

Alton B. Cobb M.D., M.P.H.
State Health Officer

MISSISSIPPI
STATE DEPARTMENT OF
HEALTH

Reply To:

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April 11, 1991

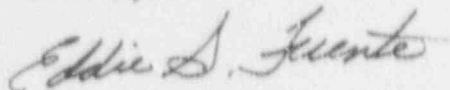
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Gentlemen:

Enclosed is a copy of Mississippi's annual report of environmental activities at the Grand Gulf Nuclear Station. These activities were conducted by the Division of Radiological Health, Mississippi State Department of Health, in accordance with Cooperative Agreement No. NRC-29-83-621.

Copies are being sent to the Office of Nuclear Reactor Regulation, the Division of Contracts and Property Management and the NRC's Regional Project Officer. Should you have any questions regarding this report, please direct them to Bob Bell at (601) 354-6657.

Sincerely,



Eddie S. Fuente, Director
Division of Radiological Health

ESF/ims
Enclosure

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Equal opportunity in employment/services

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REPORT TO THE NUCLEAR REGULATORY COMMISSION
ENVIRONMENTAL MONITORING AT GRAND GULF NUCLEAR STATION
CALENDAR YEAR 1990
NRC CONTRACT NUMBER NRC-29-83-621

Report prepared by
Diantha Stewart, Chief Chemist

ENVIRONMENTAL MONITORING AND EMERGENCY RESPONSE BRANCH
DIVISION OF RADIOLOGICAL HEALTH
MISSISSIPPI STATE DEPARTMENT OF HEALTH

Eddie S. Fuente 3/18/91
Eddie S. Fuente; Director, Division of Radiological Health

Bob Bell 1/18 Mar 91
Bob Bell; Health Physicist-Administrative,
Environmental Monitoring and Emergency Response Branch

Abstract:

Under contract to the U.S. Nuclear Regulatory Commission, the Mississippi State Department of Health (MSDH), Division of Radiological Health (DRH) provides environmental radiological data to the Commission pertaining to the Grand Gulf Nuclear Station (GGNS), Claiborne County, Mississippi.

The results detailed in this report represent the ninth year of this contract with the State of Mississippi, Calendar Year 1990.

Licensee for Grand Gulf Nuclear Station was System Energy Resources, Inc. (SERI) before June 6, 1990 and Entergy Operations, Inc. (Entergy Operations) on and after June 6, 1990.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

TABLE OF CONTENTS

I. AIR SAMPLING STATION DATA	PAGE
A. MSDH "Arnold Acres" & GGNS "Training Center"	
1. Particulate (Gross Beta)	2
2. Radioiodine	6
3. Quarterly Composite (Gamma Isotopic)	10
B. MSDH "Rad Health Bldg" & GGNS "Vicksburg"	
1. Particulate (Gross Beta)	11
2. Radioiodine	15
3. Quarterly Composite (Gamma Isotopic)	19
II. MISSISSIPPI RIVER WATER DATA	
A. Gamma Isotopic for Cesium-137	20
B. Gamma Isotopic for Other Radionuclides	22
C. Tritium	24
III. MISSISSIPPI RIVER SHORELINE SEDIMENT	
Gamma Isotopic Analysis	26
IV. ALCORN DAIRY MILK DATA	
A. Gamma Isotopic Analysis	27
B. Radioiodine	28
V. FISH AND MEAT "EDIBLE PORTIONS" DATA	
Gamma Isotopic Analysis	29
VI. VEGETABLE PRODUCTS DATA	
Gamma Isotopic Analysis	30
VII. EPA CROSS-CHECK RESULTS-1990	32

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Particulate (Gross Beta)

These results are Air Particulate samples duplicated by MSDH and the Licensee which were analyzed for Gross Beta. The Licensee's sampler is located at the Old Training Center (TC) 0.3 miles south of the GGNS and designated as AS-5 (Indicator). The MSDH's comparable sampler is located at Arnold Acres (AA) 0.4 miles south of the GGNS. The Lower Limit of Detection (LLD) required by the contract for Gross Beta is 0.01 pCi/m3.

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
TC	12/27-1/02		0.029
AA	12/27-1/02	a	
TC	1/02-1/09		0.031
AA	1/02-1/09	a	
TC	1/09-1/16		0.028
AA	1/09-1/16	0.017	
TC	1/16-1/23		0.021
AA	1/16-1/23	0.006	
TC	1/23-1/30		0.020
AA	1/23-1/30	0.010	
TC	1/30-2/06		0.021
AA	1/30-2/06	0.013	
TC	2/06-2/13		0.025
AA	2/06-2/13	0.017	
TC	2/13-2/20		0.023
AA	2/13-2/20	0.008	
TC	2/20-2/27		0.019
AA	2/20-2/27	0.017	
TC	2/27-3/06		0.030
AA	2/27-3/06	0.022	
TC	3/06-3/13		0.014
AA	3/06-3/13	0.010	
TC	3/13-3/20		0.019
AA	3/13-3/20	0.013	
TC	3/20-3/27		0.027
AA	3/20-3/27	0.015	
TC	3/27-4/03		0.017
AA	3/27-4/03	0.025	

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Particulate (Gross Beta) cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
TC	4/03-4/10		0.021
AA	4/03-4/10	0.024	
TC	4/10-4/17		0.022
AA	4/10-4/17	0.003	
TC	4/17-4/24		0.017
AA	4/17-4/24	0.017	
TC	4/24-5/01		0.014
AA	4/24-5/01	0.018	
TC	5/01-5/08		0.017
AA	5/01-5/08	0.018	
TC	5/08-5/15		0.009
AA	5/08-5/15	0.007	
TC	5/15-5/22		0.015
AA	5/15-5/22	0.012	
TC	5/22-5/29		0.017
AA	5/22-5/29	0.014	
TC	5/29-6/05		0.018
AA	5/29-6/05	0.011	
TC	6/05-6/12		0.013
AA	6/05-6/12	0.009	
TC	6/12-6/19		0.016
AA	6/12-6/19	0.025	
TC	6/19-6/26		0.018
AA	6/19-6/26	0.035	
TC	6/26-7/03		0.021
AA	6/26-7/03	0.024	
TC	7/03-7/10		0.016
AA	7/03-7/10	0.026	
TC	7/10-7/17		0.013
AA	7/10-7/17	0.011	
TC	7/17-7/24		0.012
AA	7/17-7/24	0.002	
TC	7/24-7/31		0.024
AA	7/24-7/31	0.025	
TC	7/31-8/07		0.017
AA	7/31-8/07	0.023	

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Particulate (Gross Beta) cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
TC	8/07-8/14		
AA	8/07-8/14	0.029	0.024
TC	8/14-8/21		
AA	8/14-8/21	0.053	0.023
TC	8/21-8/28		
AA	8/21-8/28	0.022	0.023
TC	8/28-9/04		
AA	8/28-9/04	0.028	0.025
TC	9/04-9/11		
AA	9/04-9/11	0.037	0.024
TC	9/11-9/18		
AA	9/11-9/18	0.027	0.015
TC	9/18-9/25		
AA	9/18-9/25	0.039	0.019
TC	9/25-10/02		
AA	9/25-10/02	0.037	0.035
TC	10/02-10/09		
AA	10/02-10/09	0.014	0.020
TC	10/09-10/16		
AA	10/09-10/16	0.017	0.020
TC	10/16-10/23		
AA	10/16-10/23	0.019	0.028
TC	10/23-10/30		
AA	10/23-10/30	0.029	0.029
TC	10/30-11/06		
AA	10/30-11/06	0.038	0.030
TC	11/06-11/13		
AA	11/06-11/13	0.033	0.025
TC	11/13-11/20		
AA	11/13-11/20	0.019	0.029
TC	11/20-11/27		
AA	11/20-11/27	0.017	0.023
TC	11/27-12/04		
AA	11/27-12/04	0.021	0.022
TC	12/04-12/11		
AA	12/04-12/11	0.023	0.023
TC	12/11-12/18		
			0.025

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Particulate (Gross Beta) cont'd

Location Name	Date	MSDH Results pCi/m3	Licnsee Results pCi/m3
AA	12/11-12/18	0.020	
TC	12/18-12/26		0.020
AA	12/18-12/26	0.007	

a No data; motor out.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Radioiodine

These results are charcoal canister samples duplicated by MSDH and the Licensee which were analyzed for Radioiodine. The Licensee's sampler is located at the Old Training Center (TC) 0.3 miles south of the GGNS and designated as AS-5 (Indicator). The MSDH's comparable sampler is located at Arnold Acres (AA) 0.4 miles south of the GGNS. The Lower Limit of Detection (LLD) required by the contract for Iodine-131 is 0.07 pCi/m3.

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
TC	12/27-1/02		<0.040
AA	12/27-1/02	a	
TC	1/02-1/09		<0.023
AA	1/02-1/09	a	
TC	1/09-1/16		<0.050
AA	1/09-1/16	<0.07	
TC	1/16-1/23		<0.043
AA	1/16-1/23	<0.07	
TC	1/23-1/30		<0.018
AA	1/23-1/30	<0.07	
TC	1/30-2/06		<0.033
AA	1/30-2/06	<0.07	
TC	2/06-2/13		<0.024
AA	2/06-2/13	<0.07	
TC	2/13-2/20		<0.025
AA	2/13-2/20	<0.07	
TC	2/20-2/27		<0.010
AA	2/20-2/27	<0.07	
TC	2/27-3/06		<0.014
AA	2/27-3/06	<0.07	
TC	3/06-3/13		<0.021
AA	3/06-3/13	<0.07	
TC	3/13-3/20		<0.014
AA	3/13-3/20	<0.07	
TC	3/20-3/27		<0.018
AA	3/20-3/27	<0.07	
TC	3/27-4/03		<0.021
AA	3/27-4/03	<0.07	

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Radioiodine cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
TC	4/03-4/10		<0.020
AA	4/03-4/10	<0.07	
TC	4/10-4/17		<0.015
AA	4/10-4/17	<0.07	
TC	4/17-4/24		<0.010
AA	4/17-4/24	<0.07	
TC	4/24-5/01		<0.011
AA	4/24-5/01	<0.07	
TC	5/01-5/08		<0.019
AA	5/01-5/08	<0.07	
TC	5/08-5/15		<0.013
AA	5/08-5/15	<0.07	
TC	5/15-5/22		<0.011
AA	5/15-5/22	<0.07	
TC	5/22-5/29		<0.016
AA	5/22-5/29	<0.07	
TC	5/29-6/05		<0.013
AA	5/29-6/05	<0.07	
TC	6/05-6/12		<0.024
AA	6/05-6/12	<0.07	
TC	6/12-6/19		<0.013
AA	6/12-6/19	<0.07	
TC	6/19-6/26		<0.015
AA	6/19-6/26	<0.07	
TC	6/26-7/03		<0.020
AA	6/26-7/03	<0.07	
TC	7/03-7/10		<0.014
AA	7/03-7/10	<0.07	
TC	7/10-7/17		<0.013
AA	7/10-7/17	<0.07	
TC	7/17-7/24		<0.011
AA	7/17-7/24	<0.07	
TC	7/24-7/31		<0.011
AA	7/24-7/31	<0.07	
TC	7/31-8/07		<0.013
AA	7/31-8/07	<0.07	

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Radioiodine cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
TC	8/07-8/14		<0.013
AA	8/07-8/14	<0.07	
TC	8/14-8/21		<0.013
AA	8/14-8/21	<0.07	
TC	8/21-8/28		<0.015
AA	8/21-8/28	<0.07	
TC	8/28-9/04		<0.013
AA	8/28-9/04	<0.07	
TC	9/04-9/11		<0.015
AA	9/04-9/11	<0.07	
TC	9/11-9/18		<0.015
AA	9/11-9/18	<0.07	
TC	9/18-9/25		<0.014
AA	9/18-9/25	<0.07	
TC	9/25-10/02		<0.022
AA	9/25-10/02	<0.07	
TC	10/02-10/09		<0.023
AA	10/02-10/09	<0.07	
TC	10/09-10/16		<0.016
AA	10/09-10/16	<0.07	
TC	10/16-10/23		<0.019
AA	10/16-10/23	<0.07	
TC	10/23-10/30		<0.012
AA	10/23-10/30	<0.07	
TC	10/30-11/06		<0.018
AA	10/30-11/06	<0.07	
TC	11/06-11/13		<0.018
AA	11/06-11/13	<0.07	
TC	11/13-11/20		<0.020
AA	11/13-11/20	<0.07	
TC	11/20-11/27		<0.017
AA	11/20-11/27	<0.07	
TC	11/27-12/04		<0.012
AA	11/27-12/04	<0.07	
TC	12/04-12/11		<0.022
AA	12/04-12/11	<0.07	
TC	12/11-12/18		<0.016

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Radioiodine cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
AA	12/11-12/18	<0.07	
TC	12/18-12/26		<0.018
AA	12/18-12/26	<0.07	

a No data; motor out.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Quarterly Composite (Gamma Isotopic)

These results are quarterly Air Particulate samples duplicated by MSDH and the Licensee which were analyzed for Gamma Emitters. The Licensee's sampler is located at the Old Training Center (TC) 0.3 miles south of the GGNS and designated as AS-5 (Indicator). The MSDH's sampler is located at Arnold Acres (AA) 0.4 miles south of the GGNS. The Lower Limit of Detection (LLD) required by the contract for Cs-134 and Cs-137 is 0.05 pCi/m3.

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
TC	12/27-3/27		<0.05
AA	12/27-3/27	<0.01	
TC	3/27-6/26		<0.05
AA	3/27-6/26	<0.01	
TC	6/26-9/25		<0.05
AA	6/26-9/25	<0.01	
TC	9/25-12/26		<0.05
AA	9/25-12/26	<0.01	

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Particulate (Gross Beta) Control

These results are Air Particulate samples taken from control locations by MSDH and the Licensee which were analyzed for Gross Beta. The Licensee's sampler is located in Vicksburg (VB) 18 miles north of GGNS and designated as AS-3 (Control). The MSDH's sampler is located behind the Radiological Health Building (RH) in Jackson, 51 miles east northeast of the GGNS. The Lower Limit of Detection (LLD) required by the contract for Gross Beta is 0.01 pCi/m3.

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
VB	12/27-1/02		
RH	12/27-1/02		0.016
VB	1/02-1/09	0.011	
RH	1/02-1/09		0.019
VB	1/09-1/16	0.006	
RH	1/09-1/16		0.012
VB	1/16-1/23	0.006	
RH	1/16-1/23		0.028
VB	1/23-1/30	0.014	
RH	1/23-1/30		0.013
VB	1/30-2/06	0.001	
RH	1/30-2/06		0.015
VB	2/06-2/13	0.010	
RH	2/06-2/13		0.016
VB	2/13-2/20	0.012	
RH	2/13-2/20		0.016
VB	2/20-2/27	0.015	
RH	2/20-2/27		0.014
VB	2/27-3/06	0.016	
RH	2/27-3/06		0.022
VB	3/06-3/13	0.015	
RH	3/06-3/13		0.012
VB	3/13-3/20	0.010	
RH	3/13-3/20		0.013
VB	3/20-3/27	0.012	
RH	3/20-3/27		0.021
VB	3/27-4/03	0.001	
RH	3/27-4/03		0.017
VB	4/03-4/10	0.005	
			0.018

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Particulate (Gross Beta) Control cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
RH	4/03-4/10	0.008	
VB	4/10-4/17		0.019
RH	4/10-4/17	0.017	
VB	4/17-4/24		0.013
RH	4/17-4/24	0.012	
VB	4/24-5/01		0.014
RH	4/24-5/01	0.015	
VB	5/01-5/08		0.016
RH	5/01-5/08	0.008	
VB	5/08-5/15		0.007
RH	5/08-5/15	0.008	
VB	5/15-5/22		0.011
RH	5/15-5/22	0.012	
VB	5/22-5/29		0.015
RH	5/22-5/29	0.020	
VB	5/29-6/05		0.014
RH	5/29-6/05	0.004	
VB	6/05-6/12		0.010
RH	6/05-6/12	0.010	
VB	6/12-6/19		0.019
RH	6/12-6/19	0.010	
VB	6/19-6/26		0.020
RH	6/19-6/26	0.014	
VB	6/26-7/03		0.019
RH	6/26-7/03	0.002	
VB	7/03-7/10		0.013
RH	7/03-7/10	0.013	
VB	7/10-7/17		0.011
RH	7/10-7/17	0.013	
VB	7/17-7/24		0.011
RH	7/17-7/24	0.008	
VB	7/24-7/31		0.020
RH	7/24-7/31	0.027	
VB	7/31-8/07		0.014
RH	7/31-8/07	0.014	
VB	8/07-8/14		0.021

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Particulate (Gross Beta) Control cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
RH	8/07-8/14	0.009	
VB	8/14-8/21		0.022
RH	8/14-8/21	0.026	
VB	8/21-8/28		0.023
RH	8/21-8/28	0.017	
VB	8/28-9/04		0.022
RH	8/28-9/04	0.012	
VB	9/04-9/11		0.024
RH	9/04-9/11	0.008	
VB	9/11-9/18		0.013
RH	9/11-9/18	0.011	
VB	9/18-9/25		0.020
RH	9/18-9/25	0.011	
VB	9/25-10/02		0.025
RH	9/25-10/02	0.025	
VB	10/02-10/09		0.016
RH	10/02-10/09	0.014	
VB	10/09-10/16		b
RH	10/09-10/16	0.019	
VB	10/16-10/23		0.016
RH	10/16-10/23	0.020	
VB	10/23-10/30		0.022
RH	10/23-10/30	0.011	
VB	10/30-11/06		0.026
RH	10/30-11/06	0.015	
VB	11/06-11/13		0.024
RH	11/06-11/13	0.009	
TV	11/13-11/20		0.029
RH	11/13-11/20	0.011	
VB	11/20-11/27		0.022
RH	11/20-11/27	0.014	
VB	11/27-12/04		0.012
RH	11/27-12/04	0.013	
VB	12/04-12/11		0.022
RH	12/04-12/11	0.008	
VB	12/11-12/18		0.016
RH	12/11-12/18	0.008	

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Particulate (Gross Beta) Control cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
VB	12/18-12/26		0.018
RH	12/18-12/26	0.010	

b No data, pump failure.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Radioiodine Control

These results are charcoal canister samples taken from control locations by MSDH and the Licensee which were analyzed for Radioiodine. The Licensee's sampler is located in Vicksburg (VB) 18 miles north of GGNS and designated as AS-3 (Control). The MSDH's sampler is located behind the Radiological Health Building (RH) in Jackson, 51 miles east northeast of the GGNS. The Lower Limit of Detection (LLD) required by the contract for Iodine-131 is 0.07 pCi/m3.

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
VB	12/27-1/02		<0.040
RH	12/27-1/02	<0.07	
VB	1/02-1/09		<0.023
RH	1/02-1/09	<0.07	
VB	1/09-1/16		<0.050
RH	1/09-1/16	<0.07	
VB	1/16-1/23		<0.043
RH	1/16-1/23	<0.07	
VB	1/23-1/30		<0.018
RH	1/23-1/30	<0.07	
VB	1/30-2/06		<0.033
RH	1/30-2/06	<0.07	
VB	2/06-2/13		<0.024
RH	2/06-2/13	<0.07	
VB	2/13-2/20		<0.025
RH	2/13-2/20	<0.07	
VB	2/20-2/27		<0.010
RH	2/20-2/27	<0.07	
VB	2/27-3/06		<0.014
RH	2/27-3/06	<0.07	
VB	3/06-3/13		<0.021
RH	3/06-3/13	<0.07	
VB	3/13-3/20		<0.014
RH	3/13-3/20	<0.07	
VB	3/20-3/27		<0.018
RH	3/20-3/27	<0.07	
VB	3/27-4/03		<0.021
RH	3/27-4/03	<0.07	

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Radioiodine Control cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
VB	4/03-4/10		<0.020
RH	4/03-4/10	<0.07	
VB	4/10-4/17		<0.015
RH	4/10-4/17	<0.07	
VB	4/17-4/24		<0.010
RH	4/17-4/24	<0.07	
VB	4/24-5/01		<0.011
RH	4/24-5/01	<0.07	
VB	5/01-5/08		<0.019
RH	5/01-5/08	<0.07	
VB	5/08-5/15		<0.013
RH	5/08-5/15	<0.07	
VB	5/15-5/22		<0.011
RH	5/15-5/22	<0.07	
VB	5/22-5/29		<0.016
RH	5/22-5/29	<0.07	
VB	5/29-6/05		<0.013
RH	5/29-6/05	<0.07	
VB	6/05-6/12		<0.024
RH	6/05-6/12	<0.07	
VB	6/12-6/19		<0.013
RH	6/12-6/19	<0.07	
VB	6/19-6/26		<0.015
RH	6/19-6/26	<0.07	
VB	6/26-7/03		<0.020
RH	6/26-7/03	<0.07	
VB	7/03-7/10		<0.014
RH	7/03-7/10	<0.07	
VB	7/10-7/17		<0.013
RH	7/10-7/17	<0.07	
VB	7/17-7/24		<0.011
RH	7/17-7/24	<0.07	
VB	7/24-7/31		<0.011
RH	7/24-7/31	<0.07	
VB	7/31-8/07		<0.013
RH	7/31-8/07	<0.07	
VB	8/07-8/14		<0.013

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Radioiodine Control cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
RH	8/07-8/14	<0.07	
VB	8/14-8/21		<0.013
RH	8/14-8/21	<0.07	
VB	8/21-8/28		<0.015
RH	8/21-8/28	<0.07	
VB	8/28-9/04		<0.013
RH	8/28-9/04	<0.07	
VB	9/04-9/11		<0.015
RH	9/04-9/11	<0.07	
VB	9/11-9/18		<0.015
RH	9/11-9/18	<0.07	
VB	9/18-9/25		<0.014
RH	9/18-9/25	<0.07	
VB	9/25-10/02		<0.022
RH	9/25-10/02	<0.07	
VB	10/02-10/09		<0.023
RH	10/02-10/09	<0.07	
VB	10/09-10/16		b
RH	10/09-10/16	<0.07	
VB	10/16-10/23		<0.019
RH	10/16-10/23	<0.07	
VB	10/23-10/30		<0.012
RH	10/23-10/30	<0.07	
VB	10/30-11/06		<0.018
RH	10/30-11/06	<0.07	
VB	11/06-11/13		<0.018
RH	11/06-11/13	<0.07	
TV	11/13-11/20		<0.020
RH	11/13-11/20	<0.07	
VB	11/20-11/27		<0.017
RH	11/20-11/27	<0.07	
VB	11/27-12/04		<0.012
RH	11/27-12/04	<0.07	
VB	12/04-12/11		<0.022
RH	12/04-12/11	<0.07	
VB	12/11-12/18		<0.016

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Radioiodine Control cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
RH	12/11-12/18	<0.07	
VB	12/18-12/26		<0.018
RH	12/18-12/26	<0.07	

b No data, pump failure.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Quarterly Composite (Gamma Isotopic) Control

These results are quarterly Air Particulate samples taken from control locations by MSDH and the Licensee which were analyzed for Gross Gamma Emitters. The Licensee's sampler is located in Vicksburg (VB) 18 miles north of GGNS and designated as AS-3 (Control). The MSDH's sampler is located behind the Radiological Health Building (RH) in Jackson, 51 miles east northeast of the GGNS. The Lower Limit of Detection (LLD) required by the contract for Cs-134 and Cs-137 is 0.05 pCi/m3.

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
VB	12/27-3/27		<0.05
RH	12/27-3/27	<0.01	
VB	3/27-6/26		<0.05
RH	3/27-6/26	<0.01	
VB	6/26-9/25		<0.05
RH	6/26-9/25	<0.01	
VB	9/25-12/26		<0.05
RH	9/25-12/26	<0.01	

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Gamma Isotopic for Cesium-137

These results are river water samples split with the Licensee and tested for Cesium-137 by Gamma Isotopic analysis. The Mississippi River Water Upstream (MRU) sample location is 2 miles north northwest of GGNS (Control). The Mississippi River Water Downstream (MRD) sample location is 2 miles west southwest of GGNS (Indicator). Licensee's Lower Limit of Detection (LLD) for Cesium-137 is 18 pCi/l which is the maximum LLD imposed by the Technical Specifications. The MSDH's LLD for Cesium-137 is 7 pCi/l. The contract requires an LLD of 15 pCi/l. The data for this isotope are reported as less than LLD in each case.

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
MRU	JAN 02, 1990	<LLD	<LLD
MRU	FEB 06, 1990	<LLD	<LLD
MRU	MAR 06, 1990	<LLD	<LLD
MRUc	MAR 06, 1990	<LLD	<LLD
MRU	APR 03, 1990	<LLD	<LLD
MRU	MAY 01, 1990	<LLD	<LLD
MRU	JUN 07, 1990	<LLD	<LLD
MRU	JUL 03, 1990	<LLD	<LLD
MRU	AUG 01, 1990	<LLD	<LLD
MRU	SEP 04, 1990	<LLD	<LLD
MRUc	SEP 04, 1990	<LLD	<LLD
MRU	OCT 02, 1990	<LLD	<LLD
MRU	NOV 06, 1990	<LLD	<LLD
MRU	DEC 04, 1990	<LLD	<LLD
MRD	JAN 02, 1990	<LLD	<LLD
MRD	FEB 06, 1990	<LLD	<LLD
MRD	MAR 06, 1990	<LLD	<LLD
MRDc	MAR 06, 1990	<LLD	<LLD
MRD	APR 03, 1990	<LLD	<LLD
MRD	MAY 01, 1990	<LLD	<LLD
MRD	JUN 07, 1990	<LLD	<LLD
MRD	JUL 03, 1990	<LLD	<LLD

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Gamma Isotopic for Cs-137 cont'd

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
MRD	AUG 01, 1990	<LLD	<LLD
MRD	SEP 04, 1990	<LLD	<LLD
MRD ^c	SEP 04, 1990	<LLD	<LLD
MRD	OCT 02, 1990	<LLD	<LLD
MRD	NOV 06, 1990	<LLD	<LLD
MRD	DEC 04, 1990	<LLD	<LLD

c Duplicate sample.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Gamma Isotopic Analysis

These results are river water samples split with the Licensee and tested by Gamma Isotopic analysis. The Mississippi River Water Upstream (MRU) sample location is 2 miles north northwest of GGNS (Control). The Mississippi River Water Downstream (MRD) sample location is 2 miles west southwest of GGNS (Indicator). The Licensee's Lower Limits of Detection (LLD), from their Technical Specifications as required by the contract, are: Mn-54, Co-58, Co-60, Nb-95, Cs-134, La-140: 15 pCi/l; Fe-59, Zn-65, Zr-95: 30 pCi/l; Ba-140: 60 pCi/l. The MSDH's LLD are: Mn-54, Cs-134: 6 pCi/l; Ba/La-140, Co-58/60, Nb-95: 15 pCi/l; Fe-59, Zn-65, Zr-95: 25 pCi/l, which are equal to or less than the contract requirement. The data for these isotopes are reported as less than LLD in each case.

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
MRU	JAN 02, 1990	<LLD	
MRU	FEB 06, 1990	<LLD	<LLD
MRU	MAR 06, 1990	<LLD	<LLD
MRUc	MAR 06, 1990		<LLD
MRU	APR 03, 1990	<LLD	<LLD
MRU	MAY 01, 1990	<LLD	<LLD
MRU	JUN 07, 1990	<LLD	<LLD
MRU	JUL 03, 1990	<LLD	<LLD
MRU	AUG 01, 1990	<LLD	<LLD
MRU	SEP 04, 1990	<LLD	<LLD
MRUc	SEP 04, 1990		<LLD
MRU	OCT 02, 1990	<LLD	<LLD
MRU	NOV 06, 1990	<LLD	<LLD
MRU	DEC 04, 1990	<LLD	<LLD
MRD	JAN 02, 1990	<LLD	<LLD
MRD	FEB 06, 1990	<LLD	<LLD
MRD	MAR 06, 1990	<LLD	<LLD
MRDc	MAR 06, 1990		<LLD
MRD	APR 03, 1990	<LLD	<LLD
MRD	MAY 01, 1990	<LLD	<LLD

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Gamma Isotopic Analysis cont'd

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
MRD	JUN 07, 1990	<LLD	<LLD
MRD	JUL 03, 1990	<LLD	<LLD
MRD	AUG 01, 1990	<LLD	<LLD
MRD	SEP 04, 1990	<LLD	<LLD
MRD ^c	SEP 04, 1990	<LLD	<LLD
MRD	OCT 02, 1990	<LLD	<LLD
MRD	NOV 06, 1990	<LLD	<LLD
MRD	DEC 04, 1990	<LLD	<LLD

c Duplicate sample.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Tritium

These results are river water samples split by MSDH and the Licensee and tested for Tritium using Liquid Scintillation analysis. The Mississippi River Water Upstream (MRU) sample location is 2 miles north northwest of GGNS (Control). The Mississippi River Water Downstream (MRD) sample location is 2 miles west southwest of GGNS (Indicator). Licensee's Lower Limit of Detection (LLD) for Tritium (H-3) as required by their Technical Specifications is 2000 pCi/l. The Licensee's LLD is computed individually for each sample and indicated by "<" below. The MSDH's LLD is 330 pCi/l. Licensee's results are a quarterly composite of the preceding three months. MSDH/DRH Tritium analyses are monthly.

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
MRU	JAN 02, 1990	<330	d
MRU	FEB 06, 1990	<330	d
MRU	MAR 06, 1990	<330	d
MRUc	MAR 06, 1990		<360
MRU	APR 03, 1990	<330	d
MRU	MAY 01, 1990	<330	d
MRU	JUN 07, 1990	<330	<368
MRU	JUL 03, 1990	<330	d
MRU	AUG 01, 1990	<330	d
MRU	SEP 04, 1990	<330	d
MRUc	SEP 04, 1990		<362
MRU	OCT 02, 1990	<330	d
MRU	NOV 06, 1990	<330	d
MRU	DEC 04, 1990	<330	<350
MRD	JAN 02, 1990	<330	d
MRD	FEB 06, 1990	<330	d
MRD	MAR 06, 1990	<330	d
MRDc	MAR 06, 1990		<360
MRD	APR 03, 1990	<330	d
MRD	MAY 01, 1990	<330	d
MRD	JUN 07, 1990	<330	<370
MRD	JUL 03, 1990	<330	d
MRD	AUG 01, 1990	<330	d
MRD	SEP 04, 1990	<330	d

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Tritium cont'd

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
MRDc	SEP 04, 1990		<485
MRD	OCT 02, 1990	<330	d
MRD	NOV 06, 1990	<330	d
MRD	DEC 04, 1990	<330	<350

c Duplicate.

d Composite sample, results below.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Gamma Isotopic Analysis

These samples are river sediments collected in duplicate and analyzed by Gamma Isotopic methods. MSDH/DRH designates their control as Mississippi River Upstream (MRU) and their indicator as Mississippi River Downstream (MRD). The Licensee's designation for control is Upper Grand Gulf Landing (UGGL) and indicator is Hamilton Lake (HL). The controls are both located approximately 2 miles north northwest of GGNS. The indicators are located approximately 2 miles west southwest of GGNS. The Licensee's Lower Limits of Detection (LLD) for the following isotopes for sediment samples are: Mn-54, Co-58, Co-60, Cs-134: 150 pCi/kg (dry) and Cs-137: 180 pCi/kg (dry); the Cs-134/137 LLD are as specified in their Technical Specifications. The contract requirements for MSDH/DRH for Cs-134/137 are 150 pCi/l and 180 pCi/l respectively.

Location Name	Date	MSDH Results pCi/kg	Licensee Results pCi/kg
MRU	5/01/90	<150	
UGGL	5/01/90		<150
MRD	5/01/90	<150	
HL	5/01/90		<150
MRU	11/6/90	<150	
UGGL	11/6/90		<150
UGGLc	11/6/90		<150
MRD	11/6/90	<150	
HL	11/6/90		<150
HLC	11/6/90		<150

c Duplicate sample.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Gamma Isotopic Analysis

These results are Alcorn Dairy Milk samples split by MSDH and the Licensee and analyzed by Gamma Isotopic methods. Alcorn Dairy is located eleven miles southwest of GGNS. Samples are labeled RH for Radiological Health and GG for Licensee. The Licensee's Lower Limits of Detection for Milk are as follows: Cs-134, La-140: 15 pCi/l; Cs-137: 18 pCi/l; Ba-140: 60 pCi/l. These limits are in accordance with their Technical Specifications. The contract requirement imposed on MSDH/DRH for Cs-134/137, Ba/La-140 is 15 pCi/l.

Sample Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
RH	5/02/90	<15	
GG	5/02/90		<15
RH	11/05/90	<15	
GG	11/13/90		<15

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Radioiodine

These results are Alcorn Dairy Milk samples split by the MSDH and the Licensee and analyzed for radioiodine by Gamma Isotopic methods. Alcorn Dairy is located eleven miles southwest of GGNS. Samples are labeled RH for Radiological Health and GG for Licensee. The MSDH's Lower Limit of Detection for Iodine in Milk is 1 pCi/l, as required by the contract.

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
RH	5/02/90	<1	
GG	5/02/90		<0.4
GGc	5/02/90		<0.8
RH	11/05/90	<1	
GG	11/13/90		<0.3

C Duplicate sample.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Gamma Isotopic Analysis

These results are for edible fish samples taken from the Mississippi River upstream (MRU) approximately 2 miles north northwest of GGNS and downstream (MRD) approximately 2 miles west southwest of GGNS. Each sample was analyzed by Gamma Isotopic methods. The Licensee's Lower Limits of Detection for specific isotopes are: Mn-54, Co-58, Co-60, Cs-134: 130 pCi/kg; Cs-137: 150 pCi/kg; and Fe-59, Zn-65: 260 pCi/kg.

Location Name	Date	MSDH Results pCi/kg	Licensee Results pCi/kg
MRU	5/11/90	<130	<130
MRD	5/11/90	<130	<130
MRU	11/20/90	<130	<130
MRD	11/20/90	<130	<130

These results are for venison samples taken separately by each agency from the Bucksnot Hunting Club (BHC). These samples were analyzed by Gamma Isotopic methods. The Licensee's Lower Limits of Detection are: Mn-54, Co-58/60, Cs-134: 130 pCi/kg; Cs-137: 150 pCi/kg; Fe-59, Zn-65: 260 pCi/kg.

Location Name	Date	MSDH Results pCi/kg	Licensee Results pCi/kg
BHC	11/26/90	<130	<130

Note: The LLD used by the Licensee in the above analyses are in accordance with their Technical Specifications. The LLD imposed on MSDH/DRH by the contract for the same analyses are: Mn-54, Co-58/60, Cs-134/137: 130 pCi/kg; Fe-59, Zn-65: 260 pCi/kg.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Gamma Isotopic Analysis

These results are Vegetation samples taken from Sectors R, K, and J. The individual vegetables are identified as collards (C), marigolds (MG), zucchini (Z), mustard (MS), swiss chard (SC), sunflower leaves (SL), and brussel sprout leaves (BS). These samples were dried in an oven at 100 degrees and analyzed by Gamma Isotopic methods. The Licensee's Lower Limits of Detection for the following isotopes are: I-131, Cs-134: 60 pCi/kg; and Cs-137: 80 pCi/kg, as specified in their Technical Specifications. The contract requirements for MSDH/DRH are: I-131, Cs-134 and Cs-137: 60 pCi/kg.

Location Name	Date	MSDH Results pCi/kg	Licensee Results pCi/kg
C-K	6/06/90	<60	<60
C-J	6/06/90	<60	<60
C-R	6/06/90	<60	<60
C-R	7/09/90	<60	<60
C-K	7/09/90	<60	<60
SL-J	7/09/90	<60	<60
C-K	9/04/90	<60	<60
SC-K	9/04/90	<60	<60
MG-R	9/05/90	<60	<60
Z-R	9/05/90	<60	<60
SC-J	9/05/90	<60	<60
BS-J	9/05/90	<60	<60
MS-J	9/05/90	<60	<60

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

Gamma Isotopic Analysis cont.

Location Name	Date	MSDH Results pCi/kg	Licensee Results pCi/kg
MS-R	11/05/90	<60	<60
C-K	11/05/90	<60	<60
SC-J	11/05/90	<60	<60
C-R	12/03/90	<60	<60
C-K	12/03/90	<60	<60
SC-J	12/03/90	<60	<60

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

EPA Cross-Check Results--1990

All values reported in pCi/l unless otherwise indicated.

		Reported	Known
January	Strontium in Water		
	Strontium 89	21, 21, 21	25±8.5
	Strontium 90	25, 25, 25	20±2.6
	Gross Alpha/Beta in Water		
	Alpha	15, 15, 15	12±8.6
	Beta	13, 13, 13	12±8.6
February	Gamma in Water		
	Cobalt 60	15, 15, 15	15±8.7
	Zinc 65	125, 125, 125	139±24
	Ruthenium 106	135, 135, 135	139±24
	Cesium 134	17, 17, 17	18±8.7
	Cesium 137	19, 19, 19	18±8.7
	Barium 133	77, 77, 77	74±12
	Tritium in Water		
	Tritium	5046, 5100, 5107	4976±863
March	Radium in Water		
	Radium 226	5.0, 5.1, 5.1	4.90±1.2
	Radium 228	13.7, 13.8, 13.8	12.7±3.3
	Air Filter		
	Alpha	6, 6, 6	5±8.6e
	Beta	31, 31, 31	31±8.6e
	Strontium 90	9, 9, 9	10±2.6e
	Cesium 137	13, 13, 13	10±8.6e
	Uranium in Water		
	Uranium	5, 5, 5	4±10.4

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

EPA Cross-Check results cont'd

April	Performance Evaluation Intercomparison Study	Reported	Known
	Alpha	82, 82, 82	90±39.9
	Radium 226	4.6, 4.6, 4.6	5.0±1.4
	Radium 228	10.0, 10.0, 9.9	10.2±2.6
	Uranium	31, 31, 31	20±10.4
	Beta	54, 54, 54	52±8.6
	Strontium 89	9, 9, 9	10±8.6
	Strontium 90	10, 10, 10	10±2.6
	Cesium 134	13, 13, 13	15±8.6
	Cesium 137	15, 15, 15	15±8.6
	Radionuclides in Milk		
	Strontium 89	15, 15, 15	23±8.6
	Strontium 90	28, 28, 28	23±8.7
	Iodine 131	75, 75, 75	99±17.3
	Cesium 137	30, 30, 30	24±8.6
	Potassium	1900, 1900, 1925	1550±135
May	Strontium in Water		
	Strontium 89	7, 7, 7	7±8.6
	Strontium 90	7, 7, 7	7±8.6
	Gross Alpha/Beta in Water		
	Alpha	20, 20, 20	22±10.4
	Beta	16, 16, 16	15±8.6
June	Radionuclides in Water		
	Barium 133	70, 70, 70	99±18
	Cobalt 60	31, 31, 31	24±8.6
	Zinc 65	180, 180, 180	148±26
	Ruthenium 106	195, 195, 195	210±37
	Cesium 134	25, 25, 25	24±8.6
	Cesium 137	32, 32, 32	25±8.6
	Tritium in Water		
	Tritium	3034, 3001, 2967	2933±622

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

EIA Cross-Check Results cont'd

		Reported	Known
July	Radium in Water		
	Radium 226	10.4, 10.4, 10.4	12.1±3.1
	Radium 228	6.0, 6.0, 6.0	5.1±2.3
	Uranium in Water		
	Uranium	12.2, 12.2, 12.2	20.8±5.2
August	Iodine in Water		
	Iodine	41, 42, 42	39±10.4
	Air Filter		
	Alpha	10, 10, 10	10±8.6e
	Beta	62, 62, 62	62±8.7e
	Iodine 131	20, 20, 20	20±8.7e
	Cesium 137	20, 20, 20	20±8.6e
September	Gross Alpha/Beta		
	in Water		
	Alpha	10, 10, 10	10±8.6
	Beta	12, 12, 12	10±8.6
	Strontium in Water		
	Strontium 89	9, 9, 9	10±8.7
	Strontium 90	10, 10, 10	9±2.6
October	Radionuclides in Water		
	Barium 133	112, 112, 112	110±19.1
	Cobalt 60	23, 23, 23	20±8.6
	Zinc 65	110, 110, 110	115±20.8
	Ruthenium 106	140, 141, 141	151±26
	Cesium 134	12, 12, 12	12±8.6
	Cesium 137	15, 15, 15	12±8.6
	Tritium in Water		
	Tritium	7080, 7061, 7053	7203±1250

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1990

EPA Cross-Check Results cont'd

October	Radionuclides in Milk	Reported	Known
	Strontium 89	8, 8, 8	16±8.7
	Strontium 90	26, 26, 26	20±8.7
	Iodine 131	63, 62, 63	58±10.4
	Cesium 137	22, 22, 22	20±8.7
	Potassium	1984, 2002, 2000	1700±147
Performance Evaluation Intercomparison Study			
	Alpha	51, 51, 51	62±27.8
	Radium 226	12.9, 12.9, 12.9	13.6±3.5
	Radium 228	6.5, 6.5, 6.5	5.0±2.3
	Uranium	7.5, 7.5, 7.5	10.2±5.2
	Beta	43, 43, 43	53±8.7
	Strontium 89	17, 17, 17	20±8.7
	Strontium 90	15, 15, 15	15±8.7
	Cesium 134	7, 7, 7	7±8.7
	Cesium 137	7, 7, 7	5±8.7
November	Radium in Water		
	Radium 226	7.2, 7.2, 7.2	7.4±2.3
	Radium 228	8.0, 8.0, 8.2	7.7±2.4
	Uranium in Water		
	Uranium	27, 27, 27	35.5±6.2

e Values are reported as pCi/filter.