



## **Explanation of Significant Differences for North Plants Soil Remediation Project**

### *Fact Sheet*

#### **Introduction**

This fact sheet documents a significant change in a portion of the remedy for the North Plants Soil Remediation (North Plants Soil) Project of the Rocky Mountain Arsenal (RMA) Federal Facility Site. North Plants was constructed by the Army from 1950 to 1953 and served as a chemical nerve agent manufacturing facility to produce sarin (GB). The complex covered approximately 90 acres located within the northern portion of the site.

Production of GB began in April 1953 and continued intermittently until 1957. The Army redistilled low purity GB intermittently from 1964 to 1970. The facilities also were used by the Army to containerize, transfer, store, demilitarize/neutralize and dispose of chemicals and munitions. As part of the RMA's Record of Decision (ROD), which outlines the framework, purpose and design of the environmental cleanup program, the North Plants' 59 structures were demolished by 2001 and placed into the RMA's on-site landfill and Basin A Consolidation Area (Basin A). More than 4,300 tons of steel were recycled during this effort.

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

This ESD summarizes modifications to the remedy for the North Plants Soil Project that resulted from new information developed by the Army since the ROD was signed. During the design phase of the project, the North Plants Soil excavation project was

incorporated into the North Plants Structures Project because of the difficulty in separating structure foundation removal and soil excavation. Additionally, the ROD did not require excavating soil that may pose a risk to wildlife in the project area; however, it was removed under this project. By excavating this soil, it prevented cross contamination between soil and structure debris during the building demolition, took advantage of implementation efficiency and supported eliminating the ROD-identified soil cover over the North Plants Soil Project area.

These proposed changes to the project are detailed in the "Explanation of Significant Differences for the North Plants Soil Remediation Project, October 28, 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?**

With the soil excavation included in the North Plants Structures Project and the additional removal of soil that may have posed a risk to wildlife, the possibility of modifying the remedy to eliminate the soil cover was considered. The modification would result in reducing the long-term operation and maintenance costs and, following removal from the U.S. Environmental Protection Agency (EPA) National Priorities List (NPL) (Superfund List), would make this 32 acre

area available for transfer to the U.S. Fish and Wildlife Service (USFWS) for inclusion into the Rocky Mountain Arsenal National Wildlife Refuge.

In order to support this remedy modification, the North Plants Structures design included excavating all contaminated soil, chemical sewers and soil that may pose a risk to wildlife. In addition, verification sampling shows there is no evidence of contaminated soil remaining in place that represents a contaminant source to groundwater.

In addition to soil excavation and sampling, cleanup activities completed during the North Plants Structures Project, including remediation of sanitary sewers, removal of underground utilities, structure foundation

removal, chemical agent screening, and munitions/munitions debris clearance activities were considered as factors for eliminating the soil cover.

Eliminating the cover removes the remaining cleanup requirement for North Plants. Although an initial design document was issued for the North Plants Soil Project, all requirements identified within the design have been completed or transferred to other projects or, in the case of the soil cover, eliminated. No field work, other than the design sampling, was conducted in support of the North Plants Soil Design. As a result, no work is required under the North Plants Soil Project and no Construction Completion Report is required.

*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 North Plants Soil Remediation**

ROD-Prescribed Remedy	Modification
No sampling required.	<b>Enhancement.</b> Verification and confirmatory sampling were conducted during the North Plants Structures Project to verify no HHE soil remaining following demolition and excavation activities and to evaluate the subsurface soil for potential impacts to groundwater. Soil sampling was conducted over the entire North Plants area to verify that no unacceptable residual ecological risk soil remained. Soil sampling to characterize the extent of contamination associated with the fuel oil spill was conducted in support of the North Plants Soil Design.
Excavate North Plants surface HHE soil, chemical sewers and associated HHE soil and dispose in the on-post HWL.	<b>Change.</b> Excavation completed under the North Plants Structures Project. Excavation of all ROD-defined HHE soil, chemical sewers and HHE soil associated with the sewers. All HHE soil was disposed in the on-post HWL.
Excavate biota risk soil outside the 2-foot soil cover area and dispose in Basin A. Leave biota risk soil in place beneath the 2-foot soil cover area.	<b>Change/Enhancement.</b> Excavation completed under the North Plants Structures Project. All biota risk soil in the North Plants area, including biota risk soil in the 2-foot cover area, was excavated and disposed in Basin A. Excavation volume was less than the biota risk soil volume identified in the ROD due to elimination of structure and concrete/asphalt areas <sup>1</sup> .
Continued biomonitoring for areas that may pose potential risk to biota in order to refine design boundaries for surficial soil.	<b>Enhancement.</b> Residual ecological risk assessment resulted in designation of TRER area 25CC-3 for remediation. Remediation of this area included soil excavation, soil tilling, and sampling to demonstrate no remaining unacceptable risk.
Monitor for chemical agent during excavation; treat agent-contaminated soil by caustic solution washing.	<b>Change.</b> Chemical agent monitoring conducted during soil and chemical sewer excavation activities was performed under the North Plants Structures Project. No chemical agent detections.

No MEC clearance activities required.	<b>Enhancement.</b> MEC sweep performed prior to demolition and excavation activities. Oversight provided during demolition and excavation to respond to and clear anomalies. No MEC recovered.
Backfill HHE soil excavations with clean soil. (Priority 1 soil allowed per ROD-defined BAS recommendation)	<b>Change.</b> Backfill completed under the North Plants Structures Project. All HHE excavation areas were backfilled. Additional site grading will be completed in association with removal of the North Plants haul road.
Construct two-foot-thick soil cover over soil posing a potential risk to biota and the footprint of the North Plants processing area.	<b>Elimination.</b> A two-foot-thick soil cover will not be constructed.
Revegetation standards consistent with ROD requirements for cover systems.	<b>Change<sup>2</sup>.</b> Vegetation will be consistent with general site remedy requirements. Revegetation of the North Plants area is documented in the RER CCR, Part 1.
Institutional controls consistent with ROD requirements for cover systems (e.g., delineation and access control).	<b>Change<sup>2</sup>.</b> Institutional controls for a noncover area will be implemented (e.g., controlled access via roads and trails).
Long-term groundwater monitoring.	<b>Elimination.</b> Groundwater monitoring to assess the effectiveness of the soil cover is no longer needed.

<sup>1</sup>Previously documented in North Plants Structures Demolition Project ESD (TtFW 2004d).

<sup>2</sup>ROD requirements for soil cover revegetation and institutional control standards are no longer applicable since a cover will not be constructed. Revegetation and institutional controls will be consistent with general site remedy requirements.

## Cost

The estimated cost for the North Plants Soil Project was \$2.74 million based on cost estimates presented in the ROD. Although the project cost decreased approximately \$726,000 by eliminating the soil cover, implementing project activities to support cover removal included excavating soil that may pose a risk to wildlife, sanitary sewers, petroleum-contaminated soil, and additional soil sampling, which resulted in cost increases of approximately \$975,000. Additional cost savings (approximately \$625,000) were generated from combining the North Plants structures demolition and soil remediation into one design and cleanup project. The final cost for implementing the North Plants Soil remedy components is estimated at \$2.62 million. This cost represents North Plants soil remediation activities that were conducted and documented under the North Plants Structure Project and sampling conducted in support of the North Plants Soil Design.

In addition, the ROD included an estimated \$1.24 million cost for short-term and long-term maintenance costs for the soil cover. Eliminating the soil cover also results in eliminating these maintenance costs.

A review of the range of alternatives evaluated in the ROD for the North Plants Soil Project indicates that the other four site-wide alternatives (not selected) would likely have experienced similar cost change.

## Site History

RMA is located in Adams County, Colorado, approximately 10 miles northeast of downtown Denver. The Arsenal On-Post OU encompasses 4,000 acres and is currently on the EPA's 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 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, more than 80 percent of Arsenal land has been removed from the EPA's NPL and all contaminated cleanup projects outlined in the Arsenal's Record of Decision have been successfully completed. Groundwater cleanup is expected to continue after the land area cleanup is complete. Most of the 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 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 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.

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.

Beginning in the early 1980s, five groundwater treatment plants were installed to treat Arsenal groundwater contamination. Four of the plants are located inside the Arsenal's boundary and

prevent the groundwater from leaving the site before it's treated. The fifth treatment system is located approximately one half mile north of the site and treats groundwater that once migrated off-site. The treatment systems operate 24 hours a day, seven days a week and treat more than 750 million gallons of water a year. These treatment efforts have greatly reduced the groundwater contamination, and regulator monitoring shows a dramatic decline in chemical concentrations on and off of the site over the past two decades.

### **Public Participation**

A public notice was published beginning October 30, 2008, in the *Denver Post*, *Rocky Mountain News*, *Brighton Blade*, *Commerce City Beacon* and *Gateway News* newspapers announcing the document's public comment period, how to provide comments and where the document is available for review. The ESD will be provided to the Arsenal's Restoration Advisory Board (RAB). 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 1, 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.

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 reallocation of the North Plants Soil Project within the overall RMA remedy, with the modifications described, satisfies the requirements of CERCLA Section 121 and is protective of human 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 disposal and containment of the wastes in the on-post landfills or Basin A, and is cost effective.

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**Document Locations**

- Joint Administrative Record and Document Facility (JARDF)  
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