

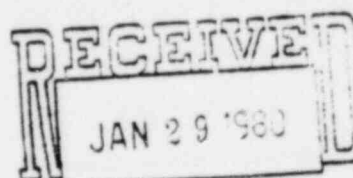
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ENVIRONMENTAL SAMPLING AND ANALYSIS

FOR

MISSISSIPPI POWER & LIGHT
GRAND GULF NUCLEAR STATION



BY Law

DECEMBER 1979

This report contains complete data for the period
January 1979 - December 1979

REVIEWED Williams

Date 1/30/80

Submitted by

EBERLINE INSTRUMENT CORPORATION

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Date: 01/18/79

THIS DOCUMENT CONTAINS
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1.0 Introduction

This report summarizes data obtained on samples received through December, 1979 in the environmental radiological monitoring program for Grand Gulf Nuclear Station.

Where blank spaces appear following dates, work was not completed on these samples in time for inclusion in this report.

Data from analyses completed during the month were within the expected ranges and do not indicate the presence of radioactivity from the operation of nuclear power stations.

The spectrum is computer scanned from -20 to -2000 KeV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137, Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level, others are 2σ . Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

A summary of Quality Control data obtained during the month is presented in Section 3.0. Included in this section are data from all analytical programs, not only those associated with this program.

MISSISSIPPI POWER AND LIGHT
AIRBORNE I-131 AND GROSS BETA CONCENTRATIONS IN AIR PARTICULATE FILTERS

Collection Date	A/S-1			A/S-2			A/S-3		
	Volume (m ³)	10 ⁻² pCi/m ³		Volume (m ³)	10 ⁻² pCi/m ³		Volume (m ³)	10 ⁻² pCi/m ³	
		Gross β	I-131		Gross β	I-131		Gross β	I-131
01/02/79	532	1±1	<7	461	2±1	<7	433	1±1	<7
01/08/79	532	2±1	<7	456	3±1	<7	427	3±1	<7
01/15/79	617	4±1	<7	546	4±1	<7	492	4±1	<7
01/22/79	642	1±1	<7	532	1±1	<7	487	2±1	<7
01/29/79	665	2±1	<7	524	3±1	<7	487	3±1	<7
02/05/79	642	2±1	<7	538	3±1	<7	473	2±1	<7
02/12/79	603	2±1	<7	535	2±1	<7	461	2±1	<7
02/19/79	651	2±1	<7	518	2±1	<7	526	3±1	<7
02/26/79	690	1±1	<7	526	1±1	<7	526	2±1	<7
03/05/79	509	2±1	(a)	509	2±1	(a)	492	3±1	(a)
03/12/79	540	2±1		529	2±1		512	2±1	
03/19/79	478	2±1		477	2±1		478	2±1	
03/26/79	485	1±1		485	1±1		485	1±1	
04/02/79	463	2±1		467	2±1		466	2±1	
04/09/79	472	2±1		474	2±1		474	2±1	
04/16/79	483	2±1		482	2±1		482	2±1	
04/23/79	482	3±1		480	3±1		480	3±1	
04/30/79	463	1±1		467	2±1		467	1±1	
05/06/79	472	1±1		476	1±1		475	1±1	
05/14/79	470	2±1		465	<1		467	2±1	
05/21/79	478	3±1		476	2±1		475	3±1	
05/29/79	439	3±1		413	3±1		441	3±1	
06/05/79	190(b)	2±1		375	2±1		390	2±1	
06/25/79(c)	305	2±1		305	2±1		305	1±1	

(a) Discontinued until March 1980.

(b) Collected 06/04/79.

(c) Sampling stations closed for maintenance during weeks ending 06/12 and 06/19.

MISSISSIPPI POWER AND LIGHT

AIRBORNE I-131 AND GROSS BETA CONCENTRATIONS IN AIR PARTICULATE FILTERS

Collection Date	A/S-4			A/S-5			A/S-6		
	Volume (m ³)	10 ⁻² pCi/m ³		Volume (m ³)	10 ⁻² pCi/m ³		Volume (m ³)	10 ⁻² pCi/m ³	
		Gross β	I-131		Gross β	I-131		Gross β	I-131
01/02/79	379	2 \pm 1	<7	402	1 \pm 1	<7	456	2 \pm 1	<7
01/08/79	131	11 \pm 1	<7	422	2 \pm 1	<7	461	3 \pm 1	<7
01/15/79	430	3 \pm 1	<7	481	3 \pm 1	<7	535	4 \pm 1	<7
01/22/79	971	1 \pm 1	<7	470	2 \pm 1	<7	518	2 \pm 1	<7
01/29/79	416	3 \pm 1	<7	498	2 \pm 1	<7	526	2 \pm 1	<7
02/05/79	405	4 \pm 1	<7	481	3 \pm 1	<7	526	3 \pm 1	<7
02/12/79	427	3 \pm 1	<7	475	2 \pm 1	<7	532	2 \pm 1	<7
02/19/79	393	4 \pm 1	<7	487	2 \pm 1	<7	501	3 \pm 1	<7
02/26/79	487	2 \pm 1	<7	473	1 \pm 1	<7	512	2 \pm 1	<7
03/05/79	Not Available		(a)	489	3 \pm 1	(a)	523	3 \pm 1	(a)
03/12/79	342	3 \pm 1		815	1 \pm 1		529	2 \pm 1	
03/19/79	464	2 \pm 1		418	2 \pm 1		464	2 \pm 1	
03/26/79	486	1 \pm 1		473	1 \pm 1		486	1 \pm 1	
04/02/79	474	4 \pm 1		471	2 \pm 1		473	3 \pm 1	
04/09/79	463	2 \pm 1		463	1 \pm 1		464	2 \pm 1	
04/16/79	479	2 \pm 1		488	2 \pm 1		482	2 \pm 1	
04/23/79	482	4 \pm 1		470	3 \pm 1		482	3 \pm 1	
04/30/79	477	2 \pm 1		465	1 \pm 1		473	1 \pm 1	
05/06/79	457	2 \pm 1		469	1 \pm 1		461	1 \pm 1	
05/14/79	477	3 \pm 1		480	3 \pm 1		475	3 \pm 1	
05/21/79	474	<1		487	3 \pm 1		489	3 \pm 1	
05/29/79	898	1 \pm 1		461	2 \pm 1		504	2 \pm 1	
05/30/79	195	1 \pm 1		403	1 \pm 1		215(b)	2 \pm 1	
06/25/79	335	2 \pm 1		345	2 \pm 1		330	2 \pm 1	

(a) Discontinued until March 1980.

(b) Collected 06/04/79.

MISSISSIPPI POWER AND LIGHT

AIRBORNE I-131 AND GROSS BETA CONCENTRATIONS IN AIR PARTICULATE FILTERS

Collection Date	Volume (m ³)	S-7 10 ⁻² pCi/m ³		Volume (m ³)	A/S-8 10 ⁻² pCi/m ³		Volume (m ³)	A/S-9 10 ⁻² pCi/m ³	
		Gross β	I-131		Gross β	I-131		Gross β	I-131
01/02/79	422	1±1	<7	484	1±1	<7	464	1±1	<7
01/08/79	433	3±1	<7	470	2±1	<7	447	3±1	<7
01/15/79	498	4±1	<7	509	3±1	<7	543	4±1	<7
01/22/79	521	2±1	<7	558	2±1	<7	526	2±1	<7
01/29/79	439	2±1	<7	566	3±1	<7	532	2±1	<7
02/05/79	490	3±1	<7	569	2±1	<7	532	3±1	<7
02/12/79	495	2±1	<7	521	2±1	<7	535	2±1	<7
02/19/79	470	2±1	<7	558	2±1	<7	501	2±1	<7
02/26/79	487	1±1	<7	574	1±1	<7	518	2±1	<7
03/05/79	515	3±1	(a)	534	2±1	(a)	515	3±1	(a)
03/12/79	520	2±1		543	2±1		517	2±1	
03/19/79	470	2±1		461	2±1		471	2±1	
03/26/79	485	1±1		486	<1		486	1±1	
04/02/79	472	3±1		471	1±1		472	2±1	
04/09/79	464	2±1		461	1±1		465	2±1	
04/16/79	482	1±1		479	2±1		483	2±1	
04/23/79	482	3±1		482	2±1		482	3±1	
04/30/79	473	2±1		474	1±1		473	1±1	
05/06/79	462	1±1		454	1±1		462	1±1	
05/14/79	485	1±1		475	3±1		470	2±1	
05/21/79	477	2±1		488	<1		489	2±1	
05/29/79	427	3±1		487	1±1		416	3±1	
06/04/79	300	1±1		435 (b)	<1		340	1±1	
06/25/79	305	2±1		310	2±1		330	2±1	

(a) Discontinued until about 1980.

(b) Collected 05/31/79.

MISSISSIPPI POWER AND LIGHT

RADIONUCLIDES IN AIR PARTICULATE SAMPLES (Quarterly Analysis on Composite of Weekly Collections)

Collection Site	pCi/m ³	
	Gamma Emitters	Collection Site
<u>1st Quarter</u>		
AS-01	<0.01	AS-01
AS-02	<0.01	AS-02
AS-03	<0.01	AS-03
AS-04	<0.01	AS-04
AS-05	<0.01	AS-05
AS-06	<0.01	AS-06
AS-07	<0.01	AS-07
AS-08	<0.01	AS-08
AS-09	<0.01	AS-09
<u>2nd Quarter</u>		
	<0.01	AS-01
	<0.01	AS-02
	<0.01	AS-03
	<0.01	AS-04
	<0.01	AS-05
	<0.01	AS-06
	<0.01	AS-07
	<0.01	AS-08
	<0.01	AS-09
<u>3rd Quarter</u>		
AS-01	<0.01	AS-01
AS-02	<0.01	AS-02
AS-03	<0.01	AS-03
AS-04	<0.01	AS-04
AS-05	<0.01	AS-05
AS-06	<0.01	AS-06
AS-07	<0.01	AS-07
AS-08	<0.01	AS-08
AS-09	<0.01	AS-09
<u>4th Quarter</u>		
	<0.01	AS-01
	<0.01	AS-02
	<0.01	AS-03
	<0.01	AS-04
	<0.01	AS-05
	<0.01	AS-06
	<0.01	AS-07
	<0.01	AS-08
	<0.01	AS-09

MISSISSIPPI POWER AND LIGHT

RADIONUCLIDES IN SURFACE WATER SAMPLES
(Monthly Collections)

GAMMA EMITTERS

<u>Collection Period</u>	<u>pCi/l</u>	
	<u>MRUP 1N79</u>	<u>MRDOWN 2N79</u>
01/11/79	<15	<15
02/14/79	<15	<15
03/07/79	<15	<15
04/25/79	<15	<15
05/09/79	<15	<15
06/11/79	<15	<15
07/18/79	<15	<15
08/09/79	<15	<15
09/05/79	<15	<15
10/05/79	<15	<15
11/02/79	<15	<15
12/07/79	<15	<15

TRITIUM CONCENTRATIONS IN SURFACE WATER SAMPLES
(Quarterly Collections)

TRITIUM

<u>Collection Period</u>	<u>pCi/l</u>	
	<u>MRUP 1N79</u>	<u>MRDOWN 2N79</u>
1st Quarter	<330	<330
2nd Quarter	<330	280±110
3rd Quarter	290±90	Lost in Processing
4th Quarter	<330	<330

MISSISSIPPI POWER AND LIGHT

GAMMA EMITTERS in FRUIT and VEGETABLE SAMPLES
(Collected at Harvest)

<u>Collection Site</u>	<u>Collection Date</u>	<u>Sample Type</u>	<u>pCi/g wet Gamma Emitters</u>
GRLV-01	05/09/79	Turnip + Mustard	<0.08
GRLV-02	06/18/79	Turnip Greens	<0.08
VEG-01	06/26/79	Radish	<0.08
GRLV-03	07/03/79	Turnip + Mustard	<0.08
VEG-02	07/06/79	Squash	<0.08
VEG-03	07/25/79	Cucumbers	<0.08
GRLV-04	08/01/79	Turnip + Mustard	<0.08
VEG-04	08/01/79	Corn	<0.08
GRLV-05	08/01/79	Turnips	<0.08
GRLV-06	08/01/79	Turnips	<0.08
VEG-05	08/01/79	Okra	<0.08
VEG-06	08/01/79	Okra	<0.08
FRUIT-01	09/07/79	Pears	<0.08
VEG-07	09/07/79	Okra	<0.08
FRUIT-02	09/07/79	Muscadino	<0.08
VEG-08	09/07/79	Butter Beans	<0.08
Fruit-03	10/03/79	Crabapple	<0.08
GRLV-09	10/03/79	Turnip Greens	<0.08
Foliage-01	10/08/79	Hay	<0.08
GRLV-10	11/01/79	Mustard Greens	<0.08
VEG-11	11/05/79	Soybeans	<0.08
GRLV-11	12/04/79	Mustard Greens	<0.08
GRLV-12	12/04/79	Turnip Greens	<0.08
VEG-12	12/04/79	Sweet Potatoes	<0.08
FRUIT	12/04/79	Persimmon	<0.08

MISSISSIPPI POWER AND LIGHT

GAMMA EMITTERS IN FISH SAMPLES (Semi-Annual Collections)

<u>Collection Site</u>	<u>Collection Date</u>	<u>Species</u>	<u>pCi/g (wet) Gamma Emitters</u>
Lake Hamilton 01	06/29/79	Crappie	<0.13
Lake Hamilton 02	06/29/79	Buffalo	<0.13
Lake Hamilton 03	10/26/79	Crappie	<0.13
Lake Hamilton 04	10/26/79	Buffalo	<0.13

GAMMA EMITTERS IN MEAT SAMPLES (Semi-Annual Collections)

<u>Collection Site</u>	<u>Collection Date</u>	<u>Sample Type</u>	<u>pCi/g (wet) Gamma Emitters</u>
Buckner Farm 6km SE of GGNS	10/08/79	Hay(a)	<0.08
Buckner Farm 6km SE of GGNS	10/19/79	Deer 01-79	<0.13
1-2-80 JMT NW Quadrant met site near MRT	12/21/79	Deer 02-79	<0.13
1-2-80 JMT NW Quadrant met site near MRT	12/20/79	Rabbit 01-79	<0.13

(a) Beef and goat meat not available; hay used as substitute (duplicate sample for foliage).

MISSISSIPPI POWER AND LIGHT

SPECIAL SAMPLES

Sample Type	Collection Site	Collection Date	Analysis	Result
Cistern Water	Ark Cist 4279	02/08/79	Gross Beta	4±1 pCi/l
Cistern Water	Trim Cist 4279	02/08/79	Gross Beta	8±2 pCi/l
Surface Water	GG Site 21579-1	02/14/79	Gamma Isotopic	<15 pCi/l
Surface Water	GG Site 21579-2	02/14/79	Gamma Isotopic	<15 pCi/l
Milk	GG 1379	03/07/79	Gamma Isotopic	<15 pCi/l
Cistern Water	GG Cist 3379	03/07/79	Gross B	8±2 pCi/l
Cistern Water	GG Cist 3379	03/07/79	Gamma Isotopic	<15 pCi/l
Ground Water	GG Well	04/10/79	Gamma Isotopic	<15 pCi/l
Ground Water	GG Well	04/11/79	Gamma Isotopic	<15 pCi/l
Ground Water	GG Well	04/12/79	Gamma Isotopic	<15 pCi/l
Ground Water	GG Well	04/17/79	Tritium	<330 pCi/l
Ground Water	GG Well	04/18/79	Tritium	<330 pCi/l
Ground Water	GG Well	04/19/79	Tritium	<330 pCi/l
Milk	GG 1579	05/07/79	I-131	<1 pCi/l
Milk	GG 1579	05/07/79	Gamma Isotopic	<15 pCi/l
Surface Water	GG 5979(1)	05/09/79	Gamma Isotopic	<15 pCi/l
Surface Water	GG 5979(2)		Gamma Isotopic	<15 pCi/l
Surface Water	GG Site Up	06/11/79	Gamma Isotopic	<15 pCi/l
Surface Water	GG Site Down	06/11/79	Gamma Isotopic	<15 pCi/l
Cistern Water	GG Cist 1	06/18/79	I-131	<1 pCi/l
Cistern Water	GG Cist 2	06/18/79	I-131	<1 pCi/l
Cistern Water	GG Cist	06/11/79	Gross B	2±1 pCi/l
Cistern Water	GG Cist	06/11/79	Gross B	6±1 pCi/l
Cistern Water	GG Cist 1	06/11/79	Gamma Isotopic	<15 pCi/l
Cistern Water	GG Cist 2	06/11/79	Gamma Isotopic	<15 pCi/l
Surface Water	GG Site	08/09/79	Gamma Isotopic	<15 pCi/l
Cistern Water	Cist GG 9579	09/05/79	I-131	<1 pCi/l
Cistern Water	Cist GG 9579	09/05/79	I-131	<1 pCi/l
Cistern Water	Cist GG 9579	09/05/79	Gross B	18±2 pCi/l
Cistern Water	Cist GG 9579	09/05/79	Gross B	4±2 pCi/l
Milk	GG 9579	09/05/79	I-131	<1 pCi/l
Milk	GG 9579	09/05/79	Gamma Isotopic	<15 pCi/l
Surface Water	GG MRUP 9579	09/05/79	Gamma Isotopic	<15 pCi/l
Surface Water	GG MRDOWN 9579	09/05/79	Lost in shipment	
Cistern Water	Arkcist GG 9579	09/05/79	Gamma Isotopic	<15 pCi/l
Cistern Water	Trimcist GG 9579	09/05/79	Gamma Isotopic	<15 pCi/l

QUALITY CONTROL ANALYSES SUMMARY

DECEMBER 1979

The tables below summarize results of samples run for process quality control purposes during the subject month. These listings are in addition to such measurements as detector backgrounds, check source values, radiometric-gravimetric comparisons, system calibrations, etc. Detailed listings of each measurement are maintained at the laboratory and are available for inspection if required.

BLANK SAMPLES

<u>Nuclide Analyzed</u>	<u>Number of Determinations</u>	<u>Number of analyses exceeding the LLD for that analysis</u>
Gross Beta	17	0
Gross Alpha	14	0
Iodine-131	24	0
Strontium-89	1	0
Strontium-90	1	0
Gamma Emitters	5	0
Tritium H-3	4	0

SPLIT SAMPLES

<u>Nuclide Analyzed</u>	<u>Number of Det's</u>	<u>No. agreeing within 2σ</u>	<u>No. agreeing within 3σ</u>	<u>No. differing by > 3σ</u>
Gross Beta	6	6	0	0
Gross Alpha	1	1	0	0
Iodine-131	1	1	0	0
Strontium-89	7	7	0	0
Strontium-90	7	7	0	0
Gamma Emitters	3	3	0	0
Tritium H-3	6	6	0	0
Calcium-45	1	1	0	0

SPIKED SAMPLES

<u>Nuclide Analyzed</u>	<u>No. of Det's</u>	<u>Within 2σ of known</u>	<u>Within 3σ of known</u>	<u>differing from known by > 3σ</u>
Gross Beta	13	13	0	0
Strontium-90	6	6	0	0
Tritium H-3	2	2	0	0
Gamma Emitters	5	5	0	0

USDOE QUALITY ASSESSMENT PROGRAM

1979

<u>Sample Type</u>	<u>Nuclide</u>	<u>Known</u>	<u>Measured ±2σ error</u>	<u>Units</u>
Air	Co-57	0.116 E+03	0.131±0.013 E+03	pCi/filter
Air	Sr-90	0.135 E+02	0.155±0.025 E+02	pCi/filter
Air	Ru-106	0.174 E+03	0.167±0.020 E+03	pCi/filter
Air	Sb-125	0.749 E+03	0.823±0.082 E+03	pCi/filter
Air	Cs-134	0.985 E+02	0.947±0.095 E+02	pCi/filter
Air	Ca-45	0.134 E+03	0.230±0.023 E+03	pCi/filter
Soil	K-40	0.216 E+02	0.235±0.024 E+02	pCi/g
Soil	Sr-90	0.200 E+00	0.200±0.080 E+00	pCi/g
Soil	Cs-137	0.240 E+00	0.266±0.027 E+00	pCi/g
Tissue	K-40	0.840 E+01	0.900±0.090 E+01	pCi/g
Tissue	Sr-90	0.440 E-02	<0.200 E+00	pCi/g
Tissue	Cs-137	0.230 E-01	0.1 0.030 E-01	pCi/g
Vegetation	K-40	0.225 E+03	0.220±0.022 E+03	pCi/g
Vegetation	Sr-90	0.573 E+01	0.593±0.059 E+01	pCi/g
Vegetation	Cs-137	0.256 E+00	0.280±0.030 E+00	pCi/g
Water	H-3	0.124 E+02	0.130±0.013 E+02	pCi/ml
Water	Na-22	0.843 E+00	0.907±0.091 E+00	pCi/ml
Water	Mn-54	0.737 E+00	0.800±0.096 E+00	pCi/ml
Water	Co-60	0.871 E+00	0.970±0.097 E+00	pCi/ml
Water	Cs-137	0.980 E+00	0.117±0.012 E+01	pCi/ml