



US Army Corps  
of Engineers  
Kansas City District

## Forest Park Recreation Camp Munitions Response Site

St. Louis, Missouri

August 2016

### INTRODUCTION

This Proposed Plan identifies the United States Army Corps of Engineers (USACE) proposed final remedy for addressing hazards associated with military munitions at the Forest Park Recreation Camp Munitions Response Site (MRS), also referred to as the Forest Park Area of Concern (AOC), located within the west central portion of the City of St. Louis Missouri.

The USACE is conducting this work under the Military Munitions Response Program (MMRP). The U.S. Department of Defense (DoD) established the MMRP to address Formerly Used

Response, Compensation, and Liability Act (CERCLA).

The USACE Kansas City District is the executing agency for the MMRP at the Forest Park Recreation Camp MRS. The City of St. Louis owns and manages the land within the Forest Park Recreation Camp MRS FUDS boundary. This Proposed Plan was developed by USACE with support from the Missouri Department of Natural Resources (MDNR). The U.S. Environmental Protection Agency (USEPA) provided regulatory assistance to MDNR during investigation activities.

The purpose of this Proposed Plan is to facilitate public involvement in the remedy selection process by providing background information about the Forest Park Recreation Camp MRS and present the rationale for adopting the existing response action of Institutional Controls. Institutional Controls consist of the distribution of educational awareness materials to St. Louis City officials and a Memorandum of Agreement (MOA) between the City of St. Louis and USACE to define the relationship, responsibilities, and general objectives under which the City of St. Louis and USACE provide military munitions response and long-term management during future construction activities performed by the City of St. Louis at the Forest Park AOC.

This Proposed Plan is being issued as part of the public participation responsibilities under Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan and Section 117(a) of CERCLA. The Forest Park Recreation Camp MRS is not on the CERCLA National Priorities List (NPL); however, under the FUDS program, MMRP sites follow the CERCLA process. After the close of the public comment period, USACE proposes to issue a Decision Document (DD) that considers input from MDNR and the public. The proposed final remedy for this site is to adopt the existing response action of Institutional Controls and the continuation of long-

#### Dates to Remember:

##### A) Public Comment Period

**September 6, 2016 to October 7, 2016**

The USACE will accept written comments on the Proposed Plan during a public comment period.

##### B) Public Meeting

**September 13, 2016**

**Starting at 5:30PM**

The USACE will hold a public meeting to explain the Proposed Final Remedy. The meeting will be held at the Dennis & Judith Jones Visitor and Education Center, 5595 Grand Drive in Forest Park, St. Louis, MO 63112. For more information regarding the meeting, contact Josephine Newton-Lund, Senior Project Manager, U.S. Army Corps of Engineers, Kansas City District, 816-389-3912.

**For more information regarding the project, see the Administrative Record File, located at:**

<http://www.nwk.usace.army.mil/Missions/Environmental/EnvironmentalProjects/FormerFores tParkRecreationCamp.aspx>

Defense Sites (FUDS) suspected of containing hazardous remains of military munitions on former military installations. The DoD operates as the lead agency under the Comprehensive Environmental

term management actions in accordance with the MOA. Long-term management actions consist of annual inspections of the Forest Park AOC, including interviews with stakeholders, the continued distribution of educational awareness materials to the City, and monitoring of the status of City Ordinance 68328. The above actions taken as part of the 2004 Action Memorandum have resulted in the site being protective of human health and the environment. Details of the 2004 Action Memorandum are found in subsequent paragraphs of this proposed plan. USACE may decide to modify the proposed final remedy if comments from MDNR or the public or additional data indicate that such a change will result in a more appropriate remedy.

This Proposed Plan summarizes information that is presented in detail in the Engineering Evaluation/Cost Analysis (EE/CA) and other documents in the Forest Park Recreation Camp MRS Administrative Record File located on-line at <http://www.nwk.usace.army.mil/Missions/Environmental/EnvironmentalProjects/FormerForestParkRecreationCamp.aspx>. The Administrative Record is a compilation of the information that was considered in formulating the proposal presented in this Proposed Plan, and presents a comprehensive description of the site investigation and remedial activities.

## SITE BACKGROUND

### Site Location

Forest Park Recreation Park Recreation Camp MRS, FUDS Property Number B07MO098801, is located within the west central portion of the City of St. Louis, approximately 5 to 6 miles west of the downtown area as shown on **Figure 1**.

### Site History

Forest Park, a St. Louis City park, was established in 1876. Forest Park is one of the largest urban parks in the country at 1,371 acres. The 1904 World's Fair used almost the entire western half of Forest Park and brought more than 19 million visitors to St. Louis. After the closing of the fair,

most of the buildings and exhibits were demolished and their debris buried on site.

Documented military use of Forest Park began with World War I (WWI). The only known military use of Forest Park was for patriotic public demonstrations and bivouacs, which are temporary encampments or shelters. Between 1917 and 1918 numerous military demonstrations were held at Forest Park, which included an Army tank demonstration, a military parade and a demonstration of British aircraft. In 1926, the City of St. Louis held the St. Louis Exposition. As part of the Exposition, Army troops from nearby Jefferson Barracks performed daily mock WWI battles using munitions containing white phosphorus (WP). WP is a chemical used in smoke, tracer, illumination, and incendiary (fire-producing) munitions. It is believed the munitions used by the Army in the mock battles were to create smoke screens.

In 1942, the Army was granted permission to use 17 acres in the southeastern corner of Forest Park for a recreation camp for soldiers. The camp accommodated approximately 1,500 men and was to operate for the duration of World War II. However, there is no historical documentation that military munitions were used at the recreation camp. By 1947, the camp was abandoned and the southeast corner of the park was restored. In 1943, during the recreation camp's operation, a mock battle for the public took place near the Art Hill area of Forest Park with soldiers from Jefferson Barracks. This mock battle included 350 soldiers, amphibious jeeps, a smoke screen and a final assault up Art Hill.

### Previous Removal Actions and Investigations

In 1988, workers installing a sprinkler system on the third fairway of the lower 9-hole golf course at Forest Park uncovered a live 3-inch Stokes mortar round containing WP. The workers thought that the mortar round was a remnant of the 1904 World's Fair. The round was given to an individual who thought it was a type of time capsule. The next week the individual attempted to open the round in his home and caused the phosphorus to ignite. A

local fire department responded and was able to contain the phosphorus by burying the round. The Granite City Illinois Support Center, 50th Explosive Ordnance Disposal Attachment recovered the round and disposed of it.

As part of the \$100 million of improvements at Forest Park as outlined in the 1995 Master Plan, the Forest Park Golf Course underwent renovations starting in 2001 with full-time construction oversight performed by USACE-St. Louis. Not long after renovations began in September 2001 at the lower nine-hole course (Hawthorne Course), a bulldozer worker uncovered a 4-inch Stokes mortar while moving soil. In 2002 as renovation work continued, two more Stokes mortar rounds were recognized by construction workers and later removed by the St. Louis Metropolitan Police Department.

All three munition items contained WP, according to the police who transported the rounds to a quarry south of the city for detonation.

Concurrent with the golf course renovation work, construction began at the Grand Basin located across the street from the lower nine-hole course. USACE-Kansas City and St. Louis Districts conducted ordnance awareness training to the Grand Basin contractor similar to the golf course contractors. In June 2002, a construction worker excavated a Livens projector. The Livens projector was a British designed mortar-like munition used in WWI that typically contained chemical agents, but could also contain flammable or explosive fill. The Livens projector was removed by the St. Louis Metropolitan Police Department, who determined it to be empty of WP.

As a result of the removal actions, an EE/CA was conducted in 2004 in order to develop alternatives to address buried WWI military munitions at the Forest Park AOC. Based on the EE/CA's findings, four response action alternatives were developed that included 1) No Department of Defense Action Indicated (NDAI); 2) Institutional Controls; 3) Comprehensive Surface Clearance with Institutional Controls; and 4) Comprehensive Subsurface Clearance with Institutional Controls.

An Action Memorandum authorizing implementation of the response action to address buried WWI military munitions at the Forest Park AOC was signed on November 23, 2004 and selected Alternative 2-Institutional Controls.

Implementation of the response action began in 2004 with the reproduction and distribution of educational awareness pamphlets to the City of St. Louis engineering and construction departments, the St. Louis Parks and Recreation department, the Norman K. Probstein golf staff, and the St. Louis Art Museum facility director.

In 2005 and as part of the response action, the MOA between the City of St. Louis and USACE was signed. The purpose of the MOA is to define the relationship, responsibilities and general objectives under which the City of St. Louis and USACE provide future military munitions response and long-term management actions during any and all construction activities performed by the City of St. Louis on the site of the Forest Park AOC.

As a final component of the response action and in accordance with the terms of the MOA, city ordinance 68328 was approved by the City of St. Louis in 2009. In previous documents, the ordinance was identified with the number 68329, but was recently discovered to be identified by the number 68328 on an updated St. Louis City government website. The purpose of the ordinance is to bind the City to the provisions of the MOA, which is similar to the purpose of a deed restriction or restrictive covenant. Because a deed to the Forest Park property does not exist, the creation of a city ordinance was agreed to by the City, MDNR and USACE.

Long-term management activities include annual site inspections and stakeholder interviews so that the USACE remains actively informed of any changes in information regarding the site. Stakeholders associated with the project include the City of St. Louis, the St. Louis Department of Parks, Recreation, and Forestry, the Norman K. Probstein Golf Course, and the St. Louis Art Museum. Distribution of additional educational awareness pamphlets to the City of St. Louis is also performed during the annual site inspection.

Additionally, USACE conducts safety briefings to City of St. Louis contractors prior to construction activities involving excavation on the Forest Park AOC.

## Site Characteristics

Forest Park is located within the west central portion of the City of St. Louis, approximately 5 to 6 miles west of the downtown area. Forest Park is bordered by Highway I-64, Kingshighway Boulevard, Lindell Boulevard, and Skinker Boulevard (**Figure 1**). Although, the former Forest Park Recreation Camp was located in the southeastern corner of Forest Park, the area of concern (AOC) where military munitions were discovered is located in the northwestern portion of Forest Park (**Figure 2**).

Forest Park is currently used as a recreation area for the City of St. Louis. Facilities at the park include the St. Louis Art Museum, the St. Louis Zoo, the Missouri History Museum, the St. Louis Science Center and the Muny outdoor musical amphitheater. It also serves as a sports center for golf (Norman K. Probststein Golf Course), tennis, baseball, bicycling, boating, fishing, handball, ice skating, roller blading, jogging, rugby and more.

The Norman K. Probststein Golf Course, where a primary portion of the Forest Park AOC is located, consists of three nine-hole courses. However, the mortar rounds were discovered in the relatively flat Hawthorne Course, which is sometimes referred to as the “lower nine.” The Grand Basin, which is surrounded by a majority of the golf course, is also considered a part of the AOC.

## SCOPE AND ROLE OF ACTION

- The primary objective of this Proposed Plan is to provide a more durable and long term protectiveness measure that reduces the potential hazards posed to the public and onsite workers by Munitions and Explosives of Concern (MEC) at the Forest Park. This long term protectiveness measure will include many of the components of the existing risk-reduction alternative that has been in place

since 2004. MEC is a term that includes unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC), such as TNT, that is present in high enough concentrations to pose an explosive hazard. An evaluation of alternatives presented in the 2004 EE/CA determined at that time that Alternative 2 -Institutional Controls, consisting of a combination of MEC educational awareness materials and a MOA between the City of St. Louis and the USACE that outlines long-term management actions, was the most effective measure to protect the public and onsite construction workers from exposure to MEC. The proposed action provides a more durable and long-term protectiveness remedial action that would be subject to statutory five-year reviews. The proposed action would also adopt the ongoing aspects of the removal action response of Institutional Controls as the final remedy at the Forest Park Recreation Camp MRS.

## SUMMARY OF SITE RISKS

USACE assessed risk to determine current and future effects on human health and the environment from buried MEC during the EE/CA. Because the Forest Park AOC is currently used as a golf course, the pathways for exposure to MEC only potentially exist below the ground surface for construction workers. No release mechanisms for MC were identified at the Forest Park AOC, so no MC risk assessment was conducted.

The likelihood of encountering MEC on the ground surface at the Norman K. Probststein Golf Course, where members of the public are most likely to encounter it, is considered extremely low. To address the risk of encountering MEC below the ground surface by construction workers, educational awareness pamphlets will continue to be distributed by USACE to the City of St. Louis engineering and construction departments on an annual basis to ensure that they remain aware that buried WWI military munitions may exist below the ground surface at the Forest park AOC.

Recurring reviews were conducted in 2010 and 2015 which concluded that the response action is

protective and is expected to remain protective of human health and the environment. There have not been any additional reports of military munitions at the site since the renovation of the golf course in 2002.

## **REMEDIAL ACTION OBJECTIVES**

Remedial action objectives (RAOs) are specific goals to protect human health and the environment.

The overall RAO for the Forest Park AOC is:

- To reduce the potential hazards posed to the public and onsite workers by MEC.



Forest Park  
St. Louis, Missouri

FOREST PARK RECREATION CAMP  
MUNITIONS RESPONSE SITE  
LOCATION MAP  
FIGURE 1

**Legend**

-  Forest Park Area of Concern (AOC)
-  Boundary of Forest Park
-  County Boundary
-  Metro Link Light Rail



 US Army Corps of Engineers  
Omaha District

Imagery Source:  
U. S. Department of Agriculture,  
Farm Service Agency 2014  
PROJECTION: NAD83  
STATEPLANE MISSOURI EAST FIPS 2401  
DATA COMPILED ON: 10 March 2016

 0 500 1,000 2,000 3,000 Feet

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|---|--|
| <b>Forest Park</b><br><b>St. Louis, Missouri</b>  |  |
| <b>FOREST PARK AREA OF CONCERN</b><br><b>LOCATION MAP</b><br><b>FIGURE 2</b>  |  |
| <b>Legend</b><br><ul style="list-style-type: none"> <li> Forest Park Area of Concern (AOC)</li> <li> Boundary of Forest Park</li> <li> County Boundary</li> <li> Metro Link Light Rail</li> </ul>   |  |
|   |  |
| <br><b>US Army Corps of Engineers</b><br>Omaha District   | Imagery Source:<br>U. S. Department of Agriculture,<br>Farm Service Agency 2014<br><br>PROJECTION : NAD83<br>STATEPLANE MISSOURI EAST FIPS 2401<br>DATA COMPILED ON: 15 March 2018 |
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## ARARs

Applicable or relevant and appropriate requirements (ARARs) are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance found at a CERCLA site, or address problems sufficiently similar to those encountered at the CERCLA site such that their use is well-suited to the particular site. State ARARs that are promulgated, more stringent than Federal ARARs, identified by the State in a timely manner, must be satisfied in the final remedial action as well.

There are three types of ARARs: 1) Location-specific ARARs restrict the occurrence of chemicals in certain sensitive environments, such as wetlands (for example, the Endangered Species Act); 2) Action specific ARARs are activity-based or technology-based, and typically control remedial activities that generate hazardous wastes (for example, RCRA); 3) Chemical-specific ARARs are health-based or risk management-based numbers that provide concentration limits for the occurrence of a chemical in the environment (for example, USEPA drinking water maximum contaminant levels).

There are no location-specific, action-specific or chemical-specific ARARs identified for the MEC at the Forest Park AOC.

## SUMMARY OF REMEDIAL ALTERNATIVES

USACE is considering the following four remedial action alternatives to address buried MEC at the Forest Park AOC.

### Alternative 1 – No Action

The No Action alternative is required to be considered in the CERCLA process, and is used to establish a baseline for comparison with the other alternatives. No Action means that no remedial

action will be implemented to reduce the potential safety risk posed by MEC.

*Estimated Cost: \$0*

### Alternative 2 - Institutional Controls

Alternative 2, which is a continuation of all ongoing components of the remedy that was implemented in 2004, consists of the following components:

- Distributing educational awareness materials to the City of St. Louis
- Prepare a Remedial Design/Remedial Action report consistent with the terms of the MOA between USACE and the City of St. Louis
- Long-term management actions consisting of annual inspections, educational awareness support consisting of safety briefings by an ordnance safety specialist, and stakeholder interviews
- Statutory five-year reviews
- Monitoring the Status of City Ordinance 68328

*Current Average Annual Long-term Maintenance Cost: \$10,000*

### Alternative 3 - Comprehensive Surface Clearance with Institutional Controls

Alternative 3 includes a surface clearance of all military munitions located on the ground surface and the continuation of all ongoing remedy components adopted in 2004 as presented in Alternative 2 above. Although this alternative, which was developed as part of the EE/CA in 2004, no longer applies today since military munitions are known not to be located on the ground surface and therefore, do not present a risk, it has been retained in this proposed plan to be consistent with previous documentation.

*Current Estimated Cost: \$ 2,033,235 to complete the surface clearance and \$10,000 Average Annual Long Term Maintenance Costs in subsequent years.*

#### **Alternative 4 - Comprehensive Subsurface Clearance with Institutional Controls**

Alternative 4 includes subsurface clearance of all detectable military munitions to a specified depth and the continuation of all ongoing remedy components adopted in 2004 as presented in Alternative 2 above. Surface military munitions would also be removed in this alternative. This alternative consists of detection and investigation of all subsurface metallic anomalies (areas suspected of buried MEC).

*Current Estimated Cost: \$ 4,011,286 to complete the sub-surface clearance and \$10,000 Average Annual Long Term Maintenance Costs in subsequent years.*

### **EVALUATION OF ALTERNATIVES**

During the evaluation of removal alternatives conducted in 2004, USACE considered the three criteria required by CERCLA during a non-time critical removal action (effectiveness, implementability, and cost) to assist in the decision making and selection process of a preferred alternative to address buried military munitions at the Forest Park AOC at that time. In order to foster public participation in the remedy selection process and ensure the most durable and best possible final remedy is selected, USACE is reexamining each alternative under the nine criteria required by CERCLA for a formal remedial action.

The first two criteria are the **Threshold Criteria**, which each alternative must meet to receive further consideration. These are: 1) Overall Protection of Human Health and the Environment; and 2) Compliance with ARARs.

The next five criteria are the **Primary Balancing Criteria**, which are the basis for analysis of the alternatives. These are: 3) Long-Term Effectiveness and Permanence; 4) Reduction of Toxicity, Mobility, and Volume through Treatment; 5) Short-term Effectiveness; 6) Implementability; and 7) Cost.

The two final criteria are the **Modifying Criteria**, which can only be evaluated following the public

comment period. These are: 8) State Acceptance; and 9) Community Acceptance.

Each of the four remedial alternatives were evaluated with respect to the individual criteria, and were compared to one another to determine their respective strengths and weaknesses and to identify the key trade-offs. A comparative analysis of the alternatives based upon the evaluation criteria noted above are as follows:

#### **Overall Protection of Human Health and the Environment**

Overall protection of human health and the environment addresses whether a remedial alternative provides protection of human health and the environment and describes how risks which are posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

This criterion was evaluated in terms of possible future human interaction with MEC. Alternative 1 was not considered protective of human health and the environment. Alternative 1 would not have removed any MEC and provided no source reduction. Alternatives 3 and 4 would remove MEC and were determined to provide overall protection of human health and the environment. Alternative 2, which does not remove any MEC and provides no source reduction, was nevertheless determined to provide overall protection of human health and the environment as it is believed to close the pathway between onsite contamination (UXO) and potential receptors (construction/excavation workers). Furthermore, the effectiveness of the removal of all MEC as part of Alternatives 3 and 4 would be questionable due to the technical difficulties associated with the presence of subsurface metallic construction debris associated with the 1904 World's Fair, which could obscure MEC items from detection.

#### **Compliance with ARARs**

Compliance with ARARs addresses whether a remedial alternative will meet all applicable or

relevant and appropriate requirements of federal and state laws and regulations related to addressing hazardous substances at the site.

The criteria, Compliance with ARARs, is not applicable as there are no ARARs pertaining to the evaluated alternatives for this site.

### **Long-Term Effectiveness and Permanence**

Long-term effectiveness and permanence addresses the ability of a remedial alternative to permanently reduce or eliminate the potential for MEC exposure hazard.

Alternative 1 provides no effective and/or permanent response to the MEC. Alternatives 3 and 4 reduce the potential for MEC exposure by performing a surface and subsurface clearance, respectively. However, Alternative 3 would not apply to present-day conditions since military munitions are not known to be located on the ground surface and permanently eliminating the potential for MEC exposure under Alternative 4 would be difficult because the potential would exist for undetected MEC to remain in place. Alternative 2 was determined to provide the second least permanent response to the buried munitions as MEC would potentially remain in place below the ground surface.

### **Reduction of Toxicity, Mobility, and Volume through Treatment**

This criterion addresses the statutory preference for selecting remedial actions that employ treatment technologies which permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances. This preference is satisfied when treatment is used to decrease the principal threats at a site by destruction of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media.

Alternatives 1 and 2 provide no reduction in toxicity, mobility, or volume of contaminants.

Alternatives 3 and 4, though involving treatment, may not provide an adequate level of reduction in toxicity, mobility, or volume of contaminants, since MEC may exist below the surface and deeper than is detectable.

### **Short-term Effectiveness**

Short-term effectiveness addresses short-term risks and the potential consequences and effects of an alternative during the implementation phase. Short-term risks are potential adverse impacts to workers, the community, and the environment during the construction and implementation phases of the remedial action.

Alternatives 1 and 2 both have no associated short-term risks or adverse impacts to workers, the community, and the environment. Alternatives 3 and 4 have short-term impacts associated with heavy equipment use, intrusive activities and/or excavation, and possible interaction with MEC. Alternative 4 would also cause environmental and ecological impacts by excavating the site to a predetermined depth.

### **Implementability**

This criterion addresses the technical and administrative feasibility of implementing a specific remedial action alternative. Implementability includes consideration of whether the alternative is technically possible; the availability of necessary materials, equipment, and specialists; administrative and regulatory requirements; and monitoring requirements.

Alternatives 1 and 2 are both technically and administratively feasible and easy to implement. Alternative 3 was ranked second for this criterion and Alternative 4 was considered the least implementable alternative due to technical constraints related to the presence of significant amounts of subsurface metallic construction debris associated with the 1904 World's Fair. The metallic debris could serve to shield MEC items from detection and may result in a significant amount of excavations that yield no reduction in explosive risk.

## Cost

This criterion evaluated the cost to implement each remedial action alternative. The cost estimates developed are order-of-magnitude level estimates based on a variety of information including productivity estimates, cost estimating guidelines and prior experience.

Alternative 1 requires no action, therefore, no costs would have been incurred. Alternative 2 has costs associated with the reproduction of pamphlets, conducting five-year reviews, and conducting site visits in subsequent years. Alternative 3 has costs associated with the surface clearance and institutional controls, but lower costs than a comprehensive subsurface clearance. Alternative 4 was determined to be the most costly alternative.

The original cost of implementing the remedial alternatives back in 2004 ranged from \$0 for Alternative 1 (No Action) to \$2,201,930 for Alternative 4. The current annual estimated cost for Alternative 2 is \$10,000, which is associated with inspections, reproduction of educational awareness pamphlets, and interviews of stakeholders. The current estimated cost to implement Alternative 3 (Surface Clearance) is \$2,033,235 in addition to \$10,000 annually in long-term management costs. The current estimated cost to implement Alternative 4 (Subsurface Clearance) is \$4,011,286 in addition to \$10,000 annually in long-term management costs.

## State Agency Acceptance

MDNR supported the selection of Alternative 2-Institution Controls as the final Removal Action Alternative for the Forest Park AOC in 2004. However, the MDNR encourages the public to submit comments on the alternatives presented in this Proposed Plan, and reserves the final remedy recommendation until input from the community is evaluated.

## Community Acceptance

Community acceptance of the proposed Final Remedy will be evaluated after the public comment

period ends and will be described in the Responsiveness Summary of the Decision Document for the site.

## DISCUSSION OF ALTERNATIVES AS THE FINAL REMEDY

### Alternative 1: No Action Alternative

The No Action alternative would consist of USACE no longer providing long-term management actions at the Forest Park AOC. USACE would also not provide the City of St. Louis with any ongoing educational awareness of the potential of encountering military munitions at the Forest Park AOC. Inspections, stakeholder interviews, and reproduction and distribution of educational awareness pamphlets, in accordance with the MOA, would not be conducted on an annual basis. Lastly, five-year reviews would not be conducted.

This alternative would not meet the threshold criteria of Overall Protection of Human Health and the Environment, but it is included as a baseline to judge the other remedial alternatives.

### Alternative 2: Institutional Controls

Adopting this removal action alternative continues all of the ongoing aspects of the removal action that was implemented in 2004 as the on-going final remedy. It will provide continued protection of public health without a disruption to the Forest Park community. It has a proven record of minimizing risk to human health through educational awareness consisting of annual inspections and interviews with stakeholders, and it continues the good relationship between the USACE and the City of St. Louis, which supports Alternative 2 as the final remedy for the Forest Park AOC. There are no new actions needed beyond five year reviews and on-going public awareness efforts. All costs are budgeted and expected. This is the proposed final remedy.

### Alternative 3: Surface Clearance

This alternative would not be beneficial today since military munitions are known not to be located on

the ground surface. Previous interim removals of WWI military munitions in 1988, 2001 and 2002 were conducted when the munitions were exposed as the result of either sprinkler system installation activities or extensive excavation and grading operations during the renovation of the Norman K. Probstein Golf Course.

#### **Alternative 4: Subsurface Clearance**

This alternative would negatively impact the public's access to the Norman K. Probstein Golf Course during work efforts. This alternative would also present a hazard to the field crew encountering and potentially handling UXO during removal operations. Furthermore, there would be technical difficulties related to the presence of subsurface metallic construction debris associated with the 1904 World's Fair. The metallic debris could obscure MEC items from detection and may result in an increase in excavations that yield no reduction in explosive risk. Lastly, costs to implement this alternative would be greater than Alternatives 2 and 3.

### **SUMMARY OF PREFERRED ALTERNATIVE**

Alternative 2 is the preferred alternative. Alternative 2, in accordance with the 2004 MOA between USACE and the City of St. Louis, consists of the continuation of inspections, stakeholder interviews, distribution of educational awareness pamphlets, and the monitoring of the status of City Ordinance 68328, effectively protect human health and the environment from MEC remaining at the Forest Park AOC. Because hazardous substances, pollutants or contaminants remain on-site above levels that allow for unlimited use and unrestricted exposure, statutory five-year reviews will be required.

Based on information currently available, Alternative 2 meets the threshold criteria and provides the best balance of tradeoffs of all alternatives with respect to balancing and modifying criteria. USACE expects the preferred alternative to satisfy the statutory requirements of CERCLA 121(b). The Proposed Remedy can

change in response to public comment or new information.

### **COMMUNITY PARTICIPATION**

USACE encourages the public to gain a more comprehensive understanding of the site and the activities that have been conducted at the site. Detailed information about the previous investigations and response action activities can be found in the reports and documents contained in the Administrative Record file located online at:

<http://www.nwk.usace.army.mil/Missions/Environmental/EnvironmentalProjects/FormerForestParkRecreationCamp.aspx>

**Public Comment Period:** The public comment period extends from September 6, 2016 to October 7, 2016 and is provided to allow the public time to review the Proposed Final Remedy presented in this document. USACE, in consultation with MDNR, will consider the views and input of the general public before making a final decision on the proposed final remedy for the former Forest Park Recreation Camp project. As part of the public comment period, USACE will host a Public Meeting on September 13, 2016 at 5:30pm to provide and discuss information in this Proposed Plan. The Public Meeting will be held at Dennis and Judith Jones Visitor and Education Center, 5595 Grand Drive in Forest Park, St. Louis, Missouri.

**Public Comments:** The public is encouraged to provide comment on the approach in this Proposed Plan through attendance at the Public Meeting. Interested parties may also submit written comments by letter or by using the attached form.

Written comments should be submitted to Josephine Newton-Lund at the address below:

U.S. Army Corps of Engineers, Kansas City  
District  
Josephine Newton-Lund, *Senior Project Manager*  
CENWK-PM-ES  
601 E. 12th Street

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## REFERENCES

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**ACRONYMS AND ABBREVIATIONS**

|          |   |
|----------|---|
| AOC      | Area of Concern   |
| ARARs    | Applicable or Relevant and Appropriate Requirements                   |
| CERCLA   | Comprehensive Environmental Response, Compensation, and Liability Act |
| DD       | Decision Document   |
| DoD      | Department of Defense   |
| EE/CA    | Engineering Evaluation/Cost Analysis                                  |
| FUDS     | Formerly Used Defense Sites   |
| MC       | Munitions Constituents  |
| MDNR     | Missouri Department of Natural Resources                              |
| MEC      | Munitions and Explosives of Concern                                   |
| MMRP     | Military Munitions Response Program                                   |
| MOA      | Memorandum of Agreement   |
| MRS      | Munitions Response Site   |
| NPL      | National Priorities List  |
| OE       | Ordnance and Explosives   |
| RAOs     | Remedial Action Objectives  |
| USACE    | U.S. Army Corps of Engineers  |
| USACE-KC | U.S. Army Corps of Engineers – Kansas City District                   |
| USEPA    | U.S. Environmental Protection Agency                                  |
| UXO      | Unexploded Ordnance   |
| WP       | White Phosphorus  |
| WWI      | World War I   |

## GLOSSARY OF TERMS

**Administrative Record** – The documents that form the basis for the selection of a response action compiled and maintained by the lead agency.

**Applicable or Relevant and Appropriate Requirements (ARARs)**: The Federal and State environmental laws and regulations that apply to a selected remedy. These requirements vary among sites and alternatives.

**Comprehensive Environmental Response Compensation, and Liability Act (CERCLA)** – The Federal law that addresses problems resulting from releases of hazardous substances to the environment.

**Decision Document (DD)** – The CERCLA decision document that presents the cleanup remedy selected by the Army.

**Munitions Constituents (MC)**- Munitions constituents is a term used to describe a chemical compound or element originating from unexploded ordnance, discarded military munitions, or other military munitions. These chemical compounds may be found in the environment such as in soil, surface water, or groundwater.

**Military Munitions** – Ammunition products and components produced for or used by the armed forces for national defense and security. Military munitions used historically at the site include bulk explosives, hand grenades, rifle grenades, anti-tank practice landmines, rockets, mortars, and projectiles.

**Munitions and Explosives of Concern (MEC)** – A specific category of military munitions that may pose unique explosives safety risks, and includes: (a) Unexploded Ordnance (UXO); (b) Discarded Military Munitions (DMM); or (c) Munitions Constituents (MC) (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.

**Munitions Response** – Response actions, including investigation, removal and remedial actions to address the explosives safety, human health, or environmental risks presented by military munitions.

**Munitions Response Site (MRS)** – A discrete location that is known to require a munitions response.

**National Priorities List (NPL)** – USEPA's list of uncontrolled or abandoned waste sites that present the greatest potential threat to human health or the environment.

**Ordnance and Explosives (OE)** – Any of the following: 1) Military munitions that are UXO or are abandoned; 2) Soil with a high enough concentration of explosives to present an explosive hazard; and 3) Facilities, equipment, or other materials contaminated with a high enough concentration of explosives such that they present a hazard of explosion.

**Proposed Plan** – CERCLA document that summarizes evidence to support the selection of a preferred remedial alternative at a CERCLA site. The document is intended for public distribution to solicit comments on the proposed action(s).

**Remedial Action Objectives (RAOs)** – Statements describing the goals to be achieved in protecting human health and the environment.

**Unexploded Ordnance (UXO)** – Military munitions that: (a) have been primed, fuzed, armed, or otherwise prepared for action; (b) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (c) remain unexploded either by malfunction, design, or any other cause.

