

# FINAL Proposed Plan South Range Landfill (FTHU-10), Fort Huachuca, Arizona

United States Department of the Army

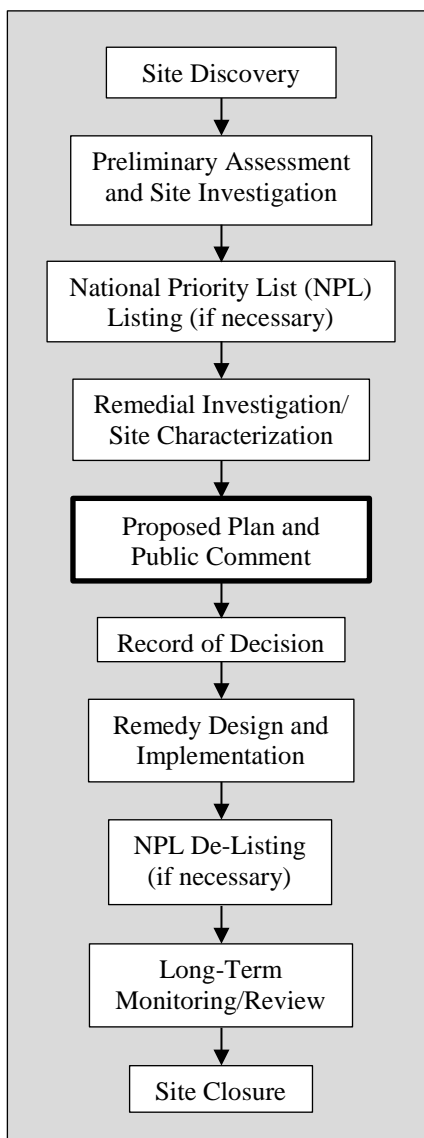
December 21, 2015

## U. S. ARMY ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the Preferred Alternative for addressing possible contaminants in soil and groundwater at the South Range Landfill (SRLF; FTHU-10), Fort Huachuca, Arizona (the Site). The purpose of the Proposed Plan is to describe the contamination present at the Site and the associated potential risks to human health and the environment,

the remedial alternatives considered, the Preferred Alternative to address these potential risks, and to solicit public review and comment on all alternatives described.

This document is issued by the U.S. Department of the Army (Army), the lead agency for the Site, as part of its public participation responsibilities under Section 300.430(f)(2) of the National Oil and Hazardous Substances Contingency Plan (NCP). Regulatory oversight is provided by the Arizona Department of Environmental Quality (ADEQ).



**Figure 1.** CERCLA process flow chart. The South Range Landfill is currently in the Proposed Plan and Public Comment phase.

### Public Comment Period:

January 4 to February 3, 2016

### Public Meeting:

January 13, 2016

6:00 to 8:00 PM

Towne Place Suites Meeting Room

3399 Rodeo Drive

Sierra Vista, AZ

The Army will hold a public meeting to explain the Proposed Plan, receive comments, and answer questions. Oral and written comments will be accepted at the meeting.

Written comments may also be submitted to:

Attn: Rande Sieracki  
Fort Huachuca Compliance Branch  
Chief

3040 Butler Road, Bldg 224  
Fort Huachuca, AZ 85613

or

randell.j.sieracki.civ@mail.mil or  
Jesse.Laurie@usace.army.mil

For further information or if you have questions about the comment period, please contact Rande Sieracki at 520-533-2550.

## COMMUNITY PARTICIPATION

The Army is seeking comments on the Proposed Plan, including the Preferred Alternative and all other alternative remedies considered. New information or arguments presented during the public comment period could result in the selection of a final remedial action that differs from the Preferred Alternative. The Army will accept comments over a 30-day comment period, from January 4 to February 3, 2016.

This Proposed Plan summarizes information that can be found in greater detail in the Preliminary Assessment/Site Inspection (PA/SI) and Site Characterization reports, other key documents identified in this Proposed Plan, and other documents maintained at the Administrative Record for the site.

## Past and Ongoing Community Involvement

Canvassing of the community to solicit community interest was conducted in 2012 and another solicitation, via notices in the Sierra Vista Herald, is in progress.

## Where to Review the Proposed Plan

The Administrative Record, which contains the Proposed Plan and other documents that form the basis for the proposed Preferred Alternative, is available for public review at the following Information Repositories:

Sierra Vista Public Library  
2600 East Tacoma Street  
Sierra Vista, AZ 85635

Huachuca City Public Library  
506 North Gonzales Blvd  
Huachuca City, AZ 85616

## Opportunities to Comment on the Proposed Plan

Written comments on this Proposed Plan may be submitted at any time during the public comment period to Randee Sieracki, the Fort Huachuca Compliance Branch Chief, using the following methods:

Email: randell.j.sieracki.civ@mail.mil or  
Jesse.Laurie@usace.army.mil

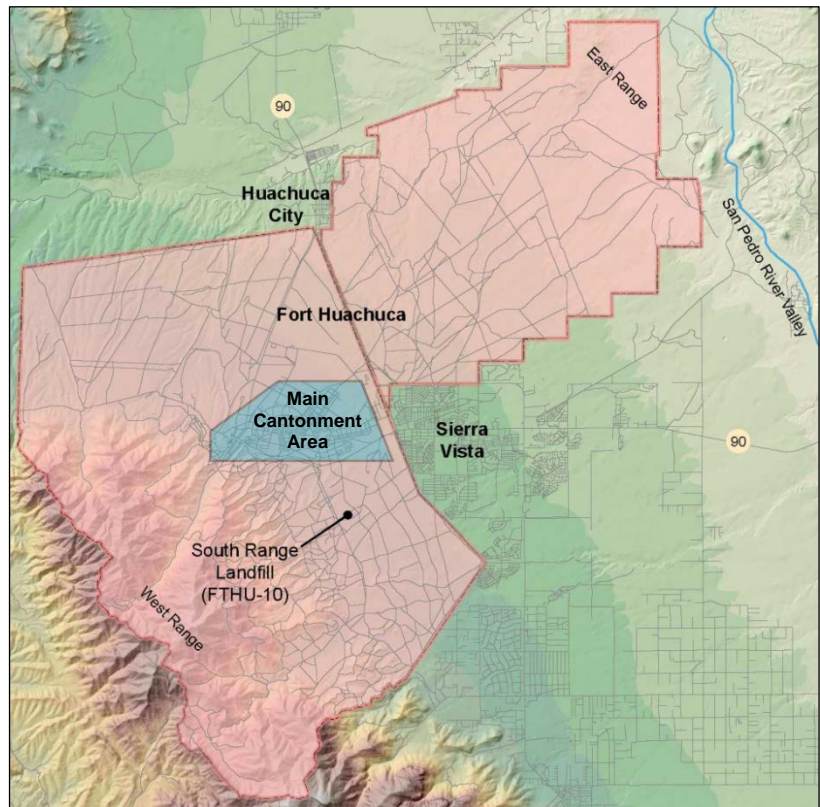
Mail: 3040 Butler Road, Bldg 224  
Fort Huachuca, AZ 85613

A blank page has been provided at the end of this document to facilitate submission of public comments. The Record of Decision (ROD), which is the official declaration of the selected remedy to be implemented at the site, will include a responsiveness summary that will address significant comments (EPA, 1999).

A public meeting will be held on January 13, 2016 from 6:00 to 8:00 PM at the Towne Place Suites, 3399 Rodeo Drive, Sierra Vista, AZ. Representatives from the Army and ADEQ will be present at the meeting to explain the Proposed Plan, receive comments, and answer questions.

## SITE HISTORY

Fort Huachuca is located in Cochise County, Arizona, approximately 75 miles southeast of the Tucson metropolitan area. The installation is located on the western flank of the San Pedro River Valley and consists of an irregularly-shaped area of approximately 115 square miles (73,323 acres) bisected by Arizona State Highway 90 (Figure 2). Fort Huachuca is divided into the Cantonment Area (Main Cantonment Area and surrounding area) and the East and West Ranges, with the area south of the Main Installation called the South Range. The City of Sierra Vista is located along the eastern boundary of Fort Huachuca and Huachuca City is located along the northern boundary. The remainder of the surrounding area is primarily sparsely populated, undeveloped, high desert with some mining and cattle grazing.



**Figure 2.** Fort Huachuca Area Map

The City of Sierra Vista is located along the eastern boundary of Fort Huachuca and Huachuca City is located along the northern boundary. The remainder of the surrounding area is primarily sparsely populated, undeveloped, high desert with some mining and cattle grazing.

Fort Huachuca is an active U.S. Army Installation originally established in 1877. Current missions at include the U.S. Army Intelligence Center and headquarters for the U.S. Army Network Enterprise Technology Command/9<sup>th</sup> Army Signal Command. The facility also is a testing ground for a wide variety of communications and electronic equipment through the U.S. Army Military Affiliate Radio System, Electronics Proving Ground and the Joint Interoperability Test Center. Fort Huachuca is currently under the general command of the Installation Management Command, West Region.

The Site is located east of Garden Canyon Road, approximately two miles south of the Cantonment Area (Figure 2). The Site consists of two adjacent solid waste disposal areas (Locations 10 and 11) originally identified in 1980 during an initial assessment (USATHAMA, 1980). Location 10 was allegedly used by the Army as a landfill from 1972 to 1975 with disposal of unknown quantities of chemicals, including pesticides, herbicides, sterilants, and sodium arsenite. Location 11, adjacent to Location 10 on the east, was identified as having been used from 1970 to 1975 for the disposal of routine municipal wastes. Disposal activities at these sites were ascertained from interviews conducted during the initial assessment and perhaps through a review of aerial photographs, though the report does not make this clear. No written records exist to document the disposal of waste materials at the Site and no interview records were preserved.

#### **CURRENT AND FUTURE LAND USE**

The South Range is currently an active range used for various training exercises. Future land use at the South Range is projected to remain the same as current usage. Any proposed changes to land use are subject to a thorough review and approval process. Institutional controls included in the Fort Huachuca Master Plan restrict future activities that might result in exposure to contamination.

#### **CONTAMINANT SOURCES AND CONTAMINATED MEDIA**

Previous disposal activities at the Site resulted in the potential release of metals, volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), chlorinated pesticides, organophosphorus pesticides, and chlorinated herbicides into the soil and groundwater. At various times, these contaminants of potential concern (COPC) have been detected in groundwater at the Site; however, investigations conducted by the Army (summarized below) conclude there is minimal soil or groundwater contamination.

#### **APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**

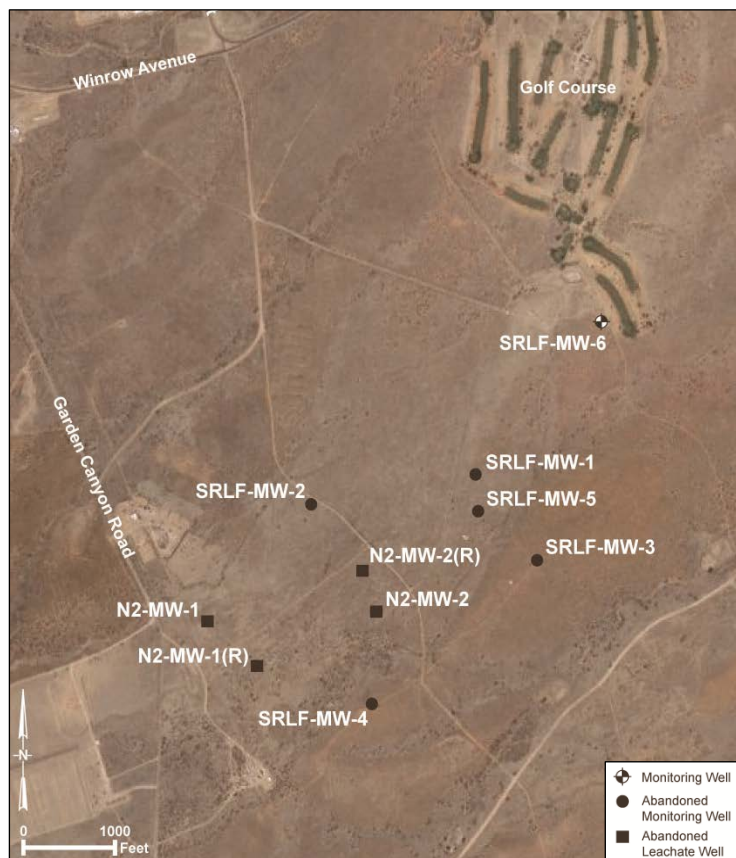
Applicable or Relevant and Appropriate Requirements (ARARs) provide health-based and cleanup standards established through federal and state standards, requirements, criteria, or limitations that are determined to be legally applicable, relevant and appropriate to a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site or action. To protect public health and provide environmental cleanup levels for contaminants that may be found in potable groundwater, the U.S. Environmental Protection Agency (EPA) established Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act. The State of Arizona has also established drinking water standards, known as Aquifer Water Quality Standards (AWQSs), and Health Based Guidance Levels (HBGLs). The HBGLs are not ARARs, but are guidance to be considered. HBGLs have no official status with respect to cleanup, but are helpful in understanding potential human health risks.

AWQSs and MCLs must be met in the State of Arizona to provide protection to public health and the environment. Under Arizona Revised Statutes §49-223(A), ADEQ established AWQSs based on the EPA MCLs for drinking water. As the groundwater downgradient of the Site is a potential source of drinking water, the EPA MCLs and the AWQSs are considered ARARs.

#### **PREVIOUS RESPONSE ACTIONS**

The Preliminary Assessment/Site Investigation (PA/SI) of the Site began in 1992 (JMM, 1993), and was followed by a Site Characterization investigation in 1995 (IT, 1995). Regional groundwater monitoring wells were installed in 1999, 2001, 2002 (EEC), and 2014 (AES). Periodic leachate and groundwater

monitoring was performed at the Site from 1992 to 2007, and resumed in 2014. No waste removal has been performed at the Site and the landfill has not been capped. Brief summaries of the site investigations and monitoring results are provided in the next section.



**Figure 3.** South Range Landfill (FTHU-10) Area Map

## SITE CHARACTERISTICS

The Site covers approximately 74 acres (Figure 3) and has a gentle slope, ranging in elevation from 4875 feet above mean sea level (msl) at the western edge to approximately 4800 feet above msl on the eastern edge of the landfill. The Site is not capped and surface debris is present, although the landfill was originally covered with local soils. Natural grass, shrubs, and trees have re-vegetated the landfill area. There are no obvious signs of stressed vegetation conditions that may be attributed to the past disposal practices at the Site. There are several dirt roads on the Site; however, no structures are present (Figure 3). There are no known sensitive habitats on the Site and proposed activities are not expected to disturb native vegetation or wildlife.

## NATURE AND EXTENT OF CONTAMINATION

Since 1992, several investigations have been conducted to determine the nature and extent of contamination at the Site.

Although sporadic detections of COPCs have been reported, there has been no indication of substantial soil or groundwater contamination. Summaries of the site investigations and monitoring results are provided below.

### 1993 Preliminary Assessment/Site Investigation

The Site PA/SI was performed in April and May of 1992 (JMM, 1993). The primary purpose of the PA/SI was to determine the lateral extent of the landfill and migration of chemicals, if any, into the underlying soil, sediment and surface water. Five soil borings, ranging in depth from 15 feet to 100 feet below ground surface (bgs), were drilled at the site. Two of the soil borings were placed through the landfill windrows, and two leachate monitoring wells (N2-MW-1 and N2-MW-2) were installed in perched water at the site. Groundwater, sediment and surface water samples were collected and analyzed for the following chemicals:

- VOCs
- SVOCs
- Organochlorine pesticides
- Polychlorinated biphenyls (PCBs)
- Organophosphorus pesticides
- Herbicides
- Metals

Eight soil samples were analyzed, with no detectable levels of VOCs, organochlorine pesticides/PCBs or organophosphorus pesticides. SVOCs were detected at four locations, well below their respective HBGLs. Beryllium, chromium, copper, mercury, nickel, and zinc were detected in the soil boring samples at concentrations below their respective HBGLs except for one beryllium test result.

Sediment samples had low-level concentrations of SVOCs, organochlorine pesticides/PCBs, metals, and one herbicide detection. All detections were below their respective HBGLs except for thallium and beryllium.

Surface water samples had no detectable levels of VOCs, SVOCs, organochlorine pesticides, PCBs, organophosphorus pesticides, or herbicides. Concentrations of detected metals were all below the HBGLs.

In the two leachate samples, total cadmium, total lead, dieldrin, and p,p'-dichlorodiphenyldichloroethane (DDD) were detected above HBGLs.

The PA/SI concluded that there was no unacceptable potential health risk to Fort Huachuca personnel, construction workers, local residents, or biota from the concentrations above HBGLs. The PA/SI also recommended the Site be evaluated for permanent closure according to applicable federal and state regulations.

### **1995 Site Characterization**

In January and February 1995, six soil borings were drilled, sampled, and abandoned at the Site to determine the vertical and lateral extent of the chemicals detected during the 1992 site assessment (IT, 1995), as requested by ADEQ. Three soil borings were drilled west of the site, two were drilled east of the site, and one was drilled near the center of the site. The soil borings were drilled to a maximum depth of 200 feet bgs and, after sampling was completed, the soil borings were abandoned.

Samples were analyzed for the following chemicals:

- Total petroleum hydrocarbons (TPH)
- VOCs
- SVOCs
- Chlorinated pesticides
- PCBs
- Metals

Only TPH was detected above the ADEQ suggested cleanup level of 100 milligrams per kilogram (mg/kg) at a concentration of 530 mg/kg at 200 feet bgs. The Army concluded the potential source of the contamination could not have been the landfill because the sample location was upgradient of the Site.

### **1996 Leachate Report**

Groundwater samples were collected from leachate monitoring wells N2-MW-1 and N2-MW-2 for four quarterly sampling events in 1994 and 1995. N2-MW-1 and N2-MW-2 were 35.5 and 31 feet deep, and located in the southwest quadrant and northeast quadrant of the site, respectively. During monitoring, the water level in the wells was reported to be approximately 6 feet bgs. Based on the soil moisture results reported in the soil boring program (JMM, 1993 and IT, 1995), which indicated the deeper soil samples were not saturated, it was concluded that the water in the wells was from surface water infiltration and not from a perched water table underneath the site. Samples were analyzed for the following chemicals:

- VOCs
- SVOCs
- Organochlorine pesticides
- PCBs
- Organophosphorus pesticides
- Herbicides
- Metals
- Nitrate/Nitrite

Based on the results of the four quarterly sampling events and the determination that the water in the wells was surface water that infiltrated through the first 6 feet of the landfill via trenches, it was concluded the water was not impacting the groundwater aquifer, which was in excess of 300 feet bgs.

### **1997 to 2014 Investigation and Monitoring**

Groundwater monitoring events were conducted at the Site periodically from February 1997 to April 2007. Samples were analyzed for the following chemicals.



**Leachate Wells**

- VOCs
- Chlorinated pesticides
- Organophosphorus pesticides
- Chlorinated herbicides
- Metals

**Regional Groundwater Wells**

- VOCs
- Chlorinated pesticides
- Chlorinated herbicides
- Metals

When monitoring began, several metals, VOCs and three organochlorine pesticides (dieldrin, 4,4'-DDD, and 4,4'-dichlorodiphenyldichloroethylene (DDE)) were detected in the leachate monitoring wells, with some of the detections above AWQs. Due to concern that contaminants in the perched water could be migrating to the regional aquifer, ADEQ requested the Army install a groundwater monitoring well in the regional aquifer downgradient from the Site. In August and September 1999, one monitoring well, SRLF-MW-1, was installed in the regional aquifer in a presumed downgradient location from the Site (EEC, 1999). SRLF-MW-1 was added to the monitoring program in January 2000. Two additional regional aquifer monitoring wells, SRLF-MW-2 and SRLF-MW-3, were installed in the area of the Site in January and February 2001 (EEC, 2001) and added to the monitoring program in March 2001. Another regional aquifer monitoring well, SRLF-MW-4, was installed in March and April 2002 at the request of ADEQ to obtain additional groundwater flow and quality data (EEC, 2002). SRLF-MW-4 was added to the monitoring program in May 2002.

In October 2003, an investigation was conducted to determine if leachate from the landfill might be traveling along an inferred interface between basin fill deposits and the bedrock conglomerate unit often described as the Pantano Formation. The investigation was conducted in the area northeast of the landfill between the perched water monitoring wells and regional aquifer monitoring well SRLF-MW-1. The investigation included a review of the regional literature, geophysical surveys, and the drilling and subsequent abandonment of monitoring well SRLF-MW-5. No clearly discernible Pantano contact was confirmed in the area northeast of the landfill (EEC, 2003a).

Leachate wells N2-MW-1 and N2-MW-2 became unusable due to damage and were abandoned and replaced with two new leachate wells, N2-MW-1(R) and N2-MW-2(R), in July 2005.

During the April 2007 monitoring event, only SRLF-MW-1 was sampled as SRLF-MW-2 had insufficient water to complete the sampling protocol, SRLF-MW-3 was dry, and SRLF-MW-4 had been removed from the monitoring program in 2006 with ADEQ approval. SRLF-MW-2, SRLF-MW-3, and SRLF-MW-4 were abandoned in August and September 2008.

Groundwater monitoring was not conducted again until May 2014 due to dewatering of the remaining monitoring wells. Installation of SRLF-MW-6, approximately one mile downgradient of the landfill, and abandonment of SRLF-MW-1 and the leachate wells, N2-MW-1(R) and N2-MW-2(R), were conducted in March and April 2014.

During the groundwater monitoring events conducted at the Site from 1997 to 2014 various metals, one SVOC (bis-(2-ethylhexyl) phthalate), and four organochlorine pesticide compounds (dieldrin, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT) were detected sporadically above their respective AWQs and/or HBGLs at the leachate wells, while only four metals (beryllium, cadmium, lead, and zinc), two VOCs (acetone and tetrachloroethene), and one SVOC (bis-(2-ethylhexyl) phthalate) were detected sporadically above their respective AWQs and/or HBGLs in groundwater wells.

**SOURCE MATERIALS**

Potential contaminant source materials are located in the Site; however, exact locations within the landfill cells and exact volumes are unknown. No written records exist that document the disposal of waste materials at the site.

## **SCOPE AND ROLE OF RESPONSE ACTION**

The overall objective of the Fort Huachuca Installation Restoration Program is to clean up contaminated sites from past Army activities with the following goals: 1) reduce risk to acceptable levels to protect the health and safety of installation personnel and the public, and 2) restore the quality of the environment. This is accomplished by ascertaining the need for remedial action, identifying the preferred remedial alternative, and implementing the selected remedial action.

Given the lack of risk to human health and the environment (i.e., indication of minimal soil or groundwater contamination) at the Site, the Army is proposing to conduct annual monitoring at the one downgradient well, SRLF-MW-6, for five years, followed by a five-year review (FYR) of the site. The need for additional monitoring and subsequent FYR cycles will be based on the results of the first FYR.

## **SUMMARY OF SITE RISKS**

A risk assessment was conducted as part of the PA/SI (JMM, 1993) and concluded there was low potential health risk from chemicals in soil and groundwater to Fort Huachuca personnel, construction workers, local residents, or biota. As current and future land and groundwater uses (i.e., operational military range and downgradient use as drinking water) have not changed since this assessment, it is the Army's judgement that the Preferred Alternative (i.e., annual groundwater monitoring with a FYR cycle), is protective of human health and the environment. The Preferred Alternative will reduce risk as it will provide annual updates on the amount of COPCs in groundwater at the Site and requires a periodic, in-depth review of overall protectiveness.

## **REMEDIAL ACTION OBJECTIVES**

The remedial action objectives (RAOs) for the Site include confirming COPCs in groundwater are below ARARs, ensuring COPCs are not migrating downgradient, and ensuring groundwater is safe (i.e., meets primary remediation goals) for reasonably anticipated future use. These RAOs can be accomplished through groundwater monitoring. Primary remediation goals for the Site are based on the ARARs described above (i.e., AWQs and EPA MCLs).

## **SUMMARY OF REMEDIAL ALTERNATIVES**

This section describes the options available for attaining the proposed RAOs for the Site. The Preferred Alternative is Alternative 2, annual groundwater monitoring with a FYR cycle.

### **ALTERNATIVE 1 – NO FURTHER ACTION**

Alternative 1 assumes no further action will be taken at the Site to address the potential release of contaminants to groundwater. This alternative is provided as a baseline for comparison to the other remedial alternatives, as required under CERCLA and the NCP.

### **ALTERNATIVE 2 – ANNUAL GROUNDWATER MONITORING**

Alternative 2 includes conducting annual monitoring at the one downgradient well, SRLF-MW-6, for five years, followed by a FYR of the Site. The long-term effectiveness of annual monitoring with a FYR cycle would either further establish the lack of substantial release and migration of contaminants to soil or groundwater, or provide evidence of the need for active remediation. The need for additional monitoring and subsequent FYR cycles will be based on the results of the first FYR. This alternative does not include active remediation, but does provide a way to monitor the potential release and migration of contaminants to groundwater and assess protectiveness of human health and the environment.

**ALTERNATIVE 3 – LANDFILL CAP & ANNUAL GROUNDWATER MONITORING**

Alternative 3 includes capping the Site and then conducting annual monitoring at the one downgradient well, SRLF-MW-6, for five years, followed by a FYR. The need for additional monitoring and subsequent FYR cycles will be based on the results of the first FYR. This alternative would 1) prevent future precipitation and runoff from infiltrating the landfill and releasing contaminants to the soil and groundwater, 2) provide a way to monitor the potential previous release and migration of contaminants to groundwater, and 3) assess risk to human health and the environment.

**EVALUATION OF ALTERNATIVES**

Remedial alternatives for the Site were evaluated based on the EPA's nine evaluation criteria. The evaluation criteria and comparison of the alternatives is summarized in Table 1.

**ALTERNATIVE 1 – NO FURTHER ACTION****Threshold Criteria**

This alternative likely meets the threshold criteria of overall protection of human health and the environment as no substantial release of contaminants to soil or groundwater has been detected; however, there would be no procedures in place to ensure protectiveness and compliance with ARARs.

**Balancing Criteria**

This alternative would likely be effective in the short- and long-term due to the lack of evidence of a substantial release of contaminants to soil or groundwater.

No treatment would be conducted with this alternative, and thus there would not be a reduction of toxicity, mobility, or volume of possible contamination; however, treatment is not currently warranted as no substantial release of contaminants to soil or groundwater has been detected.

Implementation of this alternative is technically and administratively feasible and would have minimal cost.

**Modifying Criteria**

The State is unlikely to accept this alternative as no actions would be taken to confirm the threshold and balancing criteria. Community acceptance will be evaluated after the public comment period ends and will be described in the ROD for the Site.

**ALTERNATIVE 2 – ANNUAL GROUNDWATER MONITORING****Threshold Criteria**

This alternative meets the threshold criteria of overall protection of human health and the environment, and includes annual confirmation of compliance with ARARs.

**Balancing Criteria**

This alternative would be effective in the short-term as it would monitor the potential release and migration of contaminants to groundwater for a minimum of five years. Additionally, this alternative would be effective in the long-term as annual monitoring with a FYR cycle would either further establish the lack of substantial release and migration of contaminants to soil or groundwater, or provide evidence of the need for active remediation.

No treatment would be conducted with this alternative, and thus there would not be a reduction of toxicity, mobility, or volume of possible contamination; however, treatment is not currently warranted as no substantial release of contaminants to soil or groundwater has been detected.

Implementation of this alternative is technically and administratively feasible. Capital costs (i.e., planning) are estimated to be \$6,050 with annual monitoring and reporting costs of \$188,376 over five years, for a total present worth estimate of \$194,426.



### **Modifying Criteria**

The state supports this alternative as it is the most cost effective alternative that is protective of human health and the environment. Community acceptance will be evaluated after the public comment period ends and will be described in the ROD for the Site.

### **ALTERNATIVE 3 – LANDFILL CAP & ANNUAL GROUNDWATER MONITORING**

#### **Threshold Criteria**

This alternative meets the threshold criteria of overall protection of human health and the environment, and includes annual confirmation of compliance with ARARs.

#### **Balancing Criteria**

This alternative would be effective in the short- and long-term as the landfill cap would prevent the future release of contaminants to the environment. Additionally, annual monitoring with a FYR cycle would either further establish the lack of substantial release and migration of contaminants to soil or groundwater, or provide evidence of the need for active remediation.

The installation of a landfill cap would reduce the mobility of possible future contamination. The toxicity and volume of possible current contamination would not be addressed; however, treatment is not currently warranted as no substantial release of contaminants to soil or groundwater has been detected.

Implementation of this alternative is administratively feasible but technically infeasible to implement as waste was disposed of in windrows over approximately 74 acres. Capital costs, which include planning, designing, installing the landfill cap and reporting, are estimated to be \$18,249,000, with annual monitoring and reporting costs of \$188,376 over five years, for a total present worth estimate of \$18,437,376.

#### **Modifying Criteria**

This alternative is the most protective of human health and the environment; however, the state may not accept this alternative because it is the least cost effective. Community acceptance will be evaluated after the public comment period ends and will be described in the ROD for the Site.

### **PREFERRED ALTERNATIVE**

Based on the evaluation and comparison of the three remedial alternatives, the Army proposes Alternative 2, annual groundwater monitoring with a FYR cycle, as the Preferred Alternative for implementation at the Site as it meets the nine evaluation criteria specified by the EPA.

### **PRIMARY DECISION CONSIDERATIONS**

Of the EPA's nine evaluation criteria, the threshold criteria and balancing criteria (Table 1) were the primary decision considerations for selecting the Preferred Alternative. Alternatives 2 and 3 are the most likely alternatives to meet the threshold criteria and the majority of the balancing criteria; therefore, Alternative 1 was eliminated as an option.

Alternatives 2 and 3 varied in the reduction of toxicity, mobility, or volume through treatment, implementability, and cost portions of the balancing criteria. Alternative 2 does not include treatment and thus will result in no reduction of toxicity, mobility, or volume of possible groundwater contamination; however, treatment is not currently warranted as no substantial release of contaminants to soil or groundwater has been detected. Alternative 3 includes capping the landfill and will result in reduction of toxicity, mobility, or volume of possible groundwater contamination. Both Alternatives 2 and 3 are administratively feasible to implement; however, while Alternative 2 is technically feasible to implement, Alternative 3 is not technically feasible to implement based on the size and construction of the landfill. Additionally, the cost of Alternative 2 is approximately 5 percent of the estimated cost of Alternative 3.

As Alternative 2 meets the threshold criteria, provides the best balance of tradeoffs among the balancing criteria, and is supported by the state (modifying criteria), it was selected as the Preferred Alternative.

**Table 1.** Summary of Evaluation of Remedial Alternatives for the South Range Landfill (FTHU-10)

|   |                           | <b>Remedial Alternative</b>   | <b>Alternative 1</b><br>No Further Action   | <b>Alternative 2</b><br>Annual Groundwater Monitoring  | <b>Alternative 3</b><br>Landfill Cap and Annual Groundwater Monitoring |
|---|---------------------------|---|---|--|--|
| <b>EPA's 9 CERCLA Evaluation Criteria</b> | <b>Threshold Criteria</b> | <b>Overall Protectiveness of Human Health and the Environment</b>   | Likely protective as minimal release of contaminants to soil or groundwater has been detected | Protective   | Protective   |
|   |                           | <b>Compliance with ARARs</b>  | Likely compliance with ARARs, but no confirmation of compliance                               | Annual confirmation of compliance with ARARs           | Annual confirmation of compliance with ARARs                           |
|   | <b>Balancing Criteria</b> | <b>Short-Term Effectiveness</b>                                     | Likely to be effective in the short-term  | Effective in the short-term                            | Effective in the short-term  |
|   |                           | <b>Long-Term Effectiveness &amp; Permanence</b>                     | Likely to be effective in the long-term   | Effective in the long-term                             | Effective in the long-term   |
|   |                           | <b>Reduction of Toxicity, Mobility, or Volume Through Treatment</b> | No reduction as no treatment conducted  | No reduction as no treatment conducted                 | Reduction in mobility with installation of landfill cap                |
|   |                           | <b>Implementability</b>   | Technically and administratively feasible to implement  | Technically and administratively feasible to implement | Administratively feasible but technically infeasible to implement      |
|   |                           | <b>Cost</b>   | Minimal   | \$194,426  | \$18,437,376   |
|   | <b>Modifying Criteria</b> | <b>State Acceptance</b>   | Unlikely to be acceptable   | Likely to be acceptable                                | Likely to be acceptable  |
|   |                           | <b>Community Acceptance</b>   | To be determined and described in the ROD   | To be determined and described in the ROD              | To be determined and described in the ROD                              |

**EXPECTED OUTCOMES**

It is expected that the Preferred Alternative will continue to confirm minimal, if any, contaminants in the groundwater at the Site. The Preferred Alternative will reduce risk as it will provide annual updates on the amount of COPCs in groundwater and requires a periodic, in-depth review of overall protectiveness. Additionally, the FYR is expected to confirm the protectiveness to human health and the environment of the Preferred Alternative and recommend site closure.

**CONCLUDING SUMMARY**

Based on information currently available, the Army believes Alternative 2, the Preferred Alternative, meets the threshold criteria and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. The Army expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA §121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective; 4) utilize permanent solutions and alternative

treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element (or justify not meeting the preference). ADEQ concurs with the Preferred Alternative; however, new information or arguments presented during the public comment period could result in the selection of a final remedial action that differs from the Preferred Alternative.

## REFERENCES

- AES, 2014. *Final Well Construction Completion and Groundwater Monitoring Report, FTHU-10 (South Range Landfill) and FTHU-65 (East Range Mine Shaft), Fort Huachuca, Arizona*. September.
- Engineering and Environmental Consultants, Inc. (EEC), 1999. *Report on Installation and Sampling of Groundwater Monitoring Well, South Range Landfill, USAG Fort Huachuca, Fort Huachuca, Arizona*. October.
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## ACRONYMS AND ABBREVIATIONS

|         |   |
|---------|---|
| ADEQ    | Arizona Department of Environmental Quality                           |
| AES     | Ahtna Engineering Services  |
| ARAR    | Applicable or Relevant and Appropriate Requirements                   |
| Army    | U.S. Department of the Army   |
| AWQS    | Aquifer Water Quality Standard  |
| bgs     | below ground surface  |
| CERCLA  | Comprehensive Environmental Response, Compensation, and Liability Act |
| COPC    | contaminant of potential concern                                      |
| DDD     | dichlorodiphenyldichloroethane  |
| DDE     | dichlorodiphenyldichloroethylene                                      |
| EEC     | Engineering and Environmental Consultants, Inc.                       |
| EPA     | U.S. Environmental Protection Agency                                  |
| FTHU-10 | South Range Landfill  |
| FYR     | Five Year Review  |
| HBGL    | Health Based Guidance Level   |

**ACRONYMS AND ABBREVIATIONS (CONTINUED)**

|          |  |
|----------|--|
| IT       | International Technology Corporation           |
| JMM      | James M. Montgomery Consulting Engineers, Inc. |
| MCL      | maximum contaminant level                      |
| mg/kg    | milligram per kilogram                         |
| msl      | mean sea level                                 |
| NCP      | National Contingency Plan                      |
| NPL      | National Priority List                         |
| PA/SI    | Preliminary Assessment/Site Inspection         |
| PCB      | polychlorinated biphenyl                       |
| RAO      | remedial action objective                      |
| ROD      | Record of Decision                             |
| SRLF     | South Range Landfill                           |
| SVOC     | semi-volatile organic compound                 |
| TPH      | total petroleum hydrocarbons                   |
| USATHAMA | U.S. Army Toxic and Hazardous Materials Agency |
| VOC      | volatile organic compound                      |

