

a member of The GEL Group INC

P0 Box 30712 Charleston, SC 29417

2040 Savage Road Charleston, SC 29407 P 843.556.8171 F 843.766.1178

www.gel.com

September 16, 2008

Ms. Jeri Buczek Savannah River Nuclear Solutions, LLC Building 730-4B, Room 2115 Aiken, SC 29808

Re: 212300c.GEL 212300r1.GEL 212303c.GEL 212303r1.GEL GEL-2008-ZV4SS

Lab Certification: SCDHEC 10120001/10120002

Dear Ms. Buczek:

Enclosed are the above referenced files, which contain data for the sample(s) received on July 16, 2008. The samples were assigned to the laboratory identification series 212300% and 212303%. This revised report has been prepared and reviewed in accordance with GEL's standard operating procedures. The EDD for files 212300r1.GEL and 212303r1.GEL was FTPed on September 16, 2008 and should be used in conjunction with files 212300c.GEL and 212303c.GEL which were FTPed on August 13, 2008.

Alpha Spec and Ra-226 results were erroneously reported in the original data results. Those tests were only required if the Gross Alpha results exceeded 40 pCi/g. This report contains the correct requested analysis and should replace files 212300r.GEL and 212303r.GEL reported on August 13, 2008.

The client was contacted regarding several sample receiving issues. Please refer to the enclosed e-mail for further details on all issues.

The following samples were received:

<u>Lab ID</u>	Sample Description
212300001	ZV4SS-0000033
212300002	ZV4SS-0000036
212300003	ZV4SS-0000025
212300004	ZV4SS-0000029
212300005	ZV4SS-0000026
212300006	ZV4SS-0000038

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212303001	ZV4SS-0000032
212303002	ZV4SS-0000031
212303003	ZV4SS-0000035
212303004	ZV4SS-0000028
212303005	ZV4SS-0000027
212303006	ZV4SS-0000024
212303007	ZV4SS-0000023
212303008	ZV4SS-0000034
212303009	ZV4SS-0000030
212303010	ZV4SS-0000037

The original chains of custody were sent with the initial data package. If you have any questions concerning this data, please call Martha Harrison at (843) 556-8171, extension 4475.

Yours very truly, Edith M. Kent **Project Manager** 

Enclosure WSRB001.212300c.GEL/212300r1.GEL/212303c.GEL/212303r1.GEL

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Raw Data	1276
Method Calibration Data	1889
Continuing Calibration Data	2443
Background And Efficiency Data	2525
Runlogs	2589
Chain of Custody	2597
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#### **BEIDMS Data Review Filter Program Responses for 212300c.GEL**

#### There were no errors reported from the checker program.

#### **BEIDMS Data Review Filter Program Responses for 212300r1.GEL**

- The Preparation Factor Unit field contains an invalid value, 18 times: The reporting units for some of the tracers and carriers are different than the reporting units for the radiochemistry analytes. The client has been provided with the correct reporting units in order to update their tables. The checker program currently in use by the laboratory has not yet been updated by the client to recognize these as valid preparation factor units.
- 2) The Spike Units field contains an invalid value, 18 times: The reporting units for some of the tracers and carriers are different than the reporting units for the radiochemistry analytes. The client has been provided with the correct reporting units in order to update their tables. The checker program currently in use by the laboratory has not yet been updated by the client to recognize these as valid spike units.

#### **BEIDMS Data Review Filter Program Responses for 212303c.GEL**

There were no errors reported from the checker program.

#### **BEIDMS Data Review Filter Program Responses for 212303r1.GEL**

- 1) The Preparation Factor Unit field contains an invalid value, 24 times: The reporting units for some of the tracers and carriers are different than the reporting units for the radiochemistry analytes. The client has been provided with the correct reporting units in order to update their tables. The checker program currently in use by the laboratory has not yet been updated by the client to recognize these as valid preparation factor units.
- 2) The Spike Units field contains an invalid value, 24 times: The reporting units for some of the tracers and carriers are different than the reporting units for the radiochemistry analytes. The client has been provided with the correct reporting units in order to update their tables. The checker program currently in use by the laboratory has not yet been updated by the client to recognize these as valid spike units.

## Anomaly Summary Report

H:\beidms\2008\212300r1.GEL

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Records Processed: 93

Anomaly	Severity Nu	nber Found
The Preparation Factor Unit field contains an invalid value	Fatal	18
The Spike Units field contains an invalid value	Fatal	18
	Total Anomalies Found:	36

Page 1 of 1

ebo0_elqms2_00_ds1	REG	REG	REG	REG	R REG	REG	REG	REG	л Н Н С	а Н П С	REG	REG	E FB	9	SOL F	9	9	с ССS
Analyte_Type	THO	TRO	TRO	TRO	TROI	TRO	TRO	TRO	TRO	TRO	TRO	TRCI	TRO	TRCI	TRCI	TROI	TRCI	TRC
iinU_fluseF	% 9	5 %	2 %	3%	5 % 5	8 %	% 8	% 9	% 8	2% 2%	1 %	% H	% F	4%	%	% 6	2 %	% <b>6</b>
Lab_Qualifier Analytical_Result	87.6803	65.2784	84.3507	80.7744	84.3507	70.5240	86.5704	64.0514	76.5815	70.4338	82.1309	80.5953	67.7079	85.4653	79.1156	71.0321	84.3507	91.0099
Preparation_Factor_Unit	0 mg	CPM 0	5 Gui	0 CPM	b G M	O CPM	бш С	CPM 0	gm (	CPM 0	gm (	0 CPM	0 CPM	0 CPM	0 CPM	gm	, mg	р Ш
Preparation_Factor	P. F.	Ρ.	Š	5 S	<u>S</u>	S.	Š	Š	5. S	5. S	5.5	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>,</u>	<u>5</u>	<u>5</u>
ebo0borteM_lsoitylsnA	RADA-004	RADA-005	RADA-004	RADA-005	RADA-004	RADA-005	RADA-004	RADA-005	RADA-004	RADA-005	RADA-004	RADA-005	RADA-005	RADA-005	RADA-005	RADA-004	RADA-004	RADA-004
emsN_etγlsnA	STRONTIUM CARRIER	TECHNETIUM-99M TRACER	STRONTIUM CARRIER	TECHNETIUM-99M TRACER	STRONTIUM CARRIER	TECHNETIUM-99M TRACER	STRONTIUM CARRIÈR	<b>TECHNETIUM-99M TRACER</b>	STRONTIUM CARRIER	TECHNETIUM-99M TRACER	STRONTIUM CARRIER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	STRONTIUM CARRIER	STRONTIUM CARRIER	STRONTIUM CARRIER
Group_COO_duon	GEL8198A	GEL8198A	GEL8198A	GEL8198A	GEL8198A	GEL8198A	GEL8198A	GEL8198A	GEL8198A	GEL8198A	GEL8198A	GEL8198A		GEL8198A			GEL8198A	
Olelqms2_1emolsuD	ZV4SS-000033	ZV4SS-0000033	ZV4SS-0000036	ZV4SS-0000036	ZV4SS-0000025	ZV4SS-0000025	ZV4SS-0000029	ZV4SS-0000029	ZV4SS-0000026	ZV4SS-0000026	ZV4SS-0000032	ZV4SS-000023	LABOC	ZV4SS-0000023	LABQC	LABQC	ZV4SS-0000032	LABQC
on_enil	<b>б</b>	9	<u>6</u>	20	ର	8	8	4	49	20	28	61	83	85	87	8	91	S

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CI_elqms2_ds. CI_hวis8_ጋD_8A_	21230001 77779	212300001 776635	212300002 777719	212300002 776635	212300003 777719	21230003 776635	212300004 777719	212300004 776635	212300005 777719	212300005 776635	212303001 777719	212303007 776635	1201627158 776635	1201627159 776635	1201627160 776635	1201629564 777719	1201629565 777719	1201629566 777719
Spike_Units Expected_Value Ansiyte_Type Lab_QC_Sample_Code	mg 9.01 TRCR REG	CPM 43200 TRCR REG	mg 9.01 TRCR REG	CPM 43200 TRCR REG	mg 9.01 TRCR REG	CPM 43200 TRCR REG	mg 9.01 TRCR REG	CPM 43200 TRCR REG	mg 9.01 TRCR REG	CPM 43200 TRCR REG	mg 9.01 TRCR REG	CPM 43200 TRCR REG	CPM 43200 TRCR LB	CPM 43200 TRCR LD	CPM 43200 TRCR LCS	ma 9.01 TRCR LB	mg 9.01 TRCR LD	mg 9.01 TRCR LCS
tinze/_soitytisnA Besult_Unit fruomA_exiq2	87.68036 % 9.01	65.27845 % 43200	84.35072 % 9.01	80.77443 % 43200	84.35072 % 9.01	70.52408 % 43200	86.57048 % 9.01	64.05145 % 43200	76.58158 % 9.01	70.43382 % 43200	82.13097 % 9.01	80.59531 % 43200	67.70791 % 43200	85.46534 % 43200	79.1156 % 43200	71.03219 % 9.01	84.35072 % 9.01	91.00999 % 9.01
Lab_Qualifier													·					
eboO_borteM_lsoilylsnA	RADA-004	RADA-005	RADA-005	RADA-005	RADA-005	RADA-004	RADA-004	RADA-004										
emsN_etvisnA	STRONTIUM CARRIER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	STRONTIUM CARRIER	STRONTIUM CARRIER	STRONTIUM CARRIER										
19dmuN_OOO_quo10	GEL8198A	GEL8198A		GEL8198A			GEL8198A											
GI_elqms2_nemotsu2	ZV4SS-0000033	ZV4SS-0000033	ZV4SS-0000036	ZV4SS-0000036	ZV4SS-0000025	ZV4SS-0000025	ZV4SS-0000029	ZV4SS-0000029	ZV4SS-0000026	ZV4SS-0000026	ZV4SS-0000032	ZV4SS-0000023	LABQC	ZV4SS-0000023	LABOC	LABQC	ZV4SS-0000032	LABQC
on_enil	თ	<b>e</b> :	6	22	50	ខ្ល	33	4	49	20	28	61	ß	83	87	68	9	63

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## Anomaly Summary Report

H:\beidms\2008\212303r1.GEL

Records Processed: 123

Anomaly	Severity N	umber Found
The Preparation Factor Unit field contains an invalid value	Fatal	24
The Spike Units field contains an invalid value	Fatal	24
	Total Anomalies Found:	48

Page 1 of 1

01_elqms2_ds1	212300001	212300001	212300002	212300002	212300003	212300003	212300004	212300004	212300005	212300005	212303001	212303007	1201627158	1201627159	1201627160	1201629564	1201629565	1201629566
eboD_elqms2_OD_dsJ	CR REG	CR REG	CR REG	SCR REG	CR REG	CR REG	CR REG	CR REG	CR REG	RCR REG	CR REG	CR REG	CR LB	CR LD	CR LCS	CR LB	ĈR LD	RCR LCS
eqvT_etylsnA	4	Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	Ë	Ħ	Ë	Ħ	Ë	Ħ	Ë	Ħ	Ë
tinU_tluseЯ	8036 %	27845 %	35072 %	7443 %	85072 %	52408 %	57048 %	5145 %	8158 %	3382 %	3097 %	89531 %	0791 %	6534 %	156 %	3219 %	85072 %	% 6660
Lab_Qualifier Analytical_Result	87.6	65.2	2	80.7	20	20.5	86.5	64.0	76.5	70.4	8	80.5	67.7	85.4	1.67	71.0	8.2	91.0
Preparation_Factor_Unit	gm (	0 CPM	gm (	0 CPM	ĝm (	0 CPM	6m (	O CPM	b m d	O CPM	gm (	0 CPM	O CPM	0 CPM	0 CPM	6m (	bm (	бш (
Preparation_Factor	Š	S.F.	ğ	E S	- N	8	5	5	5.0	1.0	Š	5.0	1.0	E S	Š	- No	1.0	1.00
eboQ_bortteM_IsoltylsnA	RADA-004	RADA-005	RADA-005	RADA-005	RADA-005	RADA-004	RADA-004	RADA-004										
emsИeivุlsnA	STRONTIUM CARRIER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	STRONTIUM CARRIER	STRONTIUM CARRIER	STRONTIUM CARRIER										
admuM_DOD_quorB	GEL8198A	GEL8198A		GEL8198A			GEL8198A											
01_elqms2_temoteu0	ZV4SS-0000033	ZV4SS-0000033	ZV4SS-000036	ZV4SS-0000036	ZV4SS-0000025	ZV4SS-0000025	ZV4SS-0000029	ZV4SS-0000029	ZV4SS-0000026	ZV4SS-0000026	ZV4SS-0000032	ZV4SS-0000023	LABOC	ZV4SS-0000023	LABOC	LABQC	ZV4SS-000032	LABQC
on_enil	ი	2	13	20	29	8	39	6	49	50	58	61	83	ß	87	89	9	8

Page 2		

Cl_elqms2_ds_ds LAB_QC_Batch_ID	212300001 777719	212300001 776635	212300002 777719	212300002 776635	212300003 777719	212300003 776635	212300004 777719	212300004 776635	212300005 777719	212300005 776635	212303001 777719	212303007 776635	1201627158 776635	1201627159 776635	1201627160 776635	1201629564 77719	1201629565 77719	1201629566 777719
Spike_Units Expected_Value Anatyte_Type Lab_QC_Sampte_Code	mg 9.01 TRCR REG	CPM 43200 TRCR REG	mg 9.01 TRCR REG	CPM 43200 TRCR REG	mg 9.01 TRCR REG	CPM 43200 TRCR REG	mg 9.01 TRCR REG	CPM 43200 TRCR REG	mg 9.01 TRCR REG	CPM 43200 TRCR REG	mg 9.01 TRCR REG	CPM 43200 TRCR REG	CPM 43200 TRCR 1B	CPM 43200 TRCR LD	CPM 43200 TRCR LCS	mg 9.01 TRCR LB	mg 9.01 TRCR LD	mg 9.01 TRCR LCS
tlusef_lcal_Posult Pesult_Unit fnuomA_exiq2	87.68036 % 9.01	65.27845 % 43200	84.35072 % 9.01	80.77443 % 43200	84.35072 % 9.01	70.52408 % 43200	86.57048 % 9.01	64.05145 % 43200	76.58158 % 9.01	70.43382 % 43200	82.13097 % 9.01	80.59531 % 43200	67.70791 % 43200	85.46534 % 43200	79.1156 % 43200	71.03219 % 9.01	84.35072 % 9.01	91.00999 % 9.01
Lab_Qualifier																		
eboO_borteM_lsoityisnA	RADA-004	RADA-005	RADA-004	RADA-005	RADA-005	RADA-005	RADA-005	RADA-004	RADA-004	RADA-004								
ອເກຣ່/ອາγໄຂ∩A	STRONTIUM CARRIER	TECHNETIUM-99M TRACER	STRONTIUM CARRIER	<b>TECHNETIUM-99M TRACER</b>	STRONTIUM CARRIER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	TECHNETIUM-99M TRACER	STRONTIUM CARRIER	STRONTIUM CARRIER	STRONTIUM CARRIER						
Broup_OOO_quore	GEL8198A	GEL8198A	GEL8198A	GEL8198A		GEL8198A			GEL8198A									
Cl_elqms2_nemotsuD	ZV4SS-0000033	ZV4SS-0000033	ZV4SS-0000036	ZV4SS-000036	ZV4SS-0000025	ZV4SS-0000025	ZV4SS-0000029	ZV4SS-0000029	ZV4SS-000026	ZV4SS-0000026	ZV4SS-0000032	ZV4SS-0000023	LABQC	ZV4SS-0000023	LABQC	LABQC	ZV4SS-0000032	LABQC
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# General Chemistry Analysis



#### General Chemistry Narrative Westinghouse Savannah River Co. (WSRB) SDG 212300

#### **Method/Analysis Information**

Product:	Nitrate + Nitrite		
Analytical Batch:	775789	Method:	EPA 353.2 Modified
Prep Batch :	775788	Method:	EPA 353.2 Modified

#### **Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA 353.2 Modified:

Sample ID	Client ID
212300001	ZV4SS-0000033
212300002	ZV4SS-0000036
212300003	ZV4SS-0000025
212300004	ZV4SS-0000029
212300005	ZV4SS-0000026
1201625158	Method Blank (MB)
1201625162	Laboratory Control Sample (LCS)
1201625231	212300001(ZV4SS-0000033) Sample Duplicate (DUP)
1201625232	212300001(ZV4SS-0000033) Matrix Spike (MS)
1201625233	212300001(ZV4SS-0000033) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 4.

#### **Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

#### **Calibration Information**

The Nutrient analysis was performed on a Lachat Quickchem FIA+ 8500 Series.

#### **Y Intercept Rule**

The absolute value of the intercept is less than 3 times the MDL.

#### **Quality Control (QC) Information**

#### Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

#### Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

#### **Quality Control (QC) Designation**

The following sample was selected for QC analysis: 212300001 (ZV4SS-0000033).

#### Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits.

#### Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recovery for this sample set was within the required acceptance limits.

#### MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD met the acceptance limits.

#### **Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

#### **Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

#### **Holding Times**

All samples in this SDG met the specified holding time.

#### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

#### Sample Re-analysis

The samples in this SDG did not require re-analysis.

#### **Miscellaneous Information**

**Nonconformance (NCR) Documentation** An NCR was not required for this SDG.

#### **Additional Comments**

Additional comments were not required for this SDG.

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

#### **Review Validation:**

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator yerified the/information presented in this case narrative:

M/WW/ 1/2 - Date: 1/AUG08 **Reviewer:** 

# **Sample Data Summary**

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

#### Certificate of Analysis Report for

#### WSRB001 Westinghouse Savannah River Co. (AC33915N)

#### Client SDG: 212300 GEL Work Order: 212300

#### The Qualifiers in this report are defined as follows:

U The analyte was analyzed for, but not detected. The sample quantitation limit (SQL) is valid unless blank contamination is indicated.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless gualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Edith Kent.

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## **Certificate of Analysis**

Company : Address :	Westinghouse Savannah H Building 730-4B, Cube 21 Aiken, South Carolina 29	Rvr Co 119 808							
Contact:	Mr. Robert Kemmerlin				Repo	ort Date: Aug	gust 6, 2008		
Project:	GEL-2008-ZV4SS-2								
	Client Sample ID: Sample ID: Matrix: Collect Date: Receive Date: Collector:	ZV4SS-0000033 212300001 Misc Solid 10-JUL-08 10:15 16-JUL-08 Client		Proje Clier	ect: W nt ID: W	/SRB03808 /SRB001			
Parameter	Qualifier Resul	lt DL	RL	Units	DF A	AnalystDate	Time Batch	<b>Method</b>	
Nutrient Analysis									
EPA 353.2 Nitrogen, Nitro	ate/Nitrite "As Received"								
Nitrogen, Nitrate/Nitrite	2.28	0.159	0.496	mg/kg	1 A.	XH3 07/24/08	1006 775789	1	
The following Prep Met	hods were performed								
Method	Description		Analyst	Date	Time	Prep Batch	ı		
EPA 353.2 Modified	EPA 353.1 Modified Ni	trate/Nitrite	AXH3	07/21/08	1510	775788			
The following Analytica	ll Methods were performe	ed							
Method	Description			Analyst Commo	ents				
1	EPA 353.2 Modified								

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## **Certificate of Analysis**

Company : Address :	Westinghouse Savannah H Building 730-4B, Cube 21 Aiken, South Carolina 29	Rvr Co 119 808						
Contact:	Mr. Robert Kemmerlin				Repo	ort Date: Aug	gust 6, 2008	
Project:	GEL-2008-ZV4SS-2							
	Client Sample ID: Sample ID: Matrix: Collect Date: Receive Date: Collector:	ZV4SS-0000036 212300002 Misc Solid 14-JUL-08 10:30 16-JUL-08 Client		Proje Clier	ect: W nt ID: W	/SRB03808 /SRB001		
Parameter	Qualifier Resul	lt DL	RL	Units	DF A	AnalystDate	Time Batc	h Method
Nutrient Analysis								
EPA 353.2 Nitrogen, Nitro	nte/Nitrite "As Received"							
Nitrogen, Nitrate/Nitrite	3.97	0.154	0.481	mg/kg	1 A.	XH3 07/24/08	1016 775789	1
The following Prep Met	hods were performed							
Method	Description		Analyst	Date	Time	Prep Batch	l	
EPA 353.2 Modified	EPA 353.1 Modified Ni	trate/Nitrite	AXH3	07/21/08	1510	775788		
The following Analytica	l Methods were performe	d						
Method	Description			Analyst Commo	ents			
1	EPA 353.2 Modified							

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## **Certificate of Analysis**

Company : Address :	Westinghouse Savannah I Building 730-4B, Cube 2 Aiken, South Carolina 29	Rvr Co 119 9808							
Contact:	Mr. Robert Kemmerlin				Repo	ort Date: Aug	gust 6, 2008		
Project:	GEL-2008-ZV4SS-2								
	Client Sample ID: Sample ID: Matrix: Collect Date: Receive Date: Collector:	ZV4SS-0000025 212300003 Misc Solid 10-JUL-08 10:05 16-JUL-08 Client		Proje Clier	ect: V nt ID: V	VSRB03808 VSRB001			
Parameter	Qualifier Resu	lt Di	L RL	Units	DF A	AnalystDate	Time Batcl	h Method	
Nutrient Analysis									
EPA 353.2 Nitrogen, Nitro	ate/Nitrite "As Received"								
Nitrogen, Nitrate/Nitrite	6.50	0.158	0.495	mg/kg	1 A	XH3 07/24/08	1017 775789	1	
The following Prep Met	thods were performed								
Method	Description		Analyst	Date	Time	Prep Batch	ı		
EPA 353.2 Modified	EPA 353.1 Modified Ni	trate/Nitrite	AXH3	07/21/08	1510	775788			
The following Analytica	al Methods were performe	ed							
Method	Description			Analyst Comm	ents				
1	EPA 353.2 Modified								

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## **Certificate of Analysis**

Company : Address :	Westinghouse Savannah R Building 730-4B, Cube 211 Aiken, South Carolina 298	vr Co 19 08						
Contact:	Mr. Robert Kemmerlin				Repo	ort Date: Aug	ust 6, 2008	
Project:	GEL-2008-ZV4SS-2							
	Client Sample ID: Sample ID: Matrix: Collect Date: Receive Date: Collector:	ZV4SS-0000029 212300004 Misc Solid 10-JUL-08 13:35 16-JUL-08 Client		Proje Clier	ect: V nt ID: V	VSRB03808 VSRB001		
Parameter	Qualifier Result	DL	RL	Units	DF	AnalystDate	Time Batch	Method
Nutrient Analysis								
EPA 353.2 Nitrogen, Nitro	ute/Nitrite "As Received"							
Nitrogen, Nitrate/Nitrite	5.21	0.153	0.478	mg/kg	1 A	XH3 07/24/08	1018 775789	1
The following Prep Met	hods were performed							
Method	Description		Analyst	Date	Time	Prep Batch		
EPA 353.2 Modified	EPA 353.1 Modified Nitr	ate/Nitrite	AXH3	07/21/08	1510	775788		
The following Analytica	l Methods were performed	l						
Method	Description			Analyst Comme	ents			
1	EPA 353.2 Modified							

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## **Certificate of Analysis**

Company : Address :	Westinghouse Savannah R Building 730-4B, Cube 21 Aiken, South Carolina 29	2vr Co 19 808						
Contact:	Mr. Robert Kemmerlin				Repo	ort Date: Aug	gust 6, 2008	
Project:	GEL-2008-ZV4SS-2							
	Client Sample ID: Sample ID: Matrix: Collect Date: Receive Date: Collector:	ZV4SS-0000026 212300005 Misc Solid 10-JUL-08 10:05 16-JUL-08 Client		Proje Clier	ect: W nt ID: W	/SRB03808 /SRB001		
Parameter	Qualifier Resul	t DL	RL	Units	DF A	AnalystDate	Time Batc	h Method
Nutrient Analysis								
EPA 353.2 Nitrogen, Nitro	nte/Nitrite "As Received"							
Nitrogen, Nitrate/Nitrite	5.34	0.149	0.465	mg/kg	1 A.	XH3 07/24/08	1019 775789	) 1
The following Prep Met	hods were performed							
Method	Description		Analyst	Date	Time	Prep Batch	l	
EPA 353.2 Modified	EPA 353.1 Modified Nit	rate/Nitrite	AXH3	07/21/08	1510	775788		
The following Analytica	l Methods were performe	d						
Method	Description			Analyst Comme	ents			
1	EPA 353.2 Modified							

# RADIOLOGICAL ANALYSIS

#### Radiochemistry Case Narrative Savannah River Nuclear Solutions, LLC (WSRB) SDG 212300

#### **Method/Analysis Information**

Product:	Gammaspec, Gamma, Sb-125, Cs-137, Ra-226
Analytical Method:	RADA-013
Prep Method:	Dry Soil Prep
Analytical Batch Number:	776476
Prep Batch Number:	776142

Sample ID	Client ID
212300001	ZV4SS-0000033
212300002	ZV4SS-0000036
212300003	ZV4SS-0000025
212300004	ZV4SS-0000029
212300005	ZV4SS-0000026
1201626776	Method Blank (MB)
1201626777	212303001(ZV4SS-0000032) Sample Duplicate (DUP)
1201626778	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 15.

#### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met.

#### **Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

#### **Blank Information**

The blank volume is representative of the sample volume in this batch.

#### **Designated QC**

The following sample was used for QC: 212303001 (ZV4SS-0000032).

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### CSU

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Preparation Information**

All preparation criteria have been met for these analyses.

#### Sample Re-prep/Re-analysis

Sample 1201626777 (ZV4SS-0000032) was recounted due to high MDA.

#### **Miscellaneous Information:**

#### **NCR Documentation**

Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A nonconformance report (NCR) was not generated for this SDG.

#### **Additional Comments**

Additional comments were not required for this sample set.

#### **Qualifier information**

Qualifier	Reason	Analyte	Sample	<b>Client Sample</b>
1	EPA Storet Code:Compound identification criteria were not met.	Antimony-125	212300001	ZV4SS-0000033
			212300002	ZV4SS-0000036
			212300004	ZV4SS-0000029
			212300005	ZV4SS-0000026

#### **Method/Analysis Information**

Product:	Gamma Low level I129, Solid
Analytical Method:	EML HASL 300, 4.5.2.3
Analytical Batch Number:	776477

Sample ID	Client ID
212300001	ZV4SS-0000033
212300002	ZV4SS-0000036
212300003	ZV4SS-0000025
212300004	ZV4SS-0000029
212300005	ZV4SS-0000026
212300006	ZV4SS-0000038
1201626779	Method Blank (MB)
1201626780	212303001(ZV4SS-0000032) Sample Duplicate (DUP)
1201626782	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-006 REV# 13.

#### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met.

#### **Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

#### **Blank Information**

The blank volume is representative of the sample volume in this batch.

#### **Designated QC**

The following sample was used for QC: 212303001 (ZV4SS-0000032).

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### CSU

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Preparation Information**

All preparation criteria have been met for these analyses.

#### Sample Re-prep/Re-analysis

Sample 212300006 (ZV4SS-0000038) was recounted due to high MDA.

#### **Miscellaneous Information:**

#### **NCR Documentation**

Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A nonconformance report (NCR) was not generated for this SDG.

#### **Additional Comments**

Additional comments were not required for this sample set.

#### **Qualifier information**

Qualifier	Reason	Analyte	Sample	<b>Client Sample</b>
1	EPA Storet Code:Compound identification criteria were not met.	Iodine-129	212300003	ZV4SS-0000025
			212300004	ZV4SS-0000029
			212300005	ZV4SS-0000026
			212300006	ZV4SS-0000038

#### **Method/Analysis Information**

Product:	GFPC, Gross Alpha Solid
Analytical Method:	RADA-001
Prep Method:	Dry Soil Prep
Analytical Batch Number:	776598
Prep Batch Number:	776142

Sample ID	Client ID
212300001	ZV4SS-0000033
212300002	ZV4SS-0000036
212300003	ZV4SS-0000025
212300004	ZV4SS-0000029
212300005	ZV4SS-0000026
1201627038	Method Blank (MB)
1201627039	212303001(ZV4SS-0000032) Sample Duplicate (DUP)
1201627040	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001B REV# 12.

#### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met. The discrimination settings are calibrated in beta discriminating mode to reduce beta to alpha crosstalk.

#### **Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

#### **Blank Information**

The blank volume is representative of the sample volumes in this batch.

#### **Designated QC**

The following sample was used for QC: 212303001 (ZV4SS-0000032).

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### CSU

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Preparation Information**

All preparation criteria have been met for these analyses.

#### Sample Re-prep/Re-analysis

Sample 1201627038 (MB) was recounted due to a suspected blank false positive.

#### **Chemical Recoveries**

All chemical recoveries meet the required acceptance limits for this sample set.

#### **Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

#### **Miscellaneous Information:**

#### **NCR Documentation**

Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A nonconformance report (NCR) was not generated for this SDG.

#### **Additional Comments**

Additional comments were not required for this sample set.

#### **Qualifier information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

Product:	GFPC, Sr90, solid Rad
Analytical Method:	RADA-004
Prep Method:	Dry Soil Prep
Analytical Batch Number:	777719
Prep Batch Number:	776142

Sample ID	Client ID
212300001	ZV4SS-0000033
212300002	ZV4SS-0000036
212300003	ZV4SS-0000025
212300004	ZV4SS-0000029
212300005	ZV4SS-0000026
1201629564	Method Blank (MB)
1201629565	212303001(ZV4SS-0000032) Sample Duplicate (DUP)
1201629566	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 12.

#### **Calibration Information:**

#### Calibration Information

All initial and continuing calibration requirements have been met.

#### **Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

#### **Blank Information**

The blank volume is representative of the sample volume in this batch.

#### **Designated QC**

The following sample was used for QC: 212303001 (ZV4SS-0000032).

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### CSU

The blank 1201629564 (MB) result is greater than 1.65 times the CSU but less than the MDA.

#### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Preparation Information**

All preparation criteria have been met for these analyses.

#### Sample Re-prep/Re-analysis

Samples 212300002 (ZV4SS-0000036), 212300003 (ZV4SS-0000025), 212300004 (ZV4SS-0000029) and 212300005 (ZV4SS-0000026) were recounted to verify sample results. Second counts being reported.

#### **Chemical Recoveries**

All chemical recoveries meet the required acceptance limits for this sample set.

#### **Miscellaneous Information:**

#### **NCR Documentation**

Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A nonconformance report (NCR) was not generated for this SDG.

#### **Qualifier information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

Product:	Liquid Scint Tc99, Solid
Analytical Method:	RADA-005
Analytical Batch Number:	776635

Sample ID	Client ID
212300001	ZV4SS-0000033
212300002	ZV4SS-0000036
212300003	ZV4SS-0000025
212300004	ZV4SS-0000029
212300005	ZV4SS-0000026
1201627158	Method Blank (MB)
1201627159	212303007(ZV4SS-0000023) Sample Duplicate (DUP)
1201627160	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-005 REV# 16.

#### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met.

#### **Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

#### **Blank Information**

The blank volume is representative of the sample volume in this batch.

#### **Designated QC**

The following sample was used for QC: 212303007 (ZV4SS-0000023).

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### CSU

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Preparation Information**

All preparation criteria have been met for these analyses.

#### Sample Re-prep/Re-analysis

Sample 212300005 (ZV4SS-0000026) was recounted due to a negative result greater than three times the error.

#### **Miscellaneous Information:**

#### **NCR Documentation**

Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A nonconformance report (NCR) was not generated for this SDG.

#### **Additional Comments**

Additional comments were not required for this sample set.

#### **Qualifier information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

Product:	Liquid Scint C14, Solid
Analytical Method:	EPA EERF C-01 Modified
Analytical Batch Number:	776634

Sample ID	Client ID
212300001	ZV4SS-0000033
212300002	ZV4SS-0000036
212300003	ZV4SS-0000025
212300004	ZV4SS-0000029
212300005	ZV4SS-0000026
1201627154	Method Blank (MB)
1201627155	212303002(ZV4SS-0000031) Sample Duplicate (DUP)
1201627156	212303002(ZV4SS-0000031) Matrix Spike (MS)
1201627157	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-003 REV# 11.

#### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met.

#### **Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

#### **Blank Information**

The blank volume is representative of the sample volume in this batch.

#### **Designated QC**

The following sample was used for QC: 212303002 (ZV4SS-0000031).

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### CSU

The blank result is less than 1.65 times the CSU.

#### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Preparation Information**

All preparation criteria have been met for these analyses.

#### Sample Re-prep/Re-analysis

Samples were recounted due to the quench number being outside the calibration range.

#### **Miscellaneous Information:**

#### **NCR Documentation**

Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following NCR was generated for this SDG: NCR 585474 was generated due to Sample Analyzed out of Holding. 1. Sample 212300 001, 003, 004, 005, 212303 001, 002, 006, 007, 009, 1201627155, 1201627156 were received within holding but analyzed out of holding. 1. Reporting results

#### **Additional Comments**

Additional comments were not required for this sample set.

#### **Qualifier information**

Manual qualifiers were not required.

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

#### **Review Validation:**

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the

data package.

The following data validator verified the information presented in this case narrative:

Reviewer/Date:\_\_\_\_\_\_\_\_ Mc Carty 9/15/08

	COMPANY - WIDE NONC		r
<b>Mo.Day Yr.</b> 11-AUG-08	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: LSC	Test / Method: EPA EERF C-01 Modified	Matrix Type: Solid	Client Code: WSRB
<b>Batch ID:</b> 776634	Sample Numbers: See Below		
Potentially affected work order(s)(	SDG): 212300,212303(212300-1)		
Application Issues:			
Sample Analyzed out of Holding			
Specification and Requirements Nonconformance Description:		NRG Disposition:	
1. Sample 212300 001, 003, 004, 0 1201627155, 1201627156 were rec of holding.	05, 212303 001, 002, 006, 007, 009, beived within holding but analyzed out	1. Reporting results	
Originator's Name:		Data Validator/Group Leade	r:
Kenshalla Oston 11-AUG-08		Lesley Anderson 12-A	AUG-08

Quality Review:

Director:

# SAMPLE DATA SUMMARY

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#### Certificate of Analysis Report for

#### WSRB001 Savannah River Nuclear Solutions, LLC (AC33915N)

#### Client SDG: 212300 GEL Work Order: 212300

#### The Qualifiers in this report are defined as follows:

J The detected analyte was positively identified but the result is approximate.

R The sample result is rejected as unusable due to serious deficiencies in meeting quality control criteria. The analyte may be present or absent.

U The analyte was analyzed for, but not detected. The sample quantitation limit (SQL) is valid unless blank contamination is indicated.

UJ The analyte was analyzed for, but not detected. The sample quantitation limit (SQL) is approximate, and may be inaccurate or imprecise.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Edith Kent.

Aleanne Malaroy

Reviewed by

## GEL LABORATORIES LLC 2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## **Certificate of Analysis**

Company	: Savannah Rive	er Nuclear So	olutions,								
Address :	Building 730-4 Aiken, South (	4B, Cube 211 Carolina 298	19 308				R	eport Date: S	eptember	15, 200	18
Contact:	Mr. Robert Ke	mmerlin									
Project:	GEL-2008-ZV	V4SS-2									
	Client Samp Sample ID: Matrix: Collect Date Receive Date Collector:	le ID: : e:	ZV4SS-0000 212300001 Misc Solid 10-JUL-08 1 16-JUL-08 Client	033 0:15		Pro Cl	oject: ient ID:	WSRB0380 WSRB001	98		
Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDat	e Time	Batch	1 Method
Rad Gamma Spec Ana	alysis									_	
Gamma Low level 1129,	, Solid "As Receive	ed"									
Iodine-129	U	-0.0608	+/-0.366	0.433	2.24	pCi/g		MJH1 07/28/	08 0945 7	76477	1
Gammaspec, Gamma, S	Sb-125, Cs-137, Ra	ı-226 "Dry W	Veight Corrected	d''							
Antimony-125 Cesium-137	R	0.319 8.32	+/-0.158 +/-0.520	0.292 0.0683	0.316 0.170	pCi/g pCi/g		MJH1 07/30/	08 1014 7	76476	2
<b>Rad Gas Flow Proport</b>	tional Counting										
GFPC, Gross Alpha So	lid "Dry Weight C	orrected"									
Alpha		22.5	+/-6.39	3.78	1.00	pCi/g		DXB5 08/05/	08 1725 7	76598	3
Beta		36.0	+/-6.23	6.49	8.00	pCi/g					
GFPC, Sr90, solid Rad	"Dry Weight Corr	ected"	10.010	0.050	1.00	<i></i>					
Strontium-90	U	0.148	+/-0.218	0.379	1.92	pC1/g		AXD2 07/29/	08 2002 7	77/19	4
Kad Liquid Scintillatio											
Liquid Scint C14, Solid	"As Received"	50 C		190	274	nC:/a		SVD 4 09/09	00 1220 7	176621	5
Liquid Soint To00 Solid	UJ I "As Passivad"	-50.6	+/-99.9	180	274	pCI/g		SAD4 08/08/	08 1528 /	/0054	3
Technetium-99	II AS RECEIVED	26.4	±/-38 5	67.8	90.4	nCi/g		PYE1 07/29/	08 0145 7	76635	6
reemetium <i>yy</i>	0	-20.4	17 50.5	07.0	20.4	pens		KALI 01/20	00 0145 /	10055	0
The following Prep M	Iethods were perf	formed				_					
Method	Description				Analyst	Date	Tim	e Prep Ba	tch		
Dry Soil Prep	Dry Soil Pre	p GL-RAD-A	A-021		BXJ1	07/21/08	1722	2 776142			
The following Analyt	ical Methods wer	e performed	l								
Method	Description				A	Analyst Com	ments				
1	EML HASL	300, 4.5.2.3									
2	RADA-013										
3	RADA-001										
4	RADA-004										
5	EPA EERF C	C-01 Modifie	d								
6	RADA-005										
Surrogate/Tracer reco	overy Test				Result	No	minal F	Recovery%	Accepta	able Li	mits
Strontium Carrier	GFPC.	Sr90, solid R	ad "Dry Weigh	t	7.9	0 mg	9.01	88	(25)	%-1259	%)

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## **Certificate of Analysis**

Parameter Qualifier	Result Uncertainty D	L RL	Units D	F AnalystDate	Time Batch Method
Quantita	Result Uncertainty D		N i h		A scontable Limits

Company : Savannah River Nuclear Solutions,

LLC

## GEL LABORATORIES LLC 2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## **Certificate of Analysis**

Company	: Savannah Rive	er Nuclear So	olutions,								
Address :	Building 730-4 Aiken, South C	B, Cube 211 Carolina 298	19 808				R	eport Date: Se	ptember	15, 200	8
Contact:	Mr. Robert Ke	mmerlin									
Project:	GEL-2008-ZV	/4SS-2									
	Client Sampl Sample ID: Matrix: Collect Date: Receive Date Collector:	e ID:	ZV4SS-0000 212300002 Misc Solid 14-JUL-08 10 16-JUL-08 Client	036 0:30		Pro Cli	oject: ent ID:	WSRB03808 WSRB001	}		
Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	e Batch	Method
Rad Gamma Spec Ana	alysis										
Gamma Low level 1129	, Solid "As Receive	d"									
Iodine-129	U U	-0.266	+/-0.320	0.348	2.24	pCi/g		MJH1 07/28/0	8 1036	776477	1
Gammaspec, Gamma, S Antimony-125	86-123, Cs-137, Ra R	-226 "Dry м 0.271	+/-0.195	0.255	0.316	nCi/9		MJH1 07/30/0	8 1024	776476	2
Cesium-137	K	6.22	+/-0.543	0.0775	0.170	pCi/g		WIJIII 0775070	0 1024	//04/0	2
<b>Rad Gas Flow Propor</b>	tional Counting										
GFPC, Gross Alpha So	lid "Dry Weight Co	orrected"									
Alpha		30.1	+/-7.56	3.45	1.00	pCi/g		DXB5 08/05/0	8 1725	776598	3
Beta	"D. W	40.4	+/-5.99	5.08	8.00	pC1/g					
GFPC, Sr90, solia Raa Strontium 00	Dry weight Corr	0.0252	1/0.167	0.338	1.02	nCi/a		A VD2 08/06/0	18 2023	777710	4
Rad Liquid Scintillati	on Analysis	-0.0233	+/-0.107	0.558	1.92	pc1/g		AAD2 08/00/0	8 2023	////19	4
Liquid Scint C14 Solid	"As Received"										
Carbon-14	U	46.2	+/-139	240	274	pCi/g		SXB4 08/08/0	8 1345	776634	5
Liquid Scint Tc99, Solid	d "As Received"					F 8					
Technetium-99	U	-30.3	+/-32.3	57.4	90.4	pCi/g		RXE1 07/29/0	8 0222	776635	6
The following Pren N	lathads wara norf	ormed									
Method	Description	ormeu			Analyst	Date	Tim	e Prep Bat	ch		
Dry Soil Prep	Dry Soil Prep	GL-RAD-A	4-021		BXJ1	07/21/08	1722	2 776142			
			_								
The following Analyt Method	ical Methods were	e performed	1		A	Analyst Comr	nents				
1	EMI HASI 3	300 4 5 2 3									
2	RADA-013	, 4.5.2.5									
3	RADA-001										
4	RADA-004										
5	EPA EERF C	-01 Modifie	d								
6	RADA-005	011100000									
											•
Surrogate/Tracer reco	overy Test				Result	Noi	minal F	Recovery%	Accep	table Li	mits
Strontium Carrier	GFPC, S	Sr90, solid R	ad "Dry Weight	t	7.6	0 mg	9.01	84	(2.	5%-1259	%)

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Corrected" Liquid Scint Tc99, Solid "As Received"	34900 CPM	43200 81 (15%-125%)
y Test	Result	Nominal Recovery% Acceptable Limits
Qualifier Result Uncertainty DL	RL Ur	its DF AnalystDate Time Batch Meth
Client Sample ID: ZV4SS-0000036 Sample ID: 212300002		Project: WSRB03808 Client ID: WSRB001
GEL-2008-ZV4SS-2		
Mr. Robert Kemmerlin		
Aiken, South Carolina 29808		Report Date: September 15, 2008
LLC Building 730-4B, Cube 2119		
	LLC Building 730-4B, Cube 2119 Aiken, South Carolina 29808 Mr. Robert Kemmerlin GEL-2008-ZV4SS-2	LLC Building 730-4B, Cube 2119 Aiken, South Carolina 29808 Mr. Robert Kemmerlin GEL-2008-ZV4SS-2

Company : Savannah River Nuclear Solutions,

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Compa	any : Sa	avannah River	Nuclear So	olutions,									
Addres	ss: B A	uilding 730-41 iken, South Ca	19 808		Report Date: September 15, 2008								
Contac	et: M	Ir. Robert Ken	nmerlin										
Projec	t: <b>G</b>	EL-2008-ZV	4SS-2										
	C S M C R C	Client Sample lample ID: Aatrix: Collect Date: Leceive Date: Collector:	e ID:	ZV4SS-00000 212300003 Misc Solid 10-JUL-08 10 16-JUL-08 Client	))25 ):05		Pro Cliv	viect: ent ID:	WSRB03808 WSRB001				
Parameter		Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method	
Rad Gamma Spec	Analysis												
Gamma Low level II	129, Solia	l "As Received	<b>!</b> "										
Iodine-129		R	14.9	+/-1.53	2.22	2.24	pCi/g		MJH1 07/28/08	1135	776477	1	
Gammaspec, Gamma	a, Sb-123	5, Cs-137, Ra-	226 "Dry W	Veight Corrected	!"								
Antimony-125 Cesium-137			4.46 1050	+/-1.13 +/-54.0	1.99 0.364	0.316 0.170	pCi/g pCi/g		MJH1 07/30/08	1025	776476	2	
<b>Rad Gas Flow Prop</b>	oortional	l Counting											
GFPC, Gross Alpha	Solid "L	ory Weight Co	rrected"										
Alpha			29.9	+/-7.65	5.04	1.00	pCi/g		DXB5 08/05/08	1725	776598	3	
Beta			917	+/-24.6	5.68	8.00	pCi/g						
GFPC, Sr90, solid R	Rad "Dry	Weight Corre	cted"										
Strontium-90		J	3.57	+/-0.579	0.514	1.92	pCi/g		AXD2 08/06/08	2023	777719	4	
Rad Liquid Scintill	ation Ar	alysis											
Liquid Scint C14, So	olid "As F	Received"										_	
Carbon-14		UJ	-109	+/-78.8	148	274	pCi/g		SXB4 08/08/08	1401	776634	5	
Liquid Scint Tc99, S	olid "As	Received"		105.0		00.4	<u> </u>						
Technetium-99		U	-34.2	+/-37.9	67.3	90.4	pC1/g		RXE1 07/29/08	0259	//6635	6	
The following Prej	p Metho	ds were perfo	rmed										
Method	1	Description				Analyst	Date	Tim	e Prep Batch	ı			
Dry Soil Prep		Dry Soil Prep	GL-RAD-A	A-021		BXJ1	07/21/08	1722	2 776142				
The following Ana	lytical N	Iethods were	performed	l									
Method	]	Description				A	Analyst Comm	nents					
1	l	EML HASL 3	00, 4.5.2.3										
2	]	RADA-013											
3	1	RADA-001											
4	1	RADA-004											
5	]	EPA EERF C-	01 Modifie	d									
6	1	RADA-005											
Surrogate/Tracer r	ecovery	Test				Result	Nor	ninal F	Recovery%	Accept	able Li	mits	
Strontium Carrier		GFPC, Si	r90, solid R	ad "Dry Weight		7.6	0 mg	9.01	84	(25	%-125%	6)	

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Address :	Building 730-4B, Cube 2119 Aiken, South Carolina 29808	Report Date: September 15, 2008							
Contact:	Mr. Robert Kemmerlin								
Project:	GEL-2008-ZV4SS-2								
	Client Sample ID: ZV4SS-0000025 Sample ID: 212300003		Project: WSRB03808 Client ID: WSRB001	3					
Parameter	Qualifier Result Uncertainty DL	RL Un	its DF AnalystDate	Time Batch Method					
Surrogate/Tracer recove	ry Test	Result	Nominal Recovery%	Acceptable Limits					
	Corrected"								
Technetium-99m Tracer	Liquid Scint Tc99, Solid "As Received"	30500 CPM	43200 71	(15%-125%)					

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LLC

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Company	y: Savannah River	Nuclear So	olutions,									
Address	: Building 730-4I Aiken, South Ca	B, Cube 211 arolina 298	19 308	Report Date: September 15, 2008								
Contact:	Mr. Robert Ken	nmerlin										
Project:	GEL-2008-ZV4	4SS-2										
	Client Sample Sample ID: Matrix: Collect Date: Receive Date: Collector:	e ID:	ZV4SS-00000 212300004 Misc Solid 10-JUL-08 13 16-JUL-08 Client	029 3:35		Pr Cl	oject: ient ID:	WSRB0 WSRB0	13808 101			
Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec An	alysis											
Gamma Low level 1129	9, Solid "As Received	<i>l</i> "										
Iodine-129	R	2.45	+/-0.822	1.12	2.24	pCi/g		MJH1 07	/28/08	1238 ′	776477	1
Gammaspec, Gamma,	Sb-125, Cs-137, Ra-	226 "Dry W	Veight Corrected	Į‴								
Antimony-125 Cesium-137	R	2.03 284	+/-1.09 +/-22.4	1.59 0.306	0.316 0.170	pCi/g pCi/g		MJH1 07	/30/08	1045 ′	776476	2
<b>Rad Gas Flow Propo</b>	rtional Counting											
GFPC, Gross Alpha Se	olid "Dry Weight Co	rrected"										
Alpha		26.2	+/-7.29	4.07	1.00	pCi/g		DXB5 08	/05/08	1725 ´	776598	3
Beta		265	+/-13.9	6.67	8.00	pCi/g						
GFPC, Sr90, solid Rad	l "Dry Weight Corre	cted"										
Strontium-90	U	0.817	+/-0.295	0.354	1.92	pCi/g		AXD2 08	/06/08	2023	777719	4
Rad Liquid Scintillat	ion Analysis											
Liquid Scint C14, Solid	l "As Received"											_
Carbon-14	UJ	-26.5	+/-125	221	274	pCi/g		SXB4 08	/08/08	1417 ′	776634	5
Liquid Scint Tc99, Soli	d "As Received"	<b>2</b> 0 1	/ 40.1	70 7	00.4	<u> </u>		DUEL 07		0.00		
Technetium-99	U	-28.1	+/-40.1	70.7	90.4	pC1/g		RXE1 07	/29/08	0336	//6635	6
The following Prep 1	Methods were perfo	rmed										
Method	Description				Analyst	Date	Tim	e Prep	Batch			
Dry Soil Prep	Dry Soil Prep	GL-RAD-A	A-021		BXJ1	07/21/08	172	2 7761	42			
The following Analy	tical Methods were	performed	I									
Method	Description	•			A	Analyst Com	ments					
1	EML HASL 3	00, 4.5.2.3										
2	RADA-013											
3	RADA-001											
4	RADA-004											
5	EPA EERF C-	01 Modifie	d									
6	RADA-005											
Surrogate/Tracer rec	overy Test				Result	No	ominal ]	Recovery%	<u>6</u>	Accept	able Li	mits
Strontium Carrier	GFPC, Si	r90, solid R	ad "Dry Weight		7.8	0 mg	9.01	87		(25	-1259	%)

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## **Certificate of Analysis**

Address : Building 730-4B, Cube 2119 Aiken, South Carolina 29808 Report Date: September 15, 200   Contact: Mr. Robert Kemmerlin Project: GEL-2008-ZV4SS-2   Client Sample ID: ZV4SS-0000029 212300004 Project: WSRB03808 Client ID:   Parameter Qualifier Result Uncertainty DL RL Units DF AnalystDate Time Batch   Surrogate/Tracer recovery Test Result Nominal Recovery% Acceptable Lie	Technetium-99m Tracer	Corrected" Liquid Scint Tc99	, Solid "As Received"	27700	) CPM 43200	64	(15%-125%)
Address : Building 730-4B, Cube 2119 Aiken, South Carolina 29808 Report Date: September 15, 200   Contact: Mr. Robert Kemmerlin Project: GEL-2008-ZV4SS-2   Client Sample ID: ZV4SS-0000029 212300004 Project: WSRB03808 WSRB001   Parameter Qualifier Result Uncertainty DL RL Units DF AnalystDate Time Batch	Surrogate/Tracer recove	ery Test		Result	Nominal	Recovery%	Acceptable Limits
Address : Building 730-4B, Cube 2119   Aiken, South Carolina 29808 Report Date: September 15, 200   Contact: Mr. Robert Kemmerlin   Project: GEL-2008-ZV4SS-2   Client Sample ID: ZV4SS-0000029   Sample ID: 212300004	Parameter	Qualifier Resu	ılt Uncertainty	DL RL	Units D	F AnalystDate	Time Batch Method
Address :Building 730-4B, Cube 2119 Aiken, South Carolina 29808Report Date: September 15, 200Contact:Mr. Robert Kemmerlin Project:GEL-2008-ZV4SS-2		Client Sample ID: Sample ID:	ZV4SS-0000029 212300004		Project: Client ID:	WSRB03808 WSRB001	,
Address :Building 730-4B, Cube 2119 Aiken, South Carolina 29808Report Date:September 15, 200Contact:Mr. Robert Kemmerlin	Project:	GEL-2008-ZV4SS-2					
Address :Building 730-4B, Cube 2119 Aiken, South Carolina 29808Report Date:September 15, 200	Contact:	Mr. Robert Kemmerlin					
Address : Building 730-4B, Cube 2119		Aiken, South Carolina 2	9808			Report Date: Se	ptember 15, 2008
	Address :	LLC Building 730-4B, Cube 2	2119				

Company : Savannah River Nuclear Solutions,

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Strontium Carri	ier	GFPC, St	90, solid R	ad "Dry Weight		6.9	0 mg	9.01	77		(25	5%-1259	%)
Surrogate/Tra	cer recove	ery Test				Result	No	minal <sup>]</sup>	Recovery	%	Accep	table Li	mits
0		KADA-005											
.) С		EPA EERF C-		u									
		EDA FEDE CA	1 Madifia	d									
4		RADA 004											
3		RADA-001											
2		RADA-013	-										
1		EML HASL 30	00, 4.5.2.3										
Method	•	Description				A	Analyst Com	ments					
The following	Analytica	al Methods were	performed	1									
Dry Soil Prep		Dry Soil Prep	GL-RAD-A	A-021		BXJ1	07/21/08	172	2 776	- 5142			
Method		Description				Analyst	Date	Tim	e Pre	p Batch	1		
The following	Prep Met	thods were perfo	rmed										
Technetium-99	,	U	-17.7	+/-31.7	55.9	90.4	pCi/g		RXE1 0	8/07/08	1033	776635	6
Liquid Scint Tc	99. Solid ".	As Received"	-77.7	17 155	271	<i>21</i> <b>म</b>	PC1/5		5210+ 0	0,00,00	1-55	, , 0054	5
Carbon-14	<del>т</del> , зони А	III	-49 9	+/-135	241	274	nCi/o		SXB4 0	8/08/08	1433	776634	5
Liquid Scint C1	A Solid "A	Received"											
Rad Liquid Sei	intillation	Analysis	3.98	+/-0.024	0.308	1.92	pc1/g		АЛД2 ()	0/00/08	2023	////19	4
Strontium 00	чиа <b>к</b> аа "L	ny weight Correc	2 00	1/0.624	0 560	1.02	nC:/a		1 2 1 2 0	8/06/00	2022	777710	4
Beta	J; J D J "T	m Waight Com	1150 atod"	+/-27.5	5.77	8.00	pC1/g						
Alpha			19.6	+/-5.94	4.97	1.00	pCi/g		DXB5 0	8/05/08	1725	776598	3
GFPC, Gross A	lpha Solid	"Dry Weight Cor	rected"		4.05	1.05	~			0 10 <b>-</b> 16 -			
Rad Gas Flow	Proportio	nal Counting											
Cesium-137			1390	+/-74.8	0.332	0.170	pCi/g						
Antimony-125	.,	R	4.71	+/-1.08	1.76	0.316	pCi/g		MJH1 0	7/30/08	1124	776476	2
Gammaspec, Ga	amma, Sb-	125, Cs-137, Ra-2	226 "Dry W	Veight Corrected	l"		r 8						-
Iodine-129	<i>vei 1129</i> , 50	R	13.4	+/-1.21	1.95	2.24	pCi/g		MJH1 0	7/28/08	1445	776477	1
Gamma Low ley	$p \in C$ many $p \in I = I = I = I$	olid "As Received											
Rad Gamma S	nec Analv	rsis						21					
Parameter		Oualifier	Result	Uncertainty	זח	RI.	Unite	DF	Analya	stDate	Time	Batch	n Metho
		Client Sample Sample ID: Matrix: Collect Date: Receive Date: Collector:	ID:	ZV4SS-00000 212300005 Misc Solid 10-JUL-08 10 16-JUL-08 Client	026 ):05		Pro Cli	oject: ient ID:	WSRB WSRB	03808 001			
Pi	roject:	GEL-2008-ZV4	4SS-2										
C	ontact:	Mr. Robert Kerr	merlin							~~~		,	
Л	duiess.	Aiken, South Ca	arolina 298	808		Report Date: September 15-2008							
٨	ddrass .	LLC Building 730 44	Cube 21	19									
C	ompany :	Savannah River	Nuclear So	olutions,									

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Technetium-99m Tracer	Corrected" Liquid Scint Tc99, Solid "As Received"	30400	CPM 43200	70	(15%-125%)
Surrogate/Tracer recov	ery Test	Result	Nominal	Recovery%	Acceptable Limits
Parameter	Qualifier Result Uncertainty	DL RL	Units D	F AnalystDate	Time Batch Method
	Client Sample ID: ZV4SS-0000026 Sample ID: 212300005		Project: Client ID:	WSRB03808 WSRB001	
Project:	GEL-2008-ZV4SS-2				
Contact:	Mr. Robert Kemmerlin				
	Aiken, South Carolina 29808			Report Date: Sep	ptember 15, 2008
Address :	LLC Building 730-4B, Cube 2119				

Company : Savannah River Nuclear Solutions,

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## **Certificate of Analysis**

Compa													
Addres	s: Building 730-4B	, Cube 211	9										
	Aiken, South Car	rolina 2980	08				R	eport Date: Sept	tember 1	5, 2008	3		
Contac	t. Mr. Robert Kem	merlin											
Contac													
Project	:: GEL-2008-ZV4	SS-2											
	Client Sample	ID·	ZV4SS-00000	)38	Project: WSRB03808								
	Sample ID:	12.	212300006		Client ID: WSRB001								
	Matrix: Misc Solid Collect Date: 10-JUL-08 10:00												
	Receive Date:												
	Collector:		Client										
Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method		
Rad Gamma Spec A	Analysis												
Gamma Low level II	29, Solid "As Received"	,											
Iodine-129	R	68.8	+/-3.17	2.74	2.24	pCi/g		MJH1 08/05/08	1853 77	76477	1		
The following Ana	lytical Methods were <b>p</b>	performed											
Method	Description				А	nalyst Comm	ents						
1	EML HASL 30	0, 4.5.2.3											