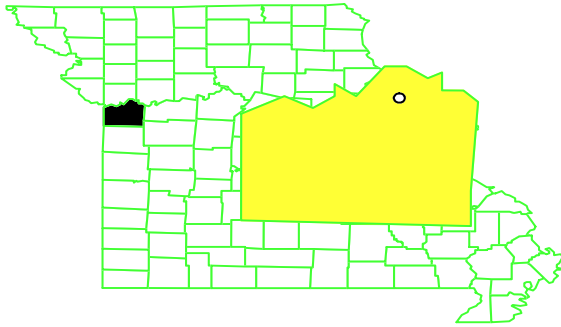


**LAKE CITY ARMY  
AMMUNITION  
PLANT  
LAGOON)  
MISSOURI  
EPA ID# MO3213890012**

**EPA Region 7  
City: Independence  
County: Jackson County  
Other Names:**

**02/05/2009**



## **SITE DESCRIPTION**

The Lake City Army Ammunition Plant (LCAAP) is a 3,935-acre government owned-contractor operated (GOCO) facility that was established in 1941 to manufacture and test small caliber ammunition for the U.S. Army. The facility has remained in continuous operation except for one 5-year period following World War II. Historically, waste treatment and disposal at LCAAP occurred on-site and relied on lagoons, landfills, and burn pits for waste disposal. Industrial operations have generated large quantities of potentially hazardous wastes and hazardous substances, including solvents, oils, greases, explosives, radionuclides, perchlorates, and metals. LCAAP uses treated groundwater from 13 on-site production wells to provide drinking and process water for plant operations. The small community of Lake City, population approximately 25, is located adjacent to the northern boundary of the Installation, and relies on groundwater obtained from private wells. The Missouri River and Little Blue River, located near the site, are used for recreational activities.

### **Site Responsibility:**

This site is being addressed by the Army with oversight provided by EPA and the State of Missouri.

### **NPL LISTING HISTORY**

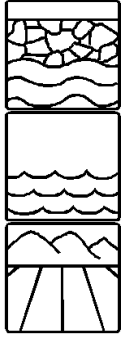
**Proposed Date:** 10/15/84

**Final Date:** 07/22/87

**Deleted Date:**

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## THREATS AND CONTAMINANTS



Groundwater beneath the site, soil, and surface water are contaminated with volatile organic compounds (VOCs), various explosives, perchlorates, and heavy metals including lead, arsenic, and chromium from former waste disposal practices. Potential threats exist for those who have direct contact with or ingest untreated groundwater, surface water, or soil. The LCAAP uses treated groundwater from the site to provide drinking and process water for plant operations. VOC-contaminated groundwater has migrated off-plant in the Northeast Corner area of the LCAAP, but does not appear to have migrated far beyond the LCAAP boundary. The migration of contaminated groundwater beyond the LCAAP boundary is controlled by a groundwater extraction well.

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## CLEANUP APPROACH

### Response Action Status

**Immediate Actions:** Air strippers were installed in the plant's drinking water supply facilities to remove volatile contaminants before reaching the LCAAP water treatment plant. LCAAP is monitoring groundwater contaminant migration through a regular sampling program.

**Installation Wide Area:** The Army initiated an investigation in 1987 to determine the extent and type of contamination on site. The study confirmed contamination of the groundwater in various areas at LCAAP and identified several potential source areas. In 1991, the investigation was expanded, identifying additional source areas for which fieldwork was completed in 1992. Groundwater monitoring, initiated in 1994, is continuing. Additional plant-wide groundwater sampling was conducted in mid-1998, and continues semi-annually. Sampling did not indicate the presence of VOCs in groundwater beyond the LCAAP boundaries, aside from the Northeast Corner. LCAAP water supply wells are used to contain groundwater contamination within the LCAAP boundary in the western part of the Plant. The water is treated prior to use by the LCAAP. Sampling of Area 8 identified soil and groundwater contamination. In early 1996, the Army completed an interim cleanup action at Area 8 to construct a soil cover on open waste lagoons. A 100 Percent Remedial Design/Remedial Action Work Plan was completed in December 2007. The intent of the RD/RA WP is to present final specifications, operation and maintenance requirements, and update applicable cost information and any relevant chemical or geotechnical data on which the remedial design is based. A Record of Decision (ROD) was signed and received in January 2008. A Land Use Control Implementation Plan (LUCIP) was incorporated into both the RD/RA WP and the ROD.

**Area 10:** During the 1960's and 1970's, LCAAP developed, test-fired, and demilitarized

munitions that contained radioactive source material (i.e., depleted uranium (DU)). Testing and demilitarization activities involved firing munitions into sand-filled structures called “bullet catchers.” Residual solid wastes from these operations were deposited in a semi-wooded area north of the firing line, which was designated for remediation under CERCLA. The footprint of the waste sand piles covers approximately four acres within Area 10. Previous investigations have identified lead and DU contamination throughout the sand piles both as discrete metal fragments and as fine particulate matter. A draft Removal Action Work Plan was completed in October 2007, to address the removal, demilitarization, and cleanup of the DU contaminated sand piles. An Explanation of Significant Differences was also completed in October 2007, to document proposed modifications to the removal action alternative recommended in the Final Area 10 Sand Piles Engineering Evaluation and Cost Analysis (EE/CA; CABRERA 2005). The Removal Action Work Plan was finalized in July 2008, and the sand piles were removed in December 2008. A Removal Action Completion Report will be finalized around May 2009, with a No Further Action ROD being completed by June 2010.

Area 18: Significant soil and groundwater contamination, primarily due to VOCs and metals, has been detected in Area 18. An investigation of Area 18 in 1992 provided information regarding the nature and extent of contamination. A groundwater extraction well and treatment plant was constructed in Area 18 in early 1997. This pump and treat system ensures that VOC-contaminated groundwater from this area of the LCAAP does not migrate off-plant. The system began operation in early 1997 and remains operational. An interim Record of Decision (ROD) for cleanup of the source area in Area 18 was signed in April 1999. In addition to groundwater cleanup via pump and treat, the ROD specifies multi-phase vapor extraction to address VOC source areas. After signing the ROD, additional data collected by the Army during the design of the multi-phase vapor extraction system indicated that the area of contamination in Area 18 was much larger than expected. The groundwater contamination plume has been found to extend much further to the west, and more source material has been found at locations deeper in the aquifer. The selected remedy for the COC's in Area 18 are as follows: *Surficial lead contaminated soil* – in-situ stabilization, consolidation with vegetative cover, and institutional controls; *VOC source areas* – in-situ reactive zone (IRZ) barrier, soil excavation, NAPL recovery wells, bio-dechlorination, monitored natural attenuation (MNA), and vegetative cover; and *OU wide groundwater* – groundwater extraction and treatment, MNA, and land use controls (LUCs). A final ROD was signed in September 2007 and a 100 percent RD/RA Workplan was received in January 2008. The 100 percent RD/RA Workplan was finalized in August 2008.

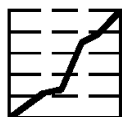
Northeast Corner: The Army initiated an investigation in 1990, to determine the extent and type of contamination present in the Northeast Corner. Groundwater sampling in the fall of 1996 detected groundwater contamination from the Northeast Corner at the northern LCAAP boundary. The Army installed an extraction well in the center of this plume on LCAAP property in early 1998, to eliminate migration of contaminated groundwater off-plant from the Northeast Corner. Further sampling was performed in the spring of 2002, to determine the extent of the off-plant contamination. Low-level VOC contamination was found in groundwater slightly beyond the LCAAP boundary. The selected remedy for the COC's in the Northeast Corner are as follows: *VOC source areas* – in-situ reactive zone (IRZ) barrier, soil excavation, NAPL recovery wells, bio-dechlorination, permeable reactive barrier (installed in 2000), and monitored natural attenuation (MNA); and *OU wide groundwater* – groundwater extraction and treatment,

MNA, and LUC's. A ROD was signed in June 2007, and a 100 percent RD/RA Work plan was submitted to EPA in November 2007. The 100 percent RD/RA Workplan was finalized in February 2008.

**Site Facts:** The LCAAP was included on the National Priorities List (NPL) in 1987. A Federal Facility Agreement (FFA) between EPA, the Army, and the State of Missouri was signed in 1989, to address investigative, design, and cleanup activities throughout the Installation. Funding to address environmental investigations and cleanups at the LCAAP is provided through the Defense Environmental Restoration Program, a program established to identify, investigate, and control hazardous contaminants at DoD facilities.

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## ENVIRONMENTAL PROGRESS



Early response actions have reduced the potential for exposure to hazardous substances at the Lake City Army Ammunition Plant site while further investigations leading to final cleanup activities are taking place. A pump and treat system to contain contaminated groundwater on-site at Area 18 began operations in the spring of 1997. An additional pump and treat system became operational in the Northeast Corner in early 1998, to prevent further migration of contaminated groundwater off-site. A permeable reactive wall was constructed in the Northeast Corner in the summer of 2000, to further reduce migration of contaminated groundwater from the source areas to drinking water locations.

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## **COMMUNITY INVOLVEMENT**

The lead on this site is the Army, with oversight being done by EPA and MDNR. The Army has issued several Fact Sheets, held several public availability sessions, and the Restoration Advisory Board holds quarterly meetings, to which EPA is always invited. EPA has not done any other public outreach.

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## SITE REPOSITORY



Mid-Continent Public Library-South,  
Blue Springs, MO

Lake City Army Ammunition Plant,  
Independence, MO

Superfund Records Center  
901 N. 5th St.  
Kansas City, KS 66101  
Mail Stop SUPR  
(913)551-7166

## REGIONAL CONTACTS

**SITE MANAGER:**

**E-MAIL ADDRESS:**

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(913) 551-7157

**COMMUNITY INVOLVEMENT**

**COORDINATOR:**

**PHONE NUMBER:**

**E-MAIL ADDRESS:**

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(913) 551-7253  
himes.beckie@epa.gov

**STATE CONTACT:**

**PHONE NUMBER:**

Mary Barnes - Missouri Department of Natural  
Resources  
573-751-6838

## MISCELLANEOUS INFORMATION

**STATE:**

MO

**CONGRESSIONAL DISTRICT:**

05

**EPA ORGANIZATION:**

SFD-SUPR/FFSE

## MODIFICATIONS

**Created by:**

Karla  
Asberry/SUPR/R7/USEPA/  
US

**Created Date:**

04/13/98 02:55 PM

**Last Modified by:**

Beckie  
Himes/R7/USEPA/US

**Last Modified Date:**

02/05/2009 11:42 AM

