Pond Discharge Notification Cover Sheet
Date: 4/29/10
Total pages including cover sheet = 16

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From: George Squibb, Rocky Flats Surface Water Lead, telephone (303) 994-0145

Re: Discharge notification for Rocky Flats Pond B-5.

Pond B-5 is currently being direct discharged using the outlet works to South Walnut Creek through Point of Compliance (POC) location GS08. All required monitoring at downstream POCs GS08 and GS03 (Walnut Creek at Indiana Street) are ongoing according to the normal protocols in Attachment 2 to RFLMA. The discharge is expected to continue for another 10-14 days, with a total discharge volume dependent on continued inflow.

Based on dam conditions and in the interest of dam safety, the Site initiated the discharge Pond B-5 at 16:47 on 4/23/10. At that time, results for split samples analyzed by CDPHE had not been received.

Pre-discharge samples for Pond B-5 were collected on 4/2/10. Results for all samples have now been received and validated. The pre-discharge sample results and validation report are included below.

Please contact me if you have questions.

Pond B-5 Pre-Discharge Results (Site Contract Labs)

RESULTS REPORT
RIN: 10042964
Site: Rocky Flats Surface Water
Site Code: RFS01 Location: B5 POND
Ticket Number: IFZ 722
Report Date: 4/14/2010

Parameter	Units	Date Sampled	Date Analyzed	Result	Qualifier(s)	Uncertainty	Detection Limit	Method
Nitrate Nitrite as N	mg/L	04/02/2010	04/09/2010	0.17			0.019	353.2
Uranium	ug/L	04/02/2010	04/06/2010	11			0.020	6020

RESULTS REPORT
RIN: 10042963
Site: Rocky Flats Surface Water
Site Code: RFS01 Location: B5 POND
Ticket Number: IFZ 721
Report Date: 4/20/2010

Parameter	Units	Date Sampled	Date Analyzed	Result	Qualifier(s)	Uncertainty	Detection Limit	Method
Americium-241	pCi/L	04/02/2010	04/08/2010	0.00348	U	0.00519	0.0131	Am-05-RC Modified
Plutonium-238	pCi/L	04/02/2010	04/08/2010	0.0073	U	0.00546	0.0148	Pu-11-RC Modified
Plutonium-239/240	pCi/L	04/02/2010	04/08/2010	0.00625	U	0.00869	0.00983	Pu-11-RC Modified

Bill Ritter, Jr., Governor
Martha E. Rudolph, Executive Director

STATE OF COLORADO

Dedicated to protecting and improving the health and environment of the people of Colorado

Laboratory Services Division
8100 Lowry Boulevard Denver. CO 80230
PO Box 17123 Denver, CO 80217
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Colorado Department of Public Health and Environment

Laboratory Results For Sample Number: ENV-2010003772-

Site ID/PWSID

Site Address

Site Description ROCKY FLATS POND B5

Customer ID 00008835

Customer CDPHE - HMWMD - Rocky Flats Unit
4300 Cherry Creek Drive South

Denver CO 80246

Contact Carl Spreng
Phone x3358
Fax
Email

Collected By CS
Collected 04/07/2010 12:50:00
Received 04/07/2010 15:47:00
Reported 04/26/2010 00:00:00
Bottles 3 GAL OTHER, 1 NUT OTHER, 1 NEUT
Matrix Surface Water
Field Fluoride
Residual Chlorine
Temperature at Receipt 12.3C

Test Name	Result	Units	MCL	MDA	Method Name	Date Analyzed	Qualifier
Plutonium-239+240	< 0.004	pCi/L	NA	0.004	ASTM-3084-89	04/24/2010 00:00:00	
Americium-241	< 0.025	pCi/L	NA	Varies	ASTM-3084-89	04/24/2010 00:00:00	Q
Uranium, Total	0.0086	mg/L	NA	0.001	EPA 200.8	04/13/2010 00:00:00	
Nitrogen, Nitrate/Nitrite	0.21	mg/L	NA	0.03	EPA 353.2	04/12/2010 00:00:00	

Comments:
Q = Am-243 tracer recovery outside normal QC limits.

Am-241 MDA = 0.025 pCi/l.

Registry Comments:

MDA - Minimum Detectable Activity. MCL - Maximum Contaminant Limit per EPA regulations.
BDL - Below Detection Limit. H - Holding Time exceeded. Q - Quality Control limit exceeded. NT - No Test.
Units: mg/L - milligrams per liter (ppm), ug/L - micrograms per liter (ppb), pCi - picoCuries
LSD Internet Address: http://www.cdphe.state.co.us/lr/lrhom.htm

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Data Review and Validation Report

General Information

Report Number (RIN):	10042964
Sample Event:	April 2, 2010
Site(s):	Rocky Flats, Colorado; Surface Water
Laboratory:	TestAmerica, Denver, Colorado
Work Order No.:	280-1979-1
Analysis:	Nitrate and Uranium
Validator:	Steve Donivan
Review Date:	April 23, 2010

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/PRO/S04325, continually updated) "Standard Practice for Validation of Laboratory Data." The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2
Uranium	LMM-02	SW-846 3020A	SW-846 6020

Data Qualifier Summary

None of the sample results required additional qualification.

Sample Shipping/Receiving

TestAmerica in Denver, Colorado, received one water sample on April 2, 2010, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that the sample was listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 3.3 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods.

Method MCAWW 353.2, Nitrate + Nitrite as N
Calibrations were performed using six calibration standards on April 9, 2010. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than three times the method detection limit (MDL). Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in ten verification checks. All calibration check results were within the acceptance criteria.

Method SW-846 6020, Uranium
Calibration was performed on April 5, 2010, using one calibration standard and a blank. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in seven verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the practical quantitation limit and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the practical quantitation limits for both analytes.

Inductively Coupled Plasma (ICP) Interference Check Sample (ICS) Analysis

ICP interference check samples ICSA and ICSAB were analyzed at the required frequency to verify the instrumental interelement and background correction factors. All check sample results met the acceptance criteria.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. For the nitrate + nitrite as N spike analysis, the laboratory used samples from another client. These results were evaluated only for acceptable precision. MS/MSD analysis was not performed for uranium because of insufficient sample volume.

A post-digestion spike was prepared and analyzed for uranium by ICP-MS. The post-digestion spike recovery met the ±15 percent acceptance criteria.

Laboratory Replicate Analysis

Laboratory replicate analyses are use to determine laboratory precision for each sample matrix. The relative percent difference for replicate results that are greater than five times the practical quantitation limit (PQL) should be less than 20 percent. For results that are less than the PQL, the range should be no greater than the PQL. The replicate results met these criteria demonstrating acceptable laboratory precision.

Laboratory Control Sample

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. ICP-MS serial dilution data are evaluated when the concentration of the undiluted sample is greater than 100 times the practical quantitation limit. All evaluated serial dilution data were acceptable.

Detection Limits/Dilutions

No dilutions were required for sample analysis. The required detection limits were met for both analytes.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable (EDD) File

A revised EDD file arrived on April 13, 2010, that included corrections to some CAS numbers. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the SEEPro database. The application compares the new data set with historical data and lists all new data that fall outside the historical data range. Data listed in the report are highlighted if the concentration detected is not within 50 percent of historical minimum or maximum values. A determination is also made if the data are normally distributed using the Studentized Range Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition.

There were not potential outliers identified and the results from this sampling event are acceptable as qualified.

Report Prepared By: _____

Steve Donivan
Laboratory Coordinator

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 10042964 **Lab Code:** STD **Validator:** Steve Donivan **Validation Date:** 4/23/2010

Project: Rocky Flats Surface Water **Analysis Type:** ☑ Metals ☑ General Chem ☐ Rad ☐ Organics

# of Samples: 1 **Matrix:** WATER **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

- ☑ Holding Times
- ☑ Detection Limits
- ☐ Field/Trip Blanks
- ☐ Field Duplicates

All analyses were completed within the applicable holding times.

The reported detection limits are equal to or below contract requirements.

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 10042964 **Lab Code:** STD **Date Due:** 4/16/2010

Matrix: Water **Site Code:** RFS02 **Date Completed:** 4/14/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
Nitrate Nitrite as N	04/09/2010	0.000	0.9998	OK	OK	OK	OK	OK	98.00	91.0	90.0	0	
Nitrate Nitrite as N	04/09/2010								97.00			1.00	

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 10042964 **Lab Code:** STD **Date Due:** 4/16/2010

Matrix: Water **Site Code:** RFS02 **Date Completed:** 4/14/2010

Analyte	Date Analyzed	CALIBRATION						Method	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB	Blank							
Uranium	04/06/2010			OK	OK	OK	OK	OK	101.0	100.0	97.0	3.0	109.0	1.4	105.0
Uranium	04/06/2010									94.0					

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Data Review and Validation Report

General Information

Report Number (RIN):	10042963
Sample Event:	April 2, 2010
Site(s):	Rocky Flats, Colorado; Surface Water
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	250480
Analysis:	Radiochemistry
Validator:	Steve Donivan
Review Date:	April 23, 2010

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/PRO/S04325, continually updated) "Standard Practice for Validation of Laboratory Data." The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Americium-241	ASP-A-020	HASL-300, Am-05	HASL-300, Am-05-RC
Plutonium Isotopes	LMR-08	HASL-300, Pu-11	HASL-300, Pu-11-RC

Data Qualifier Summary

None of the sample results required additional qualification.

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received one water sample on April 5, 2010, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that the sample was listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions. The air waybill number was listed on the Sample Receipt and Review Form.

Preservation and Holding Times

The sample shipment was received intact and at ambient temperature, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods.

Radiochemical Analysis

Radiochemical results are qualified with a "J" flag (estimated) when the result is greater than the minimum detectable concentration (MDC), but less than Determination Limit (three times the MDC). Radiochemical results are qualified with a "U" flag (not detected) when the result is greater than the MDC, but less than the Decision Level Concentration (DLC) estimated as the two sigma total propagated uncertainty.

All results were below the DLC.

Alpha Spectrometry
Alpha spectrometry calibrations and instrument backgrounds were performed within a month previous to sample analysis. Calibration standards were counted to obtain a minimum of 10,000 counts per peak. Daily instrument checks met the acceptance criteria. The tracer recoveries met the acceptance criteria of 30 to 110 percent. The full width at half maximum (FWHM) was reviewed to evaluate the spectral resolution. All internal standard FWHM values were below 100 kiloelectron volts (keV), demonstrating acceptable resolution. All internal standard peaks were within 50 keV of the expected position. The regions of interest (ROIs) for analyte peaks were reviewed. No manual integrations were performed and all ROIs were satisfactory. All results were blank-corrected using data from a blank population. Americium results were corrected for tracer impurity.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with uranium samples were below the practical quantitation limits. The radiochemistry method blank results were less than 1.65 times the respective total propagated uncertainty (TPU) or below the minimum detectable concentration.

Laboratory Replicate Analysis

Laboratory replicate sample results demonstrate acceptable laboratory precision. The radiochemical relative error ratio (calculated using the one-sigma total propagated uncertainty) for the laboratory control sample replicates was less than three, indicating acceptable precision.

Laboratory Control Sample

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable.

Detection Limits/Dilutions

No dilutions were required for sample analysis. The required detection limit was met for uranium.

All radiochemical minimum detectable concentrations (MDCs) were calculated using data from a blank population and the following equation as specified in *Quality Systems for Analytical Services*.

$$MDC = \frac{3.29 \times S_b}{K \times T} + \frac{3}{K \times T}$$

Where:
S_b = Standard deviation of the blank population counts
K = Efficiency factor
T = Count time in minutes

The calculation of the MDCs using the equation above was verified. All minimum detectable concentrations (MDCs) were less than the required MDCs.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the method detection limit (minimum detectable concentration for radiochemistry) and practical quantitation limit for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

The EDD file arrived on April 20, 2010. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

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2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition.

No values from this sampling event were identified as potential outliers.

Report Prepared By: _____

Steve Donivan
Laboratory Coordinator

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 10042963 **Lab Code:** GEN **Validator:** Steve Donivan **Validation Date:** 4/23/2010

Project: Rocky Flats Surface Water **Analysis Type:** ☐ Metals ☐ General Chem ☑ Rad ☐ Organics

# of Samples: 1 **Matrix:** Water **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

- ☑ Holding Times
- ☑ Detection Limits
- ☐ Field/Trip Blanks
- ☐ Field Duplicates

All analyses were completed within the applicable holding times.

The reported detection limits are equal to or below contract requirements.

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 10042963 **Lab Code:** GEN **Date Due:** 4/19/2010

Matrix: Water **Site Code:** RFS02 **Date Completed:** 4/19/2010

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
B5 POND	Americium-241	04/08/2010			74.0			
Blank_Spike	Americium-241	04/08/2010			99.0	99.6		
Blank_Spike_Du	Americium-241	04/08/2010			109.0	88.7		1.20
Blank	Americium-241	04/08/2010	-0.0018	U	91.0			
B5 POND	Plutonium-238	04/08/2010			88.0			
Blank	Plutonium-238	04/08/2010	0.0046	U	93.0			
Blank	Plutonium-238	04/08/2010	0.0062	U				
Blank_Spike	Plutonium-239/240	04/08/2010				104.0		
Blank_Spike_Du	Plutonium-239/240	04/08/2010				104.0		0