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The Rocky Flats Cleanup:
A History of Efforts to Protect Adjacent Communities

The Rocky Flats Plant operated from 1951 until 1992 and served as the nation's primary nuclear weapons trigger production facility. The facility was operated by, or on behalf of, the United States Department of Energy (DOE), or its predecessor agencies, throughout this period. Production of triggers (known as pits) and other classified work resulted in widespread contamination within the buildings and throughout portions of the 6,200 acre site, with the greatest contamination and hazards within the 384-acre core industrial area, now part of what is referred to as the larger Central Operable Unit. Site operations and fires in the production buildings also spread contamination to off-site lands and into off-site water supplies. The primary contaminants in and around the site include radioactive materials, chemical solvent wastes and heavy metal wastes.

Nuclear weapons production ceased in 1989 to address environmental and safety concerns raised by the Defense Nuclear Facility Safety Board. Shortly afterward, the Federal Bureau of Investigation (FBI) and the United States Environmental Protection Agency (EPA) raided the site to investigate other environmental allegations. In January of 1992, then-President George H.W. Bush announced postponement of the W-88 Trident Warhead Program. DOE did not formally announce an end to the nuclear weapons production mission until 1993. Cleanup began in earnest in 1995 and was closely regulated by the EPA and the Colorado Department of Public Health and Environment (CDPHE).

The cleanup took 10 years and cost approximately $7 billion. Concerned local governments and community organizations closely tracked site issues and engaged on numerous issues, including cleanup levels, cleanup methods, monitoring requirements and future use determinations.

The cleanup efforts were based on the 1996 Rocky Flats Clean-up Agreement (RFCA). The cleanup focused on four principal activities:

1. Stabilizing materials;
2. Decontaminating and demolishing buildings;
3. Shipping all waste to off-site receiver sites (note: the two landfills that were used during production were capped in place at Rocky Flats and did not receive clean-up waste); and
4. Remediating contaminated soils and contaminated groundwater, and protecting surface water quality.

The overarching goals for the cleanup project included:

1. Ensuring waters leaving the site are available for any and all uses – at Rocky Flats, the surface water standard established for plutonium is 100 times lower than the federal drinking water standard for alpha radiation;
2. Demolishing all buildings and removing foundations and other infrastructure to at least 3 feet below grade (some foundations remain below 3 feet, see below);
3. Remediating soils to levels that support a wildlife refuge – in fact, most of the site is clean enough to support residential and/or industrial use; and
4. Developing and implementing a comprehensive post-closure stewardship plan.

In 1998, seven local governments, including Broomfield, formed the Rocky Flats Coalition of Local Governments (RFCLOG) to increase their leverage over clean-up decisions and operations. RFCLOG later evolved into the Rocky Flats Stewardship Council (Stewardship Council) to monitor post-closure stewardship and membership was increased to represent a broader spectrum of interests. The Stewardship Council continues to meet and monitor post-closure activities at Rocky Flats.

Also in 1998, the Radionuclide Soil Action Level Oversight Panel was formed by DOE. The citizen and local government based group, funded by DOE, hired a private consultant, Risk Assessment Corporation, to develop a set of radionuclide soil action levels (RSALs). The recommended RSALs from this group were considered by DOE when it established the Rocky Flats RSALs in 2003. The RSALs were used in the cleanup effort to determine the level and method of soil mitigation necessary in radioactively-contaminated areas.

The nature and extent of contamination for the entire Rocky Flats site, which includes the Central and Peripheral Operable Units, was fully documented in the Resource and Conservation Act (RCRA) Facility Investigation - Remedial Investigation / Corrective Measures Study – Feasibility Study Report for the Rocky Flats Environmental Technology Site (RI/FS), dated June 2006. DOE's contractor, Kaiser Hill (K-H) was responsible for conducting the risk assessment and for completing any site remediation necessary to meet CDPHE's and EPA's criteria. This led to the eventual delisting, from the National Priorities List, of the Peripheral Operable Unit (Wildlife Refuge Area). In addition to the full range of conventional sampling and analyses, the investigation included aerial radiological surveying to locate high concentrations of radionuclide material. The

EPA and CDPHE were fully engaged during the clean-up to oversee the work performed on behalf of DOE.

The DOE's Rocky Flats Project Office (RFPO) requested that the Environmental Survey and Site Assessment Program of the Oak Ridge Institute for Science and Education (ORISE) provide an independent verification of the cleanup activities at Rocky Flats site. The RFPO requested that ORISE coordinate with the Rocky Flats Coalition of Local Government (RFCLOG) and the Rocky Flats Citizens Advisory Board (RFCAB) to incorporate their input into the project-specific plan prior to submitting the plan to DOE.

DOE's contract with ORISE called for it to perform an independent verification review of K-H's soil remediation plans and activities. The primary objectives of the independent verification were to evaluate the K-H final survey plan for soils, which included:

- Performance of the aerial and targeted ground-based scanning
- Performance of K-H investigations of aerial and targeted ground-based scanning results
- Adequacy and completeness of K-H closeout reports in Individual Hazardous Substance Sites that had not already been restored with a soil cover (e.g., 903 Lip Area).

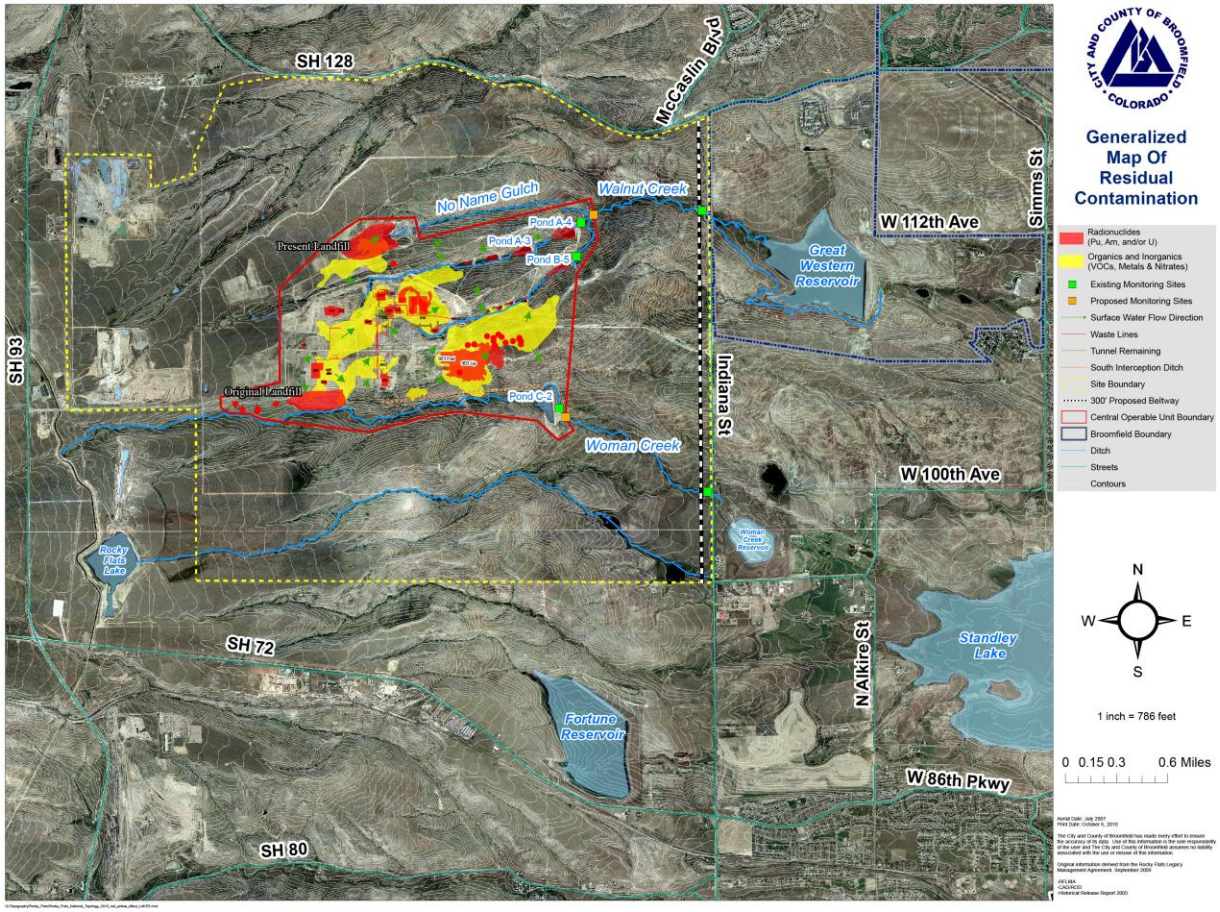
The ORISE review included document review of procedures, final survey plans and supporting data and documentation. Independent soil samples were collected to verify the contractor's current (2005) radioactive soil conditions met the established cleanup standards.

MACTECH (a private environmental consulting firm hired by the Stewardship Council to conduct an additional independent review) reviewed the ORISE verification plan for soils at the Rocky Flats site. The Stewardship Council's objective was to evaluate whether the plan had a process to ensure that the 2005 radiological conditions satisfied the release criteria identified in the final RFCA and that existing data used by K-H were representative of then-current (2005) radiological conditions.

DOE, EPA and CDPHE determined that the level of contaminants on off-site lands were below established levels for mitigation, and therefore did not warrant remediation. Cleanup activities ended in October, 2005. In late 2006 and early 2007, DOE, EPA and the CDPHE declared the cleanup complete.

Based on the findings of the RI/FS and as documented in the Corrective Action Decision/Record of Decision for Rocky Flats Plant (CAD/ROD), dated September 29, 2006, no additional action was considered necessary to protect human health and the environment for the Peripheral Operable Unit (OU). Because no hazardous substances, pollutants, or contaminants exceeded the established standards the Peripheral OU was deleted from the National Priorities List on May 25, 2007. In addition, the off-site lands that were located east of Indiana Street were also deleted from the list at the same time.

The following map, prepared by Broomfield using information compiled from DOE closure documents, highlights the areas of the site at which known contaminants were left in place and highlights the Central OU boundaries.



With their removal from the national list, approximately 4,000 acres comprising the Peripheral OU were transferred to the U.S. Department of Interior, Fish and Wildlife Service in 2007 to be protected as the Rocky Flats National Wildlife Refuge.

Cleanup, however, did not eliminate all risk. The Central OU area, including the settling ponds and two landfills, holds the greatest hazards and thus remains under DOE's Office of Legacy Management jurisdiction. Contamination is found in old building foundations, in pond sediments, in old underground process systems and waste lines, in two landfills, in groundwater and in other areas. The older of the two landfills, known as the Original Landfill, was constructed and operated in what was generally a pre-regulatory era, while the new landfill, known as the Present Landfill, was operated during a stricter regulatory era where material placed in the facility was expected to be documented. The contamination, which is at or, in nearly all cases, below all federal and state regulatory standards, includes radioactive materials, chemical solvent wastes and heavy metal wastes. There are areas in the Central OU, which exceed regulatory standards yet are in compliance with the RFCA. These areas remain DOE's responsibility in perpetuity to ensure that cleanup remedies are working as designed and to protect the remedies from human intrusion.

EPA and CDPHE agreed the remaining contamination posed no immediate threat to human health and the environment, but it does require ongoing management by DOE and regulatory oversight by CDPHE and EPA. Accordingly, in 2007, DOE, CDPHE and EPA entered into a post-closure regulatory agreement, the Rocky Flats Legacy Management Agreement (RFLMA). This agreement identifies each party's management/oversight responsibilities. An Environmental Covenant was also placed on the property to make sure that the post-closure remedies would not be inadvertently disturbed in the future. Electronic copies of the RFLMA and the Environmental Covenant can be found at http://www.lm.doe.gov/Rocky_Flats/Regulations.aspx .

The RFLMA includes and defines the regulatory approach for several activities listed below:

- Post-closure and legacy management requirements
  - Ongoing maintenance
  - Operations of implemented remedies
  - Monitoring of implemented remedies
  - Information management activities
  - Response actions
  - Process for State to approve, approve with modifications, or disapprove activities involving hazardous substances, pollutants or contaminants that are not subject to regulation under state environment law

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) five-year review
- Criteria for Institutional Controls and process to ensure procedures are in place for implementing, monitoring and maintaining compliance with institutional controls
- Performance standards for surface and groundwater
- Performance standards for treatment units and engineered response actions to ensure the units are functioning per design
- Performance standards for the two landfills
- Schedule of performance monitoring and inspections at the site
- Maintenance of information and data at the site, including the CERCLA Administrative Record
- Public Involvement Plan to comply with NEPA, CERCLA, RCRA, TSCA and CHWA.
- Quarterly and Annual reports of long-term stewardship activities
- Penalties under Colorado Hazardous Waste Act (CHWA), Resource Conservation Recovery Act (RCRA), CERCLA and State surface water standards consistent with the Colorado Water Quality Control Commission (WQCC).

The parties to the RFLMA amended the Agreement and the CAD/ROD in 2011, to: reduce the points of compliance (POC) for surface water discharges from five to two; modify the groundwater monitoring system by removing two site boundary wells; and modify the basis by which exceedances are determined. In addition an Environmental Assessment was prepared by the DOE in 2012 to breach the dams of the terminal reservoirs between 2018 and 2020 so long as the water monitoring programs demonstrate that the site is not discharging water at contaminant levels above regulatory standards.

Broomfield did not support the proposed amendment to the RFLMA or EA, but in the end did not file a legal appeal to the final decisions approving the changes to these documents. Broomfield has continuously requested that it be demonstrated that the site mitigation measures within the DOE-retained lands have stabilized prior to approval of any changes that alter the physical characteristics of the site or lessen the monitoring requirements. In correspondence from Broomfield to the DOE during the process to amend the CAD/ROD in 2011, Broomfield stated that completion of two consecutive five-year CERCLA reviews without any water quality exceedances at the POCs, after

flow-through operations at the terminal ponds commenced, would constitute stabilization.

To constantly monitor the effectiveness of the remedies, an extensive surface and groundwater monitoring program was established and continues. Per the RFLMA, water leaving the site must meet stringent standards, which in the case of plutonium is 100 times below the federal standard for alpha radiation in drinking water. The current Rocky Flats site-specific standard for uranium is equal to the lower end of the range specified in statewide standards.

This monitoring network, which is found throughout the DOE lands and within the Rocky Flats National Wildlife Refuge at two locations along Indiana Street, includes approximately 20 surface water monitoring stations and nearly 100 groundwater monitoring wells. Changes to the network require approval by the EPA and State of Colorado, through the CDPHE. Surface water in the terminal pond system (two terminal ponds on Walnut Creek and one on Woman Creek) and at the POCs at the Central OU boundary is monitored on a continuous basis by DOE. Monitoring data is shared with CDPHE and downstream communities.

CDPHE and the EPA can also collect split samples from any monitoring location. Broomfield collects its own samples at two locations including the Walnut Creek POC at Indiana Street and downstream of the Great Western Reservoir diversion channel, and then has its own analysis of the samples performed.

Any monitoring results from the sampling program that exceed prescribed levels require that DOE notify the CDPHE, EPA and downstream communities. Exceedances at levels prescribed in the RFLMA trigger specific processes by the RFLMA parties for evaluation and/or protective actions.

Broomfield and the Stewardship Council continue to closely monitor inspection, testing and sampling results. Both are committed to protecting the publics' health**.**

Quarterly reports from the long-term monitoring programs for surface water, groundwater, treatment unit performance, landfill performance, physical site conditions and ecological conditions are available electronically at http://www.lm.doe.gov/Rocky_Flats/Documents.aspx .