Rocky Flats Overview

Northern New Mexico Citizens Advisory Board
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Background

- In 1942, the U.S. began developing technology to produce nuclear weapons under the U.S. Army Corps of Engineers' Manhattan Engineer District
  - Known as the Manhattan Project
  - Facilities established to develop nuclear weapons
  - In 1945, the first atomic bombs were used to end World War II
    - "Little Boy" dropped on Hiroshima, Japan
    - "Fat Man" dropped on Nagasaki, Japan

Background (cont'd)

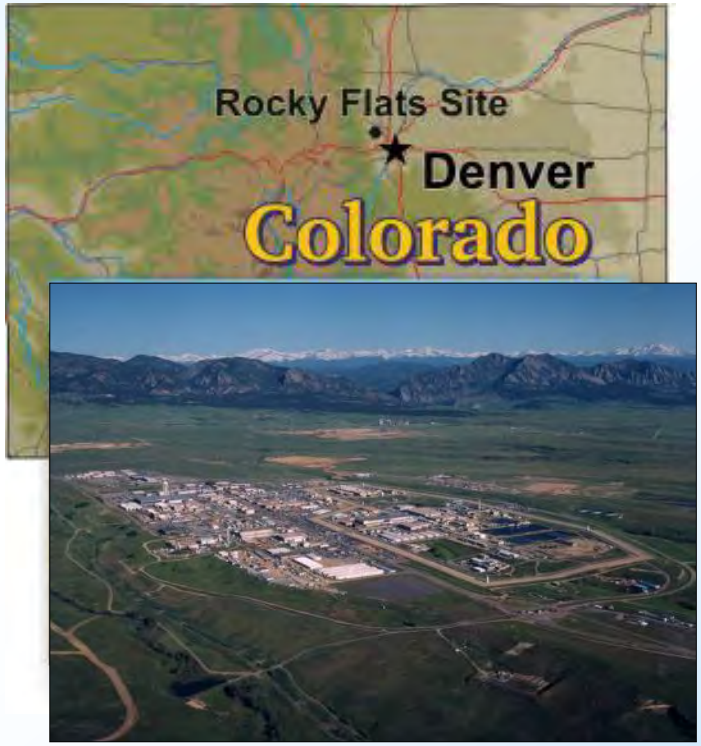
- After World War II ended, there was still a threat of nuclear weapons in enemy hands
  - The Soviet Union had begun developing its own atomic bomb
  - As tensions grew between the U.S. and the Soviet Union a new "war" began known as the Cold War
- In 1946, nuclear weapons development and production was transferred to a newly created civilian organization called the Atomic Energy Commission (AEC)
- AEC developed and managed a network of research, manufacturing, and testing sites
  - Focus was on stockpiling an arsenal of nuclear weapons

Rocky Flats Plant Beginnings

- In 1950, AEC initiated a defense project to build a new facility
- Site selection was codenamed “Project Apple” and had the following criteria:
  - West of the Mississippi River
  - North of Texas
  - South of Colorado’s northern border
  - East of Utah
  - Moderate, dry climate
  - A population of at least 25,000 people
  - Attractive surroundings for future workers
  - Accessibility from Los Alamos, Chicago, and St. Louis

Site Selection

A site near Denver, Colorado was selected in 1951 for a new facility named the ***Rocky Flats Plant*** satisfying climatic criteria, proximity to a metropolitan area with an ample labor market and appealing scenery to aid in recruitment of scientists.



The 6,500-acre site is located 16 miles northwest of Denver on a mesa between Boulder and Golden, Colorado along the Rocky Mountain Front Range

Nuclear Weapons Complex
Nuclear Weapons Production Processes

Step	Process	Major Sites
1	Uranium Mining, Milling, and Refining	Uranium Mill Tailing Remedial Action Project sites, commercially-owned mines and mills, government-owned mills, foreign suppliers, Fernald, Middlesex, Weldon Spring, Oak Ridge, Paducah, Portsmouth
2	Isotope Separation	Oak Ridge, Paducah, Portsmouth, Savannah River
3	Fuel and Target Fabrication	Savannah River, Fernald, Ashtabula, Hanford, Oak Ridge
4	Reactor Operations	Hanford, Savannah River

Nuclear Weapons Complex
Nuclear Weapons Production Processes (cont'd)

Step	Process	Major Sites
5	Chemical Separations	Hanford, Savannah River, Idaho
6	Weapons Component Fabrication	**Rocky Flats**, Hanford, Los Alamos, Oak Ridge, Mound, Savannah River
7	Weapons Operations	Pantex, Oak Ridge, Mound, Kansas City, Pinellas, Sandia
8	Research, Development, and Testing	National Laboratories: Los Alamos, Lawrence Livermore, Sandia (New Mexico and California) Test Sites: Nevada Test Site, Bikini and Enewetak Atolls; Christmas and Johnston Islands, Tonopah Test Range, Salton Sea Test Base

Mission (1952 to 1994)

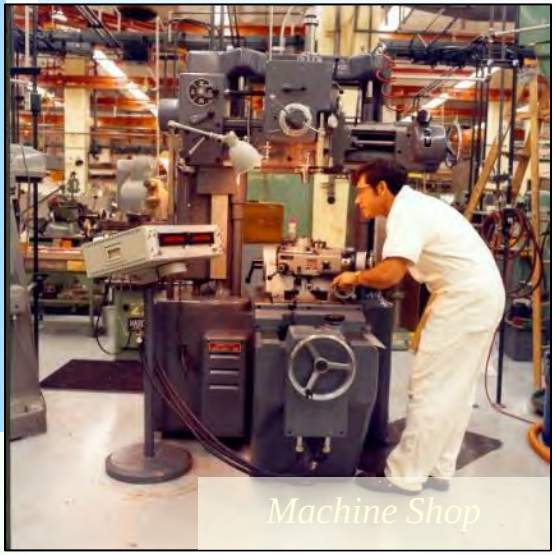
- Primary Mission: Production of nuclear and nonnuclear weapons components for the nation's nuclear arsenal
  - The key component produced was the plutonium pit, commonly referred to as the "trigger" for nuclear weapons

Glovebox work

Water Tower and Water Treatment Plant

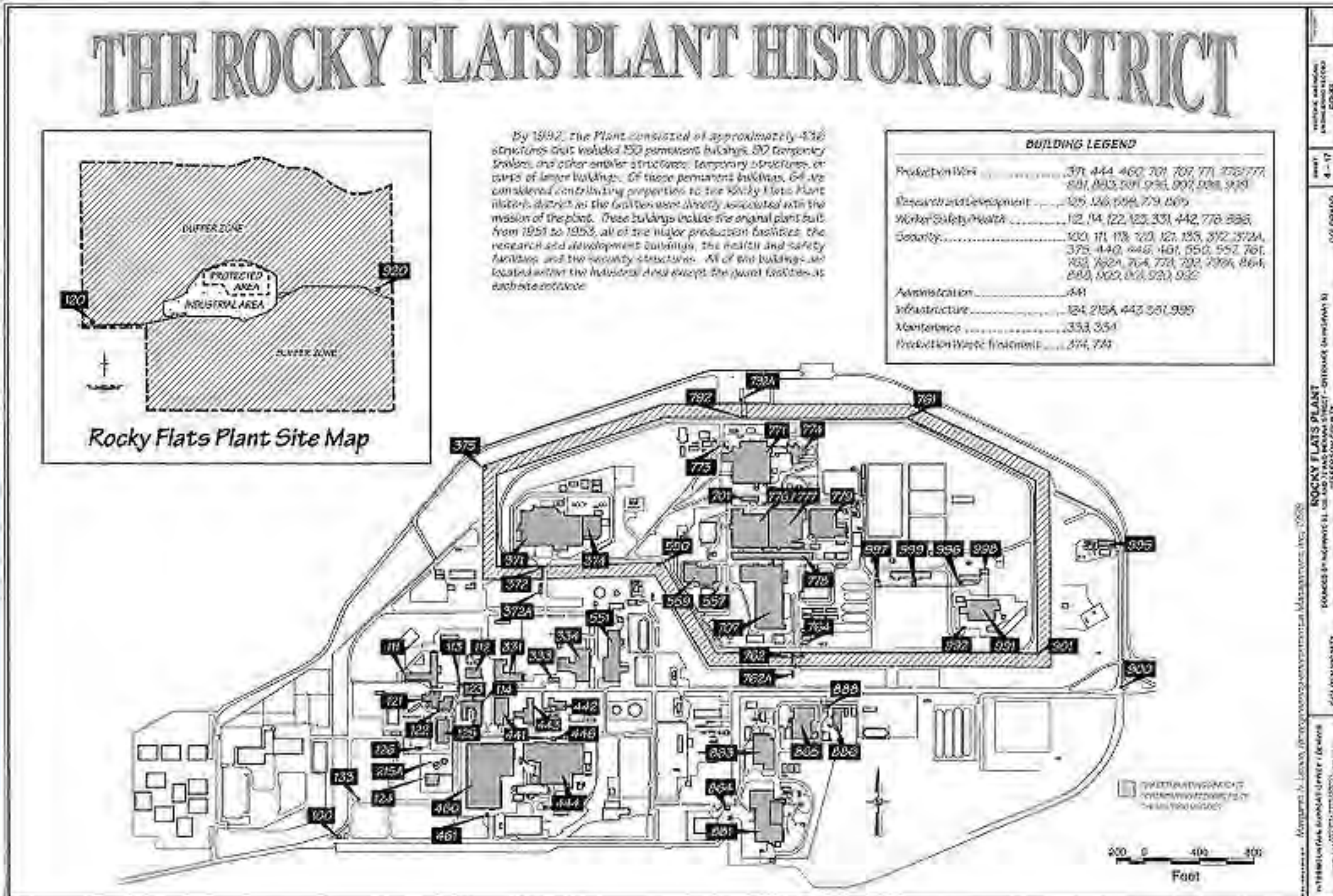
Mission (1952 to 1994) (cont'd)

- Additional plant activities
  - Manufactured components from uranium, beryllium, stainless steel, and other materials
  - Processed plutonium for reuse


Machine Shop

Test Lab


Rocky Flats Fire Department circa 1953



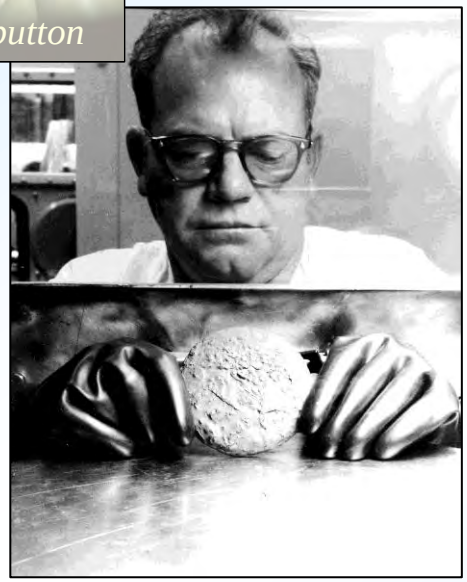
THE ROCKY FLATS PLANT HISTORIC DISTRICT
BUFFER ZONE
PROTECTED AREA
INDUSTRIAL AREA
BUFFER ZONE
Rocky Flats Plant Site Map
BUILDING LEGEND
Administration
Infrastructure
Maintenance
ROCKY FLATS PLANT
COLORADO
Feet

Production Era

1953 - 1989

Rocky Flats Production Activities

Pu button



- Plutonium Fabrication and Casting
- Plutonium Recovery
- Depleted Uranium Operations
- Enriched Uranium Operations
- Beryllium Operations

Significant Site Buildings (707)

- The 700 Buildings consolidated plutonium operations and became known as the ‘hot side’
- Building 707 – Plutonium Manufacturing Facility

B707 X-Y Retriever Pu Storage Vault

B707 Pu Storage Area

Significant Site Buildings (776/777)

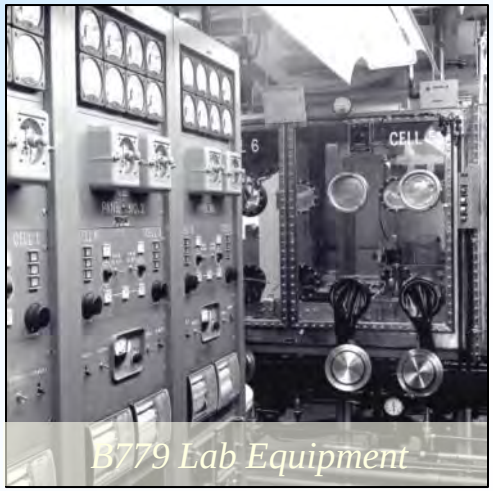
- Building 776/777 – Plutonium Processing Facility
  - 1965 - A fire occurred in Building 77 attributed to spontaneous ignition of plutonium chips
  - 1969 - A major fire occurred in Building 776/777 gloveboxes

B777 Dry Boxes

B776/777
Mold for Pu casting

Significant Site Buildings (779)

- Building 779 – Plutonium Laboratory



B779 Lab Equipment

Significant Site Buildings (371/374)

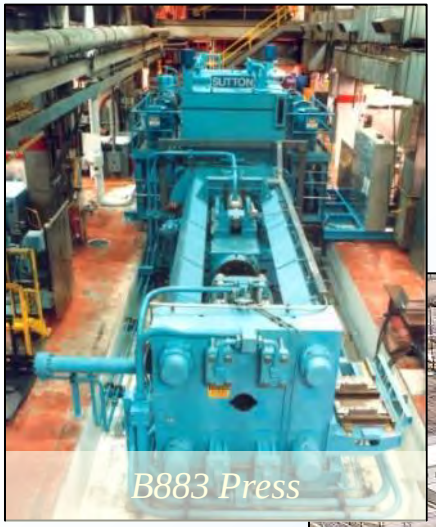
- Building 371/374 – Plutonium Recovery Facility

B371 Sub-basement

Significant Site Buildings (881/883)

- Building 881/883 – Uranium Rolling and Forming Operations (enriched and depleted uranium operations)


B883 Forming Equipment


B883 Press


B883 Rolling Mill

Other Significant Site Buildings

- Building 444 – Non-Nuclear Production Facility (beryllium operations)
- Building 559 – Plutonium Analytical Laboratory


HY-93 1954

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1989 – End of the Cold War

Rocky Flats, 1995

The Cleanup

1994 - 2005

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Rocky Flats Closure Project

- Cleanup was directed by the 1996 Rocky Flats Cleanup Agreement (RFCA)
  - DOE, CDPHE, EPA were the signatories to this tri-party agreement
  - Extensive community involvement through the Citizens' Advisory Board and the RF Coalition of Local Governments

Oversight of the Cleanup

- Coalition of Local Governments
- Citizens Advisory Board
- Oak Ridge Associated Universities
- Agency for Toxic Substances and Disease Registry
- Environmental Protection Agency
- Colorado Department of Public Health and Environment
- RSAL Working Group

Rocky Flats Closure Project
Regulatory Process

Remedial Investigation/Feasibility Study (RI/FS)

Resolving comments with regulators; 20 volumes, including 17-volume Comprehensive Risk Assessment

Proposed Plan (PP)

Based on Feasibility Study; released for public comment June 2006

Record Of Decision (ROD)

Signed by DOE, EPA and State of Colorado; September 30, 2006 (EPA driver)

Post-closure regulatory agreement (RFLMA)

Implements ROD requirements; October 2006

EPA certification of remedy & de-listing from NPL

Anticipated by EPA December 2006

Transfer property to USFWS

Internal DOI / USFWS process; mid-2007

Regulatory Completion
Accelerated Actions to Final Action

- Physical completion can be achieved through the accelerated action approach in RFCA and implemented through closure contract
- Completed accelerated actions will be evaluated as part of the RI/FS process and final remedy determination
  - The Proposed Plan is derived from the RI/FS and identifies the preferred alternative for final remedy determination
  - RFCA Parties expect that the cumulative result of accelerated actions will meet CERCLA and RCRA remedy criteria
  - Details of the final decision will be described in the CAD/ROD

NPL Site RI/FS Process

- Purpose of the Remedial Investigation
  - Collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives
  - Investigate the nature and extent of the hazardous substance releases
  - Includes the comprehensive risk assessment which analyzes risks to human and ecological receptors

NPL Site RI/FS Process

- Purpose of the Feasibility Study
  - Ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decision maker and an appropriate remedy selected
  - Develop remedial action objectives
  - Analyze alternatives (including no action) to meet these objectives

- The RI/FS forms basis for the Proposed Plan preferred alternative

Corrective Action Decision/Record of Decision (CAD/ROD)

- DOE, EPA and CDPHE signed the CAD/ROD for Rocky Flats on September 29, 2006
- The CAD/ROD documents the selected remedial action for Rocky Flats, considering and responding to comments on the Proposed Plan
- The selected remedy is institutional and physical controls, with monitoring and maintenance (Alternative 2 of the Proposed Plan)

Corrective Action Decision/Record of Decision (CAD/ROD)

- Features of the Selected Remedy
  - Continued maintenance of landfill covers and groundwater treatment systems
  - Environmental monitoring
  - Institutional controls, preventing unacceptable exposure and protecting the remedy
  - Physical controls, including signs and protection of engineered components
  - Enforceable agreement and covenant

Rocky Flats Closure Project

- Ten years and $7 billion
  - 1996 – 2005
  - Physical completion in October 2005
  - 385-acre industrial area containing 800 buildings and other structures
  - 21 tons of weapons-grade material shipped to other sites
  - 100 metric tons of plutonium residues dispositioned

Rocky Flats Closure Project
Decontamination and Decommissioning

- Extensive decontamination of facilities prior to demolition
- Tanks drained of liquids
- Equipment rip out
- Layers of concrete floor removed
- Property donated, auctioned or disposed


EXIT
OVER HEAT
ZONE 2
P-18


Building 707 X-Y Retriever

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Rocky Flats Closure Project
Facility Demolition

- Facilities demolished using heavy equipment
- Final walkthroughs and extensive sampling prior to demolition
- Rubble shipped to sanitary, hazardous and radioactive waste landfills as appropriate
- B881 explosively demolished in place

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Building 850

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Guard Tower 901

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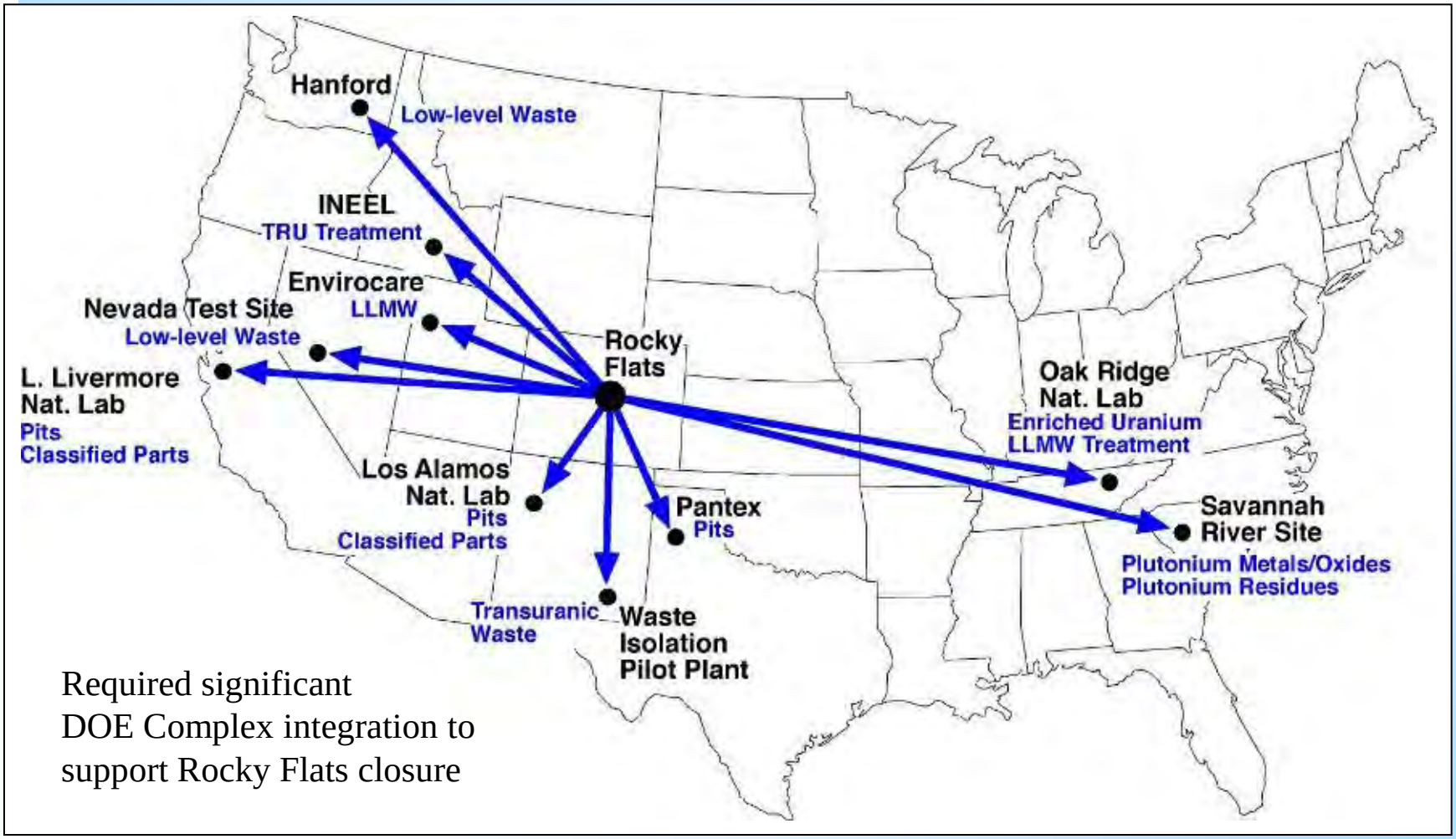
Special Nuclear Material and Waste Shipping



Required significant DOE Complex integration to support Rocky Flats closure

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Nearly 15,000 m^3 of Transuranic Waste Was Safely Shipped to Waste Isolation Pilot Plant

Rocky Flats Closure Project
Environmental Remediation

- Some soils thermally treated
- Some soils excavated and shipped
- Groundwater treatment (ongoing)
- Landfill covers
- Building foundations removed
- Historic disposal sites investigated and remediated

Rocky Flats Closure Project (continued)

- 421 potentially contaminated environmental sites investigated
  - 88 of these sites required remediation
  - Surface soils were cleaned up to a depth of 3 feet below the surface in the industrial area
  - Soils cleaned up to below the 50 picocuries per gram (pCi/g) soil action level for plutonium
- Majority of the site is below 7 pCi/g plutonium.
  - Some plutonium/americium contamination fixed and left in place in two building foundations and some process piping filled with grout (all below 6 feet)
- 275,000 cubic meters of radioactive wastes disposed

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991 Hillside

Monitoring the 903 Pad

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Physical Completion

- All buildings removed with the exception of two vehicle inspection sheds
- All Individual Hazardous Substance Sites were dispositioned per Rocky Flats Cleanup Agreement
- Soil removal where needed - remaining soils below the soil action level
- Two landfills closed with covers meeting landfill regulatory closure criteria and monitoring wells
- Four groundwater treatment systems operating to remove contaminant loading to surface water
- Continued evaluation of groundwater and surface water through RFCA sampling network
- Ongoing DOE presence through LM

Regulatory Completion

- Central Operable Unit (COU)
  - consolidated all areas requiring institutional controls and ongoing monitoring and maintenance to implement the CERCLA remedy
  - 1,309 acres managed by LM
- Peripheral Operable Unit (POU)
  - No Further Action
  - Essentially uncontaminated former buffer area
  - EPA determined the POU met unrestricted use/unlimited exposure conditions and delisted from National Priorities List
  - Approximately 4,000 acres transferred to USFWS as Rocky Flats National Wildlife refuge (additional 756 of mineral-related acres added later)
  - DOE responsible for an additional 200 mineral-related acres of POU land

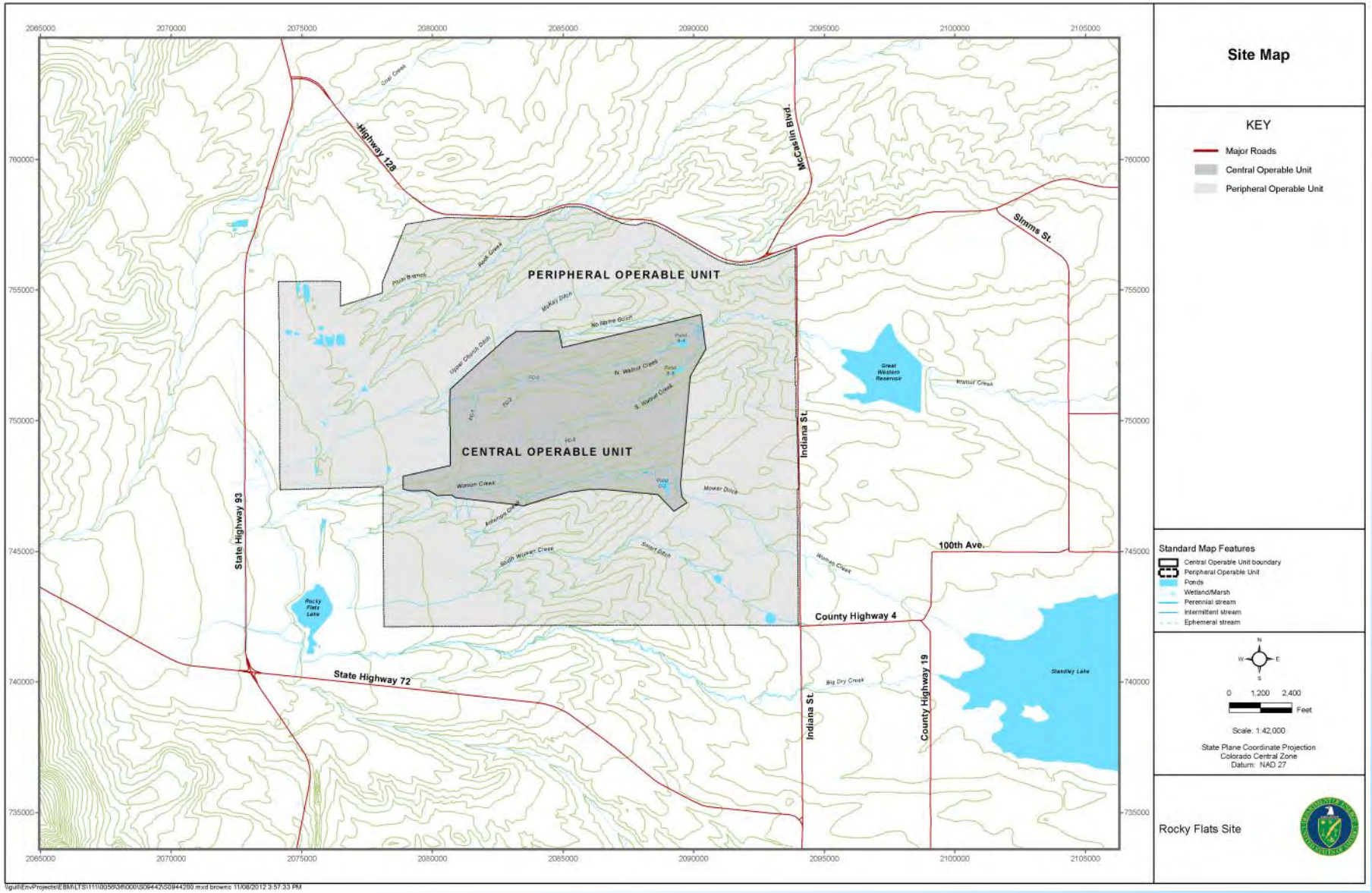
Rocky Flats, October 2005

Long-Term Surveillance and Maintenance

2006 -

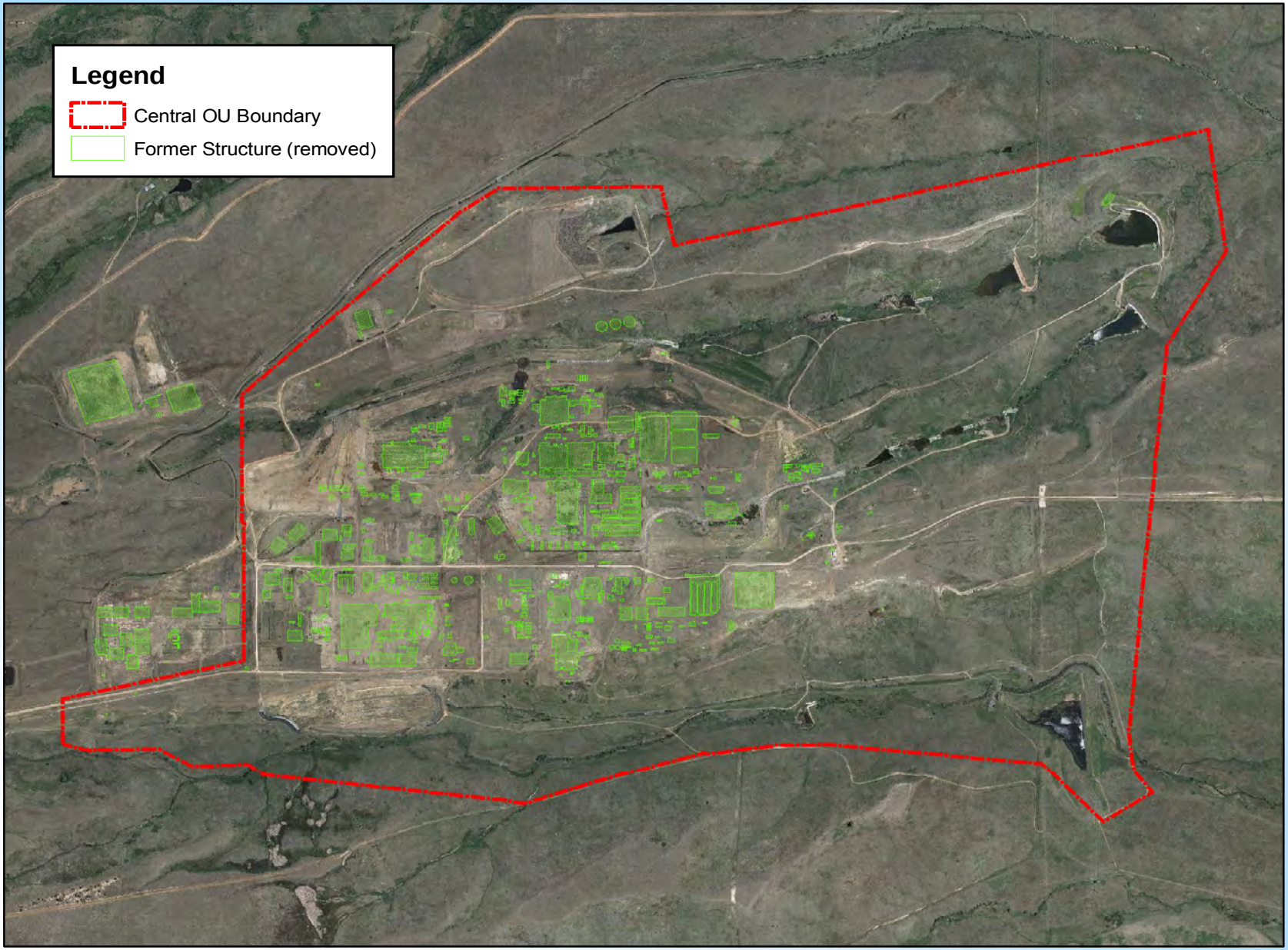
Legacy Management

- Post-closure operations, maintenance and monitoring of the remedy
  - Two closed landfills
  - Four groundwater treatment systems
  - 97 groundwater, 18 surface water monitoring locations
  - Institutional Controls
    - ICs prohibit/control groundwater and surface water use, soil disturbance, damage to any remedy components, no trespassing signs/no public access
  - Best land management practices
- Community and public interaction
  - Periodic reporting and reviews
  - Periodic public meetings
    - Rocky Flats Stewardship Council – Arvada, Boulder County, Boulder, Broomfield, Golden, Jefferson County, Northglenn, Superior, Thornton, Westminster, League of Women Voters, RF Cold War Museum, RF Homesteaders, interested individual
  - Public website


Site Map
KEY
Major Roads
Central Operable Unit
Peripheral Operable Unit
PERIPHERAL OPERABLE UNIT
CENTRAL OPERABLE UNIT
Highway 128
McCaslin Blvd.
Simms St.
Indiana St.
State Highway 93
State Highway 72
100th Ave.
County Highway 4
County Highway 19
Great Western Reservoir
Rocky Flats Lake
Standley Lake
Woman Creek
Walnut Creek
Big Dry Creek
Standard Map Features
Central Operable Unit boundary
Peripheral Operable Unit
Ponds
Wetland/Marsh
Perennial stream
Intermittent stream
Ephemeral stream
0 1,200 2,400
Feet
Scale: 1:42,000
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27
Rocky Flats Site

Central Operable Unit
Residual Contamination

- DOE Managed Area
- Original Landfill
- Present Landfill
- Groundwater plumes – VOCs, nitrates, uranium
- Some infrastructure and building remnants
  - Fixed contamination > 6 feet below ground surface
- Some historical disposal trenches and pits –
  - Contents remediated > 3 feet bgs
- Residual soil contamination


Legend
Central OU Boundary
Former Structure (removed)

Central Operable Unit
Residual Risk

- Soil remediated to a level of 1 in 1,000,000 risk or lower of increased incidence of cancer to a Wildlife Refuge Worker (WRW) scenario
- Meets DOE/NRC decommissioning criteria
  - << 25 mrem/yr for WRW scenario
  - << 100 mrem/yr for unrestricted (rural resident) scenario
- Surface water meets drinking water standards

Rocky Flats, June 2011

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Wildlife

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Questions