LMS/RFS/S14105

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

First Quarter Calendar Year 2016

April 2016

U.S. DEPARTMENT OF ENERGY | Legacy Management

Contents

Tables

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, Colorado, Site (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, this 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) 2016 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 available as of March 31, 2016. 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." Analytical data for the following AMP monitoring objectives are included in this report:

- 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 N in Walnut Creek (Item 8, AMP Table 2)

2.0 AMP Highlights: First Quarter CY 2016

- Seven informal emails were transmitted to AMP participants providing notification that composite samples from the downstream-most Points of Compliance (POCs) had been retrieved from the field (WOMPOC—Woman Creek at COU boundary and WALPOC—Walnut Creek at COU boundary).
- One informal email was transmitted to AMP participants providing notification that recent analytical data from the downstream-most 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, 107 samples were collected in support of AMP monitoring objectives.

3.0 Analytical Data: First Quarter CY 2016

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

Table 2, "Water Sampling Event Detail," 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	1/13/2016	16017597	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	42	mg/L	(blank)	F	0.19		valid	G	STD
A1EFF	SL	1/13/2016	16017597	07440-61-1	Uranium	N001	25	ug/L	(blank)	F	0.05		valid	G	STD
A1EFF	SL	2/9/2016	16027641	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	25	mg/L	(blank)	F	0.19		valid	G	STD
A1EFF	SL	2/9/2016	16027641	07440-61-1	Uranium	N001	18	ug/L	(blank)	F	0.05		valid	G	STD
A2EFF	SL	1/13/2016	16017597	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	37	mg/L	(blank)	F	0.095		valid	G	STD
A2EFF	SL	1/13/2016	16017597	07440-61-1	Uranium	N001	36	ug/L	(blank)	F	0.05		valid	G	STD
A2EFF	SL	2/9/2016	16027641	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	26	mg/L	(blank)	F	0.095		valid	G	STD
A2EFF	SL	2/9/2016	16027641	07440-61-1	Uranium	N001	27	ug/L	(blank)	F	0.05		valid	G	STD
A3EFF	SL	1/13/2016	16017597	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	32	mg/L	(blank)	F	0.095		valid	G	STD
A3EFF	SL	1/13/2016	16017597	07440-61-1	Uranium	N001	34	ug/L	(blank)	F	0.05		valid	G	STD
A3EFF	SL	2/9/2016	16027641	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	24	mg/L	(blank)	F	0.095		valid	G	STD
A3EFF	SL	2/9/2016	16027641	07440-61-1	Uranium	N001	34	ug/L	(blank)	F	0.05		valid	G	STD
B3OUTFLOW	SL	1/13/2016	16017597	07440-61-1	Uranium	N001	20	ug/L	(blank)	F	0.05		valid	G	STD
B3OUTFLOW	SL	2/10/2016	16027641	07440-61-1	Uranium	N001	18	ug/L	(blank)	F	0.05		valid	G	STD
B3OUTFLOW	SL	2/10/2016	16027641	07440-61-1	Uranium	N002	18	ug/L	(blank)	D	0.05		valid	G	STD
B5 POND	SL	7/9/2015	15077226	07440-61-1	Uranium	N001	6.3	ug/L	(blank)	F	0.05		valid	G	STD
B5INFLOW	SL	7/9/2015	15097361	07440-61-1	Uranium	N002	7.34	ug/L	(blank)	F	0.067		valid	C	GEN
B5INFLOW	SL	1/13/2016	16017597	07440-61-1	Uranium	N001	13	ug/L	(blank)	F	0.05		valid	G	STD
B5INFLOW	SL	2/10/2016	16027641	07440-61-1	Uranium	N001	17	ug/L	(blank)	F	0.05		valid	G	STD
GS08	SL	1/13/2016	16017597	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	800	mg/L	(blank)	F	1.9		R	G	STD
GS08	SL	1/13/2016	16017597	07440-61-1	Uranium	N001	8.7	ug/L	(blank)	F	0.05		valid	G	STD
GS08	SL	2/10/2016	16027641	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.19	mg/L	(blank)	F	0.019		valid	G	STD
GS08	SL	2/10/2016	16027641	07440-61-1	Uranium	N001	13	ug/L	(blank)	F	0.05		valid	G	STD
GS10	SL	1/13/2016	16017597	07440-61-1	Uranium	N001	21	ug/L	(blank)	F	0.05		valid	G	STD
GS10	SL	2/10/2016	16027641	07440-61-1	Uranium	N001	20	ug/L	(blank)	F	0.05		valid	G	STD
GS11	SL	4/27/2015	15046983	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	9.97	mg/L	(blank)	F	0.17		valid	G	GEN
GS11	SL	1/13/2016	16017597	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	3	mg/L	(blank)	F	0.019		valid	G	STD
GS11	SL	1/13/2016	16017597	07440-61-1	Uranium	N001	16	ug/L	(blank)	F	0.05		valid	G	STD
GS11	SL	2/9/2016	16027641	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	5.9	mg/L	(blank)	F	0.019		valid	G	STD
GS11	SL	2/9/2016	16027641	07440-61-1	Uranium	N001	18	ug/L	(blank)	F	0.05		valid	G	STD
GS13	SL	1/13/2016	16017597	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	41	mg/L	(blank)	F	0.095		valid	G	STD
GS13	SL	1/13/2016	16017597	07440-61-1	Uranium	N001	20	ug/L	(blank)	F	0.05		valid	G	STD
GS13	SL	2/9/2016	16027641	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	21	mg/L	(blank)	F	0.095		valid	G	STD
GS13	SL	2/9/2016	16027641	07440-61-1	Uranium	N001	13	ug/L	(blank)	F	0.05		valid	G	STD
SPOUT	TS	1/13/2016	16017597	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	310	mg/L	(blank)	F	0.76		valid	G	STD
SPOUT	TS	1/13/2016	16017597	07440-61-1	Uranium	N001	63	ug/L	(blank)	F	0.05		valid	G	STD
SPOUT	TS	2/9/2016	16027641	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	360	mg/L	(blank)	F	1.9		valid	G	STD
SPOUT	TS	2/9/2016	16027641	07440-61-1	Uranium	N001	65	ug/L	(blank)	F	0.05		valid	G	STD
SW093	SL	1/13/2016	16017597	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.88	mg/L	(blank)	F	0.019		valid	G	STD
SW093	SL	1/13/2016	16017597	07440-61-1	Uranium	N001	5.9	ug/L	(blank)	F	0.05		valid	G	STD
SW093	SL	2/9/2016	16027641	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	2.7	mg/L	(blank)	F	0.019		valid	G	STD
SW093	SL	2/9/2016	16027641	07440-61-1	Uranium	N001	6.4	ug/L	(blank)	F	0.05		valid	G	STD
WALPOC	SL	1/4/2016	16027632	AM-241	Americium-241	N002	-0.00402	pCi/L	U	F	0.0268	0.0125	valid	C	GEN
WALPOC	SL	1/4/2016	16027632	PU-239,240	Plutonium-239, 240	N002	-0.00783	pCi/L	U	F	0.0227	0.0111	valid	C	GEN
WALPOC	SL	1/4/2016	16027632	07440-61-1	Uranium	N002	17.3	ug/L	(blank)	F	0.067		valid	C	GEN
WALPOC	SL	1/28/2016	16027650	AM-241	Americium-241	N001	0.0145	pCi/L	U	F	0.0276	0.0147	valid	C	GEN
WALPOC	SL	1/28/2016	16027632	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N002	0.714	mg/L	(blank)	F	0.017		valid	G	GEN
WALPOC	SL	1/28/2016	16027650	PU-239,240	Plutonium-239, 240	N001	0.00649	pCi/L	U	F	0.0157	0.00736	valid	C	GEN
WALPOC	SL	1/28/2016	16027650	07440-61-1	Uranium	N001	17.6	ug/L	(blank)	F	0.067		valid	C	GEN
WALPOC	SL	2/16/2016	16027650	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	6.06	mg/L	(blank)	F	0.17		valid	G	GEN
WOMPOC	SL	7/7/2015	15087314	AM-241	Americium-241	N002	0.00265	pCi/L	U	F	0.033	0.0187	valid	C	GEN
WOMPOC	SL	7/7/2015	15087314	PU-239,240	Plutonium-239, 240	N002	0.0101	pCi/L	U	F	0.0154	0.00909	valid	C	GEN
WOMPOC	SL	7/7/2015	15087314	07440-61-1	Uranium	N002	1.85	ug/L	(blank)	F	0.067		valid	C	GEN
WOMPOC	SL	7/22/2015	15077242	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.15	mg/L	(blank)	F	0.019		valid	G	STD
WOMPOC	SL	7/22/2015	15077242	07440-61-1	Uranium	N001	2	ug/L	(blank)	F	0.05		valid	G	STD
WOMPOC	SL	10/5/2015	15107415	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.019	mg/L	U	F	0.019		valid	G	STD
WOMPOC	SL	10/5/2015	15107415	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N002	0.019	mg/L	U	D	0.019		valid	G	STD
WOMPOC	SL	10/5/2015	15107415	07440-61-1	Uranium	N001	3.2	ug/L	(blank)	F	0.05		valid	G	STD
WOMPOC	SL	10/5/2015	15107415	07440-61-1	Uranium	N002	3.2	ug/L	(blank)	D	0.05		valid	G	STD
WOMPOC	SL	11/3/2015	15117485	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.019	mg/L	U	F	0.019		J	G	STD
WOMPOC	SL	11/3/2015	15117485	07440-61-1	Uranium	N001	3.9	ug/L	(blank)	F	0.05		valid	G	STD
WOMPOC	SL	12/17/2015	15127563	NO3+NO2 AS N	Nitrate + Nitrite as Nitrogen	N001	0.019	mg/L	U	F	0.019		valid	G	STD
WOMPOC	SL	12/17/2015	15127563	07440-61-1	Uranium	N001	3.1	ug/L	(blank)	F	0.05		valid	G	STD
WOMPOC	SL	1/5/2016	16027650	AM-241	Americium-241	N001	0.00426	pCi/L	U	F	0.019	0.00925	valid	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
WOMPOC	SL	1/5/2016	16027650	PU-239,240	Plutonium-239, 240	N001	0.00562	pCi/L	U	F	0.0163	0.00732	valid	C	GEN
WOMPOC	SL	1/5/2016	16027650	07440-61-1	Uranium	N001	2.83	ug/L	(blank)	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 2016

	Sampling Dates		Sample Info			Analytes					Sample Tracking Info	
Location Code	**Start**	**End**	**Collection Method**	**Type**	**Filtered**	**VOC**	**U**	**Nitrate**	**Pu/Am**	**TSS**	**Ticket**	**RIN #**
GS11	4/27/2015 11:56	4/27/2015 11:56	grab	F	No			X			NFZ 199	15046983
WOMPOC	7/7/2015 14:41	8/20/2015 11:58	composite	F	No		X		X		NJS 627	15087314
B5 POND	7/9/2015 13:58	7/9/2015 13:58	grab	F	No		X				NIZ 019	15077226
B5INFLOW	7/9/2015 14:09	8/31/2015 14:02	composite	F	No		X				NKU 208	15097361
WOMPOC	7/22/2015 10:36	7/22/2015 10:36	grab	F	No		X				NIZ 656	15077242
WOMPOC	10/5/2015 11:15	10/5/2015 11:15	grab	D	No		X				NLV 554	15107415
WOMPOC	10/5/2015 11:15	10/5/2015 11:15	grab	F	No		X				NLV 553	15107415
WOMPOC	11/3/2015 14:52	11/3/2015 14:52	grab	F	No		X				NMY 027	15117485
WOMPOC	12/17/2015 9:30	12/17/2015 9:30	grab	F	No		X				NNS 019	15127563
WALPOC	1/4/2016 12:08	1/28/2016 13:30	composite	F	No		X		X		ODW 977	16027632
WOMPOC	1/5/2016 13:11	2/16/2016 13:27	composite	F	No		X		X		ODX 894	16027650
B3OUTFLOW	1/13/2016 9:26	1/13/2016 9:26	grab	F	No		X				OCT 478	16017597
GS10	1/13/2016 9:33	1/13/2016 9:33	grab	F	No		X				OCT 475	16017597
GS08	1/13/2016 11:04	1/13/2016 11:04	grab	F	No		X	X			OCT 477	16017597
GS11	1/13/2016 11:25	1/13/2016 11:25	grab	F	No		X	X			OCT 480	16017597
A3EFF	1/13/2016 11:48	1/13/2016 11:48	grab	F	No		X	X			OCT 479	16017597
B5INFLOW	1/13/2016 12:04	1/13/2016 12:04	grab	F	No		X				OCT 471	16017597
GS13	1/13/2016 12:13	1/13/2016 12:13	grab	F	No		X	X			OCT 468	16017597
A2EFF	1/13/2016 12:24	1/13/2016 12:24	grab	F	No		X	X			OCT 474	16017597
A1EFF	1/13/2016 12:29	1/13/2016 12:29	grab	F	No		X	X			OCT 470	16017597
SPOUT	1/13/2016 12:47	1/13/2016 12:47	grab	F	No		X	X			OCT 473	16017597
SW093	1/13/2016 12:50	1/13/2016 12:50	grab	F	No		X	X			OCT 476	16017597
WALPOC	1/28/2016 13:30	2/16/2016 11:40	composite	F	No		X		X		ODX 893	16027650
WALPOC	1/28/2016 14:55	1/28/2016 14:55	grab	F	No			X			ODW 978	16027632
WALPOC	1/28/2016 14:55	1/28/2016 14:55	grab	F	No			X			ODW 978	16027632
GS11	2/9/2016 11:09	2/9/2016 11:09	grab	F	No		X	X			ODX 732	16027641
A3EFF	2/9/2016 11:38	2/9/2016 11:38	grab	F	No		X	X			ODX 731	16027641
GS13	2/9/2016 11:57	2/9/2016 11:57	grab	F	No		X	X			ODX 733	16027641
A1EFF	2/9/2016 12:10	2/9/2016 12:10	grab	F	No		X	X			ODX 722	16027641
A2EFF	2/9/2016 12:16	2/9/2016 12:16	grab	F	No		X	X			ODX 726	16027641
SW093	2/9/2016 12:28	2/9/2016 12:28	grab	F	No		X	X			ODX 728	16027641
SPOUT	2/9/2016 13:36	2/9/2016 13:36	grab	F	No		X	X			ODX 725	16027641
GS08	2/10/2016 11:26	2/10/2016 11:26	grab	F	No		X				ODX 729	16027641
B5INFLOW	2/10/2016 11:30	2/10/2016 11:30	grab	F	No		X				ODX 723	16027641
GS10	2/10/2016 11:56	2/10/2016 11:56	grab	F	No		X				ODX 727	16027641
B3OUTFLOW	2/10/2016 12:10	2/10/2016 12:10	grab	D	No		X				ODX 720	16027641
B3OUTFLOW	2/10/2016 12:10	2/10/2016 12:10	grab	F	No		X				ODX 730	16027641
WALPOC	2/16/2016 11:35	2/16/2016 11:35	grab	F	No			X			ODX 892	16027650

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