

**Rocky Flats 10 Year Plan -  
Over 500 Structures To Be Demolished**

Ben Evans  
Kaiser-Hill L.L.C., Rocky Flats Colorado

Paul Bengel  
Rocky Mountain Remediation Services, L.L.C., Rocky Flats Colorado

**Abstract**

Rocky Flats Environmental Technology Site has prepared a Ten Year Plan (Plan) that demonstrates how the Site would achieve accelerated cleanup and rapidly reduce the risks the Site currently poses in its workers, the public, and the environment. A major element of the Plan is the decontamination and demolition of over 500 Site facilities, including all of the former nuclear production facilities, by the end of 2006. Facilities used for the storage of plutonium, treatment of low-level mixed waste, and several office building would remain until the plutonium is removed or there is no longer a need for the facility, in which case it would be demolished. While the Plan considers all aspects of the cleanup and closure, this paper focuses on the challenges posed by the removal of highly contaminated equipment and the demolition of structures.

This paper describes near-term decommissioning projects as well as the long range plans and budgets. Cash flow ultimately controls schedule, and sharing of budget priorities among processing of special nuclear material, disposing of waste, and cleaning up the environment has to be juggled carefully to attain the goals of the Plan. The total cost of the Plan exceeds \$5 billion, and over \$1 billion will be spent on decommissioning activities. Following removal of the plutonium and the demolition of the plutonium storage and remaining Site facilities by the end of 2015, the cost to perform the long-term environmental monitoring at the Site is estimated to be \$10 million per year.

**DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

**MASTER**

**DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED**

## **DISCLAIMER**

**Portions of this document may be illegible  
in electronic image products. Images are  
produced from the best available original  
document.**

## INTRODUCTION

### Purpose

The Rocky Flats Ten Year Plan (The Plan) describes the technical scope, schedule, and estimated cost to achieve accelerated risk reduction and significant cleanup of the Rocky Flats Environmental Site (Site) by 2006. The Plan is meant to achieve the Site Vision contained in the Rocky Flats Cleanup Agreement (RFCA). The Site Vision is the end objective which guides all future decision making at Rocky Flats.

The Plan represents a Site cleanup approach that employs DOE-stated funding level assumptions and is free of considerations not essential to accomplishment of the Plan. However, fiscal year 1997 annual work planning is proceeding in accordance with the Program Execution Guidance (PEG) funding, which is lower than that stated in the Plan.

In parallel with the development of the Plan, a Community Relations (CR) plan was developed. The CR plan describes public involvement in many of the major decisions outlined in the Ten Year Plan. It includes a decision making process which provides a framework for making complex decisions in a public process. Two major decisions which affect decommissioning costs and require public involvement in the near term are the soil action levels and low level mixed waste management. Soil action levels determine the volume of remediation waste generated which in turn impacts the methods used to treat the dispose of such wastes.

### Scope

The Plan is a product of the integrated sitewide planning process at Rocky Flats and it addresses all aspects of cleanup and closure, including special nuclear material stabilization, facility decommissioning, waste management, environmental cleanup and infrastructure activities. However, this paper addresses only facility decommissioning. Other cleanup and closure activities are addressed only to the extent needed to show the impact on decommissioning.

The Plan was developed around twelve major projects. The twelve major projects are delineated by the Site Work Breakdown Structure (WBS) which presents the Site as a single integrated project aimed at mission termination and Site closure. It is organized into fifty-seven groups or Work Authorization Documents (WADs) which are used to control work at the Site. Only two projects and 14 WADs are associated with decommissioning activities. These are listed in Table 1 along with titles and WBS line item numbers identified in the Plan.

## **DISCUSSION**

### **Statement of Work**

The Ten Year Plan would radically accelerate the reduction of Site risk, and it would cleanup almost the entire Site at a cost of about \$5.4 billion. For comparison purposes, the current annual Site budget is about \$600 million.

Under the Plan, the following would occur in ten years: SNM would be stabilized and either shipped offsite or stored onsite in a new, interim storage facility awaiting shipment. The vast majority of Site facilities would be demolished, including all of the former nuclear production facilities. Low level radioactive waste (LLW), including low level mixed waste (LLMW), would be placed in consolidated long term storage facilities and treated either onsite or offsite. Transuranic (TRU) waste would be treated and shipped to DOE's Waste Isolation Pilot Project (WIPP) for disposal. The Site would be cleaned up to levels that would allow open space and other appropriate uses.

The vast majority of the Site's 500+ facilities and structures, including buildings, cooling towers, trailers, pump houses, etc., would be deactivated and demolished by the end of 2006. Facilities used for the storage of SNM, treatment of LLMW, and several office buildings (Buildings 130, 131, and 850) would remain until either the SNM is shipped offsite or a determination is made that there is no longer a need for the facility. Clean decontamination and decommissioning construction debris would be used as clean fill and disposed onsite.

At the end of ten years, the remaining facilities left onsite would be the new, interim storage facility for special nuclear material (SNM), the LLMW treatment Facility and several office buildings. All of the facilities would be demolished by the year 2015. Activities occurring after 2015 would consist primarily of long-term environmental monitoring.

The interrelationships between the Ten Year Plan major activities are diagrammatically represented in Figure 1.

### **Assumptions**

Major assumptions affecting facilities decommissioning include:

- The total site funding target is between \$600-657 million per year for FY 97 through 2006.
- The near-term and intermediate site conditions contemplated by the RFCA, with the exception that SNM are stored onsite, are achieved at the end of ten years.
- Budget approval of capital project can be reduced to one year rather than the current 3 years.
- SNM will be stored at the Site for the life of the ten year project.

- All former nuclear production facilities will be demolished as will the vast majority of other site facilities.
- Moderate time periods overlap deactivation and subsequent decommissioning activities.
- All radioactive materials generated by decontamination and decommissioning will be containerized.
- Recent EPA draft guidance on radioactive release limits for decommissioning construction debris will be used.
- Transportation and disposal costs for TRU waste are funded by WIPP, and WIPP is opened in 1998.

### **Major Strategies**

A number of major strategies were used to develop and prioritize the scope, schedule logic, and to estimate costs for the Plan. These strategies embody the guiding principles contained in DOE's Guidance On Ten Year Planning, Rocky Flats Cleanup Agreement (RFCA), and the Site's Accelerated Site Action Project (ASAP) document. These major strategies include:

- eliminate urgent risks first,
- treat plutonium process residues to meet WIPP waste acceptance criteria,
- reduce nuclear facility baseline costs,
- accelerate deactivation of SNM facilities,
- use commercial and other sites to assist in the timely removal of SNM,
- demolish site facilities and infrastructure to eliminate future funding and safety liabilities,
- treat and ship transuranic and low level wastes offsite quickly,
- cleanup environmentally contaminated areas to mitigate and to control significant risk sources,
- reduce infrastructure and management costs at a steady pace by transferring services to offsite sources, and
- employ existing technologies to stabilize SNM and treat radioactive wastes.

While there were a number of assumptions made which impact the results of the Plan, the ones that significantly impact decommissioning are: the soil action levels and the waste disposal methodology. The Plan assumes that the radiological cleanup level of soil will be triggered by an 85 millirem/year dose limit, consistent with a draft EPA Radiation Site Cleanup Regulation. Application of a 15 millirem/year dose limit would quadruple the LLW and LLMW volume estimates. Also, the Plan assumes that WIPP will open in 1998 and will accept all TRU waste by the end of 2006. If WIPP opening is delayed by a year or two, an interim, onsite storage facility may have to be constructed. This will increase costs.

It is important to note that the Plan represents an integrated series of activities, and when assumptions such as the ones described above do not hold true, then the impacts to the plan can be significant. As a result, decommissioning would not be accomplished until sometime after 2006, and the resulting waste will then need to be treated and disposed after decommissioning.

Likewise, there are opportunities that may improve the results of the Plan. For example, for very large volumes of LLW and LLMW, it would be more cost effective to build an onsite Corrective Action Management Unit (CAMU). Also, the Plan assumes that the DOE-mandated process for dispositioning excess government property would be used. It is apparent that there may be significant cost savings if an expedited and cost-effective salvage process could be developed and implemented. Managing the cleanup as a project and early funding of critical path projects can realize significant project life-cycle cost savings. This is especially true for deactivating unneeded nuclear facilities.

## RESULTS

Rocky Flats can achieve almost complete cleanup and closure by the end of fiscal year 2006 for a cost of approximately \$5.4 billion. The total cost to manage the remaining plutonium from FY07 until it is removed by the end of FY15 and to perform environmental monitoring is estimated to cost an additional \$600 million. Following removal of the plutonium and the demolition of the plutonium storage and remaining Site facilities by the end of 2015, the cost to perform the long-term environmental monitoring on the site is estimated to be \$10 million per year.

The costs for decommissioning facilities is estimated to be over \$1 billion. In this estimate, decommissioning include building deactivation, decontamination and demolition. It does not include costs for any on-site treatment, storage and disposal of wastes. The only waste-associated costs included with decommissioning costs are for the safe handling and containerization of decommissioning wastes to maintain control of contamination and to eliminate any double handing of wastes.

Figure 2 illustrates the funding profile for the Ten Year Plan for the 10 years involved in cleanup and closure as well as for the subsequent years covering maintenance and surveillance activities. It demonstrates when decommissioning becomes a significant portion of the Plan, i.e., about fiscal year 1999.

Table 1 shows the duration and the estimated costs of the decommissioning projects over the lifetime of the Plan. While these costs are based on the assumptions of the Plan, privatization is being considered and is expected to reduce costs significantly.

For decommissioning, privatization is defined as procurement process where, as a result of competition, a private vendor is awarded a fixed-price contract for decommissioning services.

The vendor uses private funding to engineer, mobilize, decontaminate and decommission the facility as described in a performance specification. The basic approach will be to demolish the building to the slab at ground level. At the time of contract signing, DOE would obligate sufficient funds to cover construction costs and interest to be able to pay the vendor in the event DOE cancels the contract for its convenience. The vendor would be paid for providing decommissioning services to fixed work scope.

Payment to the privatized contractor will be negotiated and will correspond to the savings in the surveillance and maintenance costs realized by the Government. No payments will be made until savings is realized, and the final payment will not be made until the building is demolished per the performance specifications produced for the solicitation. The payment would be made from annual appropriations and by costing the original obligation for amortization of the capital costs.

## **FUTURE PLANS**

The Plan was prepared as a one time request from DOE to provide a way to integrate the cleanup and closure activities at Rocky Flats with other facilities in the DOE complex. Based on the usefulness of this plan, it is likely that the Plan will be updated routinely to account for changes in regulations, budgets, and successes in completing planned activities.

**TABLE I - ROCKY FLATS TEN-YEAR PLAN DECOMMISSIONING PROJECT LIST**

WAD No.	WAD Project Title	WBS Line Item Number	WBS Title	D&D PERIOD	Cost (Millions)
<b>Project No. 7 - INDUSTRIAL ZONE CLOSURE PROJECT - \$186M</b>					
25	Industrial Zone Closure Project	1.1.05	Achieve Intermediate Site Condition for Industrial Zone	FY97-08	186.0
<b>Project No. 8 - PRODUCTION AREA CLOSURE PROJECT - \$750M</b>					
26	207 Cluster Project	1.1.06.01	Remove 207 Cluster	FY01	5.3
27	500 Cluster Project	1.1.06.04	Remove 559 Cluster	FY04-05	
		1.1.06.05	Remove 566 Cluster	FY99	
		1.1.06.06	Remove 569 Cluster	FY05	27.2
28	700 Cluster Project	1.1.06.15	Remove 790 Cluster	FY02	0.465
29	800 Cluster Project	1.1.06.16	Remove 800A Cluster	FY00	
		1.1.06.19	Remove 886 Cluster	FY99-00	12.1
30	900 Cluster Project	1.1.06.20	Remove 910 Cluster	FY06	
		1.1.06.21	Remove 964 Cluster	FY00	
		1.1.06.22	Remove 980 Cluster	FY01	2.5
31	371 Cluster Project	1.1.06.02	Remove 371/374 Cluster	FY01-02	
		1.1.06.03	Remove 371A Cluster	FY99	144.9
32	707/750 Cluster Project	1.1.06.07	Remove 707 Cluster	FY00-03	
		1.1.06.07.02	SNM and Hazardous Material Removal	FY99-02	
		1.1.06.08	Remove 750 Cluster	FY00	
		1.1.06.09	Remove 750 Pad Cluster	FY00	
		1.1.06.13	Remove 778 Cluster	FY03	121.5
33	779 Cluster Project	1.1.06.14	Remove 779 Cluster	FY98-00	14.8
34	771/774 Cluster Project	1.1.06.10	Remove 771/774 Cluster	FY00-01	
		1.1.06.11	Remove 771A Cluster	FY01	77.7
35	776/777 Cluster Project	1.1.06.12	Remove 776/777 Cluster	FY00-02	117.8
36	881 Cluster Project	1.1.06.17	Remove 881 Cluster	FY03-04	
		1.1.06.18	Remove 865/883 Cluster	FY99-00	91.2
37	991 Cluster Project	1.1.06.23	Remove 991 Cluster	FY00	2.3
38	Production Zone Misc. Cluster Project	1.1.06.24	Remove PWTSN Cluster	FY05	
		1.1.06.25	Remove SCENPZ Cluster	FY03	
		1.1.06.26	Remove INFELN Cluster	FY06	
		1.1.06.27	Remove INFWTN Cluster	FY06	
		1.1.06.28	No-Action IHSS Close-out	---	112.2

Figure I

## Cluster Project Lifecycle

The Project: Remove A Typical Cluster

### THE PROJECT

Removal of Cluster

### THE ACTIVITIES

Maintain Facility Operability

Remove SNM

Deactivate Facility

Decommission Facility

Remediate Site

Remove Internal D&D Waste

**TYP II Case 2**  
**February 3, 1997**

**Program BA Funding Profiles (costs include contingency, escalation and employee benefits/payroll taxes)**

