



2609 North River Road, Port Allen, Louisiana 70767
(800) 401-4277 -- FAX (225) 381-2996

Split Sample
analysis

American Radiation Services, Inc.

Laboratory Analysis Report

ARS1-09-01568

Prepared for:

Nuclear Regulatory Commission (NRC)

Wade Loo
USNRC Region 2
61 Forsyth St. S.W.
Suite 23T85
Atlanta, Ga 30303-8931
wade.loo@nrc.gov

Phone: 404-562-4727

Fax: 404-562-4955


Project Manager Review


Management Review

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

Contact Person: Questions regarding this analytical report should be addressed to:

Project Manager

ProjectManagers@amrad.com

Phone: 225.381.2991

Fax: 225.381.2996

LELAP Cert# 01949

NELAP Cert# E87558

J-54



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July 8, 2009

Nuclear Regulatory Commission

Wade Loo
61 Forsyth St. S.W. Suite 23T85
Atlanta, Ga 30303-8931

Sample ID(S): BDL-MW1, BDL-MW2, BDL-MW3, BDL-MW5, BDL-MW6, BDL-MW8
ARS SDG: ARS1-09-01568

Dear Mr. Loo;

On May 21, 2009, ARS International received 6 aqueous sample(s) to be analyzed for Gamma Spectroscopy, 5 aqueous samples to be analyzed for Tritium, and 1 for Strontium-90.

The samples were processed and counted using the appropriate counting equipment and QA/QC for this type of analysis. Results of the analysis and QA/QC are attached in the data package.

The samples and QA/QCs were counted with a count time sufficient to meet quality control parameters for counting equipment were within acceptance criteria and statistical sound detection limits.

If you have any questions please do not hesitate to call at 225.381.2991 or email ProjectManagers@amrad.com.

Sincerely,

A handwritten signature in black ink that reads 'Virgene Mulligan'. The signature is written in a cursive, flowing style.

Virgene Mulligan
Laboratory Director
ARS International



COVER PAGE

Statement of Work for Analytical Laboratories

PROJECT SAMPLE IDENTIFICATION CROSS-REFERENCE TO ARS SAMPLE LABORATORY IDs

SAMPLE ID NUMBER(s)	ARS SAMPLE ID NUMBER(S)
BDL-MW1	ARS1-09-01568-001
BDL-MW2	ARS1-09-01568-002
BDL-MW3	ARS1-09-01568-003
BDL-MW5	ARS1-09-01568-004
BDL-MW6	ARS1-09-01568-005
BDL-MW8	ARS1-09-01568-006

SAMPLE RECEIPT

The samples were received in good condition. The samples were screened for radioactive contamination as per procedure ARS-062 "Sample Receiving".

ANALYTICAL METHODS

The Gamma Spectroscopy determinations were performed using American Radiation Services procedure ARS-007/EPA 901.1, "Gamma Emitting Radionuclides in Water." The tritium analyses were performed using American Radiation Services procedure ARS-054, "Tritium In Water". The Strontium-90 analyses were performed using American Radiation Services procedure ARS-032, "Total Strontium by Eichrom Resin Separation."

ANALYTICAL RESULTS

The result data that are flagged with "U" indicates that the activity is below the MDC.

For Strontium analyses, the LCS fell outside the acceptance criteria biased low; RER and DER didn't meet acceptance criteria due to low bias of LCS; however the LCSD is well within the acceptance criteria. The data is being reported per technical review.



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American Radiation Services Project Manager/Laboratory Director's Comments:

"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature."

"I certify that this electronic image and all hardcopies produced from this image accurately represent the data and is in compliance with the NRC specific requirements, both technically and for completeness, other than the conditions detailed above or in the sample data package narrative. Release, by submission through email, the data contained in this electronic image and the computer-readable EDD (as applicable), has been authorized by the laboratory Manager/Technical Director or the Manager's designee."

Doreen Mulhegan
Signature

Laboratory Director, ARS International
Title

7-8-09
Date



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1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-09-01568
Client Sample ID: BDL-MW1
Sample Collection Date: 05/14/09
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-09-01568-001
Date Received: 05/21/09
Report Date: 07/06/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	187.989	111.800	182.529	90.162		pCi/L	ARS-054/EPA 906.0	06/14/09 22:01	BJS	N/A

NOTES:


Project Manager Review

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ARS Sample Delivery Group: ARS1-09-01568
 Client Sample ID: BDL-MW2
 Sample Collection Date: 05/14/09
 Sample Matrix: Aqueous

Request or PO Number: N/A
 ARS Sample ID: ARS1-09-01568-002
 Date Received: 05/21/09
 Report Date: 07/06/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
MN-54	-0.494	2.533	3.930	1.965	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
CO-58	-0.062	2.019	3.460	1.730	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
FE-59	-0.057	0.041	7.380	3.690	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
CO-60	-1.984	11.974	4.510	2.255	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
ZN-65	-0.161	6.005	8.920	4.460	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
NB-95	0.332	2.230	3.790	1.895	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
ZR-95	4.177	3.585	5.780	2.890	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
CS-134	1.375	2.209	3.670	1.835	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
CS-137	0.660	2.141	3.710	1.855	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
BA-140	-5.318	26.684	15.000	7.500	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
LA-140	0.776	2.715	4.680	2.340	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:17	JLA	N/A
H-3	520.944	127.666	184.586	91.178		pCi/L	ARS-054/EPA 906.0	06/15/09 03:09	BJS	N/A
NOTES:										

C. Barligus
 Project Manager Review

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ARS Sample Delivery Group: ARS1-09-01568
 Client Sample ID: BDL-MW3
 Sample Collection Date: 05/14/09
 Sample Matrix: Aqueous

Request or PO Number: N/A
 ARS Sample ID: ARS1-09-01568-003
 Date Received: 05/21/09
 Report Date: 07/06/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
MN-54	0.011	2.576	4.360	2.180	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
CO-58	-0.390	8.380	3.970	1.985	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
FE-59	1.612	4.733	8.030	4.015	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
CO-60	0.868	2.641	4.460	2.230	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
ZN-65	-0.011	5.265	8.980	4.490	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
NB-95	-2.627	205.030	4.390	2.195	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
ZR-95	0.978	4.108	6.910	3.455	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
CS-134	0.659	2.844	4.780	2.390	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
CS-137	0.190	2.829	4.770	2.385	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
BA-140	1.314	10.033	17.000	8.500	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
LA-140	-3.700	8.290	6.300	3.150	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:18	JLA	N/A
SR-90	0.077	0.078	0.260	0.123	U	pCi/L	ARS-032/Eichrom SRW-01	06/16/09 16:33	BJS	83%
H-3	1056.951	163.759	184.199	90.987		pCi/L	ARS-054/EPA 906.0	06/15/09 08:17	BJS	N/A

NOTES:

C. Bruleguy
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ARS Sample Delivery Group: ARS1-09-01568
 Client Sample ID: BDL-MW5
 Sample Collection Date: 05/14/09
 Sample Matrix: Aqueous

Request or PO Number: N/A
 ARS Sample ID: ARS1-09-01568-004
 Date Received: 05/21/09
 Report Date: 07/06/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
MN-54	0.000	2.598	4.420	2.210	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
CO-58	-0.159	2.095	3.570	1.785	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
FE-59	-1.430	92.545	7.830	3.915	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
CO-60	-1.109	14.557	4.330	2.165	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
ZN-65	-2.266	192.260	6.840	3.420	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
NB-95	-1.091	12.628	4.030	2.015	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
ZR-95	1.602	3.878	6.500	3.250	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
CS-134	-0.589	23.569	4.250	2.125	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
CS-137	1.191	2.672	4.580	2.290	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
BA-140	0.161	8.812	15.000	7.500	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
LA-140	-1.180	3.090	5.240	2.620	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:19	JLA	N/A
H-3	1096.201	166.624	183.758	90.769		pCi/L	ARS-054/EPA 906.0	06/15/09 13:25	BJS	N/A
NOTES:										

C. Brueggly

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ARS Sample Delivery Group: ARS1-09-01568
 Client Sample ID: BDL-MW6
 Sample Collection Date: 05/14/09
 Sample Matrix: Aqueous

Request or PO Number: N/A
 ARS Sample ID: ARS1-09-01568-005
 Date Received: 05/21/09
 Report Date: 07/06/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
MN-54	-2.917	4.386	4.140	2.070	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
CO-58	0.000	2.188	3.710	1.855	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
FE-59	-3.032	230.430	7.970	3.985	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
CO-60	0.136	2.317	4.010	2.005	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
ZN-65	-3.235	5.456	9.060	4.530	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
NB-95	-0.553	4.165	3.990	1.995	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
ZR-95	1.448	3.931	6.580	3.290	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
CS-134	-0.034	2.562	4.350	2.175	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
CS-137	-0.785	20.065	4.190	2.095	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
BA-140	1.091	8.802	15.100	7.550	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
LA-140	-2.123	8.978	5.720	2.860	U	pCi/L	ARS-006/EPA 901.1	06/11/09 18:20	JLA	N/A
H-3	1552.790	204.344	182.822	90.307		pCi/L	ARS-054/EPA 906.0	06/15/09 18:33	BJS	N/A

NOTES:

C. Buleziny

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ARS Sample Delivery Group: ARS1-09-01568
 Client Sample ID: BDL-MW8
 Sample Collection Date: 05/14/09
 Sample Matrix: Aqueous

Request or PO Number: N/A
 ARS Sample ID: ARS1-09-01568-006
 Date Received: 05/21/09
 Report Date: 07/06/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
MN-54	1.083	2.195	3.670	1.835	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
CO-58	-0.105	1.965	3.370	1.685	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
FE-59	1.580	3.760	6.570	3.285	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
CO-60	-2.017	11.775	4.590	2.295	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
ZN-65	-2.493	34.420	8.180	4.090	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
NB-95	-0.060	9.153	3.820	1.910	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
ZR-95	3.194	3.111	5.040	2.520	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
CS-134	-0.177	2.298	3.930	1.965	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
CS-137	0.335	2.225	3.880	1.940	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
BA-140	1.471	8.824	15.100	7.550	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
LA-140	-0.761	3.114	5.360	2.680	U	pCi/L	ARS-006/EPA 901.1	06/12/09 17:24	JLA	N/A
H-3	56.958	105.415	177.434	87.645	U	pCi/L	ARS-054/EPA 906.0	06/15/09 23:41	BJS	N/A
NOTES:										

C. Bulechij

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QC Results Report

Sample Delivery Group: ARS1-09- 01568

Date Received: 05/21/09

Laboratory Control Sample Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (1σ)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	LCS Acceptance Range
ARS1-B09-02160	LCS	CO-60	24897.000	501.530	225.700	25394.583		pCi/g	EPA 901.1	6/11/09 17:42	JLA	98	75%-125%
ARS1-B09-02160	LCS	CS-137	15371.000	367.090	140.100	15365.617		pCi/g	EPA 901.1	6/11/09 17:42	JLA	100	75%-125%
ARS1-B09-02160	LCS	AM-241	34699.000	1259.900	276.700	34896.700		pCi/g	EPA 901.1	6/11/09 17:42	JLA	99	75%-125%

Blank Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (1σ)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician
ARS1-B09-02160	MBL	CO-60	0.000	0.004	0.016	NA	U	pCi/g	EPA 901.1	6/11/09 17:42	JLA
ARS1-B09-02160	MBL	CS-137	0.000	0.005	0.017	NA	U	pCi/g	EPA 901.1	6/11/09 17:42	JLA
ARS1-B09-02160	MBL	AM-241	-0.002	0.010	0.023	NA	U	pCi/g	EPA 901.1	6/11/09 17:42	JLA

RER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1σ)	Result 2	CSU 2 (1σ)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER Acceptance Range
ARS1-B09-02160	LCSD	CO-60	24897.000	501.530	25160.000	497.650		pCi/g	EPA 901.1	6/11/09 17:42	JLA	0.26	< 1
ARS1-B09-02160	LCSD	CS-137	15371.000	367.090	14664.000	326.430		pCi/g	EPA 901.1	6/11/09 17:42	JLA	1.02	< 1
ARS1-B09-02160	LCSD	AM-241	34699.000	1259.900	34685.000	12710.000		pCi/g	EPA 901.1	6/11/09 17:42	JLA	0.00	< 1

DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1σ)	Result 2	CSU 2 (1σ)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER Acceptance Range
ARS1-B09-02160	LCSD	CO-60	24897.000	501.530	25160.000	497.650		pCi/g	EPA 901.1	6/11/09 17:42	JLA	0.74	< 3
ARS1-B09-02160	LCSD	CS-137	15371.000	367.090	14664.000	326.430		pCi/g	EPA 901.1	6/11/09 17:42	JLA	2.88	< 3
ARS1-B09-02160	LCSD	AM-241	34699.000	1259.900	34685.000	12710.000		pCi/g	EPA 901.1	6/11/09 17:42	JLA	0.00	< 3

C. Bulciny

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QC Results Report

Sample Delivery Group: ARS1-09-01568

Date Received: 05/21/09

Laboratory Control Sample Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (1 s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	LCS Acceptance Range
ARS1-809-02125	LCS	Sr-90	19.73	1.5	0.465	20.64		pCi/L	ARS-032/EPA 905.0	6/16/09 16:33	BJS	96	75%-125%

Blank Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (1 s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician
ARS1-809-02125	MBL	Sr-90	0.106	0.14	0.474	NA		pCi/L	ARS-032/EPA 905.0	6/16/09 16:33	BJS

RER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1 s)	Result 2	CSU 2 (1s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER Acceptance Range
ARS1-809-02125	LCSD	Sr-90	19.73	1.5	14.30	1.1		pCi/L	ARS-032/EPA 905.0	6/16/09 16:33	BJS	2.07	< 1

DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1 s)	Result 2	CSU 2 (1s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER Acceptance Range
ARS1-809-02125	LCSD	Sr-90	19.73	1.5	14.3	1.1		pCi/L	ARS-032/EPA 905.0	6/16/09 16:33	BJS	5.78	< 3

C. Burley

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QC Results Report

Sample Delivery Group: ARS1-09-01568

Date Received: 5/21/2009

Laboratory Control Sample Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (1σ)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	LCS Acceptance Range
ARS1-B09-02126	LCS	H3	1360.904	187.652	182.341	1234.408		pCi/L	ARS-054/EPA 906.0	6/14/09 1:28	BS	110	75%-125%

Blank Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (1σ)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician
ARS1-B09-02126	MBL	H3	-4.944	108.695	184.804	NA		pCi/L	ARS-054/EPA 906.0	6/14/09 11:44	BS

RER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1σ)	Result 2	CSU 2 (1σ)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER Acceptance Range
ARS1-B09-02126	LCS	H3	1360.904	187.652	1235.804	178.721		pCi/L	ARS-054/EPA 906.0	6/14/09 6:36	BS	0.34	< 1

DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1σ)	Result 2	CSU 2 (1σ)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER Acceptance Range
ARS1-B09-02126	LCS	H3	1360.904	187.652	1235.804	178.721		pCi/L	ARS-054/EPA 906.0	6/14/09 6:36	BS	0.97	< 3

C. Bullock

Project Manager Review

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of ARS

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2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

Notes:

Comments:

- 1.0) Soil and Sludge analysis are reported on a wet basis or an as received basis unless otherwise indicated.
- 2.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.
- 3.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of "m" to the procedure number (i.e. 900.0M).
- 4.0) Derived Air Concentrations and Effluent Release Concentrations are obtained from 10 CFR 20 Appendix B.
- 5.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.
- 6.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228. (Gamma Spectroscopy only).
- 7.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234. (Gamma Spectroscopy only).
- 8.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (HPGe).
- 9.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected.

Method References:

- 1.0) EPA 600/4-80-032; Prescribed Procedures for the Measurements of Radioactivity in Drinking Water, August 1980.
- 2.0) Standard Methods for Examination of Water and Waste Water, 18th, 1992.
- 3.0) EPA SW-846; Test Methods for Evaluating Solid Waste, Third Edition, (9/86). (Updated through 1995).
- 4.0) EPA 600/4/79-020; Methods for Chemical Analysis of Water and Waste, March 1983.
- 5.0) HASL 300
- 6.0) ARS-040; An LCSD is not reported with this process. The criteria for the LCS/LCSD analysis for reproducibility have not been established for Low Level Tritium analysis. A prepared standard for Low Level Tritium has not been developed. As a result, the standard we use is based on the dilution of a verified conventional tritium standard. The volume required for Low Level Tritium analysis, in addition to the lack of an available Low Level Tritium standard, introduce variability into the LCS/LCSD analysis that does not represent the actual sample analysis. The preferred measure for reproducibility is to run a duplicate analysis of a sample.

Definitions:

- | | | |
|-------|----------|---|
| 1.0) | ND | Not detected above the detection limit (non-detect). |
| 2.0) | MDC | (Minimum Detectable Concentration) minimum concentration of the analyte that ARS can detect utilizing the specific analysis |
| 3.0) | MBL | Method Blank |
| 4.0) | DO | Duplicate Original |
| 5.0) | DUP | Method Duplicate |
| 6.0) | MS/MSD | Matrix Spike/Matrix Spike Duplicate |
| 7.0) | S | Spike |
| 8.0) | RS | Reference Spike |
| 9.0) | *SC | Subcontracted out to another qualified laboratory |
| 10.0) | NR | Not Referenced |
| 11.0) | N/A | Not Applicable |
| 12.0) | * | Reported as a calculated value |
| 13.0) | ** | False Positive due to interference from Bi-214 |
| 14.0) | U | Activity is below the MDC |
| 15.0) | LCS/LCSD | Laboratory Control Standard/Laboratory Control Standard Duplicate |

Notes: ARS International assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of ARS International.

LELAP Cert# 30658

NELAP Cert# E87558

NRC FORM 303 (4-2004) U.S. NUCLEAR REGULATORY COMMISSION REQUEST FOR ANALYSIS AND CHAIN OF CUSTODY LABORATORY -- ORISE				LABORATORY USE ONLY CONTROL NUMBER				
SAMPLE LOCATION (LICENSEE) <i>Harris Nuclear Plant</i>				LICENSE NO. <i>NPF-63</i>		DOCKET NO. <i>50-400</i>		
SAMPLE SUBMITTED				DATE SAMPLES SUBMITTED <i>5/18/2009</i>		PRIORITY <input checked="" type="checkbox"/> ROUTINE <input type="checkbox"/> URGENT		
# TOTAL	TYPE	VOLUME	WEIGHT	SAMPLE COLLECTION INTERVAL				
<i>6</i>	<i>Liquid</i>	<i>250 mL</i>		START	MONTH <i>05</i>	DAY <i>14</i>	YEAR <i>2009</i>	TIME <i>1015</i>
<i>4</i>	<i>Liquid</i>	<i>1 Liter</i>			STOP	MONTH <i>05</i>	DAY <i>14</i>	YEAR <i>2009</i>
<i>1</i>	<i>Liquid</i>	<i>1 Gallon</i>						
INSPECTOR RESPONSIBLE <i>Patrick Lessard or Joe Austin</i>			TELEPHONE NUMBER <i>919 362 0601</i>					
ANALYSIS TO BE PERFORMED		LIST DESIRED LLD (Optional)	OTHER TYPE OF ANALYSIS (Specify)			LIST DESIRED LLD (Optional)		
<input type="checkbox"/> GROSS ALPHA (GA)			<input checked="" type="checkbox"/> <i>Isotopic Strontium</i>					
<input type="checkbox"/> GROSS BETA (GB)			<input type="checkbox"/>					
<input checked="" type="checkbox"/> GAMMA SPEC (GS)			<input type="checkbox"/>					
<input checked="" type="checkbox"/> TRITIUM (H3)		<i>250 pCi/L</i>	<input type="checkbox"/>					
<input type="checkbox"/> CARBON-14 (C14)			<input type="checkbox"/>					
<input type="checkbox"/> IODINE-125 (I125)			<input type="checkbox"/>					
RELINQUISHED BY	RECEIVED BY	DATE	TIME	REASON FOR CHANGE OF CUSTODY				
<i>Patrick Lessard</i>	<i>FedEx</i>	<i>5/18/09</i>	<i>1415</i>	<i>Shipping to ARS</i>				
		<i>5/21/09</i>	<i>0945</i>	<i>ARS</i>				
FEE RECOVERABLE <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES IF YES, TAC NUMBER <i>Call Wade Loo 404-562-4727</i>								
REMARKS <i>The 250 mL bottles are for tritium analysis. (not preserved)</i> <i>The Liter bottles are for Gamma spec. and were preserved with Nitric acid.</i> <i>The gallon bottle is for Gamma spec. and isotopic strontium and were preserved with nitric acid.</i> <i>All bottles are sealed with tamper proof red tape.</i>								
NOTE: SAMPLES WILL BE DISCARDED AFTER ANALYSIS UNLESS REASONS ARE NOTED IN REMARKS ABOVE.								

NRC FORM 303A
(4-2004)

U.S. NUCLEAR REGULATORY COMMISSION

LABORATORY USE ONLY

SAMPLE RECORD - Continued

CONTROL NUMBER

LABORATORY - ORISE

SAMPLE NUMBER	SAMPLE NAME AND DESCRIPTION	COLLECTION DATE/TIME	REMARKS, PRESERVATIVE ANALYSIS REQUESTED, ETC.
SARCEAS NAME	BDL-MW1 (Blow Down Line Monitoring Well 1)	5/14/09 1015	No Preservative, Tritium Analysis
	BDL-MW2 (250 mL)	5/14/09 1110	No Preservative, Tritium Analysis
	BDL-MW2 (1 L)	5/14/09 1116	Preserved w/ Nitric Acid. Gamma Spec.
	BDL-MW3 (1 gallon)	5/14/09 1230	Preserved w/ Nitric Acid, Gamma Spec. Isotopic Strontium analysis
	BDL-MW3 (250 mL)	5/14/09 1230	No Preservative, Tritium Analysis
	BDL-MW5 (1 L)	5/14/09 1309	Preserved w/ Nitric Acid. Gamma Spec.
	BDL-MW5 (250 mL)	5/14/09 1309	No Preservative, Tritium Analysis
	BDL-MW6 (1 L)	5/14/09 1343	Preserved w/ Nitric Acid. Gamma Spec.
	BDL-MW6 (250 mL)	5/14/09 1343	No Preservative, Tritium Analysis
	BDL-MW8 (250 mL)	5/14/09 1430	No Preservative, Tritium Analysis
▽	BDL-MW8 (1 L)	5/14/09 1430	Preserved w/ Nitric Acid. Gamma Spec.