

ROCKY FLATS STEWARDSHIP COUNCIL

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Jefferson County ~ Boulder County ~ City and County of Broomfield ~ City of Arvada ~ City of Boulder
City of Golden ~ City of Northglenn ~ City of Thornton ~ City of Westminster ~ Town of Superior
League of Women Voters ~ Rocky Flats Cold War Museum ~ Rocky Flats Homesteaders
Kim Griffiths

Board of Directors Meeting – Agenda

Monday, April 2, 2018, 8:30 – 11:45 AM

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

- 8:30 AM Convene/Introductions/Agenda Review
- 8:35 AM Chairman’s Review of March 5th Executive Committee meeting
- 8:40 AM Public Comment: Comments are limited to the Consent Agenda and non-agenda items
- 8:50 AM Business Items (briefing memo attached)
1. Consent Agenda: Approval of meeting minutes checks
 2. Executive Director’s Report
- 9:00 AM CDPHE Briefing on Buffer Zone Sampling During Cleanup (briefing memo attached)
- o With the upcoming opening of the Rocky Flats National Wildlife Refuge for public recreation, it is important for the Board and public to be briefed on soil sampling conducted on those lands.
 - o This briefing is not the first time this topic has been discussed at a Stewardship Council meeting, but it is likely the most comprehensive.
- Public Comment on CDPHE Briefing: Comments must focus on CDPHE’s briefing.
- 10:15 AM CDPHE – Follow up to February 5th “Myths and Misunderstandings” Presentation (briefing memo attached)
- o CDPHE will provide a short follow up to issues raised during its February 5, 2018, briefing.

10:45 AM Pat Mellen Briefing (briefing memo attached)

- Pat will propose a counterpoint to CDPHE’s “Myths and Misunderstandings” presentation” from the February 5, 2018, meeting.
- As explained in the materials Pat provided, “participation in a structured discussion of the unresolved concerns underlying the counterpoint position will support ongoing efforts by the RFSC members, the media and general public, to understand the complex public perception of the impact of a particular event or proposed action at or near the Rocky Flats site.”

Public Comment on Pat’s Briefing: Comments must focus on Pat’s briefing.

11:30 AM Board Roundtable – Big Picture/Additional Questions/Issue Identification
Adjourn

Upcoming Meetings: All dates are proposed and will be set at this meeting

June 4
September 17
October 29

Business Items

- February 5, 2018, draft board meeting minutes
- List of Stewardship Council checks

ROCKY FLATS STEWARDSHIP COUNCIL
Monday, February 5, 2018, 8:30 a.m. – 12:20 p.m.
Rocky Mountain Metropolitan Airport, Terminal Building, Mount Evans Room
11755 Airport Way, Broomfield, Colorado

Board members: Mark McGoff (Director, Arvada), Sandra McDonald (Alternate, Arvada), Cindy Domenico (Director, Boulder County), Lisa Morzel (Director, Boulder), Mike Shelton (Director, Broomfield), Kim Groom (Alternate, Broomfield), David Allen (Alternate, Broomfield), Jim Dale (Director, Golden), Libby Szabo (Director, Jefferson County), Pat O’Connell (Alternate, Jefferson County), Joyce Downing (Director, Northglenn), Shelley Stanley (Alternate, Northglenn), Sandy Pennington (Alternate, Superior), Jan Kulmann (Director, Thornton), Emily Hunt (Alternate, Thornton), Shannon Bird (Director, Westminster), Cathy Shugarts (Alternate, Westminster), Jeannette Hillery (Director, League of Women Voters), Sue Vaughn (Alternate, League of Women Voters), Murph Widdowfield (Director, Rocky Flats Cold War Museum), Roman Kohler (Director, Rocky Flats Homesteaders), Kim Griffiths

Stewardship Council staff and consultants: David Abelson (Executive Director), Cameron Richards (Seter & Vander Wall, P.C.), Rik Getty (Technical Program Manager), Ann Lockhart (Minutes)

Attendees: Christine Hawley (WCRA), Sarah Borgers (Westminster), Ryan Hanson (Sen. Gardner), Stuart Feinhor (Rep. Polis), Will Noel (Rep. Polis), Carl Spreng (CDPHE), Lindsay Masters (CDPHE), Warren Smith (CDPHE), Linda Kaiser (Navarro), Patty Gallo (Navarro), Jeremy Wehner (Navarro), John Boylan (Navarro), Bob Darr (Navarro), Jody Nelson (Navarro), George Squibb (Navarro), Jeffrey Murl (DOE-LM), Scott Surovchak (DOE-LM), Karen Edson (DOE-LM), Vera Moritz (EPA), Gerald Hunt, Lynn Segal, Marion Whitney, Ted Ziegler, W. Gale Biggs, Bonnie Graham-Reed, Emily Graham, Pat Mellen, Paul Karolyi (journalist, Changing Denver), Jana Houghteling, Nathan Church (Harvey Pro Cinema), Randy Stafford, Harvey Nichols, Eric Griffiths, Sasha Stiles, Christopher Houghton, Alesya Casse

Convene/Agenda Review: Chair Joyce Downing opened the meeting at 8:30 a.m.

Public comment on Consent Agenda and Non-Agenda Items: Bonnie Graham-Reed said she was disappointed that the Rocky Flats Downwinders were not chosen to join the Stewardship Council Board of Directors. Marion Whitney noted that she was available to be a fact checker on issues related to Rocky Flats.

Business Items: The Board addressed a number of issues.

Bylaws Amendment: At the October 30, 2017, meeting, the Board discussed two amendments to the Stewardship Council bylaws. One would expand the non-voting members to include former elected officials who had previously served on the Stewardship Council Board of Directors. The second would stagger the terms of the community representative seats.

Mark McGoff moved to approve the bylaws amendments related to the non-voting members. Lisa Morzel seconded the motion. The motion was approved 14-0.

Roman Kohler moved to approve the bylaws amendment related to staggering terms. Mark McGoff seconded that motion. The motion was approved 14-0.

Local Government Ratification of Community Member Seats: At the October 30, 2017, meeting, the Board of Directors agreed to appoint the League of Women Voters and Rocky Flats Homesteaders to a two-year term, and the Rocky Flats Cold War Museum and Kim Griffiths to a one-year term, pending adoption of the bylaws amendment staggering terms. Following the Board's approval of the bylaws amendment staggering terms, Jim Dale moved to ratify this decision; the motion was seconded by Lisa Morzel. The governments voted 10-0 to ratify these terms. The terms start at the February 5, 2018, meeting.

Election of Stewardship Council Officers: Each year, the Board appoints the executive committee. The three positions are Chair, Vice Chair, and Secretary/Treasurer. Jim Dale moved to appoint Joyce Downing as Chair; Jeannette Hillery seconded the motion. The motion was approved 14-0. Mike Shelton moved to appoint Chris Hanson as Vice Chair; Jan Kuhlman seconded the motion. The motion was approved 14-0.

Both Lisa Morzel and Jeannette Hillery expressed interest in serving as the Secretary/Treasurer. Both were nominated by the Board. Following a straw poll of the Board, eight members expressed support for Jeannette and six for Lisa. Jim Dale then moved to appoint Jeannette as the Secretary/Treasurer; Mike Shelton seconded the motion. The motion was approved 14-0.

2018 Meeting Schedule: The 2018 meeting dates, as proposed by the executive committee, are February 5, April 2, June 4, September 17, and October 29. Shannon Bird moved to adopt these meeting dates; Cindy Domenico seconded the motion. The motion was approved 14-0.

Consent Agenda: Approval of Minutes and Checks: Lisa Morzel opened the discussion, noting that her name is missing from the list of attendees. Jeannette moved to approve the checks and minutes with the change Lisa noted; Roman seconded the motion. The motion was approved 14-0.

Executive Director's Report: David Abelson began by welcoming the new Board members: Cindy Domenico (Boulder County Commission), Jim Dale (Golden Council), Kim Groom (Broomfield Council), Maria De Cambra (Westminster Council), Cathy Shugarts (Westminster staff), and Kim Griffiths.

He next noted that all of the governments approved the IGA amendments and IGA triennial review. In response to a question from David Allen, David Abelson said that once they have all of the paperwork, Barb Vander Wall will compile the IGA and will send it to each member. David also noted that local government dues notices will be sent in the coming weeks. Annually, each government contributes \$1000 to the Stewardship Council.

David next explained the federal budget process. He said that the federal government is currently operating under a stop-gap funding bill (called a "continuing resolution"). The continuing resolution runs through this Friday, February 8. It is unclear whether Congress will

approve a funding bill that will cover the remainder of the federal fiscal year (through September 30), or whether it will approve another short-term continuing resolution. Additionally, on or around February 12, the Administration will submit to Congress the President's Fiscal Year 2019 budget. Through both the continuation of funding for 2018, and the 2019 budget, David will track funding for DOE in general and DOE's Office of Legacy Management in particular. If past appropriations are an indicator of fiscal years 2018 and 2019 budgets, David does not anticipate there will be any funding problems for the Office of Legacy Management. Less clear, he says, is funding for the US Fish and Wildlife Service (USFWS). Regarding USFWS funding, Jim Dale said he is interested in knowing if there will be any cuts to the portion of the budget that funds the Rocky Flats National Wildlife Refuge.

DOE-LM Quarterly Report: Third Quarter 2017

Quarterly reports are required under the Rocky Flats Legacy Management Agreement (RFLMA) to document that the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedy continues to provide effective protection. Components of the remedy for Rocky Flats include:

- Maintaining two landfill covers
- Maintaining three groundwater treatment systems
- Monitoring surface water and groundwater
- Maintaining physical controls (signage and access restrictions)
- Enforcing institutional controls including:
 - No occupied building construction
 - Excavation and soil-disturbance restrictions
 - No surface-water consumption or agricultural use
 - No groundwater wells, except for monitoring
 - Landfill covers and engineered remedy-components protection

Surface Water, George Squibb

Routine surface water sampling in Woman Creek, downstream of the Original Landfill (monitoring point GS59), showed mean concentrations for all analytes were below applicable RFLMA water quality standards. At the Present Landfill, routine second-quarter sampling showed vinyl chloride was above the applicable RFLMA standard. The standard is 0.2 µg/L; the sample was 0.28 µg/L. Per RFLMA evaluation protocols, the result triggered a sampling frequency increase from quarterly to monthly. For the following monthly sample, vinyl chloride was not detected, so sampling frequency returned to quarterly. Additionally, no RFLMA point of evaluation (POE) or point of compliance (POC) analyte concentrations were reportable during the quarter.

Shannon Bird asked about the vinyl chloride levels. George said no remedial action was needed. It was detected way upstream before anyone could be exposed. Shelley Stanley asked about 2017 precipitation. George said it was less than normal, around 12 inches at the site. It was mostly dry from June until recently. Jim Dale asked if the Present Landfill was lined. George said he did not know. Jim asked where the vinyl chloride came from. Scott Surovchak said it comes from breakdown of organic materials, and that most sanitary landfills have it. A higher

number triggers a consultation with the regulators, who then decide a response. Sandy Pennington noted that in one quarter vinyl chloride was high and the next month low and asked about the impact of precipitation on the number of tests. George said every year it varies, not just the precipitation but how it arrives. The Site Operations Guide has targets for sampling. If a sampling location has a lot of variability, he may increase the frequency of sampling. If there is no water, levels cannot be measured, and there is no risk. Sandra McDonald asked about sampling the ponds. George said sometimes water flows through, so there is no water to sample. The WALPOC location was not sampled because it was dry.

Public comment re: Surface Water: Marion Whitney asked if they were still monitoring groundwater even if the surface is dry. George said yes, that some of the 88 wells were dry last year. Lynn Segal asked how precipitation disperses contamination. George said, with lots of runoff, more contamination is picked up from the surface. In dry periods, there is more uranium, most of it naturally occurring. Hail moves more surface materials as it pounds the soil.

Groundwater Monitoring and Operations: John Boylan

The RFLMA monitoring network includes:

- 10 Resource Conservation and Recovery Act (RCRA) wells (monitored quarterly). These wells evaluate potential impacts from OLF and PLF.
- Nine Area of Concern (AOC) wells and one surface water support location (monitored semiannually). These wells are located in drainages downstream of contaminant plumes and evaluate discharges to surface water.
- 27 Sentinel wells (monitored semiannually). These are downgradient of treatment systems, on the edges of plumes, and in drainages. These wells look for plumes migrating to surface water and treatment system problems
- 42 Evaluation wells (monitored biennially). These wells are within plumes, near source areas, and interior of Central Operable Unit (COU). They evaluate whether monitoring of an area or plume can cease.
- Nine treatment system locations (seven are monitored semiannually, and two are monitored quarterly)

The third quarter is a light sampling period. Only the only RCRA wells are monitored. The results are generally consistent with previous data.

At the groundwater treatment systems, activities included routine maintenance. The site also continued evaluating treatment effectiveness at the Solar Ponds Plume Treatment System. At the Solar Ponds, influent nitrate continued to be treated to below detection limits in the treatment lagoon. DOE also subcontracted treatment experts began work on improving uranium treatment.

Shelley Stanley asked about the material in the microcell of the groundwater treatment system. John said there are ion exchange resins and fish bones. A subcontractor was hired to run other media and tested three or four. The ion exchange resins proved much more successful. Kim Groom asked about the wells near the Solar Ponds, and Shelley asked how much water is treated. John said the average flow in 2017 was about one gallon a minute, about 25 percent of normal. The Solar Ponds, Mound and East Trenches were treating 100 percent of the water. Jim Dale asked for an executive summary of the hydrology of Rocky Flats. John said the 1995 EG&G

report and the Administrative Record both include a summary. Jim asked about waste created from remediation. John said the lagoon generates sludge, but that it has never been cleaned out. Sandy Pennington asked about the 88 groundwater wells and the adequacy of testing 42 biennially. John said they are within the sources area and do not change much. He said their objectives drive frequency of testing. Protecting surface water quality is the most important thing. Asked how far the groundwater has moved in two years, John said it depends, and that the geology is fairly tight. The groundwater is very slow moving, about 50 feet a year, with some more and some less.

Sandy asked about extreme precipitation impact. John said that in 2013 most of the precipitation ran off the site and that flow velocities were calculated. Libby Szabo asked if they go through every natural disaster scenario. John said part of the closure agreement was to carefully evaluate all the “what ifs.” Now, as they maintain the site, they fill in depressions. Shelley asked about the range of uranium levels. John said it was 65-85 micrograms per liter and that the lagoon reduces the levels by 20 percent down to 50-65 micrograms per liter.

Public Comment re: Groundwater: Lynn Segal asked about different water levels in different strata. John said the upper strata varies in thickness and that there is not enough water to be considered an aquifer. Below that is the clay stone formation, which covers the entire area. Water flows across the top of it. Deeper down are aquifers. Gale Biggs said water flows down from the mountains (Coal Creek runoff) creating the rocky flats and questioned if it could wash out the plutonium. George Squibb said the 2013 precipitation included 25 inches of rain. Lynn asked about the location of buried wastes. John showed a map of the East Trenches 15-18 feet deep in the southeast area. He said that over millennia, the creek will be deeper. The East Trenches are monitored by wells. Marion Whitney asked, as a former teacher and Scoutmaster, what the situation is today, since they are all trying to keep children safe. John said she could go to the DOE website and look at the data and annual report.

Site Operations, Jeremy Wehner

Activities included quarterly sign inspections. Signs are one part of the RFLMA physical control. One sign east of the COU that had fallen off was replaced

At the Original Landfill, site personnel performed three monthly inspections (July 27, August 8, and September 21). The August 8 inspection was combined with a weather-related inspection. Another weather-related inspection was conducted on September 25. Maintenance to address a slumping event was identified and completed. Vertical settling at each monument was within limits. Additionally, the East Subsurface Drain was inspected as part of the OLF monthly and weather-related inspections. The temporary groundwater intercept system became operational on March 29 and operated throughout the third quarter

At the Present Landfill, site personnel performed the quarterly inspection on August 8. It was combined with weather-related inspection. An additional weather-related inspection was conducted on September 25. The landfill in good condition and no maintenance is required.

Former Building Areas 371, 771, 881, 991 are routinely inspected (quarterly and during weather-related inspections) for subsidence. During the quarter, two weather-related inspections were

performed (August 8 and September 25). No changes were identified.

At the North Walnut Creek Slump, hillside maintenance grading was conducted during the second quarter. During the third quarter, a crack developed along the slump scarp alignment. Maximum crack displacement was 3-4 inches in width and 2 feet in depth. Survey monitoring points were installed and surveyed. The crack was filled.

Regarding site roads, they are in good shape with no major rutting. Fall maintenance is scheduled for the fourth quarter.

Shelley Stanley asked if there were new cracks in the original landfill. The answer was no. The 2015 slump was the big one, and they continue to regrade it. Sandy Pennington asked if she could go online to see the monthly and quarterly data. The answer was yes. Mike Shelton asked about limits on slumping. The answer was that settlements have occurred measuring one-half inch to 4 inches. If they are larger, a reevaluation is done. Jeannette Hillery asked about the berm west of the Original Landfill, and David Allen asked about the depth of the landfill cover. The answer was 2 feet on top. In some places, 15 feet of fill was used on the landfill.

Public Comment re: Site Operations: There were none.

Ecology, Jody Nelson

Activities for the quarter includes preble's mouse mitigation monitoring, wetland mitigation monitoring, revegetation monitoring, prairie dog surveys, shrub/tree planting survival monitoring, and photopoint monitoring. Regarding the prairie dogs, there is one town active on the Refuge, north of the A4 Pond.

Kim Groom asked about the rattlesnake population. Jody said it is still there along the drainage bottoms.

Public Comment re: Ecology: Marion Whitney asked about the depth of roots of native plants in the area. Jody said he did a literature search and found a University of Nebraska researcher who dug up plants to check. He said blue stem grass goes down many feet. Jim Dale asked for a link to that study in the minutes. (See "Root Development in the Grassland Formation, A Correlation of the Root Systems of Native Vegetation and Crop Plants," John E. Weaver -- <https://ia902708.us.archive.org/29/items/rootdevelopment00weavgoog/rootdevelopment00weavgoog.pdf>; See also "The Ecological Relations of Roots," John E. Weaver -- <https://archive.org/details/ecologicalrelati00weav>)

CDPHE Presentation – Rocky Flats Myths and Misunderstandings

Carl Spring, RFLMA coordinator, said CDPHE added another staff person a year and a half ago, Lindsay Masters. Lindsay said she is relatively new and has degrees in geology and law. Furthermore, she said Rocky Flats is in her neighborhood.

Carl said the presentation is intended to provide an overview of some Rocky Flats myths and misunderstandings about science, data, the cleanup, risk and regulatory structure and address

frequently asked questions about Rocky Flats. For more information, please visit CDPHE's Rocky Flats website: <https://www.colorado.gov/pacific/cdphe/rocky-flats>
Contact information: Carl.Spreng@state.co.us and Lindsay.Masters@state.co.us

Some big truths:

1. Rocky Flats once was highly contaminated.
2. Environmental crimes were committed during site operations. Rockwell, the second operator, pleaded guilty to environmental crimes, and paid \$18.5 million penalty.
3. Some on and off-site environmental contamination remains.
4. The contamination will persist for a long time.

Then: Huge Superfund effort

- 10-year, \$7 billion cleanup
- Deactivated, decommissioned and demolished 800+ structures
- 421 potentially contaminated areas investigated
- ~360 areas remediated
- COCs: arsenic, benzo(a) pyrene, dioxin, plutonium, vanadium
- Activities overseen by DOE, EPA, CDPHE, DNFSB
- In 2005, ATSDR issued public health report

Now: Rocky Flats Plant gone

The industrial sources have been removed, and the lands that comprise the Refuge are delisted from CERCLA. DOE maintains the remedy, including groundwater and surface water monitoring, and the remedy remains protective of human health and environment.

Truth 3: There is on and off-site residual contamination

Residual contamination at Superfund sites is not unusual. At Rocky Flats, the levels are within the regulatory, health-based limits. Additionally, CDPHE continues to monitor the site

Truth 4: Residual contamination will be there for a very long time

Americium, plutonium, uranium and metals will remain for thousands of years; chlorinated solvents will remain for decades. Therefore, there is ongoing monitoring, operations and maintenance, and groundwater treatment. CERCLA five-year reviews will continue, and the state will enforce institutional controls.

Carl and Lindsay next discussed twenty select myths and misunderstandings. Each is labeled with "Statement #..." below.

Statement #1: DOE pays CDPHE for oversight

This statement is true. At Rocky Flats, DOE follows the "polluter pays" principle. This approach is efficient, practical and fair. Laws and regulations govern CDPHE oversight, and CDPHE reports funding to the Colorado State Legislature. Federal grants are common practice.

Statement #2: Cleanup records and data are secret and unavailable to the public

This statement is incorrect. Government open records law (FOIA and CORA) apply. They noted “sunshine is the best disinfectant.” Superfund law also requires data to be accessible. The information is available on multiple websites, and if you cannot find it, ask CDPHE.

The DOE Administrative Record: <https://www.lm.doe.gov/CERCLA/SiteSelector.aspx>
CDPHE’s records: <https://www.colorado.gov/cdphe/hmwmd=records-review> For the EPA, the information is found on the Environmental Information Service Center. Older records are in a hard copy.

Statement #3: Sealing Grand Jury records is evidence of wrongdoing

Grand juries investigate potential criminal conduct. The proceedings are generally secret by law. This requirement helps protect witnesses and ensure constitutional protections. In support of this view, Carl and Lindsay referred to Federal Rules of Criminal Procedure, Rule 6 (e) (2) (b):

“Unless these rules provide otherwise, the following persons must not disclose a matter occurring before the Grand Jury (i) a grand juror;... (vi) an attorney for the government; or a person to whom disclosure is made....”

https://www.law.cornell.edu/rules/frcrmp/rule_6Statement_#

Further, grand jury records would not impact the remedy decision. There are two separate issues: legal v. cleanup. The Rocky Flats grand jury finished before the RI/FS data was collected. Environmental investigation data was collected 1991 to 2005; this was used to make cleanup decisions because high quality assurance/quality control standards. Earlier data was not collected using the same rigorous QA/QC standards, so it was not used. Carl and Lindsay concluded that regulatory conclusions would not be changed by the grand jury proceedings.

Statement #4: A small dose of ionizing radiation could be harmful

They noted this view is “possible but not probable.” Due to uncertainties of the effect of low-level ionizing radiation, DOE and the site regulators utilized the linear no-threshold dose model. The linear no-threshold model (LNT) assumes that the long-term, biological damage caused by ionizing radiation is directly proportional to the dose; that is, it conservatively assumes that any dose, no matter how low, could potentially create the effects that could lead to a cancer. Additionally, regulations provide limits below which risk/dose is negligible.

Further, radioactivity levels at Rocky Flats are also well below regulatory standards. The average residual plutonium contamination in surface soil is:

- Refuge: 1.1 picocuries/gram
- COU: 2.3 pCi/g
- Dose: <0.5 mrem/year for adult or child
- Risk: <1 in a million excess risk of excess cancer

By comparison, the state of Colorado dose limit is 25 mrem/year above background. The calculated doses for plutonium exposure in the most contaminated area:

- 0.3 mrem/year for adult Refuge worker
- 0.2 mrem/year for a child visitor

- .07 mrem/near for an adult visitor

Carl and Lindsay then showed a chart comparing the Rocky Flats dose to other doses.

Statement #5: Inhaling even one particle of plutonium can cause cancer

The risk is not zero, but it is very small. They stated millions of dust particles contaminated with PuO₂ must be inhaled in order for significant radiation doses.

Statement #6: Plutonium is the most dangerous substance known

Plutonium is hazardous, but it is not as immediately hazardous to health as many more common chemicals are. The harmful effects from exposure to low doses is possible, not probable. Many carcinogenic substances are harmful in the environment and in products.

Statement #7: Locations of subsurface contamination are unknown

This statement is inaccurate. Contamination levels and locations are known from data. The CERCLA Administrative Record includes the RI/FS report (23 volumes). Other sampling affirmed the location of contamination. Additionally, DOE continues to monitor and report, with oversight by EPA and CDPHE.

Statement #8: Inadequate sampling

This statement is inaccurate. Cleanup entailed extensive environmental investigation, including 2,000 waste streams identified by state enforcement. Based on scientific knowledge and regulatory requirements—the same general process used at other CERCLA sites—there are samples (air, soil, groundwater, surface water, sediment) totaling 6.9 million data points. Decisions were based on data collected, interviews, records and process knowledge.

As an example, Carl and Lindsay discussed groundwater. Using hydrogeologic and release information, and approved sampling procedures and methods, the site collected extensive data from June 1991 through July 2005. In total, Rocky Flats had approximately 1,289 groundwater wells. Additionally, there is ongoing groundwater monitoring and sampling.

Statement #9: Parkway construction would release harmful levels of plutonium

As background, a 300-foot right-of-way was granted in accordance with the Rocky Flats National Wildlife Refuge Act. The RI/FS investigation concluded both the Refuge area and off-site areas are suitable for unlimited use and unrestricted exposure. Levels protective of a Refuge worker also protective of a construction worker due to a shorter exposure time.

In support of this position, Carl and Lindsay noted that along the 300-foot right-of-way, there were 31 soil samples from 14 sampling locations. The maximum concentration for plutonium is 8.8 pCi/gram. The average concentration is 1.4 pCi/gram. Third party sampling east of the right-of-way agrees with DOE sampling results.

Statement #10: No standards have been established for airborne radionuclides

This statement is incorrect. Federal air standards are the National Emission Standards for Hazardous Air Pollutants (NESHAPS, part of the Clean Air Act). The standard is 10 millirem/year dose limit for radionuclide. The state of Colorado radiation standard limits public

to total annual dose of 25 millirem/year. The average annual emission for Pu-239 and Pu-240 is .02 picocuries per cubic meter of air.

Statement #11: HiVol air samplers did not capture the right size particles

Carl and Lindsay showed a chart that explains why this statement is not correct.

Statement #12: Continuous air monitoring is still needed

Along with DOE and EPA, CDPHE disagrees with this conclusion. Prior to cleanup, air monitoring was conducted for decades. That data is included in the annual air emissions and monitoring reports. The samplers collected both site-derived and naturally occurring radionuclides. Only a small fraction of the Rad-NESHAP standard was detected. The site operated under a state of Colorado air quality operating permit.

After cleanup, sources of airborne contaminants (solvents, radionuclides, etc.) are gone. Air monitoring continued briefly to confirm very low contaminant levels. Air monitoring ceased and the state air quality permit was terminated. The potential remains for minor wind erosion of the residual contamination in surface soil.

Statement #13: Pu surface soil action levels are inadequate

This statement is incorrect. As background, an action level is the point at which an action is triggered. At Rocky Flats, all remedial surface soil action levels set at 1 in 100,000 excess cancer risk. Plutonium soil action levels were initially 651 pCi/g (1996). In 2003, the action levels were lowered to 50 pCi/g after input from stakeholders. For surface soils, the residual levels of Pu in COU are, on average, 2.3 pCi/g, below the applicable action level. No remedial action levels were triggered in the lands that comprise the Rocky Flats refuge.

Statement #14: Process waste lines were just left in place and are a continuing source

Process waste lines were thoroughly characterized. Most waste lines were removed, and some lines were purged and plugged with grout. Grouting is not unique to Rocky Flats. Finally, the remaining process line locations were documented.

Statement #15: The landfills (OLF and PLF) are full of toxic materials

The landfills were well characterized (surface soil, subsurface soil, groundwater & surface water). They contain mostly municipal wastes. There are some unknowns, so RCRA wells monitor groundwater emanating from landfills.

Statement #16: Wildfires will release harmful levels of radionuclides

Residual plutonium and americium contamination do not have sufficient potential to rise to levels of concern, based on existing regulatory guidance. There will be future fires and the agencies expect public interest and concern.

Statement #17: Drinking water supplies are being contaminated

This statement is incorrect. First, there is no longer a hydrologic connection between Rocky Flats and municipal drinking water supplies. A DOE grant funded a new drinking water supply for Broomfield and a protection project for Standley Lake. The drinking water suppliers monitor water before releasing it. Some plutonium remains in the sediments of Standley Lake, Great

Western Reservoir and Mower Reservoir from past releases. Those risk levels are below concern for residential exposure.

In addition, water leaving the Rocky Flats COU is subject to stricter standards than drinking water for plutonium, uranium and americium.

Statement #18: Plutonium missing from Rocky Flats

One of the allegations is that Rocky Flats plutonium dumped at the Lowry Landfill from the early 1950s to about 1980. There is no evidence of this claim. Of the eight main responsible parties in the 2005 Consent Decree for Lowry Superfund cleanup, DOE is not among them.

Statement #19: Plants and animals are negatively impacted

This statement is incorrect. There has been no observed unexpected animal mortality. Previous surveys of plant and animal diversity and health show plants and animals are thriving. Studies have been undertaken by EPA, Colorado State University and others. That information is included in the RI/FS Rocky Flats Ecological Risk Assessment. More specifically, samples were taken from deer tissue—Colorado State University (1970s-1990s) and US Fish and Wildlife Service (2005).

Statement #20: CDPHE is not enforcing regulations following POC exceedances

This statement is incorrect. RFLMA Attachment 2 flow charts provide procedures. There have never been conditions to justify a CDPHE penalty under RFLMA. CDPHE enforces for non-radioactive contaminants and the institutional controls. EPA has authority to fine DOE for exceedances for radionuclide standards.

David Allen had questions about a fire on the west side of Indiana Street around 2012-15. He also asked about soil action levels. Carl said there was a tiered approach with soil actions levels at 3 feet and at 6 feet. Cindy Domenico asked about the cessation of air monitoring which the public also wants to know. She said it would make sense to have an annual check. Carl said for decades the site was monitoring, but then contamination sources were removed. Continuous monitoring was done a short time and also during prescribed fires. He may recommend it during construction of the highway. David Abelson said there is a lot of concern by the governments and public about the cessation of air quality monitoring.

Libby Szabo asked if enough time had elapsed to see if there are cancer clusters and whether they could be detected. Lindsay said cancer incidence with both physical and laboratory diagnoses is recorded in the Colorado Central Cancer Registry. Minor skin cancers are not included. Studies were conducted in 2008 and 2017, but no increase was found in cancers tied to plutonium. She said there was some statistical elevation of prostate cancer in Boulder County. Regarding thyroid cancer, there was no clear pattern of cancer in neighborhoods around Rocky Flats. Libby asked about the difference between controlled burns or wildfires, whether the residual effect differs. She said the brush is out there. Carl said trained fire fighters are there for controlled burns when conditions are right to proceed, but that from a contaminant standpoint there is no difference between a controlled burn and a wildfire.

Sandy Pennington asked whether the state would consider something dire enough to resample soil, such as a major flood, which would move more soil. Carl said he met with the site to discuss the effects of flooding and movement of surface water off-site. She also asked about risks from digging deep for pylons for Jefferson Parkway, for the anticipated construction of the visitor center, and for building overpasses or underpasses that might result in lots of dust inhalation. Carl said there was no subsurface contamination along Indiana Street and there was no plutonium above background along Highway 128. Sandy questioned risk to road construction workers when they dig the pylons. Carl said the windblown Pu contamination has been 1-2 inches in the surface soil, mainly in the COU.

Jim Dale asked about slide 33 and the rain bucket tests as a surrogate for air sampling. He said Jefferson County Health Department collected rain buckets on the east side of Rocky Flats. Carl said surface water is sampled regularly. Jim also asked about radon. Lindsay said 4 picocuries per liter is the radon action level. She said half of the homes in the area have naturally occurring radon, which is a big public health hazard and the number one cause of lung cancer. Carl said people can get radon test kits to check.

Lisa Morzel asked about plutonium inhalation and how deep the cores were in Standley Lake. Carl said he will post this on the website. Sandy asked whether the public would be safe from surface particles windblown on the trails at the site, per the *Cook* case settlement. Carl said there is a 23-volume report that examined risks to wildlife Refuge workers, visitors, children, etc. The cancer risk was below regulatory standards even with 100 visits to the Refuge. David Abelson said this question will be discussed further at the April meeting.

Public Comment on CDPHE Presentation: Randy Stafford asked about internal alpha radiation. Carl said the danger is the dose from radiation absorbed in the lung. Bonnie Graham-Reed wondered how dangerous plutonium is. She said alpha does not penetrate the skin and that the risk is inside the body. She mentioned a 1948 book about the Bikini test site and that so many scientists have said plutonium is one of the most lethal substances. She asked her daughter to read a Jon Lipsky statement and then asked why all sampling was not considered. Carl said there have been lots of studies, and that national standards are based on a huge database. Since 1948, lots of data has been gathered.

Carl said samples taken before the summer of 1991 could not be used because they did not meet all the specific quality assurance/quality control standards. He said the radioactive elements such as strontium, radium and tritium are from nuclear reactors. Tritium has a short half-life, so sampling for it is negligible.

Harvey Nichols said he had a contract from the mid-1970s and found the air sampling to be inefficient. He said CDPHE has an extraordinary responsibility and in the past was passive and weak. He thanked Carl and Lindsay for the great effort, but questioned the multi-generational effect of radiation exposure. He said lots of air samples are misleading and comparisons can be misleading. He said he and John Rampe went to the Air Pollution Control Division about the burn permits. He demanded that the National Academy of Sciences look at all federal and private evidence related to allowing recreation at the Refuge and exposing the community to massive doses.

Gale Biggs asked whether stack emissions data was deleted. He said he was on Governor Romer's Air Committee and that because of poor management at Rocky Flats, plutonium was dumped and that an estimated 60-90 percent of plutonium-239 was on the ground, not the stacks. Small alpha particles, 10 microns or less, are inhalable. Carl said plutonium particles attach to soil. He said the air filters used by the state and EPA have been tested and shown to be 99 percent efficient.

Ted Ziegler said he worked on safety issues with three different Rocky Flats contractors and mentioned the 1,400 barrels of mixed wastes stored outside. He said stuff was buried that people do not know about. Access for visitors should be away from the larger spray field. Sasha Stiles said she was a physician and knows the epidemiology of cancer. As a resident of Superior, she does not feel safe living near Rocky Flats and wants to learn more. She objected to the term "myths."

Alesya Casse said citizens are concerned about the CDPHE campaign of misunderstanding. In reading the risk assessment of the Rocky Mountain Arsenal, nothing was mentioned about alpha radiation or concern about disturbed soil and that the Colorado health department says there is no risk. She said officials are very concerned about the Hanford Site in Washington State. She expects an abundance of caution.

Randy Stafford of Littleton, who is a mathematician and computer scientist, said he is on the Jefferson Parkway Advisory Committee. He said Carl ignores the risk of resuspension of plutonium in the air and that the Colorado health department is failing to protect the public and has a flip and cavalier attitude. He said his mother lived near Rocky Flats. He asked why not continue monitoring the health of the downwind population?

CDPHE's presentation can be accessed at:

http://rockyflatssc.org/public_comment/Myths%20and%20Misunderstandings%20CDPHE%20presentation%20at%20RFSC%20with%20notes%20%282018-2-5%29%20.pdf

The meeting was adjourned at 12:20 p.m.

Prepared by Ann Lockhart

10:16 PM
03/06/18

**Rocky Flats Stewardship Council
Check Detail 2018
January 18 through March 6, 2018**

Type	Num	Date	Name	Account	Paid Amount	Original Amount
Check		01/29/2018		CASH-Wells Fargo-Operating		-3.50
				Admin Services-Misc Services	-3.50	3.50
TOTAL					-3.50	3.50
Check	1901	02/02/2018	Century Link	CASH-Wells Fargo-Operating		-26.07
				Telecommunications	-26.07	26.07
TOTAL					-26.07	26.07
Bill Pmt -Check	1902	02/07/2018	Crescent Strategies, LLC	CASH-Wells Fargo-Operating		-8,911.87
Bill	1/31/18 Billing	01/31/2018		Personnel - Contract	-7,750.00	7,750.00
				Telecommunications	-521.59	521.59
				TRAVEL-Local	-50.69	50.69
				Postage	-15.99	15.99
				Supplies	-60.00	60.00
				TRAVEL-Out of State	-513.60	513.60
TOTAL					-8,911.87	8,911.87
Bill Pmt -Check	1903	02/07/2018	Jennifer A. Bohn	CASH-Wells Fargo-Operating		-608.00
Bill	18-1	01/31/2018		Accounting Fees	-608.00	608.00
TOTAL					-608.00	608.00
Bill Pmt -Check	1904	02/07/2018	Seter & Vander Wall, P.C.	CASH-Wells Fargo-Operating		-1,805.70
Bill	76004	01/31/2018		Attorney Fees	-1,805.70	1,805.70
TOTAL					-1,805.70	1,805.70
Bill Pmt -Check	1905	03/06/2018	Ann J. Lockhart	CASH-Wells Fargo-Operating		-1,062.50
Bill	2/22/2018	02/22/2018		Personnel - Contract	-1,062.50	1,062.50
TOTAL					-1,062.50	1,062.50
Bill Pmt -Check	1906	03/06/2018	Blue Sky Bistro	CASH-Wells Fargo-Operating		-300.00
Bill	2889	02/04/2018		Misc Expense-Local Government	-300.00	300.00
TOTAL					-300.00	300.00
Bill Pmt -Check	1907	03/06/2018	Crescent Strategies, LLC	CASH-Wells Fargo-Operating		-9,183.59
Bill	2/28/18 Billing	02/28/2018		Personnel - Contract	-7,750.00	7,750.00
				Telecommunications	-134.07	134.07
				TRAVEL-Local	-101.37	101.37
				Postage	-15.99	15.99
				TRAVEL-Out of State	-1,182.16	1,182.16
TOTAL					-9,183.59	9,183.59
Bill Pmt -Check	1908	03/06/2018	Jennifer A. Bohn	CASH-Wells Fargo-Operating		-731.50
Bill	18-8	02/28/2018		Accounting Fees	-731.50	731.50
TOTAL					-731.50	731.50
Check	1909	03/06/2018	Century Link	CASH-Wells Fargo-Operating		-27.09
				Telecommunications	-27.09	27.09
TOTAL					-27.09	27.09

CDPHE Buffer Zone Briefing

- Cover memo
- Rocky Flats Exposure Units with COU/Refuge overlay
- 30-Acre Grid Surface Soil Sampling Locations with Mining Soil Disturbance Area
- Figure 3.2 – Surface Soil Sampling Locations
- Figure 3.3 – Subsurface Soil Sampling Locations (0.5 - 3 ft, 3 - 8 ft, and 8 - 12 ft)
- Figure 3.4 – Subsurface Soil Sampling Locations (12 - 30 ft, 30 - 50 ft, and ≥ 50 ft)
- Figure 3.15 – Americium-241 Activity in Surface Soil
- Figure 3.16 – Plutonium-239/240 Activity in Surface Soil
- Figure 3.24 – Americium-241 Activity in Subsurface Soil (0.5 - 3 ft, 3 - 8 ft, and 8 - 12 ft)
- Figure 3.25 – Plutonium-239/240 Activity in Subsurface Soil (0.5 - 3 ft, 3 - 8 ft, and 8 - 12 ft)
- EPA 2005 sampling results
- DOE-EPA-CDPHE fact sheet

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Jefferson County ~ Boulder County ~ City and County of Broomfield ~ City of Arvada ~ City of Boulder
City of Golden ~ City of Northglenn ~ City of Thornton ~ City of Westminster ~ Town of Superior
League of Women Voters ~ Rocky Flats Cold War Museum ~ Rocky Flats Homesteaders
Kim Griffiths

MEMORANDUM

TO: Stewardship Council Board
FROM: Rik Getty and David Abelson
SUBJECT: CDPHE Briefing on Buffer Zone Sampling
DATE: March 20, 2018

With the upcoming opening of the Rocky Flats National Wildlife Refuge for public recreation, it is important for the Board and public to be briefed on soil sampling conducted on those lands. This briefing is not the first time this topic has been discussed at a Stewardship Council meeting, but it is likely the most comprehensive. CDPHE will provide the briefing.

Summary

There are three main takeaways from this memo:

1. Soil sampling in the former Rocky Flats Buffer Zone was conducted in three primary phases: pre-June 1991, 1991-2005, and EPA confirmatory sampling. As CDPHE and DOE have discussed, pre-June 1991 sampling was generally not utilized due to quality assurance/quality control (QA/QC) concerns.
2. DOE, CDPHE and EPA concluded that the 1991-2005 sampling was sufficient to satisfy CERCLA requirements, but that additional sampling by a contractor (2004) and EPA (2005) were undertaken to verify the data and assuage public concern.
3. Based on sampling, the risk assessment and other factors, the lands that comprise the Refuge are available for any and all uses, subject to non-contaminant related limitations in the Refuge Act and USFWS regulations. The Fourth CERCLA Five-Year Review that was finalized in 2017 concluded that the Refuge remains suitable for unlimited use and unrestricted exposure ("UUUE").¹

Important Distinction – Rocky Flats Buffer Zone versus Rocky Flats National Wildlife Refuge

During production, Rocky Flats was divided into two sections—the Industrial Area (the production area) and the Buffer Zone. The Industrial Area was approximately 385 acres. In 1974-1976, the Buffer Zone was expanded, and at closure, the entire site encompassed approximately 6400 acres. Currently, the historic Rocky Flats is divided into the Central Operable Unit (managed by DOE) and the Rocky Flats National Wildlife Refuge (managed by the USFWS). The Central Operable Unit is approximately 1300

¹ UUUE is a regulatory determination.

acres. It includes some of the former Buffer Zone. (See the first map. The 12 exposure units shown on that map are discussed below.)

The reason this distinction is important is that some of Buffer Zone data included in this memo is on lands that are now part of the Central Operable Unit, not the Refuge.

Historic Sampling

There are numerous data sets to examine to understand sampling from 1991-2005. Two of them are data sets that are included in the RI/FS and the Historic Release Report (HRR).

The Historic Release Report (HRR), as the name implies, is a comprehensive review of historic releases at Rocky Flats. First issued in 1992, it was updated quarterly until 1996; thereafter it was updated annually until closure. The HRR identified 421 potential release sites, 360 of which were further investigated and/or remediated. The investigation included reviewing more than 4,000 documents, interviewing former and then-current employees (>2,000 interviews), a site inspection, a site-wide survey with hand-held radiation detection instruments, a review of aerial photographs, and site walk-downs. The FY05 report is more than 1100 pages (see the RI/FS, Appendix B: https://www.lm.doe.gov/Rocky_Flats/Regulations.aspx). This analysis, in short, provided the primary basis for evaluating, and, as needed, conducting environmental remediation.

Comprehensive Risk Assessment – Additional Sampling Conducted in 2004 to Support that Analysis

As noted in summary bullet #2 above, DOE and the regulatory agencies conducted additional sampling in 2004 to support the CERCLA Comprehensive Risk Assessment (CRA). The CRA is a complex risk-based analysis using environmental sampling results—soil, air and water—to calculate the potential adverse impacts of remaining contamination on human health and the environment. Those calculations include, but are not limited to, ingestion and inhalation pathways.

Two CRAs were performed – (1) human health risk, and (2) ecological risk (risk to flora and fauna). Inadequate QA/QC protocols for the pre-June 1991 data sets meant those data could not be used for CRA calculations. In addition, some portions of the Buffer Zone did not have enough sampling data. As a result, in 2004 DOE, with oversight from EPA and CDPHE, initiated a new sampling effort for the entire site, one that generated additional characterization data. After this round of sampling was completed and the results were reported, the EPA conducted additional testing utilizing a different methodology (discussed in more detail later).

2004 Buffer Zone Sampling Methodology

As shown in the first attachment, Rocky Flats was divided into 12 areas, termed exposure units (EU). DOE and the regulatory agencies then determined whether, for each EU, additional data for radionuclides, metals or both was needed. Rocky Flats was then divided into 30-acre grids, which were sampled if adequate sampling had not already occurred. Within each 30-acre grid, five sample locations were identified (one in the center of the grid, and four towards the corners). (See the attached map, “30-Acre Grid Surface Soil Sampling Locations with Mining Soil Disturbance Area”.) For each grid, the five soil samples were combined into one composite sample, and a value was rendered. That data was then included in the 1991-2005 sampling data. For each 30-acre grid, a suite of contaminants was reported, though public interest focused almost exclusively on plutonium and americium, so for the purposes of this memo we focus on those contaminants.

In reviewing this material, it is important to note that for the 30-acre grid sampling, most of the grids in the Industrial Area EU, the Windblown EU, and the Rock Creek EU were not sampled. The reason is that the risk assessment working group (comprised of DOE, CDPHE, EPA, USFWS, and Kaiser-Hill (site contractor)) decided that they had enough characterization data for those grid locations.

Cumulative Results – Includes all 1991-2005 data

Below are the cumulative results for plutonium and americium results for each EU. This data includes all of the 1991-2005 data, including the 2004 30-acre grid composite samples. While not the focus of this briefing, we included Industrial Area data.

There are two things to note. First, the action level for both plutonium and americium is 50 pCi/g. Second, as CDPHE explained to us, negative results occur due to subtraction of background values. MARSSIM advocates the use of negative values since they are important for hypothesis testing and descriptive statistics.

West Area EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	18	-0.078	0.250	0.044
Am	18	-0.016	0.087	0.023

Rock Creek EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	64	-0.00602	0.217	0.080
Am	49	-0.00738	0.950	0.0483

Inter-Drainage EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	82	-0.00869	2.20	0.133
Am	62	-0.0820	0.430	0.0305

No Name Gulch EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	283	-0.00500	2.31	0.0780
Am	283	-0.0370	1.15	0.0307

Upper Walnut Drainage EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	188	-0.0460	22.4	1.22
Am	171	-0.0314	6.89	0.405

Lower Walnut Drainage EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	77	-0.012	1.02	0.164
Am	71	-0.022	0.336	0.064

Windblown Area EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	319	-0.00292	49	9.19
Am	290	0	15.6	1.81

Importantly, for the Windblown Area EU, CDPHE tells us that the two maximum concentrations listed above (49 pCi/g and 15.6 pCi/g) are from lands that are managed by DOE (the Central Operable Unit (“COU”)), not the Rocky Flats National Wildlife Refuge. Additionally, CDPHE also tells us that the two mean concentrations listed above (9.19 pCi/g and 1.81 pCi/g) are from a combination of COU and the Refuge.

Upper Woman Drainage EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	214	-0.0126	17.1	0.230
Am	189	-0.0288	0.802	0.0358

Lower Woman Drainage EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	140	-0.00192	12.2	1.58
Am	131	-0.0153	1.66	0.265

Southwest Buffer Zone EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	22	0.006	0.250	0.057
Am	16	-0.050	0.100	0.017

Southeast Buffer Zone EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	54	0.00205	4.60	0.251
Am	46	-0.00600	0.381	0.0466

Industrial Area EU

Analyte	Number of samples	Minimum detected concentration (pCi/g)	Maximum detected concentration (pCi/g)	Mean
Pu	1,257	-0.0459	183	1.19
Am	1,059	-0.0480	51.2	0.503

Though not a focus of this memo, we attached the four subsurface soil sampling maps (see Figures 3.3, 3.4, 3.24 and 3.25).

EPA Sampling – 2005

Following the completion of the 2004 sampling, analyses, and data validation, in 2005 EPA performed its own surface soil testing. Agency staff selected the 30-acre cell within each of the 12 EUs which had the highest mean plutonium value. Next, they obtained five samples from each cell (one sample at the center and four near the corners), but instead of compositing the five samples into one sample, they analyzed all five discrete samples. Attached are those results. (See the attached spreadsheet. Note that the West Area only shows three samples, not five.)

To make comparing the CRA values and the EPA value easier, we developed the following chart.

EU	Mean of Pu Samples Collected for the CRA (pCi/g)	Mean of Pu Samples Collected by the EPA (pCi/g)	Mean of Am Samples Collected for the CRA (pCi/g)	Mean of Am Samples Collected by the EPA (pCi/g)
West Area	0.044	0.0313	0.023	0.040
Rock Creek	0.080	0.0206	0.0483	0.100
Inter-Drainage	0.133	0.0242	0.0305	0.086
No Name Gulch	0.0780	0.0432	0.0307	0.045
Upper Walnut	1.22	0.3382	0.405	0.092
Lower Walnut	0.164	0.0646	0.064	0.064
Windblown Area	9.19	5.554	1.81	0.790
Upper Woman	0.230	0.0724	0.0358	0.043
Lower Woman	1.58	3.158	0.265	0.364
Southwest BZ	0.057	0.0594	0.017	0.128
Southeast BZ	0.251	0.1266	0.0466	0.074
Industrial Area	1.19	0.0392	0.503	0.024

As expected, there is some variation between CRA values and the EPA values. This variation is due to different methodologies, lack of uniformity of contamination across a 30-acre grid, and the fact that laboratories were measuring at the low end of their detection limits. Importantly, both sampling methodologies indicate that the contaminant values are well within regulatory limits and extremely low.

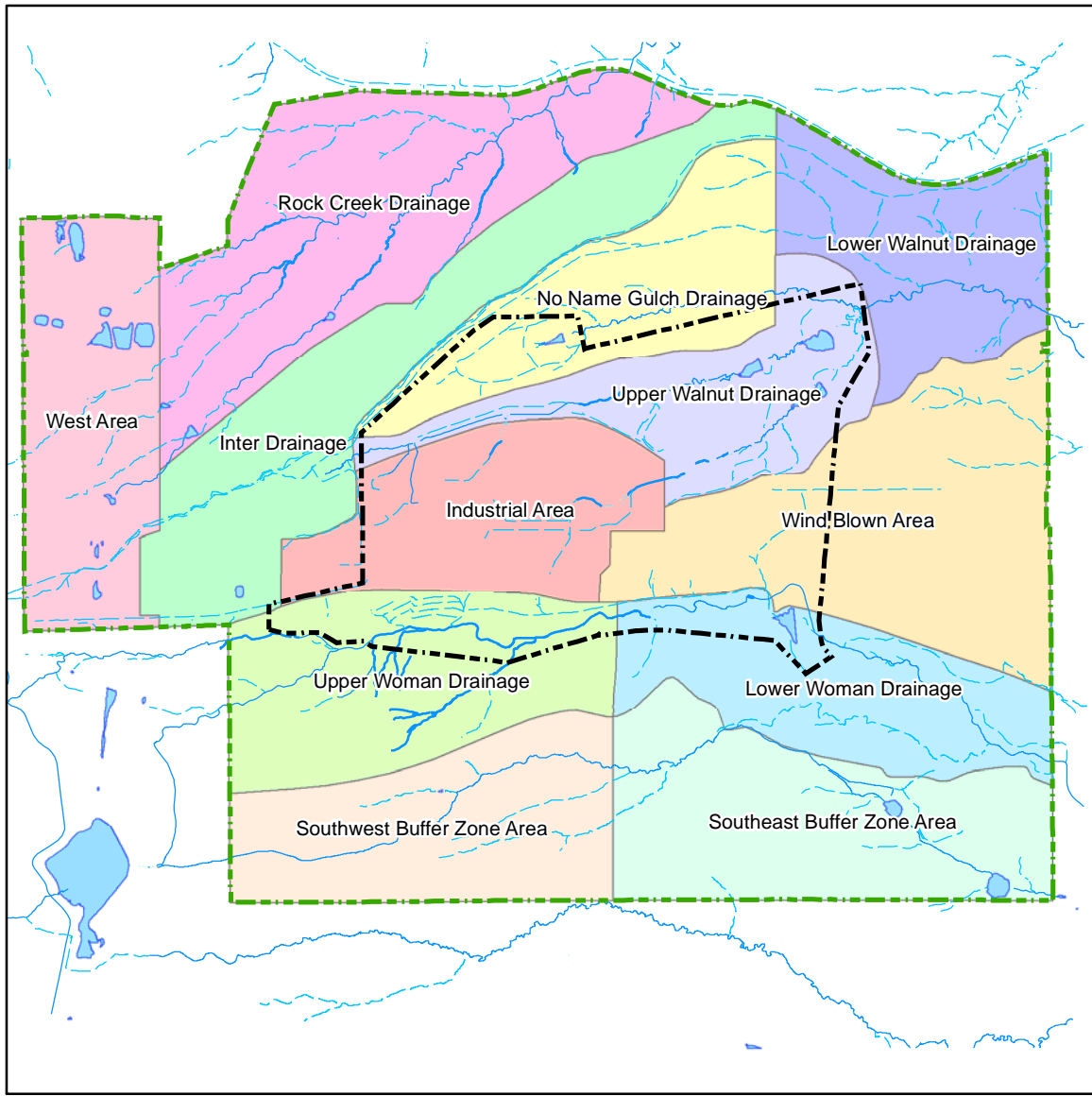
Attachments

1. Figure 1.1 – Rocky Flats Exposure Units with COU/Refuge overlay
2. 30-Acre Grid Surface Soil Sampling Locations with Mining Soil Disturbance Area
3. Figure 3.2 – Surface Soil Sampling Locations
4. Figure 3.3 – Subsurface Soil Sampling Locations (0.5 - 3 ft, 3 - 8 ft, and 8 - 12 ft)
5. Figure 3.4 – Subsurface Soil Sampling Locations (12 - 30 ft, 30 - 50 ft, and >= 50 ft)
6. Figure 3.15 – Americium-241 Activity in Surface Soil
7. Figure 3.16 – Plutonium-239/240 Activity in Surface Soil
8. Figure 3.24 – Americium-241 Activity in Subsurface Soil (0.5 - 3 ft, 3 - 8 ft, and 8 - 12 ft)
9. Figure 3.25 – Plutonium-239/240 Activity in Subsurface Soil (0.5 - 3 ft, 3 - 8 ft, and 8 - 12 ft)
10. EPA 2005 sampling results
11. DOE-EPA-CDPHE fact sheet

Figures 3.2, 3.3, 3.4, 3.15, 3.16, 3.24 and 3.25 are found in the RI/FS. (See Book 1, Section 3 https://www.lm.doe.gov/Rocky_Flats/Regulations.aspx) The RI/FS also includes surface and/or subsurface sampling maps for Aluminum, Arsenic, Chromium, Vanadium, PCB-1254, PCB-1260, 2,3,7,8-TCDD TEQ, Benzo(a)pyrene, Dibenz(a,h)anthracene, Uranium-233/234, Uranium-235, Uranium-238, Lead, Tetrachloroethene, 1,1,2,2-Tetrachloroethane, Carbon Tetrachloride, Chloroform, Methylene Chloride, and Trichloroethene.

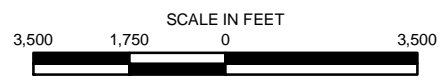
Additionally, the detailed sampling maps for each EU are found in the CRA. Go to https://www.lm.doe.gov/Rocky_Flats/Regulations.aspx and scroll down to Appendix A. Each EU is a separate volume.

Please let us know if you have any questions.



Legend

- Central Operable Unit Boundary
- Wildlife Refuge Boundary
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Lake / Pond
- Wetland / Marsh



U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION, COLORADO

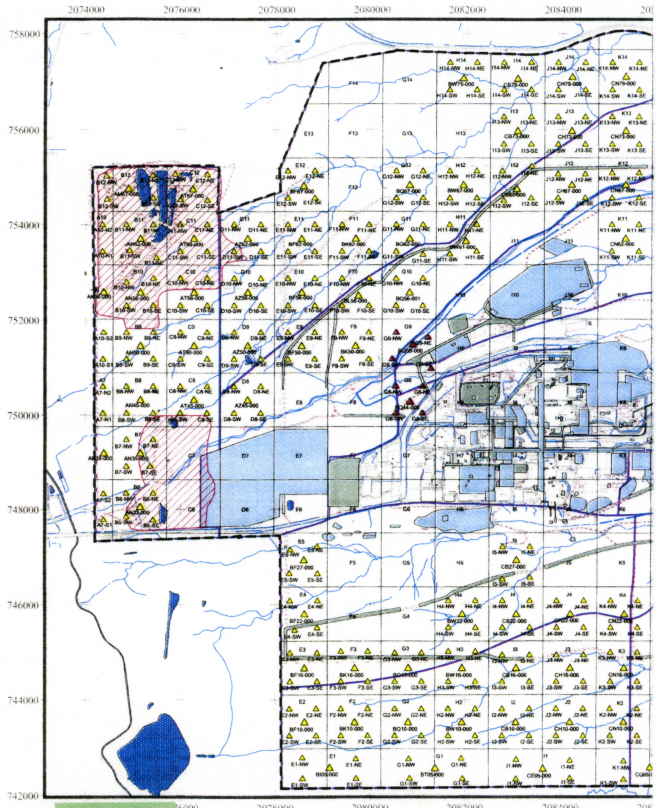
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S.M. Stoller Corporation
Under DOE Contract
No. DE-AM01-07LM00060

**Human Health Exposure
Units and Central OU Boundary**

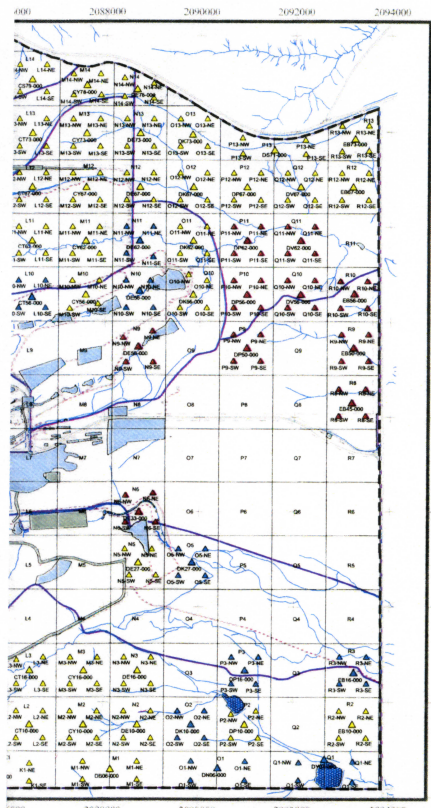
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April 23, 2012

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West side of map



East side of map

30-Acre Grid Surface Soil Sampling Locations with Mining Soil Disturbance Area

KEY

- Metals and radionuclides
- Radionuclides only
- Metals only
- Mining soil disturbance area
- 30-acre grid
- IHSS
- PAC
- Paved road
- Dirt road
- Streams
- Lakes
- Fence
- Exposure unit boundary

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1000 0 1000 Feet

Scale = 1:28,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: _____ Date: 03/09/04



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Figure 3.2
Surface Soil
Sampling Locations

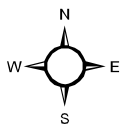
KEY

- Surface soil sampling location
- Total samples: 4,354

Note:
 Data presented are the results from soil samples, collected at depths less than 6 inches below the ground surface, from 6/28/91 through 8/22/05.

Standard Map Features

- IA OU boundary
- Original landfill
- Present landfill
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary



0 1,000 2,000
 Feet

Scale 1:24,000

State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD 27

U.S. Department of Energy
 Rocky Flats Environmental
 Technology Site

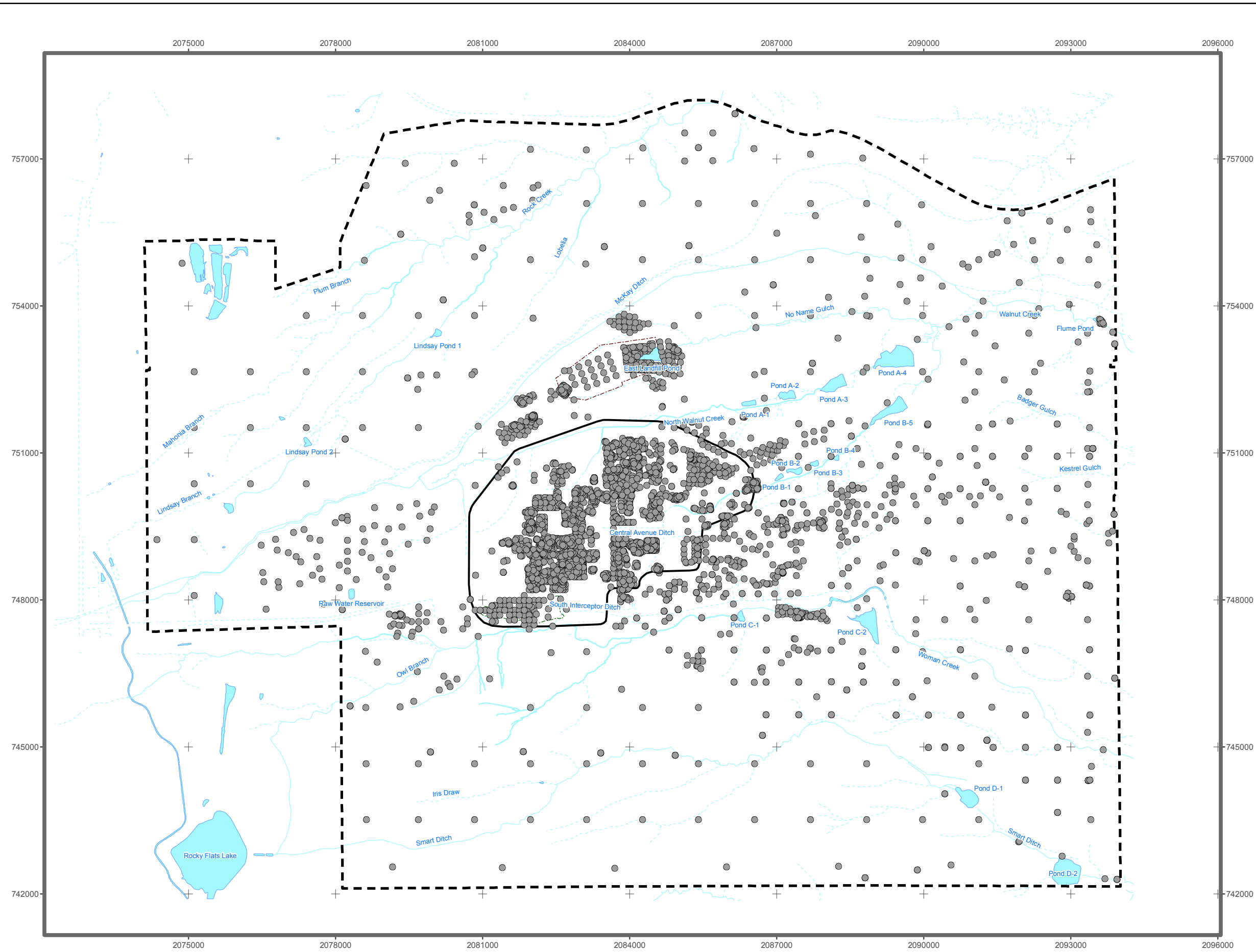


Figure 3.3
Subsurface Soil
Sampling Locations
(0.5 - 3 ft, 3 - 8 ft, and 8 - 12 ft)

KEY

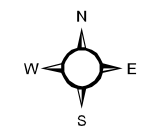
- Sample collected > 0.5 ft AND < OR = 3 ft
- Sample collected > 3ft AND < OR = 8 ft
- ▲ Sample collected > 8 ft AND < OR = 12 ft

Total Samples: 6,750

Note:
 Data presented are the results from soil samples, collected at depths greater than 6 inches below the ground surface, from 6/28/91 through 8/22/05.

Standard Map Features

- IA OU boundary
- Original landfill
- - - Present landfill
- Pond
- Perennial stream
- - - Intermittent stream
- Ephemeral stream
- - - Site boundary



0 1,000 2,000
 Feet

Scale 1:24,000

State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD 27

U.S. Department of Energy
 Rocky Flats Environmental
 Technology Site

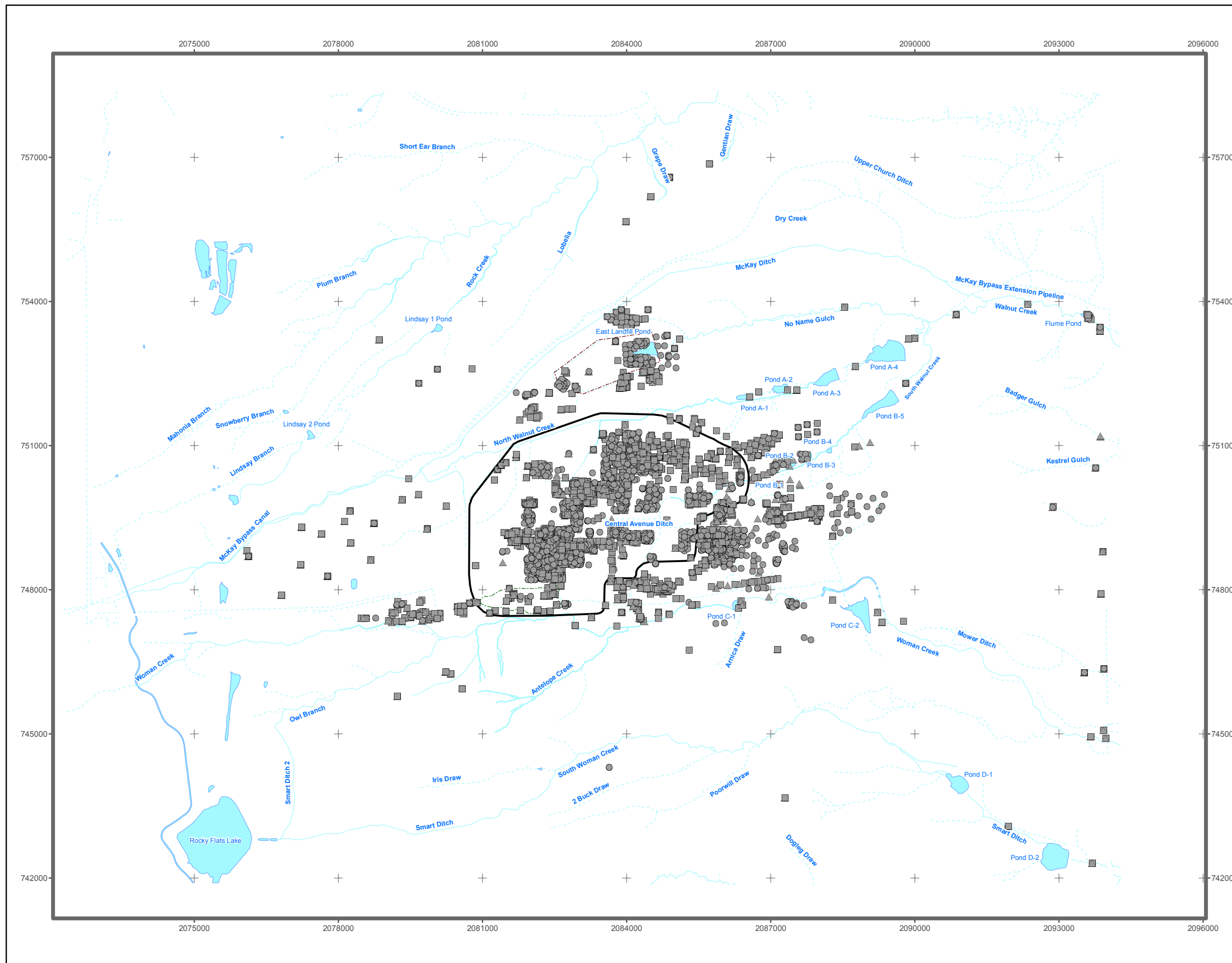


Figure 3.4
Subsurface Soil
Sampling Locations
(12 - 30 ft, 30 - 50 ft, and >= 50 ft)

KEY

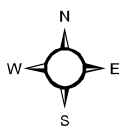
- Sample collected > 12 ft AND < OR = 30 ft
- Sample collected > 30 ft AND < OR = 50 ft
- ▲ Sample collected >= 50 ft

Total Samples: 2,128

Note:
 Data presented are the results from soil samples, collected at depths greater than 6 inches below the ground surface, from 6/28/91 through 8/22/05.

Standard Map Features

- IA OU boundary
- Original landfill
- - - Present landfill
- Pond
- Perennial stream
- - - Intermittent stream
- Ephemeral stream
- - - Site boundary



0 1,000 2,000
 Feet

Scale 1:24,000

State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD 27

U.S. Department of Energy
 Rocky Flats Environmental
 Technology Site

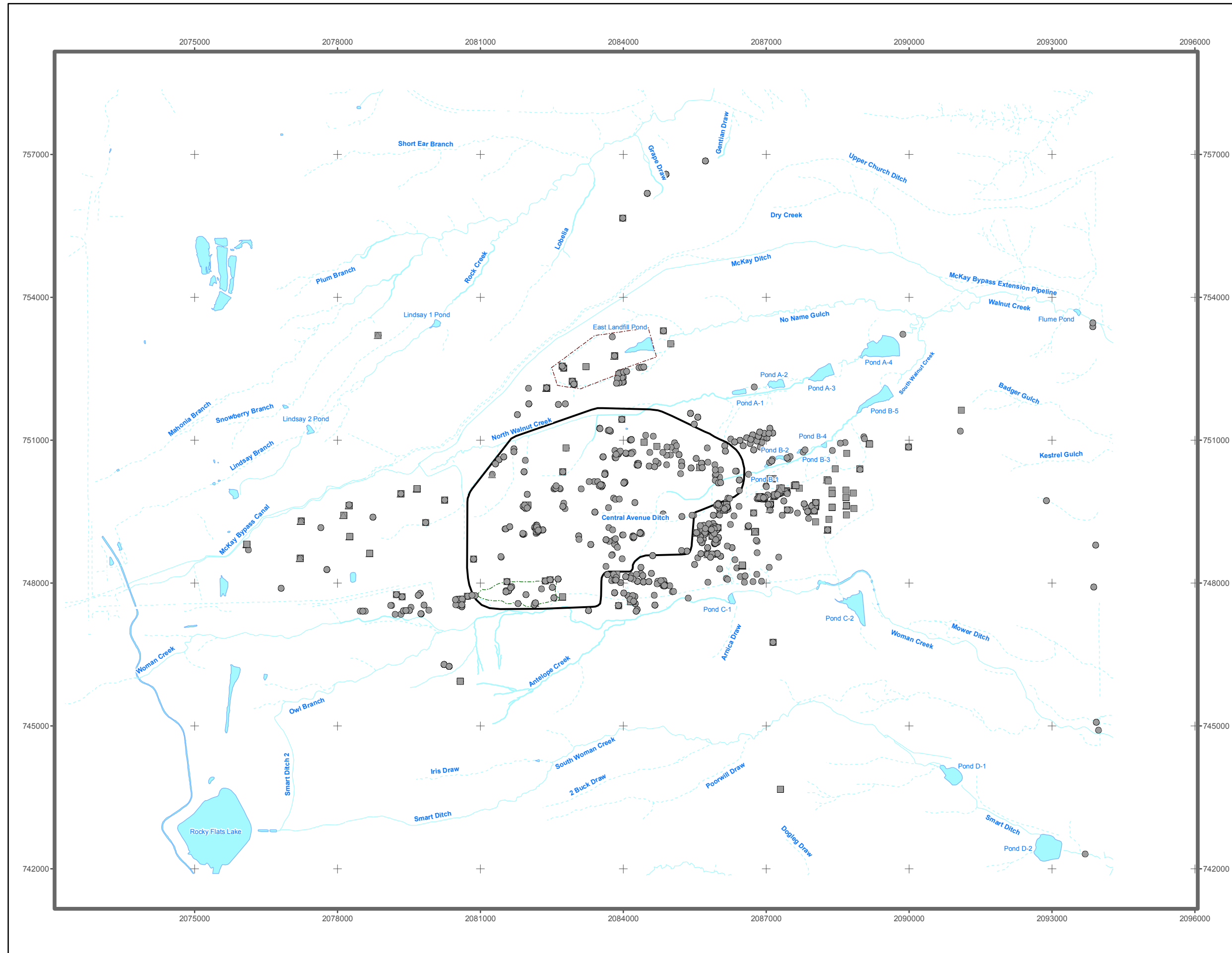


Figure 3.15
Americium-241
Activity in
Surface Soil

KEY

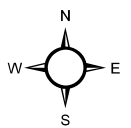
- \geq WRW PRG
- $>$ Background M2SD and $<$ WRW PRG
- Detected and \leq Background M2SD
- Not detected

Minimum nondetect reported value = -0.082 pCi/g
 Maximum nondetect reported value = 0.327 pCi/g
 Background M2SD = 0.022 pCi/g
 WRW PRG = 7.69 pCi/g

Notes:
 - Data presented are the results from soil samples collected between 6/28/1991 and 8/22/2005.
 - See Tables 3.1 and 3.13 for additional information.

Standard Map Features

- IA OU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary



0 1,000 2,000
 Feet

Scale 1:24,000

State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD 27

U.S. Department of Energy
 Rocky Flats Environmental
 Technology Site

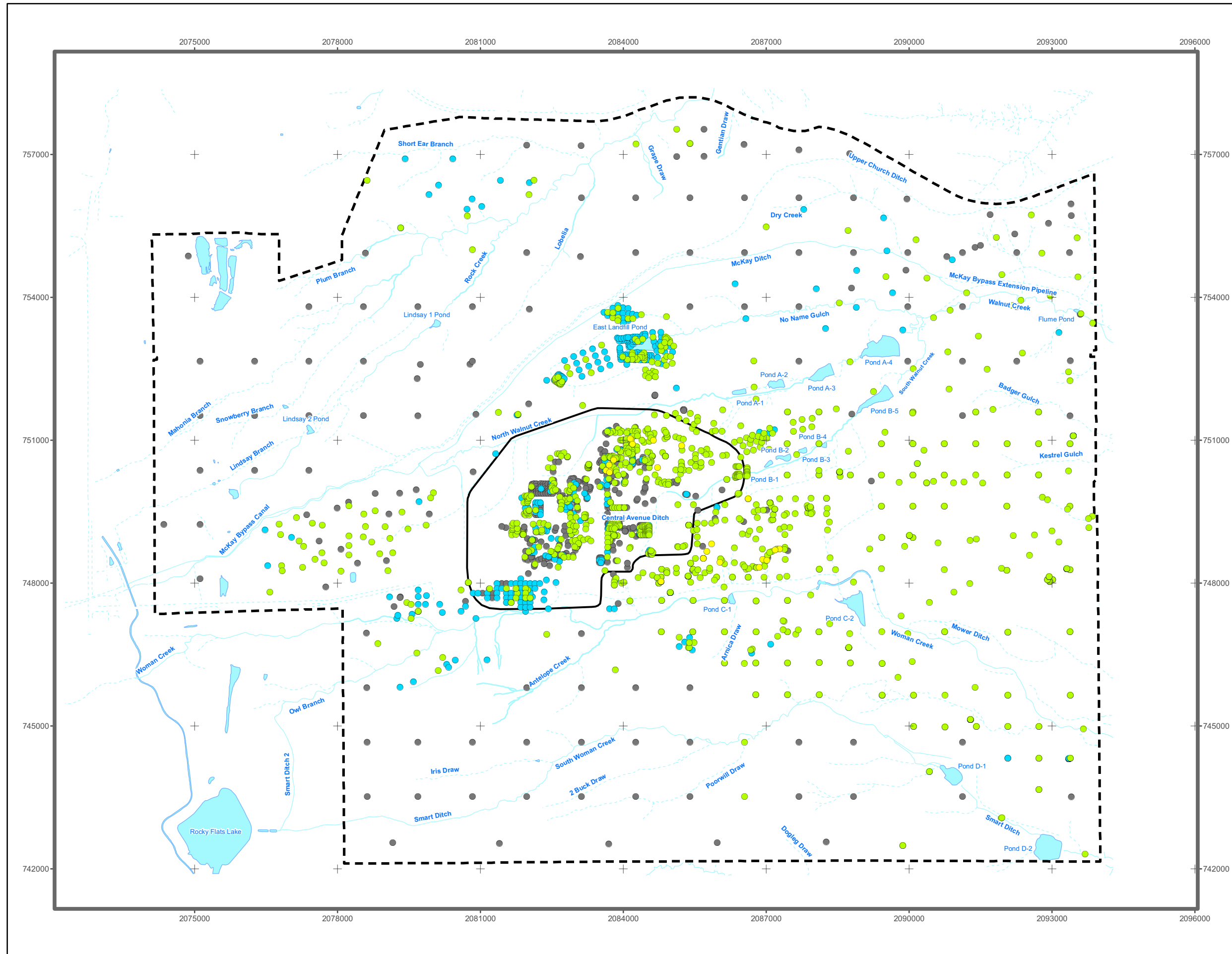


Figure 3.16
Plutonium-239/240
Activity in
Surface Soil

KEY

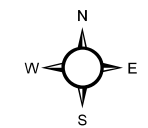
- \geq WRW PRG
- $>$ Background M2SD and $<$ WRW PRG
- Detected and \leq Background M2SD
- Not detected

Minimum nondetect reported value = -0.078 pCi/g
 Maximum nondetect reported value = 0.218 pCi/g
 Background M2SD = 0.066 pCi/g
 WRW PRG = 9.8 pCi/g

Notes:
 - Data presented are the results from soil samples collected between 6/28/1991 and 8/22/2005.
 - See Tables 3.1 and 3.13 for additional information.

Standard Map Features

- IA OU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary



0 1,000 2,000
 Feet

Scale 1:24,000

State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD 27

U.S. Department of Energy
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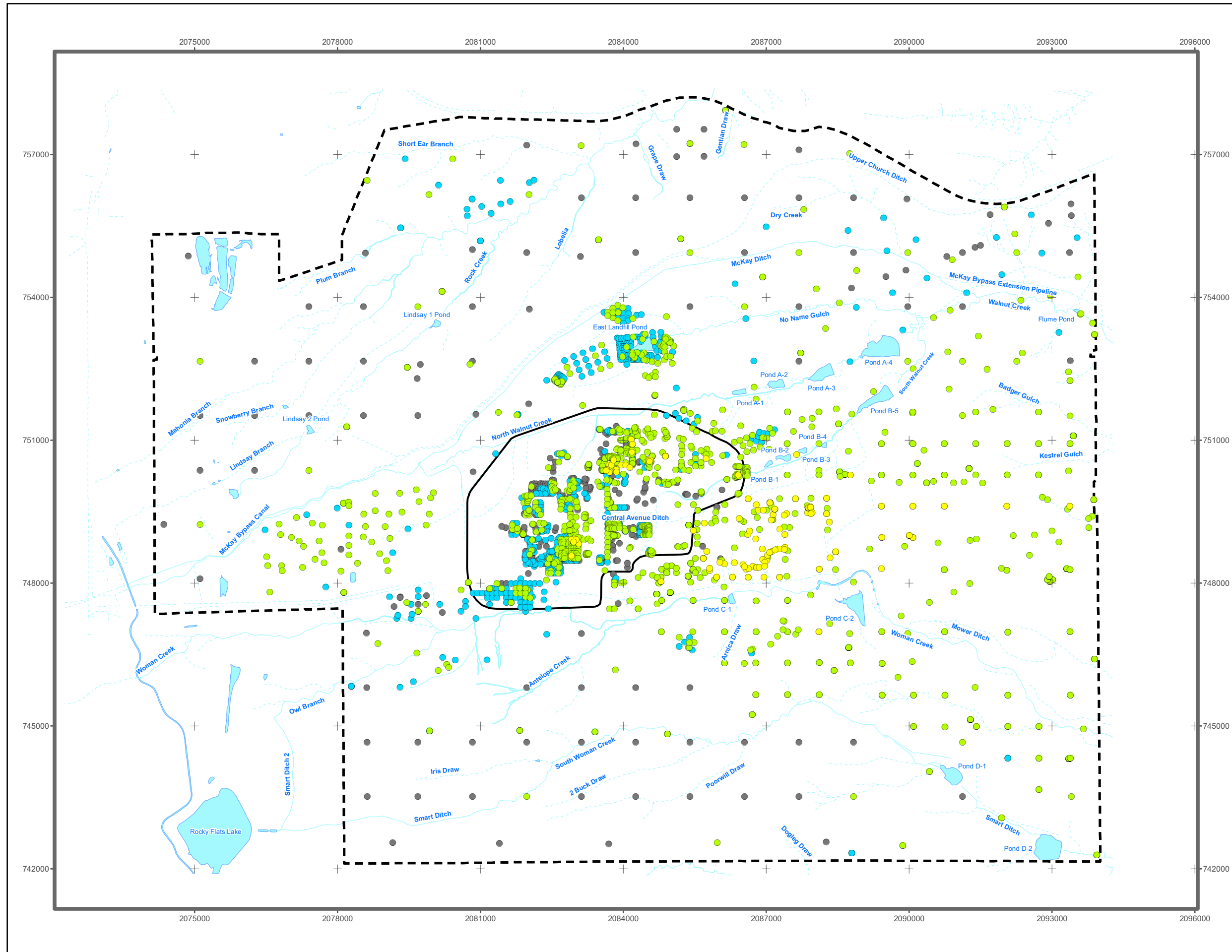


Figure 3.24
Americium-241
Activity in
Subsurface Soil
(0.5 - 3 ft, 3 - 8 ft, and 8 - 12 ft)

KEY

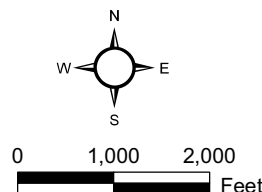
- S Sample collected > 0.5 ft and <= 3 ft
- Sample collected > 3ft and <= 8 ft
- △ Sample collected > 8 ft and <= 12 ft
- >= WRW PRG
- > Background M2SD < WRW PRG
- Detected and <= Background M2SD
- Not detected

Minimum nondetect reported value = -6.16 pCi/g
 Maximum nondetect reported value = 28.3 pCi/g
 Background M2SD = 0.01 pCi/g
 WRW PRG = 88.4 pCi/g

Notes:
 - Data presented are the results from soil samples collected between 6/28/1991 and 8/22/2005.
 - See Table 3.17 for additional information.

Standard Map Features

- IA OU boundary
- Pond
- Perennial stream
- - - Intermittent stream
- · · Ephemeral stream
- - - Site boundary



Scale 1:24,000
 State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD 27

U.S. Department of Energy
 Rocky Flats Environmental
 Technology Site

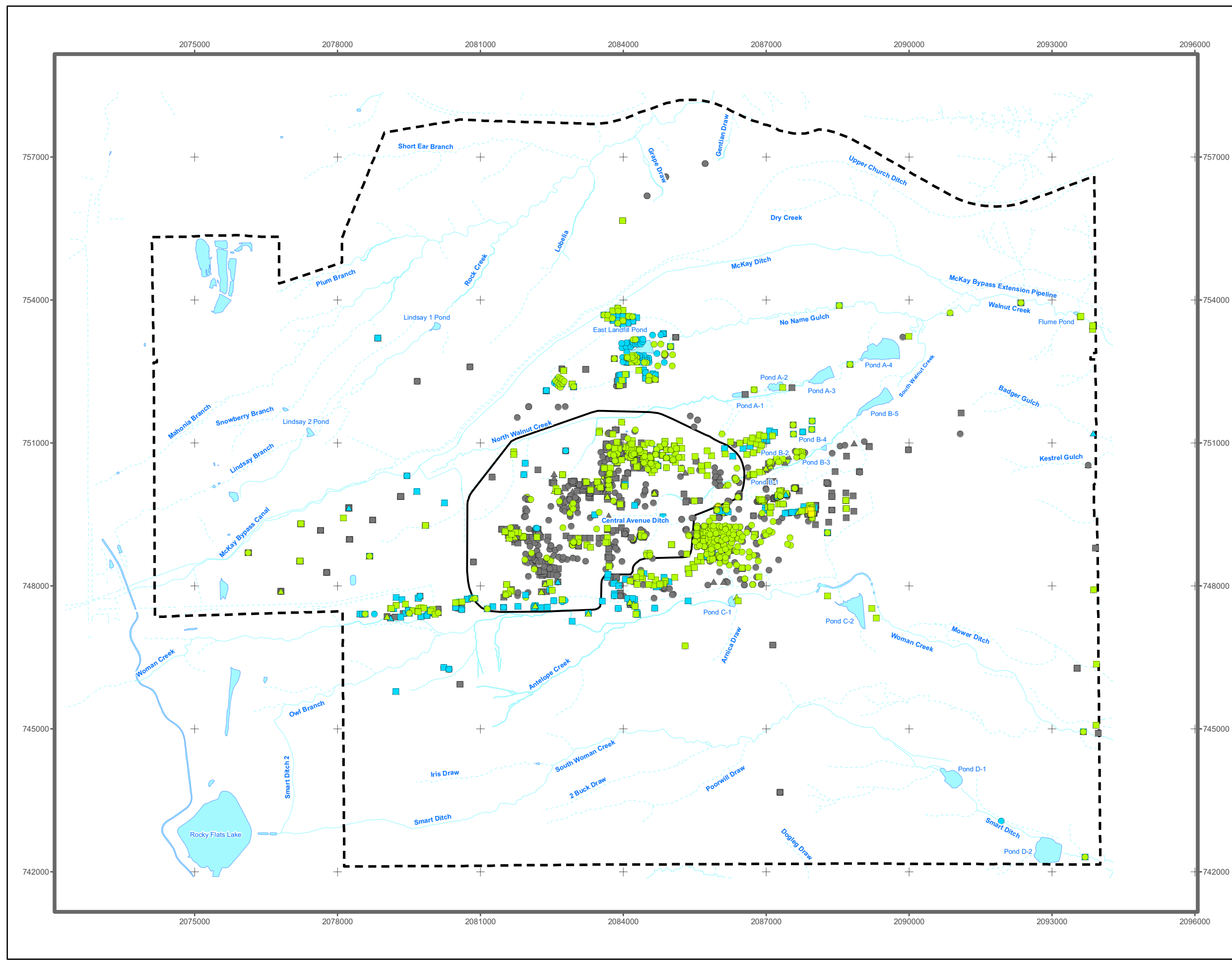


Figure 3.25
Plutonium-239/240
Activity in
Subsurface Soil
(0.5 - 3 ft, 3 - 8 ft, and 8 - 12 ft)

KEY

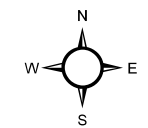
- S Sample collected > 0.5 ft and <= 3 ft
- Sample collected > 3ft and <= 8 ft
- △ Sample collected > 8 ft and <= 12 ft
- >= WRW PRG
- > Background M2SD < WRW PRG
- Detected and <= Background M2SD
- Not detected

Minimum nondetect reported value = -0.043 pCi/g
 Maximum nondetect reported value = 1.08 pCi/g
 Background M2SD = 0.022 pCi/g
 WRW PRG = 112 pCi/g

Notes:
 - Data presented are the results from soil samples collected between 6/28/1991 and 8/22/2005.
 - See Tables 3.17 and 3.19 for additional information.

Standard Map Features

- IA OU boundary
- Pond
- Perennial stream
- - - Intermittent stream
- · · Ephemeral stream
- - - Site boundary

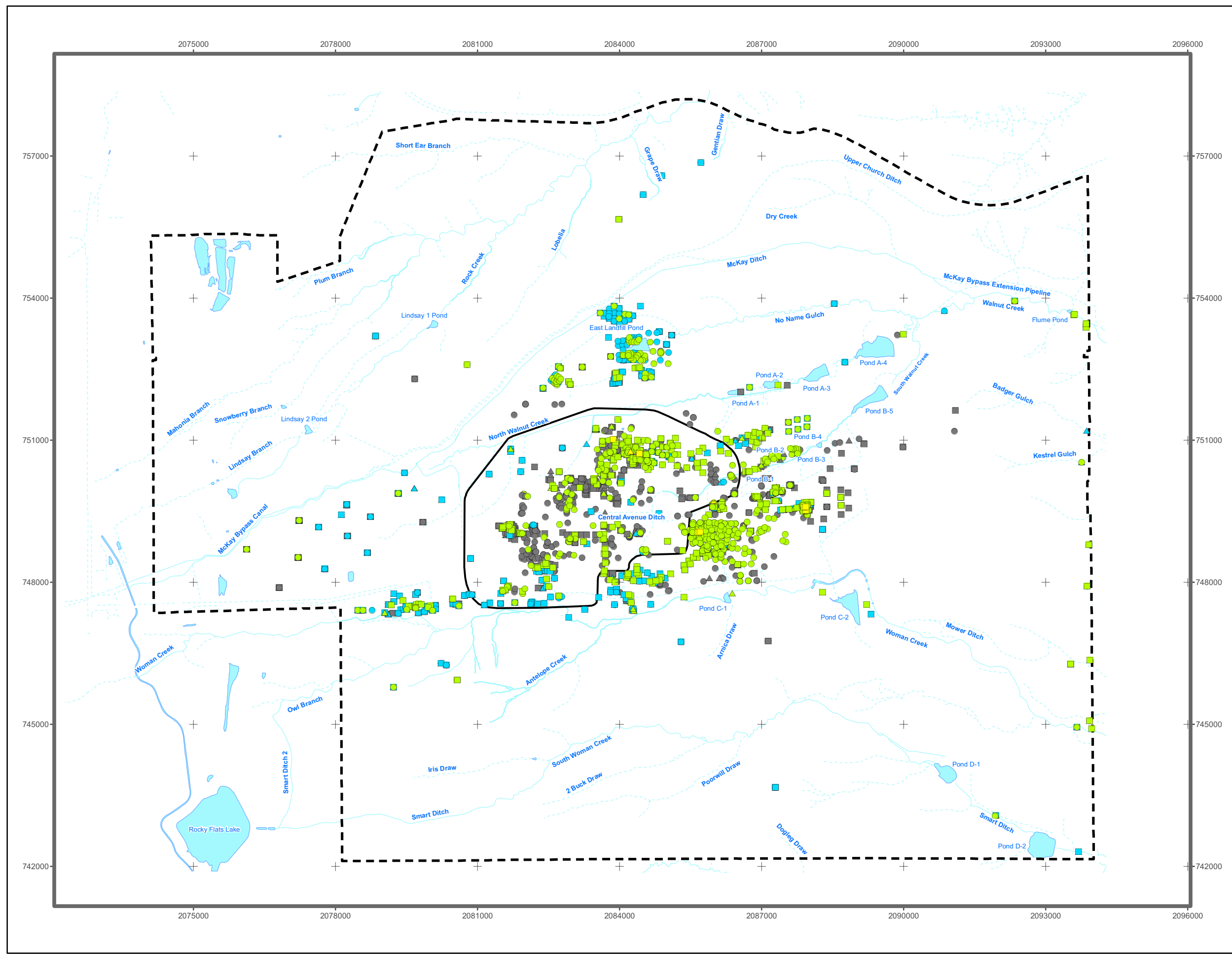


0 1,000 2,000
 Feet

Scale 1:24,000

State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD 27

U.S. Department of Energy
 Rocky Flats Environmental
 Technology Site





COLORADO
Department of Public
Health & Environment



**U.S. DEPARTMENT OF
ENERGY**

- EPA, CDPHE, and DOE in the 2006 Corrective Action Decision/Record of Decision (CAD/ROD) determined that the portion of the Rocky Flats property comprising the refuge was already in a state that is protective of human health and the environment, where unrestricted and unlimited use is acceptable.
- The Remedial Investigation/Feasibility Study (RI/FS) for Rocky Flats was completed in 2006 and consists of 23 volumes of data and analysis. The database of sample results used to prepare the RI/FS and Comprehensive Risk Assessment contained approximately 6.9 million data records for all media (soil, groundwater, surface water, air).
- The Radionuclide Soil Action Levels (RSALs) developed under the Rocky Flats Cleanup Agreement (RFCA) were reduced in 2002 for plutonium to 50 picocuries per gram of soil, which is protective to the open space user.
- Residual plutonium concentrations in surface soil in the refuge average about 1.1 picocuries/gram (about a trillionth of a Curie per gram of soil), which is approximately 2% of the RSAL for plutonium. These concentrations are protective of human health for any exposure scenario.
- The highest concentration of plutonium detected in surface soil samples in the eastern refuge area was 20.3 picocuries per gram of soil. This equates to the very low end of the regulatory risk range for a refuge worker or visitor.
- The Colorado Standards for Protection Against Radiation sets the maximum annual dose from radioactivity for an individual to 25 mrem per year. This equates to approximately 231 picocuries of plutonium per gram of soil; this is the exposure scenario for an adult rural resident. This exposure scenario includes activities such as living at the site full-time and eating home-grown produce.
- The wildlife refuge visitor scenario used for risk calculations includes both a child and an adult who visit the site 100 days a year for 2.5 hours per day. The dose estimate for plutonium for the wildlife refuge visitor child is 0.2 mrem per year, which is less than one percent of the 25 mrem per year Colorado standard. The estimated 0.2 mrem per year is a very small fraction of the average annual dose to US public from all sources of 360 mrem/year.
- In consideration of the very low risks, EPA delisted (removed) the peripheral operable unit (refuge area) from the National Priorities List. The refuge is not a Superfund site.
- The vast majority of the site would be suitable for residential and/or industrial use. The main reason the DOE-retained lands are not part of the refuge and not open to the public is to protect the ongoing actions (e.g., treatment systems) from human interference. Access restrictions are not required in either the refuge or on DOE-retained lands to protect humans from residual risk in surface soils.
- The public, including local governments, has been extensively involved in the selection of the end use of the property as a wildlife refuge with public access. During the cleanup and post-cleanup periods, public involvement included public comment, working groups, oversight panels, a Citizens Advisory Board, and a Council of Local Governments/Rocky Flats Stewardship Council. Public use of the refuge was envisioned, thoroughly analyzed, and shared with the public and the local governments in numerous decision documents and mandated by the Refuge Act passed by the US Congress in 2001.

CDPHE Follow Up Briefing

- Cover memo

Pat Mellen Briefing

- Cover memo
- Letter from Pat to David Abelson
- Pat's resume

ROCKY FLATS STEWARDSHIP COUNCIL

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League of Women Voters ~ Rocky Flats Cold War Museum ~ Rocky Flats Homesteaders
Kim Griffiths

MEMORANDUM

TO: Stewardship Council Board
FROM: David Abelson
SUBJECT: CDPHE Myths and Misunderstandings – follow up briefing
DATE: March 22, 2018

In follow up to CDPHE's February 5, 2018, "Myths and Misunderstandings" briefing, Carl Spreng and Lindsay Masters will discuss a few issues raised during their presentation. Their February 5th presentation can be found on the Stewardship Council's website:

http://rockyflatssc.org/public_comment/Myths%20and%20Misunderstandings%20CDPHE%20presentation%20at%20RFSC%20with%20notes%20%282018-2-5%29%20.pdf

Because Pat Mellen's presentation will follow this update and will cover some of the issues CDPHE raised, there will be no public comment for this part of the meeting.

Please let me know what questions you have.

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Kim Griffiths

MEMORANDUM

TO: Stewardship Council Board
FROM: David Abelson
SUBJECT: Pat Mellen Presentation
DATE: March 23, 2018

In December 2017 and February 2018, I met with Pat Mellen to better understand her perspective on and concerns with Rocky Flats. Pat lives in Superior and has regularly attended Stewardship Council meetings since February 2016. Pat has requested time at the April 2nd meeting to brief the Board. The executive committee met with her on March 5th and granted the request. Accordingly, the agenda includes 45 minutes for her presentation and discussion.

For background on this presentation, please see the attached materials from Pat. Also, as an FYI, LeRoy Moore briefed the Board at the September 2011 meeting, and Jon Lipsky and Anne Fenerty briefed the Board at the September 2015 meeting.

Please let me know what questions you have.

Pat Mellen Law LLC

www.patmellenlaw.com

February 25, 2018

David Abelson
Executive Director
Rocky Flats Stewardship Council
P.O. Box 17670
Boulder, CO 80308-0670

Dear Mr. Abelson,

Thank you very much for the opportunity to propose a counterpoint presentation to the “Rocky Flats: Myths & Misunderstandings” presentation made by Carl Spreng and Lindsay Masters of CDPHE at the Rocky Flats Stewardship Council (“RFSC”) February 5, 2018, meeting.

Below please find the details you requested about the presentation I am proposing for the April 2, 2018, RFSC meeting.

1. Who will present, including a very brief overview of each person’s background

I will be the only presenter. I am a 10-year resident of Superior. I also am an attorney based in Denver, Superior and Boulder. I was one of the attorneys involved in the 2017 lawsuit seeking court enforcement that NEPA and other environmental review work be completed as required by federal law before the Fish & Wildlife Service finalizes its plans and begins construction on the Visitor Center and trails at the Rocky Flats National Wildlife Refuge. I also represent clients in my private practice in areas of real property, landlord-tenant disputes, estate planning and probate administration, and general civil litigation.

I have attached my resume for your review. You will see that I have had a long career in multiple industries, such as in National Security Clearance background investigations, Fortune 500 retail fiscal management, and manufacturing systems and operations in the construction industry.

I hold a B.S. in Industrial & Operations Engineering from the University of Michigan. I also hold an M.A. specializing in Investigative Reporting from the University of Missouri at Columbia’s School of Journalism. I earned a Certificate in Environmental and Natural Resources Law in conjunction with my law degree from the University of Denver.

**P.O. Box 270313
Louisville, CO 80027**

**720-924-9590
pat@patmellenlaw.com**

2. What will be the focus of the presentation, including top-line messages

The focus of my presentation is to provide history and an updated context to the RFSC members, the media, and the public documenting the counterpoint to the CDPHE presentation. The number of “activist” individuals and organizations with differing missions has grown dramatically in recent years. Developments in the area, such as the imminent opening of the Refuge, the housing boom at Candelas, and the Jefferson Parkway project, have both renewed the general sense of urgency and created new voices and interests to be considered.

Participation in a structured discussion of the unresolved concerns underlying the counterpoint position will support ongoing efforts by the RFSC members, the media and general public, to understand the complex public perception of the impact of a particular event or proposed action at or near the Rocky Flats site.

The goal of this presentation is simply to expand the conversation in a constructive manner. Because the RFSC has new members, and out of respect for renewed and new public interest in the site, I believe a summary of the viewpoints that remain unresolved will provide better context for the RFSC to perform its LSO and non-LSO missions.

The presentation will use the CDPHE slide deck as a framework. I am in the process of gathering information and points of view from the various local “activist” organizations and individuals. My role will be to synthesize these various counterpoint positions into a cohesive top-level “platform.”

The presentation will acknowledge contrasting scientific theories, but it will not drill down into specific evidence of any scientific disputes. The presentation will not ask the RFSC members to take positions about the relative validity of the viewpoints. Additional details and supporting documentation will be offered for follow up after the meeting as requested.

While resolution of the viewpoints is a lofty goal, a first step toward more productive teamwork and less conflict is to ensure that all participants at least have a common framework for why the differences continue to exist.

3. How much time will be needed, and whether that time includes time for Board Q&A and public comment

I propose that this presentation will take 45 minutes including RFSC member questions and answers and public comment.

4. Any other information that you believe the executive committee will need

Although I appear as a local stakeholder, I also am an attorney. I will not be paid by or represent any client(s) interest(s) for the purposes of this presentation. It is a wholly pro-bono effort on my part to improve the process, promote constructive dialogue, and hopefully continue to de-escalate what have been at times tense interactions between some parties.

Attorneys are well versed in the concept that two reasonable minds can differ as to the meaning of underlying facts, the status of a conflict, and material differences in risk analyses.

There is no effort here to impugn anyone's integrity or disrespect their commitment to public safety. I am bound by the Colorado Rules of Ethical Conduct to guide my professional interactions with others and to focus on the presenting a truthful perspective of the counterpoint unresolved concerns about the Rocky Flats site and its future.

Thank you again for this opportunity to propose a counterpoint presentation for the April 2, 2018, meeting. I will attend the March 5, 2018, RFSC Executive Committee Meeting to respond to questions about this proposal. In the interim, please let me know if you have any further questions or concerns about this matter whatsoever.

Best regards,

/s/ Patricia A. Mellen

Patricia Mellen

Pat Mellen Law LLC

Patricia Mellen

1888 N. Sherman Street, Suite 200 • Denver, CO • (720) 924-9590 • pat@patmellenlaw.com

PROFESSIONAL EXPERIENCE:

Pat Mellen Law, LLC. **2017 - Date**

Attorney at Law

Provide representation for clients in the areas of real property, landlord/tenant disputes, estate planning and probate administration, and general civil litigation.

Law Offices of Randall M. Weiner, PC **2017 - Date**

Contract Attorney, Contract Law Clerk

Provide representation, research, and preparation of legal pleadings on behalf of clients with environmental, probate, and landlord/tenant disputes.

Probate Court, City and County of Denver **2016 - 2017**

Intern

Supported Judge Leith and Magistrate Hernandez in all aspects of case management and courtroom activities.

University of Denver, Sturm College of Law, Denver, CO

Directed Researcher - Rocky Flats Legal Legacy **2016 - Date**

Publication of a primer for the legal community documenting the litigation history and ongoing environmental concerns related to the Rocky Flats Superfund site and the adjacent Rocky Flats National Wildlife Refuge. Focus on support for upcoming second generation legal actions..

Student Attorney - Environmental Law Clinic **2015 - 2016**

Member of three student lawyer team supporting the Citizen Intervenors in the Longmont fracking ban case. Conducted case law research and analysis, and participated in extensive moot court exercises honing Intervenors' and primary defendant's oral arguments before the Colorado Supreme Court in December 2015. Spearheaded client meetings, communications, and site visits.

CACI International, Inc., Arlington, VA **2014 - 2015**

Background Investigator - Denver/Boulder, CO

Performed background investigations in support of the federal Office of Personnel Management ("OPM") Security Clearance program. Interviewed hundreds of sources and subjects, gathered public and private records, and authored reports for adjudication of clearances at all levels.

US Investigation Services, Annandale, PA **2002 - 2006, 2007 - 2014**

Contract Background Investigator - Los Angeles, CA & Denver/Boulder, CO; District Manager II, San Ramon, CA; District Manager I, San Bernardino, CA; Background Investigator - Los Angeles, CA

Same duties as above with the addition of leadership of two teams in excess of 100 investigators.

Independent Licensed Private Investigator, Denver, CO **2007 to 2015**

Provided ad-hoc investigative and litigation support for counsel appearing in a high-conflict divorce case in the 1st Judicial District, Golden, CO., from 2011 to 2012.

EDUCATION:

University of Denver, Sturm College of Law, Denver, CO

Juris Doctor, December 2016

Certificate in Environmental & Natural Resources Law

University of Missouri, Missouri School of Journalism, Columbia MO

Master of Arts, Journalism, May 2000

Emphasis on Investigative Reporting

University of Michigan, College of Engineering, Ann Arbor, MI

Bachelor of Science, Industrial and Operations Engineering, December 1982

SKILLS/INTERESTS: Skiing, bicycling, travel/exploring, and baking.

Appendix

- Meeting Protocols
- Acronym List

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Rocky Flats Stewardship Council – Meeting Overview and Protocols

The central purpose of the meeting of the Rocky Flats Stewardship Council Board of Directors is for the Board and public to learn about current site activities and monitoring results, to be briefed on any issues or challenges DOE and the regulatory agencies are facing, and other issues that come before the Board. The Board reserves time at each meeting to address governance-related issues. Those issues are identified in the meeting agenda, and could include the budget, work plan, minutes, and related items.

All meetings of the Board of Directors are open to the public. From time-to-time, and in accordance with § 24-6-402(4), Colorado Revised Statutes, the Board may go into executive session. Public notice of the executive session is provided in the meeting agenda.

Public Engagement Protocols: Time is allotted at each meeting for the public to address the Board of Directors and presenters. The following procedures apply to all meetings of the Board of Directors. The Chair reserves the right to modify these procedures.

1. **Public comment periods:** The public comment periods are identified on the meeting agenda. The goal is to have two public comment periods—one near the start of the meeting and another near the end. The public comment periods are not a Q&A with the Board.
2. **Time limit:** The Board requests that comments be to the point. If individual comments are too long and/or if there are a number of people who wish to speak, the Chair reserves the right to enact a time limit.
3. **Additional public comment:** As time allows, and as called on by the Chair, the public is allowed to ask questions or express an opinion during presentations. The Board will have the first opportunity to ask questions or make comments.

No personal attacks: All people speaking at the meeting must refrain from personal attacks and address the issues at hand.

Public Comment on Stewardship Council Website: The Stewardship Council website includes a section for public comment. To have your comment posted, you must email a copy of your comments to David Abelson (dabelson@rockyflatssc.org).

Noise: In order to help reduce background noise, sidebar and backroom conversations should be taken into the hall.

To be added to the Stewardship Council's email distribution list, please email David Abelson (dabelson@rockyflatssc.org).

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.

Rocky Flats Acronym List
 Prepared by Rik Getty, Rocky Flat Stewardship Council
 October 2014

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).

Rocky Flats Acronym List
 Prepared by Rik Getty, Rocky Flat Stewardship Council
 October 2014

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

Rocky Flats Acronym List
 Prepared by Rik Getty, Rocky Flat Stewardship Council
 October 2014

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

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

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

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

		groundwater. As a result the solar ponds plume treatment system was necessary to treat the contaminated groundwater before it emerged as surface water in North Walnut Creek.
SPPTS	solar ponds plume treatment system	System used to treat groundwater contaminated with uranium and nitrates. The nitrates originate from the former solar evaporation ponds which had high levels of nitric acid. The uranium is primarily naturally-occurring with only a slight portion man-made. Effluent flows into North Walnut Creek
SVOCs	semi-volatile organic compounds	These compounds are not as volatile as the solvent VOCs. They tend to be similar to oils and tars. They are found in many environmental media at the site. One of the most common items to contain SVOCs is asphalt.
TCE	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.
UHSU	upper hydrostratigraphic unit	A hydrogeology term describing the surficial materials and weathered bedrock found at Rocky Flats. The UHSU is hydraulically isolated from the lower hydrostratigraphic unit (see LHSU). Groundwater in some UHSU areas of the site is contaminated with various contaminants of concern while groundwater in other UHSU areas is not impacted. All groundwater in the UHSU emerges to surface water before it leaves the site.

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