

Rocky Flats Closure Project



**“Making the
Impossible, Possible”**

Jeffrey Kerridge



Making History

- Kaiser-Hill completed Rocky Flats Closure Project on Oct. 13, 2005
 - All buildings demolished
 - All contaminated environmental sites remediated
 - All plutonium, uranium and radioactive/hazardous wastes removed
 - Foundations, utilities, structures removed
 - Site contoured to pre-1950 state and reseeded

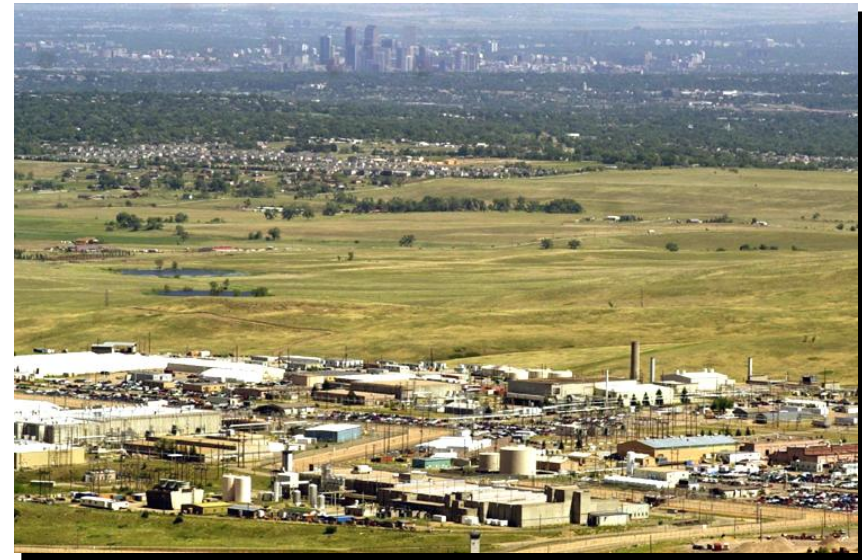
Above: Rocky Flats in 1995. At right:
Rocky Flats on Oct. 13, 2005



Rocky Flats Technical Challenges

Rocky Flats in 1995

- Approximately 800 facilities and structures on 385-acre industrial area surrounded by 6,000 acres of open space
- More than 21 tons of weapons-grade nuclear materials, much of it improperly stored
 - Most had no treatment or disposal path
- More than 30,000 liters of plutonium and enriched uranium solutions in aging tanks and pipes, some leaking
- More than 550,000 m³ of radioactive waste
- One Rocky Flats building called “the most dangerous in America”
 - Four others in top ten list of most vulnerable in DOE
- Located in the “back yard” of nearly 3 million people
- Closing the site was estimated to take 70 years and cost more than \$36 billion



The Rocky Flats site was located 15 miles from downtown Denver

Rocky Flats - A “Bankrupt” Corporate Culture

- No clear mission or work goals since 1989 FBI raid
- M&O culture - more you spend, the more you make
- Leadership direction and vision changed weekly
- No staff investment in quality of work
- “Production at any cost” culture
- Entitlement expectations
- Exceptionally risk-averse customer
- A culture that had forgotten how to succeed



When Kaiser-Hill arrived in 1995, buildings were riddled with radioactive waste



Early Mission - Put the Plant Back to Work

- Changed out most senior management
- Set quarter by quarter performance metrics (no more than 10/quarter)
- Shared 20% of earnings as general employee incentives
- Under 1995-2000 performance-based contract, real nuclear cleanup occurred at staggering pace

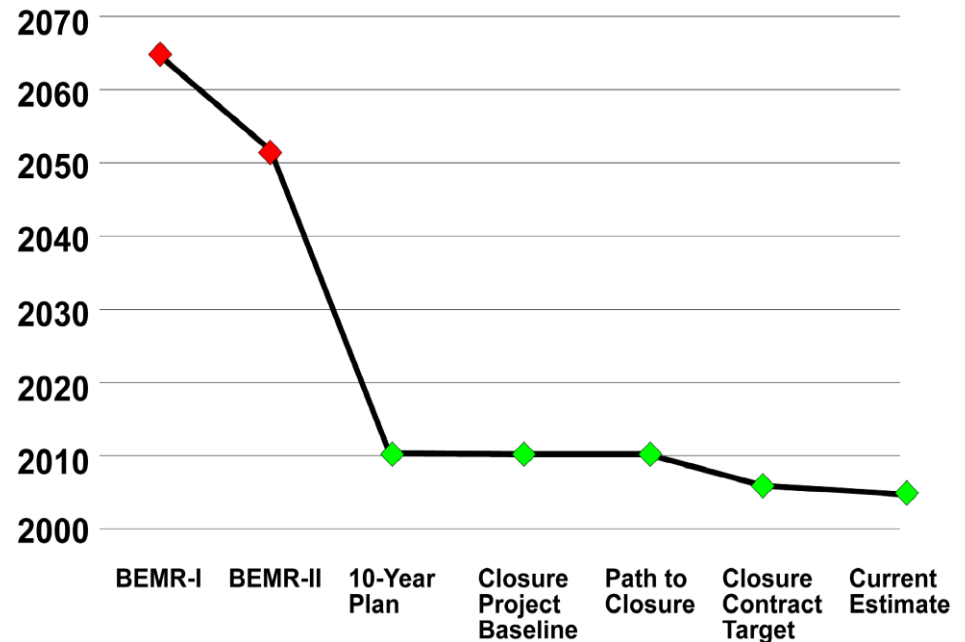


Early mission work included eliminating the highest-priority risks



In Parallel, Kaiser-Hill Develops Accelerated Closure Vision

- How can it be 2065 and \$36 billion?
- Skunkworks team
- Initial outcome - 10 years / \$7 billion
- Refined to 2014, 2010, 2006 schedule



**The Vision: Accelerated Closure -
Not a Day Later, Not a Dollar More**

The Closure Plan

- All buildings demolished
- All radioactive waste removed
- Soils and water remediated to prescribed cleanup standards
- Future wildlife refuge
- Close the site by Dec. 2006 at a target cost of \$3.9 billion (total project cost of \$7.1 billion), with incentives to complete work one year early, saving \$400 million



The foothills of the Rocky Mountains border Rocky Flats

Key Closure Activities

Special Nuclear Materials

- Completed stabilizing, packaging and shipping all 106 metric tons of plutonium residues
 - Represented 85 percent of the country's inventory
- Completed draining and processing all 30,000 liters of Pu and U liquids stored in aging tanks and piping
- Completed packaging and shipping all useable plutonium: pits, parts, classified shapes, composites, metal and oxides



Above: Tanks containing highly concentrated plutonium solutions
Right: A worker prepares to package plutonium



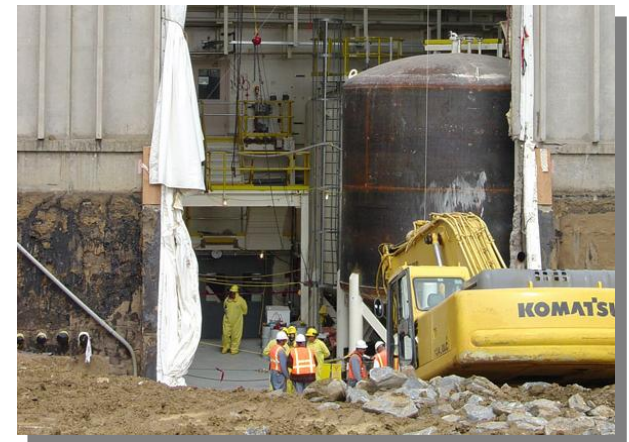
Key Closure Activities

Facility Decontamination & Demolition

- Removed 1,457 gloveboxes, some the size of 18-wheel trailers, most heavily contaminated
- Decontaminated and demolished five major plutonium processing facilities comprising more than 1 million square feet
 - B771 called “The Most Dangerous Building in America”
 - 13 “infinity rooms” were so contaminated they couldn’t be measured by Rocky Flats equipment 20 years earlier
- Removed more than 700 contaminated tanks, some as tall as three-story buildings
- Demolished or removed more than 800 contaminated and non-contaminated structures and buildings



Nighttime demolition of a plutonium facility



One of 700 contaminated tanks at Rocky Flats

Key Closure Activities

Waste Shipping and Environmental Restoration

Waste Shipping

- Shipped more than 580,000 cubic meters of radioactive waste
 - Enough to fill string of railcars more than 100 miles long
- Averaged more than 500 total shipments per week (sanitary and radioactive)

Environmental Restoration

- More than 360 potentially contaminated sites investigated and remediated
- Remediated 903 pad by removing more than 65,000 tons of contaminated soil



Waste shipping by rail



Remediation of a contaminated hillside

Management Approach

Productivity and Innovation

- Productivity
 - Negotiated new collective bargaining agreements
 - Streamlined work rules/ composite crews
 - Incentive pay
 - Retraining
- Innovation
 - Benchmarked against commercial practices
 - Identified “low tech,” high-leverage solutions
 - Implemented multiple small trials simultaneously
 - Actively shared sub-project lessons learned



Cutting gloveboxes using plasma arc improved safety and productivity

Management Approach

A “Learning Organization”

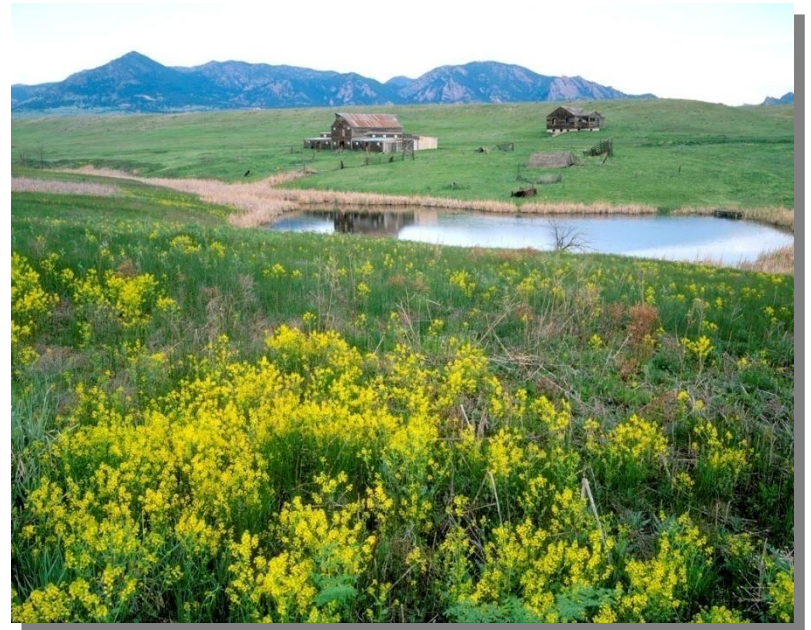
- Management philosophy: create a “learning organization”
 - Continuously improve strategy in action
 - Learn quickly and move learning to the floor (i.e., front lines of cleanup work)
 - Take bounded risks
 - Engage workers as problem solvers
 - Recognize that acceleration results from completing work correctly the first time, not necessarily from speed



Workers decontaminate concrete flooring

What We Delivered

- Eliminated environmental risk 60 years ahead of original estimate
- Saved taxpayers more than \$30 billion
- Created an industry leading safety program
- Initiated an aggressive workforce transition program to help our skilled workers move to their next job, career or personal goal
- Rocky Flats acknowledged as the model for accelerated cleanup in the DOE weapons complex



The Rocky Flats buffer zone

Lessons Learned

- Safety must be the foundation of all accelerated work
 - Clearly identify scope boundaries
- Incentive-based contracts work
- Structure bonuses to incentivize the accomplishment of contract goals
- Disciplined, relentless project management pays
- Invest in a robust project controls system



Reseeding Rocky Flats with native grasses