



2609 North River Road, Port Allen, Louisiana 70767

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

American Radiation Services, Inc.

Laboratory Analysis Report

ARS1-11-01372

Prepared for:

Nuclear Regulatory Commission (NRC)

**Eugenio A. Bonano
Region III/DNMS/MCID Branch
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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



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

ARS Sample Delivery Group: ARS1-11-01372
Client Sample ID: BD-11-1-01
Sample Collection Date: 06-21-11
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-11-01372-001
Date Received: 06-22-11
Report Date: 07-18-11

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	-50.598	103.009	176.994	87.137	U	pCi/L	ARS-054/EPA 906.0	07-15-11 10:46	BJS	N/A

NOTES:

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ARS Sample Delivery Group: ARS1-11-01372
Client Sample ID: BD-11-1-02
Sample Collection Date: 06-21-11
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-11-01372-002
Date Received: 06-22-11
Report Date: 07-18-11

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	33.474	103.705	175.640	86.470	U	pCi/L	ARS-054/EPA 906.0	07-15-11 14:55	BJS	N/A

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ARS Sample Delivery Group: ARS1-11-01372
Client Sample ID: BD-11-1-03
Sample Collection Date: 06-21-11
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-11-01372-003
Date Received: 06-22-11
Report Date: 07-18-11

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	-16.846	103.400	176.783	87.033	U	pCi/L	ARS-054/EPA 906.0	07-15-11 19:05	BJS	N/A

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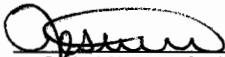
1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-11-01372
Client Sample ID: BD-11-1-04
Sample Collection Date: 06-21-11
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-11-01372-004
Date Received: 06-22-11
Report Date: 07-18-11

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	88.559	105.160	175.823	86.560	U	pCi/L	ARS-054/EPA 906.0	07-15-11 23:15	BJS	N/A

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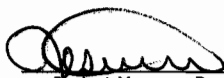
1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-11-01372
Client Sample ID: BD-11-1-05
Sample Collection Date: 06-21-11
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-11-01372-005
Date Received: 06-22-11
Report Date: 07-18-11

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	-36.061	102.988	176.603	86.944	U	pCi/L	ARS-054/EPA 906.0	07-16-11 03:24	BJS	N/A

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ARS Sample Delivery Group: ARS1-11-01372
Client Sample ID: BD-11-1-06
Sample Collection Date: 06-21-11
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-11-01372-006
Date Received: 06-22-11
Report Date: 07-18-11

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	-14.361	102.880	175.825	86.561	U	pCi/L	ARS-054/EPA 906.0	07-16-11 07:34	BJS	N/A

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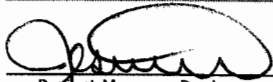
1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-11-01372
Client Sample ID: BD-11-1-07
Sample Collection Date: 06-21-11
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-11-01372-007
Date Received: 06-22-11
Report Date: 07-18-11

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	584.654	129.180	177.472	87.372		pCi/L	ARS-054/EPA 906.0	07-16-11 11:44	BJS	N/A

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ARS Sample Delivery Group: ARS1-11-01372
Client Sample ID: BD-11-1-08
Sample Collection Date: 06-21-11
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-11-01372-008
Date Received: 06-22-11
Report Date: 07-18-11

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	404.969	118.055	176.028	86.661		pCi/L	ARS-054/EPA 906.0	07-16-11 15:53	BJS	N/A

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ARS Sample Delivery Group: ARS1-11-01372
Client Sample ID: BD-11-1-09
Sample Collection Date: 06-21-11
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-11-01372-009
Date Received: 06-22-11
Report Date: 07-18-11

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	1108.646	166.900	176.278	86.784		pCi/L	ARS-054/EPA 906.0	07-16-11 20:02	BJS	N/A

NOTES:


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ARS Sample Delivery Group: ARS1-11-01372
Client Sample ID: BD-11-1-10
Sample Collection Date: 06-21-11
Sample Matrix: Aqueous

Request or PO Number: N/A
ARS Sample ID: ARS1-11-01372-010
Date Received: 06-22-11
Report Date: 07-18-11

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	354.866	116.250	177.335	87.304		pCi/L	ARS-054/EPA 906.0	07-17-11 00:12	BJS	N/A

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QC Results Report

Sample Delivery Group: ARS1-11-01372
 Date Received: 06-22-2011

Laboratory Control Sample Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	LCS Acceptance Range
ARS1-B11-02592	LCS	H3	2257.588	269.887	176.052	2421.859		pCi/L	ARS-054/EPA 906.0	7-14-11 18:05	BJS	93	75%-125%

Blank Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician
ARS1-B11-02592	MBL	H3	26.252	103.359	175.315	NA	U	pCi/L	ARS-054/EPA 906.0	7-14-11 18:05	BJS

RER Duplicate Evaluation

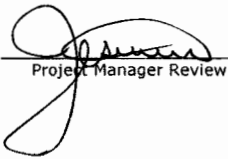
Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (2s)	Result 2	CSU 2 (2s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER Acceptance Range
ARS1-B11-02592	LCSD	H3	2257.588	269.887	2227.114	267.014		pCi/L	ARS-054/EPA 906.0	7-14-11 18:05	BJS	0.06	< 1

DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (2s)	Result 2	CSU 2 (2s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER Acceptance Range
ARS1-B11-02592	LCSD	H3	2257.588	269.887	2227.114	267.014		pCi/L	ARS-054/EPA 906.0	7-14-11 18:05	BJS	0.16	< 3

Matrix Spike

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (2s)	Unspiked Activity	Spike Con.	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	MS Acceptance Range
ARS1-B11-02592	MS	H3	6839.241	726.596	-50.598	7379.37		pCi/L	ARS-054/EPA 906.0	7-14-11 18:05	BJS	93	60%-140%


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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 (Gamma Spectroscopy only).
- 10.0) Gamma spectroscopy results are calculated values based on the ORTEC[®] GammaVision ENV32 Analysis Engine.

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) | ** | False Positive due to interference from <u>Bi-214</u> |
| 13.0) | U | Activity is below the MDC |
| 14.0) | LCS/LCSD | Laboratory Control Standard/Laboratory Control Standard Duplicate |
| 15.0) | DLC | Decision Level Concentration (ANSI N42.23) or critical level |

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NRC FORM 303
(1-2007)

U.S. NUCLEAR REGULATORY COMMISSION

LABORATORY USE ONLY

**REQUEST FOR ANALYSIS AND
CHAIN OF CUSTODY**

LABORATORY -- ORISE OTHER ARS
(Specify)

CONTROL NUMBER
BD-11-1

SAMPLE LOCATION (LICENSEE) **Braidwood Station** INSPECTION NO. **05000456/2011003**

LICENSE NO. DOCKET NO.
050-00456

SAMPLE SUBMITTED			
# TOTAL	TYPE	VOLUME	WEIGHT
10	H2O	250 ml/ea	n/a

DATE SAMPLES SUBMITTED PRIORITY
 ROUTINE
 URGENT

SAMPLE COLLECTION INTERVAL				
	MONTH	DAY	YEAR	TIME
START				
STOP				

INSPECTOR RESPONSIBLE **Gene Bonano** TELEPHONE NUMBER **630-829-9826**

ANALYSIS TO BE PERFORMED	LIST DESIRED LLD (Optional)	OTHER TYPE OF ANALYSIS (Specify)	LIST DESIRED LLD (Optional)
<input type="checkbox"/> GROSS ALPHA (GA)		<input type="checkbox"/>	
<input type="checkbox"/> GROSS BETA (GB)		<input type="checkbox"/>	
<input type="checkbox"/> GAMMA SPEC (GS)		<input type="checkbox"/>	
<input checked="" type="checkbox"/> TRITIUM (H3)	200 pCi/L	<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
Lionel Rodriguez	FEDEX			Samples shipped to lab (ARS)
	<i>Conatser</i>	6-22-11	12:00	ARS

FEE RECOVERABLE YES NO TAC NUMBER _____ (If Assigned)

REMARKS
Do not process/analyze samples until directed/authorized by Richard Conatser (Tel.: 301-415-4039), NRR, HQ NRC...
Hold samples until notified by NRC...

NOTE: SAMPLES WILL BE DISCARDED AFTER ANALYSIS UNLESS REASONS ARE NOTED IN REMARKS ABOVE.

