐ Classified Material Certificate

☐ Other _____

Continues Project No. B-10-669

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MEMORANDUM

TO: Mr. William Cline, Program Manager
Environmental Radiation Program, EPD, DNR

FROM: Bernd Kahn, Director
Environmental Resources Center

DATE: January 13, 1981

SUBJ: Monthly Report of Activities for the State by
the Environmental Radition Laboratory, December 1980

The results of radionuclide analyses are reported for the following sample types that were processed this month:

Environmental monitoring at nuclear facilities by DNR staff	Tables 1-20
Monitoring by DNR staff of Public Water Supplies	Tables 21-24
Monitoring by DNR staff at other locations	Tables 25-28
Monitoring fallout	Tables 29-30

Of the samples collected in the environment at nuclear facilities, soil collected at the Dawson Forest area contained Co-60 (Table 5) and water collected at the Savannah water supply contained H-3 (Table 20) that are attributable to the facility. All other radionuclides in these samples are attributable to fallout or natural radiation background. All samples collected for the NRC project are indicated by asterisks in appropriate tables.

Grab samples continue to be collected from public water supplies that showed elevated levels in their annual composite samples (see Table 21). A number of recently developed public wellwater supplies listed in Table 22 showed no elevated gross alpha levels. Some other submitted samples, listed in Table 23, also were below the gross alpha limits. The water samples from private wells near Alamo in which gross alpha levels were high contained Ra-226 concentrations that were generally consistent with gross alpha values (see Table 24).

No radionuclides were detected in the soil and water samples from Battle Hill listed in Tables 25 and 26. No significant surface contamination was detected in smears of radioactive material packages at the locations indicated in Tables 27 and 28.

The radionuclides Zr-95, Nb-95, Ru-103, and Ce-141 from the Chinese atmospheric nuclear test on October 16, 1980 continued to be found in airborne particles (see Table 29) but not in rain water (Table 30) during the month. These radionuclides were also found in vegetation at the nuclear facilities (Tables 3, 6, 12, 15, and 19) and in some soil samples (Tables 5 and 11).

The Beckman and Gamma-Tech alpha-beta counters have been recalibrated. Calibration of the thermoluminescent dosimeters continues.

Table 1

Radioactivity Levels in Air Filters
from the Environment of the Hatch Nuclear Plant

<u>Samples nos.</u>	<u>Sample type</u>	<u>Location</u>	<u>Volume, m³</u>	<u>Radionuclide concentration, pCi/m³</u>	
				<u>I-131</u>	<u>Gross Beta</u>
B276*	Air cartridge	#1	272	<0.04	-
B277*	Paper filter	#1	272	-	0.020
B278*	Air cartridge	#2	272	<0.02	-
B279*	Paper filter	#2	272	-	0.036

- Notes:
1. Samples were collected December 15, 1980 after 1 week sampling.
 2. No other photon-emitting radionuclides were detected in the cartridges.

Table 2

Radioactivity Levels in Clam Samples
from the Environment of the Hatch Nuclear Plant

<u>Sample #</u>	<u>Location</u>	<u>Cs-137 Concentration, pCi/kg</u>
B - 280 *	Hatch #170	<10
B 281 *	Hatch #172	<10

-
- Notes: 1. Samples were collected by Georgia Power Co. staff on December 2, 1980.
2. No other man-made photon-emitting radionuclides were detected.

Table 3

Radioactivity Levels in Grass Samples from
the Environment of the Hatch Nuclear Plant

Sample No.	Location	Radionuclide Concentration, pCi/kg					
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Be-7
B 282*	Station #5	43	53	30	110	65	190
B 283*	Station #17	<60	46	<40	26	<60	110
B 284*	Station #21	48	82	36	10	83	230

- Notes:
1. Samples were collected on December 30, 1980.
 2. No other man-made photon-emitting radionuclides were detected. The radionuclides Zr-95, Nb-95, Ru-103 and Ce-141 are attributed to fallout from a recent atmospheric nuclear test.

Table 4

Radioactivity Levels in Quarterly Composite
Air Filters from the Environment of the Hatch Nuclear Plant

<u>Samples No.</u>	<u>Location</u>	<u>Dates</u> <u>1980</u>	<u>Volume</u> <u>m³</u>	<u>Radionuclide concentration, pCi/m³</u>				
				<u>Zr-95</u>	<u>Nb-95</u>	<u>Ru-103</u>	<u>Cs-137</u>	<u>Ce-141</u>
B-262,273,277	Plant Hatch	Oct.-Dec.	816	<0.005	0.010	0.009	<0.002	0.010
B-264,275,279	Substation	Oct.-Dec.	816	<0.009	<0.010	<0.009	<0.003	<0.010

- Notes: 1. Three filters collected successively at the same location were analyzed by gamma-ray spectrometry. See earlier reports for gross beta activity in individual filters and collection dates.
2. No other photon-emitting radionuclides were detected except naturally occurring Be-7.

Table 5

Radioactivity Levels in Soil Samples from
the Dawson Forest Area

<u>Sample No.</u>	<u>Location</u>	<u>Radionuclide concentration, pCi/kg</u>	
		<u>Cs-137</u>	<u>Co-60</u>
D 119	Run-off fence south of TLD #1	< 70	580
D 120	Reactor site	< 70	450
D 121	15' SE of TLD #8	340	4,900
D 122	Run-off west side of hot cell	< 70	< 30

- Notes:
1. Samples were collected December 22, 1980.
 2. No other man-made photon-emitting radionuclides were detected in samples D-119 to -121. Sample D-122 contains Ru-103 (61 pCi/kg), Zr-95 (68 pCi/kg) and Nb-95 (120 pCi/kg), probably due to fallout from recent atmospheric nuclear test.

Table 6

Radioactivity Levels in Grass Samples from
the Dawson Forest Area

		Radionuclide concentration, pCi/kg					
<u>Sample No.</u>	<u>Location</u>	<u>Zr-95</u>	<u>Nb-95</u>	<u>Ru-103</u>	<u>Cs-137</u>	<u>Ce-141</u>	<u>Be-7</u>
D 123	Run-off west side of hot cell	360	590	320	<80	650	6,300
D 124	Reactor site	52	130	88	<80	180	1,500

- Notes: 1. Samples were collected on December 22, 1980.
2. No other man-made photon-emitting radionuclides were detected.

Table 7

Radioactivity Levels in Water Samples from
the Dawson Forest Area

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>	Gross beta, <u>pCi/l</u>	H-3, <u>pCi/l</u>
D 125	Creek north of Cooling-off area	< 1	< 2	200 \pm 100
D 126	Etowah River Above reactor site	< 1	< 2	200 \pm 100
D 127	Etowah River Below reactor site	< 1	< 2	< 200
D 128	Stream - Robert Morgan Residence	< 1	< 2	200 \pm 100

Note: Samples were collected December 22, 1980.

Table 8

Radioactivity Levels in Milk Samples from the
Environment in Georgia of the Farley Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Sr-89, pCi/l</u>	<u>Sr-90, pCi/l</u>	<u>Cs-137 pCi/l</u>	<u>K, g/l</u>	<u>H-3, pCi/l</u>
F268	A. B. White	<5	3	<10	1.2	<200
F269	Jerry Mock	<5	3	<10	1.5	<200

Notes: 1. Samples were collected December 1, 1980.
2. No I-131 (<10 pCi/l) or Ba-140 were detected.

Table 9

Radioactivity Levels in Air Samples from the
Environment in Georgia of the Farley Nuclear Plant

<u>Sample No.</u>	<u>Sample type</u>	<u>Location</u>	<u>Volume m³</u>	<u>Radionuclide concentration, pCi/m³</u>	
				<u>I-131</u>	<u>Gross beta</u>
F270*	Air cartridge	Blakely Water Tower	1.5	-	-
F271*	Paper filter	Blakely Water Tower	1.5	-	-
F272*	Air cartridge	Great Southern Airport	1.5	-	-
F273*	Paper filter	Great Southern Airport	1.5	-	-

- Notes: 1. Samples were collected on December 5, 1980 after less than one day sampling.
 2. The reported air volume is questionable, hence concentrations can not be reported. The cartridges showed no detectable I-131 (< 20 pCi); the filters showed 8.4 and 10.2 pCi gross beta, respectively, and the latter consisted of Zr-95, Nb-95, Ru-103, and Ce-141 according to gamma-ray spectrometry.

Table 10

Radioactivity Levels in Quarterly Composite Air Filters
from the Environment in Georgia of the Farley Nuclear Plant

<u>Samples No.</u>	<u>Location</u>	<u>Dates, 1980</u>	<u>Volume m³</u>	<u>Cs-137 concentration, pCi/m³</u>
F 249,251	Water Tower	Oct.-Nov.	404	< 0.007
-	Great Southern Airport	-	-	-

- Notes:
1. Two filters collected successively at the same location were analyzed by gamma-ray spectrometry. See earlier reports for gross beta activity in individual filters and collection dates.
 2. No other photon-emitting radionuclides were detected except naturally occurring Be-7.
 3. Due to the questionable volume (see Table 9. footnote) the December filters were not included in these composites.

Table 11

Radioactivity Levels in Soil Samples from
the Environment of the Georgia Tech Research Reactor Center

<u>Sample No.</u>	<u>Location</u>	<u>Cs 137 Concentration, pCi/kg</u>
GT 63	TLD #2	550
GT 64	TLD #5	110
GT 65	TLD #8	1,160
GT 66	Drainage ditch near dumpster	400

- Notes:
1. Samples were collected on December 18, 1980.
 2. No other man-made photon-emitting radionuclides were detected, except Nb-95 in samples GT 63 (66 pCi/kg) and GT 65 (105 pCi/kg), probably due to fallout from recent atmospheric nuclear test.

Table 12

Radioactivity Levels in Grass Samples from
the Environment of the Georgia Tech Research Reactor Center

<u>Sample No.</u>	<u>Location</u>	<u>Radionuclide Concentration, pCi/kg</u>					
		<u>Zr-95</u>	<u>Nb-95</u>	<u>Ru-103</u>	<u>Cs-137</u>	<u>Ce-141</u>	<u>Be-7</u>
GT 67	TLD #2	240	280	150	< 40	320	790
GT 68	TLD #5	200	270	150	< 40	290	1,510
GT 69	TLD #3	120	240	160	< 40	260	850

- Notes:
1. Samples were collected on December 18, 1980.
 2. No other man-made photon-emitting radionuclides were detected.

Table 13

Radioactivity Levels in Waste Water at the
Georgia Tech Research Reactor Center

	Radioactivity Concentration, pCi/l						
<u>Sample No.</u>	<u>Gross alpha</u>	<u>Gross beta</u>	<u>H-3</u>	<u>Co-60</u>	<u>Sr-89</u>	<u>Sr-90</u>	<u>Cs-137</u>
GT 70	< 2	1,950 + 40	56,700 ± 500	42	in process		1,450

- Notes:
1. Sample was collected December 12, 1980.
 2. No other man-made photon-emitting radionuclides were detected (I-131, < 200 pCi/l).

Table 14

Radioactivity Levels in Soil Samples from
the Environment in Georgia of the Oconee Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Cs-137 Concentration, pCi/kg</u>
LH 55	Corps Eng. Lake Hartwell Dam	2,050
LH 56	I-85 Marina	<60

- Notes: 1. Samples were collected on December 30, 1980.
2. No other man-made photon-emitting radionuclides were detected.

Table 15

Radioactivity Levels in Grass Samples from
the Environment in Georgia of the Oconee Nuclear Plant

		Radionuclide concentration, pCi/kg					
<u>Sample No.</u>	<u>Location</u>	<u>Zr-95</u>	<u>Nb-95</u>	<u>Ru-103</u>	<u>Cs-137</u>	<u>Ce-141</u>	<u>Be-7</u>
LH 57	Corps. Eng. Lake Hartwell Dam	250	400	<100	<40	610	8,100
LH 58	I-85 Marina	9,200	13,200	200	<100	990	3,000

- Notes: 1. Samples were collected on December 30, 1980.
2. No other man-made photon-emitting radionuclides were detected.

Table 16

Radioactivity Levels in Water Samples from
the Environment in Georgia of the Oconee Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>	Gross beta, <u>pCi/l</u>	Tritium, <u>pCi/l</u>
LH 59	Ga. Welcome Center	17 ± 3	12 ± 2	200 ± 100
LH 60	TLD #9	< 1	2 ± 1	< 200
LH 61	I-85 Marina	< 1	< 2	200 ± 100
LH 62	Lake Hartwell Dam	< 1	3 ± 2	< 200
LH 63	Lake Hartwell	< 1	< 2	300 ± 100

- Notes:
1. Samples were collected at Lake Hartwell on December 30, 1980.
 2. No photon-emitting radionuclides were detected in sample LH 59 (Cs-137, < 30 pCi/l).
 3. Samples LH 59 and 62 are well waters; all others are surface water.

Table 17

Radioactivity Levels in Soil Samples from
the Environment in Georgia of the Sequoyah Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Cs-137 Concentration, pCi/kg</u>
SQ 6	TLD #3	400
SQ 7	TLD #9	360
SQ 8	TLD #11	< 50

Notes: 1. Samples were collected on December 19, 1980.
2. No other man-made photon-emitting radionuclides were detected.

Table 18

Radioactivity Levels in Ground Water Sample from
the Environment in Georgia of the Sequoyah Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>	Gross beta, <u>pCi/l</u>	Tritium, <u>pCi/l</u>
SQ 9	Tap - Ga. Welcome Station	< 1	< 2	< 200

Note: Sample was collected on December 19, 1980.

Table 19

Radioactivity Levels in Grass Samples from
the Environment in Georgia of the Sequoyah Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Radionuclide concentration,</u> <u>pCi/kg</u>						<u>Be-7</u>
		<u>Zr-95</u>	<u>Nb-95</u>	<u>Ru-103</u>	<u>Cs-137</u>	<u>Ce-141</u>		
SQ 10	TLD #3	280	550	210	<80	560	3,800	
SQ 11	TLD #9	200	330	<40	<40	480	4,000	
SQ 12	TLD #11	140	270	92	<80	240	2,300	

- Notes: 1. Samples were collected on December 19, 1980.
2. No other man-made photon-emitting radionuclides were detected.

Table 20

Radioactivity Levels in Water Sample from
the Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>	Gross beta, <u>pCi/l</u>	Tritium, <u>pCi/l</u>
SRP 182	I & D Water Supply, Savannah	< 1	< 2	3100 \pm 200

Note: Sample was collected on December 9, 1980.

Table 21

Gross Alpha Activity and Radium Concentrations
in Georgia Public Water Supplies--Grab Samples of Supplies
for Which Annual Composites had Elevated Levels

<u>Sample No.</u>	<u>Location</u>	<u>Date Collected</u>	<u>Gross alpha, pCi/l</u>	<u>Ra-226, pCi/l</u>
WX 361	City of Enigma Tap at base of elevated tank	10-21-80	8 ± 1	8.0
WX 362	City of Enigma Tap under storage tank	11-17-80	5 ± 2	7.0
WX 363	Country Haven MHP Tap at storage tank	10-27-80	62 ± 6	72.

Table 22

Gross Alpha Activity in New Public Water Supply Sources

<u>Sample No.</u>	<u>Location</u>	<u>Date Collected</u>	<u>Date Received</u>	<u>Gross alpha, pCi/l</u>
WX 341	Jekyll Island Well #4A	11-24-80	12-02-80	< 4
WX 342	Oak Grove S/D	10-31-80	12-02-80	< 3
	Oconee County Well #1			
WX 343	Hazelwood S/D Well #1	11-19-80	12-02-80	< 3
WX 344	City of Thunderbolt Owen Rd.	11-19-80	12-02-80	< 3
WX 345	Shady Acres M/P Well #2	11-20-80	12-02-80	< 3
WX 346	Dutch Island S/D Well #2	11-20-80	12-02-80	< 3
WX 347	Deerwood Well #1	10-31-80	12-02-80	3 ± 2
WX 348	Melody Acres M/P Well #2	11-20-80	12-02-80	< 3
WX 349	Country Club Hill	11-19-80	12-02-80	< 3
	Pine Forest S/D Well #1			
WX 350	Town of Pooler Well #2	11-19-80	12-02-80	< 3
WX 351	City of Garden City Well #1	11-19-80	12-02-80	< 3
WX 352	Osceola Village Well #1	10-31-80	12-02-80	< 3
WX 353	City of Savannah Well #26	11-20-80	12-02-80	< 3
WX 354	City of Brunswick Well #2	11-25-80	12-04-80	< 4
WX 355	Jekyll Island Authority	11-24-80	12-04-80	< 3
	Well #3A			
WX 356	Pinehill Subdivision Well #2	11-25-80	12-04-80	< 3
WX 357	Elder Heights Subdivision	11-25-80	12-12-80	< 3
	Well #2			
WX 358	South Ga. Water Works Inc.	12-08-80	12-12-80	< 3
	Well #3001			
WX 359	Houston Valley Water System	12-10-80	12-12-80	< 3
	Well #1			
WX 360	The Landings Subdivision	12-09-80	12-12-80	< 3
	Skidaway Island Utilities			
	Well #3			
WX 366	Donnan Acres S/D Well #1	12-17-80	12-30-80	< 2
WX 367	City of Sandersville Well	12-18-80	12-30-80	< 3
	#7-A Northside			
WX 368	Davis Village S/D Well #1	12-17-80	12-30-80	< 1
WX 369	City of Sandersville Raw	12-18-80	12-30-80	< 2
	Water-Well #7A			
WX 370	Donnan Acres S/D Well #2	12-17-80	12-30-80	< 2
WX 371	Hutchins Lake Senoia Raw Water	12-19-80	12-30-80	< 1
WX 372	Frink's TP Well Tap	12-17-80	12-30-80	< 1
WX 373	Lee's Riverside Estates	12-17-80	12-30-80	< 1
	2nd trailer			
WX 374	Briarwood S/D Well #1	12-18-80	12-30-80	< 1

Note: All values are below the gross alpha activity limit of 5 pCi/l.

Table 23

Gross Alpha Activity
in Water Samples

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>
WX 364	Country Lakes S/D 1st lot at well	< 2
WX 365	Hog Hammock white block church-outside	< 2

Note: Samples were collected December 17, 1980.

Table 24

Radium-226 Concentrations in Water
from Private Wells near Alamo

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Ra-226, pCi/l</u>
WX 2	# 9	33 ± 6	22
WX 12	# 47	44 ± 7	46
WX 27	# 28	42 ± 8	50
WX 29	# 31	32 ± 4	32
WX 35	# 101	80 ± 5	86
WX 36	# 102	123 ± 13	133
WX 52	# 104	16 ± 5	17
WX 54	# 134	45 ± 8	37
WX 64	# 133	17 ± 3	22
WX 80	# 129	33 ± 4	28
WX 121	Eva Coleman Mt. Vernon	22 ± 5	27
WX 129	Randell O'Quinn Alamo	80 ± 10	57
WX 134	C. P. Braddy Mt. Vernon	20 ± 5	18
WX 154	Roy White Alamo	19 ± 1	22
WX 226	Louis Thompson Mt. Vernon	16 ± 4	14
WX 232	L. A. Holland Mt. Vernon	240 ± 14	176

- Notes:
1. Gross alpha values for Samples WX 232 and 80 are remeasured values; all others were measured earlier.
 2. Ra-226 values are single analyses.

Table 25

Radioactivity Levels in Soil Samples
from Battle Hill

<u>Sample No.</u>	<u>Location</u>	<u>Cs-137 concentration, pCi/kg</u>
S 760	#1 Small trench westside of property	< 60
S 761	#2 Catch basin northside	< 60
S 762	#3 Run-off ditch back of property-northside	< 60
S 763	#4 Control sample uphill of site	< 60

-
- Notes: 1. Samples were collected December 15, 1980.
2. No other man-made photon-emitting radionuclides were detected.

Table 26

Radioactivity Levels in Water Sample
from Battle Hill

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>	Gross beta, <u>pCi/l</u>	H-3, <u>pCi/l</u>
S 764	Catch basin run-off water	-	-	200±100
S 764 filtrate		< 1	8 ± 2	-
S 764 suspended solids		4 ± 1	3 ± 1	-

Note: Sample was collected December 15, 1980.

Table 27

Radioactivity in Smears from Eastern Cargo

<u>Sample No.</u>	<u>Location</u>	<u>Channel A</u> <u>(0-1.7)₂</u> <u>cpm/cm</u>	<u>Channel B</u> <u>(3-5.3)₂</u> <u>cpm/cm</u>	<u>Channel C</u> <u>(3.5-10)₂</u> <u>cpm/cm</u>
S 765	Control	0.18	0.30	0.50
S 766	Box #1 Outside	0.16	0.28	0.49

- Notes:
1. Samples (Q-tips) were collected on December 16, 1980.
 2. The smeared box contained I-125. Although no counting efficiency is available, the smears were not above control values in the three liquid scintillation channels (A=narrow H-3; B=C-14; C=higher energies).

Table 28

Radioactivity in Smears
from Spector Red Ball Freight

<u>Sample No.</u>	<u>Location</u>	<u>Gross beta, pCi/100cm²</u>
S 784	Top	0.89
S 785	Bottom	0.20
S 786	Side	0.42
S 787	Under band	0.22
Control	-	0.21

Note: Samples were collected on December 29, 1980.

Table 29

Fallout from Chinese Atmospheric Nuclear Test of
October 16, 1980, Airborne Particles - State Bldg. Samples

Sample No.	Sample date 1980	Gross β beta, pCi/m ³	Radionuclide Concentration, fCi/m ³				
			Be-7	Zr-95	Nb-95	Ru-103	Ce-141
S 758	Dec. 1-8	< 0.1	50	5	5	< 2	5
S 759	Dec. 8-15	< 0.1	32	7	7	< 2	6
S 783	Dec. 15-29	< 0.1	47	6	8	8	5
S 788	Dec. 29-Jan. 5, 1981	< 0.1	29	6	7	5	5

- Notes:
1. Gross beta activity was measured 6 hours after collection and consists of Rn-220 daughters. Be-7 is also of natural origin. Among the shorter-lived fission products that were searched for are I-131 and Ba-140. Longer-lived fission products such as Cs-137 also were not found, (< 2 fCi/m³).
 2. The air samples operated for 7-day periods, pumping 1400-1800 m³ of air.
 3. The filters are 12.5-cm-dia. charcoal impregnated pads.

Table 30

Fallout from Chinese Atmospheric Nuclear Test
in Rainwater

<u>Sample No.</u>	<u>Sampling Date, 1980</u>	<u>Location</u>	<u>Fission Products Concentration, pCi/l</u>
S 757	Dec. 12	Top of State Bldg.	<20

- Notes:
1. The radionuclides listed in Table 29 were measured; none were found at the indicated MDL.
 2. A sample of 500 ml was analyzed.

MEMORANDUM

TO: Mr. William Cline, Program Manager
Environmental Radiation Program, EPD, DNR

FROM: Bernd Kahn, Director *Bernd Kahn*
Environmental Resources Center

DATE: February 13, 1981

SUBJ: Monthly Report of Activities for the State by the
Environmental Radiation Laboratory, January, 1981

The results of radionuclide analyses are reported for the following sample types that were processed this month:

Environmental monitoring at nuclear facilities by DNR staff	Tables 1-14
Monitoring by DNR staff at other locations	Tables 15-19
Monitoring by DNR staff of Public Water Supplies	Tables 20-22
Monitoring fallout	Table 23

Of the samples from the environment at nuclear facilities, water collected at the Savannah water supply contained H-3 (Table 14) that is attributable to the facility. All other radionuclides in these samples are attributable to fallout or natural radiation background. All samples collected for the NRC project are indicated by asterisks in appropriate tables. Fallout from the October 16, 1980 atmospheric nuclear test by China was observed in environmental samples in Tables 2, 3, 4, and 8. Natural activity in soil is reported in Tables 3 and 8 to provide background information. Strontium-90 activity was found in radioactive waste before discharge from the Georgia Tech research reactor (see Table 12).

Among the samples collected at the Luminous Products Inc. site that is being decommissioned, elevated Ra-226 levels attributable to contamination were found in a piece of pipe (Table 16), most soils (Table 17), and two grass samples (Table 18). No Ra-226 was found in air filters (Table 15) and smears (Table 19).

In analyses of 8 new public drinking water supplies (see Table 20), elevated gross alpha levels were found in two; one (sample WX 378) showed elevated Ra-228 concentrations, but total radium below 5 pCi/l; the other (WX 383) is in process. A sample obtained recently from a public water supply from which earlier samples had contained an elevated level of Ra-226 confirmed this level (Table 21). Twelve additional private wells located near Alamo were analyzed for Ra-226 content (Table 22); 7 of them contained Ra-226 concentrations between 6 and 23 pCi/l.

Fission products with intermediate half lives (Zr-95, Nb-95, Ru-103, and Ce-141) continued to be detectable at femtocurie/m³ levels in air filters collected in Atlanta, as shown in Table 23. The same fission products, believed to be originating in the atmospheric test of a nuclear device on October 16, 1980, were found in grass and soil samples collected near nuclear facilities, as indicated above.

Method testing for the analysis of I-131 in milk by radiochemical separation and coincidence beta-gamma counting has been completed and the first set of samples was analyzed (see Table 2). Two of the milk samples collected in the vicinity of a nuclear power

plant did not contain I-131 at the minimum detectable level of 0.3 pCi/l (compared to the limit by gamma-ray spectrometry of approximately 10 pCi/l). In one sample, the marginal value of 0.4 ± 0.3 pCi/l was obtained. In the future, milk samples will be routinely analyzed by this procedure.

The results of TLD measurements obtained for an international intercomparison have been submitted to the organizer, and the true values are expected for comparison within several weeks. The TLD reader has been returned to the manufacturer for repair and renovation, and will be recalibrated when it is returned.

Table 1

Radioactivity Levels in Water Samples from
the Environment of the Hatch Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>	Gross beta, <u>pCi/l</u>	Tritium, <u>pCi/l</u>
B 285*	Station #170	<1	4 \pm 1	<300
B 286*	Station #172	<1	3 \pm 1	<300

-
- Notes: 1. Samples are quarterly composites collected from September 24, 1980 to December 24, 1980.
2. No photon-emitting radionuclides were detected (Cs-137 less than 10 pCi/l).

Table 2

Radioactivity Levels in Milk Samples from
the Environment of the Hatch Nuclear Plant

Sample No.	Location	Sr-89, pCi/l	Sr-90, pCi/l	I-131, pCi/l	Cs-137, pCi/l	K, g/l	H-3, pCi/l
B 270*	Johnson Bros.	<5	2	-			reported in Dec. Report
B 271*	Sellers Bros.	<5	3	-			
B 287*	Sellers Bros.	<5	<2	0.4 ± 0.3	<10	1.6	300 ± 200
B 288*	Georgia State Prison	<5	2	<0.3	<10	1.5	200 ± 200
B 289*	Williamson	<5	4	<0.3	<10	1.7	400 ± 200

- Notes:
1. Samples B287*, B288*, B289* were collected on January 5, 1981.
 2. No other photon-emitting radionuclides were detected (typically, <10 pCi/l).
 3. These are the first radiochemical analyses performed for I-131, for which the minimum detectable level is much lower than by gamma-ray spectrometry.

Table 3

Radioactivity Levels in Soil Samples from
the Environment of the Hatch Nuclear Plant

Sample No.	Sample Type	Location	Radionuclide concentration, pCi/kg								
			Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Be-7	K-40	Ra-226	Ra-228
B 290	Soil	Altamaha River bank, downstream	<80	<80	<50	<50	<80	<400	7,100	700	1,000
B 291	Soil	TLD #12	110	110	80	220	<50	270	700	600	600
B 292	Soil	TLD #15	50	110	60	<50	80	400	900	500	400
B 293	Soil	0.5 mile north of TLD #18	<80	140	60	150	60	<400	600	500	400
B 294	Soil	TLD #20	<50	<50	<50	190	<50	<400	300	700	500
B 295	Sand	TLD #28	<80	140	50	130	<80	<400	2,600	1,000	1,100
B 296	Soil	TLD #44	<80	80	<50	450	<80	<400	700	500	400

- Notes: 1. Samples were collected on January 19, 1981.
2. No other man-made photon-emitting radionuclides were detected; Be-7, K-40, Ra-226 and Ra-228 are of natural origin.

Table 4

Radioactivity Levels in Grass Samples from
the Environment of the Hatch Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg					
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Be-7
B 297	TLD #12	650	1,120	<120	80	990	6,200
B 298	TLD #15	260	390	220	80	390	3,000
B 299	TLD #18	130	170	60	<60	140	340
B 300	TLD #20	140	270	<60	<60	130	<500
B 301	TLD #28	130	290	130	190	220	1,840
B 302	TLD #44	580	740	600	1,070	560	1,230

- Notes: 1. Samples were collected on January 19-20, 1981.
2. No other man-made photon-emitting radionuclides were detected; Be-7 is of natural origin.

Table 5

Radioactivity Levels in Water Samples from
the Environment of the Hatch Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>	Gross beta, <u>pCi/l</u>	Tritium, <u>pCi/l</u>
B 303	Dennis Grocery Groundwater	< 2	3 \pm 1	< 200
B 304	Dean's Landing Groundwater	53 \pm 6	7 \pm 2	< 200
B 305	0.5 mile south of TLD #28 Shallow Well	3 \pm 1	4 \pm 1	< 200
B 306	Near TLD #28 1.5 mile south of plant Deep Well	3 \pm 1	2 \pm 1	200 \pm 100
B 307	City of Baxley Water System	2 \pm 1	2 \pm 1	< 200
B 308	Altamaha River Downstream	< 1	3 \pm 1	< 200
B 309	Altamaha River Upstream	< 1	2 \pm 1	200 \pm 100

- Notes:
1. Samples were collected on January 19-20, 1981.
 2. Sample B304 is being analyzed for radium content; the Ra-226 concentration is 18 pCi/l.

Table 6

Radioactivity Levels in Air Filters
from the Environment of the Hatch Nuclear Plant

<u>Samples No.</u>	<u>Sample Type</u>	<u>Location</u>	<u>Volume, m³</u>	<u>Radionuclide concentration, pCi/m³</u>	
				<u>I-131</u>	<u>Gross Beta</u>
B310*	Air cartridge	Plant Hatch	287	< 0.01	-
B311*	Paper filter	Plant Hatch	287	-	0.017
B312*	Air cartridge	Substation	287	< 0.02	-
B313*	Paper filter	Substation	287	-	0.051

- Notes:
1. Samples were collected January 19, 1981 after 1 week sampling.
 2. No other photon-emitting radionuclides were detected in the cartridges.

Table 7

Radioactivity Levels in Smears
of Drum in Etowah River at the Dawson Forest Area

<u>Sample No.</u>	<u>Location</u>	<u>Gross beta, pCi/cm²</u>
D 129	Top of Drum	<0.004
D 130	Side of Drum	0.024
D 131	Bottom of Drum	0.018
D 132	Inside Top of Drum	<0.004
D 133	Inside Wall of Drum	<0.004

-
- Notes: 1. Samples were collected on January 27, 1981.
 2. 100-cm² areas were smeared.
 3. No man-made photon-emitting radionuclides were detected in samples D130 and D131 (Co-60: <0.02 pCi/cm²).

Table 8

Radioactivity Levels in Soil Sample from
the Dawson Forest Area

<u>Sample No.</u>	<u>Location</u>	Radionuclide concentration, pCi/kg						
		<u>Zr-95</u>	<u>Nb-95</u>	<u>Cs-137</u>	<u>Co-60</u>	<u>K-40</u>	<u>Ra-226</u>	<u>Ra-228</u>
D 134	Side of Etowah River at second creek below reactor site	<50	47	66	<30	5,700	700	800

- Notes: 1. Sample was collected on January 27, 1981.
2. No other photon-emitting radionuclides were detected.

Table 9

Radioactivity Levels in Water Samples from
the Dawson Forest Area

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>	Gross beta, <u>pCi/l</u>	H-3, <u>pCi/l</u>
D 135	First creek below reactor site	< 1	2	< 200
D 136	Third creek below reactor site	< 1	2 ± 1	< 200

Note: Samples were collected January 27, 1981.

Table 10

Radioactivity Levels in Water Samples from
the Environment in Georgia of the Farley Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>	Gross beta, <u>pCi/l</u>	H-3, <u>pCi/l</u>
F 274*	Upstream	<1	2 \pm 1	<300
F 275*	Downstream	<1	2 \pm 1	<300

Note: No collection date was given; samples were received from Alabama Power on January 8, 1981.

Table 11

Radioactivity Levels in Air Filters
from the Environment of the Farley Nuclear Plant

<u>Samples Nos.</u>	<u>Sample Type</u>	<u>Location</u>	<u>Volume, m³</u>	<u>Radionuclide concentration, pCi/m³</u>	
				<u>I-131</u>	<u>Gross Beta</u>
F276*	Air cartridge	Blakely Water Tower	1002	< 0.004	-
F277*	Paper filter	Blakely Water Tower	1002	-	0.064
F278*	Air cartridge	Great Southern Airport	994	< 0.004	-
F279*	Paper filter	Great Southern Airport	994	-	0.074

- Notes: 1. Samples were collected on January 15, 1981 after 1 week sampling.
2. No other photon-emitting radionuclides were detected in the cartridges.

Table 12

Radioactivity Levels in Waste Water at the
Georgia Tech Research Reactor Center

<u>Sample No.</u>	<u>Radioactivity Concentration, pCi/l</u>	
	<u>Sr-89,</u>	<u>Sr-90,</u>
GT 70	<5	125 ±4

Note: Sample was collected on December 18, 1980;
all other concentrations were reported in the
December Report.

Table 13

Strontium-89 and Sr-90 Levels in Composite Water Sample
from the Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	<u>Radionuclide Concentration, pCi/l</u>	
		<u>Sr-89,</u>	<u>Sr-90,</u>
SR 181-182	I & D Water Supply Savannah	< 5	2

Note: SR181 was collected on October 14, 1980. SR182 was collected on December 9, 1980. The November sample (SR183) was not received until later in January, 1981.

Table 14

Radioactivity Levels in Water Samples from
the Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	Gross alpha, <u>pCi/l</u>	Gross beta, <u>pCi/l</u>	Tritium, <u>pCi/l</u>
SR 183	I & D Water Supply Savannah	<1	2 ± 1	$3,700 \pm 200$
SR 184	I & D Water Supply Savannah	<1	2 ± 1	$3,900 \pm 200$

- Notes:
1. Samples were collected on November 17, 1980 (SR 183) and January 13, 1981 (SR 184).
 2. No man-made photon-emitting radionuclides were detected (Cs-137, <30 pCi/l).

Table 15

Radioactivity in Air Filters from the
Environment at Luminous Processes, Inc., in Athens

<u>Sample No.</u>	<u>Location</u>	Radium- ²²⁶ , <u>pCi/m</u>
S 795	A-1, W. side building	< 3
S 796	A-2, SE corner building	
S 797	A-3, S. side building toward W. end	
S 798	A-4, Front parking lot	
S 799	A-5, Field W. of Luminous	< 10

- Notes:
1. Samples were collected on January 29, 1981.
 2. The sample volumes of 2.5m³ each were too small to determine Ra-226 concentrations with sufficient sensitivity.

Table 16

Radioactivity in Pipe Sample from the
Environment at Luminous Processes Inc., in Athens

<u>Sample No.</u>	<u>Location</u>	Radium-226 <u>pCi/gm</u>
S 800	#100	130

Note: Sample was collected on January 29, 1981.

Table 17

Radioactivity in Soil Samples from the
Environment at Luminous Processes Inc. in Athens

<u>Sample No.</u>	<u>Location</u>	<u>Radium-226, pCi/gm</u>
S 801	#114	2,500.
S 802	#123	5.0
S 803	#190	4,600.
S 804	#200	3.2
S 805	#219	2.0
S 806	#222	9.1
S 807	#236	2,800.
S 808	#274	220.
S 809	#333	10.8
S 810	#502	32.
S 811	#525	27.
S 812	#585	33.
S 813	#810	11.4
S 814	#938	26.

- Notes:
1. Samples were collected on January 29, 1981.
 2. Concentrations were determined by measuring the 186-keV gamma ray of Ra-226 and assuming that no uranium was present (U-235 emits a 187-keV gamma ray).
 3. Radium-226 concentrations of 0.1-3 pCi/gm soil occur naturally, hence it is not possible to determine whether samples S804 and S805 are contaminated.

Table 18

Radioactivity in Grass Samples from the
Environment at Luminous Processes Inc., in Athens

<u>Sample No.</u>	<u>Location</u>	<u>Radium-226,</u> <u>pCi/gm</u>
S 815	#150	<0.1
S 816	#364	0.3
S 817	#565	0.7
S 818	#826	98.
S 819	#915	47.

-
- Notes: 1. Samples were collected on January 29, 1981.
2. Radium-226 concentrations in samples S816 and S817 may be of natural origin.

Table 19

Radioactivity in Smears from the
Environment at Luminous Processes Inc., in Athens

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/100cm²</u>
S 820	#550	0.3 ± 0.3
S 821	#118	1.7 ± 0.6
S 822	#205	12. ± 2.

-
- Notes:
1. Samples were collected on January 29, 1981.
 2. The Ra-226 concentration in sample S822 was <0.2 pCi/100cm² as determined by gamma-ray spectrometer.

Table 20

Gross Alpha Activity in New Public Water Supplies

Sample	Location	Date Collected	Date Received	Gross alpha, pCi/l	Ra-226, pCi/l	Ra-228, pCi/l
375	River Oaks S/D Well #1	12-11-80	1-7-81	< 3	-	-
376	Bent Tree County Club, Lake Tamarack	12-11-80	1-7-81	< 1	-	-
377	Shoal Creek Well #2	12-11-80	1-7-81	< 1	-	-
378	Black Jack Water Assoc. Well #2	1-8-81	1-14-81	12 \pm 3	1.4	3
379	City of Thomasville Well #1, 120 Lester St.	1-7-81	1-14-81	2 \pm 1	-	-
380	Point Peter Subdivision Well #1	12-11-80	1-14-81	< 2	-	-
382	Athens, Middle Oconee River	1-19-81	1-22-81	2	-	-
383	Corinth Woods	1-20-81	1-26-81	8 \pm 2	< 0.1	in process

Table 21

Gross Alpha Activity and Radium Concentrations in Georgia Public
Water Supplies--Grab Samples of Supplies for Which Annual
Composites had Elevated Levels

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha,pCi/l</u>	<u>Ra-226, pCi/l</u>	<u>Ra-228 pCi/l</u>
WX 381	City of Enigma	6 ± 2	in process	

Note: The sample was collected September 18, 1980 and submitted for analysis
on January 14, 1981.

Table 22

Radium-226 Concentrations in Water
from Private Wells near Alamo

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Ra-226, pCi/l</u>
WX 9	#38	7 ± 3	9.4
WX 13	#48	7 ± 3	6.2
WX 15	#105-S	9 ± 4	2.5
WX 16	#106-D	8 ± 4	8.9
WX 26	#141-S	8 ± 3	2.4
WX 34	#49	8 ± 3	9.6
WX 58	#6	9 ± 2	1.7
WX 60	#103	12 ± 2	11.9
WX 61	#108	8 ± 2	4.8
WX 91	#4	10 ± 4	1.2
WX 126	Montgomery County Elementary; Alley	14 ± 4	23.
WX 267	Mercer Gay; Alamo	13 ± 4	14.9

Note: These samples were collected in previous months and the gross alpha activity was listed in earlier monthly reports.

Table 23

Fallout from Chinese Atmospheric Nuclear Test of
October 16, 1980, in Airborne Particles - State Bldg. Samples

Sample No.	Sample Date 1981	Volume m ³	Gross beta, pCi/m ³	Radionuclide Concentration, fCi/m ³				
				Be-7	Zr-95	Nb-95	Ru-103	Ce-141
S 789	Jan. 5-14	1,950	<0.1	55	9	13	9	6
S 790	Jan. 14-26	2,590	<0.1	22	9	14	7	5

- Notes: 1. Gross beta activity was measured six hours after collection and consists of Rn-220 daughters, Be-7 is also of natural origin. Among the shorter-lived fission products that were searched for are I-131 and Ba-140. Longer-lived fission products such as Cs-137 also were not found, (< 1 fCi/m³).
2. The filters are 12.5-cm-dia. charcoal impregnated pads.



E-26-666

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M E M O R A N D U M

DATE: April 21, 1981

TO: Mr. William Cline, Program Manager
Environmental Radiation Program, EPD, DNR

FROM: Bernd Kahn, Director *B. Kahn*
Environmental Resources Center

SUBJECT: Monthly Report of Activities for the State by the
Environmental Radiation Laboratory, March 1981

The results of radionuclide analyses are reported for the following sample types that were processed this month:

Environmental monitoring at nuclear facilities by DNR staff	Tables 1-22
Monitoring by DNR staff at other locations	Tables 23-29
Monitoring by DNR staff at other locations	Table 30
Monitoring by DNR staff of Public Water Supplies	Tables 31-34
Monitoring fallout	Tables 35-36

Of the samples from the environment at nuclear facilities, water collected at the Savannah River Plant contained H-3 (Tables 17, 19, 20, 22) that is attributable to the facility. The samples listed in Tables 20 and 21 were collected after the accidental release to air of approximately 40,000 Ci H-3 at SRP. Samples collected at the Dawson Forest area showed Co-60 and, in a few instances, Eu-152 (Tables 5-7), including concentrations of Co-60 in soil at one location as high as 0.2 uCi/g, well above acceptable levels. All other radionuclides in these samples are attributable to fallout or natural radiation background. All samples collected for the NRC project are indicated by asterisks in appropriate tables. Fallout from the October 16, 1980 atmospheric nuclear test by China was observed in environmental samples in Tables 1, 5, 6, 11, 12, 14, 15, 16 and 18. Natural activity in soil is reported in Tables 5, 11, 14 and 16 to provide background information.

A water sample and a smear collected from an unidentified drum marked as containing radioactive materials showed no contamination, as indicated in Tables 23 and 24. Samples from the vicinity of a waste burial site at the Georgia Medical College (Tables 25, 26, and 27) contained slightly elevated tritium activity in water, and fission products attributable to fallout in other samples. Samples from the Luminous Products site contained elevated H-3 and Ra-226 levels (Tables 28 and 29). Smears from a chromatograph showed only low levels of H-3, as indicated in Table 30.

Mr. William Cline
April 21, 1981

- 2 -

Analysis of additional quarterly composites of water from public supplies and of single analyses from new supplies continued, as shown in Tables 31 and 32, respectively. Radium analyses are being performed where gross alpha activity values are 5 pCi/l or higher (see Table 32). Grab samples were also analyzed from supplies that had elevated radiactivity levels in annual composites (Table 33) and from private wells near Alamo, a location with high Ra-226 concentration in some water supplies (Table 34).

Fission products with intermediate half lives continue to be observed in air samples, listed in Table 35. These are attributed to the Chinese nuclear device test of October 16. No fallout was detected in rainwater at the indicated minimum detectable levels (Table 36).

Table 1

Radioactivity Levels in Grass Samples from
the Environment of the Hatch Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg					
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Be-7
B 318*	#5	<80	77	<60	56	<80	<400
B 319*	#21	<50	54	<30	28	32	<200

-
- Notes: 1. Samples were collected on March 18, 1981.
2. No other man-made photon-emitting radionuclides were detected;
Be-7 is of natural origin.

Table 2

Radioactivity Levels in Air Filters
from the Environment of the Hatch Nuclear Plant

Sample No.	Sample type	Location	Volume, m ³	Radionuclide concentration, pCi/m ³	
				I-131	Gross beta
B 320*	Air cartridge	Substation	311	<0.02	---
B 321*	Paper filter	Substation	311	--	0.156
B 322*	Air cartridge	Plant Hatch	311	<0.02	---
B 323*	Paper filter	Plant Hatch	311	--	0.059

-
- Notes: 1. Samples were collected March 11, 1981 after 8-day sampling.
2. No other photon-emitting radionuclides were detected in the cartridge.

Table 3

Radioactivity Levels in Surface Water Samples
from the Environment of the Hatch Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>Tritium, pCi/ml</u>
B 324*	#172	<1	4 ± 1	<200
B 325*	#170	3 ± 1	4 ± 2	<200

-
- Notes: 1. Samples are composites collected February 25 - March 25, 1981.
2. No photon-emitting radionuclides were detected (Cs-137 < 10 pCi/l).

Table 4

Radioactivity Levels in Water Samples from
the Dawson Forest Area

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>
D 137	Wet-weather stream, W of COA	<1	15 ± 2	<200
D 138	Creek-Morgan residence	<1	2 ± 1	<200
D 139	Upstream COA	<1	2 ± 1	200 ± 100
D 140	Downstream COA	<1	2 ± 1	<200
D 141	Etowah River, downstream	<1	4 ± 1	200 ± 100
D 142	Etowah River, upstream	<1	2 ± 1	<200
D 168	Groundwater, Morgan residence	<1	<2	300 ± 100

Note: Samples were collected on March 19, 1981.

Table 5

Radioactivity Levels in Soil Samples from the
Dawson Forest Area

Sample No.	Location	Radionuclide concentration, pCi/kg								
		Co-60	Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	K-40	Ra-226	Ra-228
D 143	#1, inside COA, below pipe	2,900	220	350	74	102	<90	11,100	900	1,000
D 144	#2, outside COA, 100' down wet-weather stream	7.9 E4	<400	<300	<300	870	<300	7,500	200	400
D 145	#3, outside COA, wet-weather stream	5,500	<100	<92	<80	210	<80	5,300	600	700
D 146	#4, creek at TLD #2, outside COA	1,000	<100	<80	<80	107	<80	6,600	400	500
D 147	#5, wet-weather stream, below pipe	1,050	<100	<80	<80	280	<80	6,900	600	800
D 148	#6, SW corner reactor building	4,400	240	390	99	170	<80	5,800	600	400
D 149	#7, reactor basement outlet	230	<100	<80	<80	60	<80	1,900	<200	<200
D 150	#8, W of COA fence, end of fence	790	<100	<80	160	65	<80	5,900	400	600
D 151	#9, outside COA, W fence, 3 yards from TLD #1	1,600	140	180	<80	180	<300	8,700	900	800
D 152	#14, TLD #10	<80	<100	<80	<80	730	<80	8,200	500	700
D 153	#15, TLD #8	7.0 E4	<400	<300	<300	290	<300	8,700	<200	1,300
D 154	#16, inside COA at "hot spot"	4.5 E5	remainder not detectable							
D 155	#17, hot cell area	<50	320	540	140	<50	101	6,600	1,300	800
D 156	#18, N side of COA, outside fence, next to creek at end of road	2.0 E8	remainder not detectable							
D 157	#19, 100' outside COA at NW corner	2.4 E7	remainder not detectable							

- Notes: 1. Samples were collected on March 19, 1981.
 2. No other man-made photon-emitting radionuclides were detected, except for Eu-152 (D 148, 7,000 pCi/kg; D 149, 320 pCi/kg).
 3. Notation E4 means 10^4 .

Table 6

Radioactivity Levels in Vegetation and Animal Dropping Samples
from the Dawson Forest Area

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Co-60	Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144	Be-7
<u>Animal Droppings</u>									
D 158	Outside COA, SW side	<60	1,300	2,300	440	108	710	1,600	3,800
<u>Vegetation</u>									
D 159	#11, lichen, 100' W of COA, outside fence	<60	880	1,600	390	2,000	220	630	2,400
D 160	#12, lichen, inside COA, near "hot spot"	930	1,100	1,900	390	940	620	1,700	3,300
D 161	#13, lichen, TLD #8	570	840	1,600	300	560	450	1,300	2,500
D 162	30 yds S of TLD #1	460	3,300	6,700	1,400	320	2,600	5,000	14,400
D 163	TLD #8	130	1,400	3,000	640	220	1,000	2,000	6,600
D 164	TLD #10	<100	4,200	7,300	1,400	240	2,300	4,700	12,400
D 165	Inside COA, near "hot spot"	4,900	5,800	9,900	1,900	580	4,600	8,600	26,000
D 166	Inside COA, below pipe	640	3,400	7,200	1,500	460	2,800	5,400	15,000
D 167	End of road at COA	<60	3,100	6,800	1,100	530	1,800	4,200	11,500

Notes: 1. Samples were collected on March 19, 1981.

2. No other man-made photon-emitting radionuclides were detected. Be-7 is formed in nature.

Table 7

Radioactivity Levels in Core Samples from the
Environment in Georgia of the Dawson Forest

Sample No.	Location	Co-60 concentration, pCi/kg						
		Core No.:	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
D 169	A; inside COA, below pipe		4,600	4,100	3,600	24,000	340	<100
D 170	B; outside COA, W side, 30 yds S of TLD #1, wash area		690	2,700	10,000	1,400	680	--
D 171	C; TLD #8		93,000	250,000	44,000	210,000	--	--
D 172	D; outside COA, "hot spot"		360,000	33,000	2,800	1,600	--	--

Notes: 1. Samples were collected on March 19, 1981.
2. All samples were cut into 2" segments.

Table 8

Radioactivity Levels in Water Samples from
the Environment in Georgia of the Farley Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>
F 284*	Upstream	<1	<2	<200
F 285*	Downstream	<1	<2	<200

Note: No collection date was given; samples were received from Alabama Power on March 5, 1981.

Table 9

Radioactivity Levels in Air Samples from the
Environment in Georgia of the Farley Nuclear Plant

Sample No.	Sample type	Location	Volume, m ³	Radionuclide concentration, pCi/m ³	
				I-131	Gross beta
F 286*	Air cartridge	Water Tower	986	<0.006	---
F 287*	Paper filter	Water Tower	986	---	0.18
F 288*	Air cartridge	Great Southern Airport	1,005	<0.006	---
F 289*	Paper filter	Great Southern Airport	1,005	---	0.17

Notes: 1. Samples were collected March 11, 1981 after 6-day sampling.
2. No other photon-emitting radionuclides were detected in the cartridges.

Table 10

Radioactivity Levels in Water Samples from the
Environment in Georgia of the Oconee Nuclear Plant

Sample No.	Location	Gross alpha, pCi/l	Gross beta, pCi/l	Tritium, pCi/l
LH 64	TLD #1, tap	<1	2 ± 2	<200
LH 65	Georgia Welcome Center	16 ± 3	8 ± 2	<200
LH 66	TLD #9, Chatooga River	<1	<2	<200
LH 67	Lake Hartwell at dam	<1	<2	<200
LH 68	I-85 Marina	<1	<2	<200

-
- Notes: 1. Samples were collected at Lake Hartwell on March 26, 1981.
2. Samples LH 64 and 65 are well waters; all others are
surface waters.

Table 11

Radioactivity Levels in Soil Samples from the
Environment in Georgia of the Oconee Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	K-40	Ra-226	Ra-228
LH 69	TLD #1	230	480	170	840	140	8,800	1,600	2,000
LH 70	TLD #9	550	1,040	270	140	230	21,400	600	800
LH 71	I-85 Marina	440	670	180	79	81	6,800	400	500

Notes: 1. Samples were collected on March 26, 1981.
2. No other man-made photon-emitting radionuclides were detected.

Table 12

Radioactivity Levels in Grass Samples from
the Environment in Georgia of the Oconee Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg						
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144	Be-7
LH 72	TLD #1	810	1,500	340	<60	580	1,280	2,900
LH 73	TLD #9	1,900	3,700	670	130	<60	<200	6,100
LH 74	I-85 Marina	630	1,100	210	31	380	870	1,800

-
- Notes: 1. Samples were collected on March 26, 1981.
2. No other man-made photon-emitting radionuclides were detected; Be-7 is of natural origin.

Table 13

Radioactivity Levels in Water Samples
from the Environment in Georgia of the Sequoyah Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>Tritium, pCi/ml</u>
SQ 13	TLD #9, ground water	<2	2 ± 2	<200
SQ 14	TLD #10, ground water	<2	2 ± 2	<200
SQ 15	I-75 GA Welcome Ctr; ground water	<2	<2	<200
SQ 16	Hwy 2 and Dietz Rd; surface water	<2	<2	<200

Note: Samples were collected on March 3, 1981.

Table 14

Radioactivity Levels in Soil Samples from the
Environment in Georgia of the Oconee Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	K-40	Ra-226	Ra-228
SQ 17	TLD #5	84	210	71	300	<60	4,500	700	400
SQ 18	TLD #9	210	360	170	480	170	4,300	1,000	600
SQ 19	TLD #11	62	102	42	<30	<60	5,300	6,000	600

-
- Notes: 1. Samples were collected on March 3, 1981.
2. No other man-made photon-emitting radionuclides were detected.

Table 15

Radioactivity Levels in Grass Samples from the
Environment in Georgia of the Sequoyah Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Zr-95	Nb-95	Ru-103	Ru-106	Cs-137	Ce-141	Ce-144	Be-7
SQ 20	TLD #5	2,000	3,500	1,100	510	140	1,600	2,000	7,800
SQ 21	TLD #9	1,100	2,100	720	<500	91	830	1,100	4,000
SQ 22	TLD #11	2,700	4,900	1,400	450	190	2,100	2,800	9,900
SQ 23	TLD #14, background	3,100	5,400	1,100	510	120	2,200	2,800	10,100
SQ 24	TLD #15, background	2,000	3,800	1,100	<500	110	1,600	2,200	7,200
SQ 25	TLD #16, background	1,000	1,800	670	<500	<60	650	1,200	3,100

- Notes: 1. Samples were collected on March 3, 1981.
2. No other man-made photon-emitting radionuclides were detected; Be-7 is of natural origin.

Table 16

Radioactivity Levels in Soil Samples from the
Environment in Georgia of the Savannah River Plant

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	K-40	Ra-226	Ra-228
SR 218	3.1 mi W of Sardis city limits on Hwy 23	<50	57	<50	610	<50	1,000	600	300
SR 219	4.0 mi W of Sardis city limits at sample station	97	210	60	280	70	900	800	800
SR 220	Mullen City limit sign on Hwy 17	130	270	74	130	<50	7,000	500	400

Notes: 1. Samples were collected on March 5, 1981.
2. No other man-made photon-emitting radionuclides were detected.

Table 17

Radioactivity Levels in Water Samples from the
Environment in Georgia of the Savannah River Plant

Sample No.	Location	Gross alpha, pCi/l	Gross beta, pCi/l	Tritium, pCi/l
SR 221	3.1 mi W of Sardis city limit on Hwy 23	2 ± 1	3 ± 1	700 ± 200
SR 222	5.0 mi W of Hwy 25 on road to Alexander	<1	4 ± 2	700 ± 200
SR 223	Magnolia Springs Hwy 25	2 ± 1	<2	<200
SR 224	Mullen city limit sign on Hwy 17	<2	8 ± 2	<200
SR 225	4.0 mi W of Sardis city limit on Hwy 23	28 ± 4	24 ± 3	700 ± 200
SR 226	6.3 mi W of Sardis city limit on Hwy 23	2 ± 1	5 ± 2	400 ± 200
SR 227	Ground water, Mullen City Jail	<2	3 ± 2	<200
SR 228	Savannah River at Hwy 301	<2	4 ± 1	$3,000 \pm 200$
SR 236	Sardis city limit sign on Hwy 23	<1	17 ± 2	$2,700 \pm 200$

-
- Notes: 1. Samples were collected on March 5, 1981.
 2. Samples SR 224, 225, and 236 are filtrates.
 3. No man-made photon-emitting radionuclides were detected in sample SR 225 (Cs-137 <10 pCi/l).

Table 18

Radioactivity Levels in Grass Samples from the
Environment in Georgia of the Savannah River Plant

Sample No.	Location	Radionuclide concentration, pCi/kg						
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144	Be-7
SR 229	6.3 mi W of Sardis city limit on Hwy 23	520	980	260	46	400	600	2,100
SR 230	3.1 mi W of Sardis city limit on Hwy 23	1,200	2,000	600	290	1,200	1,500	5,600
SR 231	Mullen city limit on Hwy 17	280	520	160	28	200	270	940
SR 232	4.0 mi W of Sardis city limit on Hwy 23	670	1,000	210	28	330	430	1,600
SR 233	Sardis city limit sign on Hwy 23	690	1,300	350	43	530	750	2,900
SR 237	Magnolia Springs, Hwy 25	150	250	76	<30	66	110	2,100
SR 238	6.3 mi W of Sardis city limit on Hwy 23	54	101	<20	64	<20	<70	<100

-
- Notes: 1. Samples were collected on March 5, 1981.
2. No other man-made photon-emitting radionuclides were detected; Be-7 is formed in nature.

Table 19

Radioactivity Levels in Milk Samples from
the Environment in Georgia of the Savannah River Plant

<u>Sample #</u>	<u>Location</u>	<u>Sr-89, pCi/l</u>	<u>Sr-90, pCi/l</u>	<u>Cs-137, pCi/l</u>	<u>K, g/l</u>	<u>H-3, pCi/l</u>
SR 234	Thorne Farms, Millen, GA	<5	<3	<10	1.6	<200
SR 235	Burke Farms, Millen, GA	<5	<3	<10	1.4	<200
SR 251	Jimmy Long	<5	<3	<10	1.3	<200
SR 252	Diadem Dairy	<5	<3	<10	1.4	<200
SR 253	Clyde Dixon	<5	<3	<10	1.5	1,200

-
- Notes: 1. Samples SR 234 and 235 were collected on March 5, 1981 by DNR staff; samples SR 251-253 were collected on March 29, 1981 by Georgia Department of Agriculture staff.
2. No other photon-emitting radionuclides were detected (I-131, <15 pCi/l).

Table 20

Radioactivity Levels in Water Samples from
the Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	<u>Tritium, pCi/l</u>
SR 239	Standing water at Girard	1,200 ± 100
SR 240	Standing water from Wade Plantation	1,200 ± 100

Note: Samples were collected on March 27, 1981, after
accidental release of H-3 from the Savannah
River Plant.

Table 21

Radioactivity in Swabs from the Environment
in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Identification No.</u>	<u>H-3, pCi/swab</u>
SR 241	#2, blank	14 \pm 2
SR 242	#5, blank	<2
SR 243	#1	12 \pm 2
SR 244	#3	7 \pm 1
SR 245	#4	3 \pm 1
SR 246	#6	7 \pm 1
SR 247	#7	14 \pm 2
SR 248	#8	12 \pm 2
SR 249	#9	16 \pm 2

Note: Samples were collected on March 27, 1981,
after accidental release of H-3 from the
Savannah River Plant.

Table 22

Radioactivity Levels in Water Sample from
the Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>
SR 250	I & D Water Supply, finished water tap, Port Wentworth	<1	2 ± 1	4,000 ± 300

Note: Sample was collected on March 10, 1981.

Table 23

Radioactivity on Smear of Drum with Radioactivity
Marking at North and Linwood Avenues, Atlanta, GA

<u>Sample No.</u>	<u>Photon-emitting radionuclides, pCi/cm²</u>
S 856	<0.01

Note: Sample was collected on March 5, 1981.

Table 24

Radioactivity Levels in Water from Drum with
Radioactivity Marking at North and Linwood Avenues, Atlanta

Sample No.	Location	Radionuclide concentration, pCi/kg				
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141
S 857	from drum	<40	<20	<20	<20	<20
S 858	background	<30	21	19	<20	<20
	rain water					

Note: Samples were collected on March 5, 1981.

Table 25

Radioactivity in Water Samples
from the Environment at Gracewood State Farm

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>	<u>C-14, pCi/l</u>
S 861	Stream NE of burial area	<1	15 ± 1	400 ± 100	<100
S 862	Pit #1	<1	4 ± 1	3,100 ± 200	<100
S 863	Pit #2	<1	2 ± 1	600 ± 100	<100

Notes: 1. Samples were collected on March 19, 1981.
2. Samples were filtered before analysis.

Table 26

Radioactivity in Soil Samples from the
Environment at Gracewood State Farm

Sample No.	Location	Radionuclide concentration, pCi/kg	
		Nb-95	Cs-137
S 864	40 yrd in front of shed	180	<80
S 865	Composite from Pit #1, 0 - 2-1/2"	<40	<40
S 866	Composite from Pit #2, 0 - 2-1/2"	<40	<40
S 867	Surface from Pit #1	101	130
S 868	Surface at pole, Pit #2	<70	120

- Notes:
1. Samples were collected on March 19, 1981.
 2. No other man-made photon-emitting radionuclides were detected.

Table 27

Radioactivity in Vegetation Sample
from the Environment at Gracewood State Farm

Sample No.	Location	Radionuclide concentration, pCi/kg						
		Be-7	Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144
S 869	Composite from Pits #1 and #2	3,200	1,200	2,200	320	80	850	1,500

Note: Sample was collected on March 19, 1981.

Table 28

Radioactivity in Surface Water Samples
from the Environment at Luminous Processes, Inc., Athens

Sample No.	Location	Gross alpha, pCi/l	H-3, pCi/l	Ra-226, pCi/l
S 875	Location #1, pit 20' from SW corner of property	31 ± 3	$4,000 \pm 300$	22
S 876	Location #2, pit along boundary about 50' from SW corner of property	64 ± 4	$13,000 \pm 300$	46
S 877	Location #3, composite from six 55 gallon drums	33 ± 2	$182,000 \pm 1,000$	37
S 878	Location #4, bore holes adjacent to storage shed slab, S side	127 ± 8	$48,000 \pm 600$	69
S 879	Location #5, bore holes adjacent to storage shed slab, E side	214 ± 11	$14,000 \pm 300$	124

Notes: 1. Samples were collected on March 31, 1981.
2. Samples were distilled for H-3 analysis.
3. Samples were filtered for Ra-226 analysis.

Table 29

Radioactivity in Bamboo Sample from the
Environment at Luminous Processes, Inc., Athens

<u>Sample No.</u>	<u>Location</u>	<u>Ra-226, pCi/g</u>
S 880	Near concrete storage slab	92

Note: Sample was collected on March 31, 1981.

Table 30

Radioactivity in Smears from NIPRO in Augusta

<u>Sample No.</u>	<u>Identification No.</u>	<u>H-3/100 cm²</u>
S 870	Smear I	4 \pm 3
S 871	Smear II	18 \pm 3
S 872	Smear III	11 \pm 10

Note: Samples were collected on March 10, 1981 by DHR staff.

Table 31

Gross Alpha Activity in Georgia Public Water
Supplies -- One Year Composite of Quarterly Samples

<u>Sample No.</u>	<u>ID No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>
WS 1600	300918441	Bowen Mill Christian Comm. Ben Hill Co.	<1
WS 1601	408914273	Stanford Apartments Liberty Co.	<1
WS 1602	408937207	Water MHP, Liberty Co.	<2
WS 1603	401803264	Six Star MHP Village Butts Co.	3 ± 1
WS 1604	405308035	S & S Water Emmanuel Co.	<1
WS 1605	301701273	City of Midville	<1
WS 1606	301000484	City of Washville	<2
WS 1607	305321682	S & S Water De Albra Pk.	<1
WS 1608	308917336	Bill Stanford TP Liberty Co.	<1
WS 1609	308908659	Tideland Comm. School Liberty Co.	<1
WS 1610	301113962	Easy* MHP	2 ± 1
WS 1611	409027785	Pleasant View	2 ± 2

*Name not legible

Table 32

Gross Alpha Activity in New Public Water Supplies

Sample No.	Location	Date Collected	Date Received	Gross alpha, pCi/l	Ra-226, pCi/l	Ra-228, pCi/l
WX 408	Harris Co. Water System Well #2	2/17/81	2/23/81	5 ± 2	1.4	in process
WX 409	City of Dawsonville	2/13/81	2/23/81	8 ± 3	0.7	in process
WX 411	Family Life Enrichment Center; Well #2	2/25/81	3/4/81	<1		
WX 412	Family Life Enrichment Center; Well #1	2/25/81	3/4/81	<1		
WX 414	City of Calhoun	2/26/81	3/5/81	<1		
WX 415	Brittany Harbor North Well #2	2/12/81	3/10/81	1 ± 1		
WX 416	Tall Timbers S/D Well #3	2/26/81	3/30/81	2 ± 1		
WX 417	Tall Timbers S/D Well #4	2/26/81	3/30/81	8 ± 2		in process
WX 418	West Bridge S/D Well #4	3/8/81	3/30/81	2 ± 1		
WX 419	Pinebrook S/D Well #4	3/9/81	3/30/81	<1		
WX 420	Woodland Valley S/D Well #2	2/26/81	3/30/81	<1		
WX 421	Woodland Valley S/D Well #1	2/26/81	3/30/81	<2		
WX 422	Tall Timbers S/D Well #1	2/26/81	3/30/81	17 ± 3		in process
WX 423	Tall Timbers S/D Well #2	2/26/81	3/30/81	5 ± 1		in process
WX 424	I-75 South MHP Well #3	3/6/81	3/30/81	<1		

Table 32 (continued)

Sample No.	Location	Date Collected	Date Received	Gross alpha, pCi/l	Ra-226, pCi/l	Ra-228, pCi/l
WX 425	Campbell Water Supply	3/5/81	3/30/81	<1		
WX 426	City of Hiram Well #2	3/17/81	3/30/81	<1		
WX 427	Suburban MHP Well #1	3/20/81	3/30/81	<1		
WX 428	Cagle's Mobile Court Well #1	3/20/81	3/30/81	<2		
WX 429	Sugarwood Estates Well #2	3/3/81	3/30/81	<2		
WX 430	City of Swainsboro Well #9	3/20/81	3/30/81	<2		
WX 431	Bowen's Mill Christian Center Well #2	3/16/81	3/30/81	<2		
WX 432	Woodland Valley S/D Well #1	2/26/81	3/30/81	6 ± 2	in process	
WX 433	Woodland Valley S/D Well #3	2/26/81	3/30/81	<2		
WX 434	Skylake Community	2/24/81	3/30/81	<1		
WX 435	Country Estates S/D Well #1	3/9/81	3/30/81	2 ± 2		

Table 33

Gross Alpha Activity and Radium Concentrations in Georgia
Public Water Supplies -- Grab Samples of Supplies for which
Annual Composites had Elevated Levels

<u>Sample No.</u>	<u>Location</u>	<u>Collection Date, 1981</u>	<u>Gross alpha, pCi/l</u>	<u>Ra-226, pCi/l</u>	<u>Ra-228, pCi/l</u>
WX 395	Tugaloo Bay Marina Well	2/12/81	5 \pm 1	2.0	---
WX 396	Tugaloo Bay Jackson Residence	2/12/81	11 \pm 1	2.5	<2
WX 397	Tugaloo Bay Well #1	2/12/81	26 \pm 2	13.9	<2
WX 413	Seminole MHP	2/17/81	31 \pm 4	9.6	<2

Table 34

Radium-226 Concentrations in Water
from Private Wells near Alamo

Sample No.	Location	Gross alpha, pCi/l	Ra-226, pCi/l
WX 18	111-D	7 ± 4	7.3
WX 21	123-D	5 ± 3	2.2
WX 30	42	10 ± 3	19.0
WX 65	137	5 ± 2	5.8
WX 78	125	3 ± 2	3.5
WX 79	126	6 ± 1	2.5
WX 100	19	5 ± 3	11.2
WX 101	20	6 ± 3	8.7
WX 141	D. Sammons; Mt. Vernon	9 ± 3	9.4
WX 151	Clinton Stovall; Alamo	3 ± 2	2.2
WX 157	Esckol White; Alamo	3 ± 2	1.7
WX 163	J. Robert White; Alamo	3 ± 3	5.9
WX 166	Roger Smith; Alamo	3 ± 2	1.1
WX 167	W. Preston White; Alamo	6 ± 3	5.6
WX 184	Lynn McNeal; Alamo	7 ± 3	2.6
WX 230	Merrill F. Gross; Alamo	7 ± 3	12.5

Table 35

Fallout from Chinese Atmospheric Nuclear Test of
October 16, 1980, Airborne Particles - State Building Samples

Sample No.	Sample date, 1981	Volume, m ³	Gross beta, pCi/m ³	Radionuclide concentration, fCi/m ³						
				Be-7	Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144
S 847	February 16 - March 1	2810	<0.1	9	4	6	3	<1	1	4
S 860	March 9 - March 23	3020	0.1	38	21	41	13	2	7	12
S 873	March 23 - March 30	1510	0.2	47	21	37	12	<2	7	15

- Notes:
1. Gross beta activity was measured 6 hours after collection and consists of Rn-220 daughters. Be-7 is also of natural origin. Among the shorter-lived fission products that were searched for are I-131 and Ba-140.
 2. The filters are 12.5-cm-dia charcoal impregnated pads.
 3. Either the sample for March 1 - 9 was not submitted or Sample S 860 was started on March 1.

Table 36

Fallout from Chinese Atmospheric Nuclear Test
in Rainwater

<u>Sample No.</u>	<u>Sampling date, 1981</u>	<u>Location</u>	<u>Gross beta, pCi/l</u>	<u>Fission products concentration, pCi/l</u>
S 846	March 1	Top of State Bldg.	21 ± 2	<20
S 855	February 16	Top of State Bldg.	17 ± 2	<20
S 874	March 30	Top of State Bldg.	46 ± 3	<20

-
- Notes: 1. The radionuclides listed in Table 34 were measured; none were found at the indicated minimum detectable level.
2. A sample of 500 ml was analyzed.



E-26-666

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF INTERDISCIPLINARY PROGRAMS
205 OLD CIVIL ENGINEERING BUILDING
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BIOENGINEERING CENTER
(404) 894-2375

M E M O R A N D U M

DATE: May 21, 1981

TO: Mr. William Cline, Program Manager
Environmental Radiation Program, EPD, DNR

FROM: Bernd Kahn, Director *Bernd Kahn*
Environmental Resources Center

SUBJECT: Monthly Report of Activities for the State by the
Environmental Radiation Laboratory, April 1981

The results of radionuclide analyses are reported for the following sample types that were processed this month:

Environmental monitoring at nuclear facilities by DNR staff	Tables 1-14
Monitoring by DNR staff at other locations	Tables 15-17
Monitoring by DNR staff of Public Water Supplies	Tables 18-19
Monitoring fallout	Tables 20-21

Of the samples collected in the environment at nuclear facilities, only water at a water supply intake downstream from the Savannah River Plant contained elevated radioactivity levels (tritium) attributed to the facility (Table 14). All other radionuclides reported in Tables 1 - 14 are attributed to fallout or the natural radiation background. Fallout from the October 16, 1980, test of a nuclear device in the atmosphere by mainland China is still observable in soil and vegetation samples. Natural radioactivity is reported in the soil samples to establish background levels. All samples collected for the NRC project are indicated by asterisks in the appropriate tables.

Samples collected from the vicinity of the radioactive waste burial site at the Georgia Medical College did not contain elevated radium levels (Table 15). A large number of soil samples were collected to delineate the Ra-226 contamination at the Luminous Processes site; samples shown to contain Ra-226 at elevated levels in a screening procedure were not submitted for analysis, but among those that were not eliminated by screening, several contained Ra-226 levels between 4 and 24 pCi/g (Table 16). Because of the brief counting period (1000 sec) used, levels below 4 pCi/g were not detected. All values are based on the assumption that the Ra-226 was distributed uniformly throughout the sample. In two samples for which the container

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was counted on both sides, one showed values consistent with uniform distribution, while the other did not. It should be noted that the natural radiation background for Ra-226 in samples from this location has usually been below 4 pCi/g, which would be interpreted as below 6.6 pCi/g in the absence of U-235. Some water samples from the same location contained elevated levels of H-3, which had been used more recently at that site to paint luminous dials (Table 17).

Additional grab samples of new water supplies have been analyzed for gross alpha activity (Table 18). Where levels were 5 pCi/l or greater, Ra-226, Ra-228, and uranium analyses were performed to identify the source of elevated alpha activity. Samples of water from individual wells in the Alamo area continue to be analyzed, as shown in Table 19.

Air filters collected in Atlanta to follow the levels of fallout from the October 20, 1980, nuclear test continue to show elevated levels of the fission products with intermediate half lives such as Zr-95, Nb-95, Ru-103, and Ce-141 at the femtocurie/m³ level (Table 20). No radionuclides at the indicated level of detection were found in rainwater collected in Atlanta during the same period (Table 21).

Table 1

Radioactivity Levels in Water Samples from the
Environment of the Hatch River Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>
B 326*	#172	<1	3 ± 1	<200
B 327*	#170	<1	3 ± 1	<200

Note: Samples were composites collected December 24, 1980 - March 25, 1981.

Table 2

Radioactivity Levels in Milk Samples from
the Environment of the Hatch Nuclear Plant

<u>Sample #</u>	<u>Location</u>	<u>Sr-89, pCi/l</u>	<u>Sr-90, pCi/l</u>	<u>Cs-137, pCi/l</u>	<u>K, g/l</u>	<u>H-3, pCi/l</u>
B 328*	Sellers	in process		<10	1.4	200 ± 200
B 329*	Georgia State Prison	in process		<10	1.5	500 ± 200
B 330*	Williamson	in process		<10	1.7	200 ± 200
B 361*	Sellers	in process		<10	1.4	<200
B 362*	Johnson	in process		<10	1.6	<200

Notes: 1. Samples B 328 - 330 were collected March 30-31, 1981;
samples B 361 - 362 were collected on April 28, 1981.
2. No I-131 (<10 pCi/l) or Ba-140 were detected.

Table 4

Radioactivity Levels in Grass Samples from the
Environment of the Hatch Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Zr-95	Nb-95	Ru-103	Ru-106	Cs-137	Ce-141	Ce-144	Be-7
B 340	TLD #12	<80	<60	210	<300	69	280	840	2,100
B 341	TLD #20	380	770	98	<200	54	210	700	1,600
B 342	TLD #25	130	280	<50	<300	<30	71	180	460
B 343	TLD #28	60	120	<20	<200	18	410	930	260
B 344	TLD #41	820	1,900	180	<300	150	630	1,900	3,200
B 345	TLD #43	120	260	40	<100	26	79	270	590
B 346	TLD #44	260	600	<40	<200	180	130	420	800
B 347	TLD #18	610	1,400	210	<300	87	320	1,100	2,100
B 348	State Bkgd #6	180	370	64	<200	<30	<60	250	200

-
- Notes: 1. Samples were collected April 20-21, 1981.
2. No other photon-emitting radionuclides were detected.

Table 5

Radioactivity Levels in Water Samples from the
Environment of the Hatch River Plant

Sample No.	Location	Gross alpha, pCi/l	Gross beta, pCi/l	H-3, pCi/l
B 349	DOT, Baxley	1 ± 1	<2	<200
B 350	Health Department; Baxley	3 ± 1	3 ± 1	<200
B 351	Dean's Landing	2 ± 1	4 ± 1	<200
B 352	Dennis Store	2 ± 1	2 ± 1	<200
B 353	15' well, house 1 mi S of Hatch	1 ± 1	4 ± 1	<200
B 354	TLD #18	1 ± 1	6 ± 1	<200
B 355	Altamaha, upstream	<1	<1	<200
B 356	Altamaha, downstream	<1	4 ± 1	<200

-
- Notes: 1. Samples were collected April 20-21, 1981.
2. Samples B 349 - 353 are ground waters; others are surface waters.

Table 6

Radioactivity Levels in Air Samples from the
Environment of the Hatch Nuclear Plant

Sample No.	Sample type	Location	Volume, m ³	Radionuclide concentration, pCi/m ³	
				I-131	Gross beta
B 357*	Cartridge	Substation	272	<0.02	---
B 358*	Paper filter	Substation	272	---	0.22
B 359*	Cartridge	Plant	272	<0.02	---
B 360*	Paper filter	Plant	272	---	0.11

-
- Notes: 1. Samples were collected April 15, 1981 after 7-day sampling.
2. No other photon-emitting radionuclides were detected in the cartridges.

Table 7

Radioactivity Levels in Quarterly Composite Air Filters
from the Environment in Georgia of the Farley Nuclear Plant

Samples No.	Location	Dates, 1981	Volume, m ³	Radionuclide concentration, fCi/m ³						
				Zr-95	Nb-95	Ru-103	Ru-106	Cs-137	Ce-141	Ce-144
F 277, 281, 287*	Water Tower	Jan-Mar	3074	27	49	19	<8	15	16	14
F 279, 283, 289*	Great Southern Airport	Jan-Mar	2987	25	53	21	5	<1	14	13

-
- Notes: 1. Three filters collected successively at the same location were analyzed by gamma-ray spectrometry. See earlier reports for gross beta activity in individual filters and collection dates.
2. No other photon-emitting radionuclides were detected except naturally occurring Be-7. Decay was computed from midpoint of period.

Table 8

Radioactivity Levels in Air Samples from the
Environment in Georgia of the Farley Nuclear Plant

Sample No.	Sample type	Location	Volume, m ³	Radionuclide concentration, pCi/m ³	
				I-131	Gross beta
F 290*	Cartridge	Water Tower	1036	<0.006	---
F 291*	Paper filter	Water Tower	1036	---	0.30
F 292*	Cartridge	Great Southern Airport	1033	<0.006	---
F 293*	Paper filter	Great Southern Airport	1033	---	0.31

- Notes: 1. Samples were collected on April 9, 1981 after 7-day sampling.
2. No other photon-emitting radionuclides were detected in the cartridges.

Table 9

Radioactivity Levels in Soil Samples from the
Environment in Georgia of the Farley Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	K-40	Ra-226	Ra-228
F 294	TLD #1	105	160	<50	104	<80	800	1,000	800
F 295	TLD #3	310	710	160	730	140	100	800	800
F 296	TLD #12	340	450	140	260	90	600	700	600

Notes: 1. Samples were collected on April 15, 1981.
2. No other photon-emitting radionuclides were detected.

Table 10

Radioactivity Levels in Grass Samples from
the Environment in Georgia of the Farley Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg						
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144	Be-7
F 297	TLD #1	103	220	40	<20	35	97	130
F 298	TLD #3	130	250	66	220	<80	<200	490
F 299	TLD #12	88	190	<40	<30	<60	<200	180

-
- Notes: 1. Samples were collected April 14-15, 1981.
2. No other man-made photon-emitting radionuclides were detected;
Be-7 is formed in nature.

Table 11

Radioactivity Levels in Water Samples from the
Environment in Georgia of the Farley Nuclear Plant

Sample No.	Location	Gross alpha, pCi/l	Gross beta, pCi/l	H-3, pCi/l
F 300	TLD #1	<1	3 ± 2	<200
F 301	TLD #20, River	<1	3 ± 2	<200
F 302	TLD #21	<1	<2	<200
F 303	Cedar Springs Post Office	<2	<2	<200
F 304	GSPC Boat Launch	<1	2 ± 2	<200
F 305	GSPC	<2	3 ± 2	<200

-
- Notes: 1. Samples were collected on April 15, 1981.
2. Samples F 301 and F 304 are surface waters; others are ground waters.

Table 12

Radioactivity Levels in Sediment Samples from the
Environment in Georgia of the Farley Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg			
		Cs-137	K-40	Ra-226	Ra-228
F 306*	RSI-SI-041481 downstream	<40	1,400	<200	<200
F 307*	RSB-SI-041481 upstream	<40	1,400	<200	600

Notes: 1. Samples were collected on April 14, 1981.
2. No other photon-emitting radionuclides were detected.

Table 13

Radioactivity Levels in Milk Samples from
the Environment in Georgia of the Farley Nuclear Plant

<u>Sample #</u>	<u>Location</u>	<u>Sr-89, pCi/l</u>	<u>Sr-90, pCi/l</u>	<u>Cs-137, pCi/l</u>	<u>K, g/l</u>	<u>H-3, pCi/l</u>
F 308*	Jerry Mock	in process		<10	1.3	<200
F 309*	A.B. White	in process		<10	1.5	<200

-
- Notes: 1. Samples had no collection date, but were received at the laboratory on April 24, 1981.
2. No I-131 (<10 pCi/l) or Ba-140 were detected.

Table 14

Radioactivity Levels in Water Sample from the
Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>
SR 254	I & D Water Supply City of Savannah	<1	2 ± 1	3,200 200

-
- Notes: 1. Sample was collected on April 14, 1981.
2. No man-made photon-emitting radionuclides were detected
(Cs-137: <10 pCi/l).

Table 15

Radioactivity in Soil Samples from the
Environment at Gracewood State Farm

Sample No.	Location	Radionuclide concentration, pCi/kg		
		K-40	Ra-226	Ra-228
S 864	40 yd in front of shed	9,100	1,200	1,000
S 865	Composite from Pit #1, 0 - 2-1/2"	10,400	1,000	800
S 866	Composite from Pit #2, 0 - 2-1/2"	29,000	2,900	700
S 867	Surface from Pit #1	8,800	700	800
S 868	Surface at pole, Pit #2	10,600	1,100	1,000

-
- Notes: 1. Samples were collected on March 19, 1981; other radionuclide contents are given in Table 26, March 1981 Report.
2. No other photon-emitting radionuclides were detected.
3. These levels of radium are at natural background concentrations. Ra-226 values are based on the assumption that U-235 was present and that Ra-226 was in equilibrium with U-238.
4. No Ra-226 or Ra-228 (<200 pCi/kg each) were detected in sample S 869 (see Table 27, March 1981 Report).

Table 16

Radium-226 Concentrations in Soil Samples from the
Site of Luminous Processes, Inc., Athens

Lab No.	I.D.	Ra-226, pCi/g	Lab No.	I.D.	Ra-226, pCi/g
S 881	A1.1	<4	S 927	B4.2	<4
S 882	A1.2	S*	S 928	B4.3	S
S 883	A1.3	<4	S 929	B4.4	<4
S 884	A1.4	<4	S 930	B4.5	4
S 885	A1.5	<4	S 931	B4.6	S
S 886	A1.6	<4	S 932	B4.7	S
S 887	A4.1	<4	S 933	B5.1	S
S 888	A4.2	<4	S 934	B5.2	S
S 889	A4.3	<4	S 935	B5.3	S
S 890	A4.4	<4	S 936	B5.4	<4
S 891	A4.5	<4	S 937	B5.5	<4
S 892	A4.6	<4	S 938	B5.6	<4
S 893	A4.7	S	S 939	B6.1	S
S 894	A5.1	S	S 940	B6.2	S
S 895	A5.2	S	S 941	B6.3	S
S 896	A5.3	S	S 942	B6.4	<4
S 897	A5.4	S	S 943	B6.5	S
S 898	A5.5	S	S 944	B6.6	<4
S 899	A5.6	<4	S 945	B7.1	6
S 900	A6.1	S	S 946	B7.2	S
S 901	A6.2	<4	S 947	B7.3	S
S 902	A6.3	S	S 948	B7.4	<4
S 903	A6.4	S	S 949	B7.5	<4
S 904	A6.5	<4	S 950	C5.1	7
S 905	A7.1	11	S 951	C5.2	4
S 906	A7.2	S	S 952	C5.3	<4
S 907	A7.3	S	S 953	C5.4	S
S 908	A7.4	<4	S 954	C5.5	<4
S 909	A7.5	<4	S 955	C6.1	<4
S 910	A7.6	<4	S 956	C6.2	<4
S 911	A7.7	<4	S 957	C6.3	<4
S 912	A8.1	S	S 958	C6.4	<4
S 913	A8.2	4	S 959	C6.5	<4
S 914	A8.3	S	S 960	C6.6	<4
S 915	A8.4	S	S 961	C7.1	S
S 916	A8.5	S	S 962	C7.2	S
S 917	A8.6	9	S 963	C7.3	4
S 918	A9.1	S	S 964	C7.4	<4
S 919	A9.2	<4	S 965	C8.1	<4
S 920	A9.3	<4	S 966	C8.2	5
S 921	A9.4	4	S 967	C8.3	S
S 922	A9.5	S	S 968	C8.4	<4
S 923	B1.1	<4	S 969	C8.5	4
S 924	B1.2	S	S 970	C9.1	4
S 925	B1.3	S	S 971	C9.2	<4
S 926	B4.1	S	S 972	C9.3	<4

Table 16 (cont'd)

Lab No.	I.D.	Ra-226, pCi/g	Lab No.	I.D.	Ra-226, pCi/g
S 973	C9.4	S	S 1024	H5.3	S
S 974	C9.5	<4	S 1025	H5.4	<4
S 975	D3.1	S	S 1026	H5.5	<4
S 976	D3.2	<4	S 1027	H9.1	S
S 977	D3.3	<4	S 1028	H9.2	4
S 978	D3.4	S	S 1029	H9.3	S
S 979	D3.5	<4	S 1030	H9.4	<4
S 980	D3.6	<4	S 1031	H9.5	5
S 981	D8.1	7	S 1032	H9.6	4
S 982	D8.2	S	S 1033	H9.7	<4
S 983	D8.3	5	S 1034	I2.1	8
S 984	D8.4	S	S 1035	I2.2	<4
S 985	D8.5	<4	S 1036	I2.3	<4
S 986	D8.6	<4	S 1037	I2.4	<4
S 987	D8.7	<4	S 1038	I3.1	S
S 988	E3.1	6	S 1039	I3.2	S
S 989	E3.2	5	S 1040	I3.3	<4
S 990	E3.3	S	S 1041	I3.4	<4
S 991	E3.4	S	S 1042	I4.1	<4
S 992	E3.5	<4	S 1043	I4.2	4
S 993	E3.6	S	S 1044	I4.3	<4
S 994	B8.1	11	S 1045	I4.4	<4
S 995	B8.2	7	S 1046	I4.5	S
S 996	B8.3	24	S 1047	I4.6	4
S 997	B8.4	15	S 1048	I4.7	<4
S 998	B8.5	S	S 1049	Q9.1	S
S 999	B8.6	S	S 1050	Q9.2	S
S 1000	B9.1	<4	S 1051	Q9.3	<4
S 1001	B9.2	4	S 1052	Q9.4	<4
S 1002	B9.3	S	S 1053	Q9.5	4
S 1003	B9.4	<4	S 1054	Q9.6	4
S 1004	B9.5	<4	S 1055	Q9.7	6
S 1005	B9.6	<4	S 1056	Q10.1	5
S 1006	C1.1	4	S 1057	Q10.2	5
S 1007	C1.2	S	S 1058	Q10.3	S
S 1008	C1.3	<4	S 1059	Q10.4	<4
S 1009	C1.4	S	S 1060	Q10.5	S
S 1010	C1.5	<4	S 1061	Q10.6	5
S 1011	C1.6	<4	S 1062	Q11.1	S
S 1012	C4.1	6	S 1063	Q11.2	4
S 1013	C4.2	<4	S 1064	Q11.3	<4
S 1014	C4.3	<4	S 1065	Q11.4	<4
S 1015	C4.4	<4	S 1066	Q11.5	S
S 1016	C4.5	<4	S 1067	Q11.6	S
S 1017	C4.6	<4	S 1068	R11.1	9
S 1018	C4.7	<4	S 1069	R11.2	S
S 1022	H5.1	6	S 1070	R11.3	S
S 1023	H5.2	S	S 1071	R11.4	4

Table 16 (cont'd)

Lab No.	I.D.	Ra-226, pCi/g	Lab No.	I.D.	Ra-226, pCi/g
S 1072	R11.5	6	S 1120	P9.3	4
S 1073	R11.6	<4	S 1121	P9.4	4
S 1074	Q7.1	S	S 1122	P8.1	S
S 1075	Q7.2	4	S 1123	P8.2	S
S 1076	Q7.3	<4	S 1124	P8.3	<4
S 1077	Q7.4	<4	S 1125	P8.4	S
S 1078	Q7.5	<4	S 1126	P8.5	<4
S 1079	Q7.6	S	S 1127	P8.6	S
S 1080	Q8.1	19	S 1128	P8.7	<4
S 1081	Q8.2	6	S 1129	P7.1	S
S 1082	Q8.3	<4	S 1130	P7.2	8
S 1083	Q8.4	<4	S 1131	P7.3	8
S 1084	Q8.5	<4	S 1132	P7.4	S
S 1085	Q8.6	<4	S 1133	P7.5	S
S 1086	Q8.7	4	S 1134	P7.6	<4
S 1087	J6.1	S	S 1135	K2.1	S
S 1088	J6.2	4	S 1136	K2.2	<4
S 1089	J6.3	<4	S 1137	K2.3	<4
S 1090	J6.4	<4	S 1138	K2.4	<4
S 1091	J6.5	<4	S 1139	K2.5	<4
S 1092	J6.6	<4	S 1140	K2.6	S
S 1093	J6.7	<4	S 1141	K3.1	S
S 1094	J7.1	<4	S 1142	K3.2	<4
S 1095	J7.2	S	S 1143	K3.3	<4
S 1096	J7.3	<4	S 1144	K3.4	<4
S 1097	J7.4	S	S 1145	K3.5	<4
S 1098	J7.5	<4	S 1146	K3.6	S
S 1099	J7.6	<4	S 1147	K5.1	S
S 1100	J7.7	4	S 1148	K5.2	<4
S 1101	J9.1	5	S 1149	K5.4	S
S 1102	J9.2	<4	S 1150	K5.4	S
S 1103	J9.3	<4	S 1151	K6.1	S
S 1104	J9.4	<4	S 1152	K6.2	4
S 1105	J9.5	<4	S 1153	K6.3	4
S 1106	K10.1	4	S 1154	K6.4	<4
S 1107	K10.2	S	S 1155	K6.5	<4
S 1108	K10.3	4	S 1156	K6.6	4
S 1109	K10.4	<4	S 1157	K7.1	<4
S 1110	K10.5	4	S 1158	K7.2	<4
S 1111	K10.6	4	S 1159	K7.3	<4
S 1112	K10.7	<4	S 1160	K7.4	<4
S 1113	K10.8	5	S 1161	K7.5	<4
S 1114	K8.1	4	S 1162	K7.6	S
S 1115	K8.2	<4	S 1163	J10.1	<4
S 1116	K8.3	S	S 1164	J10.2	<4
S 1117	K8.4	<4	S 1165	J10.3	<4
S 1118	P9.1	<4	S 1166	J10.4	4
S 1119	P9.2	S	S 1167	J10.5	<4

Table 16 (cont'd)

Lab No.	I.D.	Ra-226, pCi/g	Lab No.	I.D.	Ra-226, pCi/g
S 1168	J2.1	S	S 1216	F8.6	<4
S 1169	J2.2	6	S 1217	F8.7	<4
S 1170	J2.3	S	S 1218	G8.1	S
S 1171	J2.4	<4	S 1219	G8.2	S
S 1172	J2.5	<4	S 1220	G8.3	4
S 1173	J2.6	S	S 1221	G8.4	S
S 1174	J2.7	S	S 1222	G8.5	<4
S 1175	J3.1	S	S 1223	G8.6	<4
S 1176	J3.2	S	S 1224	G7.1	S
S 1177	J3.3	S	S 1225	G7.2	<4
S 1178	P10.1	S	S 1226	G7.3	S
S 1179	P10.2	4	S 1227	G7.4	S
S 1180	P10.3	4	S 1228	G7.5	<4
S 1181	P10.4	<4	S 1229	F6.1	S
S 1182	P10.5	S	S 1230	F6.2	S
S 1183	P10.6	S	S 1231	F6.3	4
S 1184	P11.1	4	S 1232	F6.4	<4
S 1185	P11.2	<4	S 1233	F6.5	4
S 1186	P11.3	<4	S 1234	F6.6	<4
S 1187	P11.4	<4	S 1235	F6.7	<4
S 1188	I9.1	4	S 1236	F7.1	S
S 1189	I9.2	<4	S 1237	F7.2	4
S 1190	I9.3	<4	S 1238	F7.3	<4
S 1191	I9.4	S	S 1239	F7.4	S
S 1192	I9.5	4	S 1240	F7.5	<4
S 1193	I9.6	4	S 1241	F7.6	5
S 1194	H4.1	20	S 1242	F7.7	<4
S 1195	H4.2	S	S 1243	F3.1	<4
S 1196	H4.3	<4	S 1244	F3.2	4
S 1197	H4.4	<4	S 1245	F3.3	8
S 1198	H4.5	<4	S 1246	F3.4	S
S 1199	H4.6	<4	S 1247	F3.5	<4
S 1200	G5.1	S	S 1248	F4.1	S
S 1201	G5.2	S	S 1249	F4.2	8
S 1202	G5.3	<4	S 1250	F4.3	5
S 1203	G5.4	S	S 1251	F4.4	<4
S 1204	G5.5	S	S 1252	F4.5	<4
S 1205	G5.6	S	S 1253	F5.1	S
S 1206	G6.1	S	S 1254	F5.2	4
S 1207	G6.2	4	S 1255	F5.3	<4
S 1208	G6.3	<4	S 1256	F5.4	<4
S 1209	G6.4	S	S 1257	F5.5	<4
S 1210	G6.5	S	S 1258	R10.1	S
S 1211	F8.1	4	S 1259	R10.2	6
S 1212	F8.2	4	S 1260	R10.3	<4
S 1213	F8.3	<4	S 1261	R10.4	<4
S 1214	F8.4	<4	S 1262	R10.5	<4
S 1215	F8.5	<4	S 1263	R10.6	<4

Table 16 (cont'd)

Lab No.	I.D.	Ra-226, pCi/g	Lab No.	I.D.	Ra-226, pCi/g
S 1264	R9.1	S	S 1319	08.1	7
S 1265	R9.2	S	S 1320	08.2	4
S 1266	R9.3	S	S 1321	08.3	<4
S 1267	R9.4	S	S 1322	08.4	S
S 1268	R9.5	<4	S 1323	08.5	4
S 1269	R9.6	<4	S 1324	08.6	S
S 1270	R9.7	<4	S 1325	08.7	S
S 1278	N5.1	S	S 1326	P5.1	S
S 1279	N5.2	S	S 1327	P5.2	S
S 1280	N5.3	<4	S 1328	P5.3	4
S 1281	N5.4	<4	S 1329	P5.4	S
S 1282	N5.5	S	S 1330	P5.5	S
S 1283	N5.6	S	S 1331	N10.1	4
S 1284	N6.1	S	S 1332	N10.2	7
S 1285	N6.2	S	S 1333	N10.3	<4
S 1286	N6.3	S	S 1334	N10.4	4
S 1287	N6.4	<4	S 1335	N10.5	S
S 1288	N6.5	<4	S 1336	N10.6	<4
S 1289	N6.6	<4	S 1337	L6.1	S
S 1290	N6.7	<4	S 1338	L6.2	S
S 1291	M4.1	S	S 1339	L6.3	4
S 1292	M4.2	S	S 1340	L6.4	S
S 1293	M4.3	S	S 1341	L6.5	<4
S 1294	M4.4	5	S 1342	L6.6	<4
S 1295	M4.5	<4	S 1343	L11.1	<4
S 1296	M4.6	<4	S 1344	L11.2	<4
S 1297	M4.7	<4	S 1345	L11.3	4
S 1298	M5.1	S	S 1346	L11.4	S
S 1299	M5.2	S	S 1347	06.1	S
S 1300	M5.3	S	S 1348	06.2	S
S 1301	M5.4	S	S 1349	06.3	4
S 1302	M5.5	<4	S 1350	06.4	S
S 1303	M5.6	S	S 1351	06.5	S
S 1304	A3.0-6	4	S 1352	06.6	S
S 1305	A3.6-12	4	S 1353	P4.1	S
S 1306	A3.12-18	<4	S 1354	P4.2	S
S 1307	B3.0-6	<4	S 1355	P4.3	S
S 1308	B3.6-12	S	S 1356	P4.4	S
S 1309	B3.12-18	S	S 1357	P4.5	<4
S 1310	C3.0-6	S	S 1358	P4.6	S
S 1311	C3.6-12	5	S 1359	P4.7	S
S 1312	C3.12-18	<4	S 1360	M10.1	S
S 1313	F2.0-6	S	S 1361	M10.2	S
S 1314	F2.6-12	<4	S 1362	M10.3	S
S 1315	F2.12-18	S	S 1363	M10.4	<4
S 1316	Bkgd #19	2	S 1364	M10.5	<4
S 1317	Bkgd #21	2	S 1365	M10.6	<4
S 1318	Bkgd #22	<2	S 1366	N3.1	S

Table 16 (cont'd)

Lab No.	I.D.	Ra-226, pCi/g	Lab No.	I.D.	Ra-226, pCi/g
S 1366	N3.1	S	S 1414	D2.6-12	<4
S 1367	N3.2	<4	S 1415	D2.12-18	<4
S 1368	N3.3	S	S 1416	G2.0-6	S
S 1369	N3.4	<4	S 1417	G2.6-12	S
S 1370	N3.5	<4	S 1418	G2.12-18	4
S 1371	N3.6	S	S 1419	G3.0-6	S
S 1372	010.1	S	S 1420	G3.6-12	5
S 1373	010.2	4	S 1421	G3.12-18	5
S 1374	010.3	<4	S 1422	H2.0-6	S
S 1375	010.4	<4	S 1423	H2.6-12	<4
S 1376	010.5	5	S 1424	H2.12-18	S
S 1377	010.6	S	S 1425	H3.0-6	S
S 1378	L3.1	S	S 1426	H3.6-12	S
S 1379	L3.2	<4	S 1427	H3.12-18	<4
S 1380	L3.3	<4	S 1428	A2surface	S
S 1381	L3.4	<4	S 1429	A2.0-6	S
S 1382	L3.5	S	S 1430	A2.6-12	<4
S 1383	L9.1	S	S 1431	A2.12-18	<4
S 1384	L9.2	<4	S 1432	B2surface	<4
S 1385	L9.3	S	S 1433	B2.1	<4
S 1386	L9.4	S	S 1443	B2.2	<4
S 1387	L9.5	4	S 1444	B2.3	<4
S 1388	07.1	S	S 1445	B2.4	<4
S 1389	07.2	S	S 1446	B2.5	<4
S 1390	07.3	<4	S 1447	B2.6	<4
S 1391	07.4	5	S 1448	B-3	<4
S 1392	07.5	4	S 1449	C-3	5
S 1393	07.6	<4	S 1450	H-2	4
S 1394	07.7	<4	S 1451	H-3	4
S 1395	07.8	<4	S 1452	C2.0-6	<4
S 1396	09.1	S	S 1453	C2.6-12	<4
S 1397	09.2	S	S 1454	C2.12-18	<4
S 1398	09.3	S	S 1455	Bkgd #1	2
S 1399	09.4	<4	S 1456	Bkgd #2	3
S 1400	09.5	<4	S 1457	Bkgd #3	2
S 1401	09.6	S	S 1458	Bkgd #4	2
S 1402	09.7	<4	S 1459	L5.1	S
S 1403	L7.1	15, 10**	S 1460	L5.2	S
S 1404	L7.2	11, 4**	S 1461	L5.3	S
S 1405	L7.3	S	S 1462	L5.4	S
S 1406	L7.4	4	S 1463	L5.5	S
S 1407	L10.1	<4	S 1464	L5.6	5
S 1408	L10.2	S	S 1465	L5.7	<4
S 1409	L10.3	<4	S 1466	L4.1	S
S 1410	L10.4	<4	S 1467	L4.2	6
S 1411	L10.5	4	S 1468	L4.3	6
S 1412	L10.6	S	S 1469	L4.4	S
S 1413	D2.0-6	<4	S 1470	L4.5	S

Table 16 (cont'd)

<u>Lab No.</u>	<u>I.D.</u>	<u>Ra-226, pCi/g</u>
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S 1471	L4.6	4
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- Notes:
1. Samples were collected on April 9-10, 23-24, 1981.
 2. Ra-226 values are based on the assumption that no U-235 was present, except in samples marked "Bkdg," for which equilibrium between U-238 and Ra-226 is assumed.
 3. Samples were usually counted for 1000 seconds, hence MDL is approximately 4 pCi/g.
- S*: Not analyzed because screening measurement indicated relatively elevated levels.
- ** : Second value obtained by counting the sample upside down.

Table 17

Radioactivity Levels in Water Samples from the
Environment of Luminous Processes, Inc., Athens

<u>Sample No.</u>	<u>Location</u>	<u>H-3, pCi/l</u>
S 1271	#1, H4	25,800 ± 400
S 1272	#2, 5-1/2' NW of K5	23,300 ± 400
S 1273	#3, I4	3,800 ± 200
S 1274	#4, C2	500 ± 100
S 1275	#5, M6	25,900 ± 300
S 1276	#6, Soil depression, SE of cement slab	3,600 ± 200
S 1277	#7, J4	14,400 ± 300

Note: Samples were collected on April 28, 1981.

Table 18

Gross Alpha Activity, Radium Concentrations, and Uranium Concentrations
in New Public Water Supplies

Sample No.	Location	Date Collected	Date Received	Gross alpha, pCi/l	Ra-226, pCi/l	Ra-228, pCi/l	Uranium, pCi/l
WX 383	Corinth Woods	1/20/81 2/17/81	1/26/81 2/23/81	8 ± 2 ---	0.1 ---	--- <1	--- 4
WX 387	Suburban MHP Tift Co.	1/19/81	2/3/81	11 ± 2	7.0	*	<1
WX 408	Harris Co., Well #2	2/17/81	2/23/81	5 ± 2	1.4	1	5
WX 409	City of Dawsonville	2/13/81	2/23/81	8 ± 3	0.7	<1	in process
WX 417	Tall Timbers S/D, Well #4	2/26/81	3/30/81	8 ± 2	0.2	in process	
WX 422	Tall Timbers S/D, Well #1	2/26/81	3/30/81	17 ± 3	0.8	in process	
WX 423	Tall Timbers S/D	2/26/81	3/30/81	5 ± 1	<0.1	in process	
WX 432	Woodland Valley S/D	2/26/81	3/30/81	6 ± 2	in process		
WX 436	City of Ailey	4/2/81	4/6/81	260 ± 30	250	---	---
WX 437	City of Yatesville Alpine Well #3	3/30/81	4/6/81	1 ± 1	---	---	---
WX 438	City of Grovetown Well #12	4/1/81	4/7/81	4 ± 1	in process		
WX 439	Town of Maxeys Well #2	4/15/81	4/15/81	25 ± 2	1.4	<2	12

Table 18 (continued)

<u>Sample No.</u>	<u>Location</u>	<u>Date Collected</u>	<u>Date Received</u>	<u>Gross alpha, pCi/l</u>	<u>Ra-226, pCi/l</u>	<u>Ra-228, pCi/l</u>	<u>Uranium, pCi/l</u>
WX 440	Brookwood Estates Oconee Co. Well #2	4/10/81	4/15/81	<2	---	---	---
WX 441	City of Perry Well #1 (replacement)	4/8/81	4/15/81	3 ± 1	---	---	---
WX 442	Carr's Circle C Ranch Oconee Co. Well #1	4/3/81	4/15/81	<1	---	---	---

* additional sample requested

Table 19
Radium-226 Concentrations in Water
from Private Wells near Alamo

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Ra-226, pCi/l</u>
WX 17	#110	3 ± 2	0.4
WX 23	#128	5 ± 3	3.7
WX 24	#130	5 ± 3	1.8
WX 37	#107	4 ± 3	6.8
WX 48	#12	5 ± 2	5.3
WX 49	#13	5 ± 3	3.6
WX 51	#34	3 ± 2	3.6
WX 90	#3	6 ± 3	1.1
WX 182	William S. Clark; Alamo	3 ± 3	3.9
WX 190	Billie Owens, Alamo	4 ± 3	4.1

Table 20

Fallout from Chinese Atmospheric Nuclear Test of
October 16, 1980, Airborne Particles - State Building Samples

Sample No.	Sample date, 1981	Gross beta, pCi/m ³	Radionuclide concentration, fCi/m ³						
			Be-7	Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144
S 1020	March 30 - April 21	0.26	65	42	80	20	2	8	28
S 1472	April 21 - April 30	0.28	42	19	36	8	1	4	15

-
- Notes: 1. Gross beta activity was measured 6 hours after collection and includes of Rn-220 daughters. Be-7 is also of natural origin. Among the shorter-lived fission products that were searched for are I-131 and Ba-140.
2. The filters are 12.5-cm-dia. charcoal-impregnated pads.

Table 21

Fallout from Chinese Atmospheric Nuclear Test
in Rainwater

<u>Sample No.</u>	<u>Sampling date, 1981</u>	<u>Location</u>	<u>Gross beta, pCi/l</u>	<u>Fission products concentration, pCi/l</u>
S 1021	4/21/81	State Health Bldg.	16 ± 2	<30

-
- Notes: 1. The radionuclides listed in Table 20 were measured; none were found at the indicated minimum detectable level.
2. A sample of 500 ml was analyzed.



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ET Project #
E-16-600

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF INTERDISCIPLINARY PROGRAMS
205 OLD CIVIL ENGINEERING BUILDING
ATLANTA, GEORGIA 30332

ENVIRONMENTAL RESOURCES CENTER
(404) 894-2375

BIOENGINEERING CENTER
(404) 894-2375

M E M O R A N D U M

DATE: June 21, 1981

TO: Mr. William Cline, Program Manager
Environmental Radiation Program, EPD, DNR

FROM: Bernd Kahn, Director
Environmental Resources Center

SUBJECT: Monthly Report of Activities for the State by the Environmental
Radiation Laboratory, May 1981

The results of radionuclide analyses are reported for the following sample types that were processed this month:

Environmental monitoring at nuclear facilities by DNR staff	Tables 1-13
Monitoring by DNR staff at other locations	Table 14
Monitoring by DNR Staff	Table 15
Monitoring by DNR staff of Community Water Systems	Tables 16-18
Monitoring fallout	Tables 19-20

Of the samples collected in the environment at nuclear facilities, only water from a community system downstream from the Savannah River Plant contained elevated radioactivity levels (tritium) attributed to the facility (Table 8). A wastewater sample from the Georgia Tech Nuclear Reactor Center also contained detectable radioactivity due to the facility (Table 7). All other radionuclides reported in Tables 1 - 13 are attributed to fallout or the natural radiation background. Fallout from the October 16, 1980, test of a nuclear device in the atmosphere by mainland China is still observable in soil and vegetation samples. Natural radioactivity is reported in the soil samples to establish background levels. All samples collected for the NRC project are indicated by asterisks in the appropriate tables.

Smears collected at an airfreight carrier terminal in Atlanta that were examined for I-125 by liquid scintillation counting were all at background level (Table 14). A control smear examined for H-3 to compare with previously analyzed samples indicated in Table 15 that one of the smears was somewhat above background and that a second smear may be above background.

An additional sample from a community water system that had elevated Ra-226 and U activity in quarterly composites confirmed this observation

(Table 16). Additional grab samples from new community water systems were analyzed for gross alpha activity and, if elevated, for specific alpha-emitting radionuclides (Table 17). Private wells from the Alamo area also continue to be analyzed for Ra-226 levels; as indicated in Table 18, one additional sample with very high Ra-226 activity was found.

The concentrations of airborne fallout radionuclides remained relatively high, as shown in Table 19. If the atmospheric nuclear test in China last October is the only source of radionuclides with half lives of 30 to 65 days, then these levels are attributable to the spring rise in fallout. These elevated levels are also seen in Table 1. No radioactivity was found in rainwater (Table 20) at the indicated minimum detectable levels.

A method for determining Sr-90 in milk that is too soured to be analyzed by the ion-exchange column procedure was applied to several samples. This method, in which the ion-exchange resin is stirred in the milk and then placed on top of the column, will be used in the future. Low yields in the analysis of Sr-90 in milk from the Hatch nuclear power plant were examined in test samples; they were attributed to very high levels of sodium bisulfite added for preservation by utility staff. A change in preservatives will be requested, because much lower amounts of other preservatives are required according to published evaluations.

Table 1

Radioactivity Levels in Quarterly Composite Air Filters
from the Environment of the Hatch Nuclear Plant

Samples No.	Location	Dates, 1981	Volume, m ³	Radionuclide concentration, fCi/m ³					
				Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144
B 313,* 321*	317,* Substation	Jan-Mar	870	26	49	20	<2	19	13
B 311,* 323*	315,* Plant Hatch	Jan-Mar	870	10	16	9	<2	<8	<7

-
- Notes: 1. Three filters collected successively at the same location were analyzed by gamma-ray spectrometry. See earlier reports for gross beta activity in individual filters and collection dates.
2. No other photon-emitting radionuclides were detected except naturally occurring Be-7. Decay was computed from midpoint of period.

Table 2

Radioactivity Levels in Air Samples from the
Environment of the Hatch Nuclear Plant

Sample No.	Sample type	Location	Volume, m ³	Radionuclide concentration, pCi/m ³	
				I-131	Gross beta
B 363*	Cartridge	Substation	272	<0.02	---
B 364*	Paper filter	Substation	272	---	0.13
B 365*	Cartridge	Plant	272	<0.02	---
B 366*	Paper filter	Plant	272	---	0.05

-
- Notes: 1. Samples were collected on May 11, 1981, after 7-day sampling.
2. No other photon-emitting radionuclides were detected in the cartridges.

Table 3

Radioactivity Levels in American Shad Sample
from the Environment of the Hatch Nuclear Plant

<u>Sample #</u>	<u>Location</u>	<u>Cs-137 concentration, pCi/kg</u>
B 367*	Discharge	<20

-
- Note: 1. Sample was collected by Georgia Power Co. staff on March 17, 1981 in the Altamaha River.
2. No other man-made photon-emitting radionuclides were detected.

Table 4

Radioactivity Levels in Air Samples from the
Environment in Georgia of the Farley Nuclear Plant

Sample No.	Sample type	Location	Volume, m ³	Radionuclide concentration, pCi/m ³	
				I-131	Gross beta
F 310*	Cartridge	Water Tower	1048	<0.01	---
F 311*	Paper filter	Water Tower	1048	---	0.13
F 312*	Cartridge	Great South- ern Airport	1028	<0.01	---
F 313*	Paper filter	Great South- ern Airport	1028	---	0.13

-
- Notes: 1. Samples were collected on May 14, 1981, after 7-day sampling.
2. No other photon-emitting radionuclides were detected in the cartridges.

Table 5

Radioactivity Levels in Soil Samples from the
Environment at the Georgia Tech Research Reactor Center

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	K-40	Ra-226	Ra-228
GT 80	TLD #2	170	330	<70	350	<100	11,800	1,200	1,300
GT 81	TLD #5	210	290	<70	420	<100	15,500	2,100	1,200
GT 82	TLD #8	200	480	91	1,240	<100	17,100	1,300	1,000
GT 83	TLD #11	240	440	89	460	<100	10,800	1,200	1,100

-
- Notes: 1. Samples were collected May 22, 1981.
2. No other man-made photon-emitting radionuclides were detected.

Table 6

Radioactivity Levels in Grass Samples from the
Environment at the Georgia Tech Research Reactor Center

Sample No.	Location	Radionuclide concentration, pCi/kg						
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144	Be-7
GT 84	TLD #2	120	200	<60	<60	<90	220	560
GT 85	TLD #5	240	600	110	46	150	650	1,200
GT 86	TLD #8	180	330	42	33	750	360	450
GT 87	TLD #11	130	340	<60	<40	<80	360	520

- Notes: 1. Samples were collected May 22, 1981.
2. No other man-made photon-emitting radionuclides were detected. Be-7 is formed in nature.

Table 7
Radioactivity Levels in Waste Water at the
Georgia Tech Research Reactor Center

<u>Sample No.</u>	<u>Radioactivity concentration, pCi/l</u>							
	<u>Gross alpha</u>	<u>Gross beta</u>	<u>H-3</u>	<u>Co-60</u>	<u>Sr-89</u>	<u>Sr-90</u>	<u>Cs-134</u>	<u>Cs-137</u>
GT 76	--	--	--	--	<5	56	--	--
GT 88	<6	280 ± 20	128,000 ± 1000	170	in process		37	81

Note: Sample GT 88 was collected on May 22, 1981; other values for sample GT 76 were reported in the February, 1981 Monthly Report.

Table 8

Radioactivity Levels in Water Sample from the
Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>
SR 255	I&D Water Supply Port Wentworth	<2	4 ± 1	3,700 ± 200

-
- Notes: 1. Sample was collected on May 12, 1981.
2. No man-made photon-emitting radionuclides were detected
(Cs-137 <20 pCi/l).

Table 9

Radioactivity Levels in Soil Samples from the
Environment in Georgia of the Savannah River Plant

Sample No.	Location	Radionuclide concentration, pCi/kg					
		Zr-95	Nb-95	Cs-137	K-40	Ra-226	Ra-228
SR 256	TLD #1	<100	94	300	2,400	500	600
SR 257	TLD #7	<100	150	430	200	900	800
SR 258	TLD #10	<100	<60	110	2,600	<200	600
SR 259	TLD #11	<100	<60	240	1,000	600	700
SR 260	TLD #15	<100	120	200	9,400	1,100	800
SR 261	TLD #16	<100	110	<50	800	1,300	1,200
SR 262	TLD #20	190	310	280	2,300	1,000	1,200
SR 263	TLD #22	<100	<60	410	1,300	700	700
SR 264	TLD #25	<100	<60	360	2,100	900	600

-
- Notes: 1. Samples were collected on May 27, 1981.
2. No other photon-emitting radionuclides were detected (Ru-103, <60 pCi/kg; Ce-141, <100 pCi/kg).

Table 10

Radioactivity Levels in Vegetation Samples from the
Environment in Georgia of the Savannah River Plant

Sample No.	Location	Radionuclide concentration, pCi/kg						
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144	Be-7
SR 265	TLD #1	64	170	<30	<30	<40	<160	<300
SR 266	TLD #7	430	890	86	76	150	1,050	1,200
SR 267	TLD #8	<30	28	<20	20	<30	<100	<200
SR 268	TLD #10	260	460	104	73	110	490	650
SR 269	TLD #11	280	720	110	77	120	780	1,200
SR 270	TLD #15	73	150	<30	<30	<40	140	230
SR 271	TLD #16	230	430	73	30	43	530	470
SR 272	TLD #17	680	1,400	150	550	150	1,100	1,200
SR 273	TLD #20	91	130	110	64	210	1,040	2,200
SR 274	TLD #22	590	1,300	120	120	220	1,200	2,000
SR 275	TLD #25	180	430	53	24	53	380	510

Notes: 1. Samples were collected May 27, 1981.

2. No other man-made photon-emitting radionuclides were detected. Be-7 is formed in nature.

Table 11

Radioactivity Levels in Water Samples
from the Environment in Georgia of the Savannah River Plant

Sample No.	Location	Gross alpha, pCi/l	Gross beta, pCi/l	Tritium, pCi/l
SR 276	TLD #10 rainwater	<3	35 ± 4	<200
SR 277	Augusta - Bush Field rainwater	<2	29 ± 4	<200
SR 278	TLD #10 - Savannah River	<1	3 ± 1	<200
SR 279	TLD #11 - Savannah River	<1	3 ± 1	<200
SR 280	TLD #16 - Savannah River, Griffin Land'g	<2	4 ± 2	700 ± 100
SR 281	Savannah River - New Savannah Lock & Dam	<1	3 ± 1	<200
SR 282	TLD #17 - Savannah River, Stoney Bluff	<2	3 ± 1	2300 ± 200
SR 283	Savannah River, U.S. 301 bridge	<1	3 ± 1	3400 ± 200
SR 284	TLD #15 - Savannah River, Brighams Land'g	<1	3 ± 1	900 ± 200
SR 285	TLD #25 - Standing lake water	<1	2 ± 1	800 ± 200
SR 286	TLD #1 - GA Welcome Station, I-20, Augusta	<1	2 ± 1	<200
SR 287	TLD #17 - Stoney Bluff Store	<2	4 ± 2	<200
SR 288	TLD #25 - City of Waynesboro	<1	2 ± 1	<200
SR 289	GA Welcome Station, U.S. 301, 400' well	<2	6 ± 2	<200
SR 290	Vogtle Security Office	<2	1 ± 1	<200
SR 291	Store at Girard	<2	2 ± 1	<200

- Notes:
1. Samples were collected on May 27, 1981.
 2. Samples SR 278 - SR 285 are surface waters; others are ground waters.
 3. Rainwater samples SR 276 and 277 did not contain detectable levels of photon-emitting radionuclides (Cs-137 <10 pCi/l).

Table 12

Iodine-131 Level in Water Sample from the
Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	<u>I-131, pCi/l</u>
SR 283	Savannah River at U.S. 301	<0.1

Note: Sample was collected on May 28, 1981.

Table 13

Radioactivity Levels in Water Samples from
the Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	<u>Sr-89, pCi/l</u>	<u>Sr-90, pCi/l</u>
SR 212	Steel Creek on controlled area	<5	<2
SR 213	Brier Creek on controlled area	<5	<2
SR 214	Swiftgut North End	<5	<2
SR 215	Upper Smith Lake Creek	<5	<2
SR 216	Lower Three Runs Creek	<5	<2

-
- Notes: 1. Samples were collected on February 23, 1981.
2. Values for gross alpha, gross beta and tritium were reported in the February 1981 Monthly Report.

Table 14

Radioactivity in Smears from
Profit by Air, Atlanta

<u>Sample No.</u>	<u>Identification</u>	<u>I-125, pCi/100cm²</u>
S 1489	Control Q-tip	5 ± 1
S 1490	Broken vials & box Q-tip	<5
S 1491	Inner Pak Vials #1 - Q-tip	<5
S 1492	Inner Pak Vials #2 - Q-tip	<5
S 1493	Inner Pak #1 - Q-tip	<5
S 1494	Inner Pak #2 - Q-tip	<5
S 1495	Outside Pak - smear	<5
S 1496	Inner Pak - smear	<5

Note: Samples were collected on April 7, 1981.

Table 15

Radioactivity in Smears from NIPRO, Augusta

<u>Sample No.</u>	<u>Identification No.</u>	H-3, <u>pCi/100cm²</u>
S 870	Smear I	4 ± 3
S 871	Smear II	18 ± 3
S 872	Smear III	11 ± 10
S 1501	Control	<6

-
- Notes: 1. Samples were collected on March 10, 1981 by DHR staff.
2. Results for samples S 870 - S 872 are in the March 1981 Monthly Report.

Table 16

Gross Alpha Activity, Radium Concentrations, and Uranium Concentrations in Georgia Public Water Supplies -- Grab Sample of Supply for which Annual Composite had Elevated Levels

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Ra-226, pCi/l</u>	<u>Ra-228, pCi/l</u>	<u>Uranium, pCi/l</u>
WX 413	Seminole MHP	31 ± 4	9.6	<2	25

Note: Results of gross alpha and radium analyses are in the March 1981 Monthly Report.

Table 17

Gross Alpha Activity in New Public Water Supplies

<u>Sample No.</u>	<u>Location</u>	<u>Date Collected</u>	<u>Date Received</u>	<u>Gross alpha, pCi/l</u>	<u>Ra-226, pCi/l</u>	<u>Ra-228, pCi/l</u>	<u>Uranium, pCi/l</u>
WX 409	City of Dawsonville	2/13/81	2/23/81	(1)	(1)	(1)	<2
WX 417	Tall Timbers S/D Well #4	2/26/81	3/30/81	(1)	(1)	(2)	9
WX 422	Tall Timbers S/D Well #1	2/26/81	3/30/81	(1)	(1)	(2)	10
WX 423	Tall Timbers S/D Well #2	2/26/81	3/30/81	(1)	(1)	(2)	4
WX 432	Woodland Valley S/D	2/26/81	3/30/81	6 ± 2	0.8	---	---
WX 438	City of Grovetown Well #12	4/1/81	4/7/81	4 ± 1	1.3	---	---
WX 443	Fort Mountain Estates Well #4	4/27/81	5/1/81	<1	---	---	---
WX 444	Birchmore Hills S/D	4/27/81	5/5/81	<2	---	---	---
WX 445	City of Luthersville Well #2	4/29/81	5/12/81	2 ± 1	---	---	---
WX 447	Sycamore Mobile Village Well #1	4/30/81	5/12/81	<1	---	---	---
WX 448	B & D MHP Well #2	5/18/81	5/22/81	<2	---	---	---
WX 449	Green Tree Acres Well #1	5/26/81	5/28/81	3 ± 1	---	---	---

Table 17 (continued)

<u>Sample No.</u>	<u>Location</u>	<u>Date Collected</u>	<u>Date Received</u>	<u>Gross alpha, pCi/l</u>	<u>Ra-226, pCi/l</u>	<u>Ra-228, pCi/l</u>	<u>Uranium, pCi/l</u>
WX 450	Town of Shady Dale Well #1	5/11/81	5/28/81	2 ± 1	---	---	---
WX 451	City of Colquitt Well #3	5/21/81	5/29/81	<2	---	---	---
WX 452	City of Woodville Well #2	5/28/81	6/1/81	3 ± 1	---	---	---
WX 453	City of Ailey Well #2	5/30/81	6/1/81	<2	---	---	---

Notes: 1. Results were in the April 1981 Monthly Report.
 2. Additional sample has been requested.

Table 18
Radium-226 Concentrations in Water from
Private Wells Near Alamo

Sample No.	Location	Gross alpha, pCi/l	Ra-226, pCi/l
WX 1	#2	4 ± 3	1.3
WX 3	#11	6 ± 3	1.1
WX 22	#127-S	5 ± 3	2.8
WX 50	#23	3 ± 2	5.9
WX 67	#143	6 ± 2	4.8
WX 70	#26	108 ± 12	115.
WX 74	#113	4 ± 2	7.2
WX 89	#1	3 ± 2	0.2
WX 92	#5	6 ± 3	0.9
WX 130	Frank Thompson; Alamo	3 ± 3	5.2
WX 170	Mattie Stevenson; Alamo	3 ± 2	2.3
WX 179	W. Preston White; Alamo	10 ± 4	9.2
WX 195	R.H. Braswell; Alamo	5 ± 3	3.7
WX 212	Bill Bibb; Mt. Vernon	3 ± 3	1.8
WX 214	Rick Towns; Alamo	4 ± 3	1.2
WX 224	J.W. Thompson, Mt. Vernon	4 ± 2	1.5
WX 251	Richard Cravey; Alamo	5 ± 4	3.2
WX 268	Charles Goodowns; Ailey	5 ± 3	1.9

Note: Gross alpha results for samples WX 70 and 179 are remeasured values.

Table 19

Fallout from Chinese Atmospheric Nuclear Test of
October 16, 1980, Airborne Particles - State Building Samples

Sample No.	Sample date, 1981	Volume, m ³	Gross beta, pCi/m ³	Radionuclide concentration, fCi/m ³						
				Be-7	Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144
S 1486	April 30 - May 14	1914	0.26	61	36	78	14	2	5	28
S 1506	May 14 - May 26	2566	0.16	41	17	33	7	2	3	14

-
- Notes: 1. Gross beta activity was measured 6 hours after collection and includes Rn-220 daughters. Be-7 is also of natural origin. Among the shorter-lived fission products that were searched for are I-131 and Ba-140.
2. The filters are 12.5-cm-dia. charcoal-impregnated pads.

Table 20

Fallout from Chinese Atmospheric Nuclear Test
in Rainwater

<u>Sample No.</u>	<u>Sampling date, 1981</u>	<u>Location</u>	<u>Gross beta, pCi/l</u>	<u>Fission products concentration, pCi/l</u>
S 1485	5/11/81	State Health Bldg.	51 ± 4	<20

-
- Notes: 1. The radionuclides listed in Table 19 were measured; none were found at the indicated minimum detectable level.
2. A sample of 500 ml was analyzed.



E-26-66

GEORGIA INSTITUTE OF TECHNOLOGY
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(404) 894-2375

BIOENGINEERING CENTER
(404) 894-2375

M E M O R A N D U M

DATE: July 21, 1981

TO: Mr. William Cline, Program Manager
Environmental Radiation Program, EPD, DNR

FROM: Bernd Kahn, Director *Bernd Kahn*
Environmental Resources Center

SUBJECT: Monthly Report of Activities for the State by the Environmental
Radiation Laboratory, June 1981

The results of radionuclide analyses are reported for the following sample types that were processed this month:

Environmental monitoring at nuclear facilities by DNR staff	Tables 1-26
Monitoring by DNR staff at other locations	Tables 27-28
Monitoring by DNR staff	Tables 29-31
Monitoring by DNR staff of Community Water Systems	Tables 32-34
Monitoring fallout	Tables 35-36

Of the samples collected in the environment at nuclear facilities, the following contained radioactivity attributed to the facility:

Table 9, Co-60 and Eu-152 in soil at the Dawson Forest area
Table 24, H-3 in water supply downstream from Savannah River
Plant.

All other radionuclides in Tables 1-14 and 16-26 are attributed to fallout or the natural radiation background. Fallout from the October 16, 1980, test of a nuclear device in the atmosphere by China is still observable in airborne particle, soil and vegetation samples. Natural radioactivity in soil samples is reported to establish background levels. All samples collected for the NRC project are indicated by asterisks in the appropriate tables.

Radioactivity levels in some water samples submitted to DNR were below MCLs, as shown in Table 27. Smears of materials in a suitcase collected at a trailer park by DNR staff contained elevated levels attributed, in the case of the highest values, to uranium (see Table 28).

Soil samples submitted by DHR staff contained only fallout and naturally occurring radionuclides (Table 29). Water samples were analyzed for gross alpha and beta particle activity for DHR staff. Where these exceed MCLs for community water supplies (see Tables 30 and 31), radium analyses are being performed.

Additional composites of samples from community water systems have been analyzed (Table 32); three samples are being analyzed for radium content because of elevated gross alpha particle activity. Gross alpha particle activity is also being determined in grab samples from a supply that showed elevated levels in its composite (Table 33) and from new supplies (Table 34).

The concentrations of fallout radionuclides remained detectable in airborne particles, as shown in Table 35. No activity could be found in rainwater (Table 36) at the available detection sensitivity.

Table 1

Radioactivity Levels in Water Samples
from the Environment of the Hatch Nuclear Plant

<u>Sample #</u>	<u>Location</u>	<u>Cs-137 concentration, pCi/l</u>
B 326*	#172	<10
B 327*	#170	<10

-
- Notes:
1. Samples were composites collected December 24, 1980 - March 25, 1981.
 2. Other analyses are given in Monthly Report for April 1981, Table 1.
 3. No other photon-emitting radionuclides were detected.

Table 2

Radioactivity Levels in Milk Samples from
the Environment of the Hatch Nuclear Plant

Sample #	Location	Sr-89, pCi/l	Sr-90, pCi/l	Cs-137, pCi/l	K, g/l	H-3, pCi/l	I-131, pCi/l
B 328*	Sellers Dairy	5	2	---	---	---	---
B 329*	Georgia State Prison	<5	3	---	---	---	---
B 330*	Williamson Dairy	9	10	---	---	---	---
B 361	Sellers Brothers	<5	<2	---	---	---	---
B 362	Johnson Brothers	<5	<2	---	---	---	---
B 375*	Johnson Brothers	<5	<2	<10	1.6	<200	<0.1
B 376*	Georgia State Prison	<5	3	<10	1.5	300 ± 200	<0.1

-
- Notes: 1. Values for Cs-137, K, and H-3 for samples B 328, 329, 330, 361 and 362 were given in the Monthly Report for April, 1981, Table 2.
2. Samples B 375 and 376 were collected June 22, 1981.
3. No Ba-140 was detected (<15 pCi/l).

Table 3

Radioactivity Levels in Air Samples from the
Environment of the Hatch Nuclear Plant

Sample No.	Sample type	Location	Volume, m ³	Radionuclide concentration, pCi/m ³	
				I-131	Gross beta
B 368*	Cartridge	Substation	272	<0.02	---
B 369**	Paper filter	Substation	272	---	0.06
B 370*	Cartridge	Plant	272	<0.02	---
B 371*	Paper filter	Plant	272	---	0.02

-
- Notes: 1. Samples were collected on June 17, 1981, after 7-day sampling.
2. No other photon-emitting radionuclides were detected in the cartridges.

Table 4

Radioactivity Levels in Grass Samples from the
Environment of the Hatch Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg						
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144	Be-7
B 372*	Station #5	230	390	<70	104	<90	<300	1,500
B 373*	Station #17	67	140	<30	45	<40	<130	320
B 374*	Station #21	150	360	<70	<60	<90	470	510

- Notes: 1. Samples were collected on June 18, 1981.
2. No other man-made photon-emitting radionuclides were detected. Be-7 is formed in nature.

Table 5

Radioactivity Levels in Clam Samples
from the Environment of the Hatch Nuclear Plant

<u>Sample #</u>	<u>Location</u>	<u>Cs-137 concentration, pCi/kg</u>
B 377*	HNP #170	<20
B 378*	HNP #172	21

-
- Notes: 1. Samples were collected by Georgia
Power staff on May 28, 1981.
2. No other photon-emitting radionuclides
were detected.

Table 6
Radioactivity Levels in Sediment Samples from the
Environment of the Hatch Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg					
		Zr-95	Nb-95	Cs-137	K-40	Ra-226	Ra-228
B 379*	HNP #170	130	260	<40	6,600	900	800
B 380*	HNP #172	260	590	200	7,000	1,300	1,000

Notes: 1. Samples were collected on May 28, 1981 by Georgia Power staff.
2. No other man-made photon-emitting radionuclides were detected.

Table 7

Radioactivity Levels in Water Samples from the
Environment of the Hatch Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>	<u>I-131 pCi/l</u>
B 381*	#170	<1	3 ± 1	<200	<0.1
B 382*	#172	<1	3 ± 1	<200	<0.1

- Notes:
1. Samples are composites collected June 3-24, 1981.
 2. No man-made photon-emitting radionuclides were detected (Cs-137 <20 pCi/l).

Table 8

Radioactivity Levels in Quarterly Composite Air Filters
from the Environment of the Hatch Nuclear Plant

<u>Samples No.</u>	<u>Location</u>	<u>Dates, 1981</u>	<u>Volume, m³</u>	<u>Radionuclide concentration, fCi/m³</u>						
				<u>Zr-95</u>	<u>Nb-95</u>	<u>Ru-103</u>	<u>Cs-137</u>	<u>Ce-141</u>	<u>Ce-144</u>	<u>Be-7</u>
B 358, 364, 369*	Substation	April-June	816	31	63	11	4	<8	35	46
B 360, 366, 371*	Plant Hatch	April-June	816	16	13	8	<2	<8	18	40

-
- Notes: 1. Three filters collected successively at the same location were analyzed by gamma-ray spectrometry. See earlier reports for gross beta activity in individual filters and collection dates.
2. No other photon-emitting radionuclides were detected. Decay was computed from midpoint of period.

Table 9

Radioactivity Levels in Soil Samples from the
Environment of the Dawson Forest Area

Sample No.	Location	Radionuclide concentration, pCi/kg								
		Co-60	Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	K-40	Ra-226	Ra-228
D 173	State Bkg TLD #17	<40	104	220	<50	110	<60	8,600	800	1,200
D 174	State Bkg TLD #18	<40	80	260	<50	<50	<60	8,500	800	1,100
D 175	TLD #4	<40	91	106	<50	101	64	9,600	1,600	1,000
D 176	TLD #5	320	<90	180	<50	<50	<60	2,100	200	200
D 177	End of road at COA	120	150	140	<50	<50	<60	8,200	800	800

-
- Notes: 1. Samples were collected on June 17, 1981.
2. No other photon-emitting radionuclides were detected except Eu-152 in sample D 176 (600 pCi/kg).

Table 10
Radioactivity Levels in Water Samples from the
Environment of the Dawson Forest Area

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>
D 178	Morgan residence ground water	3 ± 2	<3	<200
D 179	Anglin residence ground water	4 ± 3	4 ± 2	<200
D 180 *	Morgan residence surface water	<3	<3	<200
D 181	Anglin residence surface water	2 ± 2	2 ± 2	<200
D 182	Etowah R., upstream	<2	<2	<200
D 183	Etowah R., downstream	<3	<3	<200
D 184	Creek at TLD #5	<2	<3	<200

Note: 1. Samples were collected on June 17, 1981.

Table 11

Radioactivity Levels in Grass Samples from the
Environment of the Dawson Forest Area

Sample No.	Location	Radionuclide concentration, pCi/kg						
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144	Be-7
D 185	TLD #5	90	190	<20	<20	34	210	610
D 186	State Bkg TLD #17	140	260	<40	<50	46	350	710
D 187	State Bkg TLD #18	490	540	170	81	160	1,400	3,600
D 188	End of road at COA	63	250	<40	<40	<50	320	270

- Notes: 1. Samples were collected on June 17, 1981.
2. No other photon-emitting radionuclides were detected. Be-7 is formed in nature.

Table 12

Radioactivity Levels in Quarterly Composite Air Filters
from the Environment in Georgia of the Farley Nuclear Plant

Samples No.	Location	Dates, 1981	Volume, m ³	Radionuclide concentration, fCi/m ³							
				Zr-95	Nb-95	Ru-103	Ru-106	Cs-137	Ce-141	Ce-144	Be-7
F 291, 311, 315*	Blakely Water Tower	April-June	3148	32	64	12	16	2	7	35	75
F 293, 313, 317*	Great South- ern Airport	April-June	3111	30	60	17	19	3	7	39	82

-
- Notes: 1. Three filters collected successively at the same location were analyzed by gamma-ray spectrometry. See earlier reports for gross beta activity in individual filters and collection dates.
2. No other photon-emitting radionuclides were detected. Decay was computed from midpoint of period.

Table 13

Radioactivity Levels in Air Samples from the
Environment in Georgia of the Farley Nuclear Plant

Sample No.	Sample type	Location	Volume, m ³	Radionuclide concentration, pCi/m ³	
				I-131	Gross beta
F 314*	Air cartridge	Blakely Water Tower	1064	<0.006	---
F 315*	Filter paper	Blakely Water Tower	1064	---	0.028
F 316*	Air cartridge	Great South- ern Airport	1050	<0.006	---
F 317*	Filter Paper	Great South- ern Airport	1050	---	0.029

-
- Notes: 1. Samples were collected on June 11, 1981, after 7-day sampling.
2. No photon-emitting radionuclides were detected in the cartridges.

Table 14

Radioactivity Levels in Water Samples from the
Environment in Georgia of the Farley Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>
F 318* 1st quarter	upstream	<1	2 ± 1	<200
F 319* 1st quarter	downstream	<1	2 ± 1	<200
F 320* 2nd quarter	upstream	<1	3 ± 1	<200
F 321* 2nd quarter	downstream	<1	<2	<200

-
- Notes: 1. Samples were collected by Alabama Power Co.
staff.
2. No photon-emitting radionuclides were detected
(Cs-137 <20 pCi/l).

Table 15

Radioactivity Levels in Waste Water Sample from
the Georgia Tech Research Reactor Center

<u>Sample No.</u>	<u>Sr-89, pCi/l</u>	<u>Sr-90, pCi/l</u>
GT 88	<5	4

-
- Notes: 1. Strontium analysis was performed on a filtered aliquot.
2. Other values are given in the Monthly Report for May 1981, Table 7.

Table 16

Radioactivity Levels in Soil Samples from the
Environment in Georgia of the Oconee Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	K-40	Ra-226	Ra-228
LH 75	State Bkg. #19	<100	150	<70	230	<100	16,500	1,500	2,000
LH 76	State Bkg. #21	64	110	<50	71	<60	4,300	900	600
LH 77	TLD #1	220	450	<50	750	<60	11,100	2,100	2,200
LH 78	Hartwell Marina	180	320	<50	64	<60	9,400	400	500
LH 79	TLD #9	170	330	<50	120	<60	23,900	900	1,000

-
- Notes: 1. Samples were collected on June 24, 1981.
2. No other man-made photon-emitting radionuclides were detected.

Table 17

Radioactivity Levels in Grass Samples from the
Environment in Georgia of the Oconee Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg						
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144	Be-7
LH 80	State Bkg #19	1,100	2,500	190	210	330	3,800	3,400
LH 81	State Bkg #21	75	270	27	<20	<30	260	790
LH 82	TLD #1	210	420	38	37	<50	470	1,200
LH 83	Hartwell Marina	160	270	<60	<40	<50	400	780
LH 84	TLD #9	130	310	52	41	51	410	1,100

- Notes: 1. Samples were collected on June 24, 1981.
2. No other photon-emitting radionuclides were detected. Be-7 is formed in nature.

Table 18

Radioactivity Levels in Water Samples from the
Environment in Georgia of the Oconee Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>
LH 85	TLD #1 surface water	<2	<3	<200
LH 86	TLD #1 ground water	<2	2 ± 2	<200
LH 87	Hartwell Marina surface water	<2	2 ± 1	<200
LH 88	TLD #3 ground water	9 ± 3	5 ± 2	<200
LH 89	TLD #9 Chatooga River	<2	<2	<200

Note: 1. Samples were collected on June 24, 1981.

Table 19

Radioactivity Levels in Soil Samples from the
Environment in Georgia of the Sequoyah Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	K-40	Ra-226	Ra-228
SQ 26	State Bkg TLD #14	<100	340	<60	<60	<80	13,500	1,200	1,100
SQ 27	State Bkg TLD #15	103	240	<60	<60	<80	3,700	1,000	1,400
SQ 28	TLD #3	110	260	44	44	<50	2,800	700	700
SQ 29	TLD #5	170	420	81	63	<50	2,200	<200	<200
SQ 30	TLD #9	95	260	41	360	<50	4,000	800	800
SQ 31	TLD #11	<60	72	<40	<40	<50	5,200	600	600

Notes: 1. Samples were collected on June 10, 1981.
2. No other man-made photon-emitting radionuclides were detected.

Table 20

Radioactivity Levels in Grass Samples from the
Environment in Georgia of the Sequoyah Nuclear Plant

Sample No.	Location	Radionuclide concentration, pCi/kg						
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	Ce-144	Be-7
SQ 32	State Bkg TLD #14	130	210	34	<30	42	270	740
SQ 33	State Bkg TLD #15	71	240	<40	<30	<40	<180	800
SQ 34	State Bkg TLD #16	110	210	<40	<40	<60	<200	630
SQ 35	TLD #3	230	350	<40	<40	<60	400	1,200
SQ 36	TLD #5	240	510	72	63	46	470	1,400
SQ 37	TLD #9	120	250	30	<30	31	280	840
SQ 38	TLD #11	220	360	52	41	76	460	1,700

- Notes: 1. Samples were collected on June 10, 1981.
 2. No other photon-emitting radionuclides were detected. Be-7 is formed in nature.

Table 21

Radioactivity Levels in Water Samples from the
Environment in Georgia of the Sequoyah Nuclear Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>
SQ 39	GA Welcome Ctr. on I-75	<1	<2	<200
SQ 40	TLD #9; Patterson residence	<3	2 ± 2	<200
SQ 41	TLD #10; Bryant's store	<1	2 ± 1	<200
SQ 42	Tiger Creek at GA 2	<1	4 ± 1	<200

-
- Notes: 1. Samples were collected on June 10, 1981.
2. SQ 42 is surface water; all others are ground water.

Table 22

Radioactivity Levels in Water Samples from
the Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	<u>Sr-89, pCi/l</u>	<u>Sr-90, pCi/l</u>
SR 184, 185 & 250	I & D Water Supply, Port Wentworth, GA	<5	<2

-
- Notes: 1. A composite was prepared using equal amounts of samples SR 184, 185, and 250.
2. These samples were collected in January, February and March 1981, respectively. Other results for these samples are given in the Monthly Reports for January, February and March 1981.

Table 23

Tritium Level of Cactus Plant Sample from the
Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	<u>H-3, pCi/l</u>
SR 267	TLD #8	500 ± 200

-
- Notes: 1. Other analysis are given in the Monthly
Report for May 1981, Table 10.
2. Water was distilled from sample to obtain
concentration of H-3 in water.

Table 24

Radioactivity Levels in Water Sample from the
Environment in Georgia of the Savannah River Plant

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>H-3, pCi/l</u>	<u>I-131, pCi/l</u>
SR 292	I & D Water Supply, Savannah	<2	3 ± 2	2,900 ± 200	<0.1

-
- Notes: 1. Sample was a 7-day composite collected June 2-9, 1981.
2. No man-made photon-emitting radionuclides were detected (Cs-137 <10 pCi/l).

Table 25

Radioactivity Levels in Milk Sample from
the Environment in Georgia of the Savannah River Plant

<u>Sample #</u>	<u>Location</u>	<u>Sr-89, pCi/l</u>	<u>Sr-90, pCi/l</u>	<u>Cs-137, pCi/l</u>	<u>K, g/l</u>	<u>H-3, pCi/l</u>	<u>I-131, pCi/l</u>
SR 293	Dixon Dairy	<5	3	<10	1.6	<200	<0.1

-
- Notes: 1. Sample was collected on June 18, 1981.
2. No other photon-emitting radionuclides were detected (Ba-140 <20 pCi/l).

Table 26

Radioactivity Levels in Water Samples from the
Environment in Georgia of the Savannah River Plant

Sample No.	Location	Gross alpha, pCi/l	Gross beta, pCi/l	H-3, pCi/l	I-131, pCi/l
SR 294	River 2	<2	<3	<200	<0.1
SR 295	River 10	<2	3 ± 2	3,200 ± 200	<0.1
SR 296	Perkins rainwater	---	---	<200	---
SR 297 *	Waynesboro rainwater	---	---	200 ± 200	---
SR 298	Augusta rainwater	---	---	300 ± 200	---
SR 299	Rt 301 rainwater	---	---	<200	---
SR 300	S. Richmond rainwater	---	---	<200	---

- Notes: 1. Samples SR 294 and 295 were collected June 16, 1981; sample SR 296 was collected for the period June 11-18, 1981, and all other samples were collected June 4-18, 1981.
2. Samples SR 294 and 295 did not contain detectable levels of man-made photon-emitting radionuclides (Cs-137 <10 pCi/l).

Table 27

Radioactivity Levels in Water Samples from
Jubilee Partners, Comer

Sample No.	Location	Gross alpha, pCi/l	Gross beta, pCi/l	Ra-226, pCi/l
S 1487	Well water	5 ± 2	3 ± 1	0.1
S 1488	Lake water	<1	5 ± 1	---

-
- Notes: 1. No collection date was given but samples were received at the laboratory on May 18, 1981.
2. Samples were not filtered in the laboratory.

Table 28

Radioactivity in Smears from Suitcase
at Clark's Trailer Park, Winder

Sample No.	Identification	Gross alpha, pCi/100cm ²	Gross beta, pCi/100cm ²	U-238, pCi/100cm ²
S 1549	Smear #1 - inside lining of suitcase	(2)	(2)	1,600
S 1550	Smear A - display container labelled strontium oxide	21 ± 1	21 ± 1	---
S 1551	Smear B - display container labelled strontium titanate	11 ± 1	10 ± 1	---
S 1552	Smear desk area - mobile lab work area	33 ± 2	46 ± 1	---
S 1553	Smear BK - blank	2 ± 0.5	4 ± 0.5	---
S 1554	Smear #1-a	(2)	(2)	5,900

- Notes:
1. Samples were collected on June 19, 1981.
 2. Screening measurements indicated that samples S 1549 and 1554 had count rates too high for low-level counting. Gamma-ray spectrometry showed the presence of uranium (U-238 and U-235); the given values are based on the 1,000-keV Pa-234m gamma ray (0.6%).

Table 29

Radioactivity Levels in Soil Samples from
Private Homes and School in Denton

Sample No.	Location	Radionuclide concentration, pCi/kg							
		Zr-95	Nb-95	Ru-103	Cs-137	Ce-141	K-40	Ra-226	Ra-228
S 1521	Ms. Jimmie Nell Tate	<60	65	<40	220	<70	200	400	200
S 1522	Mr. Edward Dyal	<60	78	<40	270	<70	200	400	200
S 1523	Mr. Ernest Smith	<60	74	<40	140	<70	<200	400	<200
S 1524	Mrs. Ora Kight	<60	<50	<40	530	<70	700	500	200
S 1525	Excelsior School	<60	62	<40	330	<70	200	500	200
S 1526	Mr. Joe Kersey	<60	74	<40	200	<70	300	500	200
S 1527	Mr. Thomas Tate	<60	<40	<40	420	<70	300	500	<200
S 1528	Mr. Artie Sinclair	<60	73	<40	170	<70	200	600	<200

- Notes: 1. Samples were collected on June 1, 1981 by DHR staff.
2. No other man-made photon-emitting radionuclides were detected.

Table 30

Radioactivity Levels in Private Well
Water Samples from Denton

Sample No.	Location	Gross alpha, pCi/l		Gross beta, pCi/l		Ra-226, pCi/l
		U	F	U	F	
S 1513	Mr. Eugene Tate	<1	---	<2	---	---
S 1514	Mr. Edward Dyal	<1	---	3 ± 1	---	---
S 1515	Mr. Ernest Smith	3 ± 1	---	4 ± 1	---	---
S 1516	Mrs. Ora Kight	8 ± 2	3 ± 3	22 ± 3	22 ± 3	3.6
S 1517	Excelsior School	7 ± 2	7 ± 6	4 ± 1	<6	5.4
S 1518	Mr. Joe Kersey	4 ± 1	4 ± 3	6 ± 1	3 ± 2	1.0
S 1519	Mr. Thomas Tate	8 ± 3	6 ± 5	4 ± 1	<6	7.2
S 1520	Mr. Artie Sinclair	4 ± 2	5 ± 5	4 ± 1	4 ± 4	5.6

- Notes:
1. Samples were collected on June 1, 1981 by DHR staff.
 2. No photon-emitting radionuclides were detected in sample S 1516 (Cs-137 <10 pCi/l).
 3. Samples S 1516, S 1517, S 1519 and S 1520 are in process for Ra-228.
- U = unfiltered
F = filtered

Table 31
Radioactivity Levels in Water Samples
from Albany

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Gross beta, pCi/l</u>	<u>Ra-226, pCi/l</u>
S 1533	Well #18, corner Dawson & Westgate Rd.	<3	3 ± 2	---
S 1534	Lake Loretta well	<3	<3	---
S 1535	Lake Loretta surface water	<4	5 ± 2	---
S 1536	Residence - 1614 Lynwood Drive	5 ± 3	7 ± 2	<0.1
S 1537	Radium Springs surface water	<4	<4	---

Notes: 1. Samples were collected June 10-11, 1981 by DHR staff.
2. Sample S 1535 was filtered for gross alpha and beta analyses.

Table 32

Gross Alpha Activity in Georgia Community
Water Systems -- One-Year Quarterly Composites

Sample No.	Location	ID #	Gross alpha, pCi/l
WS 1612	Memory Springs MHP	302221969	2 ± 1
WS 1613	Hill Crest Acres S/D	302223354	2 ± 1
WS 1614	Red Barn Court	302823259	<1
WS 1615	Heardmont Health Care	405207938	<1
WS 1616	Pine Crest MHP	402904753	<1
WS 1617	Quarels MHP	306117307	<1
WS 1618	Oak Forest MHP	310722003	<1
WS 1619	Eastanollee MHP	412721030	2 ± 1
WS 1620	The Cove S/D	300522763	<3
WS 1621	Martinez Water Assoc.	303603737	11 ± 2 ^a
WS 1622	Trailwood Acres MHP	306921191	<1
WS 1623	Augusta Youth Development Ctr.	312110783	<2
WS 1624	Waters MHP	411018067	8 ± 1 ^a
WS 1625	Carey's MHP	312621726	2 ± 2
WS 1626	Brookwood Estates	310822745	<2
WS 1627	City of Allentown	315813601	10 ± 2 ^a
WS 1628	Castle Pines MHP	312110808	<2
WS 1629	Gate 5 MHP	312110835	<1
WS 1630	Buck Creek Acres	312421537	<2

Note: a. Ra-226 analyses are in process.

Table 33

Gross Alpha and Radium Concentration in Georgia Public Water
Supply -- Grab Sample of Supply for Which Annual Composite
Had Elevated Levels

<u>Sample No.</u>	<u>Location</u>	<u>Gross alpha, pCi/l</u>	<u>Ra-226, pCi/l</u>
WX 454	Tugaloo Bay Estates Jackson residence	4 ± 3	1.2

Table 34

Gross Alpha Activity in New Community Water Systems

Sample No.	Location	Date Collected	Date Received	Gross alpha, pCi/l
WX 455	Bear Creek SD	5/20/81	6/9/81	<2
WX 456	Talbot Co. Water System Oak Mountain Estates	6/1/81	6/9/81	<1
WX 458	Black Rock Mtn. State Park, Greasy Creek	6/5/81	6/9/81	<2
WX 459	Kings Harbor SD	6/1/81	6/9/81	<2
WX 460	Parkersburg Water System Well #2	5/28/81	6/9/81	<2
WX 461	City of Albany Well #33	6/4/81	6/9/81	<2
WX 462	Foxbow Farms SD, Lakeside Water Co. Well #1	6/10/81	6/15/81	<5
WX 463	Nunn's MHP, Well #1	6/4/81	6/18/81	<1
WX 464	City of Warner Robins Water Plant #1, AI new well	6/9/81	6/18/81	<2
WX 465	Ionian Creek Estates (MHP)	6/2/81	6/18/81	<1
WX 466	Hartford Water Assoc. Well #2	6/23/81	6/25/81	<3
WX 467	City of Waynesboro Well #1	6/22/81	6/25/81	<3
WX 468	Houston Co. Water System, Dunbar Rd.	6/19/81	6/29/81	<1
WX 469	City of Grovetown Well #12	6/16/81	6/29/81	3 \pm 1
WX 470	Houston Co. Water System, Quail Run	6/19/81	6/29/81	<1
WX 471	City of Dawsonville Well #3	6/23/81	6/29/81	18 \pm 3
WX 472	Georgia Power Company Plant Scherer	none given	6/29/81	<2

Note: Sample WX 471 is being analyzed for radium.

Table 35

Fallout from Chinese Atmospheric Nuclear Test of
October 16, 1980, Airborne Particles - State Building Samples

Sample No.	Sample date, 1981	Volume, m ³	Gross beta, pCi/m ³	Radionuclide concentration, fCi/m ³							
				Be-7	Zr-95	Nb-95	Ru-103	Ru-106	Cs-137	Ce-141	Ce-144
S 1512	May 26 - June 8	2805	0.090	37	7	14	2	9	<2	<2	8
S 1555	June 8 - 26	3928	0.064	39	6	12	2	5	<2	<2	7

-
- Notes: 1. Gross beta activity was measured 6 hours after collection and includes Rn-220 daughters. Be-7 is also of natural origin. Among the shorter-lived fission products that were searched for are I-131 and Ba-140.
2. The filters are 12.5-cm-dia. charcoal-impregnated pads.

Table 36
Fallout from Chinese Atmospheric Nuclear Test
in Rainwater

<u>Sample No.</u>	<u>Sampling date, 1981</u>	<u>Location</u>	<u>Gross beta, pCi/l</u>	<u>Fission products concentration, pCi/l</u>
S 1507	June 1	Top of State Bldg.	20 ± 2	<20
S 1556	June 26	Top of State Bldg.	12 ± 2	<20

- Notes: 1. The radionuclides listed in Table 35 were measured; none were found at the indicated minimum detectable level.
2. A sample of 500 ml was analyzed.