LMS/RFS/S15949

Rocky Flats Site, Colorado, Surface Water Configuration Adaptive Management Plan Quarterly Report

First Quarter Calendar Year 2017

April 2017

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

AMP	Adaptive Management Plan
CY	calendar year
DOE	U.S. Department of Energy
EA	*Rocky Flats Surface Water Configuration Environmental Assessment*
POC	Point of Compliance
RFLMA	*Rocky Flats Legacy Management Agreement*
Site	Rocky Flats Site

1.0 Introduction

The Proposed Action assessed in the *Rocky Flats Surface Water Configuration Environmental Assessment* (EA) is to breach the remaining retention pond dams at the Rocky Flats Site, Colorado (the Site), to allow surface water flow to return to the approximate conditions that prevailed before the retention ponds were constructed. As stated in the EA, based on extensive water quality monitoring data and a thorough environmental review, the U.S. Department of Energy (DOE) Office of Legacy Management has determined that the Proposed Action does not present a significant impact on the environment under the National Environmental Policy Act evaluation criteria.

Some members of the public have commented that additional information must be collected prior to implementing the final steps of the Proposed Action to help reduce uncertainty as to whether completion of the Proposed Action will adversely impact the quality of water flowing from the Site into downstream communities. In response to the requests, DOE initiated a cooperative effort with neighboring community representatives and other interested stakeholders to develop and implement an Adaptive Management Plan (AMP) to provide additional information. The AMP group is composed of these representatives and stakeholders. The resulting AMP reflects DOE's long-term commitment to implementing the activities that the AMP describes.

The AMP provides for a monitoring and data evaluation program to assist DOE in deciding whether to implement the final steps of the Proposed Action by breaching the terminal dams during the planned time frame of 2018–2020, or to delay the completion of the Proposed Action to gather additional information for evaluation. The terminal dams will be operated in a flow-through condition during the period leading up to the completion of the Proposed Action, which will provide data similar to what can be expected post-breach. In addition to the AMP monitoring program, the AMP identifies certain performance indicators that DOE will consider in deciding whether to adjust the time frame for completing the Proposed Action.

This AMP Quarterly Report for the first quarter of calendar year (CY) 2017 is provided in accordance with Section 5.0, "Reporting," in the AMP. Section 3.0 of this report provides the first quarter data summary tables, which include all validated analytical data for the AMP monitoring objectives available as of March 31, 2017. Subsequent AMP reports will include data that were not tabulated in previous AMP reports.

AMP monitoring objectives, locations, and sampling criteria are itemized in Table 2 of the AMP. Additional field implementation for the AMP monitoring objectives can be found in the *Rocky Flats Site Operations Guide*, Appendix I, "Rocky Flats Site, Colorado, Additional Field Implementation Detail for Selected Monitoring Objectives."

This report routinely includes analytical data for the following AMP monitoring objectives:

- Pre-discharge sampling (Item 1, AMP Table 2)
- Targeted groundwater monitoring (Item 2, AMP Table 2)
- Monitoring to evaluate flow-through operations at terminal Ponds A-4, B-5, and C-2 (Item 4, AMP Table 2)
- Storm-event monitoring (Item 5, AMP Table 2)

- Continuous flow-paced composite sampling to evaluate uranium transport (Item 6, AMP Table 2)
- Grab sampling for uranium in North and South Walnut Creeks (Item 7, AMP Table 2)
- Grab sampling for nitrate + nitrite as nitrogen in Walnut Creek (Item 8, AMP Table 2)

2.0 AMP Highlights: First Quarter CY 2017

- Three informal emails were transmitted to AMP participants providing notification that composite samples had been retrieved from the Points of Compliance (POCs) (WOMPOC—Woman Creek at COU boundary and WALPOC—Walnut Creek at COU boundary).
- Two informal emails were transmitted to AMP participants providing notification that recent analytical data from the POCs had been validated and would soon be available through the Geospatial Environmental Mapping System (GEMS).
- Three informal emails were transmitted to AMP participants providing notification of individual analytical results from POCs and points of evaluation that were above the applicable *Rocky Flats Legacy Management Agreement* (RFLMA) surface water standard (RFLMA Attachment 2, Table 1).
- During the quarter, 65 samples were collected in support of AMP monitoring objectives.

3.0 Analytical Data: First Quarter CY 2017

Table 1, "Analytical Results for Water Samples," is available at the end of this report.

Table 2, "Water Sampling Events: First Quarter CY 2017," is available at the end of this report.

Table 1. Analytical Results for Water Samples

LOCATION CODE	LOCATION TYPE	DATE SAMPLED	LAB REQUISITION NUMBER	CAS	ANALYTE	SAMPLE ID	RESULT	UNITS	LAB QUALIFIERS	SAMPLE TYPE	DETECTION LIMIT	UNCER-TAINTY	DATA VALIDATION QUALIFIERS	COLLECTION METHOD	LAB CODE
A1EFF	SL	1/12/2017	17018236	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	16	mg/L		F	0.038		valid	G	STD
A1EFF	SL	1/12/2017	17018236	07440-61-1	Uranium	N001	35	ug/L		F	0.05		valid	G	STD
A1EFF	SL	1/25/2017	17018252	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	18	mg/L		F	0.038		valid	G	STD
A1EFF	SL	1/25/2017	17018252	07440-61-1	Uranium	N001	47	ug/L		F	0.05		valid	G	STD
A1EFF	SL	2/6/2017	17028269	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	16	mg/L		F	0.038		valid	G	STD
A1EFF	SL	2/6/2017	17028269	07440-61-1	Uranium	N001	49	ug/L		F	0.05		valid	G	STD
A1EFF	SL	2/22/2017	17028299	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	9.1	mg/L		F	0.019		valid	G	STD
A1EFF	SL	2/22/2017	17028299	07440-61-1	Uranium	N001	50	ug/L		F	0.05		valid	G	STD
A2EFF	SL	1/12/2017	17018236	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	25	mg/L		F	0.095		valid	G	STD
A2EFF	SL	1/12/2017	17018236	07440-61-1	Uranium	N001	32	ug/L		F	0.05		valid	G	STD
A2EFF	SL	1/25/2017	17018252	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	19	mg/L		F	0.038		valid	G	STD
A2EFF	SL	1/25/2017	17018252	07440-61-1	Uranium	N001	49	ug/L		F	0.05		valid	G	STD
A2EFF	SL	2/6/2017	17028269	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	18	mg/L		F	0.038		valid	G	STD
A2EFF	SL	2/6/2017	17028269	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N002	18	mg/L		D	0.038		valid	G	STD
A2EFF	SL	2/6/2017	17028269	07440-61-1	Uranium	N001	54	ug/L		F	0.05		valid	G	STD
A2EFF	SL	2/6/2017	17028269	07440-61-1	Uranium	N002	52	ug/L		D	0.05		valid	G	STD
A2EFF	SL	2/22/2017	17028299	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	8.9	mg/L		F	0.019		valid	G	STD
A2EFF	SL	2/22/2017	17028299	07440-61-1	Uranium	N001	51	ug/L		F	0.05		valid	G	STD
B3OUTFLOW	SL	1/12/2017	17018236	07440-61-1	Uranium	N001	21	ug/L		F	0.05		valid	G	STD
B3OUTFLOW	SL	1/25/2017	17018252	07440-61-1	Uranium	N001	33	ug/L		F	0.05		valid	G	STD
B3OUTFLOW	SL	2/6/2017	17028269	07440-61-1	Uranium	N001	24	ug/L		F	0.05		valid	G	STD
B3OUTFLOW	SL	2/22/2017	17028299	07440-61-1	Uranium	N001	28	ug/L		F	0.05		valid	G	STD
B5INFLOW	SL	1/12/2017	17018236	07440-61-1	Uranium	N001	15	ug/L		F	0.05		valid	G	STD
B5INFLOW	SL	1/25/2017	17018252	07440-61-1	Uranium	N001	17	ug/L		F	0.05		valid	G	STD
B5INFLOW	SL	2/6/2017	17028269	07440-61-1	Uranium	N001	16	ug/L		F	0.05		valid	G	STD
B5INFLOW	SL	2/22/2017	17028299	07440-61-1	Uranium	N001	13	ug/L		F	0.05		valid	G	STD
GS08	SL	2/6/2017	17028269	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.019	mg/L	U	F	0.019		valid	G	STD
GS08	SL	2/6/2017	17028269	07440-61-1	Uranium	N001	5.8	ug/L		F	0.05		valid	G	STD
GS08	SL	2/22/2017	17028299	07440-61-1	Uranium	N001	9.3	ug/L		F	0.05		valid	G	STD
GS08	SL	2/22/2017	17028299	07440-61-1	Uranium	N002	8.6	ug/L		D	0.05		valid	G	STD
GS10	SL	11/21/2016	16118157	07440-61-1	Uranium	N003	21	ug/L		F	0.05		valid	G	STD
GS10	SL	1/12/2017	17018236	07440-61-1	Uranium	N001	20	ug/L		F	0.05		valid	G	STD
GS10	SL	1/25/2017	17018252	07440-61-1	Uranium	N001	26	ug/L		F	0.05		valid	G	STD
GS10	SL	2/6/2017	17028269	07440-61-1	Uranium	N001	18	ug/L		F	0.05		valid	G	STD
GS10	SL	2/6/2017	17028269	07440-61-1	Uranium	N002	19	ug/L		D	0.05		valid	G	STD
GS10	SL	2/22/2017	17028299	07440-61-1	Uranium	N001	19	ug/L		F	0.05		valid	G	STD
GS13	SL	11/21/2016	16118157	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N003	87	mg/L		F	0.48		valid	G	STD
GS13	SL	11/21/2016	16118157	07440-61-1	Uranium	N003	47	ug/L		F	0.05		valid	G	STD
GS13	SL	1/12/2017	17018236	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	23	mg/L		F	0.095		valid	G	STD
GS13	SL	1/12/2017	17018236	07440-61-1	Uranium	N001	41	ug/L		F	0.05		valid	G	STD
GS13	SL	1/25/2017	17018252	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	21	mg/L		F	0.095		valid	G	STD
GS13	SL	1/25/2017	17018252	07440-61-1	Uranium	N001	50	ug/L		F	0.05		valid	G	STD
GS13	SL	2/6/2017	17028269	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	19	mg/L		F	0.095		valid	G	STD
GS13	SL	2/6/2017	17028269	07440-61-1	Uranium	N001	45	ug/L		F	0.05		valid	G	STD
GS13	SL	2/22/2017	17028299	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	19	mg/L		F	0.038		valid	G	STD
GS13	SL	2/22/2017	17028299	07440-61-1	Uranium	N001	51	ug/L		F	0.05		valid	G	STD
SPOUT	TS	1/12/2017	17018236	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.019	mg/L	U	F	0.019		valid	G	STD
SPOUT	TS	1/12/2017	17018236	07440-61-1	Uranium	N001	76	ug/L		F	0.05		valid	G	STD
SPOUT	TS	1/25/2017	17018252	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.019	mg/L	U	F	0.019		valid	G	STD
SPOUT	TS	1/25/2017	17018252	07440-61-1	Uranium	N001	62	ug/L		F	0.05		valid	G	STD
SPOUT	TS	2/6/2017	17028269	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.019	mg/L	U	F	0.019		valid	G	STD
SPOUT	TS	2/6/2017	17028269	07440-61-1	Uranium	N001	34	ug/L		F	0.05		valid	G	STD
SPOUT	TS	2/22/2017	17028299	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.084	mg/L		F	0.019		valid	G	STD
SPOUT	TS	2/22/2017	17028299	07440-61-1	Uranium	N001	61	ug/L		F	0.05		valid	G	STD
SW093	SL	1/12/2017	17018236	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	1.4	mg/L		F	0.019		valid	G	STD
SW093	SL	1/12/2017	17018236	07440-61-1	Uranium	N001	6.6	ug/L		F	0.05		valid	G	STD
SW093	SL	1/25/2017	17018252	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	1.3	mg/L		F	0.019		valid	G	STD
SW093	SL	1/25/2017	17018252	07440-61-1	Uranium	N001	8.7	ug/L		F	0.05		valid	G	STD
SW093	SL	2/6/2017	17028269	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	1.2	mg/L		F	0.019		valid	G	STD
SW093	SL	2/6/2017	17028269	07440-61-1	Uranium	N001	9.1	ug/L		F	0.05		valid	G	STD
SW093	SL	2/22/2017	17028299	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	2	mg/L		F	0.019		valid	G	STD
SW093	SL	2/22/2017	17028299	07440-61-1	Uranium	N001	8.4	ug/L		F	0.05		valid	G	STD
WALPOC	SL	6/16/2016	17018220	AM-241	Americium-241	N002	0.00784	pCi/L	HU	F	0.0372	0.017	J	C	GEN
WALPOC	SL	6/16/2016	17018220	PU-239,240	Plutonium-239, 240	N002	0.0181	pCi/L	HU	F	0.0257	0.0154	J	C	GEN

Table 1. Analytical Results for Water Samples

LOCATION CODE	LOCATION TYPE	DATE SAMPLED	LAB REQUISITION NUMBER	CAS	ANALYTE	SAMPLE ID	RESULT	UNITS	LAB QUALIFIERS	SAMPLE TYPE	DETECTION LIMIT	UNCER-TAINTY	DATA VALIDATION QUALIFIERS	COLLECTION METHOD	LAB CODE
WALPOC	SL	6/16/2016	17018220	07440-61-1	Uranium	N002	16.9	ug/L		F	0.067		valid	C	GEN
WALPOC	SL	1/3/2017	17018258	AM-241	Americium-241	N002	-0.00386	pCi/L	U	F	0.0181	0.00976	valid	C	GEN
WALPOC	SL	1/3/2017	17018220	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.0499	mg/L	J	F	0.017		valid	G	GEN
WALPOC	SL	1/3/2017	17018258	PU-239,240	Plutonium-239, 240	N002	0.0114	pCi/L	U	F	0.0245	0.0154	valid	C	GEN
WALPOC	SL	1/3/2017	17018258	07440-61-1	Uranium	N002	18.5	ug/L		F	0.067		valid	C	GEN
WOMPOC	SL	11/22/2016	17018220	AM-241	Americium-241	N001	0.00124	pCi/L	U	F	0.0177	0.01	valid	C	GEN
WOMPOC	SL	11/22/2016	17018220	PU-239,240	Plutonium-239, 240	N001	0.00726	pCi/L	U	F	0.0231	0.0142	valid	C	GEN
WOMPOC	SL	11/22/2016	17018220	07440-61-1	Uranium	N001	3.72	ug/L		F	0.067		valid	C	GEN
WOMPOC	SL	1/3/2017	17028259	AM-241	Americium-241	N001	0.00614	pCi/L	U	F	0.0217	0.0135	valid	C	GEN
WOMPOC	SL	1/3/2017	17028259	PU-239,240	Plutonium-239, 240	N001	1.2E-09	pCi/L	U	F	0.0216	0.00977	valid	C	GEN
WOMPOC	SL	1/3/2017	17028259	07440-61-1	Uranium	N001	3.5	ug/L		F	0.067		valid	C	GEN

EXPLANATION

SAMPLE_ID

N00x = Sample was not filtered.
000x = Sample was filtered.

WATER_UNIT_OF_MEASURE

mg/L; ppm = milligrams per liter
pCi/L = picocuries per liter
ug/L = micrograms per liter
C = degrees celsius
mS/cm = milliSiemens per centimeter
NTU = normal turbidity units
s.u. = standard pH units
uS/cm = microSiemens per centimeter
umhos/cm = microSiemens per centimeter

SAMPLE_TYPE

F = Field Sample
D = Duplicate

DATA_VALIDATION_QUALIFIERS

valid	Result is valid.
F	Low flow sampling method used.
G	Possible grout contamination, pH > 9.
J	Estimated value.
L	Less than 3 bore volumes purged prior to sampling.
Q	Qualitative result due to sampling technique
R	Unusable result.
U	Parameter analyzed for but was not detected.
X	Location is undefined.
999	Validation not complete

LAB_QUALIFIERS

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
>	Result above upper detection limit.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
C	Pesticide result confirmed by GC-MS.
D	Analyte determined in diluted sample.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
J	Estimated
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.

LOCATION_TYPE

SL	SURFACE LOCATION
TS	TREATMENT SYSTEM
WL	WELL

COLLECTION_METHOD

G	Grab
C	Composite

LAB_CODE

GEN	Gel Laboratories
STD	Test America

Table 2. Water Sampling Events: First Quarter CY 2017

	Sampling Dates		Sample Info			Analytes					Sample Tracking Info	
Location Code	**Start**	**End**	**Collection Method**	**Type**	**Filtered**	**VOC**	**U**	**Nitrate**	**Pu/Am**	**TSS**	**Ticket**	**RIN #**
GS08	5/16/2016 12:27	8/15/2016 14:15	composite	F	No		X		X		OJS 798	16087989
B5INFLOW	6/16/2016 10:20	8/11/2016 11:46	composite	D	No		X				OJS 803	16087989
B5INFLOW	6/16/2016 10:20	8/11/2016 11:46	composite	F	No		X				OJS 799	16087989
SW093	7/14/2016 11:13	7/14/2016 11:13	grab	F	No		X	X			OIQ 164	16077938
GS13	7/14/2016 11:27	7/14/2016 11:27	grab	F	No		X	X			OIQ 162	16077938
GS10	7/14/2016 13:40	7/14/2016 13:40	grab	F	No		X				OIQ 166	16077938
GS10	7/28/2016 10:18	7/28/2016 10:18	grab	F	No		X				OJS 208	16087957
SW093	7/28/2016 10:50	7/28/2016 10:50	grab	F	No		X	X			OJS 209	16087957
SW093	8/10/2016 9:12	8/10/2016 9:12	grab	F	No		X	X			OJS 802	16087990
GS10	8/11/2016 12:32	8/11/2016 12:32	grab	F	No		X				OJS 801	16087990
11104	8/17/2016 11:05	8/17/2016 11:05	grab	F	No	X					OJS 765	16087983
4087	8/19/2016 11:52	8/19/2016 11:52	grab	F	No	X					OJS 766	16087983
B206989	8/19/2016 12:20	8/19/2016 12:20	grab	F	No	X					OJS 768	16087983
GS10	8/30/2016 13:07	8/30/2016 13:07	grab	F	No		X				OKU 495	16098008
GS10	8/30/2016 13:07	8/30/2016 13:07	grab	D	No		X				OKU 499	16098008
SW093	8/30/2016 13:42	8/30/2016 13:42	grab	F	No		X	X			OKU 496	16098008
SW093	9/15/2016 12:20	9/15/2016 12:20	grab	F	No		X	X			OKU 642	16098020
GS10	9/15/2016 13:48	9/15/2016 13:48	grab	F	No		X				OKU 643	16098020
SPOUT	9/19/2016 12:42	9/19/2016 12:42	grab	F	No		X	X			OKU 641	16098020

EXPLANATION

Sample Info: Type
F = Field Sample
D = Duplicate

Analytes
VOC = volatile organic compounds
U = uranium
Nitrate = nitrate + nitrite as N
Pu/Am = plutonium-239,240 and americium-241
SVOC = semi-volatile organic compounds
TSS = total suspended solids

Sample Tracking Info: Ticket
- tracking identifier

Sample Tracking Info: RIN#
- lab requisition number

Sample Tracking Info: COC Date
- Chain of Custody date