



March 13, 2008

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Ms. Jeri Buczek  
Westinghouse Savannah River Site  
Building 730-4B, Room 2115  
Aiken, SC 29808

Re: 202836c.GEL  
202836r.GEL  
GEL-2008-ZV4SS

Lab Certification: SCDHEC 10120001/10120002

Dear Ms. Buczek:

Enclosed are the above referenced files, which contain data for the samples received on February 14, 2008 and assigned to the laboratory identification series 202836%. This original report has been prepared and reviewed in accordance with GEL's standard operating procedures. The EDD was FTPed on March 13, 2008.

The lab notified the client that the Silver for this contract will need to be analyzed by method 6010 due to certification. The same pay item of 511 still applies. The certification issue only applies to solids.

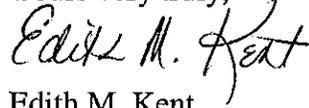
The client was also notified that there were samples received under GEL8045B missed the C-14 holding time. Please refer to the attached e-mail for further details.

The following samples were received:

<u>Lab ID</u>	<u>Sample ID</u>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010

Please find enclosed the original chain of custody form. 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

WSRB001.202836c.GEL/202836r.GEL

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**GC/MS  
VOLATILE  
ANALYSIS**

GC/MS Volatile Organics  
Westinghouse Savannah River Co. (WSRB)  
SDG 202836

Method/Analysis Information

Procedure: Volatile Organic Compounds (VOC) by Gas Chromatography/Mass Spectrometer  
Analytical Method: SW846 8260B  
Prep Method: SW846 5035  
Analytical Batch Number: 727413  
Prep Batch Number: 727410

Sample Analysis

The following client and quality control samples were analyzed to complete this SDG using the methods referenced in the Analysis Information section:

Sample ID	Client ID
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201516995	Method Blank (MB)
1201516996	Laboratory Control Sample (LCS)
1201516997	Laboratory Control Sample Duplicate (LCSD)

NOTE: For volatile organic analyses the matrix spike designations may be indicated as "PS" or "PSD". The "PS" designation (post spike) indicates that the matrix was fortified prior to analysis but after applying any prep factors, such as a dilution. The laboratory considers the MS/MSD and PS/PSD designations interchangeable.

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

Preparation/Analytical Method Verification

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-OA-E-038 REV# 10.

Raw data reports are processed and reviewed by the analyst using the Target software package. False positives have been removed from the Target quantitation reports per standard operating procedures (SOP) section 19.1.2.

Calibration Information

Please note that the 'Cal Date' indicated on each quantitation report reflects the date and time of the most recent calibrated analyte(s) in the Target processing method. Since the laboratory may calibrate with multiple solutions on different days using the same processing method, the Target software will update the 'Cal Date' to the last calibration file, date and time. The correct dates and times for all calibration files are located on the Calibration History report in the Standard Data section in the data package.

Due to software limitations, the Calibration Summary Form 6 may not indicate all the calibration files comprising the initial calibration. A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package.

The linear equation used in Target and indicated on the initial calibration summary form is not a conventional linear equation (slope intercept formula) and does not match the equation found in SW-846 method 8000B. The x and y axes are inversed in Target, so that the instrument response is treated as the independent variable (x) and the concentration ratio is treated as the dependent variable (y). The equation used in Target to calculate sample results is adjusted to account for the linear equation inversion and reciprocal slope. The adjusted calculation has been independently verified to produce valid results.

**Initial Calibration**

All initial calibration requirements have been met for this sample delivery groups (SDG). A second source initial calibration verification (ICV) was included in the standard section directly behind the initial calibration.

**Continuing Calibration Verification Requirements**

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

**Quality Control (QC) Information****Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Surrogate Recoveries**

Sample 202836002 (ZV4SS-0000007) did not pass surrogate recoveries. The sample was re-analyzed and confirmed the results. See NCR 523418.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits, except n-Butyl alcohol. The LCSD recovered in a similar manner. The unacceptable recoveries are possibly due to vagaries in the purge process and/or calibration variances. There were no detects of this analyte in the samples. See NCR 523418.

**Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits, except n-Butyl alcohol. The LCS recovered in a similar manner. The unacceptable recoveries are possibly due to vagaries in the purge process and/or calibration variances. There were no detects of this analyte in the samples. See NCR 523418.

**LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

**QC Sample Designation**

Spike analyses were not required for this SDG.

**Internal Standard (ISTD) Acceptance**

The internal standard responses, in all samples and quality control samples, met the required acceptance criteria.

**Technical Information****Holding Time Specifications**

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the ALPHALIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

**Sample Preservation and Integrity**

All samples met the sample preservation and integrity requirements.

**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-extraction/Re-analysis**

Samples 202836002 (ZV4SS-0000007) was re-analyzed due to unacceptable surrogate recoveries.

**Miscellaneous Information**

**Electronic Package Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data and package. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**Nonconformance (NCR) Documentation**

NCR # 523418 was generated for this SDG.

**Manual Integrations**

Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

**TIC Comment**

Tentatively identified compounds (TIC) were not required for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Residual Chlorine**

Residual Chlorine was not detected in any of the samples in this SDG.

**System Configuration**

The Volatile-GC/MS analysis was performed on a Agilent 6890/5875.

Instrument ID	System Configuration	Column ID	Column Description	P & T Trap
VOA6.I	HP6890/HP5975	Restek	RTX-Volatiles, 30m x 0.25 mm, 1.0 um	Trap 10

**Certification Statement**

When 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: Erin Haubert

Date: 03/10/08

## Roadmap for WSRB 202836 VOA

This roadmap was analyzed by Douglas Robinson on 02-20-2008, 19:43.

This roadmap was reviewed by Dale Mori on 02-27-2008, 17:14.

This roadmap was packaged by LySandra Gathers on 02-28-2008, 13:55.

This roadmap was validated by Erin Haubert on 03-10-2008, 15:01.

Sample

exclude	manual	datafile	smpid	clientid	injdate	injtime	sublist	dilution	comment
<input checked="" type="checkbox"/>	N	/chem/VOA6.i/021508v6/snapshot/6x516.d	202836001	ZV4SS-0000005	15-FEB-2008	22:20	202836.sub	1	<input type="text"/>
<input type="checkbox"/>	N	/chem/VOA6.i/021508v6/6x516.d	202836001	ZV4SS-0000005	15-FEB-2008	22:20	202836.sub	1	<input type="text"/>
<input checked="" type="checkbox"/>	N	/chem/VOA6.i/021508v6/6x517.d	202836002	ZV4SS-0000007	15-FEB-2008	22:49	202836.sub	1	<input type="text"/>
<input checked="" type="checkbox"/>	N	/chem/VOA6.i/021508v6/6x518.d	202836003	ZV4SS-0000009	15-FEB-2008	23:17	202836.sub	1	<input type="text"/>
<input type="checkbox"/>	N	/chem/VOA6.i/021508v6/6x519.d	202836004	ZV4SS-0000010	15-FEB-2008	23:46	202836.sub	1	<input type="text"/>
<input type="checkbox"/>	N	/chem/VOA6.i/021508v6/6x523.d	202836002	ZV4SS-0000007	16-FEB-2008	01:42	202836.sub	1	<input type="text"/>
<input type="checkbox"/>	N	/chem/VOA6.i/021508v6/6x524.d	202836003	ZV4SS-0000009	16-FEB-2008	02:11	202836.sub	1	<input type="text"/>
<input checked="" type="checkbox"/>	N	/chem/VOA6.i/021508v6/6x525.d	202836004	ZV4SS-0000010	16-FEB-2008	02:40	202836.sub	1	<input type="text"/>

QC Sample

exclude	manual	datafile	smpid	clientid	sampletype	injdate	injtime	sublist	dilution	comment
<input type="checkbox"/>	N	/chem/VOA6.i/021508v6/6x502LA.d	1201516996	LCS	lcs	15-FEB-2008	15:19	CALsubL+.sub	1	<input type="text"/>
<input type="checkbox"/>	N	/chem/VOA6.i/021508v6/6x503DA.d	1201516997	LCSD	lcsd	15-FEB-2008	15:48	CALsubL+.sub	1	<input type="text"/>
<input type="checkbox"/>	N	/chem/VOA6.i/021508v6/6x505BA.d	1201516995	BLANK	mb	15-FEB-2008	16:46	all.sub	1	<input type="text"/>

# SAMPLE DATA SUMMARY

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
 Address : Building 730-4B, Cube 2119  
 Aiken, South Carolina 29808

Contact: Mr. Robert Kemmerlin  
 Project: GEL-2008-ZV4SS

Report Date: February 28, 2008

Page 1 of 2

Client Sample ID:	ZV4SS-0000005	Project:	WSRB00308
Sample ID:	202836001	Client ID:	WSRB001
Matrix:	Misc Solid		
Collect Date:	02-FEB-08 10:30		
Receive Date:	14-FEB-08		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics Federal</b>											
<i>GEL 8260B Volatiles (6-9 items)</i>											
Benzene	J	1.00	0.351	1.06	ug/kg	1	DXR1	02/15/08	2220	727413	1
Isobutyl alcohol	U	ND	10.6	53.2	ug/kg	1					
Tetrachloroethylene	U	ND	0.213	1.06	ug/kg	1					
Toluene		1.94	0.309	1.06	ug/kg	1					
Trichloroethylene	U	ND	0.266	1.06	ug/kg	1					
n-Butyl alcohol	J	30.8	28.7	53.2	ug/kg	1					

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SW846 5035	5035/8260B Prep	DXR1	02/02/08	1013	727410

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	SW846 8260B	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	GEL 8260B Volatiles (6-9 items)	43.0 ug/kg	50.0	81	(60%-114%)
Bromofluorobenzene	GEL 8260B Volatiles (6-9 items)	55.9 ug/kg	50.0	105	(77%-129%)
Dibromofluoromethane	GEL 8260B Volatiles (6-9 items)	44.7 ug/kg	50.0	84	(68%-116%)
Toluene-d8	GEL 8260B Volatiles (6-9 items)	49.7 ug/kg	50.0	94	(75%-125%)

**Notes:**

The Qualifiers in this report are defined as follows :

- J The detected analyte was positively identified but the result is approximate.
- NJ The detected analyte was only tentatively 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.
- S Result equaling SQL is actual laboratory test output
- 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.
- d The 2:1 depletion requirement was not met for this sample

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Report Date: February 28, 2008

Page 2 of 2

Client Sample ID: ZV4SS-0000005  
Sample ID: 202836001

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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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.

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.

*Erin Haubert*

Reviewed by \_\_\_\_\_

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
 Address : Building 730-4B, Cube 2119  
 Aiken, South Carolina 29808

Contact: Mr. Robert Kemmerlin  
 Project: GEL-2008-ZV4SS

Report Date: February 28, 2008

Page 1 of 2

Client Sample ID: ZV4SS-000007  
 Sample ID: 202836002  
 Matrix: Misc Solid  
 Collect Date: 02-FEB-08 14:45  
 Receive Date: 14-FEB-08  
 Collector: Client

Project: WSRB00308  
 Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Volatile Organics Federal</b>										
<i>GEL 8260B Volatiles (6-9 items)</i>										
Benzene	J	0.880	0.295	0.893	ug/kg	1	DXR1 02/16/08	0142	727413	1
Isobutyl alcohol	J	43.6	8.93	44.6	ug/kg	1				
Tetrachloroethylene	U	ND	0.179	0.893	ug/kg	1				
Toluene		1.82	0.259	0.893	ug/kg	1				
Trichloroethylene	U	ND	0.223	0.893	ug/kg	1				
n-Butyl alcohol	U	ND	24.1	44.6	ug/kg	1				

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SW846 5035	5035/8260B Prep	DXR1	02/02/08	1445	727410

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	SW846 8260B	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	GEL 8260B Volatiles (6-9 items)	33.4 ug/kg	50.0	75	(60%-114%)
Bromofluorobenzene	GEL 8260B Volatiles (6-9 items)	26.0 ug/kg	50.0	58*	(77%-129%)
Dibromofluoromethane	GEL 8260B Volatiles (6-9 items)	34.0 ug/kg	50.0	76	(68%-116%)
Toluene-d8	GEL 8260B Volatiles (6-9 items)	33.0 ug/kg	50.0	74*	(75%-125%)

**Notes:**

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Aiken, South Carolina 29808

Contact: Mr. Robert Kemmerlin

Project: GEL-2008-ZV4SS

Report Date: February 28, 2008

Page 2 of 2

Client Sample ID: ZV4SS-0000007  
Sample ID: 202836002

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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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.

*Erin Haubert*

Reviewed by

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Report Date: February 28, 2008

Contact: Mr. Robert Kemmerlin  
Project: GEL-2008-ZV4SS

Page 1 of 2

Client Sample ID: ZV4SS-0000009  
Sample ID: 202836003  
Matrix: Misc Solid  
Collect Date: 02-FEB-08 14:45  
Receive Date: 14-FEB-08  
Collector: Client

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics Federal</b>											
<i>GEL 8260B Volatiles (6-9 items)</i>											
Benzene		1.56	0.351	1.06	ug/kg	1	DXR1	02/16/08	0211	727413	1
Isobutyl alcohol		64.4	10.6	53.2	ug/kg	1					
Tetrachloroethylene	U	ND	0.213	1.06	ug/kg	1					
Toluene		5.07	0.309	1.06	ug/kg	1					
Trichloroethylene	U	ND	0.266	1.06	ug/kg	1					
n-Butyl alcohol	U	ND	28.7	53.2	ug/kg	1					

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 5035	5035/8260B Prep	DXR1	02/02/08	1445	727410

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 8260B	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	GEL 8260B Volatiles (6-9 items)	46.6 ug/kg	50.0	88	(60%-114%)
Bromofluorobenzene	GEL 8260B Volatiles (6-9 items)	57.5 ug/kg	50.0	108	(77%-129%)
Dibromofluoromethane	GEL 8260B Volatiles (6-9 items)	49.1 ug/kg	50.0	92	(68%-116%)
Toluene-d8	GEL 8260B Volatiles (6-9 items)	52.6 ug/kg	50.0	99	(75%-125%)

### Notes:

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NJ The detected analyte was only tentatively 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.

S Result equaling SQL is actual laboratory test output

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.

d The 2:1 depletion requirement was not met for this sample

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Contact: Mr. Robert Kemmerlin  
Project: GEL-2008-ZV4SS

Report Date: February 28, 2008

Page 2 of 2

Client Sample ID: ZV4SS-0000009  
Sample ID: 202836003

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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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.

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.

*Erin Haubert*

Reviewed by

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 Address : Building 730-4B, Cube 2119  
 Aiken, South Carolina 29808

Report Date: February 28, 2008

Contact: Mr. Robert Kemmerlin  
 Project: GEL-2008-ZV4SS

Page 1 of 2

Client Sample ID: ZV4SS-0000010  
 Sample ID: 202836004  
 Matrix: Misc Solid  
 Collect Date: 02-FEB-08 15:00  
 Receive Date: 14-FEB-08  
 Collector: Client

Project: WSRB00308  
 Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics Federal</b>											
<i>GEL 8260B Volatiles (6-9 items)</i>											
Benzene		0.872	0.270	0.820	ug/kg	1	DXR1	02/15/08	2346	727413	1
Isobutyl alcohol	J	8.36	8.20	41.0	ug/kg	1					
Tetrachloroethylene	U	ND	0.164	0.820	ug/kg	1					
Toluene		28.8	0.238	0.820	ug/kg	1					
Trichloroethylene	U	ND	0.205	0.820	ug/kg	1					
n-Butyl alcohol	U	ND	22.1	41.0	ug/kg	1					

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SW846 5035	5035/8260B Prep	DXR1	02/02/08	1500	727410

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	SW846 8260B	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	GEL 8260B Volatiles (6-9 items)	33.8 ug/kg	50.0	82	(60%-114%)
Bromofluorobenzene	GEL 8260B Volatiles (6-9 items)	35.7 ug/kg	50.0	87	(77%-129%)
Dibromofluoromethane	GEL 8260B Volatiles (6-9 items)	36.1 ug/kg	50.0	88	(68%-116%)
Toluene-d8	GEL 8260B Volatiles (6-9 items)	37.5 ug/kg	50.0	91	(75%-125%)

**Notes:**

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- NJ The detected analyte was only tentatively 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.
- S Result equaling SQL is actual laboratory test output
- 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.
- d The 2:1 depletion requirement was not met for this sample

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: February 28, 2008

Contact: Mr. Robert Kemmerlin

Project: GEL-2008-ZV4SS

Page 2 of 2

Client Sample ID: ZV4SS-0000010  
Sample ID: 202836004

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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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.

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.

*Erin Haubert*

Reviewed by

**GC/MS  
SEMIVOLATILE  
ANALYSIS**

**Semi-Volatile Case Narrative  
Westinghouse Savannah River Co. (WSRB)  
SDG 202836**

**Method/Analysis Information**

<b>Procedure:</b>	<b>Semivolatile Analysis by Gas Chromatograph/Mass Spectrometer</b>
Analytical Method:	SW846 8270C
Prep Method:	SW846 3550B
Analytical Batch Number:	727374
Prep Batch Number:	727372

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 8270C:

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201516904	Method Blank (MB)
1201516905	Laboratory Control Sample (LCS)
1201516906	202825001(ZV4SS-0000004) Matrix Spike (MS)
1201516907	202825001(ZV4SS-0000004) Matrix Spike Duplicate (MSD)

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

**Preparation/Analytical Method Verification**

**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-OA-E-009 REV# 19.

Raw data reports are processed and reviewed by the analyst using the Target software package. False positives have been removed from the Target quantitation reports per standard operating procedures (SOP) section 18.2.

**Calibration Information**

Please note that the 'Cal Date' indicated on each quantitation report reflects the date and time of the most recent calibrated analyte(s) in the Target processing method. Since the laboratory may calibrate with multiple solutions on different days using the same processing method, the Target software will update the 'Cal Date' to the last calibration file, date and time. The correct dates and times for all calibration files are located on the Calibration History report in the Standard Data section in the data package.

Due to software limitations, the Calibration Summary Form 6 may not indicate all the calibration files comprising the initial calibration. A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package. Please note that the second level of the initial calibration (5 mg/L) is only used for n-Nitrosodipropylamine. The various calibration mixes may not be calibrated using all of the calibration levels. In addition, not all of the mixes are calibrated using the same levels.

Diphenylamine has now superseded N-Nitroso-diphenylamine as a CCC on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Method 8270 (prior to 8270C) listed N-Nitroso-diphenylamine as a CCC. However, as stated in EPA Method 8270C, Revision 3, December, 1996, Section 1.4.5, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, show that they not only co-elute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

When calibrations are performed for Appendix IX compounds some of the compounds may not be calibrated exactly according to the criteria in Method 8270C. If the %RSD is greater than 15% or the correlation coefficient is less than 0.99 then the analyte is quantitated using the response factor. If the analyte is detected then the sample is re-analyzed for that analyte on an instrument that is compliant with the criteria in the method.

The linear equation used in Target and indicated on the initial calibration summary form is not a conventional linear equation (slope intercept formula) and does not match the equation found in SW-846 method 8000B. The x and y axes are inversed in Target, so that the instrument response is treated as the independent variable (x) and the concentration ratio is treated as the dependent variable (y). The equation used in Target to calculate sample results is adjusted to account for the linear equation inversion and reciprocal slope. The adjusted calculation has been independently verified to produce valid results.

#### **Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG). A second source initial calibration verification (ICV) was included in the standard section directly behind the initial calibration.

#### **CCV Requirements**

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

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

##### **Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

##### **Surrogate Recoveries**

All the surrogate recoveries were within the established acceptance criteria for this SDG.

##### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

##### **QC Sample Designation**

The non-SDG sample 202825001 (ZV4SS-0000004) was selected for analysis as the matrix spike and matrix spike duplicate.

##### **Matrix Spike (MS) Recovery Statement**

The MS recoveries were within the established acceptance limits.

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

The MSD recoveries were within the established acceptance limits.

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

The RPD(s) between the MS and MSD met the acceptance limits.

**Internal Standard (ISTD) Acceptance**

The internal standard responses were within the required acceptance criteria for all samples and QC.

**Technical Information****Holding Time Specifications**

All samples in this SDG met the specified holding time. GEL assigns holding times based on the associated methodology that assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the ALPHALIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

**Preparation/Analytical Method Verification**

Container scanning event for custody missed for samples : 202836001, 202836002, 202836003 and 202836004. Analyst failed to take custody during the analytical process. However, physical custody of the samples was maintained throughout the analysis.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-extraction/Re-analysis**

These samples were reanalyzed because they were outside the tune window.

**Miscellaneous Information****Nonconformance (NCR) Documentation**

The following NCR was generated for this SDG: 523871. It is located in the Miscellaneous Section of the data report.

**Manual Integrations**

Some initial calibration standards, continuing calibration standards, and/or samples may require manual integrations due to software limitations. Please see the raw data in the Miscellaneous Section.

**Additional Comments**

Additional comments were not required for this SDG.

**Electronic Package Comment**

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data and package. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**System Configuration**

The laboratory utilizes a HP 6890 Series gas chromatograph and a HP 5973 Mass Selective Detector. The configuration is equipped with the electronic pressure control. All MS interfaces are capillary direct.

**Chromatographic Columns**

Chromatographic separation of semi-volatile components is accomplished through analysis on one or more of the following columns (all with dimensions of 30 meters x 0.25 millimeters ID and 0.25 micron film

except J&W DB-5MS2 and Phenomenex ZB-5ms which are 25 meters x 0.20 mm ID and 0.33 micron film).

### **Instrument Configuration**

The samples reported in this SDG were analyzed on one or more of the following instrument systems. Instrument systems are referenced in the raw data and individual form headers by the Instrument ID designations listed below:

The Semi-Volatile-GC/MS analysis was performed on a HP 5973 Mass Spectrometer.

<b>Instrument ID</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>
MSD1.I	HP6890/HP5973	ZB-5ms	25m x 0.2mm, 0.33um (5% Polysilarylene-95% Polydimethylsiloxane)

### **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.

Reviewer: *Dan Bevelum* Date: *3-12-08*

## Roadmap for WSRB 202836 SVOA

This roadmap was analyzed by Lloyd Fox on 02-21-2008, 18:35.

This roadmap was reviewed by Daniel Beacham on 02-25-2008, 10:19.

This roadmap was packaged by Chantay Pinckney on 02-26-2008, 10:02.

This roadmap was validated by Daniel Beacham on 03-12-2008, 15:29.

Sample

exclude	manual	datafile	smpid	injdate	injtime	sublist	clientid	dilution	comment
<input type="checkbox"/>	N	/chem/MSD1.i/s021908.b/s1b1930.d	202836001	20-FEB-2008	06:52	202836.sub	ZV4SS-0000005	1	
<input type="checkbox"/>	N	/chem/MSD1.i/s021908.b/s1b1931.d	202836002	20-FEB-2008	07:15	202836.sub	ZV4SS-0000007	1	
<input checked="" type="checkbox"/>	N	/chem/MSD1.i/s021908.b/s1b1932.d	202836003	20-FEB-2008	07:39	202836.sub	ZV4SS-0000009	1	DUSE out of tune
<input checked="" type="checkbox"/>	N	/chem/MSD1.i/s021908.b/s1b1933.d	202836004	20-FEB-2008	08:04	202836.sub	ZV4SS-0000010	1	DUSE out of tune
<input type="checkbox"/>	N	/chem/MSD1.i/s022008.b/s1b2011.d	202836003	20-FEB-2008	21:25	202836.sub	ZV4SS-0000009	1	
<input type="checkbox"/>	N	/chem/MSD1.i/s022008.b/s1b2012.d	202836004	20-FEB-2008	21:48	202836.sub	ZV4SS-0000010	1	

QC Sample

exclude	manual	datafile	smpid	sampletype	injdate	injtime	sublist	clientid	dilution	comment
<input type="checkbox"/>	N	/chem/MSD1.i/s021908.b/s1b1916-2.d	1201516904	mb	20-FEB-2008	01:21	202836.sub	SBLK01	1	
<input type="checkbox"/>	N	/chem/MSD1.i/s021908.b/s1b1917-2.d	1201516905	lcs	20-FEB-2008	01:44	202836.sub	SBLK01LCS	1	

# SAMPLE DATA SUMMARY

# GEL LABORATORIES LLC

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 Aiken, South Carolina 29808

Contact: Mr. Robert Kemmerlin  
 Project: GEL-2008-ZV4SS

Report Date: February 26, 2008

Page 1 of 2

Client Sample ID:	ZV4SS-0000005	Project:	WSRB00308
Sample ID:	202836001	Client ID:	WSRB001
Matrix:	Misc Solid		
Collect Date:	02-FEB-08 10:30		
Receive Date:	14-FEB-08		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Semi-volatile Mass spec Organics Federal</b>											
<i>Semivolatiles Method 8270C</i>											
1,1'-Biphenyl	U	ND	299	996	ug/kg	1	CAK	02/20/08	0652	727374	1
Phenol	U	ND	199	996	ug/kg	1					

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B BNA Soil Prep-8270C Analysis Fed	AXV1	02/15/08	2157	727372

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	SW846 8270C	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2-Fluorobiphenyl	Semivolatiles Method 8270C	4030 ug/kg	4980	81	(45%-101%)
Nitrobenzene-d5	Semivolatiles Method 8270C	3810 ug/kg	4980	76	(45%-101%)
p-Terphenyl-d14	Semivolatiles Method 8270C	3650 ug/kg	4980	73	(41%-114%)
2,4,6-Tribromophenol	Semivolatiles Method 8270C	5780 ug/kg	9960	58	(45%-97%)
2-Fluorophenol	Semivolatiles Method 8270C	6820 ug/kg	9960	68	(35%-98%)
Phenol-d5	Semivolatiles Method 8270C	6770 ug/kg	9960	68	(45%-95%)

**Notes:**

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Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Contact: Mr. Robert Kemmerlin  
Project: GEL-2008-ZV4SS

Report Date: February 26, 2008

Page 2 of 2

Client Sample ID: ZV4SS-0000005  
Sample ID: 202836001

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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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.

Reviewed by Dan Beuchum 3-12-08

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
 Address : Building 730-4B, Cube 2119  
 Aiken, South Carolina 29808

Report Date: February 26, 2008

Contact: Mr. Robert Kemmerlin

Project: **GEL-2008-ZV4SS**

Page 1 of 2

Client Sample ID: ZV4SS-0000007  
 Sample ID: 202836002  
 Matrix: Misc Solid  
 Collect Date: 02-FEB-08 14:45  
 Receive Date: 14-FEB-08  
 Collector: Client

Project: WSRB00308  
 Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Semi-volatile Mass spec Organics Federal</b>											
<i>Semivolatiles Method 8270C</i>											
1,1'-Biphenyl	U	ND	294	979	ug/kg	1	CAK	02/20/08	0715	727374	1
Phenol	U	ND	196	979	ug/kg	1					

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B BNA Soil Prep-8270C Analysis Fed	AXV1	02/15/08	2157	727372

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	SW846 8270C	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2-Fluorobiphenyl	Semivolatiles Method 8270C	3770 ug/kg	4900	77	(45%-101%)
Nitrobenzene-d5	Semivolatiles Method 8270C	3430 ug/kg	4900	70	(45%-101%)
p-Terphenyl-d14	Semivolatiles Method 8270C	3410 ug/kg	4900	70	(41%-114%)
2,4,6-Tribromophenol	Semivolatiles Method 8270C	4570 ug/kg	9790	47	(45%-97%)
2-Fluorophenol	Semivolatiles Method 8270C	6060 ug/kg	9790	62	(35%-98%)
Phenol-d5	Semivolatiles Method 8270C	6120 ug/kg	9790	63	(45%-95%)

**Notes:**

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Contact: Mr. Robert Kemmerlin  
Project: GEL-2008-ZV4SS

Report Date: February 26, 2008

Page 2 of 2

Client Sample ID: ZV4SS-0000007  
Sample ID: 202836002

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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Reviewed by Dan Beveling 3-12-08

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Contact: Mr. Robert Kemmerlin  
 Project: **GEL-2008-ZV4SS**

Report Date: February 26, 2008

Page 1 of 2

Client Sample ID: ZV4SS-0000009  
 Sample ID: 202836003  
 Matrix: Misc Solid  
 Collect Date: 02-FEB-08 14:45  
 Receive Date: 14-FEB-08  
 Collector: Client

Project: WSRB00308  
 Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Semi-volatile Mass spec Organics Federal</b>											
<i>Semivolatiles Method 8270C</i>											
1,1'-Biphenyl	U	ND	299	995	ug/kg	1	CAK	02/20/08	2125	727374	1
Phenol	U	ND	199	995	ug/kg	1					

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B BNA Soil Prep-8270C Analysis Fed	AXV1	02/15/08	2157	727372

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	SW846 8270C	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2-Fluorobiphenyl	Semivolatiles Method 8270C	4040 ug/kg	4980	81	(45%-101%)
Nitrobenzene-d5	Semivolatiles Method 8270C	3700 ug/kg	4980	74	(45%-101%)
p-Terphenyl-d14	Semivolatiles Method 8270C	3490 ug/kg	4980	70	(41%-114%)
2,4,6-Tribromophenol	Semivolatiles Method 8270C	6180 ug/kg	9950	62	(45%-97%)
2-Fluorophenol	Semivolatiles Method 8270C	6670 ug/kg	9950	67	(35%-98%)
Phenol-d5	Semivolatiles Method 8270C	6580 ug/kg	9950	66	(45%-95%)

**Notes:**

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Report Date: February 26, 2008

Contact: Mr. Robert Kemmerlin  
Project: GEL-2008-ZV4SS

Page 2 of 2

Client Sample ID: ZV4SS-0000009  
Sample ID: 202836003

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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Reviewed by *Dan Beuhay* *3-12-08*

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 Contact: Mr. Robert Kemmerlin  
 Project: **GEL-2008-ZV4SS**

Report Date: February 26, 2008

Page 1 of 2

Client Sample ID: ZV4SS-000010	Project: WSRB00308
Sample ID: 202836004	Client ID: WSRB001
Matrix: Misc Solid	
Collect Date: 02-FEB-08 15:00	
Receive Date: 14-FEB-08	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Semi-volatile Mass spec Organics Federal</b>											
<i>Semivolatiles Method 8270C</i>											
1,1'-Biphenyl	U	ND	293	977	ug/kg	1	CAK	02/20/08	2148	727374	1
Phenol	U	ND	195	977	ug/kg	1					

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B BNA Soil Prep-8270C Analysis Fed	AXVI	02/15/08	2157	727372

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	SW846 8270C	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2-Fluorobiphenyl	Semivolatiles Method 8270C	4120 ug/kg	4890	84	(45%-101%)
Nitrobenzene-d5	Semivolatiles Method 8270C	3870 ug/kg	4890	79	(45%-101%)
p-Terphenyl-d14	Semivolatiles Method 8270C	3680 ug/kg	4890	75	(41%-114%)
2,4,6-Tribromophenol	Semivolatiles Method 8270C	6840 ug/kg	9770	70	(45%-97%)
2-Fluorophenol	Semivolatiles Method 8270C	6860 ug/kg	9770	70	(35%-98%)
Phenol-d5	Semivolatiles Method 8270C	7080 ug/kg	9770	72	(45%-95%)

**Notes:**

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Contact: Mr. Robert Kemmerlin  
Project: GEL-2008-ZV4SS

Report Date: February 26, 2008

Page 2 of 2

Client Sample ID: ZV4SS-0000010  
Sample ID: 202836004

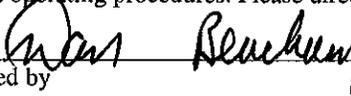
Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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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.

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.

Reviewed by

 3-12-08

# **Metals Analysis**

# Case Narrative

**Metals Fractional Narrative  
Westinghouse Savannah River Co. (WSRB)  
SDG 202836**

**Sample Analysis**

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201521221	Method Blank (MB) <b>ICP</b>
1201521222	Laboratory Control Sample (LCS)
1201521225	202647001(08022-106R-SLL) Serial Dilution (SD)
1201521223	202647001(08022-106R-SLS) Matrix Spike (MS)
1201521224	202647001(08022-106R-SLSD) Matrix Spike Duplicate (MSD)
1201521246	Method Blank (MB) <b>ICP-MS</b>
1201521247	Laboratory Control Sample (LCS)
1201521250	202836001(ZV4SS-0000005L) Serial Dilution (SD)
1201521248	202836001(ZV4SS-0000005S) Matrix Spike (MS)
1201521249	202836001(ZV4SS-0000005SD) Matrix Spike Duplicate (MSD)
1201523450	Method Blank (MB) <b>CVAA</b>
1201523451	Laboratory Control Sample (LCS)
1201523455	202836001(ZV4SS-0000005L) Serial Dilution (SD)
1201523452	202836001(ZV4SS-0000005S) Matrix Spike (MS)
1201523453	202836001(ZV4SS-0000005SD) Matrix Spike Duplicate (MSD)

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

**Method/Analysis Information**

<b>Analytical Batch:</b>	729290, 729301 and 730267
<b>Prep Batch :</b>	729289, 729299 and 730265
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 17, GL-MA-E-009 REV# 17, GL-MA-E-014 REV# 15 and GL-MA-E-010 REV# 18

**Analytical Method:** SW846 3050B/6010B, SW846 3050B/6020 and SW846 7471A  
**Prep Method :** SW846 3050B and SW846 7471A Prep

### **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.

### **System Configuration**

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 6100E inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

### **Calibration Information**

#### **Instrument Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

#### **CRDL Requirements**

All CRDL standard(s) met the referenced advisory control limits.

#### **ICSA/ICSAB Statement**

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

#### **Continuing Calibration Blank (CCB) Requirements**

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance

criteria for all applicable analytes.

### **Continuing Calibration Verification (CCV) Requirements**

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

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

#### **Method Blank (MB) Statement**

The MBs analyzed with this SDG met the acceptance criteria.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

#### **Quality Control (QC) Sample Statement**

The following samples were selected as the quality control (QC) samples for this SDG: 202647001 (08022-106R-SL)-ICP and 202836001 (ZV4SS-0000005)-ICP-MS and CVAA.

#### **Matrix Spike (MS) Recovery Statement**

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes with the exceptions of antimony, chromium, copper, lead and nickel as indicated by the “\*” qualifiers.

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

The percent recovery (%R) obtained from the MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MSD met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes with the exceptions of antimony and mercury as indicated by the “\*” qualifiers

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

The relative percent difference (RPD) obtained from the designated matrix spike duplicate (MSD) is evaluated based on acceptance criteria of 20%. The RPD between qualifying elements results in the MS and MSD were within the acceptance limits of 20% with the exceptions of aluminum, chromium, copper, iron, lithium, manganese, nickel, zinc and mercury as indicated by the “\*” qualifiers.

#### **Serial Dilution % Difference Statement**

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL for CVAA, 50X the IDL for ICP and 100X the IDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the established criteria of less than 10% difference (%D) with the exceptions of aluminum, barium and mercury as indicated by the “\*” qualifiers.

### **Technical Information**

**Holding Time Specifications**

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. 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**

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. The samples 202836001, 202836003 and 202836004 on the ICP-MS required 20x dilutions for iron, manganese and/or zinc in order to bring over range concentrations within the linear calibration range of the instrument. The samples in this SDG were diluted the standard 2x for solids on the ICPMS.

**Preparation Information**

The samples in this SDG were prepared exactly according to the cited SOP.

**Miscellaneous Information****Nonconformance 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 ID 524855, NCR ID 525421 and NCR ID 528659. A copy is included in the Miscellaneous Data section of this package.

**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 verified the information presented in this case narrative:

Reviewer: Mike DeA. Elmer Date: 3.12.08

# **Sample Data Summary**

## GEL LABORATORIES LLC

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: 202836 GEL Work Order: 202836

**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.

Yick Cole A. Elmer      3-12-08  
Reviewed by

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Report Date: March 12, 2008

Client Sample ID: ZV4SS-0000005  
Sample ID: 202836001  
Matrix: Misc Solid  
Collect Date: 02-FEB-08 10:30  
Receive Date: 14-FEB-08  
Collector: Client  
Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Mercury Analysis-CVAA</b>											
<i>7471 Cold Vapor Hg in Solid</i>											
Mercury		87.5	1.48	9.85	ug/kg	1	JXL1	02/27/08	0957	730267	1
<b>Metals Analysis-ICP</b>											
<i>3050/6010 Silver Federal</i>											
Silver	J	218	96.5	483	ug/kg	1	HSC	02/25/08	1607	729290	2
<b>Metals Analysis-ICP-MS</b>											
<i>6020 ICP SCAN Metals Soil Federal</i>											
Aluminum		6800000	994	2980	ug/kg	2	PRB	03/07/08	2300	729301	3
Antimony	U	19.5	99.4	398	ug/kg	2					
Arsenic	J	716	298	994	ug/kg	2					
Barium		72600	99.4	398	ug/kg	2					
Beryllium		888	19.9	99.4	ug/kg	2					
Boron		6300	795	2980	ug/kg	2					
Cadmium		320	19.9	199	ug/kg	2					
Chromium		9240	199	596	ug/kg	2					
Cobalt		3010	19.9	199	ug/kg	2					
Copper		6470	39.8	199	ug/kg	2					
Lead		4410	99.4	398	ug/kg	2					
Lithium		20200	398	1990	ug/kg	2					
Molybdenum		585	19.9	99.4	ug/kg	2					
Nickel		6450	99.4	398	ug/kg	2					
Selenium	U	118	497	994	ug/kg	2					
Strontium		41800	398	1990	ug/kg	2					
Thallium	J	114	39.8	199	ug/kg	2					
Uranium		2500	9.94	39.8	ug/kg	2					
Iron		14200000	19900	49700	ug/kg	20	PRB	03/10/08	1210	729301	4
Manganese		375000	1990	9940	ug/kg	20					
Zinc		524000	3980	19900	ug/kg	20					

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	846 3050BS PREP	BCD1	02/25/08	0700	729289
SW846 3050B	ICP-MS 3050BS PREP	BCD1	02/27/08	0630	729299
SW846 7471A Prep	EPA 7471A Mercury Prep Soil	TXB3	02/26/08	1700	730265

### The following Analytical Methods were performed

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 12, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000005  
Sample ID: 202836001

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 7471A	
2	SW846 3050B/6010B	
3	SW846 3050B/6020	
4	SW846 3050B/6020	

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Report Date: March 12, 2008

Client Sample ID: ZV4SS-0000007  
Sample ID: 202836002  
Matrix: Misc Solid  
Collect Date: 02-FEB-08 14:45  
Receive Date: 14-FEB-08  
Collector: Client  
Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Mercury Analysis-CVAA</b>											
<i>7471 Cold Vapor Hg in Solid</i>											
Mercury		389	1.44	9.63	ug/kg	1	JXL1	02/27/08	1009	730267	1
<b>Metals Analysis-ICP</b>											
<i>3050/6010 Silver Federal</i>											
Silver	J	192	99.8	499	ug/kg	1	HSC	02/25/08	1612	729290	2
<b>Metals Analysis-ICP-MS</b>											
<i>6020 ICP SCAN Metals Soil Federal</i>											
Aluminum		4700000	965	2900	ug/kg	2	PRB	03/07/08	2324	729301	3
Antimony	U	68.5	96.5	386	ug/kg	2					
Arsenic		1100	290	965	ug/kg	2					
Barium		39500	96.5	386	ug/kg	2					
Beryllium		627	19.3	96.5	ug/kg	2					
Boron	J	2280	772	2900	ug/kg	2					
Cadmium		442	19.3	193	ug/kg	2					
Chromium		15300	193	579	ug/kg	2					
Cobalt		2440	19.3	193	ug/kg	2					
Copper		5760	38.6	193	ug/kg	2					
Iron		7590000	1930	4830	ug/kg	2					
Lead		18500	96.5	386	ug/kg	2					
Lithium		8770	386	1930	ug/kg	2					
Manganese		164000	193	965	ug/kg	2					
Molybdenum		569	19.3	96.5	ug/kg	2					
Nickel		6000	96.5	386	ug/kg	2					
Selenium	U	-42.1	483	965	ug/kg	2					
Strontium		18400	386	1930	ug/kg	2					
Thallium	J	56.0	38.6	193	ug/kg	2					
Uranium		932	9.65	38.6	ug/kg	2					
Zinc		373000	386	1930	ug/kg	2					

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	846 3050BS PREP	BCD1	02/25/08	0700	729289
SW846 3050B	ICP-MS 3050BS PREP	BCD1	02/27/08	0630	729299
SW846 7471A Prep	EPA 7471A Mercury Prep Soil	TXB3	02/26/08	1700	730265

### The following Analytical Methods were performed

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 12, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000007  
Sample ID: 202836002

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 7471A	
2	SW846 3050B/6010B	
3	SW846 3050B/6020	

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
 Address : Building 730-4B, Cube 2119  
 Aiken, South Carolina 29808

Report Date: March 12, 2008

Contact: Mr. Robert Kemmerlin  
 Project: **GEL-2008-ZV4SS**

Client Sample ID:	ZV4SS-0000009	Project:	WSRB00308
Sample ID:	202836003	Client ID:	WSRB001
Matrix:	Misc Solid		
Collect Date:	02-FEB-08 14:45		
Receive Date:	14-FEB-08		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Mercury Analysis-CVAA</b>											
<i>7471 Cold Vapor Hg in Solid</i>											
Mercury		374	1.48	9.85	ug/kg	1	JXL1	02/27/08	1011	730267	1
<b>Metals Analysis-ICP</b>											
<i>3050/6010 Silver Federal</i>											
Silver	J	119	99.8	499	ug/kg	1	HSC	02/25/08	1618	729290	2
<b>Metals Analysis-ICP-MS</b>											
<i>6020 ICP SCAN Metals Soil Federal</i>											
Aluminum		5980000	965	2900	ug/kg	2	PRB	03/07/08	2330	729301	3
Antimony	U	91.5	96.5	386	ug/kg	2					
Arsenic	J	869	290	965	ug/kg	2					
Barium		88300	96.5	386	ug/kg	2					
Beryllium		687	19.3	96.5	ug/kg	2					
Boron		4530	772	2900	ug/kg	2					
Cadmium		419	19.3	193	ug/kg	2					
Chromium		12800	193	579	ug/kg	2					
Cobalt		3370	19.3	193	ug/kg	2					
Copper		6340	38.6	193	ug/kg	2					
Iron		8350000	1930	4830	ug/kg	2					
Lead		20200	96.5	386	ug/kg	2					
Lithium		9060	386	1930	ug/kg	2					
Molybdenum		430	19.3	96.5	ug/kg	2					
Nickel		7390	96.5	386	ug/kg	2					
Selenium	U	7.53	483	965	ug/kg	2					
Strontium		36100	386	1930	ug/kg	2					
Thallium	J	48.6	38.6	193	ug/kg	2					
Uranium		919	9.65	38.6	ug/kg	2					
Manganese		223000	1930	9650	ug/kg	20	PRB	03/10/08	1223	729301	4
Zinc		734000	3860	19300	ug/kg	20					

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	846 3050BS PREP	BCD1	02/25/08	0700	729289
SW846 3050B	ICP-MS 3050BS PREP	BCD1	02/27/08	0630	729299
SW846 7471A Prep	EPA 7471A Mercury Prep Soil	TXB3	02/26/08	1700	730265

**The following Analytical Methods were performed**

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 12, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000009  
Sample ID: 202836003

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 7471A	
2	SW846 3050B/6010B	
3	SW846 3050B/6020	
4	SW846 3050B/6020	

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Report Date: March 12, 2008

Client Sample ID: ZV4SS-0000010  
Sample ID: 202836004  
Matrix: Misc Solid  
Collect Date: 02-FEB-08 15:00  
Receive Date: 14-FEB-08  
Collector: Client  
Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Mercury Analysis-CVAA</b>											
<i>7471 Cold Vapor Hg in Solid</i>											
Mercury		76.5	1.46	9.72	ug/kg	1	JXL1	02/27/08	1013	730267	1
<b>Metals Analysis-ICP</b>											
<i>3050/6010 Silver Federal</i>											
Silver	J	234	95.2	476	ug/kg	1	HSC	02/25/08	1623	729290	2
<b>Metals Analysis-ICP-MS</b>											
<i>6020 ICP SCAN Metals Soil Federal</i>											
Aluminum		7210000	965	2900	ug/kg	2	PRB	03/07/08	2335	729301	3
Antimony	U	32.8	96.5	386	ug/kg	2					
Arsenic	J	674	290	965	ug/kg	2					
Barium		27700	96.5	386	ug/kg	2					
Beryllium		880	19.3	96.5	ug/kg	2					
Boron	J	965	772	2900	ug/kg	2					
Cadmium		246	19.3	193	ug/kg	2					
Chromium		17600	193	579	ug/kg	2					
Cobalt		5520	19.3	193	ug/kg	2					
Copper		6900	38.6	193	ug/kg	2					
Lead		19900	96.5	386	ug/kg	2					
Lithium		27300	386	1930	ug/kg	2					
Molybdenum		584	19.3	96.5	ug/kg	2					
Nickel		13500	96.5	386	ug/kg	2					
Selenium	U	-33.8	483	965	ug/kg	2					
Strontium		9640	386	1930	ug/kg	2					
Thallium	J	118	38.6	193	ug/kg	2					
Uranium		1850	9.65	38.6	ug/kg	2					
Zinc		332000	386	1930	ug/kg	2					
Iron		15000000	19300	48300	ug/kg	20	PRB	03/10/08	1225	729301	4
Manganese		420000	1930	9650	ug/kg	20					

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	846 3050BS PREP	BCD1	02/25/08	0700	729289
SW846 3050B	ICP-MS 3050BS PREP	BCD1	02/27/08	0630	729299
SW846 7471A Prep	EPA 7471A Mercury Prep Soil	TXB3	02/26/08	1700	730265

### The following Analytical Methods were performed

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 12, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000010  
Sample ID: 202836004

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 7471A	
2	SW846 3050B/6010B	
3	SW846 3050B/6020	
4	SW846 3050B/6020	

# **General Chemistry**

## **Analysis**

# Case Narrative

**General Chemistry Narrative  
Westinghouse Savannah River Co. (WSRB)  
SDG 202836**

**Method/Analysis Information**

**Product:** Ion Chromatography  
**Analytical Batch:** 727132                      **Method:** SW846 9056  
**Prep Batch :** 727131                      **Method:** SW846 9056

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in SW846 9056:

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201516250	Method Blank (MB)
1201516251	Laboratory Control Sample (LCS)
1201516252	202825001(ZV4SS-0000004) Sample Duplicate (DUP)
1201516253	202825001(ZV4SS-0000004) Matrix Spike (MS)
1201516256	202825001(ZV4SS-0000004) 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-086 REV# 14.

**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 Ion Chromatography analysis was performed on a Dionex DX300 Ion Chromatograph equipped with a Dionex AS9-HC general purpose anion column.

**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within

acceptance limits.

**Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

**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: 202825001 (ZV4SS-0000004).

**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.

**Manual Integrations**

Manual integrations were not required for the samples in this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

### Method/Analysis Information

**Product:** Nitrate + Nitrite  
**Analytical Batch:** 727006      **Method:** EPA 353.2 Modified  
**Prep Batch :** 727004      **Method:** EPA 353.2 Modified

### Sample Analysis

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

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201515940	Method Blank (MB)
1201515941	202825001(ZV4SS-0000004) Sample Duplicate (DUP)
1201515942	202825001(ZV4SS-0000004) Matrix Spike (MS)
1201515943	202825001(ZV4SS-0000004) Matrix Spike Duplicate (MSD)
1201515944	Laboratory Control Sample (LCS)
1201516216	202825002(ZV4SS-0000008) Sample Duplicate (DUP)
1201516217	202825002(ZV4SS-0000008) Matrix Spike (MS)
1201516218	202825002(ZV4SS-0000008) 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.

### 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 samples were selected for QC analysis: 202825001 (ZV4SS-0000004) and 202825002 (ZV4SS-0000008).

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

The sample concentration was more than four times the spike nominal concentration; therefore, the spike recovery was not applicable for samples 1201515942 (ZV4SS-0000004) and 1201516217 (ZV4SS-0000008).

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

The sample concentration was more than four times the spike duplicate nominal concentration; therefore, the spike duplicate recovery was not applicable. 1201515943 (ZV4SS-0000004) and 1201516218 (ZV4SS-0000008).

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

The RPDs 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 following samples in this sample group were diluted due to high concentration for this analysis. 1201515941 (ZV4SS-0000004), 1201515942 (ZV4SS-0000004), 1201515943 (ZV4SS-0000004), 1201516216 (ZV4SS-0000008), 1201516217 (ZV4SS-0000008), 1201516218 (ZV4SS-0000008) and 202836001 (ZV4SS-0000005). The following samples in this sample group were diluted due to matrix interference. 202836002 (ZV4SS-0000007), 202836003 (ZV4SS-0000009) and 202836004 (ZV4SS-0000010).

#### **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.

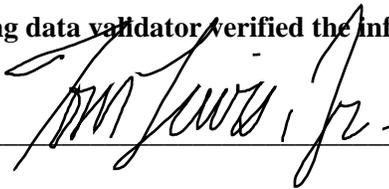
**Certification Statement**

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 verified the information presented in this case narrative:**

Reviewer:  Date: 10 March 08

# **Sample Data Summary**

# GEL LABORATORIES LLC

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: 202836 GEL Work Order: 202836

**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.

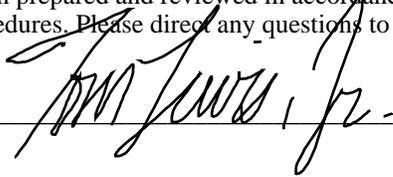
U The analyte was analyzed for, but not detected. The sample quantitation limit (SQL) is valid unless blank contamination is indicated.

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.

Reviewed by



# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 5, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000005  
Sample ID: 202836001  
Matrix: Misc Solid  
Collect Date: 02-FEB-08 10:30  
Receive Date: 14-FEB-08  
Collector: Client  
Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Ion Chromatography Federal</b>											
<i>SW846-9056 Sulfate in Solids</i>											
Chloride		2.26	0.650	1.97	mg/kg	1	VXP1	02/16/08	2247	727132	1
Fluoride	J	0.699	0.295	0.985	mg/kg	1					
Sulfate		27.5	0.985	3.94	mg/kg	1					
<b>Nutrient Analysis</b>											
<i>EPA 353.2 Nitrogen, Nitrate/Nitrite</i>											
Nitrogen, Nitrate/Nitrite		77.0	1.52	4.75	mg/kg	10	AXH3	02/19/08	1211	727006	2

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.1 Modified Nitrate/Nitrite	AXH3	02/18/08	1543	727004
SW846 9056	SW846-9056 Total Anions in Soil	VXP1	02/16/08	0811	727131

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9056	
2	EPA 353.2 Modified	

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 5, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000007  
Sample ID: 202836002  
Matrix: Misc Solid  
Collect Date: 02-FEB-08 14:45  
Receive Date: 14-FEB-08  
Collector: Client

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Ion Chromatography Federal</b>										
<i>SW846-9056 Sulfate in Solids</i>										
Chloride	U	0.00	0.621	1.88	mg/kg	1	VXP1 02/16/08	2348	727132	1
Fluoride	U	0.00	0.282	0.941	mg/kg	1				
Sulfate		4.60	0.941	3.76	mg/kg	1				
<b>Nutrient Analysis</b>										
<i>EPA 353.2 Nitrogen, Nitrate/Nitrite</i>										
Nitrogen, Nitrate/Nitrite	U	-0.404	1.60	4.99	mg/kg	10	AXH3 02/19/08	1212	727006	2

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.1 Modified Nitrate/Nitrite	AXH3	02/18/08	1543	727004
SW846 9056	SW846-9056 Total Anions in Soil	VXP1	02/16/08	0811	727131

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9056	
2	EPA 353.2 Modified	

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 5, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000009  
Sample ID: 202836003  
Matrix: Misc Solid  
Collect Date: 02-FEB-08 14:45  
Receive Date: 14-FEB-08  
Collector: Client

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Ion Chromatography Federal</b>										
<i>SW846-9056 Sulfate in Solids</i>										
Chloride	U	0.00	0.641	1.94	mg/kg	1	VXP1 02/17/08 0008	727132	1	
Fluoride	U	0.00	0.291	0.971	mg/kg	1				
Sulfate		6.10	0.971	3.88	mg/kg	1				
<b>Nutrient Analysis</b>										
<i>EPA 353.2 Nitrogen, Nitrate/Nitrite</i>										
Nitrogen, Nitrate/Nitrite	U	0.917	1.59	4.96	mg/kg	10	AXH3 02/19/08 1213	727006	2	

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.1 Modified Nitrate/Nitrite	AXH3	02/18/08	1543	727004
SW846 9056	SW846-9056 Total Anions in Soil	VXP1	02/16/08	0811	727131

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9056	
2	EPA 353.2 Modified	

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 5, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000010  
Sample ID: 202836004  
Matrix: Misc Solid  
Collect Date: 02-FEB-08 15:00  
Receive Date: 14-FEB-08  
Collector: Client

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Ion Chromatography Federal</b>										
<i>SW846-9056 Sulfate in Solids</i>										
Chloride	U	0.00	0.652	1.97	mg/kg	1	VXP1 02/17/08	0029	727132	1
Fluoride	U	0.00	0.296	0.987	mg/kg	1				
Sulfate	J	3.93	0.987	3.95	mg/kg	1				
<b>Nutrient Analysis</b>										
<i>EPA 353.2 Nitrogen, Nitrate/Nitrite</i>										
Nitrogen, Nitrate/Nitrite	U	0.0637	1.58	4.92	mg/kg	10	AXH3 02/19/08	1215	727006	2

### **The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.1 Modified Nitrate/Nitrite	AXH3	02/18/08	1543	727004
SW846 9056	SW846-9056 Total Anions in Soil	VXP1	02/16/08	0811	727131

### **The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	SW846 9056	
2	EPA 353.2 Modified	

# RADIOLOGICAL ANALYSIS

**Radiochemistry Case Narrative**  
**Westinghouse Savannah River Co. (WSRB)**  
**SDG 202836**

**Method/Analysis Information**

**Product:** Liquid Scint Tc99, Solid High Rad  
Analytical Method: DOE EML HASL-300, Tc-02-RC Modified  
Analytical Batch Number: 729240

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201521098	Method Blank (MB)
1201521099	202836001(ZV4SS-0000005) Sample Duplicate (DUP)
1201521100	202836001(ZV4SS-0000005) Matrix Spike (MS)
1201521101	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# 14.

**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 volumes in this batch.

**Designated QC**

The following sample was used for QC: 202836001 (ZV4SS-0000005).

**QC Information**

All of the QC samples met the required acceptance limits.

**CSU**

The blank result is greater than 1.65 times the CSU and MDA but less than the RDL.

**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 a suspected blank false positive.

**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.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Gamma Ni59, Solid High Rad</b>
Analytical Method:	DOE RESL Ni-1
Prep Method:	Dry Soil Prep
Analytical Batch Number:	733319
Prep Batch Number:	729236

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201530317	Method Blank (MB)
1201530318	202836001(ZV4SS-0000005) Sample Duplicate (DUP)
1201530319	202836001(ZV4SS-0000005) Matrix Spike (MS)
1201530320	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-022 REV# 10.

#### **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: 202836001 (ZV4SS-0000005).

##### **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 reprepared due to not meeting required detection limits.

**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.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Liquid Scint Ni63, Solid High Rad</b>
Analytical Method:	DOE RESL Ni-1, Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	732973
Prep Batch Number:	729236

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201529481	Method Blank (MB)
1201529482	202836004(ZV4SS-0000010) Sample Duplicate (DUP)
1201529483	202836004(ZV4SS-0000010) Matrix Spike (MS)
1201529484	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-022 REV# 10.

**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: 202836004 (ZV4SS-0000010).

**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 reprepared due to high MDAs.

**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.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:**                                **Gammasec, Gamma, Solid High Rad+ Ra226, Ra228**

Analytical Method:                    EML HASL 300, 4.5.2.3

Prep Method:                            Dry Soil Prep

Analytical Batch Number:        729245

Prep Batch Number:                729236

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201521122	Method Blank (MB)
1201521123	202836001(ZV4SS-0000005) Sample Duplicate (DUP)
1201521124	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# 14.

**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: 202836001 (ZV4SS-0000005).

#### **QC Information**

Refer to Non-Conformance Report.

#### **CSU**

The blank results for Pb-214 and K-40 for sample 1201521122 (MB) are 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**

None of the samples in this sample set required reprep or reanalysis.

### **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 527122 was generated due to RDL less than MDA. 1. Samples 202836001, 002, 003, 004, 1201521122 and 1201521123 did not meet the required detection limits due to the high sample activity. 1. Reporting results.

#### **Manual Integration**

No manual integrations were performed on data in this batch.

#### **Additional Comments**

Additional comments were not required for this sample set.

### **Qualifier information**



### **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: 202836001 (ZV4SS-0000005).

#### **QC Information**

All of the QC samples met the required acceptance limits.

#### **CSU**

The method blank 1201526576 (MB) result for I-129 is greater than 1.65 times the CSU but less than the MDA.

### **Technical Information:**

#### **Holding Time**

Refer to non-conformance report

#### **Preparation Information**

All preparation criteria have been met for these analyses.

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

Samples were reprepared due to not meeting the required detection limits.

### **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 528625 was generated due to Sample Analyzed out of Holding. 1. Samples 202836 001, 002, 003, 004, 1201526577, and 1201526578 were analyzed out of holding. 1. Reporting results.

#### **Manual Integration**

No manual integrations were performed on data in this batch.

#### **Additional Comments**

Additional comments were not required for this sample set.

## Qualifier information

<b>Qualifier</b>	<b>Reason</b>	<b>Analyte</b>	<b>Sample</b>
1	EPA Storet Code:Compound identification criteria were not met.	Iodine-129	202836004

## Method/Analysis Information

**Product:** GFPC, Gross Alpha Solid High Rad  
Analytical Method: EPA 900.0 Modified  
Prep Method: Dry Soil Prep  
Analytical Batch Number: 734823  
Prep Batch Number: 729236

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201533722	Method Blank (MB)
1201533723	202836001(ZV4SS-0000005) Sample Duplicate (DUP)
1201533724	202836001(ZV4SS-0000005) Matrix Spike (MS)
1201533725	202836001(ZV4SS-0000005) Matrix Spike Duplicate (MSD)
1201533726	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# 11.

### **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 volume in this batch.

**Designated QC**

The following sample was used for QC: 202836001 (ZV4SS-0000005).

**QC Information**

Refer to Non-Conformance Report. The matrix spike and matrix spike duplicate, 1201533724 (ZV4SS-0000005) and 1201533725 (ZV4SS-0000005), did not meet beta recovery requirements due to the sample activity being greater than five times the spiked nominal concentration.

**CSU**

The beta result for blank 1201533722 (MB) is greater than 1.65 times the CSU but less than the five percent of the lowest sample activity.

**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 low/high recovery. Samples 202836001 (ZV4SS-0000005), 202836002 (ZV4SS-0000007), 202836003 (ZV4SS-0000009) and 202836004 (ZV4SS-0000010) were repped due to low/high recovery. Samples 202836001 (ZV4SS-0000005), 202836002 (ZV4SS-0000007), 202836003 (ZV4SS-0000009) and 202836004 (ZV4SS-0000010) were repped due to high relative percent difference/relative error ratio.

**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. The following NCR was generated for this SDG: NCR 530116 was generated due to Failed Recovery for MS/PS. 1. Matrix spike 1201533724 did not meet the alpha recovery requirement. The matrix spike duplicate met the recovery requirement;

however, it passed with a low value. The matrix spike and matrix spike duplicate are similar in results.  
1. Reporting results.

### **Manual Integration**

No manual integrations were performed on data in this batch.

### **Additional Comments**

Samples 1201533722 (MB) and 202836004 (ZV4SS-0000010) did not meet the alpha required detection limit due to low sample volume. No more sample could be used without exceeding the maximum net weight limit. The samples counted for 500 minutes. The sample and the duplicate, 1201533723 (ZV4SS-0000005) and 202836001 (ZV4SS-0000005), did not meet the alpha relative percent difference requirement; however, they do meet the relative error ratio requirement with value of 0.5781.

### **Qualifier information**

Manual qualifiers were not required.

### **Method/Analysis Information**

<b>Product:</b>	<b>GFPC, Sr90, solid High Rad</b>
Analytical Method:	EPA 905.0 Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	729241
Prep Batch Number:	729236

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201521105	Method Blank (MB)
1201521106	202836001(ZV4SS-0000005) Sample Duplicate (DUP)
1201521107	202836001(ZV4SS-0000005) Matrix Spike (MS)
1201521108	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 volumes in this batch.

#### **Designated QC**

The following sample was used for QC: 202836001 (ZV4SS-0000005).

#### **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 202836004 (ZV4SS-0000010) was recounted due to high MDA. Sample 1201521105 (MB) was recounted due to a negative result greater than three times the error. Samples 202836001 (ZV4SS-0000005), 202836002 (ZV4SS-0000007), 202836003 (ZV4SS-0000009) and 202836004 (ZV4SS-0000010) 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.

#### **Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

The results for samples 202836001 (ZV4SS-0000005), 202836002 (ZV4SS-0000007), 202836003 (ZV4SS-0000009) and 202836004 (ZV4SS-0000010) were verified by recounting at least five days from the separation date.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** LSC, Tritium Dist, Solid High Rad

Analytical Method: EPA 906.0 Modified

Analytical Batch Number: 734356

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201532682	Method Blank (MB)
1201532683	202836001(ZV4SS-0000005) Sample Duplicate (DUP)
1201532684	202836001(ZV4SS-0000005) Matrix Spike (MS)
1201532685	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-002 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: 202836001 (ZV4SS-0000005).

**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 202836001 (ZV4SS-0000005), 202836002 (ZV4SS-0000007), 202836003 (ZV4SS-0000009) and 202836004 (ZV4SS-0000010) were reprepared due to low/high recovery. Samples 202836001 (ZV4SS-0000005), 202836002 (ZV4SS-0000007), 202836003 (ZV4SS-0000009) and 202836004 (ZV4SS-0000010) were reprepared due to high relative percent difference/relative error ratio.

**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.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

The result for sample 202836003 (ZV4SS-0000009) is biased high due to spectral interference.

**Qualifier information**

Qualifier	Reason	Analyte	Sample
4	Matrix interference is present.	Tritium	202836003
R	The sample result is rejected as unusable due to serious deficiencies in meeting quality control criteria. The analyte may be present or absent.		202836003

**Method/Analysis Information**

**Product:** Liquid Scint C14, Solid High RAD  
Analytical Method: EPA EERF C-01 Modified  
Analytical Batch Number: 729239

<b>Sample ID</b>	<b>Client ID</b>
202836001	ZV4SS-0000005
202836002	ZV4SS-0000007
202836003	ZV4SS-0000009
202836004	ZV4SS-0000010
1201521091	Method Blank (MB)
1201521092	202836001(ZV4SS-0000005) Sample Duplicate (DUP)
1201521093	202836001(ZV4SS-0000005) Matrix Spike (MS)
1201521094	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# 9.

**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 volumes in this batch.

**Designated QC**

The following sample was used for QC: 202836001 (ZV4SS-0000005).

**QC Information**

All of the QC samples met the required acceptance limits.



**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 04-MAR-08	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> GAMMA SPECTROMETER	<b>Test / Method:</b> EML HASL 300, 4.5.2.3	<b>Matrix Type:</b> Solid	<b>Client Code:</b> WSRB
<b>Batch ID:</b> 729245	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 202836</b>			
<b>Application Issues:</b> RDL less than MDA			
<b>Specification and Requirements Nonconformance Description:</b>		<b>NRG Disposition:</b>	
1. Samples 202836001, 002, 003, 004, 1201521122 and 1201521123 did not meet the required detection limits due to the high sample activity.		1. Reporting results.	

**Originator's Name:**  
 Heather Anderson      04-MAR-08

**Data Validator/Group Leader:**  
 Lesley Anderson      11-MAR-08

**Quality Review:**

**Director:**

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 10-MAR-08	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> GAMMA SPECTROMETER	<b>Test / Method:</b> EML HASL 300, 4.5.2.3	<b>Matrix Type:</b> Solid	<b>Client Code:</b> WSRB
<b>Batch ID:</b> 731673	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 202836</b>			
<b>Application Issues:</b> Sample Analyzed out of Holding			
<b>Specification and Requirements Nonconformance Description:</b>		<b>NRG Disposition:</b>	
1. Samples 202836 001, 002, 003, 004, 1201526577, and 1201526578 were analyzed out of holding.		1. Reporting results.	

**Originator's Name:**  
 Shenise Euland      10-MAR-08

**Data Validator/Group Leader:**  
 Lesley Anderson      11-MAR-08

**Quality Review:**

**Director:**

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 11-MAR-08	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LSC	<b>Test / Method:</b> EPA EERF C-01 Modified	<b>Matrix Type:</b> Solid	<b>Client Code:</b> WSRB
<b>Batch ID:</b> 729239	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 202836</b>			
<b>Application Issues:</b> Sample Analyzed out of Holding			
<b>Specification and Requirements</b>		<b>NRG Disposition:</b>	
<b>Nonconformance Description:</b>			
1. Samples 202836001, 202836002, 202836003, 202836004, 1201521092, and 1201521093 were analyzed out of holding.		1. Reporting results.	

**Originator's Name:**  
 John Parker            11-MAR-08

**Data Validator/Group Leader:**  
 Lesley Anderson      12-MAR-08

**Quality Review:**

**Director:**

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 13-MAR-08	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> GFPC	<b>Test / Method:</b> EPA 900.0 Modified	<b>Matrix Type:</b> Solid	<b>Client Code:</b> WSRB
<b>Batch ID:</b> 734823	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 202836</b>			
<b>Application Issues:</b> Failed Recovery for MS/PS			
<b>Specification and Requirements</b>		<b>NRG Disposition:</b>	
<b>Nonconformance Description:</b>			
<p>1. Matrix spike 1201533724 did not meet the alpha recovery requirement. The matrix spike duplicate met the recovery requirement; however, it passed with a low value. The matrix spike and matrix spike duplicate are similar in results.</p>		<p>1. Reporting results.</p>	

**Originator's Name:**  
 John Parker                      13-MAR-08

**Data Validator/Group Leader:**  
 Kate Gellatly                      13-MAR-08

**Quality Review:**

**Director:**

# SAMPLE DATA SUMMARY

## GEL LABORATORIES LLC

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: 202836 GEL Work Order: 202836

**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.



Reviewed by \_\_\_\_\_

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
 Address : Building 730-4B, Cube 2119  
 Aiken, South Carolina 29808

Report Date: March 13, 2008

Contact: Mr. Robert Kemmerlin  
 Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000005  
 Sample ID: 202836001  
 Matrix: Misc Solid  
 Collect Date: 02-FEB-08 10:30  
 Receive Date: 14-FEB-08  
 Collector: Client

Project: WSRB00308  
 Client ID: WSRB001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>High Rad Testing</b>											
<i>Gamma Low level I129, Solid High RAD</i>											
Iodine-129	UJ	-0.0446	+/-0.214	0.311	2.24	pCi/g		TC1 03/06/08	1948	731673	1
<i>LSC, Tritium Dist, Solid High Rad</i>											
Tritium	U	4.10	+/-2.15	3.34	3.00	pCi/g		GXR1 03/11/08	1630	734356	2
<i>Liquid Scint C14, Solid High RAD</i>											
Carbon-14	UJ	-11.8	+/-9.29	17.4	274	pCi/g		GXR1 03/10/08	2246	729239	3
<i>Liquid Scint Tc99, Solid High Rad</i>											
Technetium-99	J	66.4	+/-19.0	28.4	90.4	pCi/g		GXR1 03/12/08	1041	729240	4
<i>GFPC, Gross Alpha Solid High Rad</i>											
Alpha		1930	+/-102	32.7	1.00	pCi/g		GXR1 03/12/08	2005	734823	5
Beta		1.83E+05	+/-506	45.9	8.00	pCi/g					
<i>GFPC, Sr90, solid High Rad</i>											
Strontium-90		33.8	+/-5.53	4.59	1.92	pCi/g		TC1 03/10/08	2151	729241	6
<i>Gamma Ni59, Solid High Rad</i>											
Nickel-59	U	-13.6	+/-5.97	7.90	20.0	pCi/g		TC1 03/07/08	0536	733319	7
<i>Gammascpec, Gamma, Solid High Rad+ Ra226, Ra228</i>											
Actinium-228	U	14.6	+/-15.8	25.9	0.369	pCi/g		TC1 02/27/08	1411	729245	8
Antimony-125		190	+/-47.3	63.0	0.316	pCi/g					
Bismuth-214	U	-8.38	+/-16.3	27.1	6.19	pCi/g					
Cesium-137		2.09E+05	+/-19800	14.3	0.170	pCi/g					
Cobalt-60	U	0.118	+/-1.33	1.74	0.300	pCi/g					
Lead-212	U	5.94	+/-13.1	22.5	0.291	pCi/g					
Lead-214	U	6.29	+/-21.4	36.3	0.264	pCi/g					
Niobium-94	R	12.9	+/-6.18	8.68	1.00	pCi/g					
Potassium-40	J	22.2	+/-9.89	11.5	1.01	pCi/g					
Radium-226	U	-8.38	+/-16.3	27.1		pCi/g					
Radium-228	U	14.6	+/-15.8	25.9	0.500	pCi/g					
Ruthenium-106	U	-24	+/-81.0	134	0.800	pCi/g					
Thallium-208	U	12.1	+/-9.34	15.5	0.133	pCi/g					
<i>Liquid Scint Ni63, Solid High Rad</i>											
Nickel-63	U	-10.4	+/-10.8	18.7	23.4	pCi/g		TC1 03/07/08	1815	732973	9

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TC1	02/25/08	1448	729236

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 13, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000005  
Sample ID: 202836001

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	
2	EPA 906.0 Modified	
3	EPA EERF C-01 Modified	
4	DOE EML HASL-300, Tc-02-RC Modified	
5	EPA 900.0 Modified	
6	EPA 905.0 Modified	
7	DOE RESL Ni-1	
8	EML HASL 300, 4.5.2.3	
9	DOE RESL Ni-1, Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Technetium-99m Tracer	Liquid Scint Tc99, Solid High Rad	1.95E+05 CPM	2.64E+05	74	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid High Rad	8.00 mg	8.95	89	(25%-125%)
Nickel Carrier	Gamma Ni59, Solid High Rad	20.2 mg	21.3	95	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Solid High Rad	20.7 mg	23.2	89	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
 Address : Building 730-4B, Cube 2119  
 Aiken, South Carolina 29808

Report Date: March 13, 2008

Contact: Mr. Robert Kemmerlin  
 Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000007  
 Sample ID: 202836002  
 Matrix: Misc Solid  
 Collect Date: 02-FEB-08 14:45  
 Receive Date: 14-FEB-08  
 Collector: Client

Project: WSRB00308  
 Client ID: WSRB001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>High Rad Testing</b>											
<i>Gamma Low level I129, Solid High RAD</i>											
Iodine-129	UJ	0.910	+/-0.715	0.998	2.24	pCi/g		TC1 03/06/08	1949	731673	1
<i>LSC, Tritium Dist, Solid High Rad</i>											
Tritium	U	2.60	+/-1.82	2.93	3.00	pCi/g		GXR1 03/11/08	1733	734356	2
<i>Liquid Scint C14, Solid High RAD</i>											
Carbon-14	UJ	-1.63	+/-6.68	11.9	274	pCi/g		GXR1 03/10/08	2303	729239	3
<i>Liquid Scint Tc99, Solid High Rad</i>											
Technetium-99	U	34.4	+/-16.7	26.7	90.4	pCi/g		GXR1 03/12/08	1057	729240	4
<i>GFPC, Gross Alpha Solid High Rad</i>											
Alpha		4100	+/-147	23.8	1.00	pCi/g		GXR1 03/12/08	2049	734823	5
Beta		1.98E+05	+/-542	32.2	8.00	pCi/g					
<i>GFPC, Sr90, solid High Rad</i>											
Strontium-90		47.9	+/-6.10	4.07	1.92	pCi/g		TC1 03/10/08	2152	729241	6
<i>Gamma Ni59, Solid High Rad</i>											
Nickel-59	U	0.239	+/-1.21	2.40	20.0	pCi/g		TC1 03/07/08	0537	733319	7
<i>Gammascpec, Gamma, Solid High Rad+ Ra226, Ra228</i>											
Actinium-228	U	10.3	+/-17.5	29.8	0.369	pCi/g		TC1 02/28/08	0909	729245	8
Antimony-125		292	+/-57.0	67.1	0.316	pCi/g					
Bismuth-214	R	50.4	+/-21.3	29.8	6.19	pCi/g					
Cesium-137		1.65E+05	+/-15700	16.0	0.170	pCi/g					
Cobalt-60	U	0.176	+/-1.49	2.15	0.300	pCi/g					
Lead-212	U	21.5	+/-16.3	24.4	0.291	pCi/g					
Lead-214	U	6.48	+/-23.0	39.1	0.264	pCi/g					
Niobium-94	U	-10.7	+/-6.19	10.0	1.00	pCi/g					
Potassium-40	U	-4.19	+/-8.86	14.4	1.01	pCi/g					
Radium-226	R	50.4	+/-21.3	29.8		pCi/g					
Radium-228	U	10.3	+/-17.5	29.8	0.500	pCi/g					
Ruthenium-106	U	10.8	+/-91.4	148	0.800	pCi/g					
Thallium-208	U	13.7	+/-10.3	17.0	0.133	pCi/g					
<i>Liquid Scint Ni63, Solid High Rad</i>											
Nickel-63	U	-8.27	+/-12.2	21.2	23.4	pCi/g		TC1 03/07/08	2019	732973	9

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TC1	02/25/08	1448	729236

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 13, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000007  
Sample ID: 202836002

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	
2	EPA 906.0 Modified	
3	EPA EERF C-01 Modified	
4	DOE EML HASL-300, Tc-02-RC Modified	
5	EPA 900.0 Modified	
6	EPA 905.0 Modified	
7	DOE RESL Ni-1	
8	EML HASL 300, 4.5.2.3	
9	DOE RESL Ni-1, Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Technetium-99m Tracer	Liquid Scint Tc99, Solid High Rad	2.04E+05 CPM	2.64E+05	77	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid High Rad	8.00 mg	8.95	89	(25%-125%)
Nickel Carrier	Gamma Ni59, Solid High Rad	20.1 mg	21.3	94	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Solid High Rad	17.7 mg	23.2	76	(25%-125%)

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 Aiken, South Carolina 29808

Report Date: March 13, 2008

Contact: Mr. Robert Kemmerlin  
 Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000009  
 Sample ID: 202836003  
 Matrix: Misc Solid  
 Collect Date: 02-FEB-08 14:45  
 Receive Date: 14-FEB-08  
 Collector: Client

Project: WSRB00308  
 Client ID: WSRB001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>High Rad Testing</b>											
<i>Gamma Low level I129, Solid High RAD</i>											
Iodine-129	UJ	0.415	+/-0.389	0.551	2.24	pCi/g		TC1 03/07/08	1802	731673	1
<i>LSC, Tritium Dist, Solid High Rad</i>											
Tritium	R	199	+/-6.88	2.60	3.00	pCi/g		GXR1 03/11/08	1835	734356	2
<i>Liquid Scint C14, Solid High RAD</i>											
Carbon-14	UJ	-4.58	+/-7.66	13.8	274	pCi/g		GXR1 03/10/08	2319	729239	3
<i>Liquid Scint Tc99, Solid High Rad</i>											
Technetium-99	J	79.3	+/-17.6	25.1	90.4	pCi/g		GXR1 03/12/08	1114	729240	4
<i>GFPC, Gross Alpha Solid High Rad</i>											
Alpha		1860	+/-93.4	35.5	1.00	pCi/g		GXR1 03/12/08	2049	734823	5
Beta		1.87E+05	+/-504	32.2	8.00	pCi/g					
<i>GFPC, Sr90, solid High Rad</i>											
Strontium-90		27.3	+/-5.10	4.98	1.92	pCi/g		TC1 03/10/08	2152	729241	6
<i>Gamma Ni59, Solid High Rad</i>											
Nickel-59	U	-3.08	+/-2.50	3.62	20.0	pCi/g		TC1 03/07/08	0537	733319	7
<i>Gammascpec, Gamma, Solid High Rad+ Ra226, Ra228</i>											
Actinium-228	U	-16.9	+/-17.7	29.9	0.369	pCi/g		TC1 02/28/08	1130	729245	8
Antimony-125		511	+/-64.0	75.3	0.316	pCi/g					
Bismuth-214	R	66.4	+/-23.4	32.3	6.19	pCi/g					
Cesium-137		1.71E+05	+/-16200	17.0	0.170	pCi/g					
Cobalt-60	U	1.54	+/-1.31	1.99	0.300	pCi/g					
Lead-212	U	-9.71	+/-15.7	27.0	0.291	pCi/g					
Lead-214	U	1.36	+/-25.6	43.4	0.264	pCi/g					
Niobium-94	U	-14.4	+/-6.29	10.1	1.00	pCi/g					
Potassium-40	U	1.49	+/-8.34	14.0	1.01	pCi/g					
Radium-226	R	66.4	+/-23.4	32.3		pCi/g					
Radium-228	U	-16.9	+/-17.7	29.9	0.500	pCi/g					
Ruthenium-106	U	-134	+/-107	159	0.800	pCi/g					
Thallium-208	U	2.45	+/-11.1	18.4	0.133	pCi/g					
<i>Liquid Scint Ni63, Solid High Rad</i>											
Nickel-63	U	-10.8	+/-10.8	18.8	23.4	pCi/g		TC1 03/07/08	2224	732973	9

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TC1	02/25/08	1448	729236

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 13, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000009  
Sample ID: 202836003

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
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### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	
2	EPA 906.0 Modified	
3	EPA EERF C-01 Modified	
4	DOE EML HASL-300, Tc-02-RC Modified	
5	EPA 900.0 Modified	
6	EPA 905.0 Modified	
7	DOE RESL Ni-1	
8	EML HASL 300, 4.5.2.3	
9	DOE RESL Ni-1, Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Technetium-99m Tracer	Liquid Scint Tc99, Solid High Rad	1.98E+05 CPM	2.64E+05	75	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid High Rad	8.10 mg	8.95	91	(25%-125%)
Nickel Carrier	Gamma Ni59, Solid High Rad	20.5 mg	21.3	96	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Solid High Rad	20.3 mg	23.2	88	(25%-125%)

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## Certificate of Analysis

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 Address : Building 730-4B, Cube 2119  
 Aiken, South Carolina 29808

Report Date: March 13, 2008

Contact: Mr. Robert Kemmerlin  
 Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000010  
 Sample ID: 202836004  
 Matrix: Misc Solid  
 Collect Date: 02-FEB-08 15:00  
 Receive Date: 14-FEB-08  
 Collector: Client

Project: WSRB00308  
 Client ID: WSRB001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>High Rad Testing</b>											
<i>Gamma Low level I129, Solid High RAD</i>											
Iodine-129	R	2.71	+/-1.43	2.02	2.24	pCi/g		TC1 03/07/08	1802	731673	1
<i>LSC, Tritium Dist, Solid High Rad</i>											
Tritium		11.0	+/-2.22	2.73	3.00	pCi/g		GXR1 03/11/08	2112	734356	2
<i>Liquid Scint C14, Solid High RAD</i>											
Carbon-14	UJ	-4.02	+/-6.41	11.6	274	pCi/g		GXR1 03/10/08	2335	729239	3
<i>Liquid Scint Tc99, Solid High Rad</i>											
Technetium-99	U	42.0	+/-12.5	18.8	90.4	pCi/g		GXR1 03/12/08	1131	729240	4
<i>GFPC, Gross Alpha Solid High Rad</i>											
Alpha	U	-30.7	+/-17.9	20.0	1.00	pCi/g		GXR1 03/12/08	2049	734823	5
Beta		1.23E+05	+/-416	32.3	8.00	pCi/g					
<i>GFPC, Sr90, solid High Rad</i>											
Strontium-90	U	1.08	+/-1.13	1.88	1.92	pCi/g		TC1 03/12/08	1536	729241	6
<i>Gamma Ni59, Solid High Rad</i>											
Nickel-59	U	-12.1	+/-5.82	7.78	20.0	pCi/g		TC1 03/07/08	0741	733319	7
<i>Gammascpec, Gamma, Solid High Rad+ Ra226, Ra228</i>											
Actinium-228	U	0.959	+/-11.8	20.1	0.369	pCi/g		TC1 02/28/08	1347	729245	8
Antimony-125		231	+/-49.6	59.0	0.316	pCi/g					
Bismuth-214	U	-10.7	+/-15.1	25.0	6.19	pCi/g					
Cesium-137		1.17E+05	+/-11100	12.6	0.170	pCi/g					
Cobalt-60	U	0.268	+/-0.782	1.17	0.300	pCi/g					
Lead-212	U	15.0	+/-12.8	21.5	0.291	pCi/g					
Lead-214	U	3.51	+/-20.2	34.3	0.264	pCi/g					
Niobium-94	U	-3.36	+/-4.13	6.76	1.00	pCi/g					
Potassium-40	R	15.6	+/-5.83	11.1	1.01	pCi/g					
Radium-226	U	-10.7	+/-15.1	25.0		pCi/g					
Radium-228	U	0.959	+/-11.8	20.1	0.500	pCi/g					
Ruthenium-106	U	-23.7	+/-74.6	124	0.800	pCi/g					
Thallium-208	U	6.72	+/-8.63	14.3	0.133	pCi/g					
<i>Liquid Scint Ni63, Solid High Rad</i>											
Nickel-63	U	-10.7	+/-11.0	19.2	23.4	pCi/g		TC1 03/08/08	0029	732973	9

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TC1	02/25/08	1448	729236

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## Certificate of Analysis

Company : Westinghouse Savannah Rvr Co  
Address : Building 730-4B, Cube 2119  
Aiken, South Carolina 29808

Report Date: March 13, 2008

Contact: Mr. Robert Kemmerlin  
Project: **GEL-2008-ZV4SS**

Client Sample ID: ZV4SS-0000010  
Sample ID: 202836004

Project: WSRB00308  
Client ID: WSRB001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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### The following Analytical Methods were performed

Method	Description	Analyst	Comments
1	EML HASL 300, 4.5.2.3		
2	EPA 906.0 Modified		
3	EPA EERF C-01 Modified		
4	DOE EML HASL-300, Tc-02-RC Modified		
5	EPA 900.0 Modified		
6	EPA 905.0 Modified		
7	DOE RESL Ni-1		
8	EML HASL 300, 4.5.2.3		
9	DOE RESL Ni-1, Modified		

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Technetium-99m Tracer	Liquid Scint Tc99, Solid High Rad	2.09E+05 CPM	2.64E+05	79	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid High Rad	8.30 mg	8.95	93	(25%-125%)
Nickel Carrier	Gamma Ni59, Solid High Rad	20.1 mg	21.3	94	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Solid High Rad	20.1 mg	23.2	87	(25%-125%)