

REPORT TO THE NUCLEAR REGULATORY COMMISSION  
ENVIRONMENTAL MONITORING AT GRAND GULF NUCLEAR STATION  
CALENDAR YEAR 1989  
NRC CONTRACT NUMBER NRC-29-83-621

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



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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, Claiborne County, Mississippi.

The results detailed in this report represent the eighth year of this contract with the State of Mississippi, Calendar Year 1989.

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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-6 (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	12/27-1/03		.033
AA	12/27-1/03	.011	
TC	1/03-1/10		.025
AA	1/03-1/10	.011	
TC	1/10-1/17		.016
AA	1/10-1/17	<.01	
TC	1/17-1/24		.029
AA	1/17-1/24	.010	
TC	1/24-1/31		.028
AA	1/24-1/31	.012	
TC	1/31-2/07		.017
AA	1/31-2/09	.00	
TC	2/07-2/14		<.005
AA	2/09-2/14	.002	
TC	2/14-2/21		<.014a
AA	2/14-2/21	.004	
TC	2/21-2/28		.024
AA	2/21-2/28	.018	
TC	2/28-3/07		.018
AA	2/28-3/07	.007	
TC	3/07-3/14		.024
AA	3/07-3/14	.010	
TC	3/14-3/21		.024
AA	3/14-3/21	.011	
TC	3/21-3/28		.017
AA	3/21-3/28	.008	
TC	3/28-4/04		.014
AA	3/28-4/04	.005	



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Particulate (Gross Beta) cont'd

Location Name	Date	MSDH Result+ pCi/m3	Licensee Results pCi/m3
TC	4/04-4/11		.019
AA	4/04-4/11	.008	
TC	4/11-4/18		.033
AA	4/11-4/18	.006	
TC	4/18-4/25		.019
AA	4/18-4/25	.017	
TC	4/25-5/02		b
AA	4/25-5/02	.020	
TC	5/02-5/09		.017
AA	5/02-5/09	.012	
TC	5/09-5/16		<.007
AA	5/09-5/16	.013	
TC	5/16-5/23		.034
AA	5/16-5/23	.013	
TC	5/23-5/30		.029
AA	5/23-5/30	.023	
TC	5/30-6/06		.011
AA	5/30-6/06	.007	
TC	6/06-6/13		.022
AA	6/06-6/13	.020	
TC	6/13-6/20		.016
AA	6/13-6/20	.021	
TC	6/20-6/27		.014
AA	6/20-6/27	.012	
TC	6/27-7/05		.011
AA	6/27-7/05	.012	
TC	7/05-7/11		.007
AA	7/05-7/11	.017	
TC	7/11-7/18		.013
AA	7/11-7/18	.023	
TC	7/18-7/25		.017
AA	7/18-7/25	.020	
TC	7/25-8/01		.012
AA	7/25-8/01	.019	
TC	8/01-8/08		.012
AA	8/01-8/08	.030	

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Particulate (Gross Beta) cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
TC	8/08-8/15		.020
AA	8/08-8/15	.050	
TC	8/15-8/22		.030
AA	8/15-8/22	.047	
TC	8/22-8/29		.008
AA	8/22-8/29	.008	
TC	8/29-9/05		.01
AA	8/29-9/05	.018	
TC	9/05-9/12		.009
AA	9/05-9/12	.021	
TC	9/12-9/19		.020
AA	9/12-9/19	.048	
TC	9/19-9/26		.026
AA	9/19-9/26	.059	
TC	9/26-10/03		.021
AA	9/26-10/03	.031	
TC	10/03-10/10		.038
AA	10/03-10/10	.077	
TC	10/10-10/17		.037
AA	10/10-10/17	.048	
TC	10/17-10/24		.022
AA	10/17-10/24	.010	
TC	10/24-10/31		.037
AA	10/24-10/31	.038	
TC	10/31-11/07		.037
AA	10/31-11/07	.023	
TC	11/07-11/14		.028
AA	11/07-11/14	.025	
TC	11/14-11/21		.031
AA	11/14-11/21	.015	
TC	11/21-11/28		.004
AA	11/21-11/28	.019	
TC	11/28-12/05		.024
AA	11/28-12/05	.025	
TC	12/05-12/12		.019
AA	12/05-12/12	.019	
TC	12/12-12/19		.028

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Particulate (Gross Beta) cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
AA	12/12-12/19	.009	
TC	12/19-12/27		.031
AA	12/19-12/27	c	

- a LLD exceeded due to short sample run time.
- b No data; pump failure.
- c No data; motor out.

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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-6 (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	12/27-1/03		<.005
AA	12/27-1/03	<.07	
TC	1/03-1/10		<.010
AA	1/03-1/10	<.07	
TC	1/10-1/17		<.009
AA	1/10-1/17	<.07	
TC	1/17-1/24		<.006
AA	1/17-1/24	<.07	
TC	1/24-1/31		<.008
AA	1/24-1/31	<.07	
TC	1/31-2/07		<.010
AA	1/31-2/09	<.07	
TC	2/07-2/14		<.028
AA	2/09-2/14	<.07	
TC	2/14-2/21		<.068
AA	2/14-2/21	<.07	
TC	2/21-2/28		<.010
AA	2/21-2/28	<.07	
TC	2/28-3/07		<.009
AA	2/28-3/07	<.07	
TC	3/07-3/14		<.025
AA	3/07-3/14	<.07	
TC	3/14-3/21		<.020
AA	3/14-3/21	<.07	
TC	3/21-3/28		<.016
AA	3/21-3/28	<.07	
TC	3/28-4/04		<.021
AA	3/28-4/04	<.07	



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Radioiodine cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
TC	4/04-4/11		<.024
AA	4/04-4/11	<.07	
TC	4/11-4/18		<.020
AA	4/11-4/18	<.07	
TC	4/18-4/25		<.030
AA	4/18-4/25	<.07	
TC	4/25-5/02		b
AA	4/25-5/02	<.07	
TC	5/02-5/09		<.027
AA	5/02-5/09	<.07	
TC	5/09-5/16		<.043
AA	5/09-5/16	<.07	
TC	5/16-5/23		<.041
AA	5/16-5/23	<.07	
TC	5/23-5/30		<.022
AA	5/23-5/30	<.07	
TC	5/30-6/06		<.020
AA	5/30-6/06	<.07	
TC	6/06-6/13		<.029
AA	6/06-6/13	<.07	
TC	6/13-6/20		<.035
AA	6/13-6/20	<.07	
TC	6/20-6/27		<.017
AA	6/20-6/27	<.07	
TC	6/27-7/05		<.020
AA	6/27-7/05	<.07	
TC	7/05-7/11		<.035
AA	7/05-7/11	<.07	
TC	7/11-7/18		<.024
AA	7/11-7/18	<.07	
TC	7/18-7/25		<.022
AA	7/18-7/25	<.07	
TC	7/25-8/01		<.021
AA	7/25-8/01	<.07	
TC	8/01-8/08		<.016
AA	8/01-8/08	<.07	

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Radioiodine cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
TC	8/08-8/15		<.018
AA	8/08-8/15	<.07	
TC	8/15-8/22		<.024
AA	8/15-8/22	<.07	
TC	8/22-8/29		<.020
AA	8/22-8/29	<.07	
TC	8/29-9/05		<.031
AA	8/29-9/05	<.07	
TC	9/05-9/12		<.021
AA	9/05-9/12	<.07	
TC	9/12-9/19		<.022
AA	9/12-9/19	<.07	
TC	9/19-9/26		<.020
AA	9/19-9/26	<.07	
TC	9/26-10/03		<.032
AA	9/26-10/03	<.07	
TC	10/03-10/10		<.024
AA	10/03-10/10	<.07	
TC	10/10-10/17		<.031
AA	10/10-10/17	<.07	
TC	10/17-10/24		<.018
AA	10/17-10/24	<.07	
TC	10/24-10/31		<.020
AA	10/24-10/31	<.07	
TC	10/31-11/07		<.029
AA	10/31-11/07	<.07	
TC	11/07-11/14		<.032
AA	11/07-11/14	<.07	
TC	11/14-11/21		<.022
AA	11/14-11/21	<.07	
TC	11/21-11/28		<.018
AA	11/21-11/28	<.07	
TC	11/28-12/05		<.028
AA	11/28-12/05	<.07	
TC	12/05-12/12		<.029
AA	12/05-12/12	<.07	
TC	12/12-12/19		<.021

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Radioiodine cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
AA	12/12-12/19	<.07	
TC	12/19-12/27		<.022
AA	12/19-12/27	c	

b No data; pump failure.

c No data; motor out.

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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-6 (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 is 0.05 pCi/m<sup>3</sup> for Cs-134 and Cs-137.

Location Name	Date	MSDH Results pCi/m <sup>3</sup>	Licensee Results pCi/m <sup>3</sup>
TC	12/27-3/28		.023
AA	12/27-3/28	<.01	
TC	3/28-6/27		.021
AA	3/28-6/27	<.01	
TC	6/27-9/26		.015
AA	6/27-9/26	<.01	
TC	9/26-12/27		.027
AA	9/26-12/27	<.01	



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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 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	12/27-1/03		.032
RH	12/27-1/03	.011	
VB	1/03-1/10		.028
RH	1/03-1/10	.005	
VB	1/10-1/17		.013
RH	1/10-1/17	<.01	
VB	1/17-1/24		.029
RH	1/17-1/24	.007	
VB	1/24-1/31		.030
RH	1/24-1/31	.009	
VB	1/31-2/07		.022
RH	1/31-2/09	.011	
VB	2/07-2/14		.031
RH	2/09-2/14	.005	
VB	2/14-2/21		.016
RH	2/14-2/21	.004	
VB	2/21-2/28		.025
RH	2/21-2/28	.008	
VB	2/28-3/07		.017
RH	2/28-3/07	d	
VB	3/07-3/14		.025
RH	3/07-3/14	d	
VB	3/14-3/21		.023
RH	3/14-3/21	d	
VB	3/21-3/28		.016
RH	3/21-3/28	d	
VB	3/28-4/04		.013
RH	3/28-4/04	d	
VB	4/04-4/11		.016

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Particulate (Gross Beta) cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
RH	4/07-4/11	.016	
VB	4/11-4/18		.032
RH	4/11-4/18	.042	
VB	4/18-4/25		.023
RH	4/18-4/25	.013	
VB	4/25-5/02		.018
RH	4/25-5/02	.006	
VB	5/02-5/09		.016
RH	5/02-5/09	.007	
VB	5/09-5/16		.015
RH	5/09-5/16	.008	
VB	5/16-5/23		.021
RH	5/16-5/23	.009	
VB	5/23-5/30		.025
RH	5/23-5/30	.020	
VB	5/30-6/06		.008
RH	5/30-6/06	.003	
VB	6/06-6/13		.018
RH	6/06-6/13	.014	
VB	6/13-6/20		.010
RH	6/13-6/20	.014	
VB	6/20-6/27		.010
RH	6/20-6/27	.010	
VB	6/27-7/05		.009
RH	6/27-7/05	.006	
VB	7/05-7/11		<.004
RH	7/05-7/11	.007	
VB	7/11-7/18		.012
RH	7/11-7/18	.015	
VB	7/18-7/25		.014
RH	7/18-7/25	.018	
VB	7/25-8/01		.016
RH	7/25-8/01	.012	
VB	8/01-8/08		.016
RH	8/01-8/08	.012	
VB	8/08-8/15		.025

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Particulate (Gross Beta) cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
RH	8/08-8/15	.009	
VB	8/15-8/22		.038
RH	8/15-8/22	.026	
VB	8/22-8/29		.010
RH	8/22-8/29	.015	
VB	8/29-9/05		.019
RH	8/29-9/05	.016	
VB	9/05-9/12		.012
RH	9/05-9/12	.012	
VB	9/12-9/19		.022
RH	9/12-9/19	.002	
VB	9/19-9/26		.028
RH	9/19-9/26	.011	
VB	9/26-10/03		.025
RH	9/26-10/03	.013	
VB	10/03-10/10		.045
RH	10/03-10/10	.023	
VB	10/10-10/17		.038
RH	10/10-10/17	.003	
VB	10/17-10/24		.026
RH	10/17-10/24	.010	
VB	10/24-10/31		.045
RH	10/24-10/31	.028	
VB	10/31-11/07		.036
RH	10/31-11/07	.019	
VB	11/07-11/14		.028
RH	11/07-11/14	.017	
TV	11/14-11/21		.029
RH	11/14-11/21	.019	
VB	11/21-11/28		.020
RH	11/21-11/28	.015	
VB	11/28-12/05		.032
RH	11/28-12/05	.020	
VB	12/05-12/12		.016
RH	12/05-12/12	.011	
VB	12/12-12/19		.027
RH	12/12-12/19	.010	

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Particulate (Gross Beta) cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
VB	12/19-12/27		.032
RH	12/19-12/27	.029	

d No data, blower was inoperable. (New blower installed 4/07)



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Radioiodine

These results are charcoal canister samples duplicated 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 GGNP. 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	12/27-1/03		<.005
RH	12/27-1/03	<.07	
VB	1/03-1/10		<.010
RH	1/03-1/10	<.07	
VB	1/10-1/17		<.009
RH	1/10-1/17	<.07	
VB	1/17-1/24		<.006
RH	1/17-1/24	<.07	
VB	1/24-1/31		<.008
RH	1/24-1/31	<.07	
VB	1/31-2/07		<.010
RH	1/31-2/09	<.07	
VB	2/07-2/14		<.028
RH	2/09-2/14	<.07	
VB	2/14-2/21		<.008
RH	2/14-2/21	<.07	
VB	2/21-2/28		<.010
RH	2/21-2/28	<.07	
VB	2/28-3/07		<.009
RH	2/28-3/07	d	
VB	3/07-3/14		<.025
RH	3/07-3/14	d	
VB	3/14-3/21		<.020
RH	3/14-3/21	d	
VB	3/21-3/28		<.016
RH	3/21-3/28	d	
VB	3/28-4/04		<.021
RH	3/28-4/04	d	

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Radioiodine cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
VB	4/04-4/11		<.024
RH	4/07-4/11	<.07	
VB	4/11-4/18		<.020
RH	4/11-4/18	<.07	
VB	4/18-4/25		<.030
RH	4/18-4/25	<.07	
VB	4/25-5/02		<.033
RH	4/25-5/02	<.07	
VB	5/02-5/09		<.027
RH	5/02-5/09	<.07	
VB	5/09-5/16		<.020
RH	5/09-5/16	<.07	
VB	5/16-5/23		<.029
RH	5/16-5/23	<.07	
VB	5/23-5/30		<.022
RH	5/23-5/30	<.07	
VB	5/30-6/06		<.020
RH	5/30-6/06	<.07	
VB	6/06-6/13		<.029
RH	6/06-6/13	<.07	
VB	6/13-6/20		<.035
RH	6/13-6/20	<.07	
VB	6/20-6/27		<.017
RH	6/20-6/27	<.07	
VB	6/27-7/05		<.020
RH	6/27-7/05	<.07	
VB	7/05-7/11		<.035
RH	7/05-7/11	<.07	
VB	7/11-7/18		<.024
RH	7/11-7/18	<.07	
VB	7/18-7/25		<.022
RH	7/18-7/25	<.07	
VB	7/25-8/01		<.021
RH	7/25-8/01	<.07	
VB	8/01-8/08		<.016
RH	8/01-8/08	<.07	
VB	8/08-8/15		<.018

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Radioiodine cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
RH	8/08-8/15	<.07	
VB	8/15-8/22		<.024
RH	8/15-8/22	<.07	
VB	8/22-8/29		<.020
RH	8/22-8/29	<.07	
VB	8/29-9/05		<.031
RH	8/29-9/05	<.07	
VB	9/05-9/12		<.021
RH	9/05-9/12	<.07	
VB	9/12-9/19		<.022
RH	9/12-9/19	<.07	
VB	9/19-9/26		<.020
RH	9/19-9/26	<.07	
VB	9/26-10/03		<.032
RH	9/26-10/03	<.07	
VB	10/03-10/10		<.024
RH	10/03-10/10	<.07	
VB	10/10-10/17		<.031
RH	10/10-10/17	<.07	
VB	10/17-10/24		<.018
RH	10/17-10/24	<.07	
VB	10/24-10/31		<.020
RH	10/24-10/31	<.07	
VB	10/31-11/07		<.029
RH	10/31-11/07	<.07	
VB	11/07-11/14		<.032
RH	11/07-11/14	<.07	
TV	11/14-11/21		<.022
RH	11/14-11/21	<.07	
VB	11/21-11/28		<.018
RH	11/21-11/28	<.07	
VB	11/28-12/05		<.028
RH	11/28-12/05	<.07	
VB	12/05-12/12		<.029
RH	12/05-12/12	<.07	
VB	12/12-12/19		<.021

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Radioiodine cont'd

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
RH	12/12-12/19	<.07	
VB	12/19-12/27		<.022
RH	12/19-12/27	<.07	

d No data, blower was inoperable. (New blower installed 4/07)



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Quarterly Composite (Gamma Isotopic)

These results are quarterly Air Particulate samples duplicated 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 is 0.05 pCi/m3 for Cs-134 and Cs-137.

Location Name	Date	MSDH Results pCi/m3	Licensee Results pCi/m3
VB	12/27-3/28		.024
RH	12/27-3/28	<.01	
VB	3/28-6/27		.017
RH	3/28-6/27	<.01	
VB	6/27-9/26		.018
RH	6/27-9/26	<.01	
VB	9/26-12/27		.031
RH	9/26-12/27	<.01	

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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 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 12, 1989	<LLD	
MRU	JAN 12, 1989		<LLD
MRU	FEB 09, 1989	<LLD	<LLD
MRU	MAR 14, 1989	<LLD	<LLD
MRU	MAR 14, 1989		<LLD
MRU	APR 13, 1989	<LLD	<LLD
MRU	MAY 11, 1989	<LLD	<LLD
MRU	JUN 08, 1989	<LLD	<LLD
MRU	JUL 13, 1989	<LLD	<LLD
MRU	AUG 03, 1989	<LLD	<LLD
MRU	SEP 05, 1989	<LLD	<LLD
MRU	OCT 02, 1989	<LLD	<LLD
MRU	NOV 01, 1989	<LLD	<LLD
MRU	DEC 05, 1989	<LLD	<LLD
MRD	JAN 12, 1989	<LLD	<LLD
MRD	JAN 12, 1989		<LLD
MRD	FEB 09, 1989	<LLD	<LLD
MRD	MAR 14, 1989	<LLD	<LLD
MRD	MAR 14, 1989		<LLD
MRD	APR 13, 1989	<LLD	<LLD
MRD	MAY 11, 1989	<LLD	<LLD
MRD	JUN 08, 1989	<LLD	<LLD
MRD	JUL 13, 1989	<LLD	<LLD



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Gamma Isotopic for Cs-137 cont'd

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
MRD	AUG 03, 1989	<LLD	<LLD
MRD	SEP 05, 1989	<LLD	<LLD
MRD	OCT 02, 1989	<LLD	<LLD
MRD	NOV 01, 1989	<LLD	<LLD
MRD	DEC 05, 1989	<LLD	<LLD

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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 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 12, 1989	<LLD	
MRU	JAN 12, 1989		<LLD
MRU	FEB 09, 1989	<LLD	<LLD
MRU	MAR 14, 1989	<LLD	<LLD
MRU	MAR 14, 1989		<LLD
MRU	APR 13, 1989	<LLD	<LLD
MRU	MAY 11, 1989	<LLD	<LLD
MRU	JUN 08, 1989	<LLD	<LLD
MRU	JUL 13, 1989	<LLD	<LLD
MRU	AUG 03, 1989	<LLD	<LLD
MRU	SEP 05, 1989	<LLD	<LLD
MRU	OCT 02, 1989	<LLD	<LLD
MRU	NOV 01, 1989	<LLD	<LLD
MRU	DEC 05, 1989	<LLD	<LLD
MRD	JAN 12, 1989	<LLD	<LLD
MRD	JAN 12, 1989		<LLD
MRD	FEB 09, 1989	<LLD	<LLD
MRD	MAR 14, 1989	<LLD	<LLD
MRD	MAR 14, 1989		<LLD
MRD	APR 13, 1989	<LLD	<LLD



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Gamma Isotopic Analysis cont'd

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
MRD	MAY 11, 1989	<LLD	<LLD
MRD	JUN 08, 1989	<LLD	<LLD
MRD	JUL 13, 1989	<LLD	<LLD
MRD	AUG 03, 1989	<LLD	<LLD
MRD	SEP 05, 1989	<LLD	<LLD
MRD	OCT 02, 1989	<LLD	<LLD
MRD	NOV 01, 1989	<LLD	<LLD
MRD	DEC 05, 1989	<LLD	<LLD

GRAND GULF NUCLEAR STATION  
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CY 1989

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 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 12, 1989	<330	e
MRU	JAN 12, 1989		e
MRU	FEB 09, 1989	<330	e
MRU	MAR 14, 1989	<330	e
MRU	MAR 14, 1989		<460
MRU	APR 13, 1989	<330	e
MRU	MAY 11, 1989	<330	e
MRU	JUN 08, 1989	<330	<460
MRU	JUL 13, 1989	341	e
MRU	AUG 03, 1989	f	e
MRU	SEP 05, 1989	<330	<369
MRU	OCT 02, 1989	<330	e
MRU	NOV 01, 1989	<330	e
MRU	DEC 05, 1989	<330	<367
MRD	JAN 12, 1989	<330	e
MRD	JAN 12, 1989		e
MRD	FEB 09, 1989	<330	e
MRD	MAR 14, 1989	<330	e
MRD	MAR 14, 1989		<460
MRD	APR 13, 1989	<330	e
MRD	MAY 11, 1989	<330	e
MRD	JUN 08, 1989	<330	<440
MRD	JUL 13, 1989	<330	e
MRD	AUG 03, 1989	f	e

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Tritium cont'd

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
MRD	SEP 05, 1989	<330	<369
MRD	OCT 02, 1989	<330	e
MRD	NOV 01, 1989	<330	e
MRD	DEC 05, 1989	<330	<367

e Composite sample, results below.

f No sample taken.



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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	5/11/89	<150	
UGGL	5/11/89		<180
MRD	5/11/89	<150	
HL	5/11/89		<180
MRU	11/1/89	<150	
UGGL	11/1/89		<180
MRD	11/1/89	<150	
HL	11/1/89		<180



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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.

Location Name	Date	MSDH Results pCi/l	Licensee Results pCi/l
RH	1/10/89	<15	
GG	1/10/89		<18
RH	2/14/89	<15	
GG	2/14/89		<18
RH	2/21/89	<15	
GG	2/21/89		<18
RH	3/13/89	<15	
GG	3/13/89		<18
RH	4/19/89	<15	
GG	4/19/89		<18
RH	5/09/89	<15	
GG	5/09/89		<18
RH	6/07/89	<15	
GG	6/07/89		<18
RH	7/10/89	<15	
GG	7/10/89		<18
RH	8/09/89	<15	
GG	8/09/89		<18
RH	9/05/89	<15	
GG	9/05/89		<18
RH	10/02/89	<15	
GG	10/02/89		<18
RH	11/01/89	<15	
GG	11/01/89		<18
RH	11/15/89	<15	
GG	11/15/89		<18

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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	1/10/89	<1	
GG	1/10/89		<.5
RH	2/14/89	<1	
GG	2/14/89		<.3
RH	2/21/89	<1	
GG	2/21/89		<.6
RH	3/13/89	<1	
GG	3/13/89		<.3
RH	4/19/89	<1	
GG	4/19/89		<.6
RH	5/09/89	<1	
GG	5/09/89		<.4
RH	6/07/89	<1	
GG	6/07/89		<.4
RH	7/10/89	<1	
GG	7/10/89		<.3
RH	8/09/89	<1	
GG	8/09/89		<.7
RH	9/05/89	<1	
GG	9/05/89		<.3
RH	10/02/89	<1	
GG	10/02/89		<.3
RH	11/01/89	<1	
GG	11/01/89		<.2
RH	11/15/89	<1	
GG	11/15/89		<.4

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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	5/08/89	<130	<130
MRD	5/08/89	<130	<130
MRU	11/15/89	g	<130
MRD	11/15/89	g	<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: 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	11/27/89	<130	
BHC	12/05/89		<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.

g No data, no split sample received from Licensee.



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Gamma Isotopic Analysis

These results are Vegetation samples taken from Sectors R, K, and J. The individual vegetables are identified as collards (C), ornamental cabbage (OC), swiss chard (SC), and hopson rape (HR). 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-R	1/10/89	<60	<60
OC-K	1/10/89	<60	<60
C-J	1/10/89	<60	<60
SC-R	4/05/89	<60	<60
HR-J	4/05/89	<60	<60
SC-R	9/05/89	<60	<60
SC-J	9/05/89	<60	<60
SC-K	9/05/89	<60	<60



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EPA Cross-Check Results--1989

All values reported in pCi/l unless otherwise indicated.

		Reported	Known
January	Strontium in Water		
	Strontium 89	30, 30, 30	40+8.5
	Strontium 90	9, 9, 9	25+2.6
	Gross Alpha/Beta		
	in Water		
	Alpha	7, 7, 7	3+8.6
	Beta	3, 3, 3	4+8.6
	Gamma in Water		
	Chromium 51	245, 245, 245	235+41
	Cobalt 60	15, 15, 15	10+8.7
	Zinc 65	155, 155, 155	159+27
	Ruthenium 106	200, 200, 200	178+31
	Cesium 134	15, 15, 15	10+8.7
	Cesium 137	15, 15, 15	10+8.7
February	Iodine in Water		
	Iodine	140, 140, 140	106+19
	Tritium in Water		
	Tritium	2635, 2650, 2697	2754+617
April	Radium in Water		
	Radium 226	5.9, 5.9, 6.0	4.90+1.21
	Radium 228	1.9, 1.9, 2.0	1.70+.52
	Air Filter		
	Alpha	20, 20, 21	21+8.6h
	Beta	61, 61, 61	62+8.6h
	Strontium 90	25, 25, 25	20+2.6h
	Cesium 137	12, 13, 14	20+8.6h
	Uranium in Water		
	Uranium	4, 5, 5	5+8.6

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EPA Cross-check results cont'd

		Reported	Known
April	Performance Evaluation Intercomparison Study		
	Alpha	23, 24, 24	29+12
	Radium 226	3.9, 3.9, 3.9	3.5+.87
	Radium 228	7.5, 7.5, 7.5	3.6+.87
	Uranium	10, 10, 10	3+10
	Beta	27, 28, 28	57+8.6
	Strontium 89	4, 4, 4	8+8.6
	Strontium 90	8, 8, 8	8+8.6
	Cesium 134	20, 20, 20	20+8.6
	Cesium 137	20, 20, 20	20+8.6
	Radionuclides in Milk		
	Strontium 89	1, 1, 1	39+8.6
	Strontium 90	60, 60, 60	55+5.2
	Iodine 131	15, 15, 15	4+0
	Cesium 137	55, 55, 55	50+8.6
	Potassium	1700, 1700, 1700	1600+139
May	Strontium in Water		
	Strontium 89	4, 4, 4	5+8.6
	Strontium 90	5, 5, 5	6+2.6
	Gross Alpha/Beta in Water		
	Alpha	26, 26, 26	29+8.6
	Beta	29, 29, 29	50+8.6
June	Radionuclides in Water		
	Barium 133	55, 55, 55	49+8.6
	Cobalt 60	35, 35, 35	31+8.6
	Zinc 65	180, 180, 180	165+29.4
	Ruthenium 106	135, 135, 135	128+22.5
	Cesium 134	40, 40, 40	39+8.6
	Cesium 137	20, 20, 20	20+8.6
	Tritium in Water		
	Tritium	4525, 4490, 4540	4503+780

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EPA Cross-Check Results cont'd

		Reported	Known.
July	Radium in Water		
	Radium 226	19.1, 19.1, 19.1	17.7+4.68
	Radium 228	19.0, 19.0, 19.0	18.3+4.68
	Uranium in Water		
	Uranium	30, 30, 31	41+10.39
August	Iodine in Water		
	Iodine	79, 80, 80	83+13.84
	Air Filter Cross Check		
	Alpha	6, 6, 6	6+8.6h
	Beta	18, 18, 18	invalid
	Iodine 131	30, 30, 30	invalid
	Cesium 137	10, 10, 10	10+8.6h
September	Gross Alpha/Beta in Water		
	Alpha	7, 7, 7	4+8.6
	Beta	10, 10, 10	6+8.6
	Strontium in Water		
	Strontium 89	15, 15, 15	14+8.7
	Strontium 90	9, 9, 9	10+2.6
October	Radionuclides in Water		
	Barium 133	60, 60, 60	59+10.31
	Cobalt 60	35, 35, 35	30+8.6
	Zinc 65	137, 137, 137	129+22.52
	Ruthenium 106	165, 165, 165	161+27.21
	Cesium 134	30, 30, 30	29+8.6
	Cesium 137	60, 60, 60	59+8.6
	Tritium in Water		
	Tritium	3500, 3474, 3461	3496+631



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EPA Cross-Check Results cont'd

October	Performance Evaluation Intercomparison Study	Reported	Known
	Alpha	44, 44, 45	49+20.8
	Radium 226	7.9, 7.9, 7.9	8.4+2.3
	Radium 228	3.2, 3.2, 3.2	4.1+1.0
	Uranium	10, 10, 10	12+10.4
	Beta	32, 32, 32	32+8.7
	Strontium 89	15, 15, 16	15+8.7
	Strontium 90	5, 5, 5	7+2.6
	Cesium 134	5, 5, 5	5+8.7
	Cesium 137	7, 7, 7	5+8.7
November	Radium in Water		
	Radium 226	8.1, 8.1, 8.1	8.7+2.3
	Radium 228	8.2, 8.2, 8.2	9.3+2.4
	Uranium in Water		
	Uranium	11, 11, 11	15+10.39

h Values are reported as pCi/filter.