



## **Explanation of Significant Differences for the Basin F/Basin F Exterior Remediation Project – Part 2 (Basin F Cover) and Chemical Sewer Remediation**

### *Fact Sheet*

#### **Introduction**

This fact sheet documents a significant change in a portion of the remedy for the Basin F/Basin F Exterior Remediation Project - Part 2 (known as the Basin F Cover Project) and the chemical sewer remedy of the Rocky Mountain Arsenal (RMA) Federal Facility Site. Basin F was constructed in 1956 in the northern portion of the site and was used until 1981. The basin was a 93-acre solar evaporation impoundment that contained approximately 243 million gallons of liquid waste from Army and Shell manufacturing operations. The waste was transported from the manufacturing facilities to Basin F through a chemical sewer line that operated from 1957 to 1981.

After manufacturing operations ceased, the Basin F impoundment was remediated under separate cleanup projects. Following remediation, the Basin F Cover Project began, which involves construction of a Resource Conservation and Recovery Act (RCRA)-Equivalent Cover using clean soil, and contouring the area outside of the cover.

#### **Explanation of Significant Differences (ESD)**

This ESD documents a significant change in a portion of the remedy for the Basin F Cover Project and the chemical sewer remedy. Specifically, it documents changes

resulting from conditions encountered during implementation of the Basin F Cover Project.

While excavating soil to contour the area outside of the Basin F cover, a vitrified clay pipe was encountered. An extensive review of RMA records revealed that this pipe was part of the original chemical sewer line constructed in 1957 to transport liquid waste to Basin F. Records show that this pipeline segment, adjacent to Basin F, was leaking, possibly deteriorating and the sewer was identified as a potential source of groundwater contamination. Therefore, a portion of the original sewer line was abandoned in-place without any grouting or improvements and replaced in 1975 with a new sewer pipe approximately 50 feet south of the original sewer alignment. The remaining abandoned sewer segment is approximately 630 feet long.

Documentation shows most of the original chemical sewer line was removed in 1982. Records from that excavation activity show that the newer replacement segment was removed along with the rest of the chemical sewer. However, the original abandoned segment was not removed.

Because the original segment was not identified during the site's Remedial Investigation (RI), no samples were

collected along the abandoned segment. Also, the RI samples collected along the removed chemical sewer alignment were collected after the sewer and soil excavation was completed and do not represent potential contamination levels associated with the abandoned segment. However, based on the use history as a conveyance line for liquid waste disposal into Basin F, soil contamination is assumed to be consistent with contamination at the basin. In addition, the RMA Record of Decision (ROD), which outlines the overall cleanup plan for the site, identified remaining chemical sewers as potential chemical agent sites. This sewer site was not included as a potential chemical agent site in the ROD since the sewer was thought to have been previously removed. However, this remaining segment is considered a potential chemical agent site consistent with the ROD.

Following discovery and identification of the sewer line, the ROD requirements and project conditions were reviewed to determine the appropriate cleanup action for the sewer. There are two ROD-identified remedial actions for chemical sewers, which were applied based on location relative to required soil covers. For sewers located within cover areas, the ROD-identified remedy is to plug the sewer line with grout and contain the line beneath the soil cover. For sewers located outside soil cover areas, the ROD-identified remedy is excavation and disposal into the RMA's on-site landfill. Although this sewer segment is outside the design boundary of the Basin F cover, proximity adjacent to the cover and expected soil contamination similar to Basin F resulted in evaluating both the containment and excavation remedial actions.

Several factors were considered in evaluating which ROD-identified remedial action to apply to this sewer segment. For the excavation option, disposal would be

required off site because the RMA on-site landfills are full and closed. Off-site disposal would also likely require incineration because the expected contamination levels would not meet Land Disposal Restrictions for off-site disposal facilities. Air and odor monitoring would be required to ensure emission and odor control during excavation. Also, chemical agent monitoring would be required since the sewer is a potential chemical agent site. Because the RMA on-site agent laboratory has already been decommissioned, an appropriate alternative to the on-site laboratory support would need to be identified.

The containment option would require modifying the Basin F RCRA-equivalent cover because the sewer is adjacent to the cover. Consistent with other RMA RCRA-equivalent cover designs, the cover extension would encompass the sewer line and contaminated soil, in this case the 20-foot wide corridor along the abandoned sewer alignment. In addition, crushed concrete that serves as a barrier to wildlife would extend another 50 feet beyond the design limits of the cover extension. The cover extension would add less than one-half acre to the overall Basin F cover area. The increase in cover area, including the 50-foot wildlife barrier run out, would be less than two acres, representing an approximate two percent increase in project area. The cover extension area would also require long-term operations and maintenance consistent with RMA soil covers as described in the Long-Term Care Plan.

## **Cost**

Implementation cost was also considered during remedy evaluation. The cost to implement the excavation remedy with off-site disposal is estimated at \$1.17 million based on estimated contaminated soil volume. This option has considerable cost uncertainty due to unknown subsurface conditions and the potential for the volume to increase beyond the excavation assumptions. The cost to implement the containment remedy is estimated at \$485,000. There is little cost uncertainty with this option because the cover extension area is known. In addition, construction of the cover extension would be added to the existing Basin F cover construction effort, allowing use of the existing construction equipment and personnel.

## **Selected Remedy**

Considering these factors, the selected remedy is to grout the sewer line with a cement mixture and expand the Basin F RCRA-equivalent cover over the sewer line and potentially contaminated soil associated with the line. The containment remedy protects human health and the environment by isolating the sewer and contaminated soil and minimizing percolation of precipitation through the soil, thereby reducing the potential for groundwater contamination.

To take advantage of schedule efficiency, the pipe grouting effort was completed prior to design and approval of the cover extension. This activity did not preclude excavation of the sewer or associated contaminated soil. In preparation for sewer grouting activities, the sewer pipe was breached and agent screening was performed to determine the potential for chemical agent. Results of the screening were negative, indicating that sewer grouting could be performed with no potential for encountering chemical agent. The pipe grouting was completed on August 29, 2008.

In addition, a Design Change Notice (DCN) was completed detailing the changes necessary for the Basin F cover to encompass the chemical sewer area. This DCN was approved as a modification to the Basin F Closure Plan following completion of a public comment period. Construction of gradefill and placement of the wildlife barrier for the cover extension began in November 2008 following approval of the DCN. Although construction was initiated prior to finalization of the ESD, these activities do not preclude excavation of the sewer or associated contaminated soil.

These proposed changes to the project are detailed in the "Explanation of Significant Differences for the Basin F/Basin F Exterior Remediation Project - Part 2 (Basin F Cover) and Chemical Sewer Remediation, November 25, 2008." The ESD and related RMA design documents are available for public review and comment (see bottom of fact sheet for locations).

## **What are the significant changes to the remediation project?**

The change to the Basin F Cover remedy is the addition of the chemical sewer remediation. Evaluation of the sewer, project conditions and ROD requirements resulted in selection of a containment remedy for the sewer segment, which is consistent with the containment remedy identified in the ROD for other chemical sewers. As a result, the sewer line was plugged and the Basin F RCRA-equivalent cover will be extended over the contaminated soil area associated with the abandoned sewer.

The soil cover extension will be constructed consistent with all requirements contained in the Basin F Cover Project design package. The cover consists of clean soil placed over the area to reshape the land followed by 16 inches of crushed concrete that serves as a barrier to burrowing animals. Then a layer of gravel will be placed to serve as a capillary barrier, followed by the addition of

four feet of clean soil. The top of the cover will be reseeded with native plants and grasses. This protective cover system, which has been approved by the regulatory agencies, is being used at five other project locations within the central portion of the site where RMA waste remains in place. These areas will be permanently managed by the U.S. Army and will not become part of the Rocky Mountain Arsenal National Wildlife Refuge. The cover extension adds less than two acres to the project area representing an approximate two percent increase. The cover maintenance road encompassing the Basin F cover will be extended to include the cover extension area. In addition, the road, which defines the limits of the Army Maintained Area, will be

expanded along the east side of the cover to incorporate the drainage channel to the east of Basin F.

The cost for the Basin F cover construction, as presented in the 100 percent design package, is approximately \$19.8 million. The chemical sewer remedy, including sewer line grouting and extension of the soil cover, adds approximately \$485,000, or a two percent increase compared to the ROD baseline estimate, to the project cost. Additional costs for long-term operations and maintenance are minimal because the cover extension only represents an approximate two percent increase in project area.

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

Table 1: Changes to the Basin F Cover Project and Chemical Sewer Remediation

<b>ROD-Prescribed Remedy</b>	<b>Modification</b>
<p>No chemical sewer remedy for the Basin F project (chemical sewer in Section 26 identified in the ROD as previously removed).</p> <p>For chemical sewers outside of cover areas, excavate sewer and contaminated soil and dispose in on-post landfill.</p>	<p><b>Addition.</b> Chemical sewer remedy required for remaining abandoned sewer segment.</p> <p><b>Change</b> from excavation/landfill to containment in place. Plug sewer void to prevent access and eliminate as a potential groundwater migration pathway. Contain beneath Basin F RCRA-equivalent soil cover.</p>
Construct RCRA-Equivalent soil cover over Basin F.	<b>Increase.</b> Extend Basin F RCRA-equivalent soil cover over contaminated soil area associated with abandoned chemical sewer.
Revegetation standards consistent with ROD requirements for cover systems.	<b>No Change.</b> Vegetation standards required for RCRA-Equivalent covers are included in the Basin F Cover design and will be applied to the cover extension as well.
Institutional controls consistent with ROD requirements for cover systems (e.g., delineation and access control) as modified by the ROD Amendment for the Section 36 Lime Basins Remediation and Basin F Principal Threat Soil Remediation.	<b>No Change.</b> Institutional controls are included in the Basin F Cover design and will be applied to the cover extension as well.
Long-term operations and maintenance.	<b>No Change.</b> Operations and maintenance requirements will be applied to the cover extension as well.
Long-term groundwater monitoring.	<b>No Change.</b>

## **Site History**

RMA is located in Adams County, Colorado, approximately 10 miles northeast of downtown Denver. The RMA On-Post OU currently encompasses 4,000 acres and is on the EPA's National Priorities List (NPL) 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 RMA, 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 RMA 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.

To date, about 80 percent of Arsenal land has been removed from the EPA's NPL and all contaminated soil excavation projects outlined in the Arsenal's Record of Decision have been successfully completed. Groundwater treatment will continue after the land area cleanup is complete. Most remaining cleanup work involves clean construction, which means moving clean soils and materials to build covers over the landfills and consolidation areas.

Once cleanup is complete, the Arsenal's vast open spaces will constitute one of the nation's largest urban wildlife refuges. By fall 2006, more than 12,000 acres of Arsenal land had been transferred from the U.S. Army to the U.S. Fish and Wildlife Service, officially establishing and later expanding the Rocky Mountain Arsenal National Wildlife Refuge. After the Arsenal's remaining cleanup projects are completed and final areas removed from the EPA's NPL, the Army will transfer about 2,500 acres to the Service to increase the size of the Refuge to more than 15,000 acres. By the end of 2010, the cleanup program will be finished and the Army will retain approximately 1,100 acres to maintain its landfills, soil cover areas and groundwater treatment plants.

The Refuge now provides environmental education and interpretive programs, catch-and-release recreational fishing, close to nine miles of trails, wildlife viewing opportunities and site tours for the public, and is a sanctuary for more than 330 species of animals, including wild bison, deer, coyotes, bald eagles and burrowing owls.

## **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, on-post Resource Conservation and Recovery Act (RCRA)- and Toxic

Substances Control Act-compliant landfills on-post.

- Demolition of structures with no designated future use and disposal of the debris in either the Arsenal's two landfills or the Basin A consolidation area, depending upon the degree of contamination.
- The contaminated soil at the Arsenal is addressed primarily through containment in the on-post landfills, 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 included 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 are 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.

The characteristics and locations of the groundwater plumes suggest that the greatest contaminant releases to the groundwater have occurred from Basin A and the Lime Basins, the South Plants chemical sewer, the South Plants tank farm and production area, the Complex (Army) and Shell Trenches in Section 36, and the former Basin F. The Motor Pool/Rail Yard and North Plants areas have been other sources of contaminant releases to the groundwater.

### **Public Participation**

A public notice was published beginning December 1, 2008, in the *Denver Post*, *Rocky Mountain News*, *Brighton Blade*, *Commerce City Beacon* and *Gateway News* newspapers announcing the public comment period for the Explanation of Significant Differences for the Basin F/Basin F Exterior Remediation Project – Part 2 (Basin F Cover) and Chemical Sewer Remediation. The public notice also explained how to provide comments and where the document is available for review. Presentations explaining the proposed changes were provided to community groups including the Arsenal's Restoration Advisory Board (RAB) on September 11, 2008. 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 December 31, 2008. 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 project changes.

In addition, a DCN describing the changes to the Basin F Cover Project Design was

prepared to provide the details for the cover extension. The DCN was submitted by the RVO as part of a notification requesting modification of the CDPHE approved *Final Closure Plan for the Closure/Post-Closure of the Basin F Surface Impoundment and Closure of the Basin F Wastepile – Rocky Mountain Arsenal* (Basin F Closure Plan) as amended. The CDPHE issued a public notice for modification of the Basin F Closure Plan with a public comment period starting on September 30, 2008 and closing on October 30, 2008. No comments were received and the modification to the Basin F Closure Plan was approved on October 31, 2008. Subsequently, the DCN was approved on November 10, 2008.

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 303-289-0983. 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 Army, in consultation with EPA and CDPHE, believes that Basin F/Basin F Exterior Remediation Project – Part 2 (Basin F Cover) and the chemical sewer remedy, with the modifications described, satisfy the requirements of CERCLA Section 121 and are protective of human health and the environment, comply with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, use a permanent solution through proper disposal and containment of the wastes in the on-post landfills or Basin A, and are cost effective.

#### **For more information, please contact:**

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### **Document Locations**

- Joint Administrative Record and Document Facility (JARDF)  
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