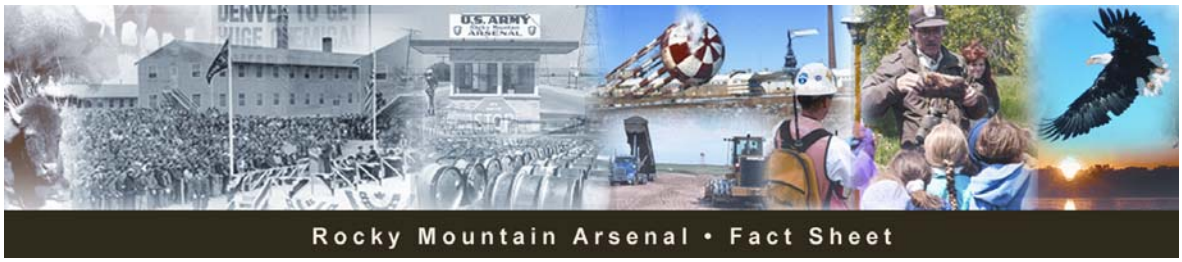


Explanation of Significant Differences Shell Disposal Trenches Remediation Project
Fact Sheet

Introduction

This fact sheet summarizes a significant change to the Shell Disposal Trenches remedy at the Rocky Mountain Arsenal (Arsenal) Federal Facility Site. Located in the central portion of the site, the trenches were used for disposal of liquid and solid wastes associated with Shell insecticide and pesticide manufacturing from 1952 to 1966. The wastes were buried in bulk form and in drums.

Explanation of Significant Differences (ESD)

During implementation of an adjacent project (the Section 36 Balance of Areas) and design of the Shell Disposal Trenches cover project, new information was discovered that resulted in changes to the Shell Trenches cover boundaries. Originally, a seven-acre RCRA-Equivalent cover (cover) consisting of soil, crushed concrete and vegetation was to be constructed over the site, however, the proposed cover would be extended an additional 10 acres resulting in a 17-acre RCRA-Equivalent Cover. In addition, a two-foot thick soil cover was added over 31 acres adjacent to the Shell Trenches.

The proposed changes to the Shell Disposal Trenches Remediation Project are detailed in the "Explanation of Significant Differences for Shell Disposal Trenches Remediation Project, Rocky Mountain Arsenal Federal Facility Site, published February 21, 2006. The Explanation of Significant Differences (ESD) and related Arsenal design documents are available for public review and comment (see bottom of fact sheet for locations). groundwater levels fall, and provide additional NBCS operational flexibility.

What are the significant changes to the remediation project?

Basis for the RCRA-Equivalent Cover Extension

Groundwater Barrier Wall and Section 36 Balance of Areas Cleanup Project

As part of the Arsenal's interim response actions designed to address immediate contamination issues, a groundwater barrier wall (slurry wall) was constructed in 1991 around the perimeter of the trenches to reduce the migration of contaminants to groundwater. Following the barrier installation, an interim soil and vegetation cover was placed over the site. However, the cover did not prevent animals from burrowing into the trenches and the groundwater barrier wall was potentially allowing continued migration of contaminants to the groundwater.

When the Record of Decision was signed in 1996, which outlined the final cleanup approach for the site, it was determined that the existing Shell Trenches cover be modified to a RCRA-Equivalent cover and that a new groundwater barrier wall be constructed around the trenches. The new cover would include a thick layer of crushed concrete preventing burrowing wildlife from coming into contact with the trenches and a soil layer that would absorb and hold moisture until it evaporates or is used by vegetation. The soil would be seeded with native grasses and plants to fit the landscape. The new groundwater barrier wall would encompass the 1991 barrier.

After the new barrier wall was constructed in 1999, it was determined that the Shell Trenches cover would need to be extended in order to encompass the new wall. Furthermore, the cover also needed to address an area of contamination, located adjacent to the Shell Trenches, from the Section 36 Balance of Areas (BOA) cleanup project that could not be excavated because of its close proximity to the groundwater barrier wall. In order to protect the barrier, excavation was prohibited within five feet of the barrier wall centerline. To provide containment, the Shell Trenches cover was extended beyond the new barrier wall to include the area of contamination. In total, this resulted in a five-acre extension around the original perimeter of the Shell Trenches.

Additionally, following the Section 36 BOA excavation of contaminated soil, confirmatory sample results were taken and one sample came back with a high level of contamination. The sample was located approximately 10 feet from the Shell Trenches boundary. Because the sample location was in close proximity to the groundwater barrier wall, the cover was again extended 15 feet east of the Shell Trenches to cover the manufacturing waste. This extension resulted in minimal increase to the overall cover area.

Drum Storage Area

As part of the Section 36 BOA Explanation of Significant Differences approved in April 2003, a two-foot soil cover that the ROD had required for the majority of the project was eliminated. This included a former drum storage area located immediately south of the Shell Trenches. During the Section 36 BOA excavation, soil stains were identified in the former drum storage area, which appeared to extend beyond its original boundary. Confirmatory samples collected in this area showed elevated levels of contaminants. The identified contaminated soil was removed but the stains and odors persisted. Sample results of the remaining stained soils were clean; however, many of the compounds disposed at the Shell Trenches are not included on the ROD contaminant of concern list. Pesticide odors were also detected and attributed to this area. While the source of the odors could not be determined, the pesticide nature of the odor suggested a possible relationship to the Shell Trenches disposal activities.

Additional review of aerial photographs showed land disturbance south of the Shell Trenches, reaching its maximum area in 1973. The staining and odors observed in the field correlated closely with the aerial photograph.

Although the identified contaminated soil had been removed, the variability of sample results and the persistence of stains and odors led to the decision to extend the Shell Trenches cover over the former drum storage area to correlate with the 1973 aerial photograph land disturbance. This extension resulted in an additional five-acre increase to the Shell Trenches cover bringing the total RCRA-equivalent cover area to 17 acres.

Basis for the Two-Foot Thick Soil Cover Addition

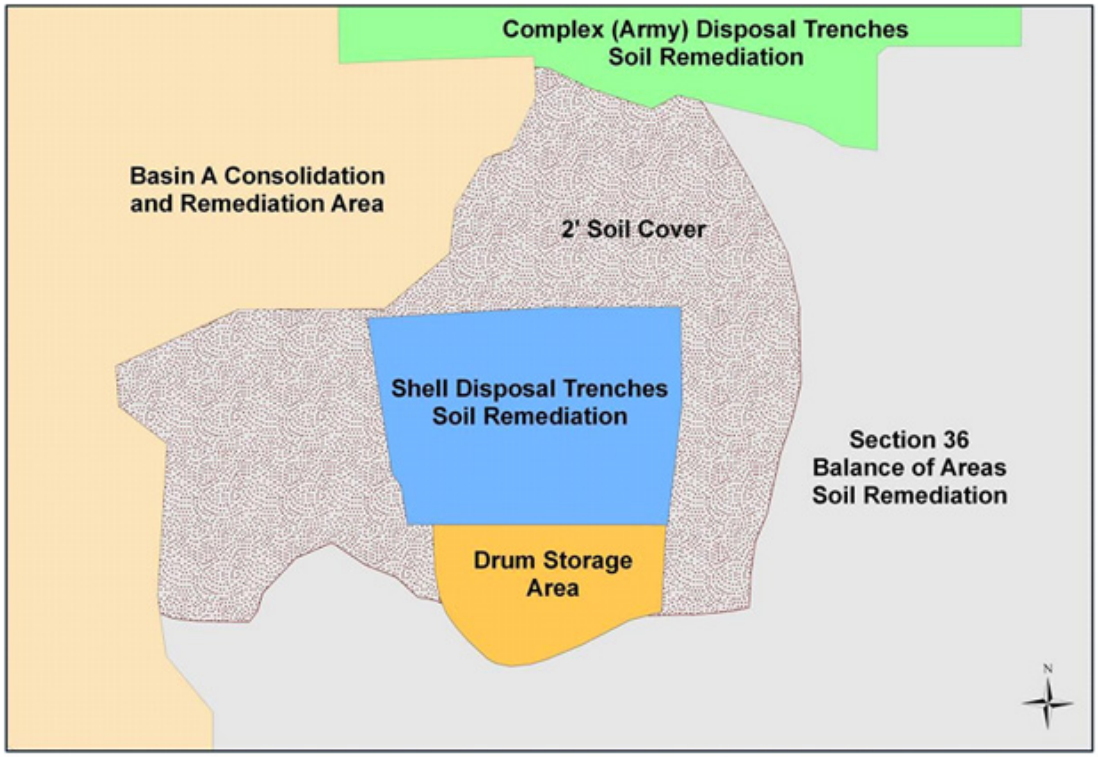
During implementation of the Section 36 BOA contaminated soil excavation project in 2004 and 2005, observed field conditions differed significantly from those expected based on the initial design sampling results. It was expected that contamination was only on the surface or was very shallow. Removal of this shallow contamination was the basis for the Section 36 BOA ESD, which included the elimination of the two-foot thick soil cover.

Following excavation of the expected shallow soil contamination, additional soil sampling was conducted in accordance with the Section 36 BOA ESD to ensure all contamination was removed. The sampling results showed that the area surrounding the Shell Trenches still had remaining pesticide contamination. The additional contaminated soil was removed and a second round of sampling was performed. As a result, two more areas of contaminated soil were identified and removed.

In addition, areas of stained soils were observed surrounding the Shell Trenches. Although the most significant staining was observed south of the Shell Trenches in the former drum storage area, stained soils were observed to the north, west and east of the Trenches as well indicating that the design soil sampling may not have located all of the contamination.

Although the identified contaminated soil was excavated, the presence of stains and additional identified contamination suggests that all contaminated soil cannot be reliably located and removed as required by the Section 36 BOA ESD. Therefore, a portion of the Section 36 BOA project area (31 acres), where stains were observed, will have a two-foot cover constructed to provide additional protection and minimize the potential migration of contaminants to the groundwater.

These changes, while necessitating an ESD, do not alter the overall hazardous waste management approach that was selected in the ROD.



Cost

The Shell Trenches RCRA-Equivalent cover was originally anticipated to cost approximately $561,000. With the 10-acre expansion and cost associated with additional soil and construction, the cost increased to approximately $1.9 million. Additional design refinements for the biota (wildlife) barrier and monitoring systems will cost another $3.5 million.

Adding the two-foot thick soil cover over 31 acres surrounding the Shell Trenches is estimated to cost $1.2 million. Although the ROD included $2.9 million for the original two-foot thick cover construction, the Section 36 BOA ESD eliminated this cover as well as the cost associated with it in the Shell Trenches ROD estimate. Therefore, the $1.2 million is a direct cost increase for the Shell Trenches project.

Miscellaneous other project costs, including oversight, revegetation, and engineering controls add approximately $1.7 M to the cost of the RCRA-Equivalent and 2-foot covers. Overall, the total cost of covers for the Shell Disposal Trenches Remediation Project has increased from $1.2 M to $8.3 M.

Please see the Explanation of Significant Differences for Shell Disposal Trenches Remediation Project dated February 21, 2006, Section 3.3 Basis for Cost Change, for more details about project cost.

Site History

RMA is located in Adams County, Colorado, approximately 10 miles northeast of downtown Denver. The Arsenal On-Post OU encompasses 11,000 acres and is currently on the U.S. Environmental Protection Agency (EPA) National Priorities List for environmental cleanup as a result of contamination released during previous RMA operations. The On-Post ROD, which describes the site-wide remedy for the Arsenal, was signed by the U.S. Army, EPA and the State of Colorado with concurrence from Shell Oil Company (Shell) and the U.S. Fish and Wildlife Service on June 11, 1996. The selected remedy includes 31 different cleanup plans for soils, structures and the treatment of groundwater contaminants.

The Arsenal was established in 1942 by the U.S. Army to manufacture chemical warfare agents and incendiary munitions for use as a deterrent in World War II. Following the war and through the early 1980s, the facilities continued to be used by the U.S. Army. Beginning in 1946, some facilities were leased to private companies to manufacture industrial and agricultural chemicals. Shell, the principal lessee, manufactured pesticides from 1952 to 1982. Common industrial and waste disposal practices used during these years resulted in contamination of structures, soil, surface water, and groundwater.

Currently, the Arsenal is undergoing an extensive environmental cleanup of the site's soil, structures and groundwater. Once cleanup is complete, the Arsenal's vast open spaces will constitute one of the nation's largest, urban wildlife refuges. In April 2004, 5,000 acres of Arsenal land were transferred from the U.S. Army to the U.S. Fish and Wildlife Service marking the official establishment of the Rocky Mountain Arsenal National Wildlife Refuge. In all, 15,000 acres will be transferred by the time cleanup is complete in 2011. The site now provides sanctuary for nearly 330 species of animals, including deer, coyotes, bald eagles and white pelicans.

Operable Units

The On-Post Operable Unit is one of two operable units at RMA. The On-Post Operable Unit addresses contamination

within the boundaries of the Arsenal. The Off-Post Operable Unit addresses contamination north and northwest of the Arsenal.

The overall remedy required by the 1996 Record of Decision (ROD) for the On-Post Operable Unit (OU) includes:

- Interception and treatment of contaminated groundwater at the three existing on-site treatment plants.

- Construction of a new Resource Conservation and Recovery Act (RCRA)- and Toxic Substances Control Act-compliant HWL on-post.

- Demolition of structures with no designated future use and disposal of the debris in either the HWL or Basin A, depending upon the degree of contamination.

- The contaminated soil at the Arsenal is addressed primarily through containment in the on-post HWL, under caps/covers, or through treatment, depending upon the type and degree of contamination. Areas that have caps or covers require long-term maintenance and will be retained by the Army. These areas will not be a part of the Rocky Mountain Arsenal National Wildlife Refuge.

- The Basin A disposal area is used for consolidating structural debris from other Arsenal contaminated areas and soil that poses a risk to wildlife, known as biota soil. Once all of the waste is received, a wildlife barrier and soil cover will be placed over Basin A.

Site Contamination

The contaminated areas within the On-Post Operable Unit include approximately 3,000 acres of soil, 15 groundwater plumes and 798 structures. The most highly contaminated sites were identified in South Plants (i.e., Central Processing Area, Hex Pit, Buried M-1 Pits, Chemical Sewers), Basins A and F, the Lime Basins, and the U.S. Army and Shell Trenches. The primary contaminants found in the soil and/or groundwater at these areas is pesticides, solvents, heavy metals and chemical agent by-products.

The most contaminated areas (those showing the highest concentrations and/or the greatest variety of contaminants) are located in the central manufacturing, transport and waste disposal areas. The highest contaminant concentrations tend to occur in soil within about five feet of the ground surface, though the higher contamination is also found at greater depths particularly where burial trenches, disposal basins or manufacturing complexes are located.

Groundwater contaminant plumes predominantly consist of organic compounds, arsenic, fluoride and chloride. The overall concentrations and configurations of the plumes suggest that the greatest contaminant releases to the unconfined flow system have occurred from Basin A, the Lime Settling Basins, the South Plants Chemical Sewers, the South Plants Tank Farm and Production Area, the U.S. Army and Shell Trenches in Section 36, and the former Basin F. Plumes flowing from the Motor Pool, Rail Yard and North Plants areas are other sources of contaminant releases to the unconfined flow system.

Public Participation
A public notice was published beginning on Feb. 21, 2006 in the *Denver Post, Rocky Mountain News, Brighton Blade, Commerce City Beacon, Commerce City Gateway* and the *Greater Far NE Reporter* newspapers announcing the document's public comment period, how to provide comments and where the document is available for review. A presentation explaining the ESD was provided to the Arsenal's Restoration Advisory Board (RAB) on January 12, 2006. The RAB is a community group that meets regularly to receive information and provide input on the cleanup. The public comment period will close on March 21, 2006. Upon completion of the comment period, the Army, in consultation with the EPA and the State of Colorado, will evaluate each comment and any significant new data received before issuing a final report documenting the Shell Trenches Cover changes.

This ESD and all documents that support the changes and clarifications are part of the Administrative Record and are available at the Joint Administrative Records and Document Facility (JARDF) and the EPA Region 8 Superfund Records Center. The JARDF can be reached at 303-289-0362. Hours of operation are Monday through Friday 12 p.m. to 4 p.m. or by appointment. EPA's Superfund Record Center can be reached at 303-312-6473. Hours of operation are Monday through Friday from 8 a.m. to 4:00 p.m.

Affirmation of Statutory Determinations
Considering the new information presented in this ESD, the U.S. Army, in consultation with EPA and CDPHE, believes that the Shell Trenches Cover and the Section 36 BOA two-foot thick cover, with the modifications described, satisfies the requirements of CERCLA Section 121, is protective of public health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, uses a permanent solution through proper containment of the wastes beneath the RCRA-equivalent cover and 2-ft-thick soil cover, and is cost effective.

For more information, please contact:

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- **Colorado Department of Public Health & Environment**
  Susan Newton
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  (303) 692-3321

Document Locations

- **Joint Administrative Record and Document Facility (JARDF)**
  Rocky Mountain Arsenal, Building 129
  Commerce City, Colorado 80022
  Monday – Friday 12 – 4 p.m. or by appointment
  (303) 289-0362

- **EPA Superfund Records Center**
  999 18th Street
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