



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

## American Radiation Services, Inc.

### Laboratory Analysis Report

**ARS1-08-02367**

*Prepared for:*

### Nuclear Regulatory Commission (NRC)

**James Noggle  
USNRC Region 1  
475 Allendale Road  
King of Prussia, PA 19406  
James.Noggle@nrc.gov**

**Phone: 610.337.5063**

**Revised 1/9/09**

  
**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# 30658**

**NELAP Cert# E87558**



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January 9, 2009

Nuclear Regulatory Commission  
James Noggle  
475 Allendale Road  
King of Prussia, PA 19406

Client Sample: LAF-002-(010)  
ARS SGD: ARS1-08-02367

Dear Mr. Noggle,

On November 19, 2008, American Radiation Services (ARS) received 1 Ground Water Sample to be analyzed for Gamma Spectroscopy, Tritium, Strontium-90, and Nickel-63. **This sample was reanalyzed for Ni-63 to verify the positive value per client's request.**

The sample was 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 sample and QA/QC's were counted with a count time sufficient to meet a statistical sound detection limits.

Counting equipment Quality Assurance was within acceptance criteria when the above referenced samples were processed.

If you have any questions please do not hesitate to call at 225-381-2991.

Sincerely,

A handwritten signature in black ink, appearing to read 'Tony Byrd', is written over a faint, illegible typed name.

Tony Byrd  
Quality Assurance Officer



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**COVER PAGE**

Statement of Work for Analytical Laboratories

**PROJECT SAMPLE IDENTIFICATION  
CROSS-REFERENCE  
TO ARS SAMPLE LABORATORY IDs**

<b>CLIENT SAMPLE</b>	<b>American Radiation Services SAMPLE ID NUMBER(S)</b>
<b>LAF-002-(010)</b>	<b>ARS1-08-02367-001</b>

**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-006/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." The Nickel-63 analyses were performed using American Radiation Services procedure ARS-022.

**ANALYTICAL RESULTS**

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

With regards to Nickel-63 analysis, the high level LCS standard (S-0178) was accidentally used for the LCS/LCSD. Due to the LCS/LCSD sample counts being higher than the yield spike counts, the activity for the LCS/LCSD could not be calculated. Due to each sample having its own yield spike, data is being released as valid per technical review.

After reanalyzing the sample, the activity was below the MDA; therefore, the original results were a false positive.



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**American Radiation Services Project Manager/Laboratory Manager'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 represents the data and is in compliance with the client 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."*

A handwritten signature in black ink, appearing to be 'J. S. ...', written over a horizontal line.

Signature

Quality Assurance Officer, American Radiation Services

Title

1-12-09

Date



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ARS Sample Delivery Group: ARS1-08-02367  
 Client Sample ID: LAF-002-(010)  
 Sample Collection Date: 10/17/08 10:32  
 Sample Matrix: Aqueous

Request or PO Number: N/A  
 ARS Sample ID: ARS1-08-02367-01  
 Date Received: 11/19/2008  
 Report Date: 12/15/08 16:24

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Trans/Chem Recovery
MN-54	-0.092	0.888	3.070	1.535	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
FE-59	-2.127	2.455	8.260	4.130	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
CO-58	0.858	1.120	3.770	1.885	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
CO-60	-1.256	1.339	4.520	2.260	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
ZN-65	1.087	2.286	9.640	4.820	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
NB-95	0.600	1.269	4.290	2.145	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
ZR-95	1.124	1.852	6.350	3.175	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
I-131	0.192	1.137	3.840	1.920	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
CS-134	3.142	1.199	4.510	2.255	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
CS-137	1.142	1.258	4.220	2.110	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
BA-140	-1.254	18.742	17.200	8.600	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
LA-140	-1.188	1.792	6.110	3.055	U	pCi/L	ARS-006/EPA 901.1	11/24/08 16:46	JLA	N/A
SR-90	0.413	0.111	0.316	0.147	U	pCi/L	ARS-032/Eichrom SRW-01	12/10/08 13:30	BJS	100.67%
H-3	124.532	89.882	147.733	72.695	U	pCi/L	ARS-054/EPA 906.0	12/7/08 18:00	BJS	N/A
NI-63	-3.6214	4.5757	7.7984	3.8363	U	pCi/L	ARS-022	1/7/09 20:37	BJS	N/A

NOTES: NI-63 reanalyzed

*Lindsay Ransel*  
 Project Manager Review

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LELAP Certificate# 30658

NELAP Certificate # E87558



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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.

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

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FORM 303

U.S. NUCLEAR REGULATORY COMMISSION

LABORATORY USE ONLY

004)

REQUEST FOR ANALYSIS AND CHAIN OF CUSTODY

CONTROL NUMBER

LABORATORY:

SAMPLE LOCATION (LICENSEE)

INDIAN POINT ENERGY CENTER

LICENSEE NUMBER

DOCKET NO.

SAMPLE SUBMITTED

# TOTAL	TYPE	VOLUME	WEIGHT
1	GROUND WATER	2000 ML	~ 2 Kg

DATE SAMPLES SUBMITTED

PRIORITY  
 ROUTINE  
 URGENT

SAMPLE COLLECTION INTERVAL

	MONTH	DAY	YEAR	TIME
START				
STOP				

SECTOR RESPONSIBLE

Jim Noggle (USNRC)

TELEPHONE NUMBER

(610) 337-5063

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"/> STRONTIUM-90 (Sr90)	
<input type="checkbox"/> GROSS BETA (GB)		<input checked="" type="checkbox"/> NICKEL-63 (Ni63)	
<input checked="" type="checkbox"/> GAMMA SPEC (GS)		<input type="checkbox"/>	
<input checked="" type="checkbox"/> TRITIUM (H3)		<input type="checkbox"/>	
<input type="checkbox"/> CARBON-14 (C14)		<input type="checkbox"/>	
<input type="checkbox"/> IODINE-125 (I125)		<input type="checkbox"/>	

RELEQUISHED BY	RECEIVED BY	DATE	TIME	REASON FOR CHANGE OF CUSTODY
<i>William Rudge</i>	<i>William Rudge</i>	10/17/08	10:36	Transfer of custody to NRC
<i>William Rudge</i>	<i>Arthur Wondrus</i>	10/17/08	10:37	Transfer of custody for shipment
<i>William Rudge</i>	<i>Arthur Wondrus</i>	11-13-08	14:26	SHIPMENT
<i>Ed Ex</i>	<i>William Rudge</i>	11/9/08	9:33	VERIFY SAMPLES

FEE RECOVERABLE  NO  YES TAC NUMBER

REMARKS:

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

