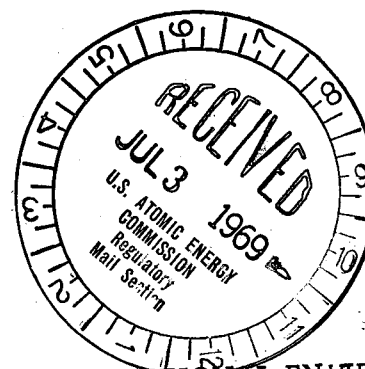


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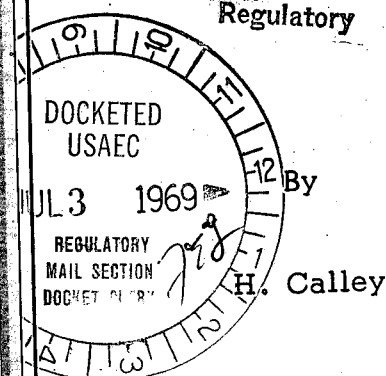


PREOPERATIONAL ENVIRONMENT
SURVEILLANCE PROGRAM FOR
H. B. ROBINSON UNIT #2

QUARTERLY REPORT

Regulatory

File Cy.



April 22, 1969

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Received w/Ltr Dated 6-27-69

I. Introduction

A preoperational radiological monitoring study of the Lake Robinson environs was started on December 23, 1968. The program will provide background measurements which will serve as a basis for distinguishing significant radioactivity introduced into the environment by the operation of the station from that due to nuclear detonations and other sources. This preliminary report compiles all of the environmental sample data which have been prepared to date.

II. Program Description

Samples are collected from 30 locations within a radius of approximately 5 miles of the plant site as shown in Figure 1. The expected spatial distribution of the plant effluents released, meteorological conditions, lake diffusion and population centers were considered in the selection of the sampling locations.

The type of sample, sample location, sampling frequency and sample size are listed in Table 1. The South Carolina State Board of Health is also performing independent environmental studies.

III. Preliminary Results to Date

A. Air Samples

Air samples are collected with a low volume (~1cfm) Gelman air sampler using high efficiency (99.9% efficient for particles 0.3 μ in diameter, or greater) filters. The filters are gross beta counted in an internal gas flow proportional counter. The results of the air samples processed are listed

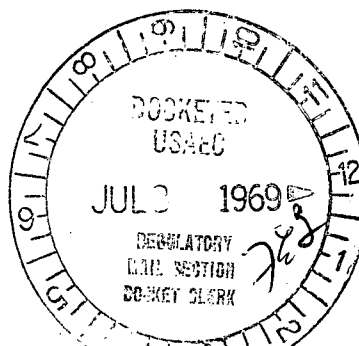


FIGURE 1
H.B. ROBINSON
ENVIRONMENTAL SAMPLING
POINTS

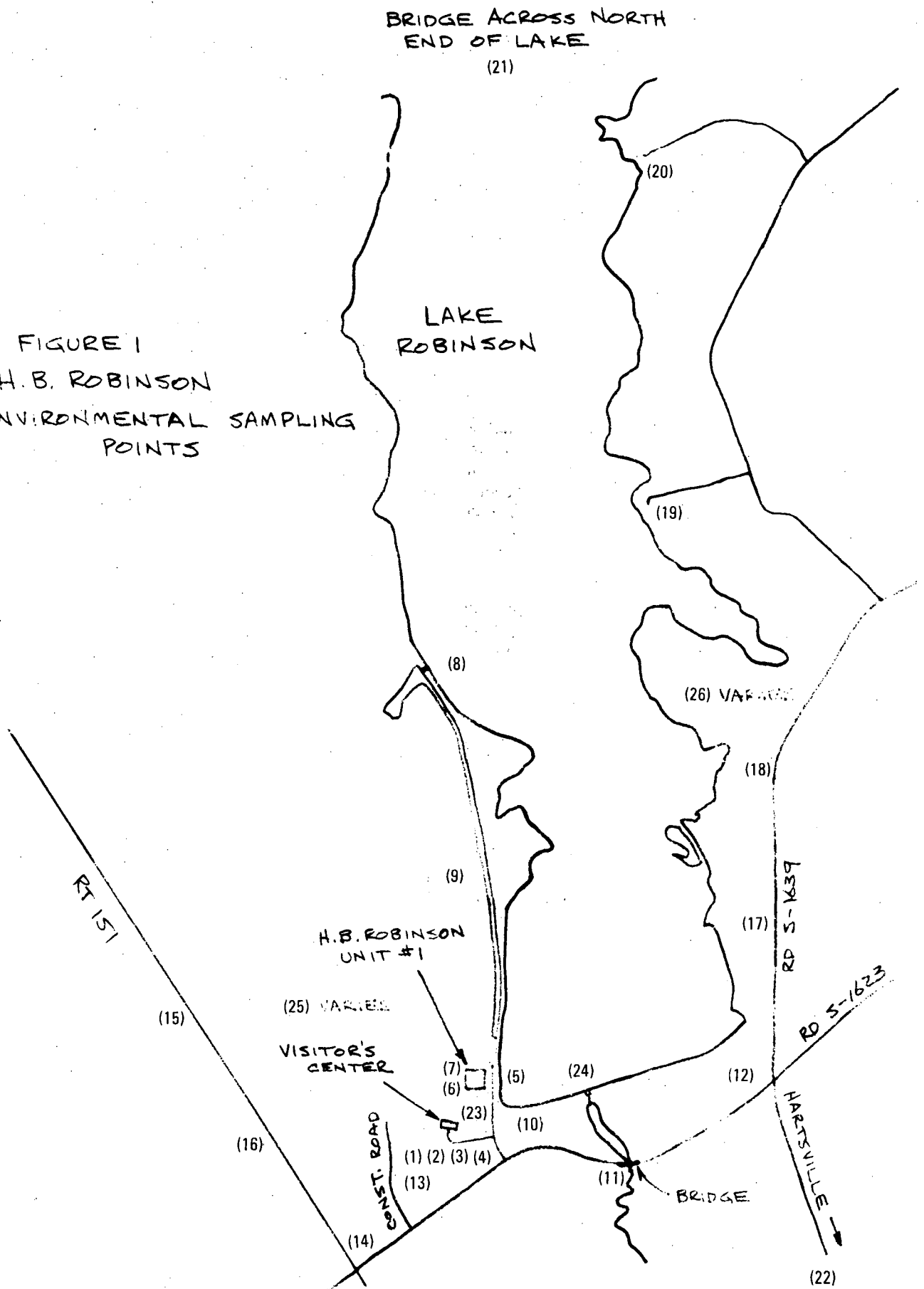


TABLE I

PRE-OPERATIONAL ENVIRONMENTAL SURVEILLANCE PROGRAM FOR THE H. B. ROBINSON GENERATING STATION

Type of Sample	Sampling Point	Location of Sampling Points	Sampling Frequency	Sample Size
AIR SAMPLES	22	Hartsville, CP&L Sub-Station	WEEKLY	1/3 Cycle
	2	Visitor's Center, CP&L Pole #3		1.5 Hr ON 3.0 Hr OFF @ ~1 CFM
SURFACE WATER	5	Plant intake, East of Administration Building	WEEKLY	1 Gal.
	8	Plant Discharge Canal, at point where it enters Lake Robinson	WEEKLY	1 Gal.
	11	Stream below Dam*, at bridge	WEEKLY	1 Gal.
	21	Bridge crossing, north end of lake	QUARTERLY	1 Gal.
AIR RADIATION DOSIMETERS (TLD'S)	1	Visitor's Center, CP&L Pole #2	QUARTERLY	
	3	Visitor's Center, CP&L Pole #4	QUARTERLY	
	4	Visitor's Center, CP&L Pole #5	QUARTERLY	
	6	West Side of Unit #1, second column from south side.	QUARTERLY	

* Manual grab sample shall be taken from stream until continuous proportional sampler is installed.

(Table I Con't) Page 2

	7	West Side of Unit #2, second column from north side	QUARTERLY	
	9	Microwave Station	QUARTERLY	
	10	Picnic Area, Metal Transmission Tower, Southwest Corner of lake	QUARTERLY	
	11	Bridge below Dam	QUARTERLY	
	12	Intersection of Roads S-1623 and S-1639, on fence post at Southeast corner of lake	QUARTERLY	
	13	Construction Road Entrance Southwest of Visitor's Center, on fifth fence post in from road	QUARTERLY	
	14	Intersection of Rt 151 and Road S-1623, West Pole in group of four power poles, adjacent to switch box.		
	15	Baptist Church on Rt 151, first CP&L Pole South of entrance to church	QUARTERLY	

(Table I Con't) Page 3

GROUND WATER BOTTOM SEDIMENTS	16	CP&L pole on West side of Rt 151, 1/2 Mile South of sample point#18, North of Gulf Station	QUARTERLY	
	17	CP&L pole#38, East Road, Wilkenson Property	QUARTERLY	
	18	REA pole 51A 41/51, Road S-1639 on East side of lake	QUARTERLY	
	19	CP&L Employee Picnic Area, East side of lake, on tree near water	QUARTERLY	
	20	Road to lake, about 200 Ft North of Wood's Grocery on Road S-1639, left fork of road, on CP&L pole #36	QUARTERLY	
	22	Hartsville, CP&L pole at CP&L Sub-station	QUARTERLY	
	23	Well near site entrance	QUARTERLY	1 Gal.
	21	in the lake, near bridge crossing North end of lake	QUARTERLY	1 lb.
	24	in the lake, near the Dam	QUARTERLY	1 lb.

(Table I Con't) Page 4

SOIL	25	Plant Periphery, various locations	QUARTERLY	1 Lb.
	26	Plant Periphery, various locations	QUARTERLY	1 Lb.
FISH	8	Plant Discharge Canal, at point where it enters lake	SEMI-ANNUAL	2Lb Flesh Each of bottom feeders and free swimmers

in Table 2.

B. Water Samples

Water samples are collected by grab sampling techniques. The continuous proportional sampler below the dam spillway has not been in operation due to equipment procurement and installation delays. The sampler is scheduled for operation the week of April 21, 1969. However, in the interim, grab samples on a weekly basis have been taken.

One liter water samples are filtered through a Millipore membrane filter to separate the dissolved from the suspended radioactivity fractions. Each fraction is then separately counted in an internal gas flow proportional counter for gross beta activity. The results of both fractions and the total activity for each sample analyzed are listed in Tables 3.1, 3.2 and 3.3.

Although the determination of the total radionuclide intake from all sources is of primary importance, a measure of the public health importance of radioactivity in water can be obtained by comparison of the observed values with the Public Health Service Drinking Water Standards.⁽¹⁾ These standards, based on consideration of Federal Radiation Council recommendations, set the limits for approval of a drinking water supply containing radium-226 and strontium-90 as 3 pCi/liter and 10 pCi/liter, respectively. In the known absence of strontium-90 and alpha particle emitters, the limit is 1,000 pCi/liter except when additional analysis indicates that concentrations of radionuclides are not likely to cause exposures greater than the limits indicated by the FRC Radiation Protection Guides.

A well, suitable for ground water sampling (to determine the exchange of lake water with the normal water in the water table) does not exist at present. Future plans include drilling such a well to the southwest of the lake and south of the visitor's center.

¹U.S. Public Health Service. Drinking Water Standards, revised 1962, PHS Publication No. 956.

TABLE 2

RADIOACTIVITY CONCENTRATIONS IN AIR

<u>Date</u>	<u>LOCATION</u>	
	<u>Visitor's Center</u>	<u>Hartsville (Sub-station)</u>
	Gross beta activity, pCi/M ³ of air*	Gross beta activity, pCi/M ³ of air*
1/ 6/69	0.13 \pm 0.04	No sample taken
1/12/69	0.04 \pm 0.04	0.06 \pm 0.03
1/19/69	0.09 \pm 0.03	0.10 \pm 0.03
1/28/69	0.01 \pm 0.02	0.05 \pm 0.02
2/ 3/69	0.04 \pm 0.03	0.10 \pm 0.04
2/ 9/69	0. \pm 0.02	0.01 \pm 0.03
2/18/69	0. \pm 0.02	0.04 \pm 0.02
2/24/69	0.01 \pm 0.04	No sample taken
3/ 3/69	0.02 \pm 0.03	0.04 \pm 0.03
3/10/69	0.07 \pm 0.03	0.09 \pm 0.03
3/17/69	0.27 \pm 0.03	0.26 \pm 0.03
3/24/69	0.08 \pm 0.03	0.15 \pm 0.03
4/ 1/69	0.19 \pm 0.03	0.19 \pm 0.04
4/ 8/69	0.19 \pm 0.03	0.15 \pm 0.03
4/15/69	0.23 \pm 0.04	0.28 \pm 0.04

* \pm 2 σ error

TABLE 3.1

RADIOACTIVITY CONCENTRATION IN WATER

Sample Date	Location	Gross Beta Radioactivity (pCi/L)*		
		Suspended	Dissolved	Total
12-20-69	Discharge	0.78 ± 1.3	0.79 ± 1.1	1.6 ± 1.7
1- 1-69		0.95 ± 1.1	$0. \pm 0.9$	0.95 ± 1.4
1- 6-69		$0. \pm 1.1$	2.2 ± 1.1	2.2 ± 1.6
1-12-69		0.39 ± 1.1	1.5 ± 1.1	1.9 ± 1.6
1-19-69		$0. \pm 0.9$	$0. \pm 0.9$	$0. \pm 1.3$
1-28-69		1.0 ± 0.9	$0. \pm 0.9$	1.0 ± 1.3
2- 3-69		2.3 ± 1.4	0.5 ± 1.1	2.9 ± 1.8
2- 9-69		1.2 ± 1.2	$0. \pm 1.1$	1.2 ± 1.6
2-18-69		0.94 ± 1.3	1.3 ± 1.3	2.2 ± 1.8
2-24-69		8.1 ± 1.3	0.24 ± 1.2	8.3 ± 1.8

* $\pm 2 \sigma$ error

TABLE 3.2

RADIOACTIVITY CONCENTRATION IN WATER

<u>Sample Date</u>	<u>Location</u>	<u>Gross Beta Radioactivity (pCi/L)*</u>		
		Suspended	Dissolved	Total
12-20-68	DAM	0.1 \pm 1.3	0. \pm .1	0.1 \pm 1.7
1- 1-69		0. \pm 1.3	0.47 \pm 1.1	0.47 \pm 1.7
1- 6-69		3.3 \pm 1.4	1.2 \pm 1.1	4.5 \pm 1.8
1-12-69		4.0 \pm 1.1	1.90 \pm 1.1	5.9 \pm 1.6
1-19-69		0. \pm 1.3	0. \pm 1.4	0. \pm 1.9
1-28-69		4.9 \pm 1.3	0.94 \pm 1.3	5.8 \pm 1.8
2- 3-69		0.1 \pm 1.3	0.47 \pm 1.1	0.57 \pm 1.7
2- 9-69		1.9 \pm 1.2	0.39 \pm 1.3	2.3 \pm 1.8
2-18-69		8.0 \pm 1.3	0.95 \pm 1.1	9.0 \pm 1.7
2-24-69		12.1 \pm 1.3	2.2 \pm 1.1	14.3 \pm 1.7
3- 3-69		18.0 \pm 1.6	0.08 \pm 1.2	18.1 \pm 2.0
12-20-68	UPPER BRIDGE	0.1 \pm 1.3	0. \pm 1.1	0.1 \pm 1.7

* \pm 2 σ error

TABLE 3.3

RADIOACTIVITY CONCENTRATION IN WATER

<u>Sample Date</u>	<u>Location</u>	<u>Gross Beta Radioactivity (pCi/L)*</u>		
		Suspended	Dissolved	Total
12-20-68	INLET	0. \pm 1.3	1.25 \pm 1.1	1.3 \pm 1.7
1- 1-69		0. \pm 1.1	0.63 \pm 1.1	0.63 \pm 1.5
1- 6-69		0.94 \pm 1.2	0.86 \pm 1.2	1.8 \pm 1.7
1-12-69		0. \pm 1.2	1.9 \pm 1.1	1.9 \pm 1.6
1-19-69		0. \pm 0.9	0.77 \pm 0.9	0.77 \pm 1.3
1-28-69		0.78 \pm 1.2	1.5 \pm 1.3	2.3 \pm 1.8
2- 3-69		4.2 \pm 1.2	0.55 \pm 1.1	4.8 \pm 1.6
2- 9-69		1.9 \pm 1.2	1.1 \pm 1.1	3.0 \pm 1.6
2-18-69		0. \pm 1.4	1.6 \pm 1.4	1.6 \pm 2.0
2-24-69		0. \pm 1.2	0.94 \pm 1.2	0.94 \pm 1.7

* \pm 2 σ error

C. Air Radiation Monitors

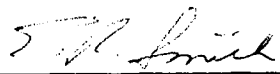
Thermoluminescent dosimeters (hot pressed LiF chips) are used to measure the ambient radiation levels at selected points around the periphery of the site. The results of the TLD measurements are tabulated in Table 4.

The results of the first set of TLD's processed by an accredited vendor were considered too high for normal background radiation levels. Upon investigation it was concluded that the reported results were biased by an operating error in the vendor's processing technique. This set, therefore, is not considered representative of the actual radiation levels. The normal background radiation level varies between locations but can be expected to range from 10-20 mrem/month.

D. Other Samples

No other samples listed as part of the program such as soil, bottom sediments or fish were obtained during the first quarter of 1969. However, these samples will be collected the week of April 21, 1969.

Approved: _____


E.R. Smith, Manager
Industrial Systems and Operations


Harry W. Calley, Jr.
Technical Associate

TABLE 4

AMBIENT RADIATION LEVELS

Sample Location (Figure 1)	<u>Exposure, mrem</u>		
	12-20-68 to 1-31-69	1-31-69 to 3- 4-69	3-4-69 to 4-4-69
(Control TLD)	42	6	12
1	54	7	12
3	48	7	29
4	59	6	11
6	85	6	14
7	42	3	9
9	27	4	44
10	56	3	20
11	46	6	14
12	32	6	16
13	64	4	10
14	TLD missing	TLD missing	11
15	43	7	12
16	129	3	13
17	47	6	14
18	37	7	15
19	61	7	12
20	89	7	23
22	129	3	12