

**STATUS UPDATE:  
CLOSING ROCKY FLATS BY 2006**

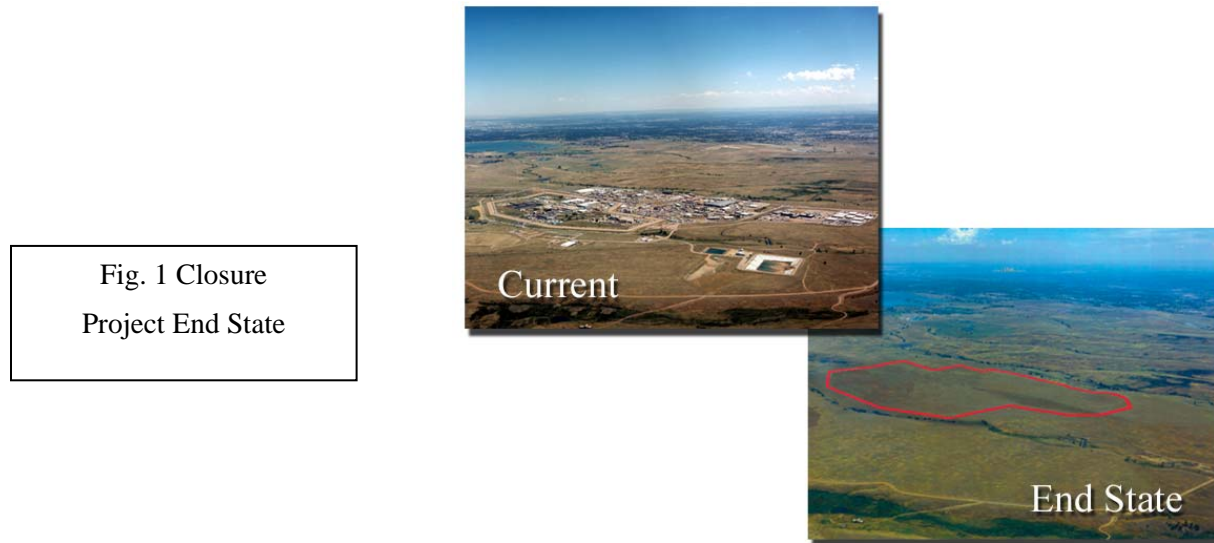
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**ABSTRACT**

Safely accelerating the closure of the U.S. Department of Energy's Rocky Flats Environmental Technology Site by 2006 is a goal shared by many stakeholders. To that end, significant progress was made in calendar year 2003. Perhaps the most noteworthy achievement was the final stabilization, packaging and offsite shipment of the last of Rocky Flats' weapons-usable special nuclear materials. Additionally, significant progress was made in decontaminating and demolishing facilities, cleaning up environmentally contaminated areas and shipping radioactive waste offsite for disposal. This record-setting project performance was also accompanied by significant gains in closure project cost and schedule performance, and suggests that closure of the site can be achieved earlier than closure contract target date of December 2006 and for less than the closure contract target cost of \$3.97 billion.

**INTRODUCTION/CLOSURE PROJECT BACKGROUND**

On January 24, 2000, the DOE and Kaiser-Hill signed a first-of-its-kind closure contract to complete the Rocky Flats Closure Project by a target date of December 15, 2006, at a target cost of \$3.97 billion. The closure of the site will ultimately enable the establishment of a federal wildlife refuge. Figure 1 illustrates the closure project's end state.



The closure contract completion criteria are:

- All buildings are demolished, except continuing water treatment facilities or other structures with a DOE-declared continuing mission.
- All Individual Hazardous Substance Sites are remediated or dispositioned per the Rocky Flats Cleanup Agreement.
- All wastes are removed except for some materials that can be left in place, recycled or used as fill materials in accordance with regulatory requirements.

- Building foundations, utilities, or other remaining structures paved roads and/or parking lots are covered by a minimum of 3 feet of fill after final grade.
- Surface water on site will meet health-based standards based on open space use.
- Water leaving the site in Woman and Walnut Creeks meets the water quality standards established by the Colorado Water Quality Control Commission.

To accomplish this undertaking, Kaiser-Hill developed an approach that achieves cleanup of the site on an accelerated schedule and at the lowest feasible cost. Key elements of Kaiser-Hill's approach include:

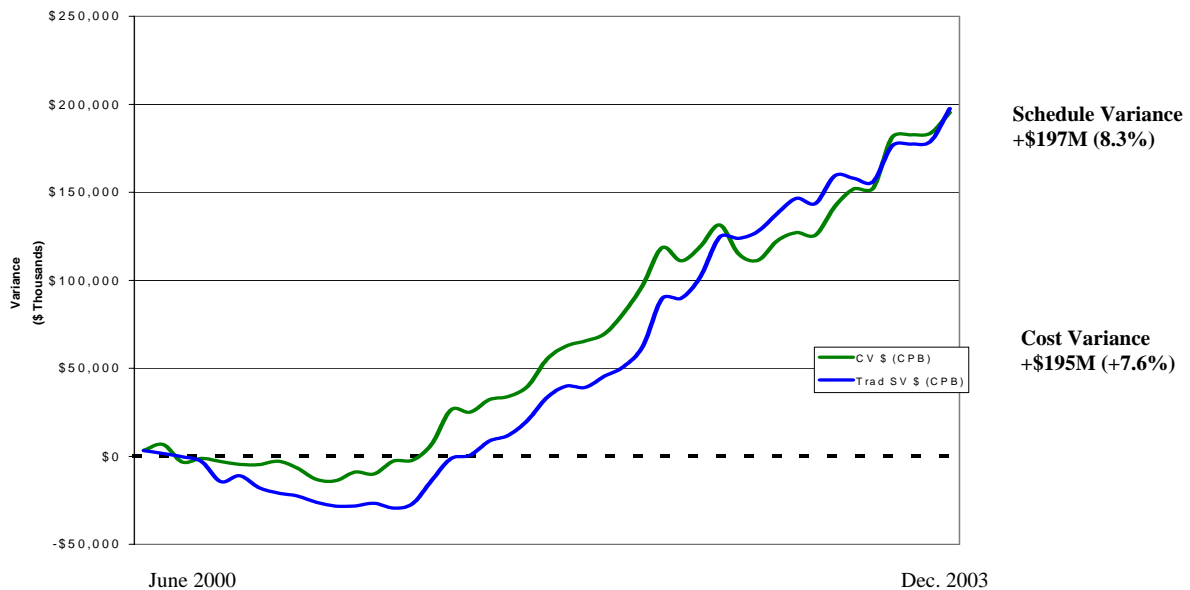
- Emphasizing safety as the foundation of all work
- Eliminating the highest health risks first
- Reducing the site's mortgage costs to make more funds available to accomplish more cleanup activities
- Focusing the highest attention on the critical path and near critical path activities (the critical path activities are those activities which, if they slip, could significantly impact project completion)
- Rewarding employees to work safely, cost effectively and efficiently
- Employing proven, innovative technologies and approaches to increase efficiency and safety

**CLOSURE PROJECT STATUS**

More than two thirds of the way through the Closure Project, Rocky Flats is currently under cost and ahead of schedule. Kaiser-Hill remains optimistic that the project will be delivered below the target contract cost of \$3.97 billion and before December 2006. Through December 2003, the project cost and schedule performances against the Closure Project Baseline (CPB) are as follows:

- Cost variance is +\$195 million (7.6%)
- Schedule variance is +\$197 million (8.3%)
- Current projected closure date is August 2006

Chart 1 Project Cost and Schedule Variances



Kaiser-Hill also tracks a number of key closure project performance metrics in addition to monitoring traditional project performance parameters. Table I below shows the work completed on these metrics through December 2003, and how much work remains.

Table I Closure Project Performance Metrics

Key Closure Activities	Total Work Scope	Completed	Percent Complete
<b>Special Nuclear Material Stabilization and Packaging</b>			
Pu Stabilization and Processing	1,895 containers	1,895 containers	100%
Pu Residue Processing Packaging	106,000 kgs	106,000 kgs	100%
<b>Facility Deactivation, Decommissioning and Demolition (D&amp;D)</b>			
Type 1 Facilities* Demolition (free from contamination)	1,364,699 sq. ft. (611 facilities)	581,063 sq. ft. (287 facilities)	43% 47%
Type 2 Facilities* Demolition (without significant contamination or hazards)	1,213,417 sq. ft. (187 facilities)	219,479 sq. ft. (49 facilities)	18% 26%
Type 3 Facilities* Demolition (significant contamination/hazards)	989,792 sq. ft. (7 facilities)	64,790 sq. ft. (1 facility)	7% 14%
Type 3 Facilities Decontamination and Dismantlement	1,457 Gloveboxes 273 D&D Work Sets	1,240 Gloveboxes 224 D&D Work Sets	85% 82%
	<ul style="list-style-type: none"> <li>• Glovebox Removal</li> <li>• "Set" Removal</li> </ul>		
<b>Offsite Shipment of Special Nuclear Material, Waste, and Other Materials</b>			
Pit Shipment	100% of inventory	100% of inventory	100%
eU Parts destined for Oak Ridge	100% of inventory	100% of inventory	100%
eU Parts destined for other DOE Sites	100% of inventory	100% of inventory	100%
Pu Parts destined for LANL	100% of inventory	100% of inventory	100%
Pu Parts destined for SRS	100% of inventory	100% of inventory	100%
Pu Metals and Oxides	100% of inventory	100% of inventory	100%
LLW Shipment	197,536 m <sup>3</sup>	130,110 m <sup>3</sup>	66%
LLMW Shipment	104,873 m <sup>3</sup>	46,352 m <sup>3</sup>	44%
TRU/TRUM Shipment	12,500 m <sup>3</sup>	9,113 m <sup>3</sup>	73%
<b>Environmental Restoration</b>			
Sites projected to require remediation	88 sites	39 sites	44%

\*Based on anticipated facility typing

## NOTABLE ACCOMPLISHMENTS OF 2003

During 2003, a number of significant accomplishments were achieved that allowed Rocky Flats to not only stay on course for a 2006 closure, but to increase the probability of completing closure before the end of 2006.

### Completion of Packaging and Removal of Special Nuclear Materials from the Site

The Closure Project made headlines in 2003 by completing nuclear operations and shipping the site's remaining weapons-usable plutonium and uranium, effectively ending Rocky Flats' 50-year history of working with weapons-usable nuclear materials. Completing the last of the Special Nuclear Material (SNM) packaging and shipping beat the Rocky Flats Cleanup Agreement milestone by 12 years.

Fig. 2  
Safe, Secure  
Transports leave  
Rocky Flats



In July, the Plutonium Stabilization & Packaging System team finished the packaging of 1,895 "3013" 50-year storage containers. Despite frequent equipment breakdowns, the team achieved the best production rates of the two-year effort. Shipping the remaining weapons-usable material from Rocky Flats concluded an eight-year effort by the Kaiser-Hill team. Early on in the Project, workers aggressively solved legacy safety issues by repackaging fissile materials and draining and processing plutonium-contaminated liquids. Shipping campaigns tackled SNM pits, hemi-shells, alloys and parts. Weapons-usable material was consolidated from several locations on site. And the Rocky Flats protective force, responsible for ensuring the highest levels of security for SNM, continually received the highest ratings possible during annual evaluations.

### Closure of the Protected Area

Following the removal of all remaining weapons-usable plutonium and uranium, the last remaining Material Access Area (MAA) on site, B371's MAA, was closed August 8, 2003, within weeks of the final shipment of weapons-usable material, paving the way for the elimination of the Protected Area (PA). Closing the B371 MAA and the site PA is one of the significant accomplishments to date in the cleanup and closure of Rocky Flats. Removal of the last weapons-usable material from the site significantly reduced security requirements. Closing the PA saved an estimated \$1-2 million per month in security costs that can now be directed toward accomplishing more cleanup work.

Closing the B371 MAA required more than 2,000 scans using radiological instruments to make sure no attractive quantities of SNM were present in or around the building. In addition to all gloveboxes and tanks in B371, everything was scanned—every cargo container, every wall cabinet – anything and everything – ten-foot-section by ten-foot section, attic to sub-basement. Complicating matters, drums containing radioactive waste couldn't be stationed anywhere within 10 feet of where measurements were occurring — meaning thousands of drums had to be relocated as the scans were performed.

Fig. 3  
Senator Allard,  
Representative Udall and  
NNSA Administrator  
Brooks attend PA closure  
ceremony



### Building D&D

Facility Decontamination and Demolition (D&D) employees working in Rocky Flats' four major plutonium facilities – 371, 707, 776/777 and 771/774 -- successfully decontaminated and dismantled some of the most complex and highly contaminated areas during the year.

One of the most significant accomplishments was completing all of the interior decontamination and dismantlement work in Building 771, once dubbed “the most dangerous building in America,” and turning it over to a demolition contractor for final structural decontamination and demolition. To do this, workers removed the last six of 12 filter plenums, including the highly contaminated FU-2B plenum, and the FU-2C dehumidifier, where 50 years of operations created extremely hazardous conditions. In neighboring Building 774, a former liquid waste treatment facility, workers removed four 15,000-gallon tanks that contained 10,000 gallons of transuranic sludge. Building 774 is currently being demolished and Building 771 is scheduled to be demolished in the spring of 2004.

Workers in Building 371 made tremendous D&D progress in parallel with completing the last of Rocky Flats' nuclear operations. D&D crews removed 107 gloveboxes, 67 tanks and completed 18 of the project's 45 D&D work sets. Using an innovative vacuum system developed by the project, the last of 600,000 pounds of highly contaminated boron-impregnated raschig rings contained in 75 tanks was removed. Workers also deactivated and began to decommission the large Central Storage Vault.

Decommissioning work in the Building 707 and 776/777 facilities was equally impressive. In 707, workers removed a significant number of plutonium-contaminated welders, lathes, rolling mills and other large pieces of equipment used in the production of nuclear weapons triggers. They also made outstanding progress cleaning out the 1,800 square foot X-Y Retriever storage vault. The 776/777 project stripped out,



decontaminated and encapsulated the Advanced Size Reduction Facility (ASRF), a two-story, stainless steel containment canyon and remote-controlled glovebox system. Airborne radioactive contamination levels exceeded 400,000 derived airborne concentration (DAC) prior to the start of D&D. One measurement taken at the cutting room table inside the ASRF reached levels too high to be measured by Rocky Flats' radiation measuring equipment. Workers made more than 900 entries in supplied breathing suits to remove more than 250,000 pounds of contaminated materials.

As of December 2003, workers in all four plutonium facilities have removed more than 1,107 of 1,324 gloveboxes and completed 224 of 273 D&D work areas.

Building 865 was demolished in 2003 and proved to be challenging due to the significant amounts of beryllium (Be) and uranium contamination. Early on, there was concern that the building would not meet the unrestricted release criteria because contamination had permeated cracks in the walls and floors. The project successfully employed a new approach to decontamination. After manually decontaminating the walls, a fixative was sprayed on to encapsulate any remaining uranium and Be. As demolition proceeded, stringent work controls ensured that uranium and Be contamination was not released. Air samples taken before, during and after demolition showed that Be and uranium exposure action levels were not exceeded.

The non-radioactively contaminated building demolition teams now demolish buildings as a matter of routine practice. The project improved upon unprecedented accomplishments in 2002, with the demolition of 126 structures versus 118 in 2002. Not only did the project demolish more buildings than in the previous year; it significantly improved its safety record at the same time. Of the many other structures demolished during the year, one of Rocky Flats' most visible structures fell in November, dramatically altering the historic Rocky Flats skyline. The 50-year old water tower was safely razed using small-scale explosives. The water tower was a landmark and its absence symbolizes the tremendous progress the site is making toward closure. Constructed in 1952, the 300,000-gallon elevated tank supported Rocky Flats industrial, domestic and fire protection needs. But for the employees and nearby communities, the 155-foot high tower has been the most prominent feature of the skyline and has served as a symbol for the site.

Fig. 4  
The Rocky Flats Water Tower  
was demolished in November



## **Environmental Restoration**

The Environmental Restoration (ER) project continued to make exceptional progress during 2003, with heavy equipment visible in every corner of the site's Industrial Area. A historic milestone was accomplished in 2003 with the successful cleanup of the 903 Pad - the site's largest and most complex contaminated soil removal project to date. The cleanup project involved removing 32,000 tons of plutonium-contaminated soil and asphalt from the pad area. Nearly 1,800 intermodals or roll-off containers were filled, loaded on trucks and shipped for disposal.

Other notable ER accomplishments were marked by the successful remediation of the Solar Evaporation Ponds and an old abandoned incinerator. The Solar Ponds were used from 1953 to 1986 to store and evaporate process wastewaters containing nitrates and low-level radioactive isotopes. The project involved removing pond sludges, support buildings, and surrounding soils with elevated contaminants.

Significant characterization progress was also made in determining the extent of contamination associated with the original process waste lines and under building contamination. To date, this effort is more than 50% complete and sampling results have indicated far less contamination than originally anticipated. Additional characterization requires existing buildings to be demolished.

## **Waste Shipping**

Project workers again set waste shipping records, improving productivity by 260 percent. The project shipped more than 4,000 cubic meters of transuranic (TRU) waste. The volume of TRU shipped in 2003 was more than 2001 and 2002 combined and exceeded the target by more than 1,000 cubic meters. These shipments included the 1,000th shipment of TRU waste to the Waste Isolation Pilot Plant (WIPP), which occurred in the summer of 2003.

55,000 cubic meters of low-level waste was shipped, 18,000 cubic meters more than planned. The project also shipped 23,500 cubic meters of low-level mixed waste, nearly three times the planned volume. Low-level and low-level mixed shipments exceeded the volume shipped during the previous three years combined. In all, more than 7,250 radioactive and sanitary waste shipments left Rocky Flats—an average of nearly 20 shipments every day of the year. In one-week period, 123 shipments of radioactive wastes were shipped off site.

## **Workforce Transition**

The closing of Rocky Flats will ultimately affect more than 3,000 skilled workers. Kaiser-Hill recognizes that an effective and comprehensive Workforce Transition Program is essential to meeting the goal of cleaning up and closing down the site by no later than December 15, 2006. To safely reach closure, Kaiser-Hill is committed to helping employees prepare for transition to their next jobs or meet their personal goals.

In April, Kaiser-Hill launched an aggressive Workforce Transition Program to assist employees whose jobs will end over the next three years. The Rocky Flats closure plan calls for the time phasing of job reductions as the project proceeds. As their tasks are completed, groups of workers will have a full menu of services under the Workforce Transition Program to help them move to new careers, start a new business, retire or make other choices. As part of this innovative Program, Kaiser-Hill has created a high-tech Career Transition Center managed by a professional outplacement firm that will provide a wide range of services including career counseling, an entrepreneurial resource program, a leading-edge internet-based career transition assistance tool, and many other innovative resources. The program also

has a job development team to work with other DOE sites and with local companies and organizations to develop partnerships and create job opportunities for the Rocky Flats workforce. The program has sponsored several job fairs, placed full-page advertisements highlighting the workforce's job skills and worked with the governor's office to promote the workers.

## **CLOSURE PROJECT CHALLENGES**

Achieving the completion criteria contained in the closure contract would be challenging under any time frame. Kaiser-Hill, its subcontractors, and all Rocky Flats workers are performing work the scope, complexity and within a timeframe that has never been attempted anywhere in the world. Key challenges of the Rocky Flats Closure Project that remain are:

- The need to continuously maintain the highest safety standards while performing work that involves increasing industrial hazards.
- The timely termination of site programs.
- The management of a highly skilled and dedicated workforce that is rapidly shrinking as closure work is decreasing. In the next 2-3 years, more than 3,000 salaried and union employees will leave the site.
- The disposition of orphan radioactive wastes, predominately radioactive wastes that mixed with hazardous chemicals.

## **Continuous Safety Improvement**

Cleaning up an old, former nuclear weapons production site presents unique challenges to a management team and the workforce that will perform the work. The workforce has successfully transitioned from building nuclear weapons components to decontaminating and demolishing the very facilities they worked in to support winning the Cold War.

The D&D of radioactively and chemically contaminated facilities, management of hundreds of thousands of radioactive waste packages and hundreds of thousands of pounds of industrial waste, and the clean-up of radioactive waste dump sites is inherently dangerous work. In addition to the risks from working with radiological and hazardous materials, many workers are also facing significant industrial safety hazards. Electrical, elevated heights, hoisting and rigging, heavy equipment and fire hazards are faced by many workers every day, at an unprecedented level.

Meeting the challenges of accelerated closure will only be accomplished by focusing on performing the work safely and committing to continuous improvement. Outstanding safety performance requires active, daily participation from everyone involved in the project, from senior managers to floor level workers. Every individual must make a personal commitment to Integrated Safety Management (ISM). ISM is a philosophy based on continuous safety improvement in all phases of work, striving to identify potential safety issues and correcting them before an event or injury occurs. This individual commitment to safety is supported by a number of processes and strategies that provide the tools needed to take safety from a philosophy to an accepted part of every day work.

These processes, strategies and tools of the Rocky Flats Safety Program feature:

- A clear definition of safety
- Line ownership of safety
- Frequent and effective communications with the workforce, DOE and stakeholders
- Work processes that identify hazards and establish controls to protect the workers
- Effective event analysis



- Leading indicator program and rapid communication of trends
- Safety stand-downs and pauses in response to significant events or trends
- Effective safety issue resolution process for line management to react to safety concerns
- Joint bargaining unit/K-H/DOE assessment of key safety areas
- Including bargaining unit representatives in fact-finding meetings and event investigations
- Effective forum for bargaining unit officers to discuss safety concerns with Senior Management
- Centers of Excellence to resolve concerns and share good practices and lessons learned
- Never being satisfied with our safety performance

The basic tenet of the Kaiser-Hill Safety Program is that continuous improvement is mandatory. As long as there is one recordable injury or one first aid case, we know we can do better. Every accident or injury is preventable and therefore we must continue to find new and innovative approaches to eliminate them. Despite record-setting safety performance in 2003 in the areas of recordable injuries, lost workdays rates and controlling radiation dose, a few safety issues/incidents occurred in 2003 that reinforced our need for continued focus on safety to ensure that we don't become complacent.

### **Effective Process for the Timely Termination of Site Programs**

When the final shipment of SNM left Rocky Flats, a series of actions were triggered which will impact many activities at the site. For 50 years, Rocky Flats had an "infrastructure" in place linked to the housing of SNM at the site. The need for this infrastructure was essentially eliminated with the removal of the SNM. For example, safeguard and security needs were reduced, other requirements changed or ended, and the need for the specialized systems and personnel who support these activities was eliminated. These activities did not simply end "on their own" once the final shipment of SNM was completed.

Many preparatory and close out activities accompany the reduction or elimination of this program "infrastructure." In 2003, Kaiser-Hill formed a "Program Termination Team" that has been working to develop and implement plans to timely terminate the many "programs" that are part of the every day activities at Rocky Flats. Examples of some of these programs include Information Technology, Record Management, Personnel Security, Communications, Environmental Permitting, and Planning & Integration. This team, in conjunction with the many program owners, have developed "going out of business" plans and are now managing the implementation of these plans. In many instances, the team is breaking new ground in closing-out programs for the first time in the DOE complex.

### **Management of a Large Workforce in Transition**

Management of a workforce that is literally working itself out of a job is an ongoing challenge. The goals of the Workforce Transition Program are to retain workers long enough to complete their job, but also to create opportunities for workers after project completion. Significant effort is being spent, and will continue to be spent, to help the workforce transition as the cleanup progresses to completion.

Kaiser-Hill's Workforce Transition Program continues to create new networks and partnerships with outside companies, chambers of commerce and business associations. As described earlier, abundant resources are being made available to assist workers in their career transitions.

**Orphan Wastes**

Currently, there are no DOE or commercial facilities for treatment of some Rocky Flats low-level wastes that are contaminated with hazardous chemicals. These particular "mixed wastes" must be treated to meet the requirements of the Resource Conservation and Recovery Act before they can be disposed. Some low-level mixed streams can be treated by DOE or commercial facilities, but others have no treatment option and, consequently, no disposal option. Further, there are no current DOE or commercial waste disposal facilities for some low-level mixed wastes of higher radioactive concentration.

Rocky Flats is working to identify innovative treatment technologies to treat these wastes. Progress was made during 2003 on developing some of these options by working with DOE and commercial vendors to perform treatability studies of the treatment processes, but much remains to be done. Further, Rocky Flats will continue to aggressively pursue temporary and permanent waste disposition options including the option of temporary storage at other DOE or commercial sites for wastes which have no current or near-term treatment or disposal option.

**THE OUTLOOK FOR SUCCESS IN 2006**

Based on its record-setting project performance in 2003 and despite the current challenges facing the project, Kaiser-Hill remains optimistic about the probability of achieving closure earlier than the closure contract target date of December 2006 and for a cost less than the contract target total project cost of \$3.963 billion.

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