

ROCKY FLATS STEWARDSHIP COUNCIL

P.O. Box 17670
Boulder, CO 80308-0670
www.rockyflatssc.org

(303) 412-1200
(303) 600-7773 (f)

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
Arthur Widdowfield

Board of Directors Meeting – Agenda

Monday, April 1, 2013, 8:30 AM – 12:00 PM

**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 March 7, 2013, Executive Committee meeting
- 8:40 AM Business Items (briefing memo attached)
1. Consent Agenda
 - Approval of checks and meeting minutes
 2. Executive Director's Report
- 8:50 AM Public Comment
- 9:00 AM DOE briefing on water quality compliance during drought conditions (briefing memo attached)
- The cleanup remedy at Rocky Flats is designed to protect water quality. Activities associated with ensuring remedy compliance include surface water and groundwater monitoring.
 - However, with the current drought, there is less water to monitor, thereby raising questions about how DOE can measure actinide movement and, in turn, remedy compliance.
 - DOE will review its monitoring program and discuss remedy compliance with a focus on the drought conditions.
- 9:45 AM Briefing/Discussion on vegetation management and adaptation (briefing memo attached)
- As discussed in 2012 during the series of briefings on actinide movement, mature and diverse plant communities are central to reducing actinide migration and thus ensuring the long-term viability of the site remedy.
 - Seed mix to both address drought and increased moisture is therefore a critical ingredient of the site's adaptive management approach. Jody Nelson, the site ecologist, discussed his strategy at the September meeting. He will expand on this approach at this meeting.

- Open space staff from Boulder, Boulder County and Jefferson County will join the conversation to share and discuss adaptive management strategies their open space programs employ.

- 10:45 AM Briefing/Discussion on prairie fire at Rocky Flats (briefing memo attached)
- Prairie fires at Rocky Flats generate broad concern in surrounding communities.
 - DOE, CDPHE and EPA have studied these fires, including controlled burns, focusing on the impacts on actinide movement, re-vegetation efforts, and habitat restoration.
 - The agencies will discuss the suite of issues related to prairie fire.

11:40 AM Public comment

- 11:50 PM Updates/Big Picture Review
1. Executive Director
 2. Member Updates
 3. Review Big Picture

Adjourn

Next Meetings: June 3
 September 9
 October 28

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.
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.
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.
LM	Legacy Management	DOE office responsible for overseeing activities at closed sites.
LMP/IP	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.
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	trichloroethylene	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..
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

Rocky Flats Acronym List
 Prepared by Rik Getty, Rocky Flat Stewardship Council
 November 2012

		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

- Cover memo
- List of Stewardship Council checks
- February 4, 2013, draft board meeting minutes
- Select slides from CDPHE February 4th briefing

10:37 PM

03/18/13

Rocky Flats Stewardship Council
Check Detail-2013
 January 20 through March 18, 2013

Type	Num	Date	Name	Account	Paid Amount	Original Amount
Check		1/29/2013		CASH-Wells Fargo-Operating		-3.50
				Admin Services-Misc Services	-3.50	3.50
TOTAL					-3.50	3.50
Check	1598	2/3/2013	Century Link	CASH-Wells Fargo-Operating		-27.02
				Telecommunications	-27.02	27.02
TOTAL					-27.02	27.02
Bill P...	1599	2/3/2013	Crescent Strategies...	CASH-Wells Fargo-Operating		-7,237.50
Bill	1/31...	1/31/2013		Personnel - Contract	-6,850.00	6,850.00
				Telecommunications	-144.85	144.85
				TRAVEL-Local	-101.14	101.14
				Postage	-15.99	15.99
				Printing	-125.52	125.52
TOTAL					-7,237.50	7,237.50
Bill P...	1600	2/3/2013	Jennifer A. Bohn	CASH-Wells Fargo-Operating		-306.00
Bill	13-3	1/31/2013		Accounting Fees	-306.00	365.50
TOTAL					-306.00	365.50
Check	1601	3/6/2013	Century Link	CASH-Wells Fargo-Operating		-26.41
				Telecommunications	-26.41	26.41
TOTAL					-26.41	26.41
Bill P...	1602	3/6/2013	Blue Sky Bistro	CASH-Wells Fargo-Operating		-260.00
Bill	1376	2/4/2013		Misc Expense-Local Government	-260.00	260.00
TOTAL					-260.00	260.00
Bill P...	1603	3/6/2013	Crescent Strategies...	CASH-Wells Fargo-Operating		-7,020.36
Bill	2/28...	2/28/2013		Personnel - Contract	-6,850.00	6,850.00
				Telecommunications	-115.38	115.38
				TRAVEL-Local	-38.99	38.99
				Postage	-15.99	15.99
TOTAL					-7,020.36	7,020.36
Bill P...	1604	3/6/2013	Jennifer A. Bohn	CASH-Wells Fargo-Operating		-663.00
Bill	13-3	1/31/2013		Accounting Fees	-59.50	365.50
Bill	13-14	2/28/2013		Accounting Fees	-603.50	603.50
TOTAL					-663.00	969.00
Bill P...	1605	3/6/2013	Seter & Vander Wal...	CASH-Wells Fargo-Operating		-2,403.50
Bill	65122	1/31/2013		Attorney Fees	-476.25	476.25
Bill	65335	2/28/2013		Attorney Fees	-1,927.25	1,927.25
TOTAL					-2,403.50	2,403.50
Bill P...	1606	3/6/2013	The Rogers Group, ...	CASH-Wells Fargo-Operating		-500.00
Bill	3/1/...	2/28/2013		Personnel - Contract	-500.00	500.00

10:37 PM

03/18/13

Rocky Flats Stewardship Council
Check Detail-2013
January 20 through March 18, 2013

<u>Type</u>	<u>Num</u>	<u>Date</u>	<u>Name</u>	<u>Account</u>	<u>Paid Amount</u>	<u>Original Amount</u>
TOTAL					-500.00	500.00

ROCKY FLATS STEWARDSHIP COUNCIL
Monday, February 4, 2013, 8:30 AM – 11:45 AM

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

Board members in attendance: Shelley Cook (Director, Arvada), Jim McCarthy (Alternate, Arvada), Lisa Morzel (Director, City of Boulder), Tim Plass (Alternate, City of Boulder), Deb Gardner (Director, Boulder County), Megan Davis (Alternate, Boulder County), Greg Stokes (Director, Broomfield), Mike Shelton (Alternate, Broomfield), David Allen (Alternate, Broomfield), Bill Fisher (Director, Golden), Faye Griffin (Director, Jefferson County), Joyce Downing (Director, Northglenn), Shelley Stanley (Alternate, Northglenn), Emily Hunt (Alternate, Thornton), Chris Hansen (Alternate, Superior), Bob Briggs (Director, Westminster), Mary Fabisiak (Alternate, Westminster), Jeannette Hillery (Director, League of Women Voters), Ann Lockhart (Director, Rocky Flats Cold War Museum), Conny Bogaard (Alternate, Rocky Flats Cold War Museum), Roman Kohler (Director, Rocky Flats Homesteaders), Arthur Widdowfield (citizen).

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

Attendees: Shirley Garcia (Broomfield), Vera Moritz (EPA), John Dalton (EPA), Carl Spreng (CDPHE), Charles Adams (CDPHE), Jeremiah McLaughlin (Stoller), Bob Darr (Stoller), John Boylan (Stoller), Jody Nelson (Stoller), George Squibb (Stoller), Linda Kaiser (Stoller), Tamara Moon (Northglenn), Stuart Feinhor (U.S. Rep. Polis), Dylan Brasious (U.S. Rep. Polis), Creig Veldhuizen (Cimarron Metro District), Harvey Nichols (citizen).

Convene/Agenda Review

Chair Lisa Morzel convened the meeting at 8:34 a.m.

Chairman's Review of January 14th Executive Committee meeting

Chair Morzel noted that an Executive Committee meeting was held on January 14, 2013. Meeting attendees included the Executive Committee and David Abelson. The purpose was to develop the agenda for this meeting. The committee also discussed the draft letter regarding worker benefits, but did not make any changes. These meetings are open to public.

Consent Agenda

Joyce Downing moved to approve the November Board meeting minutes (with minor spelling changes) and the checks. The motion was seconded by Roman Kohler. The motion to accept the minutes and checks passed 14-0.

Election of Stewardship Council Officers for 2013

Each year, the board must elect a Chair, Vice Chair, and Secretary/Treasurer. As provided in the bylaws, the terms shall commence at the first meeting of the Board held on or after February 1.

Prior to the meeting, three people had expressed an interest in serving as an Officer for 2013. These were Deb Gardner as Secretary, Joyce Downing as Vice Chair, and Bob Briggs as Chair. Lisa Morzel then asked if anyone else was interested in being considered for one of the positions. No one replied. Jeannette Hillery moved to close discussion and approve the three candidates for officer positions. The motion was seconded by Murph Widdowfield. The motion passed 14-0.

Bob Briggs took over as Chair of the meeting.

Approval 2013 Meeting Dates and Notice Provisions Resolution

Each year the board is required to adopt a resolution establishing the meeting dates for the given year. The Board was provided with a suggested schedule for 2013 in their meeting packets. Jeannette Hillery moved to approve the resolution and meeting notice provisions. The motion was seconded by Roman Kohler. The motion passed 14-0.

The meeting dates are as follows:

February 4

April 1

June 3

September 9

October 28

Approval of letter supporting Rocky Flats workers

Last fall, the Board agreed to send a letter to the Colorado Congressional delegation supporting efforts to secure compensation due under the Energy Employees Occupational Illness Compensation Program Act (EEOICPA). A draft letter was included in the Board packet. It was vetted with board members and includes all input and edits received.

Roman Kohler summarized some of the problems former workers have been facing when attempting to receive benefits for illnesses resulting from their work at Rocky Flats. One of the biggest difficulties they face is the requirement to prove that their illnesses were caused by job-related exposure to radioactive materials. This issue affects both Rocky Flats workers and workers at DOE facilities throughout the federal complex. Lisa Morzel spoke about the importance of keeping this issue in foreground, as there are other situations in which workers in various fields have been and may be exposed and become ill. Roman Kohler moved to approve sending this letter. The motion was seconded by Murph Widdowfield. The motion passed 14-0.

Executive Director's Report

David began by introducing two new Board members. Conny Bogaard is the Executive Director of the Rocky Flats Cold War Museum and will take over as Alternate for the Museum, with Ann Lockhart becoming the Director. Cathy Shugarts with the City of Westminster will become the Second Alternate. Cathy has been attending meetings for many years and is very well-versed on the issues. David then acknowledged and thanked Shirley Garcia for her service on the Board. She had previously represented the Rocky Flats Cold War Museum.

David noted that annual dues for the governmental members were to be collected soon. He also reminded Board members to let staff know if they run across any additional acronyms that

should be added to the list that is included in each Board packet. He also noted that the Board's quarterly financial report had been distributed, and he would be happy to answer any questions.

David informed the Board that recent re-districting had affected Rocky Flats. The Representative for this area had been Rep. Jared Polis, but will now be Rep. Ed Perlmutter.

In December, David attended an Intergovernmental Meeting, which included attendees from Energy Communities Alliance (ECA), the Environmental Council of the States (ECOS), the National Association of Attorneys General (NAAG), the National Governors Association's Federal Facilities Task Force (FFTF), the National Conference of State Legislatures (NCSL), the State and Tribal Government Working Group (STGWG), and DOE. The purpose of this meeting was to provide opportunities for increased communication and coordination with DOE and among states, tribes and local communities affected by the ongoing cleanup of the nuclear weapons complex. David noted that this meeting was geared more towards cleanup than Legacy Management (LM), but was nevertheless valuable for our work at Rocky Flats. He noted that the biggest issue with the DOE programs right now is the budget uncertainty. He said that the President's budget was going to be delayed until April, and that there would be uncertainty for quite a while.

In 2012, the Stewardship Council was granted a new five-year grant from DOE. As part of this, one year of funding was committed, along with some carryover funds already received. Over the last few weeks, David was able to get additional money committed and the paperwork should be completed soon. This funding will sustain the Board through February 2014.

Barb Vander Wall noted that all Board members should have received copies of their 'Oaths of Office'. All Board member terms commence as of February. These forms show a commitment to service on the Board and support the Board's public entity status. They must be signed and witnessed and then returned to staff.

Public Comment

There was none.

Member Updates

Chris Hanson reported that Joe Cirelli had been re-elected as Trustee for the Town of Superior and will be serving as Mayor Pro Tem. Ann Lockhart thanked the Board for its support, and noted that the Museum would greatly appreciate resolutions of support from other local government entities as well. She also said that the Museum had just elected Dan James, a Humanities Professor at Rocky Mountain College of Art and Design, as its new President. Conny Bogaard, the Museum's new Executive Director, reported that the Museum had an opportunity to purchase former Building 60 at Rocky Flats. However, while the paperwork was in progress, a manufacturing company purchased the property. The Museum Board is still interested in finding another location, as its current building is too small and the lease is up at end of year. Conny said this will be a crucial year for the Museum in terms of looking for different marketing opportunities. She noted that many nuclear museums around the country are looking to re-focus their efforts on current nuclear weapon issues.

Faye Griffin updated the Board that she is serving on a committee to build the ‘Rocky Mountain Greenway’ trail, which is envisioned to connect the Rocky Mountain Arsenal to Rocky Flats and then to Rocky Mountain National Park. She also noted that, in December, Jefferson County, along with Boulder, Boulder County, and state and federal agencies closed on the purchase of ‘Section 16’ which is a parcel south of the Rocky Flats National Wildlife Refuge along Highway 93. The land was transferred to the Fish and Wildlife Service and is now part of the Refuge. Lisa Morzel noted that the Rocky Mountain Greenway, which is part of the President’s ‘America’s Great Outdoors’ program, is not yet funded, but the entities involved are working toward some partnerships to help make this come to fruition. Faye also noted that Jefferson County’s light rail line will be opening in April.

Deb Gardner said that Boulder County was happy to support the former Rocky Flats workers as well as the Rocky Flats Cold War Museum, and was also participating in the Rocky Mountain Greenway discussions. Lisa Morzel added that the area involved in the Section 16 purchase was 627 acres. Bob Briggs noted that the City of Westminster was planning for a community park and station that will be part of the Greenway.

Host DOE Quarterly Meeting

DOE briefed on site activities for the third quarter of 2012 (July – September). DOE posted the report on its website. Activities included surface water monitoring, groundwater monitoring, ecological monitoring, and site operations (inspections, maintenance, etc.).

Site Monitoring and Reporting – Bob Darr

The Rocky Flats Legacy Management Agreement (RFLMA) requires quarterly reports to document that the CERCLA remedy continues to be protective. The primary goal of the remedy is the protection of surface water. The response actions for this remedy include maintaining two landfill covers; maintaining four groundwater treatment systems; and surface water and groundwater monitoring. Additionally, physical controls protecting the remedy include signage and restricted access (note: fences are not part of the remedy). Finally, institutional controls (ICs) are in place to complete the remedy requirements. These IC’s are part of the public record and address the following:

- No building construction or occupation
- Restrictions on excavation and soil disturbance
- No drinking or agricultural use of surface water
- No groundwater wells except for monitoring
- Protecting landfill covers and engineered remedy components

Surface Water – George Squibb

George began by showing the map of the various monitoring points. He next reviewed sampling results for plutonium, americium, uranium, and nitrates at the Points of Compliance (POCs). All were below applicable standards. At both the Original and Present Landfill (OLF and PLF), surface water quality results were below standards for the quarter.

Reportable 12-month rolling average values for uranium at GS10 continued to be observed through the quarter. These reportable results have been seen since closure and are cyclical.

Reportable 12-month rolling average values for americium at GS10 continued to be observed through the quarter. Reportable 12-month rolling average values for plutonium at GS10 were observed starting in May 2012. Additional sampling is being conducted both upstream and downstream of GS10; no downstream results have been detected. There is currently not sufficient water to be able to sample upstream. The Contact Records with additional information on these reportable values can be found on the Rocky Flats website.

Deb Gardner said that the sampling plots seemed to show similar results at various locations. She also said she was concerned about contaminants building up upstream that could be released downstream. George responded that the extremely low levels of plutonium and americium results obscure any attempt to draw correlations between levels at different sites – the technology does not allow for that level of detail within the ranges of uncertainty. However, he said they can identify these kinds of trends with uranium. As previously reported, through specialized testing at the Los Alamos National Laboratory, it has been found that most of the uranium at Rocky Flats is naturally-occurring. The site is also working with a subcontractor to provide a more detailed look at this geochemistry. Tim Plass asked about previous results from LANL, and the ratios of man-made vs. naturally-occurring uranium. George said that at the Solar Ponds, the uranium is mostly anthropogenic (man-made). They have not observed any significant change in these ratios at the site. Also, the baseline ratios are different at different locations. He said the site will be using Berkeley Laboratories for these analyses in the future.

Chris Hanson asked if there was a standard that was less conservative than what was used in the RFLMA. Carl Spreng said that the Rocky Flats standard for plutonium was 100 times more stringent (lower) than the national drinking water standard for plutonium. An audience member, Creig Veldhuizen, asked how uranium levels at Rocky Flats compared with the broader Denver area. George said that creeks in the mountains have higher uranium levels. Vera Moritz said that the uranium drinking water standard is double the Rocky Flats uranium standard. Lisa Morzel asked what the detectable level was for plutonium. George said it was about .01 pCi/l. Emily Hunt asked in which forms each of these major contaminants were found at the site. George said that uranium and nitrates were primarily dissolved, while plutonium and americium were usually stuck to small pieces of sediment or organic matter. He added that sometimes they saw a mix of both dissolved and suspended contaminants.

Groundwater Monitoring - John Boylan

John began by noting that groundwater monitoring and treatment ensured surface water protection at the site, and that monitoring results indicated continued protectiveness. Treatment system enhancements included:

Mound Site Plume Treatment System

- Installed powered ventilation on air stripper
- Air stripping reduced contaminants by 90 percent

Solar Ponds Plume Treatment System

- Continued testing of ZVI-filled microcells for uranium treatment
- Continued testing of lagoons for nitrate treatment

John noted that the Bench Scale Lagoon tests are using two cells (A and B) to evaluate various options using carbon and a bacteria-laced inoculum to treat nitrate. After treatment, nitrate levels have been going down to a non-detectable level, or slightly above. Mary Fabisiak asked if they did any tests during ambient summer conditions. John said that the tests were done below surface, so there were lower temperatures. He added that Cell B, which does not use a re-circulation pump, has been showing non-detectable results. This is good because it is an easier option to implement.

Site Operations - Jeremiah McLaughlin

Jeremiah reported that the site conducted a few road upgrades during the quarter. All landfill inspections were completed, and the landfill covers were found to be in good condition. Settlement monuments were surveyed, and the results indicated that both landfills were stable. Inclinometer measurements were taken at the Original Landfill, and these results also indicated continued landfill stability.

The site conducted a quarterly sign inspection during the quarter to ensure that these physical controls under RFLMA were intact, and they were all found to be in good condition. David Abelson asked the site to provide a copy of the language printed on signage. Deb Gardner asked what was currently in place around the site perimeter. Jeremiah said that there are fences, but nothing designed to prevent entry. Chris Hanson asked how the site would find out if people trespass onsite. Jeremiah said that they have never seen anyone within the COU, which has higher levels of signage and fencing. Vera Moritz noted that they look for evidence of trespassing during the annual site inspections, and have not found any. Jeremiah added that the US Fish and Wildlife Service now has an officer assigned to the Rocky Flats Refuge.

Ecological Monitoring - Jody Nelson

Jody reported that although ecological monitoring activities are not required by the remedy, they are best management practices. He also noted that photo-monitoring photos which compare the same areas onsite over time can be found in the Annual Report. These are the activities that were conducted during the quarter:

- Revegetation monitoring
- Prebles Meadow Jumping Mouse mitigation monitoring
- Wetland mitigation monitoring
- Weed mapping
- Present Landfill (PLF) and Original landfill quarterly vegetation surveys
- Nest box monitoring (tree swallows & wrens)
- Prairie dog surveys (not found in Central Operating Unit [COU])
- Photopoint monitoring

Ecological maintenance activities included:

- Fall herbicide applications (approximately 96 acres treated in COU)
- Treatment of several dozen small Russian olive trees and a few saltcedar (tamarisk) plants with herbicides throughout COU
- Revegetation and installation of erosion controls along former PLF – A-3 ridge top road

- Mowing of several roadside edges and other off-road locations to help control weeds and reduce wildfire risk
- Providing supplemental watering for woody plants that were installed for habitat enhancement

Lisa Morzel asked whether any soil amendments were used. Jody said that not in most places, but some of areas that used to contain roads or parking lots required fertilizer and mulch.

Briefing/Discussion on Off-Site Contamination

At the September 2012 meeting, a Board member asked a question about potential contamination in areas south of the Rocky Flats border. It became clear in the ensuing conversation that the topic of radioactive contamination (originating at Rocky Flats) outside the boundaries of the site continues to draw interest and some concern. Carl Spreng (CDPHE) led the briefing. He started by noting that Rik Getty had prepared a very thorough overview of this topic that could be found in the Board packet.

Carl explained that during cleanup, 20,480 acres of land (about 32 square miles) primarily to the east and south of Rocky Flats was designated as Operable Unit 3 (OU3). OU3 was one of 16 Operable Units identified in the 1991 Interagency Agreement and the 1996 Rocky Flats Cleanup Agreement (RFCA). OU3 was further divided into four Individual Hazardous Substance Sites (IHSSs) – Great Western Reservoir, Mower Reservoir, Standley Lake and Surface Soils.

In 1996, after reviewing the data for OU 3, DOE, EPA and CDPHE released the Proposed Plan in which the selected remedy was the ‘no action’ alternative. The document stated that all IHSSs were already in a state that was protective of human health and the environment, and that offsite areas could safely be available for all uses without restriction. After a public comment period and public hearing, the final Corrective Action Decision/Record of Decision (CAD/ROD) was signed by the three agencies in June 1997. This decision did not consider potential future releases, and was based on what was known as a ‘RCRA Facility Investigation/Remedial Investigation’ (RFI/RI).

The RFI/RI investigated surface soils, subsurface soils, sediments, surface water, ground water and air. The ‘Contaminants of Concern’ were americium (surface soil) and plutonium (surface soil; surface sediment). The agencies conducted both a Human Health Risk Assessment and an Ecological Risk Assessment. For the human health risk assessment, the residential reasonable maximum exposure (RME) used was 3×10^{-6} , and the recreational use RME was 1×10^{-8} . For the ecological risk assessment, a ‘Hazard Quotient’ less than 1 equaled ‘no adverse ecological effects’. After conducting the risk assessments, the agencies concluded that ‘Conditions in OU 3 pose no unacceptable or significant risks to human health or the environment’.

After soil sampling was performed, 17 of 61 areas sampled were found to be above background. These were located closest to the site. The investigation produced a map that showed ‘isopleths’, or contoured areas, reflecting decreasing contamination levels moving outwards from Rocky Flats. This map was based on approximately 750 samples. Plutonium was found to be only in the upper 1-3 centimeters of the soil. Uranium was uniformly distributed down to 96 cm

(evidence that it was natural). The plots were sampled by two different methods, and the results were the same. The highest value found was 6.5 pCi/g.

Deb Gardner asked whether CDPHE would require any re-testing of these areas prior to any potential road construction. Carl said that the agency within CDPHE in charge of that decision, the Radiation Control Division, likely has enough evidence to make a decision without any further testing, but that further testing remained a possibility. Deb noted that the existing data was fairly old.

Carl added that air monitoring (using wind tunnels) and sediment sampling in the three reservoirs was also done as part of the RFI/RI. A class action lawsuit, known as the Cook case, was brought against the agencies in the early 1990s. A jury decision in 2008 awarded \$900 million to the plaintiffs, but was overturned on appeal by the 10th Circuit court of Appeals in 2011. An appeal of that decision was made last May to the Supreme Court, and in June 2012, the Court announced it would not hear the appeal.

Carl next reviewed earlier studies of off-site contamination. He discussed a contamination map, referred to as the Kray-Hardy map, which has been widely circulated. He said the map was done in 1970 and was based on very few samples. He added that the data included multiple analyses by various labs, and did not meet EPA usability criteria. He also noted that much of the map showed levels that were at or below background (.08 pCi/g). Carl showed a long list of contamination studies that have been performed throughout the years, including more than two dozen done on behalf DOE, and more than a dozen each by CDPHE and other sources. (Those slides from his presentation are attached.)

In 2007, OU3 was removed (called “delisting” in regulatory terms) from the CERCLA Superfund list. This process deemed that no further remedial measures pursuant to CERCLA were appropriate. Importantly, these lands were deemed available for any and all use with no restrictions due to contamination levels.

In response to questions, Carl explained that there is no national plutonium standard for soil, only site-specific standards. David Abelson asked Carl to give an overview of how the Rocky Flats standards were set. Carl explained that it was a multi-year process that resulted in the determination of ‘action levels’ for cleanup (not ‘standards’). The process involved detailed studies, as well as public involvement.

OU3 was included in first CERCLA 5-Year Review at Rocky Flats because of new information and studies that had been done since it was designated ‘no action’. Carl said that over the years, results at the same sample areas generally decline. He said that the most likely scenario was that the contamination was being covered and buried with clean dust. Lisa Morzel asked if any studies had looked at core samples of plutonium levels over time. Carl said they see this more with sediments in water bodies, rather than soil areas. This is because in the soil, the depth of the plutonium contamination was too shallow an area to be able to see any stratification. An audience member, Harvey Nichols, suggested that the agencies consider the effects of bioturbation. Carl said that the off-site areas had been thoroughly investigated over decades, and posed no threat to public health.

Murph Widdowfield asked if any testing had been done during construction of off-site developments (east of Indiana). Carl said that none was required, although years previously there was a release form that had to be signed by home buyers in the area. This requirement was discontinued, although he was not sure of the exact date. David Allen asked why the OU3 delisting was called a 'partial' delisting. Carl said that was because the Central Operable Unit (COU) was still listed (and will always be listed). Murph Widdowfield asked about any specific requirements for testing in the event of road construction. Carl said that that state construction standard was about 1 pCi/g, which would trigger an evaluation. Carl said there were enough studies already in place, but they may do additional investigation if there was public interest. Any road construction work would already require dust suppression, and other common practices. Tim Plass asked for the citation for the Cook case. David Abelson said he would get that to him. David added that this case covered three main claims - diminution of value, trespass and nuisance (knowing contamination of property), and medical monitoring (which was thrown out early on).

Public comment

There was none.

Updates/Big Picture Review **April 1, 2013**

Potential Briefing Items

- Special Meeting - Adaptation

June 3, 2013

Potential Briefing Items

- Host DOE Annual Update
- NRD Update
- Solar Ponds Performance
- AMP Monitoring Update

Issues to watch:

Americium and uranium levels upstream of pond B-3

David also brought up the issue of a possibly scheduling a discussion about the potential effects of wildfires at Rocky Flats. He noted that past history shows that great concern would be raised if there were a fire at the site. He said they may add this to the April agenda. Vera Moritz commented that test burns at the site showed very interesting results about the behavior of contaminants during fires, and the effects of wind. Tim Plass referred to the April special meeting on adaptation, and asked if there was a chance of finding someone from DOE-LM who was involved in looking climate change and potential effects on remedy sites who could participate in this meeting. He said he would like to hear about the 'bigger picture' on these issues. Vera noted that there was a task force looking into these issues.

The meeting was adjourned at 11:13 a.m.

Respectfully submitted by Erin Rogers.

Operable Unit 3 Offsite Areas

Rocky Flats Stewardship
Council Board Meeting

February 4, 2013



Scott Surovchak



Carl Spreng



Other Off-site Environmental Studies

DOE:

- 1970. Krey, P.W. and Hardy, E.P. *Plutonium in soil around the Rocky Flats Plant.*
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- 1971. Seed, J.R. et al. *Committee evaluation of Plutonium levels in soils within and surrounding USAEC Installation at Rocky Flats, CO.*
- 1971-2006. EG&G, et al. *Rocky Flats Monthly Environmental Monitoring Report.*
- 1972. Loser, R.W. and Tibbals, R.L. *Soil sampling east of Indiana Avenue.*
- 1976. Krey, P. W. *Remote plutonium contamination and total inventories from Rocky Flats.*
- 1977. Illsley, C.T. *Results of special soil samples collected adjacent to the Rocky Flats Plant Site.*
- 1979. Illsley, C.T. and Hume, M.W. *Plutonium concentrations in soil on lands adjacent to the Rocky Flats Plant.*
- 1979. Hurley, J.D. Great Western Reservoir spillway sediment sampling program, phase I report.
- 1980. Hardy, et al. *Time pattern of off-site plutonium deposition from Rocky Flats Plant by lake sediment analyses.*
- 1980. Hurley, J.D. Great Western Reservoir spillway sediment sampling program, phase II report.
- 1985. Rockwell International. *Disclosure to the City of Broomfield.*
- 1985. Illsley, C.T. *Soil sample collection and analysis for plutonium on lands adjacent to Great Western Reservoir for the City of Broomfield.*
- 1985. Campbell, G.W. *Great Western Reservoir Sediment Cores.*
- 1987. Illsley, C.T. *Remedial action program on Jefferson County Open Space land in Section 7, T2S, R69W, south of Great Western Reservoir.*
- 1987. Rockwell International. *Remedial action program on Jefferson County Open Space land status report for period January 15, 1987 to October 15, 1987.*
- 1988. Rockwell International. *Status of remedial action program on Jefferson County Open Space land, November 1987 to November 1988.*
- 1991. DOE. *Past Remedy Report, Operable Unit 3 – IHSS 199.*
- 1994. Litaor, M. I., et al. *Plutonium-239+240 and Americium-241 in soils east of Rocky Flats.*
- 1995. Litaor, M. I. *Spatial analysis of plutonium-239+240 and americium-241 in soils around Rocky Flats.*
- 1995. Litaor, M.I., et al. *Comprehensive appraisal of ²³⁹⁺²⁴⁰Pu in soils around Rocky Flats.*
- 1995. Litaor, M.I., et al. *A comprehensive appraisal of plutonium-239+240 in soils of Colorado.*
- 1996. Litaor, M.I. and Allen, L. *A comprehensive appraisal of ²⁴¹Am in soils around Rocky Flats.*
- 2001. DOE, CDPHE, and EPA. *Radionuclide Soil Action Levels.*
- 2002. DOE. *First Five-Year Review Report*



Other Off-site Environmental Studies

CDPHE:

- 1977. Colorado Department of Health. *Amendment to rules and regulations pertaining to radiation control.*
- 1977. Colorado Department of Health. *Radioactive soil contamination (Ce-137 and Pu) in the environment near the Rocky Flats Nuclear Weapons Plant.*
- 1990. Colorado Department of Health. *Rocky Flats surface soil survey, 1970-1989.*
- 1991. Terry, R. *Contamination of surface soil in Colorado by plutonium, 1970-1989: summary and comparison of Pu concentration in soil in the Rocky Flats plant vicinity and eastern Colorado.*
- 1993. CDPHE. *Groundwater sampling in private wells near Rocky Flats.*
- 1993. ChemRisk. *Exposure pathway emissions and transport modeling, Project Task 6, Health Studies on Rocky Flats.*
- 1993. Radiological Assessments Corp. *Evaluation of historical environmental data, Project Task 4, Health Studies on Rocky Flats.*
- 1994. ChemRisk. *Reconstruction of Historical Rocky Flats operations & identification of release points, Project Tasks 3 & 4, Health Studies on Rocky Flats.*
- 1994. ChemRisk. *Estimating Historical Emissions from Rocky Flats, Project Task 5, Health Studies on Rocky Flats.*
- 1994. Love, J. *Rocky Flats soil plutonium survey from 1970 to 1991, technical status report.*
- 1996. Jones, R.H., and Zhang, Y. *Spatial and Temporal Analysis of the Rocky Flats Soil Plutonium Data.*
- 1996. CDPHE - Citizens' Environmental Sampling Committee. *Soil and sediment study of off-site areas surrounding the Rocky Flats Nuclear Weapons Plant, Golden, Colorado.*
- 1996. CDPHE. *Ground Water Plutonium^{239,240} Data in Walnut Creek Alluvium East of Terminal Ponds.*
- 2002. Lavelle, J.M., et al. *A comparative study of ^{239,240}Pu in soil near the former Rocky Flats Nuclear Weapons Facility, Golden, Colorado*



Other Off-site Environmental Studies

Other sources:

- 1970, Colorado Committee for Environmental Information Subcommittee on Rocky Flats. *Report on the Dow Rocky Flats fire: Implications of plutonium releases to the public health and safety.*
- 1971. USEPA. *Radioactivity levels in the environs of the Rocky Flats plutonium plant.*
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- 1972. Poet, S.E. and Martell, E. A. *Plutonium-239 and Americium-241 contamination in the Denver area.*
- 1973. USEPA. *Radioactivity levels in the environs of the Rocky Flats plutonium plan – Part II.*
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- 1977. Johnson, C.J. *Offsite distribution of plutonium in the respirable dust on the surface of soil in the vicinity of the Rocky Flats Plant.*
- 1977. Sehmel, G.A. *An overview of plutonium resuspension research at Rocky Flats conducted by Battelle Northwest.*
- 1981. Thomas, C.W., and Robertson, R.E. *Radionuclide concentrations in reservoirs, streams and domestic waters near the Rocky Flats installation.*
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- 1994. Webb, et al. *The spatial distribution of plutonium in soil near the Rocky Flats Plant.*
- 1995. Clow, D.W., and Johncox, D.A. (USGS). *Characterization of selected radionuclides in sediment and surface water in Standley Lake, Great Western Reservoir, and Mower Reservoir, Jefferson County, Colorado, 1992.*
- 1995. Thomas, R.S. and Ibrahim, S.A. *Plutonium concentrations in lichens of Rocky Flats environs.*
- **1997. ATSDR. *Health consultation – RFETS Operable Unit 3.***
- 1997. Ibrahim, S.A., Webb, S.B. and Whicker, F.W. *Contributions of Rocky Flats releases to the total plutonium in regional soils.*
- 2010. Moore, L. *Citizens find plutonium in breathable form at two locations near the Rocky Flats Site.*
- 2011. Moore, L. *Citizen sampling near Rocky Flats.*

Adaptation -- DOE Briefings on Water Quality Compliance and Vegetation Management

- Cover memo
- Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*
- Executive summary – *Federal Actions for a Climate Resistant Nation*

ROCKY FLATS STEWARDSHIP COUNCIL

P.O. Box 17670
Boulder, CO 80308-0670
www.rockyflatssc.org

(303) 412-1200
(303) 600-7773 (f)

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
Arthur Widdowfield

MEMORANDUM

TO: Board
FROM: David Abelson
SUBJECT: Adaptation – RFLMA water quality compliance and vegetation management
DATE: March 20, 2013

This memo frames this special meeting on adaptation, and serves as the briefing memo for both the briefing/discussion on water compliance during drought conditions and vegetation management.

At the end of the November meeting, the board began discussing site management issues in light of the ongoing drought. Through subsequent discussions at the February meeting and the executive committee's March meeting, the issues have narrowed to focus on remedy performance compliance and vegetation management.

Big Picture – Federal adaptation policy

Executive Order 13514, *Federal Leadership in Environmental and Energy Performance*, sets sustainability goals for federal agencies, and focuses on making improvements in agency environmental, energy, and economic performance. The E.O., which is attached to this memo, directs federal agencies to:

1. increase energy efficiency;
2. measure, report, and reduce their greenhouse gas emissions from direct and indirect activities;
3. conserve and protect water resources through efficiency, reuse, and stormwater management;
4. eliminate waste, recycle, and prevent pollution;
5. leverage agency acquisitions to foster markets for sustainable technologies and environmentally preferable materials, products, and services;
6. design, construct, maintain, and operate high performance sustainable buildings in sustainable locations;
7. strengthen the vitality and livability of the communities in which Federal facilities are located; and
8. inform Federal employees about and involve them in the achievement of these goals.

As part of this effort, the federal agencies are directed to participate in the Climate Change Adaptation Task Force (see Sec. 16 of the E.O.). The Task Force focuses on (quoting from the document -- <http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation>):

1. Integrating adaptation into federal government planning and activities. Highlights:
 - a. Federal agencies are beginning to more closely identify and manage climate-related risks and to implement actions that reduce climate change vulnerability and increase resilience of the Nation.
 - b. Federal agencies are developing agency-specific plans to strengthen existing adaptation efforts and establish long-term priorities to respond to the challenges and opportunities that climate change poses to their missions, operations, and programs.
2. Building resilience to climate change in communities. Highlights:
 - a. Federal agencies are developing ways to incorporate climate adaptation into planning, emergency preparedness, and disaster recovery to protect communities and reduce losses.
 - b. Federal agencies are providing data, information, and decision tools to reduce health and insurance risks related to climate impacts.
3. Improving accessibility and coordination for science for decision making. Highlights:
 - a. The Federal Government is working to improve the accessibility and utility of climate information and tools to meet the needs of decision makers.
 - b. The U.S. Global Change Research Program is advancing a process for timely climate research, assessments, and services to support adaptation planning across the country.
4. Developing strategies to safeguard natural resources in a changing climate. Highlights:
 - a. The Federal Government worked with stakeholders to develop a National Action Plan for managing freshwater resources in a changing climate in order to assure adequate water supplies and protect water quality, human health, property, and aquatic ecosystems.
 - b. Federal agencies are partnering with state, tribal and local representatives to develop strategies for safeguarding our Nation's oceans, fish, wildlife, and plants.
5. Enhancing efforts to lead and support international adaptation. Highlights:
 - a. The Federal Government is working to identify and address the impacts of climate change that exacerbate conflict and social, economic, and political instability abroad.
 - b. Select Federal agencies have dedicated resources to support and build the capacity of partner countries and communities as they craft and implement climate-resilient development strategies.

Additionally, the Task Force identified a set of guiding principles that public and private decision-makers should consider in designing and implementing adaptation strategies. They include (but are not limited to) the following:

1. **Adopt Integrated Approaches:** Adaptation should be incorporated into core policies, planning, practices, and programs whenever possible.
2. **Prioritize the Most Vulnerable:** Adaptation strategies should help people, places, and infrastructure that are most vulnerable to climate impacts and be designed and implemented with meaningful involvement from all parts of society.

3. **Use Best-Available Science:** Adaptation should be grounded in the best-available scientific understanding of climate change risks, impacts, and vulnerabilities.
4. **Apply Risk-Management Methods and Tools:** Adaptation planning should incorporate risk-management methods and tools to help identify, assess, and prioritize options to reduce vulnerability to potential environmental, social, and economic implications of climate change.
5. **Apply Ecosystem-based Approaches:** Adaptation should, where appropriate, take into account strategies to increase ecosystem resilience and protect critical ecosystem services on which humans depend, to reduce vulnerability of human and natural systems to climate change.

DOE participates in the Task Force, although the Office of Legacy Management (LM), which manages Rocky Flats, does not have anyone assigned specifically to climate change, including adaptation. DOE's primary focus on this effort is reducing greenhouse gas emissions and energy use. LM, like the other offices within DOE, reports on its greenhouse gas emissions. LM staff tells me that because LM is so small, LM's emissions are less than 1% of DOE's total.

That said, as discussed below, Jody Nelson, the site ecologist, does address species adaptation and resiliency as part of the ongoing revegetation efforts.

Rocky Flats specific questions and issues

Consistent with the board's discussion at the November meeting, the ongoing drought triggers a number of questions about regulatory compliance at Rocky Flats and habitat management. Before delving into these issues, it is important to review how DOE addresses the remedies and the strategies it employs.

Regulatory structure

Rocky Flats management activities are guided by the Rocky Flats Legacy Management Agreement (RFLMA), a regulatory agreement between DOE, CDPHE, and EPA. The RFLMA establishes "the regulatory framework for implementing the final response action selected and approved in the final CAD/ROD, and ensuring that it remains protective of human health and the environment." Management activities must ensure the long-term protectiveness of the actions specified in the final cleanup regulatory documents (CAD/ROD). Specific activities include (quoting from the document):

1. monitoring of environmental conditions (e.g., surface water or groundwater quality) and the performance or condition of response actions (e.g., physical systems for contaminant containment, including caps; contaminant treatment systems such as passive groundwater treatment barrier walls; contaminant monitoring devices such as groundwater monitoring wells; physical access restrictions such as fences or locks; and institutional controls);
2. operation and maintenance of response actions;
3. information management; and
4. institutional controls.

Without oversimplifying DOE’s responsibilities, the cleanup remedy is geared towards protecting surface water. That is why surface water monitoring and groundwater remediation and monitoring are essential—to be able to gauge surface water quality and ensure that contaminated groundwater as it surfaces remains protective of surface water.¹ For this reason, measuring surface water quality is a fundamental action of ongoing remedy management. Groundwater monitoring is, in turn, designed to assess the potential effects of contaminated groundwater on surface water.

As part of the water quality protection strategies, the RFLMA includes a section called “Action Determinations,” section 6.0. This section provides

Whenever any of the following reportable conditions are observed, DOE shall follow the appropriate procedures in this section. Reportable conditions include:

- Exceedances of surface water standards at surface water and groundwater monitoring locations consistent with the attached flowcharts;
- Evidence of significant erosion in areas of residual subsurface contamination;
- Evidence of adverse biological conditions;
- Conditions affecting the effectiveness of the landfill covers;
- Evidence of violation of the institutional controls;
- Physical control failure that adversely affects the remedy; or
- Other abnormal conditions that adversely affect the remedy.

These conditions, which are designed to protect water quality, trigger specific evaluations. Depending on the outcome of the evaluations, specific actions areas required (ranging from increased monitoring to remedial action).

Measuring water quality – and measuring the protectiveness of the cleanup remedy

As board members have stated, drought, resulting in little or no surface water, then poses a vexing problem—namely, how do you show remedy compliance if there is no water (particularly surface water) to monitor. Asked another way, how does DOE confirm actinides are not moving if there is little-to-no water to monitor? Similarly, how will DOE address groundwater (and uranium in particular) in a dry environment? Board members have also queried whether DOE should resume air monitoring or change the frequency of water quality monitoring.

Vegetation management

One strategy DOE employs in limiting actinide movement across the site is developing and maintaining diverse, robust plant communities. Drought, though, can/will pose challenges. This question arose at the September meeting: (from the minutes –

http://rockyflatssc.org/RFSC_meeting_minutes/RFSC_minutes_9_10_12%20FINAL.pdf)

¹ Importantly, all contaminated groundwater daylight as surface water inside DOE’s management boundary. Most, but not all, groundwater daylight as surface water within the DOE or Refuge lands.

Jody [Nelson – site ecologist] explained that some areas were sparsely vegetated because the SID [South Interceptor Ditch] was dry. However, even with the drought, vegetation is still doing very well. He explained that dry conditions force roots down further into the soil, which is actually a benefit of drought conditions. Deb Gardner [Boulder County] commented that drought may be the “new normal” for this area and asked if there were any plans to address this. Jody said that if conditions were to change, they would re-seed and could even modify the seed mix they use. Vera Moritz [EPA] noted that some grass seeds being used at Rocky Flats were developed in the New Mexico desert.

Jody also commented that different mixes were used for different slope positions, moisture regimes, etc.

At the meeting, we will explore these issues in more depth. Open space staff from Boulder, Boulder County and Jefferson County will join the conversation and share strategies they are evaluating and employing in address drought management.

Please let me know what questions you have.



Federal Register

**Thursday,
October 8, 2009**

Part VII

The President

**Executive Order 13514—Federal
Leadership in Environmental, Energy,
and Economic Performance**

Presidential Documents

Title3—

Executive Order 13514 of October 5, 2009

The President

Federal Leadership in Environmental, Energy, and Economic Performance

By the authority vested in me as President by the Constitution and the laws of the United States of America, and to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of greenhouse gas emissions a priority for Federal agencies, it is hereby ordered as follows:

Section 1. Policy. In order to create a clean energy economy that will increase our Nation's prosperity, promote energy security, protect the interests of taxpayers, and safeguard the health of our environment, the Federal Government must lead by example. It is therefore the policy of the United States that Federal agencies shall increase energy efficiency; measure, report, and reduce their greenhouse gas emissions from direct and indirect activities; conserve and protect water resources through efficiency, reuse, and stormwater management; eliminate waste, recycle, and prevent pollution; leverage agency acquisitions to foster markets for sustainable technologies and environmentally preferable materials, products, and services; design, construct, maintain, and operate high performance sustainable buildings in sustainable locations; strengthen the vitality and livability of the communities in which Federal facilities are located; and inform Federal employees about and involve them in the achievement of these goals.

It is further the policy of the United States that to achieve these goals and support their respective missions, agencies shall prioritize actions based on a full accounting of both economic and social benefits and costs and shall drive continuous improvement by annually evaluating performance, extending or expanding projects that have net benefits, and reassessing or discontinuing under-performing projects.

Finally, it is also the policy of the United States that agencies' efforts and outcomes in implementing this order shall be transparent and that agencies shall therefore disclose results associated with the actions taken pursuant to this order on publicly available Federal websites.

Sec. 2. Goals for Agencies. In implementing the policy set forth in section 1 of this order, and preparing and implementing the Strategic Sustainability Performance Plan called for in section 8 of this order, the head of each agency shall:

(a) within 90 days of the date of this order, establish and report to the Chair of the Council on Environmental Quality (CEQ Chair) and the Director of the Office of Management and Budget (OMB Director) a percentage reduction target for agency-wide reductions of scope 1 and 2 greenhouse gas emissions in absolute terms by fiscal year 2020, relative to a fiscal year 2008 baseline of the agency's scope 1 and 2 greenhouse gas emissions. Where appropriate, the target shall exclude direct emissions from excluded vehicles and equipment and from electric power produced and sold commercially to other parties in the course of regular business. This target shall be subject to review and approval by the CEQ Chair in consultation with the OMB Director under section 5 of this order. In establishing the target, the agency head shall consider reductions associated with:

(i) reducing energy intensity in agency buildings;

- (ii) increasing agency use of renewable energy and implementing renewable energy generation projects on agency property; and
- (iii) reducing the use of fossil fuels by:
 - (A) using low greenhouse gas emitting vehicles including alternative fuel vehicles;
 - (B) optimizing the number of vehicles in the agency fleet; and
 - (C) reducing, if the agency operates a fleet of at least 20 motor vehicles, the agency fleet's total consumption of petroleum products by a minimum of 2 percent annually through the end of fiscal year 2020, relative to a baseline of fiscal year 2005;
- (b) within 240 days of the date of this order and concurrent with submission of the Strategic Sustainability Performance Plan as described in section 8 of this order, establish and report to the CEQ Chair and the OMB Director a percentage reduction target for reducing agency-wide scope 3 greenhouse gas emissions in absolute terms by fiscal year 2020, relative to a fiscal year 2008 baseline of agency scope 3 emissions. This target shall be subject to review and approval by the CEQ Chair in consultation with the OMB Director under section 5 of this order. In establishing the target, the agency head shall consider reductions associated with:
 - (i) pursuing opportunities with vendors and contractors to address and incorporate incentives to reduce greenhouse gas emissions (such as changes to manufacturing, utility or delivery services, modes of transportation used, or other changes in supply chain activities);
 - (ii) implementing strategies and accommodations for transit, travel, training, and conferencing that actively support lower-carbon commuting and travel by agency staff;
 - (iii) greenhouse gas emission reductions associated with pursuing other relevant goals in this section; and
 - (iv) developing and implementing innovative policies and practices to address scope 3 greenhouse gas emissions unique to agency operations;
- (c) establish and report to the CEQ Chair and OMB Director a comprehensive inventory of absolute greenhouse gas emissions, including scope 1, scope 2, and specified scope 3 emissions (i) within 15 months of the date of this order for fiscal year 2010, and (ii) thereafter, annually at the end of January, for the preceding fiscal year.
- (d) improve water use efficiency and management by:
 - (i) reducing potable water consumption intensity by 2 percent annually through fiscal year 2020, or 26 percent by the end of fiscal year 2020, relative to a baseline of the agency's water consumption in fiscal year 2007, by implementing water management strategies including water-efficient and low-flow fixtures and efficient cooling towers;
 - (ii) reducing agency industrial, landscaping, and agricultural water consumption by 2 percent annually or 20 percent by the end of fiscal year 2020 relative to a baseline of the agency's industrial, landscaping, and agricultural water consumption in fiscal year 2010;
 - (iii) consistent with State law, identifying, promoting, and implementing water reuse strategies that reduce potable water consumption; and
 - (iv) implementing and achieving the objectives identified in the stormwater management guidance referenced in section 14 of this order;
- (e) promote pollution prevention and eliminate waste by:
 - (i) minimizing the generation of waste and pollutants through source reduction;
 - (ii) diverting at least 50 percent of non-hazardous solid waste, excluding construction and demolition debris, by the end of fiscal year 2015;
 - (iii) diverting at least 50 percent of construction and demolition materials and debris by the end of fiscal year 2015;
 - (iv) reducing printing paper use and acquiring uncoated printing and writing paper containing at least 30 percent postconsumer fiber;

- (v) reducing and minimizing the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of;
 - (vi) increasing diversion of compostable and organic material from the waste stream;
 - (vii) implementing integrated pest management and other appropriate landscape management practices;
 - (viii) increasing agency use of acceptable alternative chemicals and processes in keeping with the agency's procurement policies;
 - (ix) decreasing agency use of chemicals where such decrease will assist the agency in achieving greenhouse gas emission reduction targets under section 2(a) and (b) of this order; and
 - (x) reporting in accordance with the requirements of sections 301 through 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11001 *et seq.*);
- (f) advance regional and local integrated planning by:
- (i) participating in regional transportation planning and recognizing existing community transportation infrastructure;
 - (ii) aligning Federal policies to increase the effectiveness of local planning for energy choices such as locally generated renewable energy;
 - (iii) ensuring that planning for new Federal facilities or new leases includes consideration of sites that are pedestrian friendly, near existing employment centers, and accessible to public transit, and emphasizes existing central cities and, in rural communities, existing or planned town centers;
 - (iv) identifying and analyzing impacts from energy usage and alternative energy sources in all Environmental Impact Statements and Environmental Assessments for proposals for new or expanded Federal facilities under the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*); and
 - (v) coordinating with regional programs for Federal, State, tribal, and local ecosystem, watershed, and environmental management;
- (g) implement high performance sustainable Federal building design, construction, operation and management, maintenance, and deconstruction including by:
- (i) beginning in 2020 and thereafter, ensuring that all new Federal buildings that enter the planning process are designed to achieve zero-net-energy by 2030;
 - (ii) ensuring that all new construction, major renovation, or repair and alteration of Federal buildings complies with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*, (Guiding Principles);
 - (iii) ensuring that at least 15 percent of the agency's existing buildings (above 5,000 gross square feet) and building leases (above 5,000 gross square feet) meet the Guiding Principles by fiscal year 2015 and that the agency makes annual progress toward 100-percent conformance with the Guiding Principles for its building inventory;
 - (iv) pursuing cost-effective, innovative strategies, such as highly reflective and vegetated roofs, to minimize consumption of energy, water, and materials;
 - (v) managing existing building systems to reduce the consumption of energy, water, and materials, and identifying alternatives to renovation that reduce existing assets' deferred maintenance costs;
 - (vi) when adding assets to the agency's real property inventory, identifying opportunities to consolidate and dispose of existing assets, optimize the performance of the agency's real-property portfolio, and reduce associated environmental impacts; and
 - (vii) ensuring that rehabilitation of federally owned historic buildings utilizes best practices and technologies in retrofitting to promote long-term viability of the buildings;
- (h) advance sustainable acquisition to ensure that 95 percent of new contract actions including task and delivery orders, for products and services with the exception of acquisition of weapon systems, are energy-

efficient (Energy Star or Federal Energy Management Program (FEMP) designated), water-efficient, biobased, environmentally preferable (e.g., Electronic Product Environmental Assessment Tool (EPEAT) certified), non-ozone depleting, contain recycled content, or are non-toxic or less-toxic alternatives, where such products and services meet agency performance requirements;

(i) promote electronics stewardship, in particular by:

(i) ensuring procurement preference for EPEAT-registered electronic products;

(ii) establishing and implementing policies to enable power management, duplex printing, and other energy-efficient or environmentally preferable features on all eligible agency electronic products;

(iii) employing environmentally sound practices with respect to the agency's disposition of all agency excess or surplus electronic products;

(iv) ensuring the procurement of Energy Star and FEMP designated electronic equipment;

(v) implementing best management practices for energy-efficient management of servers and Federal data centers; and

(j) sustain environmental management, including by:

(i) continuing implementation of formal environmental management systems at all appropriate organizational levels; and

(ii) ensuring these formal systems are appropriately implemented and maintained to achieve the performance necessary to meet the goals of this order.

Sec. 3. *Steering Committee on Federal Sustainability.* The OMB Director and the CEQ Chair shall:

(a) establish an interagency Steering Committee (Steering Committee) on Federal Sustainability composed of the Federal Environmental Executive, designated under section 6 of Executive Order 13423 of January 24, 2007, and Agency Senior Sustainability Officers, designated under section 7 of this order, and that shall:

(i) serve in the dual capacity of the Steering Committee on Strengthening Federal Environmental, Energy, and Transportation Management designated by the CEQ Chair pursuant to section 4 of Executive Order 13423;

(ii) advise the OMB Director and the CEQ Chair on implementation of this order;

(iii) facilitate the implementation of each agency's Strategic Sustainability Performance Plan; and

(iv) share information and promote progress towards the goals of this order;

(b) enlist the support of other organizations within the Federal Government to assist the Steering Committee in addressing the goals of this order;

(c) establish and disband, as appropriate, interagency subcommittees of the Steering Committee, to assist the Steering Committee in carrying out its responsibilities;

(d) determine appropriate Federal actions to achieve the policy of section 1 and the goals of section 2 of this order;

(e) ensure that Federal agencies are held accountable for conformance with the requirements of this order; and

(f) in coordination with the Department of Energy's Federal Energy Management Program and the Office of the Federal Environmental Executive designated under section 6 of Executive Order 13423, provide guidance and assistance to facilitate the development of agency targets for greenhouse gas emission reductions required under subsections 2(a) and (b) of this order.

Sec. 4. *Additional Duties of the Director of the Office of Management and Budget.* In addition to the duties of the OMB Director specified elsewhere in this order, the OMB Director shall:

(a) review and approve each agency's multi-year Strategic Sustainability Performance Plan under section 8 of this order and each update of the Plan. The Director shall, where feasible, review each agency's Plan concurrently with OMB's review and evaluation of the agency's budget request;

(b) prepare scorecards providing periodic evaluation of Federal agency performance in implementing this order and publish scorecard results on a publicly available website; and

(c) approve and issue instructions to the heads of agencies concerning budget and appropriations matters relating to implementation of this order.

Sec. 5. *Additional Duties of the Chair of the Council on Environmental Quality.* In addition to the duties of the CEQ Chair specified elsewhere in this order, the CEQ Chair shall:

(a) issue guidance for greenhouse gas accounting and reporting required under section 2 of this order;

(b) issue instructions to implement this order, in addition to instructions within the authority of the OMB Director to issue under subsection 4(c) of this order;

(c) review and approve each agency's targets, in consultation with the OMB Director, for agency-wide reductions of greenhouse gas emissions under section 2 of this order;

(d) prepare, in coordination with the OMB Director, streamlined reporting metrics to determine each agency's progress under section 2 of this order;

(e) review and evaluate each agency's multi-year Strategic Sustainability Performance Plan under section 8 of this order and each update of the Plan;

(f) assess agency progress toward achieving the goals and policies of this order, and provide its assessment of the agency's progress to the OMB Director;

(g) within 120 days of the date of this order, provide the President with an aggregate Federal Government-wide target for reducing scope 1 and 2 greenhouse gas emissions in absolute terms by fiscal year 2020 relative to a fiscal year 2008 baseline;

(h) within 270 days of the date of this order, provide the President with an aggregate Federal Government-wide target for reducing scope 3 greenhouse gas emissions in absolute terms by fiscal year 2020 relative to a fiscal year 2008 baseline;

(i) establish and disband, as appropriate, interagency working groups to provide recommendations to the CEQ for areas of Federal agency operational and managerial improvement associated with the goals of this order; and

(j) administer the Presidential leadership awards program, established under subsection 4(c) of Executive Order 13423, to recognize exceptional and outstanding agency performance with respect to achieving the goals of this order and to recognize extraordinary innovation, technologies, and practices employed to achieve the goals of this order.

Sec. 6. *Duties of the Federal Environmental Executive.* The Federal Environmental Executive designated by the President to head the Office of the Federal Environmental Executive, pursuant to section 6 of Executive Order 13423, shall:

(a) identify strategies and tools to assist Federal implementation efforts under this order, including through the sharing of best practices from successful Federal sustainability efforts; and

(b) monitor and advise the CEQ Chair and the OMB Director on the agencies' implementation of this order and their progress in achieving the order's policies and goals.

Sec. 7. *Agency Senior Sustainability Officers.* (a) Within 30 days of the date of this order, the head of each agency shall designate from among

the agency's senior management officials a Senior Sustainability Officer who shall be accountable for agency conformance with the requirements of this order; and shall report such designation to the OMB Director and the CEQ Chair.

(b) The Senior Sustainability Officer for each agency shall perform the functions of the senior agency official designated by the head of each agency pursuant to section 3(d)(i) of Executive Order 13423 and shall be responsible for:

(i) preparing the targets for agency-wide reductions and the inventory of greenhouse gas emissions required under subsections 2(a), (b), and (c) of this order;

(ii) within 240 days of the date of this order, and annually thereafter, preparing and submitting to the CEQ Chair and the OMB Director, for their review and approval, a multi-year Strategic Sustainability Performance Plan (Sustainability Plan or Plan) as described in section 8 of this order;

(iii) preparing and implementing the approved Plan in coordination with appropriate offices and organizations within the agency including the General Counsel, Chief Information Officer, Chief Acquisition Officer, Chief Financial Officer, and Senior Real Property Officers, and in coordination with other agency plans, policies, and activities;

(iv) monitoring the agency's performance and progress in implementing the Plan, and reporting the performance and progress to the CEQ Chair and the OMB Director, on such schedule and in such format as the Chair and the Director may require; and

(v) reporting annually to the head of the agency on the adequacy and effectiveness of the agency's Plan in implementing this order.

Sec. 8. Agency Strategic Sustainability Performance Plan. Each agency shall develop, implement, and annually update an integrated Strategic Sustainability Performance Plan that will prioritize agency actions based on lifecycle return on investment. Each agency Plan and update shall be subject to approval by the OMB Director under section 4 of this order. With respect to the period beginning in fiscal year 2011 and continuing through the end of fiscal year 2021, each agency Plan shall:

(a) include a policy statement committing the agency to compliance with environmental and energy statutes, regulations, and Executive Orders;

(b) achieve the sustainability goals and targets, including greenhouse gas reduction targets, established under section 2 of this order;

(c) be integrated into the agency's strategic planning and budget process, including the agency's strategic plan under section 3 of the Government Performance and Results Act of 1993, as amended (5 U.S.C. 306);

(d) identify agency activities, policies, plans, procedures, and practices that are relevant to the agency's implementation of this order, and where necessary, provide for development and implementation of new or revised policies, plans, procedures, and practices;

(e) identify specific agency goals, a schedule, milestones, and approaches for achieving results, and quantifiable metrics for agency implementation of this order;

(f) take into consideration environmental measures as well as economic and social benefits and costs in evaluating projects and activities based on lifecycle return on investment;

(g) outline planned actions to provide information about agency progress and performance with respect to achieving the goals of this order on a publicly available Federal website;

(h) incorporate actions for achieving progress metrics identified by the OMB Director and the CEQ Chair;

(i) evaluate agency climate-change risks and vulnerabilities to manage the effects of climate change on the agency's operations and mission in both the short and long term; and

(j) identify in annual updates opportunities for improvement and evaluation of past performance in order to extend or expand projects that have net lifecycle benefits, and reassess or discontinue under-performing projects.

Sec. 9. *Recommendations for Greenhouse Gas Accounting and Reporting.* The Department of Energy, through its Federal Energy Management Program, and in coordination with the Environmental Protection Agency, the Department of Defense, the General Services Administration, the Department of the Interior, the Department of Commerce, and other agencies as appropriate, shall:

(a) within 180 days of the date of this order develop and provide to the CEQ Chair recommended Federal greenhouse gas reporting and accounting procedures for agencies to use in carrying out their obligations under subsections 2(a), (b), and (c) of this order, including procedures that will ensure that agencies:

(i) accurately and consistently quantify and account for greenhouse gas emissions from all scope 1, 2, and 3 sources, using accepted greenhouse gas accounting and reporting principles, and identify appropriate opportunities to revise the fiscal year 2008 baseline to address significant changes in factors affecting agency emissions such as reorganization and improvements in accuracy of data collection and estimation procedures or other major changes that would otherwise render the initial baseline information unsuitable;

(ii) consider past Federal agency efforts to reduce greenhouse gas emissions; and

(iii) consider and account for sequestration and emissions of greenhouse gases resulting from Federal land management practices;

(b) within 1 year of the date of this order, to ensure consistent and accurate reporting under this section, provide electronic accounting and reporting capability for the Federal greenhouse gas reporting procedures developed under subsection (a) of this section, and to the extent practicable, ensure compatibility between this capability and existing Federal agency reporting systems; and

(c) every 3 years from the date of the CEQ Chair's issuance of the initial version of the reporting guidance, and as otherwise necessary, develop and provide recommendations to the CEQ Chair for revised Federal greenhouse gas reporting procedures for agencies to use in implementing subsections 2(a), (b), and (c) of this order.

Sec. 10. *Recommendations for Sustainable Locations for Federal Facilities.* Within 180 days of the date of this order, the Department of Transportation, in accordance with its Sustainable Partnership Agreement with the Department of Housing and Urban Development and the Environmental Protection Agency, and in coordination with the General Services Administration, the Department of Homeland Security, the Department of Defense, and other agencies as appropriate, shall:

(a) review existing policies and practices associated with site selection for Federal facilities; and

(b) provide recommendations to the CEQ Chair regarding sustainable location strategies for consideration in Sustainability Plans. The recommendations shall be consistent with principles of sustainable development including prioritizing central business district and rural town center locations, prioritizing sites well served by transit, including site design elements that ensure safe and convenient pedestrian access, consideration of transit access and proximity to housing affordable to a wide range of Federal employees, adaptive reuse or renovation of buildings, avoidance of development of sensitive land resources, and evaluation of parking management strategies.

Sec. 11. *Recommendations for Federal Local Transportation Logistics.* Within 180 days of the date of this order, the General Services Administration, in coordination with the Department of Transportation, the Department of

the Treasury, the Department of Energy, the Office of Personnel Management, and other agencies as appropriate, shall review current policies and practices associated with use of public transportation by Federal personnel, Federal shuttle bus and vehicle transportation routes supported by multiple Federal agencies, and use of alternative fuel vehicles in Federal shuttle bus fleets, and shall provide recommendations to the CEQ Chair on how these policies and practices could be revised to support the implementation of this order and the achievement of its policies and goals.

Sec. 12. *Guidance for Federal Fleet Management.* Within 180 days of the date of this order, the Department of Energy, in coordination with the General Services Administration, shall issue guidance on Federal fleet management that addresses the acquisition of alternative fuel vehicles and use of alternative fuels; the use of biodiesel blends in diesel vehicles; the acquisition of electric vehicles for appropriate functions; improvement of fleet fuel economy; the optimizing of fleets to the agency mission; petroleum reduction strategies, such as the acquisition of low greenhouse gas emitting vehicles and the reduction of vehicle miles traveled; and the installation of renewable fuel pumps at Federal fleet fueling centers.

Sec. 13. *Recommendations for Vendor and Contractor Emissions.* Within 180 days of the date of this order, the General Services Administration, in coordination with the Department of Defense, the Environmental Protection Agency, and other agencies as appropriate, shall review and provide recommendations to the CEQ Chair and the Administrator of OMB's Office of Federal Procurement Policy regarding the feasibility of working with the Federal vendor and contractor community to provide information that will assist Federal agencies in tracking and reducing scope 3 greenhouse gas emissions related to the supply of products and services to the Government. These recommendations should consider the potential impacts on the procurement process, and the Federal vendor and contractor community including small businesses and other socioeconomic procurement programs. Recommendations should also explore the feasibility of:

- (a) requiring vendors and contractors to register with a voluntary registry or organization for reporting greenhouse gas emissions;
- (b) requiring contractors, as part of a new or revised registration under the Central Contractor Registration or other tracking system, to develop and make available its greenhouse gas inventory and description of efforts to mitigate greenhouse gas emissions;
- (c) using Federal Government purchasing preferences or other incentives for products manufactured using processes that minimize greenhouse gas emissions; and
- (d) other options for encouraging sustainable practices and reducing greenhouse gas emissions.

Sec. 14. *Stormwater Guidance for Federal Facilities.* Within 60 days of the date of this order, the Environmental Protection Agency, in coordination with other Federal agencies as appropriate, shall issue guidance on the implementation of section 438 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17094).

Sec. 15. *Regional Coordination.* Within 180 days of the date of this order, the Federal Environmental Executive shall develop and implement a regional implementation plan to support the goals of this order taking into account energy and environmental priorities of particular regions of the United States.

Sec. 16. *Agency Roles in Support of Federal Adaptation Strategy.* In addition to other roles and responsibilities of agencies with respect to environmental leadership as specified in this order, the agencies shall participate actively in the interagency Climate Change Adaptation Task Force, which is already engaged in developing the domestic and international dimensions of a U.S. strategy for adaptation to climate change, and shall develop approaches through which the policies and practices of the agencies can be made compatible with and reinforce that strategy. Within 1 year of the date of

this order the CEQ Chair shall provide to the President, following consultation with the agencies and the Climate Change Adaptation Task Force, as appropriate, a progress report on agency actions in support of the national adaptation strategy and recommendations for any further such measures as the CEQ Chair may deem necessary.

Sec. 17. *Limitations.* (a) This order shall apply to an agency with respect to the activities, personnel, resources, and facilities of the agency that are located within the United States. The head of an agency may provide that this order shall apply in whole or in part with respect to the activities, personnel, resources, and facilities of the agency that are not located within the United States, if the head of the agency determines that such application is in the interest of the United States.

(b) The head of an agency shall manage activities, personnel, resources, and facilities of the agency that are not located within the United States, and with respect to which the head of the agency has not made a determination under subsection (a) of this section, in a manner consistent with the policy set forth in section 1 of this order to the extent the head of the agency determines practicable.

Sec. 18. *Exemption Authority.*

(a) The Director of National Intelligence may exempt an intelligence activity of the United States, and related personnel, resources, and facilities, from the provisions of this order, other than this subsection and section 20, to the extent the Director determines necessary to protect intelligence sources and methods from unauthorized disclosure.

(b) The head of an agency may exempt law enforcement activities of that agency, and related personnel, resources, and facilities, from the provisions of this order, other than this subsection and section 20, to the extent the head of an agency determines necessary to protect undercover operations from unauthorized disclosure.

(c) (i) The head of an agency may exempt law enforcement, protective, emergency response, or military tactical vehicle fleets of that agency from the provisions of this order, other than this subsection and section 20.

(ii) Heads of agencies shall manage fleets to which paragraph (i) of this subsection refers in a manner consistent with the policy set forth in section 1 of this order to the extent they determine practicable.

(d) The head of an agency may exempt particular agency activities and facilities from the provisions of this order, other than this subsection and section 20, where it is in the interest of national security. If the head of an agency issues an exemption under this section, the agency must notify the CEQ Chair in writing within 30 days of issuance of the exemption under this subsection. To the maximum extent practicable, and without compromising national security, each agency shall strive to comply with the purposes, goals, and implementation steps in this order.

(e) The head of an agency may submit to the President, through the CEQ Chair, a request for an exemption of an agency activity, and related personnel, resources, and facilities, from this order.

Sec. 19. *Definitions.* As used in this order:

(a) “absolute greenhouse gas emissions” means total greenhouse gas emissions without normalization for activity levels and includes any allowable consideration of sequestration;

(b) “agency” means an executive agency as defined in section 105 of title 5, United States Code, excluding the Government Accountability Office;

(c) “alternative fuel vehicle” means vehicles defined by section 301 of the Energy Policy Act of 1992, as amended (42 U.S.C. 13211), and otherwise includes electric fueled vehicles, hybrid electric vehicles, plug-in hybrid electric vehicles, dedicated alternative fuel vehicles, dual fueled alternative

fuel vehicles, qualified fuel cell motor vehicles, advanced lean burn technology motor vehicles, self-propelled vehicles such as bicycles and any other alternative fuel vehicles that are defined by statute;

(d) “construction and demolition materials and debris” means materials and debris generated during construction, renovation, demolition, or dismantling of all structures and buildings and associated infrastructure;

(e) “divert” and “diverting” means redirecting materials that might otherwise be placed in the waste stream to recycling or recovery, excluding diversion to waste-to-energy facilities;

(f) “energy intensity” means energy consumption per square foot of building space, including industrial or laboratory facilities;

(g) “environmental” means environmental aspects of internal agency operations and activities, including those aspects related to energy and transportation functions;

(h) “excluded vehicles and equipment” means any vehicle, vessel, aircraft, or non-road equipment owned or operated by an agency of the Federal Government that is used in:

(i) combat support, combat service support, tactical or relief operations, or training for such operations;

(ii) Federal law enforcement (including protective service and investigation);

(iii) emergency response (including fire and rescue); or

(iv) spaceflight vehicles (including associated ground-support equipment);

(i) “greenhouse gases” means carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride;

(j) “renewable energy” means energy produced by solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project;

(k) “scope 1, 2, and 3” mean;

(i) scope 1: direct greenhouse gas emissions from sources that are owned or controlled by the Federal agency;

(ii) scope 2: direct greenhouse gas emissions resulting from the generation of electricity, heat, or steam purchased by a Federal agency; and

(iii) scope 3: greenhouse gas emissions from sources not owned or directly controlled by a Federal agency but related to agency activities such as vendor supply chains, delivery services, and employee travel and commuting;

(l) “sustainability” and “sustainable” mean to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations;

(m) “United States” means the fifty States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, and the Northern Mariana Islands, and associated territorial waters and airspace;

(n) “water consumption intensity” means water consumption per square foot of building space; and

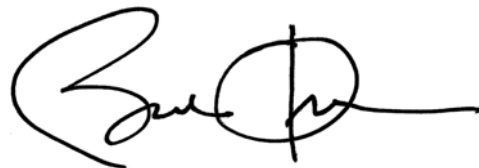
(o) “zero-net-energy building” means a building that is designed, constructed, and operated to require a greatly reduced quantity of energy to operate, meet the balance of energy needs from sources of energy that do not produce greenhouse gases, and therefore result in no net emissions of greenhouse gases and be economically viable.

Sec. 20. General Provisions.

(a) This order shall be implemented in a manner consistent with applicable law and subject to the availability of appropriations.

(b) Nothing in this order shall be construed to impair or otherwise affect the functions of the OMB Director relating to budgetary, administrative, or legislative proposals.

(c) This order is intended only to improve the internal management of the Federal Government and is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

A handwritten signature in black ink, appearing to be Barack Obama's signature, consisting of a large 'B' followed by a circle and a horizontal line.

THE WHITE HOUSE,
Washington, October 5, 2009.

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Federal Actions for a Climate Resilient Nation



**Progress Report of the Interagency
Climate Change Adaptation Task Force**

October 28, 2011

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Title Page Photos (from left to right): Aurora, NC, September 13, 2011 - The elevated house on the right received only minor damage when Hurricane Irene pushed 5 feet of storm surge ashore. The house on the left was completely destroyed (Credit: FEMA, Tim Burkitt); 2002 Valley Fire that burned San Juan National Forest lands and many homes located at the urban interface (Credit: U.S. Forest Service, Craig Goodell); Local business along Las Olas Boulevard in downtown Fort Lauderdale, FL inundated by sea water (Credit: Broward County Natural Resources Planning and Management Division); The fast attack submarine USS Providence (SSN 719) is moored at the North Pole in the Arctic Ocean to commemorate the 50th anniversary of the first submarine polar transit completed by the USS Nautilus (SSN 571) in 1958 (Credit: U.S. Navy, Petty Officer 1st Class J. Thompson).

LIST OF ACRONYMS

BLM – Bureau of Land Management
CDC – Centers for Disease Control
CEQ – Council on Environmental Quality
CSC – Climate Science Centers
DOE – Department of Energy
DOI – Department of the Interior
DOT – Department of Transportation
EPA – Environmental Protection Agency
FEMA – Federal Emergency Management Agency
FTA – Federal Transit Administration
HUD – Department of Housing and Urban Development
LCC – Landscape Conservation Cooperatives
MCC – Millennium Challenge Corporation
NASA – National Aeronautics and Space Administration
NCA – National Climate Assessment
NFIP – National Flood Insurance Program
NOAA – National Oceanic and Atmospheric Administration
NOC – National Ocean Council
NPS – National Park Service
OSTP – Office of Science and Technology Policy
REA – Rapid Ecoregional Assessments
RISA – Regional Integrated Sciences and Assessments
RPA – Regional Plan Association
Task Force – Interagency Climate Change Adaptation Task Force
USACE – U.S. Army Corps of Engineers
USAID – U.S. Agency for International Development
USDA – U.S. Department of Agriculture
USFS – U.S. Forest Service
USFWS – U.S. Fish and Wildlife Service
USGCRP – U.S. Global Change Research Program
USGS – U.S. Geological Survey
WARN – Water/Wastewater Agency Response Network

Executive Summary

In October 2009, President Obama signed Executive Order 13514, *Federal Leadership in Environmental and Energy Performance*, which sets sustainability goals for Federal agencies and focuses on making improvements in agency environmental, energy, and economic performance. The Executive Order charged the Interagency Climate Change Adaptation Task Force with providing recommendations on how Federal policies, programs, and planning efforts can better prepare the United States for climate change. In October 2010, the Task Force recommended a set of policy goals and actions in its Progress Report to the President. The Task Force outlined how the Federal Government should work with local, state, and tribal partners to provide leadership, coordination, science, and services to address climate risks to the Nation as well as Federal assets and operations. In the 2010 Report, the Task Force committed to providing an update on Federal Government adaptation progress in 2011. This report provides that update in five key adaptation areas that align with the policy goals set forth by the Task Force in 2010:

Integrating Adaptation into Federal Government Planning and Activities: Agencies are taking steps to manage climate impacts to Federal agency missions, programs, and operations to ensure that resources are invested wisely and Federal services remain effective for the American people. Agencies are developing climate adaptation plans to identify their vulnerabilities and prioritize activities that reduce climate risk.

Building Resilience to Climate Change in Communities: Recognizing that most adaptation occurs at the local level, Federal agencies are working with diverse stakeholders in communities to prepare for a range of extreme weather and climate impacts (e.g. flooding, drought, and wildfire) that put people, property, local economies, and ecosystems at risk.

Improving Accessibility and Coordination of Science for Decision Making: To advance understanding and management of climate risks, the Federal Government is working to develop strong partnerships, enhance regional coordination of climate science and services, and provide accessible information and tools to help decision makers develop strategies to reduce extreme weather impacts and climate risks.

Developing Strategies to Safeguard Natural Resources in a Changing Climate: Recognizing that American communities depend on natural resources and the valuable ecosystem services they provide, agencies are working with key partners to create a coordinated set of national strategies to help safeguard the Nation's valuable freshwater, ocean, fish, wildlife, and plant resources in a changing climate.

Enhancing Efforts to Lead and Support International Adaptation: To promote economic development, regional stability, and U.S. security interests around the world, the Federal Government is supporting a range of bilateral and multilateral climate change adaptation activities and coordinating defense, development and diplomacy policies to take into account growing climate risks.

Extreme weather and other climate change impacts pose significant social, economic, and environmental risks to the United States. The U.S. Government has a responsibility to reduce climate risks to public health and safety, economic well-being, natural resources, and Federal programs and services. While much work remains, this report describes important Federal progress toward the Task Force's strategic vision of a *resilient, healthy, and prosperous Nation in the face of a changing climate*.

Introduction

The Interagency Climate Change Adaptation Task Force (hereafter Task Force) was established in 2009 to assess key steps needed to help the Federal Government understand and adapt to climate change. The Task Force is comprised of senior representatives from over 20 Departments and Agencies (Appendix A) and is co-chaired by the Council on Environmental Quality (CEQ), the Office of Science and Technology Policy (OSTP), and the National Oceanic and Atmospheric Administration (NOAA). As part of Executive Order 13514, President Obama directed the Task Force to examine how the Federal Government can better prepare the United States for climate impacts. In October 2010, the Task Force submitted a Progress Report to the President outlining a set of Federal climate adaptation policy goals (Appendix B) and guiding principles (Appendix C). This report provides an update on Federal Government adaptation.

In the 2010 Progress Report, the Task Force called on Federal agencies to demonstrate leadership on climate change adaptation. Rising sea levels, drought, extreme weather events, loss of land and sea ice, and other climate-related impacts threaten communities, ecosystems, and Federal services and assets. As people in the United States and around the globe experience these impacts, the Federal Government will face growing demands for accurate climate information, disaster risk reduction, and preparedness and response support. Through stakeholder and public listening sessions, outreach events, and online comments, the 2010 Task Force Report determined that the Federal Government has a responsibility to safeguard Federal services and resources and to help states, tribes, and communities manage climate-related risks by improving access to climate information, enhancing coordination and capacity, and leading and supporting actions that reduce vulnerability and increase resilience.

Federal agencies are taking steps to prepare the Nation for the impacts of climate change and have demonstrated significant progress towards the Task Force's adaptation policy goals in five key areas. These efforts are informed by the guiding principles developed by the Task Force and ensure that Federal resources are invested wisely and that the Federal Government's operations and services remain effective in a changing climate. Going forward, the Task Force will continue to support and coordinate these and other Federal actions to realize the Task Force's vision of *a resilient, healthy, and prosperous Nation in the face of a changing climate*.

Key Areas of Federal Adaptation Progress

- **Integrating Adaptation into Federal Government Planning and Activities**
- **Building Resilience to Climate Change in Communities**
- **Improving Accessibility and Coordination of Science for Decision Making**
- **Developing Strategies to Safeguard Natural Resources in a Changing Climate**
- **Enhancing Efforts to Lead and Support International Adaptation**

The Task Force has played an important leadership and coordination role in the Federal Government's adaptation activities. The Task Force directly supports Federal adaptation efforts related to communities, public health, insurance, science and services, natural resources (e.g., freshwater, oceans, fish, wildlife and plants), international contexts, and non-Federal partnerships and outreach. In addition, the Task Force

provides a forum for interagency collaboration on adaptation and is consulted regularly by Federal agencies and non-Federal entities for adaptation expertise, coordination, and partnership opportunities.

The Need to Adapt

Climate change impacts pose significant social, economic, and environmental risks to the United States and the global community. As documented in the latest U.S. National Climate Assessment (NCA) report, *Global Climate Change Impacts in the United States*, and the National Research Council's report series on *America's Climate Choices*, communities across the Nation are already experiencing a range of climatic changes, including more frequent and extreme precipitation events, longer wildfire seasons, reduced snowpack, extreme heat events, increasing ocean temperatures, and rising sea levels.^{1,2} The impacts from these changes are affecting livelihoods, infrastructure, ecosystems, food production, energy supply, national security, and the cultural heritage of populations and communities. Certain communities and ecological systems are particularly vulnerable to these impacts. We know enough about climate risks to take actions now that ensure a safer, more resilient and prosperous future.

Definitions of Key Terms

Adaptation: Adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects.

Resilience: A capability to anticipate, prepare for, respond to, and recover from significant multihazard threats with minimum damage to social well-being, the economy, and the environment.

Risk: A combination of the magnitude of the potential consequence(s) of climate change impact(s) and the likelihood that the consequence(s) will occur.

Vulnerability: The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

Source: National Research Council. 2011. *America's Climate Choices*: www.nap.edu/catalog.php?record_id=12781

Climate change is expected to significantly affect the United States. By the end of this century, global sea level is expected to rise by more than 2 feet in a low emissions scenario or nearly 3.5 feet in a higher emissions scenario.³ Higher sea levels, especially in combination with storm surge, will increasingly inundate U.S. coastal communities and threaten coastal ecosystems and infrastructure, such as military installations.⁴ Heat waves are expected to become more frequent and intense, posing a threat to human health and agriculture.⁵ For rivers fed by snowpack, runoff will continue to occur earlier, with reduced flows late in the summer, and the potential for water shortages that can affect the supply of water for drinking, agriculture, electricity production, and ecosystems.⁶ Economic, social, and natural systems are also inter-connected on a global scale, meaning that climate impacts in other regions of the world can pose serious economic and security risks to the United States. Increases in extreme weather and climate

¹ USGCRP. (2009). *Global Climate Change Impacts in the United States*. www.globalchange.gov/publications/reports

² National Research Council. (2011). *America's Climate Choices*. The National Academies Press. Washington, DC www.nap.edu/catalog.php?record_id=12781

³ USGCRP. (2009). *Global Climate Change Impacts in the United States*. www.globalchange.gov/publications/reports

⁴ US Department of Defense. (2010). *Quadrennial Defense Review*. www.defense.gov/qdr/

⁵ USGCRP. (2009). *Global Climate Change Impacts in the United States*. www.globalchange.gov/publications/reports

⁶ USGCRP. (2009). *Global Climate Change Impacts in the United States*. www.globalchange.gov/publications/reports

events will contribute to food and water scarcity, which can intensify existing tensions over access to life-sustaining resources.

Extreme weather and greater climate variability is expected to become more common in the future.⁷ While it is not possible to attribute any individual extreme event to climate change, these events do provide valuable insight into the climate-related vulnerabilities and challenges faced by the United States. In April 2011, the United States experienced record-breaking floods, tornadoes, drought, and wildfires all within a single month. As of September 2011, NOAA's National Climatic Data Center had already reported ten weather events from 2011 for which damages and/or costs reached or exceeded \$1 billion each,⁸ exceeding the previous *annual* record of nine events recorded over the entire year in 2008. NOAA estimates the total damage of property and economic impacts for all weather-related disasters during the spring and summer of 2011 at more than \$45 billion.⁹ The severe and costly losses suffered during recent extreme weather events demonstrate the importance of increasing the resilience of the United States to climate variability and change in order to reduce economic damages and prevent loss of life.

The Obama Administration is committed to reducing the magnitude of future climate impacts by curbing greenhouse gas emissions and advancing a clean energy economy. However, a range of climate impacts are unavoidable. To manage these risks, we must identify key threats, prioritize activities that reduce our vulnerability, initiate actions that promote resilience, and enhance preparedness capabilities.¹⁰

"The City of Grand Rapids is addressing various climate-related threats such as extreme heat and more intense precipitation events. We see these climate strategies as an extension of responsible governance and an imperative investment in the future prosperity of our city. As an inland watershed city, we have focused on restoring and maintaining a high quality of water in the Grand River with over \$240 million in combined sewer separation investment. This prepares us for ever-increasing precipitation levels now and into the future."

- George K. Heartwell
Mayor, Grand Rapids, MI

Adaptation can involve a range of actions taken by individuals, businesses, and governments, such as: a farmer choosing to grow a different crop variety better suited to warmer or drier conditions; a company deciding to relocate key facilities away from coastal areas vulnerable to sea level rise and hurricanes; a community updating its ordinances to protect wetland habitat that provides critical ecosystem services like flood protection; a city developing early warning systems for severe storms; and a Federal agency increasing its water-use efficiency at regional facilities to prepare for more frequent and severe drought. As demonstrated by these examples, there are management strategies at all levels of government and in all sectors that can help communities and businesses adapt to climate variability and change.

Local, State, and Private Sector Adaptation

Across the country, cities, towns, tribes, and states are leading efforts to reduce climate change risks. As of January 2011, eleven states had completed adaptation plans, four had plans in progress, and eight had

⁷ USGCRP. (2009). *Global Climate Change Impacts in the United States*. www.globalchange.gov/publications/reports

⁸ NOAA. (2011). *Billion Dollar US Weather Disasters*. National Climatic Data Center. www.ncdc.noaa.gov/oa/reports/billionz.html

⁹ NOAA. (2011). *Billion Dollar US Weather Disasters*. National Climatic Data Center. www.ncdc.noaa.gov/oa/reports/billionz.html

¹⁰ National Research Council. (2011). *America's Climate Choices*. The National Academies Press. Washington, DC: www.nap.edu/catalog.php?record_id=12781

recommended developing adaptation plans in their State Climate Action Plans.¹¹ Local adaptation efforts are emerging as well. The City of Chicago, for example, anticipating a hotter and wetter future, is already taking steps to adapt such as repaving alleyways with permeable materials to handle greater rainfall and reduce flood risks, and planting trees that can tolerate warmer conditions.¹²

The private sector is also taking action to adapt to climate change. Investors are increasing pressure on firms, as evidenced by a record 101 shareholder resolutions in 2010 calling on North American companies to manage climate change risks.¹³ Mounting losses from natural disasters are also shifting the business environment. In a 2011 global survey of businesses, nearly nine out of ten firms reported that they suffered climate impacts in the last three years.¹⁴ Businesses are starting to take preventive action to protect their assets, employees, and operations from climate change risks. In the same survey, approximately 22 percent of North American firms reported actively making changes within their business to minimize climate risks and damages.

“With the multiplier effect [of economic growth, subsidence, and climate change], the amount of economic loss to the Gulf Coast could rise to \$700 billion, the gross domestic product for the entire region for one year. No region in the country can afford to lose their entire GDP once every 20 years...Doing nothing is not an acceptable plan. That’s a plan to put Energy out of business, a plan for misery and suffering for our customers and a plan that would devastate a region already economically impaired.”

- J. Wayne Leonard
Chairman and CEO, Entergy Corporation
www.entergy.com/news_room/newsrelease.aspx?nr_id=1906

As highlighted throughout this report, the Task Force and its member agencies interact with business, local government, tribes, and other decision makers to learn from their successes and challenges and to understand what science and services they need to manage the impacts of climate change. Promoting and coordinating this dialogue will continue to be an essential element of the Federal Government’s role moving forward.

Report Scope

This report provides a Task Force update on progress in five key areas at the core of Federal efforts to advance a national climate adaptation strategy and build a climate resilient Nation. These five areas closely align with the recommended policy goals in the 2010 Task Force Report (Appendix B) and also reflect how adaptation actions complement and intersect with one another. The examples of progress described in this report include technical assistance projects, regional partnerships, scientific advancements, and programs that foster adaptation. All of these efforts, with their diversity and breadth, demonstrate the Federal Government’s progress toward the Task Force’s 2010 policy goals.

¹¹ Pew Center on Global Climate Change. (2011). www.pewclimate.org/what_s_being_done/in_the_states/adaptation_map.cfm

¹² Kaufman, L. (2011). *A City Prepares for a Warm Long-Term Forecast*. The New York Times. www.nytimes.com/2011/05/23/science/earth/23adaptation.html?pagewanted=1

¹³ CERES. (2010). *Investors Achieve Record Results on Climate Change*. Boston. www.ceres.org/incr/news/climate-resolutions-2010.

¹⁴ UK Trade and Investment and The Economist Intelligence Unit. (March 2011). *Adapting to an Uncertain Climate: A World of Commercial Opportunities*. London, UK. Link: www.ukti.gov.uk/uktihome/item/128100.html.

Briefing on Prairie Fire at Rocky Flats

- Cover memo
- DOE report on April 2000 controlled burn
- Air modeling assessment of April 2006 fire
- Rik Getty memo on April 2006 prairie fire
- October 2003 EPA letter to USFWS re: effects of/risk from prairie fire

ROCKY FLATS STEWARDSHIP COUNCIL

P.O. Box 17670
Boulder, CO 80308-0670
www.rockyflatssc.org

(303) 412-1200
(303) 600-7773 (f)

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
Arthur Widdowfield

MEMORANDUM

TO: Board
FROM: Rik Getty
SUBJECT: Briefing by CDPHE on the history prairie fires and their impacts at Rocky Flats
DATE: March 20, 2013

We have scheduled 55 minutes for CDPHE to brief the Board on prairie fires at Rocky Flats, an issue that has generated broad concern in surrounding communities. Over the years DOE, CDPHE and EPA have studied these fires, including controlled burns, focusing on the impacts on actinide movement, re-vegetation efforts, and habitat restoration.

The CERCLA administrative record contains a number of documents on prairie fires, including the April 2000 test burn. I have selected four fires as they address the suite of issues concerning prairie fires and their aftermath. These are presented below in a chronological format.

March 22, 1994 fire

On March 22, 1994, a fire started on Rocky Flats' northern border along Colorado Highway 128. The source of the fire was likely caused by a discarded cigarette. Fanned by high winds, the fire burned approximately 70 acres before it was brought under control. A report on the aftermath of the fire and its impact on vegetation was issued (see: http://www.lm.doe.gov/cercla/documents/rockyflats_docs/BZ/BZ-A-000482.PDF)

As the report states, following the fire, there was an interest in qualitative visual observations about how the vegetation in the area recovered:

Because the burned area was a target weed control location, the immediate area had been characterized during 1993 to estimate musk thistle densities, and to characterize the native grassland vegetation. Interestingly, the fire did not kill the musk thistle rosettes that had survived the winter, though most plants were somewhat to severely damaged by the fire. General wildlife and bird surveys performed on established survey transects that cross the burn showed only short-term drops in wildlife activity. Surveys performed within days of the fire confirmed that birds and other wildlife were continuing to use the area as usual. As

the season progressed, greater numbers of birds were often recorded in burned portions than in unburned portions.

By the end of the 1994 growing season, a visual comparison between burned and unburned areas revealed apparently healthy grasslands with no visible differences in growth and production. The only obvious differences between adjacent burned and unburned areas were:

- No discernible plant litter in the burned area -vs- abundant plant litter in the unburned area
- Absence of several early spring weedy annuals in the burned area -vs- abundant early spring weedy annuals in the unburned area
- Recovering yucca and cactus plants within the burn -vs- undamaged plants in unburned areas
- Visible evidence of still scorched old vegetation and ash within the burn -vs- no evidence of fire in the unburned area

This report proposes the use of controlled burns as a means of weed control. However, the site did not perform a controlled burn until 2000.

April 6, 2000 controlled burn

This analysis proved critical in understanding the effect of fire on actinide movement, especially during the fire. This fire was a prescribed burn. It covered approximately 50 acres in the Buffer Zone, south of the former Industrial Area (these lands are now part of the wildlife refuge).

The burn was planned by DOE in partnership with EPA and CDPHE, with CDPHE issuing an air quality permit to conduct the burn. The test was widely (although not unanimously) opposed by local officials and community members, but was initiated because of the importance of securing data that DOE and the regulatory agencies did not have. The effort included:

1. air sampling of the smoke plume for actinides (air samplers were placed at various points around the fire, including in the smoke plume itself)
2. temperature monitoring of the flame front
3. post-fire portable wind tunnel testing to assess the fire's effect on re-suspension of soil particles by wind (a wind tunnel was set up in the burn site to evaluate what happens when strong winds blow across the burn area)
4. post-fire soil analysis for actinides
5. calculation of estimated dose for an individual who theoretically would have been at the air sampler; this is only theoretical since a person would not have been present as the flame front passed

Two questions, among many, emerge from these tests – air quality impacts, and health impacts (dose) on people downwind of the test. Regarding the air samplers mentioned in item #1 above, none of the fixed air samplers along the Rocky Flats' boundary showed any elevated levels of radioactivity due to the test burn in the buffer zone. Portable air samplers were placed around the burn to provide additional monitoring of the test burn. The samplers directly downwind of the burn detected radioactivity, but at levels barely above the minimum detectable levels, which, as we know from water quality monitoring, is an extremely low level.

Regarding dose a person downwind of the test could receive, attached to this memo is a short report by DOE that addresses that issue. According to DOE, any dose a person could receive as a result of a prairie fire would be quite low. (FYI, the question of impacts to firefighters is addressed below in the section on the 2006 fire.)

Finally, DOE examined the effects of wind on an area following a burn. The wind erosion rate study was a key part of the test burn. The day after the fire a portable wind tunnel device was used to measure the impacts of the fire on soil re-suspension rates. The fire burned both the grasses and the accumulated years of plant litter. This resulted in more soil particles being exposed to potential winds and subsequent particle re-suspension and transport downwind. The wind tunnel tests revealed that immediately after the fire the re-suspension rates were several times higher than before the fire for PM-10 particles (particles measuring less than 10 microns in diameter which are more likely to be re-suspend than larger particles). However when additional testing was performed 25 and 73 days after the fire, the erosion rates were observed to decrease. (For more information see: *Effects of Prescribed Grass Fire on Wind Erosion Rates from Surface Soil at Rocky Flats (RF)*,

Colorado. http://www.lm.doe.gov/cercla/documents/rockyflats_docs/SW/SW-A-006228.pdf

July 10, 2000 fire

A lightning-caused wildfire burned approximately 10 acres in the East Buffer Zone. Wind tunnel testing of the area was performed and the following report was issued:

Midwest Research Institute submits the Effects of Wildfires on Soil Erodibility by Wind, Final Test Report dated May 16,

2001. http://www.lm.doe.gov/cercla/documents/rockyflats_docs/SW/SW-A-004356.pdf

The following is an excerpt from the report's conclusion, which discusses both the wind tunnel tests and surface soil analysis for plutonium content.

Only 8 percent of the surface soil at the wildfire areas is in the particle size range that can be suspended as dust emissions (i.e., silt particles with diameters less than 75 μm). A significant fraction of Rocky Flats soil particles in the wildfire area were found to be protective of wind erosion emissions because of their size. Nearly 50 percent of the soil particles in the wildfire area are greater than 600 micron diameter. The burned vegetative stubble provided additional protection against wind erosion.

In addition, the coarsest soil size range above 600 microns in diameter was found to have the lowest Pu239 activity (1.27 pCi/g). The highest Pu239 activity (2.09 pCi/g) was observed in the mid-size range (75-600 micron diameter). The silt soil fraction (< 75 microns diameter) had a Pu239 activity level of 1.77 pCi/g, which is also representative to the composite soil activity level. The observation was counter to the hypothesis that the finest soil particles on the surface were most contaminated with Pu239.

When the soil was disturbed to a depth of 1 to 2 cm, wind tunnel tests of the wildfire area showed both higher erodibility and higher Pu239 activity rate than for the undisturbed wildfire soil. This indicates that the surface soil is less contaminated than the soil

immediately beneath the surface. This may be attributed to dry and wet soil deposition of "cleaner" ambient air particles that accumulate on the soil surface over time. The deposition rate would result in a relatively clean (but thin) soil surface layer that, if crusted, would inhibit wind erosion of subsurface contaminated soil.

April 2, 2006 fire

This prairie fire was the largest as measured by acres burned. On April 2, a wildfire sparked by a faulty electrical component on a power pole along Colorado Highway 128 on the north border of the site burned approximately 850 acres of the Northeast Buffer Zone (now part of the wildlife refuge). The fire spread rapidly, and fanned by high winds, jumped Indiana Street and advanced on Great Western Reservoir. It was brought under control and the total burned acreage on-site and off-site was approximately 1,600 acres.

Attached to this memo is a 2006 DOE report on the fire, including an assessment of the impacts on firefighters (the maps and photos have been removed). The entire report can be found at http://www.lm.doe.gov/Rocky_Flats/Documents.aspx (scroll down under the section "All Site Documents" and the 1st quarter 2006 report is listed fifth. The fire assessment, Appendix B, begins on pdf p. 90.)

Also attached is a short memo I wrote in 2006 regarding the fire.

Finally, I have attached an EPA letter to USFWS in 2003 where EPA answers some questions on prescribed burns on refuge lands.

USFWS: Once EPA certifies the remedy to be complete and jurisdiction of property has been transferred to the Service, does EPA foresee any restrictions on the use of prescribed fire?

EPA response: The use of prescribed fire at Rocky Flats is of special interest to citizens and public officials in the surrounding communities. EPA believes that the use of prescribed fire at the site will not pose significant risk to firefighters, Service personnel or the general public. This belief is based upon data gathered during and after the 2000 test burn and for accidental burns at the site, as well as risk assessment work documented in the Task 3 Report (Assessing Risk of Exposure to Plutonium, February 2000) on the effects of prescribed fire at Rocky Flats. However, relatively large areas of Rocky Flats have not been characterized to date. These areas are often referred to as "white spaces". EPA does not believe there is great potential to find contamination in these areas because they are removed from areas of known contamination and are not associated with past practices at the site that resulted in releases of contamination. Nevertheless, unexpected discoveries have occurred at Rocky Flats (e.g., the incinerator near the ash pits), and EPA believes that samples should be collected from white spaces before closure and analyzed prior to the application of prescribed fire in those areas.

The letter can be found at:

http://www.lm.doe.gov/cercla/documents/rockyflats_docs/SW/SW-A-004845.PDF

Please let me know if you have any questions.

Summary of Air Monitoring Data from the Rocky Flats test burn of April 6, 2000

By John Rampe
Deputy Assistant Manager, Environment and Infrastructure
Rocky Flats Field Office
April 11, 2000

Background

The Rocky Flats Environmental Technology Site conducted a controlled test burn of approximately 50 acres of its buffer zone Thursday morning, April 6, 2000. The following discusses the methodology and preliminary results.

Methodology

During the test burn DOE contractors and the U.S. Environmental Protection Agency Region VIII (EPA) took separate air monitoring samples using high-volume air samplers. Both sets of samplers collected samples three to six feet from the ground, were well immersed in the plume, and collected substantial samples of smoke from the burn. These samplers were placed on the upwind and the downwind side of the burn.

Data from these samples, as well as a simplified calculation of the possible radiation dose resulting from exposure to the smoke from the test burn, are attached.

The air monitors are designed to capture essentially all airborne particles on filters. These filters are then analyzed for alpha radiation activity. Plutonium is an alpha particle emitter. There are also numerous naturally occurring and common elements that emit alpha radiation, such as radon.

A blank filter is analyzed and compared to the filters used in the sampling to distinguish any alpha activity that might occur naturally from the filter.

Preliminary Results

Alpha radiation levels for both upwind samples and for the blank filter were below the laboratory detection limit of 1.5 disintegrations per minute (dpm), or showed less than minimum detectable activity. Only the downwind sample had a measurable activity, slightly above minimum detectable activity, of approximately 2.0 dpm. Using the volume of air sampled, and correcting for the area of the filter, this resulted in an alpha activity of 0.2 picoCuries per cubic meter of air sampled (pCi/m³).

The analysis then treated all of the activity as though it had resulted from plutonium. This is a conservative assumption, since the natural radionuclide sources, e.g. Uranium, have not been subtracted. Also, the dose resulting from plutonium activity is somewhat higher than the dose from the same activity for some other radionuclides such as uranium.

The analysis resulted in an extrapolated dose of 0.2 millirem (mrem) to someone located at that air sampler (which was continually in the smoke plume) for the entire time the sampler was running. This value was derived using regulatory-based values for the concentration of

plutonium in air that would result in a 10 mrem annual exposure (these were from the National Emission Standards for Hazardous Air Pollutants, NESHAP) and converted to allow for the time the air monitor was actually running (82 minutes).

Since all the alpha activity was assumed to be from plutonium, the actual dose a co-located individual would have received is less, since most of the activity observed on the filter is from natural radioisotopes.

This estimated dose is low when compared to natural radiation exposures, which range to about 400 mrem/year or about 1 mrem/day in Colorado. This calculated dose is consistent with other observations made during the test burn.

Radiological scans of burn site personnel exiting the area showed no detectable radioactivity, and results from dosimeters worn by firefighters also showed no detectable exposure.

This level of exposure from this burn would be roughly equivalent to a burn in similar areas outside of Rocky Flats

Additional Analysis

EPA Region VIII is conducting an isotopic analysis of the filters, as well as an alpha-beta analysis. This isotopic analysis will distinguish individual radioactive elements such as Plutonium and Uranium. It will show what specific contaminants are present and in what quantities. An isotopic analysis takes three-four weeks to complete. EPA has agreed to share these results with the community as soon as they are available

DOE will continue to analyze data from the air monitors, including calculating the potential exposure to an off-site individual (such as someone along Highway 93), and, as isotopic data become available, doing more detailed exposure modeling of a person at the scene of the test burn. All of this information will be available to the public. Additionally, DOE will hold its remaining filter samples, and will make them available on request for analysis by an independent party.

Assessment of April 2006 Grass Fire at the Rocky Flats Site: Modeling of Grass Fire Emissions and Discussion of Air Sampling as it Relates to a Grass Fire

On April 2, 2006, a grass fire ignited in the northeastern quadrant of the RFS (Rocky Flats Site). A “small wildland fire” was reported at 1:46 P.M. at the end of the power line on the south side of Rock Creek at Highway 128 (next to the Colorado Department of Public Health and Environment air sampler location within the RFS boundary); firefighting teams were called in immediately and the fire was reported as controlled at approximately 8:06 P.M., having burned over a thousand acres, including a portion of the Open Space between Indiana Street and Great Western Reservoir. Winds were generally out of the northwest at speeds from 6 to 25 miles per hour with gusts reported as high as 39 miles per hour. The map attached as Figure 1 shows the extent of the burned area within the RFS boundary, and Figure 2 includes photographs taken 1 day and 24 days after the fire. Damage to property was confined to power poles, fence posts and some water monitoring equipment located in a drainage to the east of Pond B-5 on RFS itself. The cause of the fire was described in the Cherryvale Fire Report as “arc from faulty contact, broken conductor” on the power line. Regarding radiological contamination, the area on which the fire occurred is known to be only very moderately contaminated with plutonium and americium, the concentration levels in the soil being mostly at background with some small areas of contamination nearer the old industrial area approaching several picocuries per gram (pCi/g) in the surface soil. The entire northeastern Buffer Zone was covered with accumulated litter from many years of vegetative growth that had been protected from fire by policies developed following intense participatory public discussions.

A great deal of interest in this fire can be anticipated based around the question of the hazard associated with the possible release of airborne radioactive contaminants in the smoke from the fire. The discussion that follows provides general answers to that question.

Air Quality Modeling of a Hypothetical Grass Fire at RFS

In the summer of FY 2000, Rocky Flats environmental protection staff developed an assessment of probable exposure consequences of a grass fire to firefighters who might be called to the Site. The reason for this assessment was the recognition that a fire would inevitably occur, as had been demonstrated that summer by a small fire ignited by a lightning strike in the eastern Buffer Zone. That fire was confined to about 10 acres due to the close proximity and easy access of observers and firefighting personnel on the site. Local fire teams had been called to assist in extinguishing that fire and some interest was expressed by these firemen regarding the potential radiological hazards they might have encountered.

The modeling assessment, performed for both typical and worst case meteorological conditions, estimated the concentrations to which a firefighter might be exposed should the firefighter remain in the downwind smoke plume continuously for periods of from 1 to 5 hours, and assessed the potential inhalation dose from such an exposure. The results of the modeling assessment are reported in a “White Paper on the Radiation Dose Assessment for Firefighters During a Grass Fire” (Attachment 1).

The white paper provides strong evidence that the radiological hazards of a grass fire at RFS are negligible, based on both U.S. Department of Energy (DOE) guidelines and U.S. Environmental

Protection Agency (EPA) regulations. DOE requirements provide that no member of the public is to receive a potential dose in excess of 100 millirem (mrem) per year. EPA regulations limit emissions of airborne contaminants to a level below which any member of the public would be exposed to concentrations that could result in a potential dose of 10 mrem per year via the airborne pathway.

The modeling assessment asked two fundamental questions: what air concentrations would result at breathing height in the downwind smoke plume for a fire that occurred in an area with a 1 pCi/g uniform soil contaminant concentration; and what would be the limiting uniform soil contaminant concentrations that would result in no more than a 1 mrem dose to the firefighter who remained in the plume continuously for the varying time periods of the study? The answer to the first of these questions suggested that the average concentration of plutonium and americium in air would be 0.0004 pCi/m³ per pCi/g under the worst probable conditions of meteorology and exposure time. This level would result in a potential inhalation dose of 0.00066 mrem, considerably less than the 10 mrem limit to which a member of the public could be exposed for an entire year without exceedance of the EPA's airborne radionuclide dose standards. The estimates were adjusted considering the increased breathing rate of the firefighters compared to the breathing rates used to derive the EPA standard. Modeling to a dose limit of one mrem, one tenth of the EPA standard, resulted in the conclusion that this arbitrary 1 mrem dose limit would not be exceeded for a fire burning in a uniformly contaminated area of less than 115 pCi/g plutonium and less than 102 pCi/g depleted uranium (Depleted uranium is the limiting case for uranium isotope mixtures; the limiting natural uranium concentration is higher, as is the limiting concentration of enriched uranium). Americium contribution to dose is included with the plutonium.

Using these results, the probable emissions from the grass fire of April 2006 can be evaluated. Following the cleanup of the contaminated soils at RFS where some soil concentrations initially exceeded 50 pCi/g of plutonium, there are assuredly no significant contaminated surface soil areas exceeding this concentration. In the area of the burn, where project cleanup was not required, the soil concentrations are known to be very low with the average concentration over the area being less than 1 pCi/g, with much of the area showing considerably less, approaching or achieving insignificant background levels. This information, and the results of the modeling study, lead to the conclusion that no significant air concentrations resulted from radionuclide emissions during the April 2006 fire. The model results can be extended to show that maximum air concentrations would not have exceeded about 0.0004 pCi/m³, as noted above, and concentrations further downwind would have rapidly diminished due to normal dispersion of the smoke. Firefighters with higher breathing rates than the population used to establish the ambient-based standard, would have received doses considerably less than one mrem, one-tenth of the Radionuclide NESHAP (National Emission Standards for Hazardous Air Pollutants) standard upon which the concentration limits of these analyses were based.

Radioactive Air Sampling of Grass Fires at RFS

Routine air monitoring has been continued at RFS even though no facility exists at the Site that houses operations that would trigger a requirement for such monitoring under EPA's Radionuclide NESHAP for DOE facilities (see 40 CFR 61, subpart H). The three monitors that remain are being used to evaluate the air quality that exists following remediation of surface contamination and the consequent natural revegetation and weathering of the surface following that remediation. During development of the final 2005 Integrated Monitoring Plan, fire

scenarios were not considered as a serious driver for monitoring. The reasons for this are several-fold. First, in a grass fire, the location and magnitude of the fire, and direction of localized smoke travel are not predictable over the short-term periods of interest. Generally, the monitoring of such fires requires the use of portable equipment and dedicated staff who can move the equipment to keep it in the plume. Second, as indicated in the modeling already discussed, there is no potential for such fires to yield a significant contribution to the radionuclide emissions of the site. Finally, at the concentrations that are estimated, the high-volume air samplers that are deployed would not be able to collect enough sample to provide a measurable estimate of the radionuclide concentrations in the plume.

Regarding this last point: prior to Site closure, the radionuclide air monitoring program at RFS was designed to quantitatively detect radionuclide air concentrations at levels equivalent to those that would yield a hypothetical dose at the receptor locations (monitoring locations) of about 1 percent of the Rad-NESHAP standard *using a 30-day sampling period*. (Evaluation for compliance against the standard is based on annual exposure to the averaged air concentration.) The site chose to continue this monitoring strategy following the completion of accelerated remedial actions. One percent of the Rad-NESHAP standard, stated as an air concentration, is about 2×10^{-5} pCi/g of Plutonium-239. The laboratory protocols can yield approximately this detection limit for air samples that are collected for a continuous month, about 720 hours of sampling. Shorter periods of sampling at this air concentration will not normally yield sufficient material on the filter and impaction substrates to allow a quantitative estimate of the average air concentration. At the modeled maximum air concentrations estimated for this grass fire (0.0004 pCi/m^3 , as discussed above) the air sampler would have to be immersed in that average plume concentration for more than 30 hours. Realistically, fixed samplers would likely not be immersed in the maximized grass-fire smoke plume for more than 15 minutes to half an hour at RFS. Also, as previously noted, the April 2006 fire was reported as controlled in just over 6 hours, so immersion in the plume for over 30 hours would not have been possible.

In summary, a grass fire at RFS is not expected to yield detectable air concentrations in the present fixed network of samplers, nor is the network intended for that purpose.

Sampling During the April 2006 Grass Fire

In the April 2006 fire, only one of the three samplers appears to have been immersed in the smoke plume. Sampler S-136 is located near Indiana Street approximately a quarter mile south of Highway 128. On the date of the fire, telemetry data from this sampler indicate that it ceased operation approximately 6 minutes after the fire had been reported. (The fire was reported at approximately 1:46 P.M., the sampler stopped operating at 1:53 P.M.) Examination of the filter substrate did not indicate any discoloration that might suggest the smoke plume had been sampled. The other two samplers, S132 (located on Highway 93, upwind of the fire), and S-138 (located approximately 1 mile south of S-136 on Indiana) showed no discoloration even though both operated continuously throughout the fire. Sampler S-138 may have been immersed incidentally in the plume but at its distant proximity from the nearest approach of the fire, the smoke would have experienced considerable dispersion and consequent reduction in concentration compared to the smoke immediately in front of the fire.

The samples from the three samplers were submitted for expedited laboratory analysis even though they were likely not impacted by the fire. Both fine samples (for particles less than about

10 micrometers aerodynamic diameter) and coarse samples (particles between about 10 and 25 micrometer aerodynamic diameter) were submitted from each location. Through laboratory technician error the fine samples were accidentally discarded during initial processing (Attachment 2); the coarse samples were processed and analyzed. None of the coarse samples showed detectable concentrations of either plutonium or americium. Uranium was detected at concentrations typically seen at these sampler locations but the concentrations were not sufficiently high to yield a reliable quantitative result. Table 1 shows the results of these measurements and compares the reported results to concentrations reported since October 2005 when the three-station air monitoring network began operation.

Table 1. Coarse particle concentrations reported for the three air monitoring locations during the April 2006 grass fire. Samplers had been running for the previous month prior to the fire and samples were submitted for laboratory analysis immediately following the fire event. These calculated concentrations are compared to those observed in the same samplers for the reported periods to-date following physical completion at RFS.

Sampling Location, Size	Parameter	Total Concentration (pCi/m ³)	Comment	Highest Reported -- October 2005 thru Dec 2005 (pCi/m ³)
S-132 Coarse	Americium 241	3.145E-07	Non-detect	1.237E-06
	Plutonium 239/40	2.752E-07	Non-detect	1.434E-06
	Uranium-234	3.616E-05		1.609E-04
	Uranium-235	-4.324E-07	Non-detect	9.468E-06
	Uranium-238	3.656E-05		1.237E-04
S-136 Coarse	Americium 241	0.000E+00	Non-detect	2.358E-06
	Plutonium 239/40	-5.611E-07	Non-detect	2.358E-06
	Uranium-234	2.485E-05		4.167E-05
	Uranium-235	2.805E-07	Non-detect	5.940E-06
	Uranium-238	1.523E-05		4.520E-05
S-138 Coarse	Americium 241	1.559E-07	Non-detect	4.962E-07
	Plutonium 239/40	2.729E-06	Non-detect	1.682E-06
	Uranium-234	2.534E-05		2.928E-05
	Uranium-235	9.355E-07	Non-detect	6.451E-06
	Uranium-238	2.339E-05		3.235E-05

Note: Negative concentrations are an artifact of sampling-medium blank correction

Discussion of Fine Particle Concentrations versus Coarse Concentrations Reported

The modeling performed for the grass fires provides additional insight into the probable relationship between what would have been observed in the fine fraction of the air sample compared to what was observed in the coarse fraction. In the modeling assessment, estimates of partitioning between fine-fraction concentrations of smoke mass and coarse-fraction concentrations were calculated. These calculations were based on Bureau of Land Management sponsored studies of grass fires of the same type as occur at RFS (see reference to Leenhouts 1998 in Attachment 1). Those calculations suggested that as much as 75 percent of the smoke mass from a grass fire will be found in the fine fraction, with the rest going to the coarse fraction.

At RFS, the mechanism for contamination of vegetative matter has been studied in some detail. Since plutonium and americium are not expected to be absorbed into the plant matter (see Kaiser-Hill, April 2002, *Actinide Migration Evaluation Pathway Analysis Summary*, with appendices), contamination of plant matter by these isotopes is understood to occur via the mechanisms of wind-blown deposition and rain splash. Comparisons of contamination on plants with that on the underlying soil have shown that the concentrations observed in plant material are roughly 18 percent, on the average, of the concentrations observed in the soil in the vicinity of the plants. In other words, if the soil is contaminated to a level of 1 pCi/g, the plant material would be expected to yield a concentration of 0.18 pCi/g or so.

There is no evidence in airborne measurements of plutonium at RFS that there is a preferential partitioning of the material into the fine fraction. To the contrary, the routine air data show about 40 percent of the contamination resides in the fine fraction and about 60 percent resides in the coarse fraction. Mass distribution studies of plutonium in resuspended soil particles show a similar result. The explanation is that the very small plutonium and americium particles released into the environment attached very quickly to larger soil particles. The resulting distribution of airborne plutonium is determined by the size distribution of the agglomerated soil particles rather than by the distribution of the plutonium itself.

The consequence of these observations for the April 2 grass fire is that the expected distribution of radioactivity in the air samples would not be expected to differ markedly from the underlying distribution of the radioactivity in the mass itself. The rain-splashed particles adhere to the plant material and would be emitted into the smoke with the soil particles as the plant material burns. The smoldering plant material that continues to emit after the passage of the flame front would likely have much less contamination associated with it since the rain-splash contaminated leaves and sheath will have been burned away in the initial fire.

Probable Post-Fire Air Emissions

Another potential concern from a fire on a contaminated soil surface might be the residual effects of wind-blown erosion following the fire. The amount of increased erosion and its duration is determined in part by the condition of the soil following the fire, and by the rate at which vegetative matter recovers and grows over the burned soils. From the prescribed test burn in 2000, and from the later lightning-initiated fire that same summer, RFS personnel have gathered several bits of pertinent information. As would be predicted by consideration of the amount of combustible material, the grass fires observed at RFS have not lingered for a long period of time over any one area of the soil. The result, shown in Figure 3, is that the temperature of the soil does not become so hot as to damage the root systems of typical vegetation nor is the organic matter in the soil destroyed as might be typical of a more intense fire such as that associated with a burning forest.

Evidence verifying this concept has been found following both the CY2000 fires (and others on the site) and following the subject fire of this assessment—the plant cover over the burned surface has been observed to recover very quickly and grow in a manner that could be described as “vigorous”. The net result from an air quality perspective is that the soil does not remain unusually erodible for longer than a few weeks to a few months, depending on time of year when the fire occurs. A full discussion of these effects can be found in RAC, October 1999, *Final Report: Task 3: Input and Assumptions, Radionuclide Soil Action Level Oversight Panel*; and

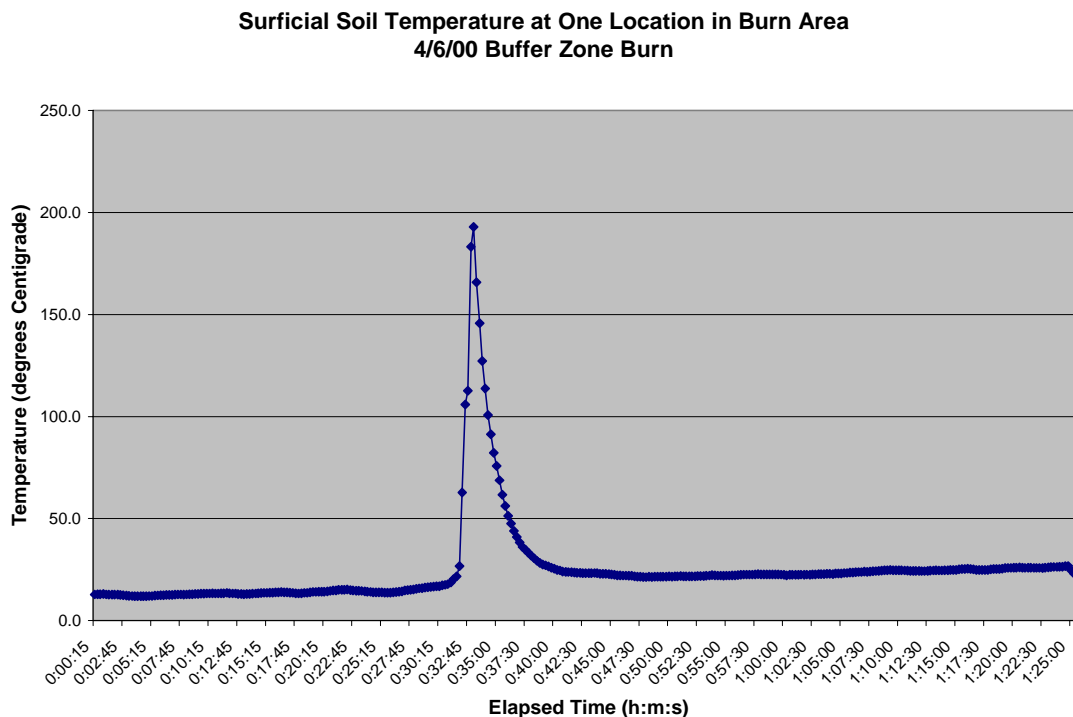


Figure 3. Soil temperature profile as a grass fire passed over a buried recording temperature sensor. Derived from data recorded during the prescribed test burn in Spring of CY 2000.

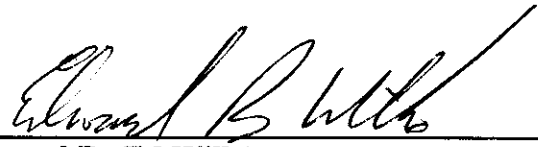
Air Monitoring Recommendation

In consideration of the information presented above, no viable reason for air monitoring of grass fires at RFS can be justified. While such monitoring would possibly satisfy an “academic” curiosity regarding what is contained in the samples, the data and investigations already performed suggest the minor residual contamination at RFS does not have sufficient potential to produce air concentrations of plutonium and associated americium of concern, based on existing regulatory guidance.

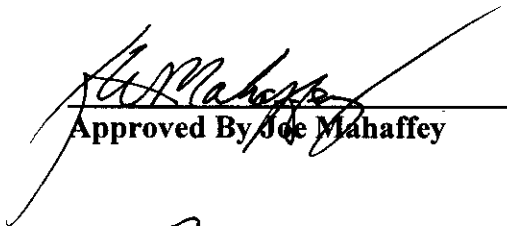
**WHITE PAPER
ON THE
RADIATION DOSE ASSESSMENT FOR FIREFIGHTERS
DURING A GRASS FIRE**




Prepared By Rick Roberts **12/1/00**
Date



Reviewed By Ed Wilkés **1 DEC 2000**
Date



Approved By Joe Mahaffey **12-5-00**
Date



Approved By Bob Nininger **12/14/00**
Date



Approved By Wil Zurliene **01/09/01**
Date



RADIATION DOSE ASSESSMENT FOR FIREFIGHTERS DURING A GRASS FIRE

Introduction

A radiation dose assessment was performed for firefighters at the Rocky Flats Environmental Technology Site (RFETS) trying to extinguish a grass fire. This dose assessment is being performed to assure that firefighters would not exceed any radiation dose limits. This radiation dose assessment will be used to delineate areas at RFETS where firefighters would be advised to not follow a grass fire based on increased radiation dose potential.

Radiation dose could be received by the firefighter through the inhalation of resuspended radioactive material. This resuspended radioactive material augments naturally occurring radioactive material in the air. For the purposes of this study, the radiation dose to firefighters located adjacent to a grass fire will be assessed so that the maximum radiation dose to the firefighter is estimated. Conservative assumptions were made in the dose assessment to assure that radiation dose to the firefighter was overestimated in the calculations.

It is recommended that the "Soil Contamination Area" (SCA) radiological posting limits be used as the demarcation where firefighters should not follow a grass fire based on potential radiation dose. SCA posting limits for Pu-239/Am-241, enriched uranium and depleted uranium in surface soils have been set at 115 pCi Pu-239/gram soil, 188 pCi Total Enriched U/gram soil and 102 pCi Total Depleted U/gram soil, respectively, based on soil action levels prescribed presently in the Rocky Flats Cleanup Agreement (RFCA). By following this recommendation, a firefighter should not receive more than 1 mrem of radiation dose while extinguishing a grass fire at RFETS (See Table 1, "Allowable Soil Concentration Based on Radiation Dose to Firefighters From Grass Fires.").

The radiation dose assessment was performed by: 1) defining the locations where individuals could receive radiation dose, 2) calculating the amount of radioactive material in air at this location during grass fires and 3) computing the radiation dose with its associated acceptable soil concentration. Each of these steps is discussed below.

Location of Individuals

In order to assess the radiation dose to a firefighter, the location of the firefighter must first be defined. The maximum radiation dose would be received by a firefighter directly adjacent to the grass fire and downwind since these individuals would be exposed to the highest air concentrations of radioactive material. For conservatism, it is assumed that a firefighter is located immediately downwind of the burning grass for the duration of the grass-burning episode. It is also assumed that this firefighter is not wearing any type of

respiratory protection. It should be noted that normal fire fighting methods do not place the firefighters in the path of the fire or the direct smoke plume from the fire.

Air Concentrations at Firefighter Location

Radioactive material present in the environment is resuspended and transported downwind during a grass burning episode. By knowing the amount of radioactive material in the grass, the concentration of radioactive material in air can be calculated using resuspension factors applicable to a fire. The firefighter can subsequently inhale some fraction of this radioactive material in the air.

This dose assessment is based on a computer model of emissions from a series of hypothetical fire and atmospheric conditions (See Attachment A – “Hypothetical Wildfire Air Modeling Analysis.”). For this radiation dose assessment, the concentration of radioactive material in air is maximized. By modeling, the firefighter immediately downwind of the fire is exposed for several different time-periods and for several different wind conditions in this assessment. To capture a range of air concentrations, a grass fire duration of 1, 2 and 5 hours is assessed for average and worst-case conditions.

Radiation Dose

To calculate radiation dose, the concentration of radioactive material in the air is initially multiplied by the firefighters breathing rate and the duration of the grass fire. This product will be the estimated amount of radioactive material inhaled. This amount inhaled is then multiplied by a dose conversion factor to calculate radiation dose. The radiation dose to the firefighters from plutonium, americium and uranium are outlined in Table 2, “Radiation Dose from Plutonium & Americium to Firefighters Due to Inhalation of Particulates During a Grass Fire,” Table 4, “Radiation Dose from Enriched Uranium to Firefighters Due to Inhalation of Particulates During a Grass Fire,” and Table 5, “Radiation Dose from Depleted Uranium to Firefighters Due to Inhalation of Particulates During a Grass Fire.”

The firefighters at the boundary of the burn site will inhale at a rate of 3.2 m³/hr. The firefighters inhalation rate is indicative of a short term, heavy activity inhalation rate. This inhalation rate was taken from EPA’s “Exposure Factors Handbook,” dated August 1997 (EPA/600/P-95/002).

The radiation Dose Conversion Factor (DCF) is used to convert the amount of radioactive material taken into the body into a radiation dose. The inhalation DCF used to calculate radiation dose for Am-241, Pu-239, U-234, U-235 and U-238 were taken from EPA’s Federal Guidance Report No. 11, “Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion,” dated September, 1988 (EPA-520/1-88-020). The inhalation DCF used to calculate

radiation dose was the highest DCF available and corresponded to the Committed Effective Dose Equivalent.

It was assumed that the Am-241/Pu-241 activity ratio is 18%. This is consistent with the median Am-241/Pu-241 activity ratio seen in surface soils east of RFETS (Health Physics, Vol. 70, No. 4, April 1996). For assessing uranium isotope ratios, typical values for depleted and enriched uranium were taken from the "Health Physics and Radiological Health Handbook." Uranium isotope ratios are outlined in Table 3, "Uranium Isotope Characterization."

The acceptable soil concentration was then calculated by dividing a radiation dose limit by the radiation dose calculated for a unit concentration of activity. This will give the soil concentration that would give the firefighter the designated radiation dose limit for the given burn conditions (See Table 1).

Recommendations

The results of this assessment indicate that the maximum dose will be less than 1 mrem to any individual downwind of a fire if the fire is not in an area exceeding the SCA radiological posting limit. It is therefore recommended that the SCA radiological posting limit be used as the demarcation where firefighters should not follow a grass fire. SCA posting limits for Pu-239/Am-241, enriched uranium and depleted uranium in surface soils are at 115 pCi Pu-239/gram soil, 188 pCi Total U/gram soil and 102 pCi Total U/gram soil, respectively. By following this proposal, a firefighter should not receive more than 1 mrem of radiation dose.

Attachments

Attachment A – Hypothetical Wildfire Air Modeling Analysis

Tables

Table 1 - Allowable Soil Concentration Based on Radiation Dose to Firefighters from Grass Fires

Table 2 - Radiation Dose from Plutonium & Americium to Firefighters Due to Inhalation of Particulates during a Grass Fire

Table 3 - Uranium Isotope Characterization

Table 4 - Radiation Dose from Enriched Uranium to Firefighters Due to Inhalation of Particulates during a Grass Fire

Table 5 - Radiation Dose from Depleted Uranium to Firefighters Due to Inhalation of Particulates during a Grass Fire

ATTACHMENT A

Hypothetical Wildfire Air Modeling Analysis

Introduction

A wildfire may release radionuclides to the environment if radionuclides are present on or in the vegetation, or on soil attached to the vegetation surfaces. Airborne radionuclides may then be inhaled by fire fighters, resulting in a radiation dose to the individual.

Studies at the Rocky Flats Environmental Technology Site (RFETS or Site) and elsewhere have shown that plants do not readily uptake actinides such as plutonium (Pu) and americium (Am) from soil (Arthur and Alldredge, 1982). However, radionuclide-contaminated soil may be resuspended by wind or rain splash and become attached to vegetation surfaces. Measurements conducted at RFETS show that both standing vegetation and litter may trap radionuclide-contaminated soils, with litter showing a higher radionuclide content than the standing vegetation (Langer, 1986).

To look at radiation dose from a hypothetical wildfire, a dispersion model was used to calculate downwind concentrations of particulate matter. Assuming that airborne soil particles released from the burning plants have the same radionuclide concentrations as the surrounding contaminated surface soils allowed an estimate of airborne radionuclides that might be released during a wildfire. The dispersion modeling and subsequent radiation exposure calculations are described below.

Fire Scenario Modeling

A series of hypothetical wildfires was modeled, based on fire durations of 1, 2, or 5 hours and a variety of wind speed/stability combinations. The 54 wind speed/stability combinations that were used for this study were taken from the U.S. Environmental Protection Agency's (EPA's) SCREEN dispersion model (EPA, 1995a) and represent the probable range of wind speed and stability that are likely to occur in nature. For each wind speed and fire duration, the U.S. Forest Service's fire behavior model BEHAVE was used to predict the area and length-to-width ratio of the burned area.

Particulate emissions (and therefore actinide emissions) from the hypothetical fires were maximized by assuming that the fire would begin in late September, when fuel loading would be at a maximum. Subsequent dispersion was assumed to occur under each of the 54 wind speed/stability combinations. Dispersion from the fire was modeled for the 1-hour case for each of the 54 meteorological combinations. Worst-case impacts were found to occur under light winds (1 meter per second [m/s]) and stable conditions (nighttime stability, F). The 2- and 5-hour fires were modeled for the worst case conditions and also under annual average wind speed and stability conditions (4 m/s and

neutral [D] stability). These meteorological conditions were assumed to persist for the full 2 or 5 hours for the longer duration fires.

Dispersion from each fire was simulated using a model developed by the EPA, the Industrial Source Complex Short-Term model (ISCST3). Each hypothetical wildfire was represented by a rectangular area with dimensions based on the total acreage and the length-to-width ratios predicted by BEHAVE. The fire was input as a ground-based area source with an initial vertical dimension based on the expected height to which a smoke plume would rise (described below). The "regulatory default" options were used, along with rural dispersion coefficients. The model essentially assumed that the entire fire area would be burning simultaneously, which would not be the case in a real fire.

Winds were assumed to blow from west to east during each fire. Receptors (points at which the model will calculate a concentration) were established in a rectangular grid pattern over the eastern half of the fire and for some distance beyond the burned area to the north, south, and east. Receptor spacing was 100 m in the north-south direction and 50 m east-west. Because each fire was represented as a ground-based source, the receptors near the eastern edge of the fire will show the maximum concentrations that would be produced anywhere by a hypothetical fire. All receptors were assumed to be located 2 m above the ground (breathing level).

Fire Scenario Particulate Emissions

Particulate emissions from fires have been estimated by a number of researchers. Emission factors for a grass fire similar to the hypothetical wildfires generally range from approximately 3 grams (g) of particulate matter per kilogram (kg) of grass burned to around 18 g/kg. For this study, emission factors were taken from Leenhouts (1998). These factors have been used in a recent update to the Bureau of Land Management's (BLM's) *Simple Approach Smoke Estimation Model* (SASEM) (Sestak and Riebau, 1988) and are specific to western perennial grassland fires. The particulate emissions calculated represent emissions of particles smaller than 10 micrometers aerodynamic diameter (PM₁₀).

Equations given in the SASEM documentation (Sestak and Riebau, 1988) were used to estimate heat release and plume rise from each of the hypothetical fires. The SASEM approach assumes that a fire line will produce multiple small plumes, with horizontal dimensions governed by the depth of the fire line, rather than a single, massive plume. The expected plume rise for each individual plume is then largely a function of how hot the fire is (heat release) and the wind speed (higher winds inhibit plume rise).

The plume rise was calculated for a 1-hour fire for each of the 54 wind speed/stability combinations. Based on equations in the ISCST User's Guide (EPA, 1995b), these plume rise figures were used to estimate the initial vertical dimension of the fire plume for each meteorological condition. Once the worst-case dispersion conditions were identified by modeling each 1-hour fire with ISCST3, plume rise and initial vertical

dimension were also calculated for the 2- and 5-hours fires for the worst-case and average conditions.

Fire Scenario Radionuclide Emissions

Measurements have been taken on Site of the amount of soil attached to vegetation and litter. An autumn maximum figure plus one standard deviation of 134 milligrams of soil per gram of plant mass (mg/g) was used for this study (Arthur and Alldredge, 1982). The attached soil was assumed to be radiologically contaminated at a level of 1 picocurie per gram of soil (1 pCi/g). In addition, a small amount of radioactivity was assumed to be present within the plant material itself, based on transfer coefficients from Baes, et al. (1984).

Fire Scenario Results

The maximum and average 1-hour, 2-hour, and 5-hour particulate and radionuclide concentrations predicted by the modeling are shown in Table 1.

Table 1. Hypothetical Wildfire Air Modeling Results

Fire Duration and Scenario	Maximum Particulate Concentration ($\mu\text{g}/\text{m}^3$)	Maximum Pu-239/240 Concentration (pCi/m^3)	Maximum Am-241 Concentration (pCi/m^3)	Maximum Uranium Concentration (pCi/m^3)
1 hour Worst-case meteorology	2,989	4.02×10^{-4}	4.17×10^{-4}	4.26×10^{-4}
1 hour Average meteorology	728	9.79×10^{-5}	1.02×10^{-4}	1.04×10^{-4}
2 hour Worst-case meteorology	2,962	3.98×10^{-4}	4.13×10^{-4}	4.22×10^{-4}
2 hour Average meteorology	722	9.70×10^{-5}	1.01×10^{-4}	1.03×10^{-4}
5 hour Worst-case meteorology	2,883	3.88×10^{-4}	4.02×10^{-4}	4.11×10^{-4}
5 hour Average meteorology	695	9.34×10^{-5}	9.69×10^{-5}	9.90×10^{-5}

Notes:

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

pCi/m^3 = picocuries per cubic meter

Pu-239/240 = plutonium 239/240

Am-241 = americium 241

U = uranium species

All radionuclide concentrations based on soil contamination at 1 picocurie per gram (pCi/g)

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ROCKY FLATS STEWARDSHIP COUNCIL

P.O. Box 17670
Boulder, CO 80308-0670
www.rockyflatssc.org

(303) 412-1200
(303) 412-1211 (f)

Jefferson County -- Boulder County -- City and County of Broomfield -- City of Arvada -- City of Boulder
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MEMORANDUM

TO: Stewardship Council Board

FROM: Rik Getty

SUBJECT: Summary of DOE air quality assessment of April 2, 2006 grass fire

DATE: July 1, 2006

Based on your interest in the April 2, 2006, fire that burned approximately 850 acres at Rocky Flats, I have prepared this memo which focuses on air quality monitoring and possible firefighter exposure resulting from airborne contamination. My information is based on DOE Office of Legacy Management's report on the fire, *Assessment of April 2006 Grass Fire at the Rocky Flats Site: Modeling of Grass Fire Emissions and Discussion of Air Sampling as it Relates to a Grass Fire*.

As background, the closest downwind air monitor to the fire, located where Walnut Creek crosses Indiana St., lost power only a few minutes after the fire started. A second air monitor, located where Woman Creek crosses Indiana, had power throughout the duration of the fire but was not in the path of the smoke plume. The third and final site air monitor is located upwind from the fire on the site's northwestern boundary with Highway 93 and would not be expected to have collected any smoke from the fire.

The aforementioned assessment of the April 2006 fire relied heavily on a report published by DOE and Kaiser-Hill in 2000 titled *White Paper on the Radiation Dose Assessment for Firefighters During a Grass Fire*. The 2000 report was the result of comments from local fire teams who helped the site extinguish a small 10 acre fire in the eastern Buffer Zone. The firefighters had questions regarding potential radiological hazards they may have encountered when fighting the fire.

Based on DOE standards and the more conservative EPA standards, the 2000 study concluded that exposures to airborne contaminants during a site grass fire would be negligible -- just a tiny fraction of the maximum allowed EPA limit. The more conservative EPA regulations limit emissions of airborne radioactive contaminants to a level below which any member of the public

would be exposed to concentrations that could result in a potential dose of 10 mrem per year via the airborne inhalation pathway. In fact, the 2000 study goes a step further and assumes the firefighters would be fighting the fire directly in front of the smoke plume without any respiratory protection, assumptions that are very conservative.

This additional degree of conservatism is actually unrealistic for the following two reasons:

- firefighters do not normally fight wildland grass fires by positioning themselves directly in the smoke plume of an advancing fire; and,
- even if they were directly in the smoke plume of an advancing fire, without respiratory protection they would succumb to smoke inhalation.

Based on these conservative assumptions the firefighters in the 2000 and 2006 fires would have received much less exposure than the scenario modeled in the 2000 report.

Finally, the 2006 fire assessment examined the role of the three remaining air monitors at the site. These air monitors were originally designed to collect airborne particulate contamination over the course of a 30-day monitoring period. They are not designed to monitor air quality for a short-duration event like a grass fire. The fundamental problem is that a short-duration grass fire event of several hours does not generate enough contamination on the air monitor filters to be detected by the lab analysis. As DOE states in their assessment, “In summary, a grass fire at RFS is not expected to yield detectable air concentrations in the present fixed network of samplers, nor is the network intended for that purpose.”

In order for meaningful data to be collected it would be necessary to use portable air monitoring equipment that would have to be constantly moved with the smoke plume. Moving these systems during a fire would cause additional personnel safety concerns.

If you have any questions concerning this summary of the 2006 fire assessment please contact me. If you are interested in reading the report, click on the following link. The analysis starts on page 90:

http://192.149.55.183/PublicItems/StakeFocusGroup/meetings2002/pdf/2006_1stqtr.pdf

CORRES CONTROL
INCOMING LTR NO

00979 RF03



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8
999 18TH STREET - SUITE 300
DENVER, CO 80202-2466

RECEIVED

OCT 21 P 2 22
CORRESPONDENCE CONTROL

OCT 20 2003

DUE DATE
ACTION

Ref 8EPR-F

Mr Mark Sattelberg
Senior Contaminant Biologist
US Fish and Wildlife Service
Rocky Mountain Arsenal National Wildlife Refuge
Building 111
Commerce City, CO 80222-1748

Re USFWS Future Activities at Rocky Flats

Dear Mr Sattelberg

This is in response to your letter dated August 20, 2003, in which you asked whether EPA anticipated placing restrictions on activities the US Fish and Wildlife Service (Service) may wish to conduct at the future Rocky Flats National Wildlife Refuge Specifically the Service asked about the following activities prescribed fire, grazing, plowing, and ripping up old roads

Once EPA certifies the remedy to be complete and jurisdiction of property has been transferred to the Service, does EPA foresee any restrictions on the use of prescribed fire? Similarly, does the EPA envision restrictions on ripping up roads?

As you are aware, the widespread contaminants of most concern at Rocky Flats are plutonium and americium Consequently, areas at the site where these contaminants remain at closure would have the most use restrictions In June 2003, CDPHE and EPA approved modifications to the Rocky Flats Cleanup Agreement, including revised contaminant soil action levels EPA expects that at the completion of the remedy no significant contamination will be left in the surface soils at concentrations greater than outlined in the Attachment 5 of the modified agreement For plutonium, the expectation is that surface soils contaminated at concentrations greater than 50 picocuries/gram (pCi/g) will have been removed Surface soils are defined as those less than three feet in depth EPA anticipates there will be restrictions on areas of the Site with residual contamination less than 50 pCi/g but greater than 9 pCi/g - a concentration representing lifetime excess cancer risk of one in 1,000,000 to a wildlife refuge worker This is not to say that prescribed fire or ripping up roads would be precluded in areas with residual contamination in the 9-50 pCi/g range Rather, the Service would need to take extra precautions in those areas to minimize soil disturbances The primary concern is that major soil disturbances could result in elevated levels of contaminants to migrate to surface water

DIST	LTR	ENC
BERARDINI, J. H.	X	
BOGNAR, E. S.	X	
BROOKS, L.	X	
BUTLER, L.	X	
CROCKETT, G. A.		
DECK, C. A.	X	
DEGENHART, K. R.		
DIETER, T. J.		
DIETERLE, S. E.		
FERRERA, D. W.		
GIACOMINI, J. J.		
HIETT, S. B.	X	
ISOM, J. H.		
LINDSAY, D. C.		
LONG, J. W.		
LYLE, J. L.		
MARTINEZ, L. A.	X	
NAGEL, R. E.	X	
NORTH, K.	X	
PARKER, A. M.		
RODGERS, A. D.		
SHELTON, D. C.	X	
SPEARS, M. S.		
TRICE, K. D.		
TUOR, N. R.		
WILLIAMS, J. L.		
ZAHM, C.	X	

COR. CONTROL	X
ADMN. RECORD	X
PATS/130	

Reviewed for Addressee
Corres Control RFP

10/21/03 DRR
Date By

Ref Ltr #

DOE ORDER #
5400.1

1/2



ADMIN RECORD
SW-A-004845

The use of prescribed fire at Rocky Flats is of special interest to citizens and public officials in the surrounding communities. EPA believes that the use of prescribed fire at the site will not pose significant risk to firefighters, Service personnel or the general public. This belief is based upon data gathered during and after the 2000 test burn and for accidental burns at the site, as well as risk assessment work documented in the Task 3 Report (Assessing Risks of Exposure to Plutonium, February 2000) on the effects of prescribed fire at Rocky Flats. However, relatively large areas of Rocky Flats have not been characterized to date. These areas are often referred to as "white spaces." EPA does not believe there is great potential to find contamination in these areas because they are removed from areas of known contamination and are not associated with past practices at the site that resulted in releases of contamination. Nevertheless, unexpected discoveries have occurred at Rocky Flats (e.g., the incinerator near the ash pits), and EPA believes that samples should be collected from white spaces before closure and analyzed prior to the application of prescribed fire in those areas.

Does EPA foresee any restrictions on the consumption of edible tissues from the grazing animals used for weed control at Rocky Flats?

Animal studies to date, and studies conducted by the actinide migration panel, indicate that there is no significant uptake of contaminants by grazing animals at Rocky Flats. Therefore, EPA does not anticipate restrictions on consumption of animals that graze at Rocky Flats. However, overgrazing in the areas in the 9 to 50 pCi/g range could result in water quality issues as discussed above. Therefore, EPA would expect to see measures put in place that would prevent overgrazing.

Do you foresee any restrictions on the plowing of areas in the southeast portion of the site for the purpose of reestablishing native vegetation?

Plowing will in all likelihood be prohibited in any areas of the site where contamination concentrations are greater than 9 pCi/g plutonium.

EPA looks forward to working with the Service in identifying and implementing the necessary restrictions for assuring that residual contamination at the future Rocky Flats National Wildlife Refuge poses a negligible risk to workers and members of the public. Please contact me at (303) 312-6246 if you have any questions regarding these matters.

Sincerely,



Gary Kleeman
Acting Rocky Flats Team Leader

cc Dean Rundle, FWS
Steve Gunderson, CDPHE
Joe Legare, DOE
Dave Shelton, KH
Administrative Records, T130G

2/1/00