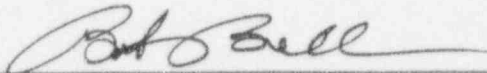


REPORT TO THE NUCLEAR REGULATORY COMMISSION
ENVIRONMENTAL MONITORING AT GRAND GULF NUCLEAR STATION
CALENDAR YEAR 1993
NRC CONTRACT NUMBER NRC-29-83-621

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 (NRC), the Mississippi State Department of Health (MSDH), Division of Radiological Health (DRH) provides environmental radiological data to the NRC pertaining to the Grand Gulf Nuclear Station (GGNS), Claiborne County, Mississippi.

The results detailed in this report are for Calendar Year 1993 which represent the thirteenth year of this contract with the State of Mississippi.

GRAND GULF NUCLEAR STATION
CLAIBORNE COUNTY, MISSISSIPPI
CY 1993

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Particulate Gross Beta

These results are for particulate air samples duplicated by the 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) specified in the contract for Gross Beta is 0.01 pCi/m³.

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
TC	12/29-1/05		0.010
AA	12/29-1/05	0.013	
TC	1/05-1/12		0.014
AA	1/05-1/12	0.020	
TC	1/12-1/19		0.018
AA	1/12-1/19	0.031	
TC	1/19-1/26		0.006
AA	1/19-1/26	0.012	
TC	1/26-2/02		0.015
AA	1/26-2/02	0.030	
TC	2/02-2/09		0.010
AA	2/02-2/09	0.060	
TC	2/09-2/16		0.010
AA	2/09-2/16	0.015	
TC	2/16-2/23		0.015
AA	2/16-2/23	0.035	
TC	2/23-3/02		0.019
AA	2/23-3/02	0.021	
TC	3/02-3/09		0.006
AA	3/02-3/09	0.023	
TC	3/09-3/16		0.008
AA	3/09-3/16	0.019	
TC	3/16-3/23		0.009
AA	3/16-3/23	0.009	
TC	3/23-3/30		0.008
AA	3/23-3/30	0.017	

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Particulate Gross Beta (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
TC	3/30-4/06		0.005
AA	3/30-4/06	0.024	
TC	4/06-4/13		0.013
AA	4/06-4/13	0.022	
TC	4/13-4/20		0.006
AA	4/13-4/20	0.022	
TC	4/20-4/27		0.009
AA	4/20-4/27	0.009	
TC	4/27-5/04		0.007
AA	4/27-5/04	0.012	
TC	5/04-5/11		0.008
AA	5/04-5/11	0.016	
TC	5/11-5/18		0.008
AA	5/11-5/18	0.026	
TC	5/18-5/25		0.013
AA	5/18-5/25	0.018	
TC	5/25-6/02		0.008
AA	5/25-6/02	0.044	
TC	6/02-6/08		0.006
AA	6/02-6/08	0.014	
TC	6/08-6/15		0.007
AA	6/08-6/15	0.058	
TC	6/15-6/22		0.008
AA	6/15-6/22	0.010	
TC	6/22-6/29		0.007
AA	6/22-6/29	0.010	
TC	6/29-7/06		0.020
AA	6/29-7/06	0.029	
TC	7/06-7/13		0.009
AA	7/06-7/13	0.034	
TC	7/13-7/20		0.005
AA	7/13-7/20	0.021	
TC	7/20-7/27		A
AA	7/20-7/27	0.054	
TC	7/27-8/03		0.016
AA	7/27-8/03	0.010	

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Particulate Gross Beta (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
TC	8/03-8/10		0.013
AA	8/03-8/10	0.052	
TC	8/10-8/17		0.022
AA	8/10-8/17	0.021	
TC	8/17-8/24		0.018
AA	8/17-8/24	0.048	
TC	8/24-8/31		0.017
AA	8/24-8/31	0.033	
TC	8/31-9/07		0.014
AA	8/31-9/07	0.068	
TC	9/07-9/14		0.021
AA	9/07-9/14	0.021	
TC	9/14-9/21		0.009
AA	9/14-9/21	0.030	
TC	9/21-9/28		0.010
AA	9/21-9/28	0.037	
TC	9/28-10/05		0.016
AA	9/28-10/05	0.064	
TC	10/05-10/12		0.015
AA	10/05-10/12	0.073	
TC	10/12-10/19		0.025
AA	10/12-10/19	0.040	
TC	10/19-10/26		0.015
AA	10/19-10/26	0.017	
TC	10/26-11/02		0.015
AA	10/26-11/02	0.044	
TC	11/02-11/09		0.012
AA	11/02-11/09	0.028	
TC	11/09-11/16		0.013
AA	11/09-11/16	0.021	
TC	11/16-11/23		0.009
AA	11/16-11/23	0.036	
TC	11/23-11/30		0.012
AA	11/23-11/30	0.066	
TC	11/30-12/07		0.015
AA	11/30-12/07	0.030	
TC	12/07-12/14		0.014

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Particulate Gross Beta (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
AA	12/07-12/14	0.013	
TC	12/14-12/21		0.014
AA	12/14-12/21	0.018	
TC	12/21-12/28		0.011
AA	12/21-12/28	0.021	

A No sample.

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Radioiodine

These results are for charcoal canister air samples duplicated by the 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.

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
TC	12/29-1/05		<0.015
AA	12/29-1/05	<0.07	
TC	1/05-1/12		<0.013
AA	1/05-1/12	<0.07	
TC	1/12-1/19		<0.009
AA	1/12-1/19	<0.07	
TC	1/19-1/26		<0.009
AA	1/19-1/26	<0.07	
TC	1/26-2/02		<0.010
AA	1/26-2/02	<0.07	
TC	2/02-2/09		<0.017
AA	2/02-2/09	<0.07	
TC	2/09-2/16		<0.021
AA	2/09-2/16	<0.07	
TC	2/16-2/23		<0.010
AA	2/16-2/23	<0.07	
TC	2/23-3/02		<0.015
AA	2/23-3/02	<0.07	
TC	3/02-3/09		<0.017
AA	3/02-3/09	<0.07	
TC	3/09-3/16		<0.013
AA	3/09-3/16	<0.07	
TC	3/16-3/23		<0.023
AA	3/16-3/23	<0.07	
TC	3/23-3/30		<0.010
AA	3/23-3/30	<0.07	

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Radioiodine (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
TC	3/30-4/06		<0.025
AA	3/30-4/06	<0.07	
TC	4/06-4/13		<0.009
AA	4/06-4/13	<0.07	
TC	4/13-4/20		<0.012
AA	4/13-4/20	<0.07	
TC	4/20-4/27		<0.011
AA	4/20-4/27	<0.07	
TC	4/27-5/04		<0.017
AA	4/27-5/04	<0.07	
TC	5/04-5/11		<0.009
AA	5/04-5/11	<0.07	
TC	5/11-5/18		<0.015
AA	5/11-5/18	<0.07	
TC	5/18-5/25		<0.010
AA	5/18-5/25	<0.07	
TC	5/25-6/02		<0.018
AA	5/25-6/02	<0.07	
TC	6/02-6/08		<0.022
AA	6/02-6/08	<0.07	
TC	6/08-6/15		<0.017
AA	6/08-6/15	<0.07	
TC	6/15-6/22		<0.018
AA	6/15-6/22	<0.07	
TC	6/22-6/29		<0.016
AA	6/22-6/29	<0.07	
TC	6/29-7/06		<0.013
AA	6/29-7/06	<0.07	
TC	7/06-7/13		<0.014
AA	7/06-7/13	<0.07	
TC	7/13-7/20		<0.011
AA	7/13-7/20	<0.07	
TC	7/20-7/27		A
AA	7/20-7/27	<0.07	
TC	7/27-8/03		<0.019
AA	7/27-8/03	<0.07	

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Radioiodine (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
TC	8/03-8/10		<0.013
AA	8/03-8/10	<0.07	
TC	8/10-8/17		<0.011
AA	8/10-8/17	<0.07	
TC	8/17-8/24		<0.013
AA	8/17-8/24	<0.07	
TC	8/24-8/31		<0.022
AA	8/24-8/31	<0.07	
TC	8/31-9/07		<0.009
AA	8/31-9/07	<0.07	
TC	9/07-9/14		<0.013
AA	9/07-9/14	<0.07	
TC	9/14-9/21		<0.013
AA	9/14-9/21	<0.07	
TC	9/21-9/28		<0.010
AA	9/21-9/28	<0.07	
TC	9/28-10/05		<0.016
AA	9/28-10/05	<0.07	
TC	10/05-10/12		<0.027
AA	10/05-10/12	<0.07	
TC	10/12-10/19		<0.022
AA	10/12-10/19	<0.07	
TC	10/19-10/26		<0.022
AA	10/19-10/26	<0.07	
TC	10/26-11/02		<0.019
AA	10/26-11/02	<0.07	
TC	11/02-11/09		<0.014
AA	11/02-11/09	<0.07	
TC	11/09-11/16		<0.020
AA	11/09-11/16	<0.07	
TC	11/16-11/23		<0.018
AA	11/16-11/23	<0.07	
TC	11/23-11/30		<0.014
AA	11/23-11/30	<0.07	
TC	11/30-12/07		<0.014
AA	11/30-12/07	<0.07	
TC	12/07-12/14		<0.010

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Radioiodine (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
AA	12/07-12/14	<0.07	
TC	12/14-12/21		<0.018
AA	12/14-12/21	<0.07	
TC	12/21-12/28		<0.014
AA	12/21-12/28	<0.07	

A No sample.

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Quarterly Composite (Gamma Isotopic)

These results are for particulate air samples, collected during a quarter, duplicated by the MSDH and the Licensee which were analyzed as a composite 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.

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
TC	12/29-3/30		<0.01
AA	12/29-3/30	<0.01	
TC	3/30-6/29		<0.01
AA	3/30-6/29	<0.01	
TC	6/29-9/28		<0.01
AA	6/29-9/28	<0.01	
TC	9/28-12/28		<0.01
AA	9/28-12/28	<0.01	

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Particulate Gross Beta Control

These results are for particulate air samples taken from control locations by the MSDH and the Licensee which were analyzed for Gross Beta. The Licensee's sampler is located in Vicksburg (VB) 18 miles north of the 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.

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
VB	12/29-1/05		0.011
RH	12/29-1/05	0.005	
VB	1/05-1/12		0.015
RH	1/05-1/12	0.011	
VB	1/12-1/19		0.018
RH	1/12-1/19	0.020	
VB	1/19-1/26		0.008
RH	1/19-1/26	0.002	
VB	1/26-2/02		0.013
RH	1/26-2/02	0.022	
VB	2/02-2/09		0.015
RH	2/02-2/09	0.032	
VB	2/09-2/16		0.010
RH	2/09-2/16	0.015	
VB	2/16-2/23		0.017
RH	2/16-2/23	0.008	
VB	2/23-3/01		0.019
RH	2/23-3/01	0.012	
VB	3/01-3/09		0.011
RH	3/01-3/09	0.013	
VB	3/09-3/16		0.009
RH	3/09-3/16	0.014	
VB	3/16-3/23		0.012
RH	3/16-3/23	0.012	
VB	3/23-3/30		0.009
RH	3/23-3/30	0.011	
VB	3/30-4/06		0.008

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Particulate Gross Beta Control (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
RH	3/30-4/06	0.008	
VB	4/06-4/13		0.017
RH	4/06-4/13	0.016	
VB	4/13-4/20		0.003
RH	4/13-4/20	0.020	
VB	4/20-4/27		0.009
RH	4/20-4/27	0.014	
VB	4/27-5/04		0.007
RH	4/27-5/04	0.018	
VB	5/04-5/11		0.010
RH	5/04-5/11	0.022	
VB	5/11-5/18		0.009
RH	5/11-5/18	0.015	
VB	5/18-5/25		0.011
RH	5/18-5/25	0.018	
VB	5/25-6/02		0.008
RH	5/25-6/02	0.022	
VB	6/02-6/08		0.006
RH	6/02-6/08	0.002	
VB	6/08-6/15		0.006
RH	6/08-6/15	0.019	
VB	6/15-6/22		0.007
RH	6/15-6/22	0.013	
VB	6/22-6/29		0.005
RH	6/22-6/29	0.006	
VB	6/29-7/06		0.019
RH	6/29-7/06	0.003	
VB	7/06-7/13		0.008
RH	7/06-7/13	0.000	
VB	7/13-7/20		0.005
RH	7/13-7/20	0.013	
VB	7/20-7/27		0.016
RH	7/20-7/27	0.017	
VB	7/27-8/03		0.029B
RH	7/27-8/03	0.027	
VB	8/03-8/10		0.008

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Particulate Gross Beta Control (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
RH	8/03-8/10	0.002	
VB	8/10-8/17		0.014
RH	8/10-8/17	0.012	
VB	8/17-8/24		0.016
RH	8/17-8/24	0.000	
VB	8/24-8/31		0.014
RH	8/24-8/31	0.041	
VB	8/31-9/07		0.013
RH	8/31-9/07	0.022	
VB	9/07-9/14		0.021
RH	9/07-9/14	0.025	
VB	9/14-9/21		0.005
RH	9/14-9/21	0.025	
VB	9/21-9/28		0.008
RH	9/21-9/28	0.003	
VB	9/28-10/05		0.013
RH	9/28-10/05	0.012	
VB	10/05-10/12		0.013
RH	10/05-10/12	0.029	
VB	10/12-10/19		0.016
RH	10/12-10/19	0.029	
VB	10/19-10/26		0.011
RH	10/19-10/26	0.024	
VB	10/26-11/02		0.011
RH	10/26-11/02	0.012	
VB	11/02-11/09		0.008
RH	11/02-11/09	0.026	
VB	11/09-11/16		0.013
RH	11/09-11/16	0.019	
VB	11/16-11/23		0.009
RH	11/16-11/23	0.029	
VB	11/23-11/30		0.016
RH	11/23-11/30	0.043	
VB	11/30-12/07		0.016
RH	11/30-12/07	0.026	
VB	12/07-12/14		0.014
RH	12/07-12/14	0.019	

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Particulate Gross Beta Control (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
VB	12/14-12/21		0.012
RH	12/14-12/21	0.025	
VB	12/21-12/28		0.011
RH	12/21-12/28	0.007	

B Power failure at 88.27 hours run time.

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Radioiodine Control

These results are for charcoal canister air samples taken from control locations by the MSDH and the Licensee which were analyzed for radioiodine. The Licensee's sampler is located in Vicksburg (VB) 18 miles north of the 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.

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
VB	12/29-1/05		<0.015
RH	12/29-1/05	<0.07	
VB	1/05-1/12		<0.013
RH	1/05-1/12	<0.07	
VB	1/12-1/19		<0.009
RH	1/12-1/19	<0.07	
VB	1/19-1/26		<0.009
RH	1/19-1/26	<0.07	
VB	1/26-2/02		<0.010
RH	1/26-2/02	<0.07	
VB	2/02-2/09		<0.017
RH	2/02-2/09	<0.07	
VB	2/09-2/16		<0.021
RH	2/09-2/16	<0.07	
VB	2/16-2/23		<0.010
RH	2/16-2/23	<0.07	
VB	2/23-3/01		<0.015
RH	2/23-3/01	<0.07	
VB	3/01-3/09		<0.017
RH	3/01-3/09	<0.07	
VB	3/09-3/16		<0.013
RH	3/09-3/16	<0.07	
VB	3/16-3/23		<0.023
RH	3/16-3/23	<0.07	
VB	3/23-3/30		<0.010
RH	3/23-3/30	<0.07	

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Radioiodine Control (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
VB	3/30-4/06		<0.025
RH	3/30-4/06	<0.07	
VB	4/06-4/13		<0.009
RH	4/06-4/13	<0.07	
VB	4/13-4/20		<0.012
RH	4/13-4/20	<0.07	
VB	4/20-4/27		<0.011
RH	4/20-4/27	<0.07	
VB	4/27-5/04		<0.017
RH	4/27-5/04	<0.07	
VB	5/04-5/11		<0.009
RH	5/04-5/11	<0.07	
VB	5/11-5/18		<0.015
RH	5/11-5/18	<0.07	
VB	5/18-5/25		<0.010
RH	5/18-5/25	<0.07	
VB	5/25-6/02		<0.018
RH	5/25-6/02	<0.07	
VB	6/02-6/08		<0.022
RH	6/02-6/08	<0.07	
VB	6/08-6/15		<0.017
RH	6/08-6/15	<0.07	
VB	6/15-6/22		<0.018
RH	6/15-6/22	<0.07	
VB	6/22-6/29		<0.016
RH	6/22-6/29	<0.07	
VB	6/29-7/06		<0.013
RH	6/29-7/06	<0.07	
VB	7/06-7/13		<0.014
RH	7/06-7/13	<0.07	
VB	7/13-7/20		<0.011
RH	7/13-7/20	<0.07	
VB	7/20-7/27		<0.010
RH	7/20-7/27	<0.07	
VB	7/27-8/03		<0.019B
RH	7/27-8/03	<0.07	
VB	8/03-8/10		<0.013

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Radioiodine Control (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
RH	8/03-8/10	<0.07	
VB	8/10-8/17		<0.011
RH	8/10-8/17	<0.07	
VB	8/17-8/24		<0.013
RH	8/17-8/24	<0.07	
VB	8/24-8/31		<0.022
RH	8/24-8/31	<0.07	
VB	8/31-9/07		<0.009
RH	8/31-9/07	<0.07	
VB	9/07-9/14		<0.013
RH	9/07-9/14	<0.07	
VB	9/14-9/21		<0.013
RH	9/14-9/21	<0.07	
VB	9/21-9/28		<0.010
RH	9/21-9/28	<0.07	
VB	9/28-10/05		<0.016
RH	9/28-10/05	<0.07	
VB	10/05-10/12		<0.027
RH	10/05-10/12	<0.07	
VB	10/12-10/19		<0.022
RH	10/12-10/19	<0.07	
VB	10/19-10/26		<0.022
RH	10/19-10/26	<0.07	
VB	10/26-11/02		<0.019
RH	10/26-11/02	<0.07	
VB	11/02-11/09		<0.014
RH	11/02-11/09	<0.07	
VB	11/09-11/16		<0.020
RH	11/09-11/16	<0.07	
VB	11/16-11/23		<0.018
RH	11/16-11/23	<0.07	
VB	11/23-11/30		<0.014
RH	11/23-11/30	<0.07	
VB	11/30-12/07		<0.014
RH	11/30-12/07	<0.07	
VB	12/07-12/14		<0.010

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Radioiodine Control (cont'd)

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
RH	12/07-12/14	<0.07	
VB	12/14-12/21		<0.018
RH	12/14-12/21	<0.07	
VB	12/21-12/28		<0.014
RH	12/21-12/28	<0.07	

B Power failure at 88.27 hours run time.

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Quarterly Composite (Gamma Isotopic) Control

These results are for particulate air samples, collected during a quarter, taken from control locations by the MSDH and the Licensee which were analyzed as a composite for gross gamma emitters. The Licensee's sampler is located in Vicksburg (VB) 18 miles north of the 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.

Location	Date	MSDH (pCi/m ³)	Licensee (pCi/m ³)
VB	12/29-3/30		<0.01
RH	12/29-3/30	<0.01	
VB	3/30-6/29		<0.01
RH	3/30-6/29	<0.01	
VB	6/29-9/28		<0.01
RH	6/29-9/28	<0.01	
VB	9/28-12/28		<0.01
RH	9/28-12/28	<0.01	

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Gamma Isotopic Analysis

These results are for river water samples split with the Licensee and analyzed by Gamma Isotopic analysis. The Mississippi River Water Upstream (MRU) sample location is 2 miles north northwest of the GGNS (Control). The Mississippi River Water Downstream (MRD) sample location is 2 miles west southwest of the GGNS (Indicator). The Licensee's Lower Limits of Detection (LLD), from their Technical Specifications, are: Cs-137: 18 pCi/l; 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; Cs-137: 18 pCi/l; Fe-59, Zn-65, Zr-95: 25 pCi/l, which are equal to or less than the contract specification. The data for these radionuclides are reported as less than LLD in each case.

Location	Date	MSDH (pCi/l)	Licensee (pCi/l)
MRU	JAN 05, 1993	<LLD	<LLD
MRU-C	JAN 05, 1993	<LLD	<LLD
MRU	FEB 02, 1993	<LLD	<LLD
MRU	MAR 02, 1993	<LLD	<LLD
MRU	APR 06, 1993	<LLD	<LLD
MRU-C	APR 06, 1993	<LLD	<LLD
MRU	MAY 04, 1993	<LLD	<LLD
MRU	JUN 02, 1993	<LLD	<LLD
MRU	JUL 01, 1993	<LLD	<LLD
MRU	AUG 03, 1993	<LLD	<LLD
MRU	AUG 31, 1993	<LLD	<LLD
MRU	OCT 01, 1993	<LLD	<LLD
MRU	NOV 02, 1993	<LLD	<LLD
MRU	NOV 30, 1993	<LLD	<LLD
MRD	JAN 05, 1993	<LLD	<LLD
MRD-C	JAN 05, 1993	<LLD	<LLD
MRD	FEB 02, 1993	<LLD	<LLD
MRD	MAR 02, 1993	<LLD	<LLD
MRD	APR 06, 1993	<LLD	<LLD
MRD-C	APR 06, 1993	<LLD	<LLD
MRD	MAY 04, 1993	<LLD	<LLD
MRD	JUN 02, 1993	<LLD	<LLD

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Gamma Isotopic Analysis (cont'd)

Location	Date	MSDH (pCi/l)	Licensee (pCi/l)
MRD	JUL 01, 1993	<LLD	<LLD
MRD	AUG 03, 1993	<LLD	<LLD
MRD	AUG 31, 1993	<LLD	<LLD
MRD	OCT 01, 1993	<LLD	<LLD
MRD	NOV 02, 1993	<LLD	<LLD
MRD	NOV 30, 1993	<LLD	<LLD

C Duplicate sample for Licensee Quality Control program.

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Tritium

These results are for river water samples split by the MSDH and the Licensee and analyzed for tritium using liquid scintillation analysis. The Mississippi River Water Upstream (MRU) sample location is 2 miles north northwest of the GGNS (Control). The Mississippi River Water Downstream (MRD) sample location is 2 miles west southwest of the 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. The contract specifications are 1000 pCi/l for drinking water, and 2000 pCi/l for other water samples. Licensee's results are a quarterly composite of the preceding three months. The MSDH tritium analyses are performed monthly.

Location	Date	MSDH (pCi/l)	Licensee (pCi/l)
MRU	JAN 05, 1993	<330	D
MRU-C	JAN 05, 1993		D
MRU	FEB 02, 1993	<330	D
MRU	MAR 02, 1992	<330	<470
MRU	APR 06, 1993	<330	D
MRU-C	APR 06, 1993		D
MRU	MAY 04, 1993	<330	D
MRU	JUN 02, 1993	<330	<420
MRU	JUL 01, 1993	<330	D
MRU	AUG 03, 1993	<330	D
MRU	AUG 31, 1993	<330	<430
MRU	OCT 01, 1993	<330	D
MRU	NOV 02, 1993	<330	D
MRU	NOV 30, 1993	<330	<430
MRD	JAN 05, 1993	<330	D
MRD-C	JAN 05, 1993		D
MRD	FEB 02, 1993	<330	D
MRD	MAR 02, 1993	<330	<470
MRD	APR 06, 1993	<330	D
MRD-C	APR 06, 1993		D
MRD	MAY 04, 1993	<330	D
MRD	JUN 02, 1993	<330	<430

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Tritium (cont'd)

Location	Date	MSDH (pCi/l)	Licensee (pCi/l)
MRD	JUL 01, 1993	<330	D
MRD	AUG 03, 1993	<330	D
MRD	AUG 31, 1993	<330	<430
MRD	OCT 01, 1993	<330	D
MRD	NOV 02, 1993	<330	D
MRD	NOV 30, 1993	<330	<430

C Duplicate sample for Licensee Quality Control program.

D Composite sample, results below.

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Gamma Isotopic Analysis

These results are for river sediment samples collected in duplicate and analyzed by Gamma Isotopic methods. The MSDH designates their control as the Mississippi River Upstream (MRU) and their indicator as the Mississippi River Downstream (MRD). The Licensee's designation for control is the Mississippi River Upstream, (SEDCONT) and indicator is Hamilton Lake (SEDHAM). The controls are both located approximately 2 miles north northwest of GGNS. The indicators are located approximately 2 miles west southwest of the GGNS. The Licensee's Lower Limits of Detection (LLD) 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 LLD specified for Cs-134/-137 is 150 pCi/kg and 180 pCi/kg respectively.

Location	Date	MSDH (pCi/kg)	Licensee (pCi/kg)
MRU	7/01/93	<LLD	
SEDCONT	7/01/93		<LLD
SEDCONT-C	7/01/93		<LLD
MRD	7/01/93	<LLD	
SEDHAM	7/01/93		<LLD
SEDHAM-C	7/01/93		<LLD
MRU	11/02/93	<LLD	
SEDCONT	11/02/93		<LLD
MRD	11/02/93	<LLD	
SEDHAM	11/02/93		<LLD

C Duplicate sample for Licensee Quality Control program.

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Gamma Isotopic Analysis

These results are for duplicate Alcorn Dairy milk samples which the MSDH and the Licensee analyzed by Gamma Isotopic methods. Alcorn Dairy is located eleven miles southwest of the GGNS. Samples are labeled RH for Radiological Health and GG for Licensee.

Sample	Date	MSDH (pCi/l)	Licensee (pCi/l)
RH	6/16/93	<15	
GG	6/16/93		<15
GG-C	6/16/93		<15
GG	6/29/93		<15
GG-C	6/29/93		<15
RH	11/10/93	<15	
GG	11/10/93		<15

C Duplicate sample for Licensee Quality Control program.

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Radioiodine

These results are for duplicate Alcorn Dairy milk samples which the MSDH and the Licensee analyzed for radioiodine by Gamma Isotopic methods. Alcorn Dairy is located eleven miles southwest of the GCNS. Samples are labeled RH for Radiological Health and GG for Licensee.

Sample	Date	MSDH (pCi/l)	Licensee (pCi/l)
RH	6/16/93	<1	
GG	6/16/93		<0.3
GG-C	6/16/93		<0.3
RH	11/10/93	<1	
GG	11/10/93		<0.3

C Duplicate sample for Licensee Quality Control program.

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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 the GGNS and the Mississippi River Downstream (MRD) approximately 2 miles west southwest of the GGNS. Each sample was analyzed by Gamma Isotopic methods. The Licensee's Lower Limits of Detection 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. The LLD used by the Licensee in these analyses are in accordance with their Technical Specifications. The LLD specified in the MSDH contract are: Mn-54, Co-58/60, Cs-134: 130 pCi/kg; Cs-137 : 150 pCi/kg; Fe-59, Zn-65: 260 pCi/kg.

Location	Date	MSDH (pCi/kg)	Licensee (pCi/kg)
MRU	5/25/93	A	<LLD
MRD	5/25/93	A	<LLD
MRU	11/08/93	<LLD	<LLD
MRD	11/08/93	<LLD	<LLD

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	Date	MSDH (pCi/kg)	Licensee (pCi/kg)
BHC	01/14/93	<LLD	<LLD

A No sample.

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Gamma Isotopic Analysis

These results are for vegetation samples taken from Sectors J, K, and R. These samples were analyzed by Gamma Isotopic methods.

Vegetable	Sector	Date	MSDH (pCi/kg)	Licensee (pCi/kg)
Cabbage	J	1/14/93	<60	<60
Collards	K	1/14/93	<60	<60
Cabbage	R	1/14/93	<60	<60
Collards	J	4/14/93	<60	<60
Collards	K	4/14/93	<60	<60
Swiss Chard	R	4/14/93	<60	<60
Swiss Chard	J	7/07/93	<60	<60
Collards	K	7/07/93	<60	<60
Crowder Peas	R	7/07/93	<60	<60
Mustard	J	11/10/93	<60	<60
Collards	K	11/10/93	<60	<60
Collards	R	11/10/93	<60	<60

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EPA Cross-Check Results--1993

All values reported in pCi/l unless otherwise indicated.

		Reported	Known
January	Strontium in Water		
	Strontium 89	13, 13, 13	15±8.7
	Strontium 90	10, 11, 11	10±8.7
	Gross Alpha/Beta in Water		
	Alpha	24, 25, 25	34±15.6
Beta	54, 54, 55	44±8.7	
February	Iodine in Water		
	Iodine	95, 96, 96	100±17.3
	Uranium in Water		
	Uranium	7.1, 7.2, 7.5	7.6±5.2
March	Radium in Water		
	Radium 226	8.0, 8.0, 8.0	9.8±2.6
	Radium 228	22.0, 21.6, 21.4	18.5±8.0
April	Performance Evaluation Intercomparison Study		
	Alpha	123, 124, 125	95±41.6
	Radium 226	26.6, 27.3, 27.8	24.9±6.4
	Radium 228	19.2, 19.3, 19.4	19.0±8.3
	Uranium	29.1, 29.2, 29.2	28.9±5.2
	Beta	183, 183, 184	177±46.8
	Strontium 89	40, 40, 41	41±8.7
	Strontium 90	31, 32, 32	29±8.7
	Cesium 134	24, 24, 25	27±8.7
	Cesium 137	34, 34, 34	32±8.7
	Cobalt 60	40, 40, 40	39±8.7

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EPA Cross-Check Results (cont'd)

	Reported	Known
June		
Radionuclides in Water		
Cobalt 60	16, 16, 16	15±8.7
Zinc 65	106, 107, 108	103±17.3
Ruthenium 106	88, 88, 88	119±20.8
Barium 133	95, 95, 96	99±17.3
Cesium 134	5, 5, 5	5±8.7
Cesium 137	8, 8, 8	5±8.7
Tritium in Water		
Tritium	9400, 9416, 9432	9844±1707
July		
Strontium in Water		
Strontium 89	30, 30, 31	34±8.7
Strontium 90	25, 26, 26	25±8.7
Gross Alpha/Beta in Water		
Alpha	15, 16, 16	15±8.7
Beta	39, 39, 39	43±12.0
August		
Uranium in Water		
Uranium	21.6, 21.6, 21.6	25.3±5.2
Air Filter		
Alpha	20, 21, 21	19±8.7-E
Beta	55, 56, 56	47±8.7-E
Strontium 90	20, 20, 20	19±8.7-E
Cesium 137	10, 10, 10	9±8.7-E
September		
Radium in Water		
Radium 226	14.1, 14.2, 14.2	14.9±3.8
Radium 228	21.9, 21.9, 22.0	20.4±8.8

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EPA Cross-Check Results (cont'd)

	Reported	Known
Radionuclides in Milk		
Strontium 89	15, 15, 15	30±8.7
Strontium 90	15, 15, 15	25±8.7
Iodine 131	118, 118, 119	120±20.8
Potassium	1520, 1520, 1525	1679±145
Cesium 137	53, 53, 53	49±8.7
October		
Iodine in Water		
Iodine	120, 121, 121	117±20.8
Performance Evaluation Intercomparison Study		
Alpha	48, 48, 48	40±17.3
Radium 226	10.9, 11.0, 11.0	9.9±2.6
Radium 228	11.6, 11.7, 11.8	12.5±3.0
Uranium	14.6, 14.8, 14.8	15.1±5.2
Beta	55, 56, 56	58±17.3
Strontium 89	12, 13, 13	15±8.7
Strontium 90	10, 10, 11	10±8.7
Cobalt 60	12, 12, 13	10±8.7
Cesium 134	8, 8, 9	12±8.7
Cesium 137	13, 13, 13	10±8.7
Gross Alpha/Beta in Water		
Alpha	26, 26, 26	20±8.7
Beta	21, 21, 21	15±8.7
November		
Tritium in Water		
Tritium	7340, 7393, 7408	7398±740
Radionuclides in Water		
Cobalt 60	32, 32, 33	30±8.7
Zinc 65	156, 156, 157	150±26
Ruthenium 106	192, 193, 194	201±34.7
Barium 133	74, 75, 75	79±13.9
Cesium 134	54, 54, 55	59±8.7
Cesium 137	45, 45, 45	40±8.7

E Values are reported as pCi/filter.