ROCKY FLATS STEWARDSHIP COUNCIL

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Jefferson County -- Boulder County -- City and County of Broomfield -- City of Arvada -- City of Boulder
City of Golden -- City of Northglenn -- City of Thornton -- City of Westminster -- Town of Superior
League of Women Voters -- Rocky Flats Cold War Museum -- Rocky Flats Homesteaders
Steven Franks

Board of Directors Meeting – Agenda

Monday, June 6, 2016, 8:30 AM – 11:45 AM

Rocky Mountain Metropolitan Airport, Terminal Building, Mount Evans Room
11755 Airport Way, Broomfield, Colorado

8:30 AM Convene/Introductions/Agenda Review

8:35 AM Chairman's Review of April 22, 2016 Executive Committee meeting

8:40 AM Business Items

1. Consent Agenda
   - Approval of meeting minutes and checks

2. Executive Director's Report

8:50 AM Public Comment

9:00 AM Receive Stewardship Council 2015 Financial Audit (briefing memo attached)
- The Board will be briefed on the results of the audit.
- No material problems were found, and the Stewardship Council was found to be in compliance with all applicable laws and regulations.

Action item: Approve Motion Accepting Stewardship Council 2015 Financial Audit

9:10 AM Host DOE Annual Meeting (briefing memo attached)
- DOE will brief on site activities for calendar year 2015.
- DOE has posted the report on its website and will provide a summary of its activities to the Stewardship Council.
- Activities included surface water monitoring, groundwater monitoring, ecological monitoring, and site operations (inspections, maintenance, etc.).

10:25 AM DOE Briefing on 2017 CERCLA Five-Year Review (briefing memo attached)

- CERCLA, one of the two federal laws guiding remediation activities of contaminated sites, requires that every five years DOE review the remedies.
- The broad purpose of this review is to ensure that the remediation goals are being met and that the remedies continue to protect human health and the environment.
- The last five-year review for Rocky Flats was completed in 2012.

11:25 AM Public comment

11:35 PM Board Roundtable – Big Picture/Additional Questions/Issue Identification
Adjourn

Adjourn

Upcoming Meetings:

September 12
October 31 (4th Monday of the month)

Acronym or Term	Means	Definition
Alpha Radiation		A type of radiation that is not very penetrating and can be blocked by materials such as human skin or paper. Alpha radiation presents its greatest risk when it gets inside the human body, such as when a particle of alpha emitting material is inhaled into the lungs. Plutonium, the radioactive material of greatest concern at Rocky Flats, produces this type of radiation.
Am	americium	A man-made radioactive element which is often associated with plutonium. In a mass of Pu, Am increases in concentration over time which can pose personnel handling issues since Am is a gamma radiation-emitter which penetrates many types of protective shielding. During the production era at Rocky Flats, Am was chemically separated from Pu to reduce personnel exposures.
AME	Actinide Migration Evaluation	An exhaustive years-long study by independent researchers who studied how actinides such as Pu, Am, and U move through the soil and water at Rocky Flats
AMP	Adaptive Management Plan	Additional analyses that DOE is performing beyond the normal environmental assessment for breaching the remaining site dams.
AOC well	Area of Concern well	A particular type of groundwater well
B	boron	Boron has been found in some surface water and groundwater samples at the site
Be	beryllium	A very strong and lightweight metal that was used at Rocky Flats in the manufacture of nuclear weapons. Exposure to beryllium is now known to cause respiratory disease in those persons sensitive to it
Beta Radiation		A type of radiation more penetrating than alpha and hence requires more shielding. Some forms of uranium emit beta radiation.

BMP	best management practice	A term used to describe actions taken by DOE that are not required by regulation but warrant action.
BZ	Buffer Zone	The majority of the Rocky Flats site was open land that was added to provide a "buffer" between the neighboring communities and the industrial portion of the site. The buffer zone was approximately 6,000 acres. Most of the buffer zone lands now make up the Rocky Flats National Wildlife Refuge.
CAD/ROD	corrective action decision/record of decision	The complete final plan for cleanup and closure for Rocky Flats. The Federal/State laws that governed the cleanup at Rocky Flats required a document of this sort.
CCP	Comprehensive Conservation Plan	The refuge plan adopted by the U.S. Fish and Wildlife Service in 2007.
CDPHE	Colorado Department of Public Health and Environment	State agency that regulates the site.
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	Federal legislation that governs site cleanup. Also known as the Superfund Act
cfs	cubic feet per second	A volumetric measure of water flow.
COC	Contaminant of Concern	A hazardous or radioactive substance that is present at the site.
COU	Central Operable Unit	A CERCLA term used to describe the DOE-retained lands, about 1,500 acres comprised mainly of the former Industrial Area where remediation occurred
CR	Contact Record	A regulatory procedure where CDPHE reviews a proposed action by DOE and either approves the proposal as is or requires changes to the proposal before approval. CRs apply to a wide range of activities performed by DOE. After approval the CR is posted on the DOE-LM website and the public is notified via email.
Cr	chromium	Potentially toxic metal used at the site.
CRA	comprehensive risk assessment	A complicated series of analyses detailing human health risks and risks to the environment (flora and fauna).

D&D	decontamination and decommissioning	The process of cleaning up and tearing down buildings and other structures.
DG	discharge gallery	This is where the treated effluent of the SPPTS empties into North Walnut Creek.
DOE	U.S. Department of Energy	The federal agency that manages portions of Rocky Flats. The site office is the Office of Legacy Management (LM).
EA	environmental assessment	Required by NEPA (see below) when a federal agency proposes an action that could impact the environment. The agency is responsible for conducting the analysis to determine what, if any, impacts to the environment might occur due to a proposed action.
EIS	environmental impact statement	A complex evaluation that is undertaken by a government agency when it is determined that a proposed action by the agency may have significant impacts to the environment.
EPA	U.S. Environmental Protection Agency	The federal regulatory agency for the site.
EEOICPA	energy employees occupational illness compensation program act	This act was passed by Congress in 2000 to compensate sick nuclear weapons workers and certain survivors. Unfortunately the program has been fraught with difficulties in getting benefits to these workers over the years.
ETPTS	east trenches plume treatment system	The treatment system near the location of the east waste disposal trenches which treats groundwater contaminated with organic solvents emanating from the trenches. Treated effluent flows into South Walnut Creek.
FC	functional channel	Man-made stream channels constructed during cleanup to help direct water flow.
FACA	Federal Advisory Committee Act	This federal law regulated federal advisory boards. The law requires balanced membership and open meetings with published Federal Register meeting dates.
Gamma Radiation		This type of radiation is very penetrating and requires heavy shielding to keep it from exposing people. Am is a strong gamma emitter.
GAO	Government Accountability Office	Congressional office which reports to Congress. The GAO did 2 investigations of

		Rocky Flats relating to the ability to close the site for a certain dollar amount and on a certain time schedule. The first study was not optimistic while the second was very positive.
g	gram	metric unit of weight
gpm	gallons per minute	A volumetric measure of water flow in the site's groundwater treatment systems and other locations.
GWIS	groundwater intercept system	Refers to a below ground system that directs contaminated groundwater toward the Solar Ponds and East Trenches treatment systems.
IA	Industrial Area	Refers to the central core of Rocky Flats where all production activities took place. The IA was roughly 350 of the total 6,500 acres at the site.
IC	Institutional Control	ICs are physical and legal controls geared towards ensuring the cleanup remedies remain in place and remain effective.
IGA	intergovernmental agreement	A cooperative agreement between local governments which sets up the framework of the Stewardship Council.
IHSS	Individual Hazardous Substance Site	A name given during cleanup to a discrete area of known or suspected contamination. There were over two hundred such sites at Rocky Flats.
ITPH	interceptor trench pump house	The location where contaminated groundwater collected by the interceptor trench is pumped to either the Solar Ponds and East Trenches treatment systems
L	liter	Metric measure of volume, a liter is slightly larger than a quart.
LANL	Los Alamos National Laboratory	One of the US government's premier research institutions located near Santa Fe, NM. LANL is continuing to conduct highly specialized water analysis for Rocky Flats. Using sophisticated techniques LANL is able to determine the percentages of both naturally-occurring and man-made uranium which helps to inform water quality decisions.
LHSU	lower hydrostratigraphic unit	Hydrogeology term for deep unweathered bedrock which is hydraulically isolated from the upper hydrostratigraphic unit (see

		UHSU). Data shows that site contaminants have not contaminated the LHSU.
LM	Legacy Management	DOE office responsible for overseeing activities at closed sites.
LMPIP	Legacy Management Public Involvement Plan	This plan follows DOE and EPA guidance on public participation and outlines the methods of public involvement and communication used to inform the public of site conditions and activities. It was previously known as the Post-Closure Public Involvement Plan (PCPIP).
M&M	monitoring and maintenance	Refers to ongoing activities at Rocky Flats.
MOU	Memorandum of Understanding	MOU refers to the formal agreement between EPA and CDPHE which provides that CDPHE is the lead post-closure regulator with EPA providing assistance when needed.
MSPTS	Mound site plume treatment system	The treatment system for treating groundwater contaminated with organic solvents which emanates from the Mound site where waste barrels were buried. Treated effluent flows into South Walnut Creek.
NEPA	National Environmental Policy Act	Federal legislation that requires the federal government to perform analyses of environmental consequences of major projects or activities.
nitrates		Contaminant of concern found in the North Walnut Creek drainage derived from Solar Ponds wastes. Nitrates are very soluble in water and move readily through the aquatic environment
Np	neptunium	A man-made radioactive isotope that is found as a by-product of nuclear reactors and plutonium production.
NPL	National Priorities List	A listing of Superfund sites. The refuge lands were de-listed from the NPL while the DOE-retained lands are still on the NPL due to ongoing groundwater contamination and associated remediation activities.
OLF	Original Landfill	Hillside dumping area of about 20 acres which was used from 1951 to 1968. It underwent extensive remediation with the

		addition of a soil cap and groundwater monitoring locations.
OU	Operable Unit	A term given to large areas of the site where remediation was focused.
PCE	perchloroethylene	A volatile organic solvent used in past operations at the site. PCE is also found in environmental media as a breakdown product of other solvents.
pCi/g	picocuries per gram of soil	A unit of radioactivity measure. The soil cleanup standard at the site was 50 pCi/g of soil.
pCi/L	picocuries per liter of water	A water concentration measurement. The State of Colorado has a regulatory limit for Pu and Am which is 0.15 pCi/L of water. This standard is 100 times stricter than the EPA's national standard.
PLF	Present Landfill	Landfill constructed in 1968 to replace the OLF. During cleanup the PLF was closed under RCRA regulations with an extensive cap and monitoring system.
PMJM	Preble's Meadow Jumping Mouse	A species of mouse found along the Front Range that is on the endangered species list. There are several areas in the Refuge and COU that provide an adequate habitat for the mouse, usually found in drainages. Any operations that are planned in potential mouse habitat are strictly controlled.
POC	Point of Compliance (surface water)	A surface water site that is monitored and must be found to be in compliance with federal and state standards for hazardous constituents. Violations of water quality standards at the points of compliance could result in DOE receiving financial penalties.
POE	Point of Evaluation (surface water)	These are locations at Rocky Flats at which surface water is monitored for water quality. There are no financial penalties associated with water quality exceedances at these locations, but the site may be required to develop a plan of action to improve the water quality.
POU	Peripheral Operable Unit	A CERCLA term used to describe the Wildlife Refuge lands of about 4,000 acres.

Pu	plutonium	Plutonium is a metallic substance that was fabricated to form the core or "trigger" of a nuclear weapon. Formation of these triggers was the primary production mission of the Rocky Flats site. Pu-239 is the primary radioactive element of concern at the site. There are different forms of plutonium, called isotopes. Each isotope is known by a different number. Hence, there are plutonium 239, 238, 241 and others.
RCRA	Resource Conservation and Recovery Act	Federal law regulating hazardous waste. In Colorado, the EPA delegates CDPHE the authority to regulate hazardous wastes.
RFCA	Rocky Flats Cleanup Agreement	The regulatory agreement which governed cleanup activities. DOE, EPA, and CDPHE were signors.
RFCAB	Rocky Flats Citizen Advisory Board	This group was formed as part of DOE's site-specific advisory board network. They provided community feedback to DOE on a wide variety of Rocky Flats issues from 1993-2006.
RFCLOG	Rocky Flats Coalition of Local Governments	The predecessor organization of the Rocky Flats Stewardship Council
RFETS	Rocky Flats Environmental Technology Site	The moniker for the site during cleanup years.
RFLMA	Rocky Flats Legacy Management Agreement	The post-cleanup regulatory agreement between DOE, CDPHE, and EPA which governs site activities. The CDPHE takes lead regulator role, with support from EPA as required.
RFNWR	Rocky Flats National Wildlife Refuge	The approximate 4,000 acres which compose the wildlife refuge.
RFSOG	Rocky Flats Site Operations Guide	The nuts-and-bolt guide for post-closure site activities performed by DOE and its contractors.
SEP	Solar Evaporation Ponds	In the 1950's when the site's liquid waste treatment capability was surpassed by the liquid waste generation rate, the site resulted to transferring liquid wastes to open-air holding ponds where solar energy was utilized to evaporate and concentrate the waste. The original SEPs were not impermeable and substantial quantities of uranium and nitrates made their way into

		groundwater. As a result the solar ponds plume treatment system was necessary to treat the contaminated groundwater before it emerged as surface water in North Walnut Creek.
SPPTS	solar ponds plume treatment system	System used to treat groundwater contaminated with uranium and nitrates. The nitrates originate from the former solar evaporation ponds which had high levels of nitric acid. The uranium is primarily naturally-occurring with only a slight portion man-made. Effluent flows into North Walnut Creek
SVOCs	semi-volatile organic compounds	These compounds are not as volatile as the solvent VOCs. They tend to be similar to oils and tars. They are found in many environmental media at the site. One of the most common items to contain SVOCs is asphalt.
TCE	trichloroethlyene	A volatile organic solvent used in past operations at the site. TCE is also found in environmental media as a breakdown product of other solvents.
U	uranium	Naturally occurring radioactive element. There were two primary isotopes of U used during production activities. The first was enriched U which contained a very high percentage (>90%) of U-235 which was used in nuclear weapons. The second isotope was U-238, also known as depleted uranium. This had various uses at the site and only had low levels of radioactivity.
UHSU	upper hydrostratigraphic unit	A hydrogeology term describing the surficial materials and weathered bedrock found at Rocky Flats. The UHSU is hydraulically isolated from the lower hydrostratigraphic unit (see LHSU). Groundwater in some UHSU areas of the site is contaminated with various contaminants of concern while groundwater in other UHSU areas is not impacted. All groundwater in the UHSU emerges to surface water before it leaves the site.

USFWS	United States Fish & Wildlife Service	An agency within the US Department of the Interior that is responsible for maintaining the nation-wide system of wildlife refuges, among other duties. The regional office is responsible for the RFNWR.
VOC	volatile organic compound	These compounds include cleaning solvents that were used in the manufacturing operations at Rocky Flats. The VOCs used at Rocky Flats include carbon tetrachloride (often called carbon tet), trichloroethene (also called TCE), perchloroethylene (also called PCE), and methylene chloride.
WCRA	Woman Creek Reservoir Authority	This group is composed of the three local communities, the Cities of Westminster, Northglenn, and Thornton, who use Stanley Lake as part of their drinking water supply network. Water from the site used to flow through Woman Creek to Stanley Lake but the reservoir severed that connection. The Authority has an operations agreement with DOE to manage the Woman Creek Reservoir.
WQCC	Water Quality Control Commission	State board within CDPHE tasked with overseeing water quality issues throughout the state. DOE has petitioned the WQCC several times in the last few years regarding water quality issues.
ZVI	zero valent iron	A type of fine iron particles used to treat VOC's in the ETPTS and MSPTS.

Business Items

- April 4, 2016, draft board meeting minutes
- List of Stewardship Council checks

2015 Audit

- Cover memo
- Draft audit

ROCKY FLATS STEWARDSHIP COUNCIL
Monday, April 4, 2016, 8:30 AM – 12:10 PM
Rocky Mountain Metropolitan Airport, Terminal Building, Mount Evans Room
11755 Airport Way, Broomfield, Colorado

Meeting Announcement: The Board of Directors will first convene as the Department of Energy (DOE)-designated Local Stakeholder Organization (LSO). At the conclusion of the LSO meeting, the Board will briefly adjourn and reconvene to review management of the Rocky Flats National Wildlife Refuge. That Refuge conversation will include a discussion of the joint DOE-U.S. Fish and Wildlife Service multipurpose facility. As a joint agency project, that facility both falls within the Stewardship Council's role as the LSO, and concerns matters not included in that designation. For this meeting, the multipurpose facility discussion will not be part of the LSO conversation; at future meetings, it might be included in LSO conversations.

The minutes reflect the meetings.

LSO MEETING

Board members in attendance: Mark McGoff (Director, Arvada), Sandra McDonald (Alternate, Arvada), Lisa Morzel (Director, City of Boulder), Deb Gardner (Director, Boulder County), Megan Davis (Alternate, Boulder County), Mike Shelton (Director, Broomfield), David Allen (Alternate, Broomfield), Laura Weinberg (Director, Golden), Libby Szabo (Director, Jefferson County), Pat O'Connell (Alternate, Jefferson County), Joyce Downing (Director, Northglenn), Shelley Stanley (Alternate, Northglenn), Joe Cirelli (Director, Superior), Emily Hunt (Alternate, Thornton), Bruce Baker (Director, Westminster), Mary Fabisiak (Alternate, Westminster), Jeannette Hillery (Director, League of Women Voters), Sue Vaughan (Alternate, League of Women Voters), Roman Kohler (Rocky Flats Homesteaders), Arthur Widdowfield (Director, Rocky Flats Cold War Museum), Steven Franks.

Stewardship Council staff members and consultants in attendance: David Abelson (Executive Director), Elizabeth Dower (Seter & Vander Wall, P.C), Rik Getty (Technical Program Manager), Erin Rogers (consultant).

Attendees: Scott Surovchak (DOE-LM), Bob Darr (Navarro), Linda Kaiser (Navarro), Carl Spreng (CDPHE), Vera Moritz (EPA), Christine Hawly (Woman Creek Reservoir Authority), Sandy Pennington (Superior Trustee), Hannah Mullen (Rep. Perlmutter), Stuart Feinhor (Rep. Polis), Carolyn Boller (Friends of the Front Range Wildlife Refuge), Susan Flack (Rocky Flats Museum), Mac West (Rocky Flats Museum), Anne Fenerty (citizen), Michael Ketterer (citizen), LeRoy Moore (Rocky Mountain Peace and Justice Center), Evan Singleton (Gablehouse Granberg, LLC), W. Gale Biggs (citizen), Harvey Nichols (citizen), Jon Lipsky (citizen).

Convene/Agenda Review

Chair Lisa Morzel convened the meeting at 8:33 a.m. The first order of business was introductions of Board members and the audience.

David Abelson began with an explanation of the format of this meeting, which was set up differently than a typical Stewardship Council meeting. While the Stewardship Council is engaged on both past and present issues related to Rocky Flats, the terms of its DOE grant dictate that, as the Local Stakeholder Organization (LSO), the Board may only be involved in issues relating to the past operations and ongoing management of Rocky Flats. However, the Board also receives funding from the local governments that it can use to address non-LSO issues, such as the US Fish and Wildlife Service (USFWS) management plan for the Rocky Flats Refuge.

David explained for this meeting, the Stewardship Council would sit as both the LSO for Rocky Flats, and would address non-LSO issues. The Chair would gavel each part of the meeting open and closed so that there would absolute clarity about which role the Board was taking on for each section. He noted that there were also separate public comment periods for each part of the meeting. David said that the Board of Directors would first convene as the LSO. At the conclusion of the LSO meeting, the Board would briefly adjourn and reconvene to review management of the Rocky Flats National Wildlife Refuge in a non-LSO role. The Refuge conversation was created to include a discussion of the joint DOE-U.S. Fish and Wildlife Service multipurpose facility. As a joint agency project, that facility both falls within the Stewardship Council's role as the LSO, and concerns matters not included in that designation. David explained that for this meeting, the multipurpose facility discussion would not be part of the LSO conversation, but at future meetings, it might be included in LSO conversations.

Chair Lisa Morzel officially opened the LSO portion of the meeting. She noted that the Executive Committee met on March 3, 2016, and had reviewed and the draft agenda for this meeting.

Consent Agenda

The Board next addressed the consent agenda, which included approval of the minutes from the last meeting, as well as checks written since the last meeting. Joyce Downing moved to approve the February 2016 Board minutes and the checks. The motion was seconded by Roman Kohler. The motion to accept the minutes and checks passed 14-0.

Executive Director's Report

David Abelson began his update by mentioning that Elizabeth Dower was sitting in for Barb Vander Wall for this meeting, as Barb was out of town. David announced that all of the annual local government contributions had been received for the year, and thanked everyone for their help and cooperation.

David moved on to an update regarding a recent public notice of a uranium water quality exceedance at the Point of Compliance on Walnut Creek (WALPOC). He noted that the standard was 16.8 μg/L, and the sample came back at 16.9 μg/L. Although the 12-month rolling average was below the standard, the 30-day rolling average was above it. David explained that this result was not a surprise, as it was expected to occur and was mentioned at the Board's February 2016 meeting. David reported that the levels had since returned to 16 μg/L. He also explained that while the drinking water standard was 30 μg/L, Rocky Flats was required to meet lower

standards than even municipal water suppliers. Fluctuations in uranium levels were expected based on previous studies. He noted that while most of the uranium was naturally-occurring, Rocky Flats still was required to meet the standard. David said that this issue led him to consider that it was probably time for the Board (especially newer members) to receive a refresher presentation about the standards, how and why they were set, and explaining the different types of monitoring points. He said he would look at the June meeting for scheduling this type of presentation.

David moved on to a discussion of the public comment section of the Stewardship Council website. He said there was some confusion about the purpose and meaning of this section. David explained that in 2010 DOE's Office of General Counsel provided a strong recommendation, although not a mandate, that the Stewardship Council create a venue for making public comments from its meetings more available, and find a way to more broadly communicate these issues. Therefore, the Board created a "Public Comment" section on its website. In time, it became apparent that the Board was posting comments that included information that may or may not be true, and positions that were not supported by the Board. In order to better clarify the nature of the comments found on this page, David spoke with DOE and created a disclaimer that was consistent with the direction from the Office of General Counsel. David read a copy of the disclaimer – "The following information has been posted to help facilitate dialogue with the Department of Energy. The Rocky Flats Stewardship Council does not endorse the information nor vouch for its accuracy. For more information about the Stewardship Council's role as the local stakeholder organization for Rocky Flats, including facilitating dialogue between DOE and the community, please click here". The link takes the user to the guidance from General Counsel.

Public Comment on LSO-related issues

Jon Lipsky noted that the Stewardship Council, as the LSO, was charged with encouraging public engagement, and transmitting unfiltered comments to DOE. Jon said that DOE funding for the Stewardship Council was $650,000 for a five-year period. He said the Board received an additional $10,000 from local governments, and that these funds were co-mingled. He said that the co-mingling of federal money was generally not allowed. He said that the Board's financial reports did not segregate costs between the sources of income. He also said that contractor payments should be based on actual time rather than estimated time. He said that in terms of preparation for this meeting, RFSC staff time was not broken down between LSO and non-LSO in the financial reports. He said that stakeholders deserved to know which source of funding was being used. Jon also referred to 2015 congressional testimony by the Director of the USFWS (Dan Ashe) which committed to better communication and increased efforts to involve the public. He said that a ten-minute comment period at this Stewardship Council meeting was not sufficient to meet this commitment. *A copy of Mr. Lipsky's written comments can be found here: http://rockyflatssc.org/public_comment/20160404%20RFSC%20Public%20Comment%20-%20Jon%20Lipsky..pdf

Sandy Pennington introduced herself as a Town of Superior Trustee. She said that she had some confusion about this body. She said it was hard to understand what the Board had responsibility for and what they do not. She noted that she was confused about whether or not this group had an advisory role. She said that the Town of Superior was recently presented a proposal by two

Stewardship Council leaders to support the planned Rocky Mountain Greenway. She said that a portion of the Greenway would go through what was alleged to be the most highly contaminated areas at Rocky Flats. She asked if this group had performed the function of soliciting public comment on this planned incursion into Rocky Flats lands. Sandy said that the Visitor Center would disturb the soil, and may put harmful contamination into the air, which could be breathed in by residents and may be harmful to them. She said some in Superior had inferred that the Stewardship Council supported the Greenway because the affiliation of the presenters was not clear. Sandy asked why the visitor center was on the agenda for the non-LSO meeting, but the Greenway was not. She said that the elected officials on the Board had a duty to their constituents and the broader region to foster communication and to ensure safety. She said they needed to avoid operating in a reckless manner, and to take this responsibility seriously.

Gale Biggs circulated copies of a handout, and said he was concerned about plutonium (Pu) 239 at Rocky Flats. He said that the Heath Department did a study about 25 years ago, and found that the most dangerous emissions from Rocky Flats were the airborne emissions. He noted that no air monitoring was in place at the site, and neither CDPHE nor EPA had airborne standards for Pu-239. He said that once Pu enters a body, it emits alpha radiation for the rest of the person's life. He said he had seen estimates that a tablespoon of plutonium evenly spread over Denver could kill every person in the area. He said that the USFWS was proposing to turn the site into a family picnic area, and that kids visiting the site would die before they made it to college.

Ted Ziegler noted that he continuously shared and addressed the same issues. He said that there was contamination in the soil, and there was a need for complimentary soil samples in order to prevent disturbance and the creation of airborne contamination. He said this was not a safe area for anyone to visit now or anytime in the future. *A copy of Mr. Ziegler's written comments can be found here:
http://rockyflatssc.org/public_comment/20160404%20RFSC%20Public%20Comment%20-%20Ted%20Ziegler.pdf

Lisa Morzel stepped in to address the questions from Sandy Pennington. She said she had raised the topic of the Rocky Mountain Greenway with the Board during member update time. She said she agreed that there needed to be some kind of public hearing. She said that the Board could perhaps talk at the end of the meeting today in terms of making plans for its next meeting. Sandy said that Superior was being asked to make a decision by the end of April, and asked how they could do this prior to public hearings. David Abelson noted that the USFWS was charged with public engagement regarding this and other uses of the Refuge, and that they were presenting later in the meeting. David said he did not know what their plan was, but that they would be addressing it in their presentation. Lisa noted that a grant was available to the Rocky Mountain Greenway as part of the Federal Land Access Program (FLAP), and the deadline was in May. Deb Gardner agreed that some of the issues pertaining to the Rocky Mountain Greenway were confusing. She explained the Rocky Mountain Greenway planners that would be making the grant application for trail access points, and that the April date was being driven by this grant deadline. David Abelson clarified that the Greenway was not the work of the Stewardship Council, and when officials spoke to the Superior Trustees, they were representing their governments and not the Board. He said that the Board was just starting to ask questions about how it would like to engage in its non-LSO capacity. He said that this meeting was a first step,

and then the Board would look further into this issue in the future. David told Sandy that the question she asked about contamination and safety was a question that the Stewardship Council could address as part of its LSO role, along with DOE, CDPHE and EPA. He explained that the Stewardship Council was not an advisory Board, but that local governments engaged individually on advocacy related to Rocky Flats. Lisa and David offered to meet with her for more in depth discussions.

Libby Szabo noted that the USFWS and Colorado Department of Natural Resources were co-chairs of the Greenway Steering Committee. Anne Fenerty said that the Board had a responsibility to submit questions to DOE on this subject. She added that since the Greenway plans had changed to include a section of Rocky Flats, the public had a right to comment. David Abelson clarified that any questions regarding safety issues should be addressed to the Rocky Flats regulators, and not the USFWS. He added that the Board always posted public comments it received in electronic format, and reiterated that the question of public engagement on Refuge-related issues, including the Greenway plan, was the responsibility of USFWS.

Briefing/Discussion on Original Landfill

Chair Lisa Morzel introduced the next briefing, which the Board requested regarding the independent review of the Original Landfill, including options for stabilizing the OLF.

Linda Kaiser, Site Manager with Navarro, contractor to DOE, was on hand to give the briefing. She began by displaying a map of the landfill area, which showed the waste footprint, location of berms and seeps, and key surface water features in the area. She then recapped key events from 2015 that affected the landfill. The site experienced extended, heavy precipitation from mid-February through mid-July (approximately 18 inches). Cracking and slumping developed in areas along the eastern and western edges of the waste footprint (mostly outside waste footprint). Water ponding occurred in areas affected by cracking and slumping. The East Perimeter Channel (EPC) experienced significant slumping. However, most of the landfill area did not experience cracking, slumping, or movement. Linda showed another map which depicted these post-precipitation conditions at the landfill.

DOE issued Contact Record 2015-03 in May 2015, which was approved for immediate response actions without public notice. This included draining and diverting surface water and groundwater, and also approved the use of excavation below three feet, if needed. In July, 2015, Contact Record 2015-06 was approved for interim actions to re-establish surface water management. This included:

- Regrading to fill cracks and smooth irregularities (then reseeding/erosion matting)
- Installing above-ground drain pipes
- Berm heights and cover thickness might not be maintained in some areas

These interim actions were completed September 22, 2015. Linda showed photos of some of the work, as well as an aerial image showing the 4-acre area of soil disturbance.

She said DOE was now working on developing a path forward evaluation for the landfill. A geotechnical engineering firm had been evaluating technical alternatives to increase slope stability and enhance water-management features. As part of this evaluation, the engineers were reviewing previous geotechnical investigations, the remedial action decision documents, and observations and experience since the 2005 closure. Linda said they reviewed over 20 documents and reports (there was a partial list in the presentation materials).

DOE received a draft Options Analysis Report from the geotechnical subcontractor, which identified three primary factors contributing to slope instability at the landfill:

- Naturally weak soils underlying the OLF
- Slope angle that is sufficiently steep that soils can mobilize downslope
- Water that is introduced into the already weak soils from sources including:
    - Surface water run-on and runoff
    - Precipitation and infiltration
    - Groundwater

The geotechnical subcontractor identified a set of options to be evaluated individually and combined, as appropriate, to address slope instability:

- Options for addressing naturally weak soils
- Consideration of slope angle
- Options for water management
    - Berm redesign
    - Groundwater control

The subcontractor also provided a preliminary evaluation of options. DOE will select a subset of these options (individually or in combination) for more detailed evaluation. Evaluation criteria include:

- Satisfy the Remedial Action Objectives (RAOs)
- Maintain protectiveness to human health and the environment
- Effectively contribute to reducing one or more factors contributing to slope instability:
    - Technical effectiveness
    - More effective than current design
- Minimize effect on other areas (industrial area plume and stable portions of the landfill)
- Provide reasonable cost/benefit
- Safe implementation
- Regulatory approval

Linda also reviewed the Remedial Action Objectives for the landfill:

- Prevent direct contact with landfill soil and commingled waste
- Control erosion caused by storm water run-on and runoff

She also spoke about the remedy components necessary to address these RAOs:

- Uranium-contaminated surface soils removal (completed July 2004)
- Stable landfill cover to prevent direct contact with landfill soil or debris
- Landfill cover that adequately controls erosion caused by storm water run-on and runoff
- Institutional controls

Jon Lipsky referred to the objective of preventing contact between landfill soil and co-mingled waste. He said he had read that there was no depleted uranium left in the landfill and asked how they could have removed just uranium from co-mingled waste. Scott Surovchak said that Linda was talking about surface uranium contamination, which was addressed through a series of removal actions. Anne Fenerty asked how much DOE had spent on the landfill since 2005. Linda said she did not have that number in her head. Lisa Morzel asked Linda to follow-up on this question. Jon Lipsky referred to a Contact Record showing that the OLF had subsided, and he asked how many feet. Linda said that most of the OLF had not subsided. There was a crack that was beginning of a rotational slump, which slid in circular motion. This area was about 15 feet tall at its highest. She added that they did not see movement within the waste footprint area. Sandy Pennington asked if they sampled the pooled water for contaminants. Linda said they did not, and added that there were several standard monitoring points in the area. She said that, in general, very little contamination was showing up in wells associated with the landfill, and none in surface water. Sandy asked why they did not test the pools of water before they dispersed. Linda explained that the monitoring system was set up based on a network of sampling points designed to meet all necessary criteria. Lisa Morzel said she was also surprised that DOE would not sample even just out of curiosity. Linda said someone could discuss this with DOE. Mike Shelton asked if wells at the bottom of the slope were monitored, and how they could know that none of the contamination was associated with the OLF. Linda said they were seeing constituents like selenium, and nothing at levels that would cause them to have to go back and take another look.

Deb Gardner referred to water getting into the landfill through weak soils, and asked where this was and how deep. Linda said it was about 20-28 feet. Deb asked if water was coming from percolation and other sources. Linda said it was, including from groundwater and natural seeps. Deb asked which factors caused the slumping. Linda said that groundwater was a significant factor, and noted that some of the path forward options were related to groundwater. Bruce Baker asked if there was a spring to the east of the landfill. Linda said there were seeps. Bruce asked Scott to weigh in and characterized him as the person in charge of these decisions. Scott noted that they did not know what the exact contributions were from groundwater vs. water from the surface, but that it was primarily a surface water problem. Bruce said he would have thought opposite. Scott explained that groundwater moved very slowly, especially in this area of low permeability soils. He said the soil contained a lot of pebbles and boulders, and that the matrix was essentially clay. Bruce said that this type of soil would act like reservoir or sponge. Scott reiterated that groundwater controls were part of the equation moving forward.

Shelley Stanley asked if there was any new cracking in 2016. Linda said there was not. Laura Weinberg asked how many alternatives were being considered. Linda said there were 16. They included options such as building a slurry wall, drain trenches, reconfiguring berms, installing low permeability covers, and extending the buttresses. She said that the solution would likely involve some combination of actions. Scott Surovchak clarified that the contractor provided the

list of options, while DOE would be conducting the evaluation. Linda said they expected that a design would be ready in federal fiscal year 2016. Steven Franks asked how they were getting baseline data to use for future actions since the inclinometers were removed or broken. Linda said that the evaluation would be looking at all factors and that most of the problems could be seen on a visual basis. Linda added that they conduct a detailed survey every two years. Lisa asked whether they used physical markers. Linda said that settlement monuments provided data for vertical movement, as well as some indications of horizontal movement.

Joe Cirelli referred to the ponded water being channeled to automated sampling points, and asked if they were functioning during the time of extended precipitation. Linda said that, to the best of her knowledge, the sampler beneath the landfill was operating at that time. Lisa asked Linda to follow-up with answers to any questions she did not know the answers to. Sue Vaughan asked if the geotechnical engineer provided any recommendations. Linda said that they did provide some technical evaluation. They noted that groundwater and surface water controls would likely be the most effective, while changing the landfill cover would probably be less effective. She added that a change to the slope angle would have to be very significant to be effective in this kind of geology, and that this was not likely to be feasible. Deb Gardner said it would be helpful if the Board could see list of the recommendations and to see the criteria DOE was going to use to review them. She said there was a lot of interest in finding a long-term fix. Linda noted that DOE was really looking for a long-term fix as well. She pointed to the criteria she shared in her presentation, which defined how the alternatives would be evaluated. She added that they were also doing a cost-benefit analysis. Lisa asked if this could be shared with the Board. Scott Surovchak said they would share it when they were done. Lisa said that the Board would appreciate being able to see the options before it was a done deal.

Michael Ketterer said he did not see isotopic analyses in the DOE reports he reviewed and asked how much of the uranium was naturally-occurring. Linda said that samples were sent to the Lawrence Berkeley labs to determine isotopic ratios. She said some groundwater wells showed 100% natural uranium, while others had a mixture. She said they found 68-82% natural uranium in Walnut Creek, and Scott said that Woman Creek was 99% natural. He added that all of this data was online. Mike Shelton asked why the DOE/Navarro water experts were not present for this briefing. Linda said that they were not expecting that level of detail and questions for this presentation. She added that they would come in the future if needed. Mike said he thought this was needed.

LeRoy Moore commented that it seemed like the Stewardship Council wanted to give advice or recommendations to DOE about the OLF. He said that DOE's General Counsel had made clear that this was not the Board's role. David Abelson said that the Board did not and would not make recommendations. He said that the Board only engaged in dialogue. Sandra Pennington asked what the next step would be now that this Board had asked to see additional information in advance DOE moving forward with the OLF. David Abelson explained that the Board was allowed to ask for information, as well as promote dialogue and provide additional questions. He said that one option for follow-up was on the staff level within the local governments. He also said that today was part of an ongoing discussion between the board, members of the public, DOE and the regulators (CDPHE and EPA). Sandra asked how the Board would respond if DOE ignored their request. David explained that the Board did not respond in an advisory capacity. He

said individual governments could raise issues directly with DOE. Libby Szabo asked if the Board had some kind of mission statement that spelled out its actual duties and role. David Abelson said that the best resource for this was the work plan, as it broke out both LSO and non-LSO activities. Libby suggested that they create a document that summarized this description and include it in each meeting packet. David Abelson noted that this was the very first split meeting the Board had ever done. A statement about the different roles of the Board was added to agenda this time. David said they could include LSO/non-LSO information about the Board in future meeting packets.

Joe Cirelli asked David Abelson to explain what the Stewardship Council did when DOE was proposing to breach dams a few years ago and how that changed the outcome. David said that as DOE was evaluating whether it should breach the dams on the terminal ponds, the agency developed an Adaptive Management Plan (AMP). The Board asked downstream communities to take the lead on this issue, and took on the role as serving as a conveyance mechanism for downstream communities' concerns. Bruce Baker said one of his frustrations was that the Board's mission statement used the word 'oversight', which he said implied power. David Abelson explained that when the initial LSO legislation was passed, it had yet to be determined exactly what the role of LSO would be. The Board's Mission statement was adopted in 2004 or 2005. He said that over time, there had been an evolution in terms of understanding our role. He added that the Stewardship Council was the only LSO that resulted from the legislation. He suggested that if the Board were to revise the mission statement, it would probably come up with different language. Libby Szabo said that perhaps that should happen. David said this was something that could be looked at when creating the next workplan. He added that he would have to check with counsel regarding any potential issues with the Board's Intergovernmental Agreement (IGA).

Chair Morzel officially closed the LSO meeting at 10:05 am

NON- LSO MEETING

Chair Morzel opened the non-LSO meeting at10:10 am, and introduced the next briefing by the USFWS.

Board members in attendance: Mark McGoff (Director, Arvada), Sandra McDonald (Alternate, Arvada), Lisa Morzel (Director, City of Boulder), Deb Gardner (Director, Boulder County), Megan Davis (Alternate, Boulder County), Mike Shelton (Director, Broomfield), David Allen (Alternate, Broomfield), Laura Weinberg (Director, Golden), Libby Szabo (Director, Jefferson County), Pat O'Connell (Alternate, Jefferson County), Joyce Downing (Director, Northglenn), Shelley Stanley (Alternate, Northglenn), Joe Cirelli (Director, Superior), Emily Hunt (Alternate, Thornton), Bruce Baker (Director, Westminster), Mary Fabisiak (Alternate, Westminster), Jeannette Hillery (Director, League of Women Voters), Sue Vaughan (Alternate, League of Women Voters), Roman Kohler (Rocky Flats Homesteaders), Arthur Widdowfield (Director, Rocky Flats Cold War Museum), Steven Franks.

Stewardship Council staff members and consultants in attendance: David Abelson (Executive Director), Elizabeth Dower (Seter & Vander Wall, P.C), Rik Getty (Technical Program Manager), Erin Rogers (consultant).

Attendees: Scott Surovchak (DOE-LM), Bob Darr (Navarro), Linda Kaiser (Navarro), Carl Spreng (CDPHE), Vera Moritz (EPA), Dave Azure (USFWS), David Lucas (USFWS), Ryan Moehring (USFWS), Cindy Souders (USFWS), Bill Mangle (USFWS contractor), Mimi Mather (Root House), Christine Hawly (Woman Creek Reservoir Authority), Sandy Pennington (Superior Trustee), Rita Dozal (Superior Trustee), Hannah Mullen (Rep. Perlmutter), Stuart Feinhor (Rep. Polis), Carolyn Boller (Friends of the Front Range Wildlife Refuge), Susan Flack (Rocky Flats Museum), Mac West (Rocky Flats Museum), Anne Fenerty (citizen), Michael Ketterer (citizen), LeRoy Moore (Rocky Mountain Peace and Justice Center), Evan Singleton (Gablehouse Granberg, LLC), W. Gale Biggs (citizen), Harvey Nichols (citizen), Jon Lipsky (citizen), Jeff Kellogg (citizen), Ann Parker (citizen), Pat Mellen (citizen), Teresa Kay (citizen), Tom Colwell (citizen), Allen Kennedy (citizen), S. Shank (citizen), Kevin Smyth (citizen), Marc Roberson (citizen), Ted Ziegler (citizen), David Wood (citizen), Kim Griffiths (citizen), Eric Griffiths (citizen).

USFWS Briefing on the Rocky Flats National Wildlife Refuge

USFWS was on hand to provide an overview of the Rocky Flats National Wildlife Refuge, including its organic act, Rocky Flats refuge organizing legislation, and management plans. The briefing was also designed to include an update on the multi-purpose facility that USFWS and DOE were jointly developing.

David Lucas was the presenter. David is the Refuge Manager for the Rocky Mountain Refuge complex which includes the Rocky Mountain Arsenal, Rocky Flats, Two Ponds and some conservation easements near Fort Collins.

As an introduction, David reviewed the national network of Wildlife Refuges, which consists of 200 million acres of land managed for fish and wildlife conservation. He shared that the mission of the USFWS was: "…working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people." David noted that the USFWS was actively involved in public engagement, and believed strongly in the need to connect with future generations.

The Rocky Flats National Wildlife Refuge was created in 2007 and consists of 5,000 acres. The purpose of the refuge is 'to restore and preserve native ecosystems'. In terms of history, the Rocky Flats area was intermittently occupied by Native Americans prior to 1800s. It was used by homesteaders in the late 1800s and the early- to mid-1900s. It later became one of 13 nuclear weapons production facilities in the U.S. The site was added to the EPA's National Priorities List (Superfund List) in 1989. As production slowed, cleanup began and in 2007 the refuge was established.

David noted that all refuges were required to create a Comprehensive Conservation Plan (CCP). A CCP sets the long-range (20 year) management goals, objectives and strategies for each Refuge. At Rocky Flats, this was a multi-year planning effort (2002-2005) that involved extensive public involvement. The CCP guides development of new facilities and visitor opportunities at Rocky Flats.

Planned visitor opportunities at Rocky Flats include:

- Visitor Information / Multipurpose Building
- Hiking, cycling and horseback riding trails
- Connections to the Rocky Mountain Greenway trail system
- Guided tours, hikes and nature programs
- Environmental education opportunities for high school and college-level students
- Signs, maps and interpretive panels

David showed a map depicting planned locations for the various visitor features. He added that the Refuge budget was not large, which meant staff limitations in terms of running specific programs. The USFWS was looking at partnering with other organizations to make some of these things happen. He noted that the Rocky Mountain Greenway was a big endeavor, and included many different entities. He also noted that not all refuges have their own legislation, like Rocky Flats did. The Rocky Flats Refuge takes it guidance from both this site-specific legislation, as well as national legislation pertaining to all Refuges.

David noted that opportunities on the west side of the Refuge would be explored, as the USFWS did not own this land when the CCP was developed. He said a scenic overlook was being constructed off Indiana Avenue. He also mentioned a future overpass and underpass, which would possibly be funded through a grant. David said they were envisioning the visitor building in the northeast corner of the site. He said they had contracted with a company to do surveys and an evaluation of whether this was a good place for the building.

David explained that the Refuge's engagement strategy included these goals:

- Keep interested parties informed
- Share information about what Rocky Flats NWR has to offer
- Increase public, stakeholder, media and elected official support
- Incorporate "lessons learned" from Rocky Mountain Arsenal NWR

He said that the Refuge viewed their audience as those in the middle of the public opinion spectrum, Refuge 'neighbors', and building on existing relationships and attracting new partners.

David noted that the Refuge had also developed 'key messages':

- We are good stewards
- We are listening and sharing information
- We believe Rocky Flats Refuge will offer a safe and enjoyable venue for wildlife-dependent recreation
- Rocky Flats Refuge will be a great wildlife dependent recreation destination and provide a key link in the Rocky Mountain Greenway.

David next reviewed the Refuge's 'Talking Points' on different subjects. In terms of safety, the USFWS stated 'the cleanup of Rocky Flats was a success and that the Refuge is safe for our employees and visitors'. David noted that the USFWS did not make these decisions, and would defer safety questions to CDPHE and EPA.

In terms of history, the Refuge "intends to share the site's full story, including prehistory; homesteading; Cold War/nuclear weapons production; clean-up and remediation; and Refuge establishment & habitat conservation." Regarding habitats and wildlife, the Refuge site has been undisturbed for 30–50 years, and parts of the refuge retain diverse habitat and wildlife including:

- Xeric tallgrass prairie
- 630 plant species, 185 bird species, and numerous other mammal, reptile, amphibian, fish, and insect species
- Preble's Meadow Jumping Mouse

With regard to future visitor uses, David said that the Refuge had clear goals:

- Open to hiking, biking, wildlife observation, wildlife photography
- USFWS and its partners will offer interpretive and environmental education programming
- There will be trails, a visitor facility, and connections to outlying trail systems

David also introduced the concept of the Urban Wildlife Refuge Conservation Program, which strives to make USFWS' programs far more relevant to millions of Americans, 80% of whom live in big and small cities. He noted this was a great match with Rocky Flats since it contains 5,000 acres, striking vistas, and native prairie – all right in the Denver Metro Area. This initiative was intended to help with people becoming disconnected from nature. USFWS is looking at using Urban Refuges as tools to connect with future generations. In terms of connectivity, the Rocky Mountain Greenway will be able to serve as a habitat corridor for migrating wildlife and as a trail corridor for humans.

Next, David reviewed the priority habitat management goals at the Refuge, which were:

- Enhance, restore and monitor wildlife and habitat
- Protect and maintain Preble's meadow jumping mouse habitat
- Control and remove invasive weeds

David explained that fire was a key management tool in conserving and restoring prairie habitat and USFWS would like to use prescribed fire to remove invasive weeds and to improve the prairie habitat. He noted that the prairie will burn, whether it was intentional or not. He added that this was an issue on which the public had already made an impact. USFWS had listened to public concerns, and took a pause on moving forward with plan for a prescribed burn.

David noted that the Refuge would use a variety of communication tools to reach out to the public, including an e-newsletter, website, social media, video, refuge map/brochure/flyers, 'coming soon' sign, tours, sharing sessions, and press releases.

David reviewed a timeline for upcoming activities at the refuge:

- April 2016 - Refine Public Engagement Strategy
- Spring/Summer 2016 - Sharing Sessions w/ neighbors and interested groups
- Spring through Winter 2016 - Digital Outreach (e-newsletter, social media posts) & Monthly refuge tours
- Fall 2016 - Host former Rocky Flats employee day
- Summer 2016 through Fall 2017 - Trail & visitor facility design and construction begins
- Spring through Winter 2017- Digital Outreach & Monthly tours
- Fall/Winter 2017 - Tours of new facilities (RMSC and media)
- Late 2017- Refuge Opening

Also, they may have documents that require public review during this process

David noted that the USFWS had identified their key partners and influencers as local governments, neighbors in Candelas and Leyden Rock, conservation and recreation organizations, and media representatives.

Mike Shelton asked how humans being onsite might affect wildlife. David Lucas said they looked at priority habitats, and then built public use access plans around that. He added that surrogate/indicator species are also used to gauge any impacts. He said that USFWS always maintains the right to further restrict use if they deem it necessary. Mike asked if they had done this at the Arsenal. David said they had not. He added that the elk herd at Rocky Flats is unique because they had not seen people in years, and are somewhat skittish. They retreat to drainages when they feel threatened. The staff will be watching to determine if any changes in use would be needed. Lisa Morzel asked if they would be considering any temporary or seasonal closures for things such as calving. David said they did not think that would be an issue, but they do have the ability to address if needed. He went on to say that he did not think this site would see the same level of visitors as the Arsenal.

Pat O'Connell asked for a copy of the trail map. This will be distributed to the Board. He then asked if they had a visitor estimate for the Refuge. David said they did not have one, but he

guessed there would be about 100,000-200,000 visitors per year. Pat also asked of there would be any fishing allowed in the Refuge. David said no, and also no hunting unless they ran into an excess ungulate population, which might lead to limited hunting. Mark McGoff asked about the trail crossing over Indiana and under Highway 128. He noted that the FLAP grant proposal due May 18, 2016, included funding for those two crossings. Mark said two bridges were being constructed this week, and asked if the other two on the map were planned. David said they were still seeking funding for the other two. Joe Cirelli asked what the purpose of the wildlife crossing proposal was. David said that this was in the Rock Creek drainage, and the culvert was identified as a problem for the endangered Preble's Meadow Jumping Mouse. They had originally envisioned an overpass for the trail, but it appeared that would be cost-prohibitive. The hiking trail was now planned to go under the road, and they hoped to also improve the Preble's drainage, which needed to be separate from the hiking trail.

Bruce Baker said he was looking at a map of the proposed Greenway that was currently on the Refuge website. He said this map showed the trail route staying outside of the Rocky Flats border. David Lucas said that a feasibility study that took place over the past 2-3 years resulted in a change to the proposed route. Megan Davis explained that the goal of the Greenway project was to leverage existing trails when possible. She also emphasized that nothing had been decided as of yet and that the maps were still conceptual at this point. Bruce said that the differences in the maps brought up the matter of trust. He said that the Rocky Flats buffer zone was not part of the original Rocky Flats plan, and was only added because of the spread of contamination. He said that Dr. Johnson who alerted the community of these problems was vilified by government agencies, but was actually proven to be right. Bruce asked if David Lucas could understand why some would be reluctant to trust the 'experts'. David said that of course everyone was entitled to their own opinions. He added that EPA's certification allowed for unrestricted use before this land was transferred to the USFWS. Bruce said that he was still concerned about disturbing the soils when building trails, and that it would be beneficial to have a way to show the public that it was safe. He suggested a competing investigation, and not just experts the agencies paid for, or could be bought. David replied that he did not believe that EPA or CDPHE could be bought, and that everyone could make their own determination about safety. He said the process had been completely transparent.

David Abelson noted that many parts of the proposed Refuge map were reflective of the USFWS wishing to accommodate the wishes and guidance of the original seven governments on the Stewardship Council's predecessor, the Rocky Flats Coalition of Local Governments. He noted that Broomfield, Westminster, Arvada, and Jefferson County were the primary forces behind the type of uses now being implemented, and that the specific trail Bruce was addressing reflected the position of the Westminster and Broomfield council's during the development of the CCP. At the time, the governments based these decisions upon determinations of safety and what would meet the needs of their constituents.

Deb Gardner asked if an Environmental Assessment would be done regarding trail development. David Lucas said they would comply with all federal laws and guidelines. He said that the NEPA requirements would depend on the scope of the project. He added that a full EIS was completed previously for the Refuge. Lisa Morzel asked what kind of geotechnical analyses would be completed regarding construction of the visitor center. David said that whenever they do

construction, they perform various assessments for things such a soils analysis and transportation needs. He said that was underway now, and they would have results in about 2-4 weeks. He said that in this instance one of main things they are looking into is the feasibility of water and electric utilities.

Harvey Nichols addressed his comments to Bruce Baker and the Stewardship Council. He said that the entire site was dusted with plutonium particles as a result of everyday emissions, in addition to the major building fires. Another member of the audience asked if USFWS would make any special efforts during construction in order to mitigate some of the fears regarding the spread of contamination. David Lucas said this would be based on what CDPHE recommended. Carl Spreng with CDPHE said that they would be directed to meet the State of Colorado's "special construction standards," which had been around for several decades. These standards applied to any areas with radiological contamination over 1 pCi/g. They include requirements for weather evaluations, as well as other special techniques. David Lucas added that they would typically employ dust suppression techniques when disturbing soil. Gale Biggs said he heard a story from a Rocky Flats employee about a firetruck that had become so contaminated during the fighting of a fire at Rocky Flats that it was buried onsite. He asked if David Lucas knew about this. David said he did not.

Sandy Pennington commented that the USFWS' efforts did not constitute public engagement. She said true engagement needed to happen before a decision was made. She said that what David Lucas was describing was actually public relations and marketing, but not engagement. She said that they had not asked the public if these actions should be taken at this very dangerous site. She said it was incumbent upon the Stewardship Council to make sure that occurred. Addressing David Abelson, she said it was an old ploy to tell the Board that their predecessors approved these plans. She said that the Greenway discussions had only been going on since 2012, and she had been in office since 2010 and had not been asked to address this issue before. She said that the region did not need these trails, and there was no need to disturb this property. David Lucas emphasized that the intention of Greenway plan was to maximize the use of existing trails, and that the decision to include trails and buildings at the Refuge was made in 2005 during the development of the CCP and thus prior to any Greenway plans. He also explained that the USFWS was not seeking input about whether or not to build trails because that had already been done when the CCP. At this point, they were looking for input on how to best implement the plans that were already developed.

Lisa Morzel said she had been working on these issues since 1996, and noted that she and the City of Boulder was not on the prevailing side in terms of the CCP plan in 2005. She said Boulder had advocated for restoring the lands and leaving them as-is, while others had different views. However, she said she disagreed with Ms. Pennington about the lack of public engagement and supported David Abelson's prior comment that the CCP followed an extensive public engagement process. Lisa explained that there was a very extensive, several-year public process involved in creating the CCP. Sandy Pennington asked Lisa how she would propose that the local governments proceed regarding plans for the Greenway. She said that up until a couple weeks ago, her understanding was that the Greenway would be going around and not through Rocky Flats, and she was struggling with the request to take a position so quickly. Lisa said she did not know if the Stewardship Council would have any impact on these decisions as local

governments were addressing these issues outside of the Stewardship Council. Deb Gardner explained that the original Greenway route that went around Rocky Flats was designed that way because USFWS had not yet begun to implement the CCP at that time. Once the USFWS became engaged and starting making their own plans for trails, the Greenway route evolved to include these trails that were now being planned. She said that each local government needed to make a decision about whether they wanted to be involved in applying for the FLAP grant. She said the grant would enable additional environmental testing in those areas slated for access points.

Lisa Morzel noted that individuals had repeatedly been asking for additional sampling at Rocky Flats, and were not getting any results. She pointed out that the FLAP grant would allow for additional sampling, which would be helpful in terms of addressing the many concerns about contamination. Sandy noted that decisions were looming and asked when and where residents would be engaged regarding the Greenway. Lisa explained that the Rocky Mountain Greenway first came about in early 2012, based on an initiative by President Obama. A Steering Group formed at that point, with the counties as the main players. She said she recently got back involved because of the connection to Boulder. She said there was a public meeting scheduled for May 16 at the Butterfly Pavilion, at which there would be a public comment period. David Lucas interjected that he was not sure there was a public comment period scheduled, but he would make sure this was accommodated on the agenda. He reiterated that plans for Refuge trails dated back to the 2005 CCP, and the Greenway route was only being changed because USFWS was getting closer to implementing its plan for building trails within the Refuge. This was just another way of leveraging existing trails for the Greenway. David Lucas noted that whether or not the Greenway tied into Rocky Flats, those trails in the Refuge were would still be built. Deb Gardner explained that because the plan was to use existing trails for the Greenway, a great deal of the implementation would simply involve putting up signage to mark the route, along with construction of a few connecting trails. She said there would be normal a public engagement planning process for this, and noted that the counties do not have purview within the Refuge. Lisa Morzel noted that the City of Boulder would be discussing the Greenway the following evening. Sandra Pennington said that Boulder County offered no public involvement on the recent decision for the Greenway to intrude onto Rocky Flats.

Laura Weinberg said that she envisioned that the character of the Rocky Flats Refuge would be very different from the Rocky Mountain Arsenal. She believed that surrounding neighbors would be using the Refuge a lot, and that there may not be as many tourists visiting. She asked if the USFWS had any relevant data for usage of nearby trails and impacts that could translate to expected usage of the Refuge. David Lucas agreed that usage would likely be very similar to the designated Open Spaces in the area. He noted that the Refuge would have some different rules and enforcement than Open Space areas, in terms of things such as allowed uses. Steven Franks asked about the scope of the previous NEPA study. David Lucas said that the EIS looked at construction of buildings and trails, among other things. He said there had been millions of samples and corresponding analyses, making the Refuge a very highly characterized area. Bruce Baker asked if they had a plan for parking. David Lucas said this was part of the design process. Bruce asked how much parking was available at the Arsenal. David said there were about 200-300 parking spaces at the Arsenal's visitor center.

Public Comment on Non-LSO Issues

Michael Ketterer introduced himself as a chemistry professor. He said that the area where the trails were being proposed was some of the most plutonium-contaminated land in the United States. He referred to contour maps created by Hardy and Kray in the early 1970's that showed the levels of contamination. He criticized the reported use by the USFWS of Geiger counters. He said that handheld counters could not detect plutonium. He said this was not a meaningful measurement, and he thought it was deceptive. He said plutonium could only be measured through laboratory samples. *A copy of Mr. Ketterer's written comments can be found here: http://rockyflatssc.org/public_comment/Ketterer%20comments%20RFSC%2004April2016.pdf

Harvey Nichols introduced himself as a biology professor. He said it was clear that David Lucas did not understand the health implications of the contamination in the Refuge. Harvey said he had asked for full-scale investigation of USFWS management of the Refuge. He said he was first working with the Department of the Interior's Inspector General. He said he also asked for a National Academy of Sciences investigation through Congressional representatives. He said he was in contact with CDPHE as well, and that there was a need to be very cautious about the Refuge.

Rita Dozal introduced herself as a Trustee for the Town of Superior. She recounted that when she bought her house, she had to sign a document that said she knew the home was within three miles of Rocky Flats, but that she had not heard anything about the site since that time. She said that not much information was presented in a public way. She said she had tried to look at data on websites, but that it was difficult to find cohesive, organized files that explained issues at Rocky Flats. She recommended starting fresh with document planning, and deciding how to come to a decision. She said to make sure the plans move forward in orderly process. She said she read the 2005 NEPA document and it was not clear to her that it allowed for a park environment with trails, buildings and parking lots. She asked where in the NEPA document it said that it was acceptable to do what is now being proposed. Lisa Morzel suggested that Rita attend the Rocky Mountain Greenway meeting on May 16.

LeRoy Moore thanked the speakers for reminding him about the active public participation in 2005. He said that 82% of commenting parties said they did not want the refuge to open. He said that contamination on the DOE lands would be transported onto Refuge lands. He said contamination would be moved by water, burrowing animals, plants bringing it to the surface, and wind. He cautioned that the Refuge was not going to be a safe place. He brought a copy of paper that detailed the genetic dangers of plutonium, and submitted a copy to staff. He said plutonium exposure would cause the loss of ability to reproduce, and that the whole human race could be wiped out with a little plutonium. He said there was no excuse for DOE and the regulators not to know this. *A copy of Mr. Moore's written comments can be found here: http://rockyflatssc.org/public_comment/L%20Moore%204-3-16.pdf

Chair Lisa Morzel made an announcement for the commenters to keep their comments succinct.

Anne Fenerty brought up the planning map that showed the Rocky Mountain Greenway route going around Rocky Flats. She asked what had happened for this drastic change to happen, now

that the Greenway was going to go through the site. She said the agencies were failing the public. She said they knew the dangers. She mentioned a YouTube video that focused on unaccounted-for plutonium within the DOE complex. She asked the Stewardship Council to vote against trails at Rocky Flats.

David Wood introduced himself as a resident of the Candelas neighborhood, and noted that he had a PhD in physics. He encouraged homeowners to contact him to be kept abreast of USFWS developments. He said they were making decisions based on 20-year old data. He said he believed there was a lack of tools to move the discussion forward, and that the effect was confusion about actual risks. He said that the questions about risk were not terribly technical. He said each homeowner must make their own determination about whether it was safe. He said he did his own soil samples before moving into the area, and found no detectable amounts of contamination. He said he logged count rates all around area, and would be happy to share his findings. *A copy of Mr. Wood's written comments can be found here: http://rockyflatssc.org/public_comment/DMWood-Combined.pdf

Jon Lipsky referenced USFWS Director Dan Ashe's testimony before a Congressional panel regarding his commitment to public involvement. Jon said that he did not think that the USFWS would come in and engage in a one-way conversation, but that they did. He said they misled the public by not posted updated trail maps regarding the Greenway. He said that they needed to call Rocky Flats a CERCLA site, not a Legacy site. Lisa Morzel noted that the Stewardship Council invited the USFWS to give this presentation and that there had been two-way discussions happening at this meeting. She said she was appreciative of this, and that it was important that USFWS representatives attend these meetings.

Kim Griffiths introduced herself as a resident of Candelas, with a perimeter lot backing to the Refuge. She said her family did their homework prior to purchasing their home and were very happy with their choice. She said they were very well informed, and knew exactly what we were buying. She said that everyone was entitled to their own opinion, but not their own set of facts. She said she felt that her neighborhood was safe, and that there was more of a risk getting into her car every day. She referenced an earlier comment that the area did not need these trails. She said that Candelas residents feel very strongly that they are needed, as this was one of the amenities that was part of their home purchase decision. She said that new people to this issue could give fresh perspectives, and that she would like to see a de-stigmatization of Rocky Flats. *A copy of Ms. Griffiths' written comments can be found here: http://rockyflatssc.org/public_comment/Kim%20Griffiths%20comment%204-16.pdf

Gale Biggs said he was appointed by Governor Romer in 1989 to a Rocky Flats oversight group, and that he served as Chairman of the air committee. He said the Governor wanted an honest assessment of conditions at Rocky Flats. Gale said their group went into buildings and found that poor management led to high levels of contamination being blown out of the stacks. He said that 60-90% of the plutonium leaving the plant side was from fugitive sources, such as the ground.

Chair Morzel closed the non-LSO meeting at 11:25 am.

RESUMPTION OF LSO MEETING

Chair Morzel resumed the LSO meeting at11:30 am.

Big Picture Review

David Abelson reviewed topics for the next Board meeting, which was scheduled for June 6, 2016. Topics would include the 2015 Stewardship Council audit, the quarterly DOE update, and an overview of the Rocky Flats sampling program. In September, the Board would look at the 2017 budget and work plan and receive another quarterly update from DOE. He brought up the topic of why air sampling had been discontinued at Rocky Flats, and said it was apparent that many had questions about this, so it should be addressed. He said there would most likely not be a strategy for moving forward with OLF until later in the year, or perhaps early 2017, so he did not envision another stand-alone briefing on this topic for a while.

David Allen noted that a previous presentation to the Board on actinide migration had been extremely helpful and said that requesting a repeat of this presentation might serve as a good precursor to the air sampling discussion.

June 6, 2016

Potential Business Items

- Receive 2015 audit

Potential Briefing Items

- DOE quarterly update
- Overview of RFLMA Sampling

September 12, 2016

Potential Business Items

- Initial review of 2017 budget
- Initial review of 2017 work plan

Potential Briefing Items

- DOE quarterly update
- Discontinuance of Air Quality Sampling

Issues to watch:

- Original landfill
- Uranium exceedances
- Plutonium levels at SW027
- Groundwater treatment systems
- Plutonium movement in soil column

Board Roundtable – Big Picture/Additional Questions/Issue Identification

Murph Widdowfield noted that there were no new developments regarding the Rocky Flats Cold War Museum. All of the artifacts were in storage, and no displays were active.

Mark McGoff noted that a ribbon-cutting event was scheduled for June 4th for a portion of the Greenway in Arvada and Westminster south of Standley Lake. The Secretary of the Interior would be in attendance, as well as former Interior Secretary Ken Salazar. He said this connection to the Standley Lake area would allow for hiking from the south of the lake to the north side, as well as around the east side of the lake.

Laura Weinberg commented that she thought it would be a good idea for the Board to review its mission while working on next year's work plan.

Mike Shelton thanked the attendees for their comments. He noted that these were good meetings to learn about the issues, and identify whether or not there were things that the participants felt they should take action on through other channels.

Joe Cirelli noted that Superior was considering whether or not to participate in the land access (FLAP) grant.

Bruce Benson noted previous concerns with the logistics of the meeting room that was being used. He offered the use of a room at Westview Recreation Center that might be more conducive to the Board's needs. David Abelson said he would work with Westminster staff to take a look at the space before the next meeting.

Lisa Morzel also thanked the attendees on behalf of the City of Boulder for their public comments. She invited them to keep coming to the meetings, as well as addressing their own local governments. She also reminded everyone again about the public meeting about the Rocky Mountain Greenway on May 16th, 1 pm at the Butterfly Pavilion in Westminster.

The meeting was adjourned at 12:10 p.m.

Respectfully submitted by Erin Rogers.

Rocky Flats Stewardship Council
Check Detail
March 18 through May 19, 2016

Type	Num	Date	Name	Item	Account	Paid Amount	Original Amount
Check		**03/25/2016**			**CASH-Wells Fargo...**		**-3.50**
					Admin Services-Mis...	-3.50	3.50
TOTAL						-3.50	3.50
Bill Pmt -Check	**1790**	**04/10/2016**	**Crescent Strategie...**		**CASH-Wells Fargo...**		**-7,984.60**
Bill	3/31/...	03/31/2016			Personnel - Contract	-6,435.00	6,435.00
					Telecommunications	-132.59	132.59
					TRAVEL-Local	-62.64	62.64
					Postage	-15.99	15.99
					Supplies	-134.58	134.58
					Subscriptions/Mem...	-488.80	488.80
					Personnel - Contract	-715.00	715.00
TOTAL						-7,984.60	7,984.60
Bill Pmt -Check	**1791**	**04/10/2016**	**Jennifer A. Bohn**		**CASH-Wells Fargo...**		**-427.50**
Bill	16-16	03/31/2016			Accounting Fees	-427.50	427.50
TOTAL						-427.50	427.50
Bill Pmt -Check	**1792**	**04/10/2016**	**Seter & Vander W...**		**CASH-Wells Fargo...**		**-351.00**
Bill	72890	03/31/2016			Attorney Fees	-351.00	351.00
TOTAL						-351.00	351.00
Bill Pmt -Check	**1793**	**04/10/2016**	**The Rogers Group...**		**CASH-Wells Fargo...**		**-575.00**
Bill	3/10/...	02/29/2016			Personnel - Contract	-575.00	575.00
TOTAL						-575.00	575.00
Check	**1794**	**04/10/2016**	**Century Link**		**CASH-Wells Fargo...**		**-27.13**
					Telecommunications	-27.13	27.13
TOTAL						-27.13	27.13
Check	**1795**	**05/09/2016**	**Century Link**		**CASH-Wells Fargo...**		**-27.67**
					Telecommunications	-27.67	27.67
TOTAL						-27.67	27.67
Bill Pmt -Check	**1796**	**05/09/2016**	**Blue Sky Bistro**		**CASH-Wells Fargo...**		**-290.00**
Bill	2297	04/04/2016			Misc Expense-Local...	-290.00	290.00
TOTAL						-290.00	290.00
Bill Pmt -Check	**1797**	**05/09/2016**	**Crescent Strategie...**		**CASH-Wells Fargo...**		**-7,354.74**
Bill	4/30/...	04/30/2016			Personnel - Contract	-6,435.00	6,435.00
					Telecommunications	-132.59	132.59
					TRAVEL-Local	-56.16	56.16
					Postage	-15.99	15.99
					Personnel - Contract	-715.00	715.00
TOTAL						-7,354.74	7,354.74
Bill Pmt -Check	**1798**	**05/09/2016**	**Jennifer A. Bohn**		**CASH-Wells Fargo...**		**-888.25**
Bill	16-30	04/30/2016			Accounting Fees	-888.25	888.25
TOTAL						-888.25	888.25
Bill Pmt -Check	**1799**	**05/09/2016**	**Seter & Vander W...**		**CASH-Wells Fargo...**		**-1,669.62**
Bill	73120	04/30/2016			Attorney Fees	-1,279.62	1,279.62
					Attorney Fees	-390.00	390.00
TOTAL						-1,669.62	1,669.62

Rocky Flats Stewardship Council
Check Detail
March 18 through May 19, 2016

Type	Num	Date	Name	Item	Account	Paid Amount	Original Amount
Bill Pmt -Check	**1800**	**05/09/2016**	**The Hartford**		**CASH-Wells Fargo...**		**-500.00**
Bill	1159...	05/06/2016			Insurance	-500.00	500.00
TOTAL						-500.00	500.00
Bill Pmt -Check	**1801**	**05/09/2016**	**The Rogers Group...**		**CASH-Wells Fargo...**		**-850.00**
Bill	4/28/...	04/28/2016			Personnel - Contract	-425.00	425.00
					Personnel - Contract	-425.00	425.00
TOTAL						-850.00	850.00
Bill Pmt -Check	**1802**	**05/09/2016**	**HUB International**		**CASH-Wells Fargo...**		**-3,385.61**
Bill	0202...	05/09/2016			Insurance	-3,385.61	3,385.61
TOTAL						-3,385.61	3,385.61

ROCKY FLATS STEWARDSHIP COUNCIL

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www.rockyflatssc.org

Jefferson County -- Boulder County -- City and County of Broomfield -- City of Arvada -- City of Boulder
City of Golden -- City of Northglenn -- City of Thornton -- City of Westminster -- Town of Superior
League of Women Voters -- Rocky Flats Cold War Museum -- Rocky Flats Homesteaders
Steven Franks

MEMORANDUM

TO: Board
FROM: David Abelson
SUBJECT: 2015 Financial Audit
DATE: May 21, 2016

Attached for your review is Wagner, Barnes and Griggs' draft 2015 financial audit of the Rocky Flats Stewardship Council. As he has done in past years, Eric Barnes will discuss the audit at the meeting, and will be prepared to answer any questions. He did not find any material deficiencies and issued a clean audit.

The Stewardship Council will need to formally accept the audit at the meeting. If you have any questions for Eric prior to the meeting, please email me and I will forward them to him. The Stewardship Council is not required by either state law or the DOE grant to seek an audit. However, an independent audit is an important check that confirms both the Board and staff are managing the finances in accordance with applicable laws and regulations.

Action Item: Approve motion accepting Stewardship Council's 2015 audit.

Rocky Flats Stewardship Council

FINANCIAL STATEMENTS

With Independent Auditor's Report

December 31, 2015

Rocky Flats Stewardship Council

BASIC FINANCIAL STATEMENTS

December 31, 2015

WAGNER BARNES & GRIGGS, PC

Certified Public Accountants and Business Consultants

INDEPENDENT AUDITOR'S REPORT

To the Board of Directors
Rocky Flats Stewardship Council
Boulder, Colorado

We have audited the accompanying financial statements of the governmental activities and each major fund of Rocky Flats Stewardship Council (the Council) as of and for the year ended December 31, 2015, and the related notes to the financial statements, which collectively comprise the Council's basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express opinions on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

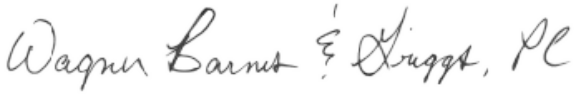
Opinions

In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the governmental activities and each major fund of Rocky Flats Stewardship Council, as of December 31, 2015, and the respective changes in financial position thereof, and the respective budgetary comparison for the General Fund for the year then ended in accordance with accounting principles generally accepted in the United States of America.

12136 W. Bayaud Avenue., Suite 300 · Lakewood, Colorado 80228
303.202.1800 Office · 303.237.0155 Fax · www.wbcpaco.com

Other Matters

Management has omitted management's discussion and analysis that accounting principles generally accepted in the United States of America require to be presented to supplement the basic financial statements. Such missing information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. Our opinion on the basic financial statements is not affected by this missing information.



Lakewood, Colorado
April 11, 2016

ROCKY FLATS STEWARDSHIP COUNCIL

STATEMENT OF NET POSITION

December 31, 2015

	Governmental Activities
ASSETS	
Cash and cash equivalents	$ 192,582
Capital assets, net	405
Total assets	192,987
LIABILITIES	
Accounts payable	9,041
Unearned grant revenue	19,889
Total liabilities	28,930
NET POSITION	
Net investment in capital assets	405
Restricted for grant expenditures	19,889
Unrestricted	143,763
Total net position	$ 164,057

The accompanying Notes to the Financial Statements are an integral part of these statements.

ROCKY FLATS STEWARDSHIP COUNCIL

STATEMENT OF ACTIVITIES

For the Year Ended December 31, 2015

Functions/Programs	Expenses	Program Revenue: Charges for Services	Program Revenue: Operating Grants and Contributions	Program Revenue: Capital Grants and Contributions	Net (Expense) Revenue and Changes in Net Assets: Governmental Activities
Primary government	$ 141,580	$ -	$ 148,050	$ -	$ 6,470
Total primary government	$ 141,580	$ -	$ 148,050	$ -	6,470
General revenues:					
Interest income					27
Total general revenues					27
Change in net position					6,497
Net position - beginning					157,560
Net position - ending					$ 164,057

The accompanying Notes to the Financial Statements are an integral part of these statements.

ROCKY FLATS STEWARDSHIP COUNCIL

BALANCE SHEET
GOVERNMENTAL FUND

December 31, 2015

	General Fund	Total Governmental Funds
ASSETS		
Cash and cash equivalents	$ 192,582	$ 192,582
Total assets	192,582	192,582
LIABILITIES AND FUND BALANCES		
LIABILITIES		
Accounts payable	9,041	9,041
Unearned grant revenue	19,889	19,889
Total liabilities	28,930	28,930
FUND BALANCES		
Restricted for:		
Grant expenditures	19,889	19,889
Unassigned:		
General government	143,763	143,763
Total fund balances	163,652	163,652
Total liabilities and fund balances	$ 192,582	
Amounts reported for governmental activities in the statement of net position are different because:		
Capital assets used in governmental activites are not financial resources and, therefore, are not reported in the funds.		405
Net position of governmental activities		$ 164,057

The accompanying Notes to the Financial Statements are an integral part of these statements.

ROCKY FLATS STEWARDSHIP COUNCIL

STATEMENT OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE
GOVERNMENTAL FUND

For the Year Ended December 31, 2015

	Total General Fund and Governmental Funds
REVENUES	
Grants	$ 138,050
Contributions from local governments	10,000
Interest income	27
Total revenues	148,077
EXPENDITURES	
General government	
Annual Audit	4,000
Accounting Fees	5,044
Attorney Fees	25,101
Administrative Service	987
Equipment	441
Insurance	3,704
Local government	1,440
Personnel - contract	87,550
Postage	1,180
Printing	1,386
Subscriptions/membership dues	1,413
Supplies	569
Telecommunications	1,927
Travel - local	987
Travel - out of state	6,256
Total expenditures	141,985
Net change in fund balances	6,092
Fund balances - beginning	157,560
Fund balances - ending	$ 163,652

The accompanying Notes to the Financial Statements are an integral part of these statements.

ROCKY FLATS STEWARDSHIP COUNCIL

RECONCILIATION OF THE STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCES OF GOVERNMENTAL FUNDS TO THE STATEMENT OF ACTIVITIES

For the Year Ended December 31, 2015

Amounts reported for governmental activities in the statement of activities are different because:

Net change in fund balances - total governmental funds:	$	6,092
Governmental funds report capital outlays as expenditures. In the statement of activities capital outlay is not reported as an expenditure. However, the statement of activities will report as depreciation expense the allocation of the cost of any depreciable asset over the estimated useful life of the asset.		
Capital expenses		442
Depreciation expense		(37)
Change in net position of governmental activities	$	6,497

The accompanying Notes to the Financial Statements are an integral part of these statements.

ROCKY FLATS STEWARDSHIP COUNCIL

STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCE - BUDGET AND ACTUAL - GENERAL FUND

For the Year Ended December 31, 2015

	Original and Final Budget	Actual	Variance with Final Budget Favorable (Unfavorable)
Revenues			
U.S. Department of Energy - Office of Legacy Management	$ 130,000	$ 138,050	$ 8,050
Contributions from local governments	10,000	10,000	-
Carry over - Rocky Flats Coalition of Local Governments	14,800	-	(14,800)
Interest income	-	27	27
Total revenues	154,800	148,077	(6,723)
Expenditures			
General government			
Personnel	93,000	87,550	5,450
Travel	5,700	7,243	(1,543)
Equipment	500	441	59
Supplies	1,200	569	631
Contractual	40,100	36,572	3,528
Insurance	4,000	3,704	296
Postage	1,500	1,180	320
Printing	2,000	1,386	614
Subscriptions/membership dues	2,100	1,413	687
Telecomunications	2,700	1,927	773
Website	2,000	-	2,000
Total expenditures	154,800	141,985	12,815
Net change in fund balance	-	6,092	6,092
Fund balance - beginning of year	141,267	157,560	16,293
Fund balance - end of year	$ 141,267	$ 163,652	$ 22,385

The accompanying Notes to the Financial Statements are an integral part of these statements.

Rocky Flats Stewardship Council

NOTES TO FINANCIAL STATEMENTS

December 31, 2015

Note 1 – Summary of significant accounting policies

A. Reporting entity

The Rocky Flats Stewardship Council (Council) was organized on February 13, 2006 through an Intergovernmental Agreement (IGA) by and among the following governments: the City and County of Broomfield, the Counties of Jefferson and Boulder, the Cities of Arvada, Boulder, Golden, Northglenn, Thornton, and Westminster, and the Town of Superior. All jurisdictions are located adjacent to or near the former U.S. Department of Energy's Rocky Flats weapons plant. All jurisdictions are permanent parties, with continuous representation on the Board of Directors. The Council was organized as the successor organization to the Rocky Flats Coalition of Local Governments (Coalition), also formed through an IGA, which concluded its existence shortly following the organization of the Council, having fulfilled its purpose in connection with the closure of the Rocky Flats Site.

The Council was formed for the purpose of overseeing all post-closure Rocky Flats activities. The legislative and administrative power of the Council is vested with a Board of Directors not to exceed 14 in number. Members are community stakeholder representatives, selected by the remaining Board of Directors upon application, and have a right to appoint a Director to the Board.

Under the terms of the IGA, the status of the Council is to be reviewed periodically by the local governments which are parties to the agreements to determine whether the Council will continue in existence. Also under the terms of the IGA, the Council is established as an "enterprise", as defined by Article X, Section 20 of the Colorado constitution, commonly referred to as the Taxpayer's Bill of Rights, or Tabor (Note 5).

The Council has no employees and all operations and administrative functions are contracted.

The Council follows the Governmental Accounting Standards Board (GASB) accounting pronouncements which provide guidance for determining which governmental activities, organizations and functions should be included within the financial reporting entity. GASB pronouncements set forth the financial accountability of a governmental organization's elected governing body as the basic criterion for including a possible component governmental organization in a primary government's legal entity. Financial accountability includes, but is not limited to, appointment of a voting majority of the organization's governing body, ability to impose its will on the organization, a potential for the organization to provide specific financial benefits or burdens and fiscal dependency.

As of December 31, 2015, no component unit has been identified as reportable to the Council, nor is the Council a component unit of any other primary governmental entity.

B. Government-wide and fund financial statements

The government-wide financial statements include the statement of net position and the statement of activities. These financial statements include all of the activities of the Council. Both statements distinguish between governmental activities, which normally are supported by taxes and intergovernmental revenue, and business-type activities, which rely to a significant extent on fees and charges for support.

The statement of net position reports all financial and capital resources of the Council. The difference between the assets and liabilities of the Council is reported as net position.

The statement of activities demonstrates the degree to which the direct expenses of a given function or segment is offset by program revenues. Direct expenses are those that are clearly identifiable with a specific function or segment. Program revenues include 1) charges to customers or applicants who purchase, use, or directly benefit from goods, services or privileges provided by a given function or segment, and 2) grants and contributions that are restricted to meeting the operational or capital requirements of a particular function or segment. Taxes and other items not properly included among program revenues are reported instead as general revenues.

Separate financial statements are provided for governmental funds. Major individual governmental funds are reported as separate columns in the fund financial statements.

C. Measurement focus, basis of accounting and financial statement presentation

The government-wide financial statements are reported using the *economic resources measurement focus* and the *accrual basis of accounting*. Revenues are recorded when earned and expenses are recorded when a liability is incurred, regardless of the timing of related cash flows. Expenditures for property and equipment are shown as increases in assets.

Governmental fund financial statements are reported using the *current financial resources measurement focus* and the *modified accrual basis of accounting*. Revenues are recognized as soon as they are both measurable and available. Revenues are considered to be available when they are collectible within the current period or soon enough thereafter to pay liabilities of the current period. For this purpose, the government considers revenues to be available if they are

collected within 60 days of the end of the current fiscal period. Expenditures generally are recorded when a liability is incurred, as under accrual accounting.

Eligible grant receipts and interest associated with the current fiscal period are all considered to be susceptible to accrual and so have been recognized as revenues of the current fiscal period. Other revenue items are considered to be measurable and available only when the Council receives cash.

The government reports the following major governmental fund:

> *The general fund* is the Council's primary operating fund. It accounts for all financial resources of the general government.

When both restricted and unrestricted resources are available for use, it is the Council's policy to use restricted resources first, then unrestricted resources as they are needed.

D. Use of estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires Council management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenditures during the reporting period. Actual results could differ from those estimates.

E. Assets, liabilities, and fund equity

1. Deposits and investments

The Council's cash and cash equivalents are considered to be cash on hand, demand deposits and short-term investments with maturities of three months or less.

Investments for the government are reported at fair value.

2. Capital assets

Capital assets, which include furniture and equipment, are reported in the government-wide financial statements. Capital assets are defined by the Council as assets with an initial, individual cost of more than $250. Such assets are recorded at historical cost if purchased or constructed. Donated capital assets are recorded at estimated fair market value at the date of donation.

The cost of normal maintenance and repairs that do not add to the value of the asset or materially extend the life of the asset are not capitalized. Improvements are capitalized and depreciated over the remaining useful lives of the related fixed assets, as applicable. Depreciation expense is computed using the straight-line method for all assets, based on the estimated useful lives of the assets, estimated at 3 years.

3. Fund equity

Fund balance for governmental funds should be reported in classifications that comprise a hierarchy based on the extent to which the government is bound to honor constraints on the specific purposes for which spending can occur. Governmental funds report up to five classifications of fund balance: nonspendable, restricted, committed, assigned, and unassigned. Because circumstances differ among governments, not every government or every governmental fund will present all of these components. The following classifications describe the relative strength of spending constraints:

Non-spendable fund balance – The portion of fund balance that cannot be spent because it is either not in spendable form (such as inventory) or is legally or contractually required to be maintained intact.

Restricted fund balance – The portion of fund balance constrained to being used for a specific purpose by external parties (such as grantors or bondholders), constitutional provisions or enabling legislation.

Committed fund balance – The portion of fund balance constrained for specific purposes according to limitations imposed by the Council's highest level of decision making authority, the Board of Directors, prior to the end of the current fiscal year. The constraint may be removed or changed only through formal action of the Board of Directors.

Assigned fund balance – The portion of fund balance that is constrained by the government's intent to be used for specific purposes, but is neither restricted nor committed. Intent is expressed by the Board of Directors to be used for a specific purpose. Constraints imposed on the use of assigned amounts are more easily removed or modified than those imposed on amounts that are classified as committed.

Unassigned fund balance – The residual portion of fund balance that does not meet any of the above criteria.

If more than one classification of fund balance is available for use when an expenditure is incurred, it is the Council's policy to use the most restrictive classification first.

At December 31, 2015, the Council had $19,889 restricted by grantors (for expenses connected with monitoring of post-closure Rocky Flats activities – see Note 1A above).

The remaining fund balance is considered by the Council to be unassigned. At December 31, 2015, the Council had an unassigned fund balance in the general fund of $143,763.

F. Budgetary information

Annual budgets are adopted on a basis consistent with generally accepted accounting principles for all governmental funds. In accordance with the Colorado State Budget Law, the Council's Board of Directors follows these procedures in establishing the budgetary data reflected in the financial statements:

1. On or before October 15, the Board prepares a proposed operating budget for each fund, based on their respective basis of accounting, for the fiscal year commencing the following January 1. The operating budget includes proposed expenditures and the means of financing them.
2. After considering comments received, the Board approves the budget. The budget is formally adopted by resolution, published, and filed with the state.
3. Before December 31, the expenditures are appropriated for the ensuing year. The appropriation is at the total fund level and lapses at year-end.

Note 2 – Cash and Investments

Cash and investments as of December 31, 2015 are classified in the accompanying statements as follows:

Statement of net position:	
Cash and cash equivalents	$192,582

Deposits with Financial Institutions

Colorado statutes require that the Council use eligible public depositories as defined by the Colorado Public Deposit Protection Act (the Act). Under the Act, amounts on deposit in excess of federal insurance levels must be collateralized. The eligible collateral is determined by the Act and allows the institution to create a single collateral pool for all public funds. The pool is to be maintained by another institution or held in trust for all the uninsured public deposits as a group. The market value of the collateral must be at least equal to 102% of the aggregate uninsured deposits.

The State Regulatory Commissions for banks and financial services are required by Statute to monitor the naming of eligible depositories and reporting of the uninsured deposits and assets maintained in the collateral pools.

At December 31, 2015, all of the Council's deposits were covered by insurance provided by the federal government. The Council was not subject to custodial credit risk at December 31, 2015.

The Council's cash deposits at December 31, 2015 are as follows:

	Carrying Balance	Bank Balance
Deposits with financial institutions	$192,582	$ 192,582
Total cash and cash equivalents	$192,582	$ 192,582

Investments

The Council has not adopted a formal investment policy, however, the Council follows state statutes regarding investments. Colorado revised statutes limit investment maturities to five years or less unless formally approved by the Board of Directors. Such actions are generally associated with a debt service reserve or sinking fund requirements.

Colorado statutes specify investment instruments meeting defined rating and risk criteria in which local governments may invest which include:

- Obligations of the United States and certain U.S. government agencies securities
- Certain international agency securities
- General obligation and revenue bonds of U.S. local government entities
- Bankers' acceptance of certain banks
- Commercial paper
- Local government investment pools
- Guaranteed investment contracts
- Written repurchase agreements collateralized by certain authorized securities
- Certain money market funds

As of December 31, 2015, the Council had no investments.

Note 3 – Capital Assets

An analysis of the changes in capital assets for the year ended December 31, 2015 follows:

	Balance 12/31/14	Additions	Deletions	Balance 12/31/15
Capital assets being depreciated:				
Furniture and equipment	$ 398	$ 442	$ -	$ 840
Total capital assets	398	442	-	840
Accumulated depreciation	(398)	(37)	-	(435)
Capital assets, net	$ -	$ 405	$ -	$ 405

Note 4 – Net position

The Council has net position consisting of three components – net investment in capital assets, restricted, and unrestricted.

Net investment in capital assets consists of capital assets, net of accumulated depreciation. As of December 31, 2015, the Council had $405 net investment in capital assets.

Restricted assets include net position that are restricted for use either externally imposed by creditors, grantors, contributors, or laws and regulations of other governments or imposed by law through constitutional provisions or enabling legislation. As of December 31, 2015, the Council had $19,889 of restricted net position.

As of December 31, 2015, the Council had unrestricted net position of $143,763.

Note 5 - Risk management

The Council is exposed to various risks of loss related to torts, thefts of, damage to, or destruction of assets, errors or omissions, injuries to personnel, or natural disasters. The Council maintains commercial insurance for all risks of loss. Settled claims have not exceeded the commercial insurance coverage limits in any of the past three years.

Note 6 - Concentration

The Council receives the majority of its funding through a grant from the U.S. Department of Energy (DOE). The DOE grant has a current expiration date of February 28, 2017.

Note 7 - Tax, spending and debt limitation

Article X, Section 20 of the Colorado Constitution, referred to as the Taxpayer's Bill of Rights (TABOR), contains tax, spending, revenue, and debt limitations which apply to the State of Colorado and all local governments.

Spending and revenue limits are determined based on the prior year's Fiscal Year Spending adjusted for allowable increases based upon inflation and local growth. Fiscal Year Spending is generally defined as expenditures plus reserve increases with certain exceptions. Revenue in excess of the Fiscal Year Spending limit must be refunded unless the voters approve retention of such revenue.

As an enterprise (Note 1), management believes that the Council is exempt from the provisions of TABOR. However, TABOR is complex and subject to interpretation. Ultimate implementation may depend upon litigation and legislative guidance.

*****

DOE Annual Report

- Cover memo
- Selection of the annual report

CERCLA Five Year Review Briefing

- Cover memo
- Selection of 2012 Five Year Review

ROCKY FLATS STEWARDSHIP COUNCIL

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Jefferson County -- Boulder County -- City and County of Broomfield -- City of Arvada -- City of Boulder
City of Golden -- City of Northglenn -- City of Thornton -- City of Westminster -- Town of Superior
League of Women Voters -- Rocky Flats Cold War Museum -- Rocky Flats Homesteaders
Steven Franks

MEMORANDUM

TO: Stewardship Council Board
FROM: Rik Getty
SUBJECT: Annual Report Briefing
DATE: May 20, 2016

We have scheduled 75 minutes for DOE to present its 2015 annual report. The full report can be found at: http://www.lm.doe.gov/Rocky_Flats/Documents.aspx Sections of that report, including the table of contents, are attached.

Executive Summary – The following are highlights from the annual report:

- Extremely heavy precipitation was recorded in the first two quarters of the year. By the end of July, the site had received 14.76 inches of precipitation. Historically, Rocky Flats receives an average of 12.07 inches of precipitation annually. As a result, groundwater levels, and thus flows into the groundwater treatment systems, were higher in 2015.
- The Original Landfill (OLF) was inspected monthly. In addition, nine weather-related inspections were conducted as a result of the heavy precipitation.
- The Present Landfill (PLF) was inspected quarterly. Nine weather-related inspections were also conducted. No significant problems were observed during these inspections.
- All RFLMA Point of Compliance analyte concentrations/activities remained below reportable levels.
- Reportable 12-month rolling average americium and plutonium were observed during the second half of the year in surface water at RFLMA Point of Evaluation (POE) monitoring station SW027. SW027 is located on the South Interceptor Ditch upstream of Pond C-2. Details regarding the subsequent regulatory consultation and plan to address the reportable condition can be found in Contact Record 2015-05.
- All other RFLMA POE analyte concentrations/activities remained below reportable levels.
- Water monitoring at the Present Landfill Treatment System showed three analytes (arsenic, selenium, and vinyl chloride) detected above the applicable standards.
  - Arsenic and selenium concentrations did not reoccur in subsequent testing.

- Vinyl chloride was detected above the standard in three successive monthly samples. In accordance with the evaluation protocols in RFLMA Attachment 2, Figure 11, "Groundwater Treatment Systems," these consecutive results triggered consultation among the RFLMA Parties. Additional sampling was conducted at NNG01 (outfall of the former PLF Pond area). Vinyl chloride was not detected in the sample, and consequently quarterly sampling was resumed. The consultation is documented in Contact Record 2015-07.

- Wright Water Engineers' report on Uranium movement in water, *Evaluation of Water Quality Variability for Uranium and Other Selected Parameters in Walnut Creek at the Rocky Flats Site*, was posted to the DOE Rocky Flats website on April 9, 2015; it was subsequently updated on September 30, 2015. The study addresses the distribution, transport mechanisms, sources, and composition of uranium, in terms of its natural versus anthropogenic fractions, with a focus on the North and South Walnut Creek drainages. Other water-quality parameters related to the transport of uranium at Rocky Flats are also evaluated. The report is available at http://www.lm.doe.gov/Rocky_Flats/Documents.aspx.
- East Trenches Plume Treatment System (ETPTS) effluent water quality reflected the most dramatic reduction in volatile-organic-compound load ever achieved at this treatment system. This was a result of the completion of the ETPTS Reconfiguration Project in January 2015. This project replaced the passive, zero-valent iron (ZVI)-based treatment system with a solar/battery-powered active treatment system utilizing a proven, commercial air stripper.
- The Mound Site Plume Treatment System (MSPTS) continued to treat groundwater throughout the year. However, the ZVI treatment media has become increasingly clogged and its effectiveness has decreased. As part of the MSPTS Reconfiguration Project, scheduled for the summer of 2016, groundwater will continue to be intercepted by the MSPTS groundwater intercept trench, but then will be pumped to the ETPTS for treatment.
- Treatment by the Solar Ponds Plume Treatment System (SPPTS) was limited throughout much of 2015 due to clogging of the media and plumbing in the concrete structure containing the two original treatment cells (the "Big Box"). The SPPTS Interim Reconfiguration Project, scheduled for construction in 2016, includes removing and disposing of the Big Box contents and converting it to a full-scale, test lagoon for nitrate treatment. This approach is based on the results of the Phase III pilot-scale lagoons.
- Groundwater quality data were obtained for all monitored areas in 2015, including Sentinel well 95299, which has never before produced water for sampling. Groundwater quality and flow were generally consistent with previous years. A reportable condition was identified at well 10304 after data collected in the second and fourth quarters showed concentrations of trichloroethene (TCE). A surface water sample from Woman Creek was subsequently collected, and TCE was not detected. The consultation is documented in Contact Record 2015-10.
- Revegetation monitoring data continued to demonstrate the establishment and sustainability of desirable grassland species.
- 10 contact records were issued in 2015. They can be found at: http://www.lm.doe.gov/Rocky_Flats/ContactRecords.aspx

Please contact me if you have any questions.

LMS/RFS/S13696

Annual Report of Site Surveillance and Maintenance Activities at the Rocky Flats Site, Colorado

Calendar Year 2015

April 2016

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Contents

Figures

Tables

Appendixes

Available on DVD:
Ecology DVD: 2015 Annual RFS Ecology Reports

Abbreviations

AC	alternating current
ac-ft	acre-feet
Ag	silver
Am	americium
AMP	Adaptive Management Plan
ANOVA	Analysis of Variance
AOC	Area of Concern
B	boron
B	Applies to analytical data for organics, indicating that the constituent was also detected in the blank
B<*nnn*>	building number (for example, B371 = Building 371)
Be	beryllium
BMP	best management practice
CAD/ROD	Corrective Action Decision/Record of Decision
Cd	cadmium
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (also known as "Superfund")
cfs	cubic feet per second
COU	Central Operable Unit
Cr	chromium
Cu	copper
CY	calendar year
DCB	dichlorobenzene
DCE	dichloroethene
DER	duplicate error ratio
DG	Discharge Gallery
dh/dl	hydraulic gradient
DNAPL	dense nonaqueous-phase liquid
DOC	dissolved organic carbon
DOE	U.S. Department of Energy
DQA	data quality assessment
DUP	duplicate sample

EPA	U.S. Environmental Protection Agency
EPC	East Perimeter Channel
ERP	Emergency Response Plan for Rocky Flats Site Dams
ESA	Endangered Species Act
ESL	Environmental Sciences Laboratory
ETPTS	East Trenches Plume Treatment System
FC	Functional Channel
FR	*Federal Register*
ft/yr	feet per year
gal	gallons
GIS	geographic information system
gpm	gallons per minute
GWIS	Groundwater Intercept System
HRC	Hydrogen Release Compound
HRT	hydraulic residence time
IA	Industrial Area
IC	institutional control
IHSS	Individual Hazardous Substance Site
IMP	Integrated Monitoring Plan
ITS	Interceptor Trench System
ITSS	Interceptor Trench System Sump
J	For sampling data, a laboratory and/or validation qualifier that indicates an estimated value.
K	hydraulic conductivity
K-H	Kaiser-Hill Company LLC
kg	kilograms
L	liters
LANL	Los Alamos National Laboratory
LBNL	Lawrence Berkeley National Laboratory
LCS	laboratory control sample
LM	Office of Legacy Management
M&M	monitoring and maintenance
M-K	Mann-Kendall
µg	micrograms

µg/L	micrograms per liter (sometimes expressed as ug/L)
mg/L	milligrams per liter
mL	milliliters
MS	matrix spike
MSD	matrix spike duplicate
MSPTS	Mound Site Plume Treatment System
n	effective porosity
N	nitrogen
Ni	nickel
NOIPD	Notice of Intent for Partial Deletion
NPL	National Priorities List
NREL	National Renewable Energy Laboratory
OBP	Oil Burn Pit
OLF	Original Landfill
OU	operable unit
PARCC	precision, accuracy, representativeness, completeness, and comparability
PBA	Programmatic Biological Assessment
PCE	tetrachloroethene
pCi	picocuries
pCi/L	picocuries per liter
PIP	Public Involvement Plan
PLF	Present Landfill
PLFTS	Present Landfill Treatment System
POC	Point of Compliance
POE	Point of Evaluation
POU	Peripheral Operable Unit
PQL	practical quantitation limit
psi	pounds per square inch
Pu	plutonium
PU&D	Property Utilization and Disposal
QA	quality assurance
QC	quality control
R	For sampling data, a laboratory and/or validation qualifier that indicates a value rejected as unusable.

RCRA	Resource Conservation and Recovery Act
Refuge	Rocky Flats National Wildlife Refuge
RER	relative error ratio
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFLMA	*Rocky Flats Legacy Management Agreement*
RFS	Rocky Flats Site
RFSOG	Rocky Flats Site Operations Guide
RNS	rinsate sample
RPD	relative percent difference
S-K	Seasonal-Kendall
Se	selenium
SED	Sitewide Ecological Database
SEEPro	Site Environmental Evaluation for Projects
SEP	Solar Evaporation Pond
SID	South Interceptor Ditch
SPP	Solar Ponds Plume
SPPTS	Solar Ponds Plume Treatment System
STP	Sewage Treatment Plant
SVOC	semivolatile organic compound
TCA	trichloroethane
TCB	trichlorobenzene
TCE	trichloroethene
TOC	total organic carbon
TSS	total suspended solids
U	For sampling data, a laboratory and/or validation qualifier that indicates an analyte not detected at the indicated concentration.
U	uranium
UHSU	upper hydrostratigraphic unit
USFWS	U.S. Fish and Wildlife Service
v	seepage velocity
V&V	validation and verification
VC	vinyl chloride
VOC	volatile organic compound

WQP	water quality parameter
WWTP	Wastewater Treatment Plant
Zn	zinc
ZVI	zero-valent iron

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Executive Summary

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is responsible for implementing the final response action selected in the final *Corrective Action Decision/Record of Decision for Rocky Flats Plant (USDOE) Peripheral Operable Unit and Central Operable Unit* (CAD/ROD) (DOE 2006a) issued September 29, 2006, for the Rocky Flats Site (Site or RFS).

Under the CAD/ROD, two operable units were established within the boundaries of the Rocky Flats property: the Peripheral Operable Unit (POU) and the Central Operable Unit (COU). The COU consolidates all areas of the Site that require additional remedial or corrective actions while also considering practicalities of future land management. The POU includes the remaining, generally unimpacted portions of the Site and surrounds the COU. The response action in the Final CAD/ROD is no action for the POU and institutional and physical controls with continued monitoring for the COU. The CAD/ROD determined that conditions in the POU were suitable for unrestricted use. The U.S. Environmental Protection Agency (EPA) subsequently published a Notice of Partial Deletion from the National Priorities List for the POU on May 25, 2007.

DOE, EPA, and the Colorado Department of Public Health and Environment (CDPHE) have chosen to implement the monitoring and maintenance requirements of the CAD/ROD under, and as described in, the *Rocky Flats Legacy Management Agreement* (RFLMA), executed March 14, 2007, and subsequently revised in 2012 (CDPHE et al. 2012). RFLMA Attachment 2 defines the COU remedy surveillance and maintenance requirements. The requirements include environmental monitoring; maintenance of the erosion controls, access controls (signs), landfill covers, and groundwater treatment systems; and operation of the groundwater treatment systems.

LM prepared and updates the Rocky Flats Site Operations Guide (DOE 2013b). It is the primary document to guide work performed to satisfy the requirements of RFLMA and to implement best management practices at the Site.

This report addresses surveillance and maintenance activities conducted at the Site during calendar year (CY) 2015 (January 1 through December 31, 2015). Highlights of the surveillance and maintenance activities are as follows:

- Extremely heavy precipitation was recorded in CY 2015, specifically in the first two quarters of the year. By the end of July the Site had received 14.76 inches of precipitation. Historically, the Site receives an average of 12.07 inches of precipitation annually. As a result of this heavy precipitation, groundwater levels were higher in 2015, as were flows to the groundwater treatment systems.
- The RFLMA references the use of contact records to document CDPHE approvals of field modifications to implement approved response actions. RFLMA Attachment 2 references the use of contact records to document the outcome of consultation related to addressing any reportable conditions. This report discusses the 10 RFLMA contact records issued in 2015 and the contact record status as of December 31, 2015.
- The Original Landfill (OLF) was inspected monthly during CY 2015. In addition, nine weather-related inspections were also conducted as a result of the heavy precipitation the Site received. Even with all the precipitation during CY 2015 the majority of the OLF and the waste footprint remained stable. In August and September, an interim action project was

performed to smooth cracking and slumping observed in isolated areas. Since completion of the project, the regraded areas have remained in a satisfactory configuration.

- The Present Landfill (PLF) was inspected quarterly during CY 2015. Additionally, as at the OLF, nine weather-related inspections were conducted. No significant problems were observed during these inspections.
- All RFLMA Point of Compliance analyte concentrations/activities remained below reportable levels throughout CY 2015.
- Reportable 12-month rolling average americium and plutonium activities were observed during the second half of CY 2015 in surface water at RFLMA Point of Evaluation (POE) monitoring station SW027, which is located on the South Interceptor Ditch upstream of Pond C-2. Details regarding the subsequent regulatory consultation and plan to address the reportable condition can be found in regulatory Contact Record 2015-05.
- All other RFLMA POE analyte concentrations/activities remained below reportable levels throughout CY 2015.
- The results of statistical evaluations of groundwater quality at the OLF and PLF were similar to the results of these evaluations performed for 2014.
- Water monitoring at the Present Landfill Treatment System during CY 2015 showed three analytes (arsenic, selenium, and vinyl chloride) detected above the applicable standards for individual sample results collected at the system effluent during routine quarterly sampling.

  The observed arsenic and selenium concentrations did not reoccur and RFLMA consultation regarding these analytes was not required during CY 2015.

  Vinyl chloride was detected above the standard in three successive monthly samples following the routine quarterly sample. In accordance with the evaluation protocols in RFLMA Attachment 2, Figure 11, "Groundwater Treatment Systems," these consecutive results triggered consultation among the RFLMA Parties and sampling at location NNG01 (outfall of the former PLF Pond area) for vinyl chloride. NNG01 was sampled on July 27, 2015. Vinyl chloride was not detected in the sample from NNG01, and consequently the PLFSYSEFF quarterly sampling frequency was resumed. The consultation is documented in Contact Record 2015-07.
- The report *Evaluation of Water Quality Variability for Uranium and Other Selected Parameters in Walnut Creek at the Rocky Flats Site* (WWE 2015) was posted to the DOE Legacy Management website on April 9, 2015, and subsequently updated on September 30, 2015. This report summarized the findings from an extensive study initiated to address specific questions regarding uranium in surface water at the RFS. The study addresses the distribution, transport mechanisms, sources, and composition of uranium, in terms of its natural versus anthropogenic fractions, with a focus on the North and South Walnut Creek drainages. Other water-quality parameters related to the transport of uranium at RFS are also evaluated. The report is available at http://www.lm.doe.gov/Rocky_Flats/Documents.aspx.
- East Trenches Plume Treatment System (ETPTS) effluent water quality in 2015 reflected the most dramatic reduction in volatile-organic-compound load ever achieved at this treatment system. This was a result of the completion of the ETPTS Reconfiguration Project in January 2015. This project replaced the passive, zero-valent iron (ZVI)-based treatment

system with a solar/battery-powered active treatment system utilizing a proven, commercial air stripper.

- The Mound Site Plume Treatment System (MSPTS) continued to treat groundwater throughout CY 2015. However, the ZVI treatment media has become increasingly clogged and its effectiveness has decreased. As part of the MSPTS Reconfiguration Project, scheduled for the summer of 2016, groundwater will continue to be intercepted by the MSPTS groundwater intercept trench but then will be pumped to the ETPTS for treatment by the commercial air stripper installed there in 2014–2015.
- Treatment by the Solar Ponds Plume Treatment System (SPPTS) was limited throughout much of 2015 due to clogging of the media and plumbing in the concrete structure containing the two original treatment cells (the "Big Box"). The SPPTS Interim Reconfiguration Project, scheduled for construction in 2016, includes removing and disposing of the Big Box contents and converting it to a full-scale, test lagoon for nitrate treatment. This approach is based on the results of the Phase III pilot-scale lagoons.
- Groundwater quality data were obtained for all monitored areas in 2015 (including Sentinel well 95299, which has never before produced water for sampling). Groundwater quality and flow were generally consistent with previous years. A reportable condition was identified at well 10304 after data collected in the second and fourth quarters of CY 2015 showed concentrations of trichloroethene (TCE) at this well exceeded the RFLMA Attachment 2, Table 1 value. A surface water sample from Woman Creek was subsequently collected; no TCE concentrations were detected in this sample. The consultation is documented in Contact Record 2015-10.
- Revegetation monitoring data continued to demonstrate the establishment and sustainability of desirable grassland species at the Site.
- The annual data quality assessment showed that the Site continues to collect high-quality data sufficient for decision making.

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1.0 Introduction

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is responsible for implementing the final response action selected in the final *Corrective Action Decision/Record of Decision for Rocky Flats Plant (USDOE) Peripheral Operable Unit and Central Operable Unit* (CAD/ROD) (DOE 2006a) issued September 29, 2006, for the Rocky Flats Site, Colorado (Site). Prior to the CAD/ROD, cleanup and closure activities were completed in accordance with the requirements of the *Final Rocky Flats Cleanup Agreement* (RFCA) (CDPHE et al. 1996). Under the CAD/ROD, two operable units (OUs) were established within the boundaries of the Rocky Flats property: the Peripheral Operable Unit (POU) and the Central Operable Unit (COU). The COU consolidates all areas of the Site that require additional remedial or corrective actions while also considering practicalities of future land management. The POU includes the remaining, generally unimpacted portions of the Site and surrounds the COU. The response action in the final CAD/ROD is no action for the POU and institutional and physical controls with continued monitoring for the COU. The Offsite Areas at Rocky Flats, known as OU 3, were addressed under a separate no-action CAD/ROD dated June 3, 1997.

The CAD/RODs for OU 3 and the POU determined that conditions in those OUs were suitable for unrestricted use. As a result, the U.S. Environmental Protection Agency (EPA) published a Notice of Intent for Partial Deletion (NOIPD) of the Rocky Flats Site (also known as the Rocky Flats Plant) from the National Priorities List (NPL) on March 13, 2007 (Volume 72 *Federal Register* page 11313 [72 FR 11313]), which was a proposal to delete the POU and OU 3 from the NPL. The NOIPD was based on the results of the remedial investigations leading to the CAD/ROD no-action remedies being selected for these OUs. The NOIPD stated that, because no hazardous substances occur in the OUs above levels that allow for unlimited use and unrestricted exposure, a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Five-Year Review was no longer required for these OUs. EPA subsequently published a Notice of Partial Deletion from the NPL for the POU and OU 3 on May 25, 2007 (72 FR 29276).

On July 12, 2007, most of the property outside the COU was transferred to the U.S. Department of the Interior for establishment of the Rocky Flats National Wildlife Refuge (also called the Refuge), which is managed by the U.S. Fish and Wildlife Service (USFWS). EPA certified that cleanup and closure of Rocky Flats was complete and that the COU remedy was operating properly and successfully, in accordance with requirements for DOE to transfer land to USFWS for establishing the Refuge. DOE retained the COU and is responsible for implementing the CAD/ROD final response action and for ensuring that it remains protective of human health and the environment. The monitoring, surveillance, and maintenance activities—for which quarterly, annual, and Five-Year Review reports are issued—are prescribed in the *Rocky Flats Legacy Management Agreement* (RFLMA) (CDPHE et al. 2012).

The RFLMA, signed March 14, 2007, and revised in 2012, superseded the RFCA. The RFLMA is a Federal Facility Agreement and Consent Order under CERCLA, the Resource Conservation and Recovery Act (RCRA), and the Colorado Hazardous Waste Act. The RFLMA is signed by DOE, EPA Region 8, and the Colorado Department of Public Health and Environment (CDPHE). The purpose of the RFLMA is to establish the regulatory framework for RFLMA Attachment 2, "Legacy Management Requirements."

RFLMA Attachment 2, Section 7.0, requires DOE to provide reports pertaining to the surveillance and maintenance of the remedy prescribed in the CAD/ROD on a calendar quarter and annual basis. The fourth-quarter report information is to be included in the annual report.

RFLMA Attachment 2, Section 7.2, specifies that the annual reports may include a summary for the previous quarter and shall include the following:

- A discussion of surface-water monitoring data
- A discussion of groundwater monitoring data
- A discussion of groundwater treatment system monitoring data
- A discussion of ecological sampling data
- A description of any adverse biological conditions
- A summary of actions taken in response to reportable conditions
- A summary of maintenance and repairs
- Inspection reports
- Verification of the *Environmental Covenant* (DOE and CDPHE 2011) and an evaluation of the effectiveness of institutional controls (ICs)
- Monitoring and maintenance required by the Original Landfill (OLF) Monitoring Report (see the *U.S. Department of Energy Rocky Flats Site*, *Original Landfill Monitoring and Maintenance Plan* [OLF M&M Plan] [DOE 2009a])
- Monitoring and maintenance required by the Present Landfill (PLF) Monitoring Report (see the *Present Landfill Monitoring and Maintenance Plan and Post-Closure Plan, U.S. Department of Energy Rocky Flats, Colorado, Site* (PLF M&M Plan) [DOE 2014d])
- Assessments of analytical data, including laboratory audits
- Other conditions or actions taken that are pertinent to the continued effectiveness of the remedy

This calendar year (CY) 2015 Annual Report contains the summary for the fourth quarter of CY 2015.

LM prepared and continually updates the Rocky Flats Site Operations Guide (RFSOG) (DOE 2013b) as a framework to guide work at the Site. The RFSOG provides details on the surveillance and maintenance needed to satisfy the requirements of the CAD/ROD as well as best management practices (BMPs) at the Site. The RFSOG explains how DOE will fulfill its long-term surveillance and maintenance obligations at the Site.

While the specific BMPs are not subject to regulation under RFLMA, this annual report includes a discussion of some of the activities related to implementing BMPs to document the information for future reference and to provide a perspective of the work conducted over the year.

1.1 Purpose and Scope

The purpose of this report is to inform the regulatory agencies and stakeholders of the surveillance, monitoring, and maintenance activities being conducted at the Site. LM provides

periodic communications such as this report and communicates through other means such as web-based tools and public meetings.

Topics covered in this annual report include Site operations and maintenance (Section 2.0) and environmental monitoring, including water and ecological monitoring (Section 3.0). Data management, data validation, and an assessment of data quality are also included in Section 3.0. References cited in this report are included in Section 4.0.

Supporting information is provided in a series of appendixes. Appendix A provides the hydrologic data and Appendix B provides the water-quality data. The fourth quarter of CY 2015 landfill inspection forms for the PLF and OLF are included in Appendix C. RFLMA and RFSOG data evaluation flowcharts are provided in Appendix D. Appendix E consists of the Lawrence Berkeley National Laboratory report received for selected site samples, and Appendix F contains the RFLMA contact records issued during CY 2015.

1.2 Background

Surveillance, maintenance, and monitoring activities are conducted according to the RFLMA. The RFLMA incorporates the following plans:

- The OLF M&M Plan (DOE 2009a)
- The PLF M&M Plan (DOE 2014d)

RFLMA Attachment 2 stipulates that DOE employ administrative procedures to control activities in accordance with the ICs and to meet quality assurance and quality control program requirements. Other Site procedures are established to guide work and implement BMPs. These procedures are referenced in the RFSOG and include the *Erosion Control Plan for the Rocky Flats Property Central Operable Unit* (DOE 2007a).

1.3 RFLMA Contact Records

This section provides a summary of the status of activities addressed by RFLMA contact records issued during 2015. RFLMA references the use of contact records to document CDPHE oral approvals of field modifications to implement approved response actions (see RFLMA paragraph 34). Excavation or soil disturbance activities that are subject to ICs must have prior regulatory review and approval pursuant to the Soil Disturbance Review Plan in RFLMA Attachment 2, Section 4.1, and results of consultation will be documented in contact records or written correspondence. RFLMA Attachment 2 also references the use of contact records to document the outcome of consultation related to addressing any reportable conditions (see RFLMA Attachment 2, Section 6.0). Finally, the Rocky Flats Site Public Involvement Plan (PIP), in RFLMA Appendix 2, also provides that a contact record of consultative process discussions between the RFLMA Parties will be made available to the Rocky Flats Stewardship Council and other interested stakeholders as early in the process as is practicable following signature approval by the parties. The PIP process to make contact records available is implemented by posting contact records on the Rocky Flats public website and by promptly notifying stakeholders (by email) that the contact record is posted.

The RFLMA Parties agreed, as documented in RFLMA Contact Record 2007-08, that DOE will, from time to time, document the status of actions or activities in RFLMA contact records and will include the documentation in RFLMA quarterly and/or annual surveillance and maintenance reports for tracking purposes. The RFLMA Parties also agreed that to facilitate the status reporting, contact records should include a short discussion of the anticipated actions or activities to close out the RFLMA contact record. Thus, RFLMA Contact Record 2007-08 and subsequent contact records will include the closeout discussion.

Under certain situations, activities previously approved in a contact record that has been closed out will need to be performed. A simple notification and approval process has been developed for these situations, which is documented in RFLMA Contact Record 2009-05. CDPHE may receive notification of and approve the activities over the phone or in person, with email follow-ups. The notification and approval of such work shall be reported in the next RFLMA annual report, in relation to the contact record that originally covered the work. This protocol is consistent with RFLMA paragraph 34.

Table 1 lists the RFLMA contact records issued in 2015 and their status at the end of 2015. The table also lists contact records that were issued from 2008 to the end of 2014, were discussed in the 2014 Annual Report, and were not closed by the end of 2014, and shows their status at the end of 2015. The table also lists email approval of activities previously covered by closed-out contact records. Appendix F contains copies of the 2015 contact records.

1.4 RFLMA Modifications

There were no modifications or proposed modifications to RFLMA Attachment 2 during 2015. There is an outstanding minor modification to RFLMA Attachment 2 from 2014 which was proposed and approved in Contact Record 2014-02. This minor modification removed sampling locations GS01 and GS03 from the text, tables, and figures for clarity and simplicity. This 2014-approved change will be included the next time RFLMA Attachment 2 is modified.

Table 1. Status of RFLMA Contact Records

Contact Record No.	Subject	Approval Date	Status as of December 31, 2015
2015-01	Reportable condition for uranium 12-month rolling average at POC WALPOC (superseded 2014-10)	1/14/2015	A geochemistry evaluation of water quality variability for uranium in Walnut Creek was performed by a qualified subcontractor. The report of this evaluation was posted on the Rocky Flats website on September 30, 2015. Complete.
2015-02	Soil Disturbance Review Plan for Shed PV upgrades	4/20/2015	Complete.
2015-03	OLF Immediate Action	5/26/2015	Complete.
2015-04	MSPTS reconfiguration conceptual approach	7/8/2015	Design should be completed in spring 2016 and construction completed in late summer 2016.
2015-05	Reportable condition for plutonium 12-month rolling average at POE SW027	7/8/2015	Most of the proposed erosion and water management control methods have been implemented. The remaining erosion control methods will be implemented in 2016. Because of low or no flows, no sample has been retrieved from SW027 since the reportable condition.
2015-06	OLF Interim Action Implementation with Soil Disturbance Review Plan	7/28/2015	Complete.
2015-07	PLFTS vinyl chloride consultation	8/31/2015	Complete.
2015-08	SPPTS interim design and implementation	9/8/2015	Design should be completed in spring 2016 and construction completed in summer 2016.
2015-09	Soil Disturbance Review Plan for SPPTS interim configuration	12/7/2015	Design should be completed in spring 2016 and construction completed in summer 2016.
2015-10	AOC Well 10304 Reportable Condition	12/16/2015	Validated results from a surface water sample collected from Woman Creek downgradient of well 10304 (location SW10200) indicated all volatile organic compounds were below RFLMA Attachment 2 levels. The next scheduled sampling of the well is second quarter of CY 2016.
2014-02	Minor modification of RFLMA Attachment 2, “Legacy Management Requirements”	1/30/2014	Contact record will be closed when the identified minor modifications to RFLMA Attachment 2 are incorporated into an approved revision.
2014-04	ETPTS reconfiguration and soil disturbance final approval	2/19/2014	Complete.
2014-05	Reportable condition for evaluation purposes of uranium at POC WALPOC	4/8/2014	A geochemistry evaluation of water quality variability for uranium in Walnut Creek was performed by a qualified subcontractor. The report of this evaluation was posted on the Rocky Flats website on September 30, 2015. Complete.
2014-07	Abandonment of Sentinel well 88104	7/21/2014	Complete.

Table 1 (continued). Status of RFLMA Contact Records

Contact Record No.	Subject	Approval Date	Status as of December 31, 2015
2014-09	OLF East Perimeter Channel (EPC) Soil Disturbance Review Plan update for regrading the EPC at the OLF	10/6/2014	Complete.
2013-02	Reportable condition at the OLF	10/21/2013	Construction was completed in January 2015. Because there was additional movement in approximately the same location in the EPC during spring 2015, this reportable condition will remain open until additional evaluations of corrective action alternatives are complete and the preferred alternative is implemented. Contact record will be closed when the post-construction reseeding has been performed and post-construction erosion controls are in place after implementation of the selected alternative.
2013-03	Soil Disturbance Review Plan for regrading the EPC and associated diversion berms at the OLF	11/22/2013	Complete.
2011-04	Reportable condition for uranium at POE GS10	7/8/2011	A geochemistry evaluation of water quality variability for uranium in Walnut Creek was performed by a qualified subcontractor. The report of this evaluation was posted on the Rocky Flats website on September 30, 2015. Complete.
2011-05	Update for reportable condition for uranium at POE GS10	10/4/2011	A geochemistry evaluation of water quality variability for uranium in Walnut Creek was performed by a qualified subcontractor. The report of this evaluation was posted on the Rocky Flats website on September 30, 2015. Complete.
2011-08	Reportable condition for americium-241 at POE GS10	12/23/2011	Contact record serves as the plan and schedule for the evaluation of the reportable condition and will be closed when the evaluation is completed.
2009-01	Phase II and III upgrades to the SPPTS	2/17/2009	Construction and post-construction revegetation and erosion controls are in place. Optimization of the upgrades and monitoring is ongoing. Contact record will be closed when testing is completed and as-built drawings are completed.
2008-06	Management of intercepted groundwater during SPPTS repair or maintenance activities	7/3/2008	Actions continuing.

Abbreviations:
EPC = East Perimeter Channel; ETPTS = East Trenches Plume Treatment System; MSPTS = Mound Site Plume Treatment System; PLFTS = Present Landfill Treatment System; POC = Point of Compliance; POE = Point of Evaluation; PV = photovoltaic; SPPTS = Solar Ponds Plume Treatment System

2.0 Site Operations and Maintenance

2.1 Annual Site Inspection

The Site must be inspected annually for evidence of significant erosion and IC violations, in accordance with RFLMA Attachment 2, Sections 5.3.4 and 5.3.6. The 2015 inspection was conducted on March 17, 2015, and reported in the Rocky Flats Site *Quarterly Report of Site Surveillance and Maintenance Activities, First Quarter Calendar Year 2015* (DOE 2015d).

The inspection includes observations associated with the following condition categories:

- Evidence of significant erosion in the COU and evaluation of the proximity of significant erosion to subsurface features in RFLMA Attachment 2, Figures 3 and 4. This monitoring includes visual observation for precursor evidence of significant erosion (e.g., cracks, rills, slumping, subsidence, and sediment deposition).
- The effectiveness of ICs, as determined by any evidence of violation.
- Evidence of adverse biological conditions, such as unexpected morbidity or mortality, observed during the inspection and monitoring activities.

As part of the IC inspection, the Environmental Covenant's presence in the Administrative Record and in Jefferson County records was verified. This verification is required annually. In addition, physical controls (signs placed along the COU fence) were also inspected quarterly as required.

Marker flags were placed where conditions showed evidence of the three condition categories listed above, to track their location for follow-up by Site subject matter experts. Several areas were noted as having evidence of erosion and possible depressions, which were minor and very limited in area. The inspection forms and maps are included in the quarterly report for the first quarter of CY 2015 (DOE 2015d).

Most inspection observations were related to metal debris on the surface or trash that was either picked up or marked for subsequent removal and pickup. Rocky Flats field operations subject matter experts visited the areas to determine if any observations were significant or required repairs and, additionally, to collect debris. All items were closed out in the Site Observation Log.

No evidence of violations of ICs or physical controls was observed.

No adverse biological conditions were noted during the inspection.

2.2 Pond Operations

Three constructed ponds collect and manage surface-water runoff at the Site. The ponds are A-4 in North Walnut Creek, B-5 in South Walnut Creek, and C-2 near and alongside of Woman Creek. Ponds A-4, B-5, and C-2 are referred to as "terminal ponds" because they were the farthest downstream ponds in their respective drainages, but now they are the only constructed ponds in those drainages. All three terminal ponds were operated in a flow-through configuration for all of CY 2015.

Routine dam inspections, pond-level measurements, and piezometer measurements were performed as scheduled during the year. Annual dam mowing and vegetation removal was completed in October. Annual monument-movement surveys were performed in July. Semiannual inclinometer readings were performed as scheduled in June and December.

In compliance with the State of Colorado Rules and Regulations for Dam Safety and Dam Construction, a registered professional engineer periodically conducts a formal dam safety inspection for Dams A-4, B-5, and C-2.

2.3 Landfills

The 2015 results of inspections, monitoring data, and maintenance activities for the PLF and OLF are provided below.

2.3.1 Present Landfill

The PLF consists of an approximately 22-acre engineered RCRA Subtitle C–compliant cover over a former sanitary and construction debris landfill. A diversion channel surrounds the landfill and diverts storm-water runoff away from the landfill to No Name Gulch. The landfill has a passive seep interception and treatment system (the Present Landfill Treatment System [PLFTS]) installed to treat landfill seep water and Groundwater Intercept System (GWIS) water that discharges into the former Landfill Pond area. A passive gas extraction system is also built into the landfill to let subsurface gas vent to the atmosphere.

Subsidence and consolidation at the PLF is monitored by visually inspecting the surface of the landfill cover for cracks, depressions, heaving, and sinkholes. The landfill final construction site conditions are used as a baseline for comparisons made during Site inspections. In addition to the visual inspection, settlement monuments are used to evaluate the actual settlement at specific locations compared to the expected settlement calculated in the final design. Nine settlement monuments were installed across the top of the landfill cap, and an additional six monuments are located on the east face of the landfill. The monuments were monitored quarterly for the first year and annually thereafter.

Inspections and monitoring tasks follow the format and protocol established in the PLF M&M Plan and include groundwater and surface-water monitoring, as well as monitoring subsidence and consolidation, slope stability, soil cover, storm-water management structures, and erosion in surrounding features. This monitoring is conducted so that corrective actions can be taken in a timely manner.

2.3.1.1 Inspection Results

Four quarterly inspections were performed at the PLF in CY 2015. Additionally, nine weather-related inspections were conducted throughout CY 2015. The inspection process followed the format and protocol established in the PLF M&M Plan. No significant problems were observed during these inspections. The fourth quarter inspection was performed on November 24, 2015. Appendix C contains the landfill inspection forms for the fourth quarter of CY 2015; earlier 2015 inspection forms are included in the applicable quarterly reports.

PLF area surface-water and groundwater monitoring, and operation of the PLFTS, is covered in those respective sections of this report.

2.3.1.2 Slumps

On February 13, 2007, a slump was discovered on the south-facing hillside just east of the PLF. The slump is not on the PLF, and engineering review determined that it does not impact the PLF cover. The slump was likely caused by heavy snow conditions and influenced by the post-closure lower water levels in the Landfill Pond. Therefore, regrading the slump is not necessary. The higher than normal precipitation in early CY 2015 caused additional movement of the hillside; areas showing movement now extend farther north. This area will continue to be monitored to determine whether the slump might impact the PLF.

2.3.1.3 Settlement Monuments

The annual settlement monument survey was completed on December 9, 2015. Results of the survey indicate that settling at each monument does not exceed expected settlement calculated in the final design and therefore does not trigger any maintenance activity under the PLF M&M Plan.

2.3.2 Original Landfill

The OLF consists of an approximately 20-acre soil cover over a former solid sanitary and construction debris landfill. The final cover consists of a 2-foot-thick Rocky Flats Alluvium soil cover that was constructed over both a regraded surface and a buttress fill and then revegetated. The original surface was regraded to provide a consistent slope. A 20-foot-high, 1,000-foot-long soil buttress was placed at the toe of the landfill. Erosion is controlled by a series of diversion berms that carry storm-water runoff away from the cover to channels on the east and west perimeter of the cover.

The OLF is inspected monthly in accordance with the OLF M&M Plan (DOE 2009a). In addition, as a best management practice, the OLF was inspected weekly throughout CY 2015.

2.3.2.1 Inspection Results

Twelve monthly inspections were performed at the OLF in CY 2015. Additionally, nine weather-related inspections were conducted due to higher than normal amounts of precipitation received on the Site by the end of July. The inspection process followed the format and protocol established in the OLF M&M Plan. The majority of the OLF remained stable throughout CY 2015 even with the higher than normal precipitation. In the first quarter of CY 2015, cracking, slumping, and uplift were noted on the east edge of the OLF and included the East Perimeter Channel (EPC). The majority of the observed movement was outside of the landfill waste footprint. Cracks were filled as required by the M&M Plan.

During the second quarter, slumping on the eastern edge of the landfill and in the EPC continued. A new crack was discovered on the west side running from the West Perimeter Channel to Berm 1 and down toward Berm 2. Where feasible, cracks were filled by hand and machinery was

used to restore the flow of water off the cover and to stop water infiltration into surface soils. Temporary drain pipes were installed in May through the berms on the east edge to divert water away from the affected area. Some minor ponding was also discovered and small channels were created by hand to drain water to the EPC.

During the third quarter additional movement was observed on both the east and west edge; however, it was minor compared to the movement observed in the first two quarters. Figure 1 depicts the locations of the observed cracking and slumping in 2015.

In August and September an interim action project was performed to smooth the cracking and slumping in the affected areas. Two areas, located on the eastern and northwestern edges of the landfill, primarily outside the waste footprint and totaling about four acres, were regraded during the project. Upon completion of the project, the berm channels were again functional, thereby facilitating water runoff from the cover. In addition, all cracking was successfully filled in. (Refer to the CY 2015 quarterly reports for more information [DOE 2015d, 2015e, 2016].)

Appendix C contains the landfill inspection forms for the fourth quarter of CY 2015; earlier 2015 inspections forms are included in the applicable quarterly reports. Inspections during the fourth quarter were performed on October 21, November 24, and December 28. Since completion of the interim action project in September the regraded areas have remained in a satisfactory configuration. No movement was noted in the fourth quarter. Most of the landfill area and cover remained stable throughout CY 2015.

Small mammal (vole) trails were discovered on the OLF during CY 2015. Several burrows were also encountered on the landfill. The majority of the burrow holes were located on the west side outside of the waste footprint and were continually monitored to ensure they did not expand in size or quantity. The holes were small, showed no signs of recent activity, and were not considered to pose a threat to the integrity of the OLF. By the end of CY 2015, the holes were no longer noticeable.

OLF area surface-water and groundwater monitoring is covered in those respective sections of this report.

2.3.2.2 Settlement Monuments

The OLF settlement monuments were surveyed in March, June, September, and December 2015. Figure 1 includes the locations of the settlement monuments. Survey data indicate that settling at monuments E and F exceeded the expected, calculated settling in the second quarter. Settlement of 0.94 foot was observed at monument G, which had no previous calculated maximum. These monuments were located in areas where slumping occurred. The surrounding soils were compacted and graded during the interim action project. Very minor movement (less than 0.03 foot) was observed at all settlement monuments during the December survey. The minor settlement observed in the fourth quarter did not trigger any maintenance activity under the OLF M&M Plan.

Figure 1. Original Landfill Observed Surface Cracks

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2.3.2.3 Geotechnical Evaluation

DOE requested a geotechnical engineering review and evaluation of documents, design concepts, and mitigation procedures related to the OLF. The purpose of the review was to evaluate previous design decisions and current observations to provide options and recommendations for a long-term stabilization plan for the OLF. While an interim measure was completed in September, further evaluation was needed to select a more permanent response for the OLF hillside. The evaluation began in fourth quarter 2015 and is ongoing.

2.3.2.4 Precipitation Response Repairs

Heavy precipitation was recorded throughout CY 2015, specifically in the first two quarters of the year. By the end of July the site had received 14.76 inches of precipitation, calculated using the averages from 10 rain gauges located across the site at surface water locations. (Calculating the average of all the rain gauges gives a more accurate precipitation total for sitewide accumulation.) Historically, the Site receives an average of 12.07 inches of precipitation annually. For reference, the National Renewable Energy Laboratory, adjacent to the northwest corner of the Site, recorded 27.92 inches of precipitation by the end of July. This large amount of rain and snowfall directly affected the groundwater table in the vicinity of the OLF; this is discussed further in Section 3.1.3.5. This led to cracking and slumping throughout the first three quarters of CY 2015 as discussed in the reports for those quarters.

The precipitation events led to unusually high groundwater volumes that, in turn, have destabilized soils in some areas of the landfill along the eastern and northwestern edges. Slumping and cracking were observed on the eastern edge of the OLF cover, from berm 4 south to below berm 7. Additionally, the EPC and the west side between berms 1 and 2 also showed these same signs of distress. Figure 1 shows the cracks, by date, on the edge of the OLF from CY 2015, measured with a GPS unit.

Localized instability of the EPC first occurred as the result of the rain event from September 9 through September 16, 2013, and was identified as a reportable condition in Contact Record 2013-02, dated September 18, 2013. A project to address slope stability in the EPC and surrounding area was originally scheduled for completion in December 2013 but was rescheduled to the summer of 2014 because the soil was either frozen or too wet to complete the project. The proposed modifications are described and approved in Contact Record 2013-03, "Soil Disturbance Review Plan (SDRP) for Regrading the East Perimeter Channel (EPC) and Associated Diversion Berms at the Original Landfill (OLF)." CDPHE approved Contact Record 2013-03 on November 22, 2013, and the final grading plan on December 4, 2013. Because of the additional movement in the EPC and continued minor cracking near the edge of the landfill area, DOE reevaluated the approved design before implementation. Changes to the approved designed are documented in Contact Record 2014-09. Construction began in October 2014. The efforts to repair, reconfigure, and stabilize the EPC that are listed in Contact Record 2013-03 and modified in Contact Record 2014-09 were completed in February 2015.

Contact Record 2015-03 was generated on May 13, 2015, and approved May 26, 2015, to create an immediate response to the slumping and cracking resulting from the extended precipitation events in an effort to minimize the effects of water on the OLF cover. DOE notified CDPHE and

EPA on May 13, 2015, that the reportable condition had continued at the OLF from precipitation events from September 2013 (described above). DOE, CDPHE, and EPA personnel toured the area on May 14 to start the consultative process to develop a proposed course of action. During the walkdown of the EPC and OLF cover, DOE and CDPHE representatives determined that immediate action was warranted to get the water off of, or out of, the EPC and OLF cover. Excavation to depths greater than 3 feet was required to effectively provide runoff of surface water and investigate the east subsurface drain for potential issues. In addition, minor regrading of the surface and berm repair was necessary to achieve proper water runoff. Work initiated immediately after the walkdown. The immediate action improved drainage of water on the surface of the OLF.

Prior to the OLF Regrade and Berm Repair project, Contact Record 2015-06 was proposed by DOE to CDPHE and EPA on July 22, 2015. The purpose of the contact record was to reestablish surface water management on portions of the OLF. The contact record was approved on July 28, 2015. The project was successfully completed on September 22, 2015 (Figure 2). Following completion, no further signs of movement, or distress, have been observed.

2.3.2.5 Inclinometers

Seven inclinometers were installed in boreholes at the OLF in 2008 as part of the geotechnical investigation (Figure 1). Movement of the inclinometers has been monitored approximately monthly since installation. During CY 2015, the inclinometers were monitored on January 29, March 11, March 26, April 30, and May 28, 2015. The data were no longer reliable because the majority of the inclinometers were broken as of May 2015. The OLF M&M Plan states that once an inclinometer tube breaks, it will no longer be monitored. On June 5, 2015, CHPHE and EPA agreed with DOE to discontinue monitoring the inclinometers on the OLF.

2.4 Former Building Area Inspections

Former building areas are routinely inspected (i.e., quarterly and weather-related inspections) for evidence of subsidence. These areas include former Buildings 371, 771, 881, and 991. Subsidences ranging in size from 1 to 8 feet in width and from 1 to 5 feet in depth were observed in the area of former Buildings 771, 881, and 991 during CY 2015. These areas were filled with Rocky Flats Alluvium and graded smooth shortly after discovery.

Figure 2. OLF Regrade and Berm Repair Project

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2.5 Site Road Maintenance

Access to different areas of the Site is provided by established gravel roadways and ATV paths; these are typically maintained on an annual basis. During the early months of CY 2015, the Site experienced higher-than-normal precipitation that caused many of the roadways to become eroded and in some areas impassable due to 1–2 foot ruts. The Site Roads Project (performed in the fourth quarter) to perform maintenance included repairs to eroded roads. The repairs required adding aggregates from local quarries. Heavy equipment was used to place and compact the road repair sections. Site roads are continually monitored throughout the year and after significant weather events to ensure safe passage of Site personnel for routine operations.

2.6 Monitoring Well Maintenance

2.6.1 Well Redevelopment

Precipitation received in 2015 was well above average (Section 3.1.3.4). The resulting elevated water levels in monitoring wells created optimal conditions for well redevelopment. Well redevelopment is a routine maintenance activity that helps keep wells functional by removing fines that can fill the well casing and accumulate in the filter pack, conditioning the borehole and geologic formation at the screened interval of the well, and cleaning the well components themselves (such as slots in the screened interval). Results may include lower turbidity and improved well yield. It is a routine activity that is not typically mentioned, but discussion is included in this report because the redevelopment effort in 2015 targeted all wells.

Well redevelopment activities began in July. The first step of the process was to remove any dedicated equipment from the well. A surge block (created from a suitable length of rigid tubing and a bailer) was then forcefully lowered and raised through the water column in the well for several minutes to suspend any sand and particulates that had accumulated over time. After surging, water was removed from the well with a small pump or bailer, along with any sediment or other particulates. After each water-removal cycle, the well was left to recharge for several minutes, and the process was then repeated. The turbidity and water level were measured periodically to evaluate progress. When well redevelopment was deemed complete or the well no longer recharged adequately to support continuation, the water level and total depth of the well were measured. Any dedicated equipment that had been removed was decontaminated and reinstalled in the well. All of the water purged from the wells was disposed of following purge water disposition procedures.

All but three of the RFLMA wells were redeveloped over a 9-week period. Access issues prevented redevelopment of the remaining wells. Some wells were visited and worked multiple times; wells with 1-inch or 4-inch diameters were not revisited. Table 2 summarizes well redevelopment information, including the date of redevelopment (which can be useful when inspecting hydrographs, as discussed in Section 3.1.3.5) and the total volume of water purged from the well. Many of the wells that were redeveloped subsequently showed an improved recharge rate. Although not all redeveloped wells were scheduled for sampling during the subsequent sampling event, many that were sampled produced water with lower turbidity. The effects on water levels due to this activity are discussed further in the text on hydrographs (Section 3.1.3.5).

Table 2. Summary of 2015 Well Redevelopment Activities

Well ID	Date of Redevelopment	Total Volume Purged (gallons)	Did Well Dewater?	Well ID	Date of Redevelopment	Total Volume Purged (gallons)	Did Well Dewater?
00191	8/4/2015	50	no	55905	8/4/2015	80	yes
00193	9/2/2015	20	yes	56305	7/30/2015	42	no
00203	9/22/2015	2	yes	70099	8/6/2015	4	no
00491	9/24/2015	10	no	70193	9/14/2015	22	yes
00797	7/22/2015	24	yes	70393	9/14/2015	20	yes
00897	8/26/2015	13	yes	70693	9/14/2015	50	no
00997	8/19/2015	4	yes	70705	8/3/2015	50	yes
3687	8/6/2015	42	no	73005	9/15/2015	5	yes
03991	8/10/2015	50	no	73105	9/15/2015	16	yes
4087	8/11/2015	13	yes	73205	9/15/2015	16	yes
04091	8/10/2015	3	no	79102	8/26/2015	25	yes
05691	8/31/2015	25	no	79202	8/26/2015	25	no
07391	7/23/2015	20	no	79302	8/26/2015	46	yes
10304	7/28/2015	50	no	79402	8/11/2015	10	yes
10594	9/9/2015	2	yes	79502	8/20/2015	14	yes
11104	Inaccessible[a]	0	no	79605	8/12/2015	14	yes
11502	8/27/2015	25	no	80005	9/8/2015	10	no
15699	8/20/2015	2	no	80105	9/8/2015	20	no
18199	8/24/2015	28	yes	80205	9/8/2015	15	no
20205	8/24/2015	15	no	88205	7/30/2015	50	no
20505	7/29/2015	13	no	89104	8/18/2015	13.5	no
20705	7/29/2015	50	no	90299	9/23/2015	5	yes
20902	9/15/2015	10	yes	90399	9/23/2015	13	yes
21505	9/17/2015	2	yes	90402	8/12/2015	16	no
22205	9/2/2015	5	yes	90804	8/25/2015	9	no
22996	8/18/2015	9	no	91105	9/22/2015	5	no
23296	7/28/2015	25	no	91203	9/22/2015	12	no
30002	9/23/2015	1.5	yes	91305	7/21/2015	16	yes
30900	9/21/2015	3	yes	95099	8/4/2015	6.5	no
33502	9/21/2015	17	no	95199	8/4/2015	6	no
33604	9/17/2015	3	yes	95299	7/28/2015	3	yes
33711	9/17/2015	12	no	99305	8/6/2015	18	no
33905	9/17/2015	7	no	99405	8/13/2015	19	no
37405	8/27/2015	25	yes	891WEL	8/19/2015	46	no
37505	8/27/2015	25	no	B206989	9/3/2015	15	yes
37705	9/9/2015	13	no	B210489	Inaccessible[a]	0	no
40005	9/1/2015	50	no	P114689	8/13/2015	31	no
40205	8/31/2015	85	yes	P115589	7/27/2015	14	yes
40305	8/24/2015	50	no	P208989	9/3/2015	17	yes

Table 2 (continued). Summary of 2015 Well Redevelopment Activities

Well ID	Date of Redevelopment	Total Volume Purged (gallons)	Did Well Dewater?	Well ID	Date of Redevelopment	Total Volume Purged (gallons)	Did Well Dewater?
42505	9/10/2015	6.5	yes	P210089	Inaccessible[a]	0	no
45608	7/27/2015	45+	no	P210189	9/2/2015	50	yes
50299	7/22/2015	16.5	yes	P416589	9/21/2015	14	yes
51605	8/18/2015	9	no	P416889	8/27/2015	25	no
52505	7/29/2015	25	yes	P419689	8/13/2015	17	yes

Notes:
[a] Wells deemed inaccessible had biological hazards (wasps) or could not be reached due to temporary obstructions.

2.7 Groundwater Plume Treatment Systems Maintenance

Rocky Flats utilizes four groundwater treatment systems designed to reduce contaminant load before the water is discharged. The four systems are the Mound Site Plume Treatment System (MSPTS), the East Trenches Plume Treatment System (ETPTS), the Solar Ponds Plume Treatment System (SPPTS), and the PLFTS. Each of these was designed and installed to passively collect and treat groundwater. Before the Site closed, only the SPPTS had been modified to include an active—i.e., powered—component. However, since Site closure, additional active components have been required to meet the more stringent post-closure treatment objectives. Additional active components were first added to the SPPTS. In 2011 the MSPTS received active components, and in early 2013 those components were bolstered and similar components were installed at the ETPTS. In 2014–2015 the ETPTS was reconfigured to incorporate a fully active treatment approach. (The ETPTS Reconfiguration Project is described in greater detail in Section 3.1.5.3.) Only the PLFTS remains fully passive.

This section focuses on the maintenance and operation of the MSPTS, ETPTS, and SPPTS during CY 2015. Additional information is provided in the previous quarterly reports from 2015 (DOE 2015d, 2015e, 2016).

Details of the monitoring of the treatment systems, including the PLFTS, for the fourth quarter of 2015 are presented in Section 3.1.2.8, and interpretations related to system operation and the corresponding contaminant plumes are provided in Section 3.1.5.3.

2.7.1 Mound Site Plume Treatment System

The MSPTS treated groundwater throughout the year. Maintenance activities were conducted as necessary and small adjustments were made in CY 2015. The MSPTS is scheduled to be reconfigured in 2016. See Section 3.1.5.3 for additional discussion on this project.

2.7.1.1 Flow Configuration

MSPTS flows are measured using two flow meters located in a configuration vault between the two treatment cells that contain zero-valent iron (ZVI). Untreated groundwater is piped into this vault, where it is then directed to the desired treatment cell(s) for treatment. After flowing

through the media, treated groundwater from each treatment cell is piped back to the flow configuration vault, where it is combined. The combined flow then enters the effluent manhole, which is located just east of treatment Cell 2. This treatment cell effluent is then polished by an air stripper installed within this manhole. (This air stripper operates via spray aeration, and was designed and built by Rocky Flats staff. More information is provided in Section 3.1.5.3 and in recent annual reports, especially DOE 2013a and 2014b.) Effluent from this manhole is discharged to a small, subsurface vertical French drain and then to the larger subsurface discharge gallery.

The flow configuration through the treatment cells was "parallel upflow" through most of the year. In this configuration, the influent that is piped into the configuration vault is then split among two pipes, with part of the flow directed upward through the media in treatment Cell 1 and the rest upward through the media in Cell 2. Each of the two flow meters in the vault is dedicated to measuring the flow rate through one of the two treatment cells. The goal is typically to split the flow approximately equally between the two cells. However, in April the flows through Cell 2 began to slow considerably due to increased clogging in that cell. By late April only a small portion of the total influent was flowing through Cell 2. The valves were adjusted several times in attempts to rebalance the flows through the two cells; however, these efforts were not successful. The flow configuration was briefly revised to "series upflow," with the water flowing upward through Cell 1 and then upward through Cell 2. This was also not successful in achieving a more equivalent flow rate through the two cells. The flow was reconfigured back to parallel upflow and remained in this configuration through the rest of the year.

2.7.1.2 Revisions of System Components

No modifications or upgrades were made to the MSPTS during the year. The air stripper housed in the effluent manhole continued to operate using a single spray nozzle.

2.7.1.3 Maintenance

MSPTS maintenance in CY 2015 consisted primarily of routine activities such as flushing or otherwise removing biological growth and clayey iron oxide/oxyhydroxide accumulations from system components (most often the air stripper pump, but also the air stripper spray nozzle, effluent manhole, and various pipes), and cleaning flow meters and water-level transducers. In addition, on a couple of occasions when accumulated snow did not melt off quickly enough, snow was cleared off the solar panels.

2.7.1.4 Operation

Operational activities are conducted to gather data, optimize performance, and control various treatment system functions. Routine activities in CY 2015 included controlling and adjusting flow through the treatment system, recording flow and pressure data, measuring water levels, and inspecting system components. As noted above in the discussion on flow configuration, rebalancing flow rates was repeatedly attempted in the spring due to clogging in Cell 2 but was largely unsuccessful. Several times in the early and late months of 2015 the air stripper pump slowed or stopped when conditions were especially cold or cloudy. An electrical contractor tested the batteries and determined they are unable to hold a sufficient charge under some

circumstances, such as these types of weather conditions. Design planning began in 2015 for the reconfiguration of the MSPTS, which will include replacement of the batteries. This project is scheduled for construction in 2016.

For additional information on treatment system monitoring and performance, refer to Section 3.1.5.

2.7.2 East Trenches Plume Treatment System

The ETPTS Reconfiguration Project began construction in 2014 and was completed in mid-January 2015. The new system continues to rely on the solar/battery power facility installed in 2013, which was augmented with additional photovoltaic panels to support the new configuration. In addition, hardware was added and the electrical system was modified to produce 208-volt alternating current (AC) power as well as 48-, 24-, and 12-volt DC power to operate the new air stripper and pumps.

Section 3.1.5.3 provides additional information on this work; a more comprehensive description is provided in the annual report for 2014 (DOE 2015c).

2.7.2.1 Flow Configuration

There is no longer an option to revise flow configurations at the ETPTS (e.g., from upflow to downflow and/or from series to parallel through the two treatment cells). As described in the 2014 annual report (DOE 2015c), the two former treatment cells are now influent and effluent batch tanks. Water is routed from the influent manhole at the groundwater intercept trench to the Influent Tank (previously Cell 1), from which it is pumped to the air stripper. The resulting treated water drains to the Effluent Tank (previously Cell 2), from which it is pumped through the effluent manhole to the subsurface discharge gallery. Between January 1 and January 12, 2015 (before the ETPTS Reconfiguration Project was completed), influent was treated by the original, small-scale air stripper that was installed within the influent manhole in 2013 (as detailed in the annual report for 2014 [DOE 2015c]; for information on the 2013 installation, see the prior annual report [DOE 2014a]). On January 16, 2015, the newly reconfigured system—with the commercial air stripper as the sole treatment component—was placed online.

2.7.2.2 Revisions of System Components

The ETPTS Reconfiguration Project was completed in January 2015. As previously reported (DOE 2015c), this entailed revision of the majority of components directly involved in water treatment (i.e., the ZVI-filled treatment cells and the original air stripper). Once the reconfigured components were in place, minor adjustments were made to achieve the desired level of treatment. Influent and effluent samples were collected at designated monitoring locations immediately upstream of where water enters the air stripper and immediately downstream of where it exits the air stripper, respectively (as opposed to the RFLMA locations at the influent and effluent manholes). These results supported a more focused evaluation of air-stripper performance without the potential for confounding influences of contaminant off-gassing, water mixing, and other water-quality changes between the influent manhole and the Influent Tank, or between the air stripper and the effluent manhole.

The first samples collected included concentrations of trichloroethene (TCE) that were slightly above the RFLMA standard (2.8 micrograms per liter [µg/L] versus the RFLMA standard of 2.5 µg/L). Adjustments were made to the air stripper components, and subsequent samples all showed adequate treatment of all analyzed volatile organic compounds (VOCs). Refer to Section 3.1.5.3 for additional information on this project and a summary of water-quality data; analytical data are also presented in the second quarter report for 2015 (DOE 2015e).

A few minor revisions to the newly reconfigured system were made over the course of 2015. A valve was installed on the water line from the influent manhole to the Influent Tank. This allows water to be shut off to the remainder of the system to support maintenance. Pipe insulation was installed on the air stripper effluent line (between the air stripper enclosure and the Effluent Tank) to help prevent freezing of that water, even though the associated pipe drains freely by gravity.

Temporary changes in 2015 (which could be considered "maintenance" and are also noted in the corresponding text below) included using a generator to support the power facility and using a second pump in the Effluent Tank when needed. Due to the unusually high flow rates and the fact that high flows were present for most of the year (see Section 3.1.5.3), the air stripper needed to run for longer periods than the power facility could support. (In fact, for much of the year the air stripper operated 12 hours per day, well above what historic flow rates would suggest to be normal. Refer to the hydrographs for the ETPTS in Section 3.1.5.3 for a visual depiction of flow rates since 2000.) This was compounded by the fact that the high flow rates were a result of many cloudy, rainy days, which reduced the amount of solar charge to the batteries. An electrical outlet installed as part of the ETPTS Reconfiguration Project allows an appropriate generator to be connected to the power facility to assist with operation of the air stripper or charging the batteries. Because the amount of groundwater intercepted by the ETPTS trench greatly exceeded historic amounts, the operational power demand surpassed the available power—which was designed based on historic flows plus a contingency factor.

For the same reason—unprecedented high flows at the ETPTS—the pump installed in the Effluent Tank had to be supplemented temporarily with a portable sump pump. The installed effluent pump was selected based on historic flow rates, and operates at approximately 4 gallons per minute (gpm), well over the long-term, post-closure average flow rate at the ETPTS of under 2 gpm. However, with the influent accumulating in the Influent Tank at more than 6 gpm for several months, an additional pump was required in the Effluent Tank to keep up with the production of treated water. The power for this temporary pump, which also operates at approximately 4 gpm, was sometimes provided by the solar/battery power facility at the ETPTS—at times exacerbating the problems with power availability—and other times provided by a small, separate generator.

A mass air flow meter was installed on the air exhaust pipe from the air stripper, but was not activated until 2016. This meter allows the flow of air through the air stripper to be measured and monitored, which can aid in operating and scheduling maintenance on the unit.

2.7.2.3 Maintenance

Maintenance in 2015 at the ETPTS was sharply reduced compared to 2014 as a result of the Reconfiguration Project. In particular, the original air stripper that had been in the influent manhole required very frequent descaling (removal of hard-water deposits); in contrast, the new unit requires very little. The hard-water scale did not pose problems but was occasionally cleaned off level-control switches and water-level transducers in the Influent and Effluent Tanks. The window on the front face of the air stripper was also cleaned of hard-water deposits, an activity performed to support a Site tour by stakeholders rather than in response to air-stripper performance or operation.

The heavy precipitation that led to high flows to the treatment system also led to rising water levels in the groundwater intercept trench. This caused one of the piezometers (identified as 95799) installed within the trench to become artesian, a condition that has not been observed before at this location. (Similarly, nearby monitoring well 95299 not only contained water, but also produced samples for the first time on record; see Section 3.1.5.3.) Water flowed from the top of piezometer 95799 and ran overland toward South Walnut Creek. Note that during this same time, seepage was issuing from the hillside above (south of) the intercept trench and flowing across the road toward South Walnut Creek; see the related discussion in Section 3.1.3.6. To promote recapture of the groundwater issuing from the trench piezometer, a hose was temporarily attached to the top of the casing and was used to redirect this water to the ground surface upgradient of the intercept trench. While some of this overflow water probably infiltrated back into the trench, soils were generally saturated by surface runoff from seeps on the upgradient hillside as well as from this piezometer, leading to surface runoff that was evident for much of the summer. As noted in Section 3.1.5.3, RFLMA standards were met at the RFLMA performance monitoring location downstream from this area. The perforated collection pipe at the bottom of the trench was inspected for blockage by a subcontractor using downhole video equipment inserted through one of the trench cleanouts. While results were inconclusive, this pipe was full of water over the full extent inspected and water continued to flow from the trench into the Influent Tank at high rates, indicating the groundwater intercept trench was fully functional.

A small, pole-mounted photovoltaic array that was added to the ETPTS power facility as part of the Reconfiguration Project was the focus of a maintenance activity in July. The soils around this pole-mount had settled. Additional soil was placed around the structure and graded to promote drainage.

The effluent pump installed in the Effluent Tank malfunctioned in August and was replaced. Its failure may have been due to the continuous operation it had maintained since early spring. A higher-flow pump will be installed in this tank as part of the MSPTS Reconfiguration Project in 2016.

On several occasions in early and late 2015, accumulations of snow were brushed off the solar panels to promote better charging of the batteries. The air stripper blower motor was greased every 3 months in accordance with the manufacturer's instructions for preventive maintenance.

2.7.2.4 Operation

Operational activities are conducted to gather data, optimize performance, maintain compliance, and control various treatment system functions. Routine activities during 2015 included controlling flow through the air stripper, recording flow and pressure data, measuring water levels, inspecting system components, and adjusting flows to and from the air stripper and tanks.

Monitoring equipment, including pressure transducers (in the influent manhole and in the Influent and Effluent Tanks) and a data logger, were put in place to allow remote monitoring of the ETPTS following completion of the Reconfiguration Project.

Influent flow rates were adjusted, as was the system timer, to accommodate the very wet conditions. Most timer adjustments were made to better coincide with sunrise/sunset, in order to maximize air stripper operation during the peak sun hours and also to extend the operating "window" so that the air stripper would run long enough to treat each day's batch of influent. There were some instances when the photovoltaic panels did not receive sufficient solar irradiance to recharge the batteries enough to allow the air stripper to treat the high flows, leading to untreated influent discharging through the designed overflow bypass to the subsurface discharge gallery. Nonetheless, as noted in Section 3.1.5.3, all RFLMA monitoring showed both excellent treatment and RFLMA standards achieved by the treatment system and observed in the surface water at the performance monitoring location.

Finally, minor adjustments were made in 2015 to the effluent side of the system. The air stripper requires a certain minimum amount of back pressure to prevent the forced air from blowing out the effluent pipe instead of through the perforated air stripper trays and out the exhaust pipe. This back pressure is provided by water in the Effluent Tank and a valve on the bottom of the air stripper. If the water level in the Effluent Tank is too low or the valve is open too much, air can short-circuit out that effluent pipe rather than being forced through the perforated trays to treat influent water. (If the valve is not open enough, it triggers an automated system shutdown.) Once the water-level setting was finalized, adjustments were made to the valve to maintain this desired back pressure.

Refer to Section 3.1.5.3 for additional information on ETPTS monitoring and performance in 2015.

2.7.3 Solar Ponds Plume Treatment System

Treatment by the SPPTS was limited through most of 2015 due to clogging of the media and/or plumbing in the original concrete structure containing the two original treatment cells, which is informally referred to as "the Big Box." As has been reported in previous years, this clogged condition has worsened gradually and reached the point where a pool of water is typically present across the entire surface of the overburden in the Big Box. (See the annual report for 2014, DOE 2015c, for a discussion of this behavior.) Several attempts to clear the clogging took place in 2014 with minor and temporary success (DOE 2015c). Ongoing maintenance was performed throughout the first half of 2015 in an attempt to maintain flow through the Big Box, but met with little success.

Planning for an interim reconfiguration of the system began in early 2015, and construction is scheduled for the first half of 2016 (refer to Section 3.1.5.3 for additional information). Heavy rains in the spring and early summer of 2015 caused groundwater levels to rise, flooding the open-bottom instrumentation and equipment vaults at the SPPTS and damaging some equipment. This caused the system to be shut off for approximately 1 week while the affected parts were removed, cleaned, and either returned to service or replaced. Corroded wiring in the conduit leading to the SPIN (influent) pump caused a short and prevented it from running for a few days in July. The wiring was replaced and the pump restarted. The Interceptor Trench System Sump (ITSS) pump experienced an electrical problem in early spring and then a mechanical problem in early fall. Both issues caused the ITSS to be off for approximately 1 week per event. Additional system operations are discussed below. Other maintenance activities were performed periodically, and some operational adjustments and configuration changes were made.

2.7.3.1 Flow Configuration

SPPTS flows are measured using several flow meters, some of which are dedicated to specific components within the system. Total system flows are monitored by (1) a flow meter located on the influent line before water enters any treatment component and (2) a flow meter on the effluent line in a vault near the Solar Ponds Plume (SPP) Discharge Gallery. These are referred to as SPIN and SPOUT flows, respectively (from the associated monitoring location names, SPIN for SPPTS influent, and SPOUT for SPPTS effluent). The flow of groundwater that is pumped from the ITSS over a distance of approximately 420 feet to the SPIN influent collection sump is also measured, as are flows directed through certain test components (including each Phase III pilot-scale lagoon and microcells, as discussed in previous annual reports). Finally, the flows of liquid nutrients provided to those pilot-scale lagoons are also monitored.

SPPTS influent is therefore a mixture of water from the ITSS (which empties into the SPIN collection well) and water from the original groundwater intercept trench. These commingled waters are routed from SPIN through the small SPIN vault and then through a second vault (the metering vault). Within this metering vault, the influent flow is divided among the various components of the system for treatment and to support ongoing tests. The majority of this groundwater passes through the metering vault and enters the ZVI-filled Phase II Cell a few feet to the west, through which it moves in an upflow direction. This water then flows by gravity to the Big Box. A portion of the groundwater from the Phase II cell is pumped in timed pulses back through the metering vault, where this water is split among two lines, dosed with liquid nutrients, and then routed into the two Phase III pilot-scale lagoons located just north of the metering vault. These Phase III Cell A and Cell B lagoons are supporting nitrate treatment tests. (Refer to Section 3.1.5.3 for a more detailed discussion of these lagoons.) Effluent from these lagoons flows by gravity to the Big Box.

The first half of the year, a portion of the groundwater entering the metering vault was diverted from the Phase II Cell to support ongoing microcell tests to treat uranium (Section 3.1.5.3). Effluent from these tests also gravity flowed to the Big Box. The microcell testing apparatus was moved in July to the northeast corner of the Big Box, and an additional pump was installed at that location to support continued testing. This change was made because of the desire to test microcell treatment effectiveness on water containing lower concentrations of nitrate, because nitrate can oxidize the ZVI-based media in each microcell and thereby reduce its uranium treatment effectiveness. The pooled water available on the surface in the northeast corner of the

Big Box was confirmed to contain lower concentrations of nitrate, and therefore provided water for preliminary microcell tests of water with a reduced nitrate concentration. Water was pumped from this northeast portion of the Big Box through the microcell, and the microcell effluent was directed back into the Big Box near the effluent riser (and downstream of the microcell pump intake). Refer to Section 3.1.5.3 for additional discussion of microcell testing conducted in 2015.

2.7.3.2 Revisions of System Components

Minor upgrades were installed at a few locations within the SPPTS in CY 2015. In February, the concrete blankets previously used to insulate the Phase III pilot-scale lagoons were replaced with better-insulated hot tub covers. This change was made because testing has shown the effectiveness of the lagoons in denitrifying influent is reduced when water temperatures drop too low.

The ITSS pump, which is located within the collection sump installed in 2008 as part of the Phase I upgrades, malfunctioned in February. It was replaced but the replacement pump also malfunctioned, in September.

Heavy precipitation in the early spring flooded the open-bottom instrumentation and equipment vaults and damaged one of the nutrient dosing pumps and the SPIN flow meter. Both were replaced within a week. An electrical subcontractor inspected the system after the vaults were pumped out and found the rest of the electrical system to be undamaged, although several electrical connections were proactively rewired. In addition, an AC inverter was installed in the metering vault west of the Big Box in April to power a dedicated, automated sump pump installed to automatically pump rising groundwater out of the vault when necessary. (This water was routed to the Big Box.) The inverter can also support AC-powered equipment and tools.

2.7.3.3 Maintenance

SPPTS maintenance in CY 2015 consisted of routine activities such as inspecting the various components, cleaning flow meters and lines, calibrating liquid carbon dosing pumps, cleaning temperature sensors and water-level transducers, and refilling the liquid nutrient tank.

In January, the nutrient dosing pumps were rebuilt. This is performed annually as preventive maintenance.

Risers connected to the buried perforated piping within the Big Box were surged many times throughout the first half of the year in attempts to improve or maintain flow through the media. At most, these surgings met with minimal success. Surging was terminated in late spring when the process was determined to be of minimal benefit, if any, and the extremely wet conditions across the Site presented higher priorities. The water that is present across the top of the overburden within the Big Box essentially forms a “lagoon” similar to the Phase III pilot-scale lagoons, and therefore may be assisting nitrate treatment.

Several times throughout the year, especially after heavy snow or rain, groundwater levels in the immediate area rose to the point that the open-bottom vaults became flooded. This water was pumped out of the vaults and into the Big Box, sometimes daily, to lower the water levels in the vaults and maintain system components.

The inverter for the solar power system, installed in 2015, malfunctioned in December and was sent for repair. The repaired unit was reinstalled in early 2016.

2.7.3.4 Operation

Operational activities are conducted to gather data, optimize performance, and control various treatment system functions. Routine activities this year included starting, stopping, and adjusting the rate of flow through the treatment system and its various components; recording flow, temperature, and pressure data; and measuring water levels.

Changes to flow rates most often focused on the SPIN pump, which delivers influent to treatment components. The flow rate was increased to draw down the water present in the groundwater intercept trench, or was decreased to retain a nominal amount of water in the trench. This adjustment was automated in June via a software program so that SPIN maintains a more desirable water level in the collection well, which is situated at the deepest point of the SPPTS groundwater intercept trench. The pump flow is now automatically adjusted by the system data logger according to the pressure transducer measuring the water level in the SPIN collection well.

Influent flows to microcells and to the Phase III Cell A and B lagoons were adjusted on occasion to maintain the desired flow rates. The nutrient dose rate for each lagoon was also adjusted to test further optimization. In late April, the dose rate was reduced from the successfully tested 15 milliliters (mL) of nutrient per gallon (gal) of lagoon influent to 14 mL/gal. This was reduced further in early August to 13 mL/gal, but nitrate treatment began to suffer. This result and the expected onset of winter temperatures led to the resumption in early October of a 15 mL/gal dose rate. (Refer to Section 3.1.5.3 for additional discussion of nitrate treatment performance by these pilot-scale lagoons.)

The two dosing pumps were calibrated in June, and as usual required only minor adjustment. The average rate of pumping from ITSS was also adjusted as necessary to manage the water level in this sump.

Beginning in early summer, the riser pipe attached to the effluent line from the Big Box ("Riser 4") was trimmed periodically to prepare for the upcoming SPPTS Interim Reconfiguration Project. This pipe will continue to be trimmed a few inches at a time to gradually drain the water covering the overburden in the Big Box so that this overburden material and the underlying treatment media can be more easily removed and dewatered.

For additional information on treatment system monitoring and performance, refer to Section 3.1.5.3.

2.8 Sign Inspection

"U.S. Department of Energy - No Trespassing" signs are required to be posted at intervals around the perimeter of the COU to notify persons that they are at its boundary. Signs listing the use restrictions (ICs) and providing contact information are also required to be posted at access points to the COU. The signs are required as physical controls of the remedy, inspected

quarterly, and maintained by repairing or replacing them as needed. Physical controls protect the engineered components of the remedy, including landfill covers, groundwater treatment systems, and monitoring equipment, which are also inspected routinely during monitoring and maintenance activities.

The signs were inspected quarterly during CY 2015 as required. A few signs were added or replaced as needed and DOE logo stickers on the signs that had faded were replaced.

2.9 Erosion Control and Revegetation

The existing erosion controls are maintained and repaired to protect bare soil areas until the vegetation can stabilize the soil. Areas lacking sufficient vegetation cover are assessed and typically reseeded. In some cases, soil amendments are added to help establish the native vegetation. Additional information on the revegetation activities conducted at the Site during 2015 is provided in Section 3.2.5.

2.9.1 Erosion Control

Maintenance, repair, replacement, and monitoring of the Site erosion control features continued as needed through 2015. Assessing erosion control is especially important following high-wind events that are common at the Site and after significant precipitation events. Repairs in 2015 included re-staking (or weighting with rocks) wattles or erosion blankets that had loosened. It also included adding woodstraw and GeoRidges at some locations. In response to the reportable condition at Point of Evaluation (POE) SW027, additional erosion controls were added upgradient of this sampling location. Refer to Section 3.1.2.2 for more details. The *Erosion Control Plan for the Rocky Flats Property Central Operable Unit* (DOE 2007a) was followed for various projects conducted in 2015. The plan addresses the regulatory approach, monitoring inspections, and applicability and scope of erosion control activities at the Site. It outlines the responsibilities, BMPs, and implementation aspects for erosion control activities before, during, and after projects.

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MEMORANDUM

TO: Stewardship Council Board
FROM: Rik Getty
SUBJECT: CERCLA Five Year Review
DATE: May 20, 2016

We have scheduled 60 minutes for DOE to brief on the upcoming CERCLA 5-year review.

Overview
Under CERCLA Superfund regulations, the EPA is required to review the remedies at Superfund sites where hazardous substances remain at levels that potentially pose an unacceptable risk. The DOE-retained lands at Rocky Flats have residual contamination resulting in use restrictions, so this review is required by CERCLA. Lands de-listed from the CERCLA National Priorities List, namely, the off-site lands and the lands that comprise the Rocky Flats National Wildlife Refuge, are not subject to this review.

EPA guidance provides reviews must be conducted every five years and may be conducted more frequently if necessary to ensure the protectiveness of the remedy. CERCLA reviews are EPA's responsibility. At Rocky Flats, DOE, working with CPDHE and EPA, undertakes the review and produces the report for formal approval by the EPA.

There is no formal public comment period on the draft report. However, at the outset of the process, the agencies ask for issues and questions the public believes should be addressed during the review.

2012 Review
Attached to this memo is a selection of the final 2012 five-year review, including EPA's approval and executive summary. The complete document can be found at: http://www.lm.doe.gov/Rocky_Flats/Regulations.aspx (see 2nd bullet, "Third Five-Tear Review Report for the Rocky Flats Site"). The 2007 review can also be found on that webpage (see "Second Five-Tear Review Report for the Rocky Flats Site").

CERCLA Review Process

As stated in the EPA guidance, "The Five-Year Review process integrates information taken from decision documents and operational data with the experiences of those responsible for and affected by actions at the site." The six components for the review process are:

- Community involvement and notification;
- Document review;
- Data review and analysis;
- Site inspection;
- Interviews; and,
- Protectiveness determination.

Information from the first five components are used to formulate a conclusion for the sixth component—whether the site's remedial actions are protective of human health and the environment. The review, by design, is a high-level analysis, not a detailed, data-driven review.

The review focuses on three questions:

1. Is the remedy functioning as intended? To answer this question the review focuses on the technical performance of the remedy. Data on monitoring, system performance and operation and maintenance of the remedy plays an important role in the determinations. In addition, the review confirms that access controls and institutional controls are in place and successfully prevent exposure.

2. Are the exposure assumptions, toxicity data, cleanup levels, and Remedial Action Objectives still valid? The review examines the risk parameters on which the original remedy decision was based. This assessment tests the validity of all assumptions that underlie the original risk calculations. To reach its conclusions, the review will generally consider changes in target populations, exposure routes, site characteristics and land use, reference doses and slope factors, ARARs, and Remedial Action Objectives.

3. Has any other information come to light that could call into question the protectiveness of the remedy? The review considers new information that could call into question the protectiveness of the remedy. An example would be ecological risks which had not been adequately evaluated or addressed at a site, and there is no plan to address these risks through a future action.

These questions provide a framework for organizing and evaluating data, and ensure that relevant issues are considered when determining the protectiveness of the remedy. Based on the answers these three questions, a determination will be made regarding whether the remedy remains protective of human health and the environment. A draft report will be submitted to EPA for their final review and approval.

Issues to Consider for the Review
The following are my top issues that I believe must be evaluated as part of the review. I offer them for your consideration, with the caveat that the list is not exhaustive.

2013 Flood
There are two things to consider. First, although Rocky Flats incurred some damage from the flood, it fared remarkably well compared to the surrounding communities. All the roads are dirt/gravel and although they sustained some erosion, they were easily repaired.

Second, and more importantly, the flood overwhelmed parts of the surface water monitoring network and groundwater treatment systems. Two surface water monitoring stations went off line, so there are gaps in the data. The underground vaults at the three groundwater treatment systems sustained some damage to equipment, but they were easily replaced.

The review should examine the effects of the flooding, and evaluate how to mitigate damage in subsequent floods.

Solar Ponds Plume Treatment System (SPPTS)
The original treatment media at the SPPTS was difficult to maintain and a series of pilot scale tests using several different treatment processes have been investigated for their ability to remove nitrate and uranium from contaminated groundwater. There is a major project underway at the SPPTS to improve the treatment effectiveness; that project is scheduled for Summer 2016.

It will be important to track the progress of the new treatment over the next year before the final report is submitted to the EPA.

Mound Site Plume Treatment System (MSPTS) and East Trenches Plume Treatment System (ETPTS)
I have combined these two groundwater treatment systems (both treat VOC contaminated groundwater) since the MSPTS influent will soon be routed to the commercial air stripper currently used at the ETPTS. The use of the commercial air stripper (powered by 208 VAC solar/battery array) has led to dramatic decreases in the levels of VOCs in the effluent from the treatment process. The air stripper is much more effective than the old zero-valent iron system formerly used.

An evaluation of these systems should be included in the review.

Original Landfill (OLF)
The Board has been briefed a number of times on the issues at the OLF, so I will not get into them in this memo. Soil movement at the OLF continues to be problematic, and DOE is currently evaluating options stabilizing the OLF.

Clearly, the review must include an evaluation of the OLF.

Please contact me if you have any questions.

LMS/RFS/S07693

Third Five-Year Review Report for the Rocky Flats Site Jefferson and Boulder Counties, Colorado

July 2012

U.S. DEPARTMENT OF ENERGY | Legacy Management

LMS/RFS/S07693

Third Five-Year Review Report
for the Rocky Flats Site
Jefferson and Boulder Counties, Colorado

July 2012

Prepared by
U.S. Department of Energy
Office of Legacy Management

Approved by:

U.S. Department of Energy

Date:

7/23/12

Concurrence Letter Enclosed
U.S. Environmental Protection Agency

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JUL 30 2012

Ref: 8 EPR-F

Scott Surovchak
Rocky Flats Site Manager
US Department of Energy,
Office of Legacy Management
11025 Dover Street Suite 1000
Westminster, Colorado 80021

Re: Five Year Review Report for Rocky Flats US DOE Site, Jefferson County, Colorado

Dear Mr. Surovchak:

Thank you for submitting the Five Year Review Report for the Rocky Flats US DOE Site, Jefferson County, Colorado. The US Environmental Protection Agency (EPA) in consultation with the State of Colorado concurs with your assessment that the remedy for the Central Operable Unit is protective of human health and the environment. We agree with your determination in the sitewide protectiveness statement that the remedy is protective of human health and the environment. This information will be included in the EPA's annual Superfund Five-Year Review Report to Congress.

No issues or recommendations relating to this Five Year Review will be tracked in the EPA's Superfund tracking system, CERCLIS. Although the report lists some issues and recommendations, none of these affect protectiveness, and therefore will not be tracked. The environmental indicator for this site is "current human exposure is controlled and a protective remedy is in place." Environmental indicators include site wide human exposure control and contaminated groundwater migration.

The due date for the next five year review report will be August 03, 2017.

Sincerely,

Martin Hestmark
Acting Assistant Regional Administrator
Office of Ecosystems Protection
and Remediation

cc. Carl Spreng, CDPHE

Contents

Figures

Tables

Appendixes

Abbreviations

AEA	Atomic Energy Act
AEU	Aquatic Exposure Unit
AL	action level
AMP	Adaptive Management Plan
AOC	Area of Concern
AOI	analyte of interest
ARAR	applicable or relevant and appropriate requirement
ATSDR	Agency for Toxic Substances Disease Registry
BZ	Buffer Zone
CAD/ROD	Corrective Action Decision/Record of Decision
CCP	Comprehensive Conservation Plan
CCR	*Code of Colorado Regulations*
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CGP	construction general permit
CHWA	Colorado Hazardous Waste Act
COC	contaminant of concern
CRA	Comprehensive Risk Assessment
CRS	Colorado Revised Statutes
CY	calendar year
DCF	dose-conversion factor
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
ECOC	ecological contaminant of concern
ECOI	ecological contaminant of interest
ECOPC	ecological contaminant of potential concern
Eco-SSL	Ecological Soil Screening Level
ECOTOX	ECOTOXicology
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ERA	ecological risk assessment
ESL	ecological screening level
ETPTS	East Trenches Plume Treatment System
EU	Exposure Unit
FC	Functional Channel
FR	*Federal Register*
FY	fiscal year
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
HR	high resolution
IA	Industrial Area
ICP/MS	inductively coupled plasma/mass spectrometry
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action

IRIS	Integrated Risk Information System
LANL	Los Alamos National Laboratory
LHSU	lower hydrostratigraphic unit
LM	Office of Legacy Management
LOAEL	lowest observed adverse effects level
µg/L	micrograms per liter
m^3	cubic meter
M&M	monitoring and maintenance
MCL	maximum contaminant level
MDC	maximum detected concentration
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mrem	millirems
MSPTS	Mound Site Plume Treatment System
NCP	National Contingency Plan
NOAEL	no observed adverse effects level
NOIPD	Notice of Intent for Partial Deletion
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCPP	Natural Resource Compliance and Protection Program
NWP	nationwide permit
O&M	operation and maintenance
OLF	Original Landfill
OU	Operable Unit
PAC	Potential Area of Concern
PBA	Programmatic Biological Assessment
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
pCi/g	picocuries per gram
pCi/L	picocuries per liter
PCOC	potential contaminant of concern
PIC	Potential Incident of Concern
PLF	Present Landfill
PLFTS	Present Landfill Treatment System
PMJM	Preble's meadow jumping mouse
POC	Point of Compliance
POE	Point of Evaluation
PQL	practical quantitation limit
PRG	preliminary remediation goal
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RFA	Rocky Flats Alluvium
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFI	RCRA Facility Investigation
RFLMA	Rocky Flats Legacy Management Agreement
RFSC	Rocky Flats Stewardship Council
RI	Remedial Investigation

RI/FS	Remedial Investigation/Feasibility Study
SPPTS	Solar Ponds Plume Treatment System
STP	Sewage Treatment Plant
TCDD	Tetrachlorodibenzo-p-dioxin
TCE	trichloroethene
TEDE	total effective dose equivalent
TEF	Toxic Equivalency Factor
TEQ	toxicity equivalence
TIMS	thermal ionization mass spectrometry
TRV	toxicity reference value
UBC	Under Building Contamination
UCL	upper confidence level
UHSU	upper hydrostratigraphic unit
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WBEU	Wind Blown Area Exposure Unit
WQCC	Water Quality Control Commission
WQCD	Water Quality Control Division
WRV	wildlife refuge visitor
WRW	wildlife refuge worker
ZVI	zero valent iron

Executive Summary

The U.S. Department of Energy's (DOE's) Rocky Flats Site (Rocky Flats), which is located approximately 16 miles northwest of Denver, Colorado, was listed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) in 1989. The final remedy was selected in the September 29, 2006, Corrective Action Decision/Record of Decision (CAD/ROD) after completion of cleanup and closure by DOE under the Rocky Flats Cleanup Agreement (RFCA). The CAD/ROD was based on the results of the July 2006 Remedial Investigation/Feasibility Study, which included a Comprehensive (Human Health and Ecological) Risk Assessment (CRA), and the July 2006 Proposed Plan.

Rocky Flats has two Operable Units (OUs) within the boundaries of the property: the 1,308-acre Central OU and the 4,883-acre Peripheral OU. The Central OU contains the areas of Rocky Flats that required additional remedial/response actions, within a boundary based on the practicalities of future land management. The Peripheral OU includes the remaining, generally unimpacted portions of Rocky Flats, and surrounds the Central OU. The Offsite Areas at Rocky Flats, known as OU 3, were addressed under a separate no action CAD/ROD dated June 3, 1997. Conditions in OU 3 and the Peripheral OU allow for unlimited use and unrestricted exposure and these OUs were deleted from the NPL in May 2007.

The response action in the final CAD/ROD is no action for the Peripheral OU, and institutional controls and physical controls with continued monitoring for the Central OU. A CAD/ROD amendment to clarify certain institutional controls and their implementation was approved on September 21, 2011. Because remaining contamination in the Central OU does not allow for unlimited use and unrestricted exposure, CERCLA requires that a periodic review be conducted at least every five years to determine whether the Central OU remedial actions remain protective of human health and the environment. This third five-year review covers May 2007 through April 2012 and evaluates the performance of the remedy implemented under the final CAD/ROD (as amended in September 2011) and RFLMA.

Most of the Rocky Flats property outside the Central OU was transferred on July 12, 2007, to the U.S. Department of the Interior for establishment of a National Wildlife Refuge managed by the U.S. Fish and Wildlife Service. The Central OU land was retained by DOE for remedy implementation and is managed consistent with the Refuge purposes.

The *Rocky Flats Legacy Management Agreement* (RFLMA), between DOE, the U.S. Environmental Protection Agency (EPA), and the Colorado Department of Public Health and Environment (CDPHE), provides the implementing regulatory framework for the Central OU remedy.

The primary contaminants, contaminated media, and waste present in the Central OU are:

- Wastes disposed in two closed landfills: the Present Landfill (PLF), and the Original Landfill (OLF).
- Some subsurface soils with residual volatile organic compounds (VOCs), metals, and radionuclide contamination and areas where former building and infrastructure components, debris, and incinerator ash remain well below the surface with low levels of uranium, plutonium, and americium contamination.

- Areas of groundwater that comprise contaminant plumes that contain VOCs, nitrates, and uranium at levels above Colorado's surface water standards.
- Areas of surface soil contaminated with low levels of plutonium-239/240 and americium-241.
- Some subsurface areas with VOC contamination at levels that could lead to inhalation of unacceptable VOC concentrations by building occupants if buildings were constructed in these areas.

Institutional controls prohibit soil disturbance activities that are not appropriately controlled, activities that could damage the landfill covers or other remedy components, construction of buildings for human occupancy, and the non-remedy-related use of surface water or groundwater. Physical controls include no trespassing signage at access points to the Central OU listing the institutional controls and no trespassing signs around the Central OU perimeter prohibiting unauthorized access. Monitoring includes requirements to routinely inspect and maintain the landfill covers, treatment systems, and institutional controls; and sampling and analysis of groundwater and surface water at specified locations and frequencies.

This review was conducted in accordance with EPA's *Comprehensive Five-Year Review Guidance* dated June 2001 and updates to the guidance regarding institutional controls dated September 2011. DOE, as the CERCLA federal lead agency under Executive Order 12580, conducted the review, using a team composed of knowledgeable DOE, DOE's contractor, CDPHE, and EPA staff. The team conducted a site inspection as part of the review on March 12, 2012.

While this report provides background information on the Peripheral OU and OU 3, a five-year review for these OUs is not required. But, information about studies regarding levels of residual plutonium in soil for these areas is included in Appendix E, "Public Participation Summary," because this report provides another opportunity to help inform stakeholders regarding this topic.

This report summarizes the progress made since the second five-year review, including the completion of all recommendations made for issues identified in the Second Five-Year Review Report, which was approved on September 14, 2007.

This report documents the technical evaluation of the performance of the remedy to determine the status of protectiveness of the remedy. The technical evaluation included consideration of monitoring and surveillance information reported in RFLMA quarterly and annual reports of site surveillance and maintenance activities and information on post-remedy decision-making documented in RFLMA Party contact records and amendments or modifications to remedy requirements. It also included review of the status of the remedial action objectives, any changes to the applicable or relevant and appropriate requirements the remedy must attain, any changes to toxicity factors or exposure parameters or assumptions that might affect the level of risk posed by residual contamination and any new information that may call into question the protectiveness of the remedy.

In accordance with RFLMA requirements, the review includes an evaluation of remedy implementation components to provide recommendations regarding continuing, discontinuing or modifying any components and whether any additional response actions based on new technologies could be taken. This evaluation resulted in a recommendation to discontinue

specific landfill vegetation monitoring because the vegetation meets success criteria, and continuation of groundwater treatment system optimization activities begun within the last five years.

The following Five-Year Review Summary Form provides further information related to the review including issues, recommendations, and follow-up actions that were identified.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Rocky Flats Site		
EPA ID: CO7890010526		
Region: 8	**State:** CO	**City/County:** Golden/Jefferson and Boulder

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: Other Federal Agency **If "Other Federal Agency" was selected above, enter Agency name:** U.S. Department of Energy
Author name (Federal or State Project Manager): Scott Surovchak, Site Manager
Author affiliation: U.S. Department of Energy, Office of Legacy Management
Review period: September 8, 2011- April 30, 2012
Date of site inspection: March 12, 2102
Type of review: Statutory
Review number: 3
Triggering action date: September 14, 2007, Second Five-Year Review Report
Due date *(five years after triggering action date)*: September 14, 2012

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
There are no issues or recommendations for the Peripheral OU and OU3, Offsite Areas. Conditions in these OU's allow for unlimited use and unrestricted exposure. EPA published a Notice of Partial Deletion from the NPL for the Peripheral OU and OU3 on May 25, 2007. A five-year review is not required for these OU's.

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): Central OU	**Issue Category:** Monitoring			
	Issue: Surface water Point of Evaluation (POE) GS10 uranium concentration has periodically exceeded the *Rocky Flats Legacy Management Agreement* (RFLMA) standard during this review period and exceeds the standard at the end of this review period. POEs are located upstream of surface water Points of Compliance (POCs) at the edge of the former Industrial Area within the Central OU to provide early indication of potential contaminant migration.			
	Recommendation: Continue to monitor in accordance with RFLMA requirements. Complete work in accordance with the Colorado Department of Public Health and Environment (CDPHE) - and EPA-approved evaluation plan.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	Federal Facility	EPA/State	The RFLMA consultative process is effective in determining whether, and to what extent, any mitigating action may be recommended, and to establish the schedule to complete actions.
OU(s): Central OU	**Issue Category:** Monitoring			
	Issue: Surface water POE GS10 americium concentration began to exceed the RFLMA standard in 2011 and exceeds the standard at the end of this review period.			
	Recommendation: Continue to monitor in accordance with RFLMA requirements. Complete work in accordance with the CDPHE- and EPA-approved evaluation plan.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	Federal Facility	EPA/State	The RFLMA consultative process is effective in determining whether, and to what extent, any mitigating action may be recommended, and to establish the schedule to complete actions.

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): Central OU	**Issue Category:** Monitoring			
	Issue: Surface water POE SW027 plutonium concentration exceeded the RFLMA standard in 2010 during a high precipitation event. Flow at SW027 is precipitation dependent. After mitigating actions to improve erosion controls in the drainage were completed in 2010, only very small volumes of infrequent, short-term, intermittent flows occurred at SW027. No samples have been able to be obtained for over a year. Because the RFLMA standard is based on 12 month rolling average of the results, and there are no sample results for averaging, the standard was no longer exceeded at the end of this review period. Samples will be obtained when there is sufficient flow to evaluate the effectiveness of the mitigating measures.			
	Recommendation: Continue to monitor in accordance with RFLMA requirements.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	Federal Facility	EPA/State	When water flows at SW027 allowing sample collection and analysis again.
OU(s): Central OU	**Issue Category:** Institutional Controls			
	Issue: Institutional controls might not be easily enforceable against a utility easement holder who is not a party to the Environmental Covenant granted by DOE to CDPHE. While this is not a near-term issue (because the Office of Legacy Management (LM) maintains a good working relationship with the current easement holder), the lack of enforceability could become an issue in the future if LM and the easement holder (or any successor) do not maintain routine contact.			
	Recommendation: Replace the Environmental Covenant with a restrictive notice under Colorado law, as provided for in the 2011 Corrective Action Decision/Record of Decision amendment. While an environmental covenant might not be directly enforceable against a prior holder of an interest in land who is not a party to the covenant, a restrictive notice is enforceable by the CDPHE against any person in violation of the institutional controls.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	Federal Facility	EPA/State	DOE and CDPHE will consult with a goal to replace the Environmental Covenant with a restrictive notice by end of 2012.

Protectiveness Statement		
Operable Unit:	***Protectiveness Determination:***	***Addendum Due Date (if applicable):***
Central OU	Protective	Not Applicable

Protectiveness Statement:

The remedy for the Central OU is protective of human health and the environment because surface water concentrations are meeting standards at points of compliance, and monitoring and maintenance plans and institutional controls are working to prevent unacceptable exposure to site contaminants.

Sitewide Protectiveness Statement	
Protectiveness Determination:	***Addendum Due Date (if applicable):***
Protective.	Not Applicable

Protectiveness Statement:

Because the conditions at all OUs are protective, the site is protective of human health and the environment.