

**INSTALLATION ACTION PLAN**  
For  
**LAKE CITY ARMY AMMUNITION  
PLANT**



**March 2001**

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for  
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# PURPOSE

The purpose of the Installation Action Plan (IAP) is to outline the total multi-year restoration program for an installation. The plan will define Installation Restoration Program (IRP) requirements and propose a comprehensive approach and associated costs to conduct future investigations and remedial actions at each Solid Waste Management Unit (SWMU) at the installation and other areas of concern.

In an effort to coordinate planning information between the IRP manager, major army commands (MACOMs), installations, executing agencies, regulatory agencies, and the public, an IAP has been completed for the Lake City Army Ammunition Plant (LCAAP). The IAP is used by the Army to track requirements, schedules and tentative budgets for all major Army installation restoration programs.

All site specific funding and schedule information has been prepared according to projected over-all Army funding levels and is therefore subject to change during the document's annual review. Under current project funding, all remedies will be in place at the LCAAP by the end of 2009.

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# PREPARED BY

**LAKE CITY ARMY AMMUNITION PLANT**

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# ACRONYMS & ABBREVIATIONS

<b>ABLF</b>	Abandoned Landfill
<b>ATK</b>	Alliant Tech Systems
<b>CERCLA</b>	Comprehensive Environmental Response Compensation and Liability Act
<b>CAMU</b>	Corrective Action Management Unit
<b>DA</b>	Department of the Army
<b>DERA</b>	Defense Environmental Restoration Account
<b>DRMO</b>	Defense Reutilization and Marketing Office
<b>DSERTS</b>	Defense Site Environmental Restoration Tracking System
<b>DU</b>	Depleted Uranium
<b>EPA</b>	Environmental Protection Agency
<b>ER,A</b>	Environmental Restoration, Army (formally called DERA)
<b>FFCA</b>	Federal Facility Compliance Agreement
<b>FFSRA</b>	Federal Facility Site Remediation Agreement
<b>FS</b>	Feasibility Study
<b>FY</b>	Fiscal Year
<b>GOCO</b>	Government Owned, Contractor Operated
<b>IAG</b>	Interagency Agreement
<b>IOC</b>	Industrial Operations Command (replaced by OSC)
<b>IRA</b>	Interim Remedial Action
<b>IRP</b>	Installation Restoration Program
<b>IWOU</b>	Installation Wide Operable Unit
<b>LCAAP</b>	Lake City Army Ammunition Plant
<b>LTM</b>	Long Term Monitoring
<b>LTO</b>	Long Term Operations
<b>MCL</b>	Maximum Contaminant Level
<b>MIBK</b>	Methyl Iso Butal Keyton
<b>MDNR</b>	Missouri Department of Natural Resources
<b>NE</b>	Not Evaluated
<b>NECOU</b>	Northeast Corner Operable Unit
<b>NFA</b>	No Further Action
<b>NPL</b>	National Priority List
<b>NRC</b>	Nuclear Regulatory Commission
<b>OSC</b>	Operations Support Command
<b>OU</b>	Operable Unit
<b>POL</b>	Petroleum, Oil & Lubricants
<b>PRB</b>	Permeable Reactive Barrier
<b>PRW</b>	Permeable Reaction Wall
<b>P &amp; T</b>	Pump and Treat
<b>RA</b>	Remedial Action
<b>RA(C)</b>	Remedial Action - Construction
<b>RA(O)</b>	Remedial Action - Operation
<b>RAB</b>	Restoration Advisory Board
<b>RAMP</b>	Remedial Action Management Plan
<b>RCRA</b>	Resource Conservation and Recovery Act
<b>RBSC</b>	Risk Based Screening Criteria
<b>RD</b>	Remedial Design
<b>REM</b>	Removal Action
<b>RI</b>	Remedial Investigation
<b>RIP</b>	Remedy in Place

# ACRONYMS & ABBREVIATIONS

<b>ROD</b>	Record of Decision
<b>RRSE</b>	Relative Risk Site Evaluation
<b>SCAPS</b>	Site Characterization Analysis and Penetrometer System
<b>SI</b>	Site Inspection
<b>SVOC</b>	Semi-Volatile Organic Compounds
<b>SWMU</b>	Solid Waste Management Unit
<b>TCE</b>	Trichloroethylene
<b>TPH</b>	Total Petroleum Hydrocarbons
<b>USACHPPM</b>	United States Army Center for Health Promotion and Preventive Medicine
<b>USAEC</b>	United States Army Environmental Center
<b>USAEHA</b>	United States Army Environmental Hygiene Agency (replaced by CHPPM)
<b>USATHMA</b>	United States Army Toxic and Hazardous Material Agency (replaced by AEC)
<b>UXO</b>	Unexploded Ordnance
<b>VOC</b>	Volatile Organic Compounds



# SUMMARY

<b>STATUS</b>	NPL Installation, HRS of 33.62		
<b>NUMBER OF DSERTS SITES:</b>	35 DSERTS sites 8 Active ER,A Eligible Sites (receiving funds) 27 Response Complete		
<b>DIFFERENT DSERTS SITE TYPES:</b>	1	Burn Area	4 Contaminated Fill
	5	Surface Disposal area	3 Drainage Ditch
	4	Disposal Pit/ Dry Well	1 Firing Range
	1	Industrial Discharge	6 Landfill
	1	Storage Area	7 Surface Impoundment/Lagoon
	1	Spill Site Area	1 Waste Treatment Plant
<b>CONTAMINANTS OF CONCERN:</b>	Explosives, Organic Chemicals, Heavy Metals, PCB's		
<b>MEDIA OF CONCERN:</b>	Groundwater, Soil, Surface Water, Sediments		
<b>COMPLETED REM/IRA/RA:</b>	REM: Lagoon and Trench Closures (1986-1989) Total Cost: \$17,760,000 REM: Area 18 Pump and Treat System (1997), Total Cost: \$5,597,000 REM: Area 16 Extraction Well EW-2 (1998), Total Cost: \$857,000		
<b>CURRENT IRP PHASES:</b>	RI/FS at 5 sites	RD at 1 site	IRA at 1 site
	RA at 1 site	RAO at 2 sites	
<b>PROJECTED IRP PHASES:</b>	RI/FS at 4 sites	RD at 4 sites	RA at 6 site
	RAO at 3 sites	IRA at 1 site	LTM at 4 site
<b>IDENTIFIED POSSIBLE REM/IRA/RA:</b>	RA at LCAAP-007, 008, 010, 016, 017, 018 IRA at 016, 035		
<b>FUNDING:</b>	PRIOR YEAR FUNDS		\$ 24,810.0 K
	FY 00 FUNDS		\$ 4,858.0 K
	FUTURE REQUIREMENTS		\$ 76,255.0 K
	TOTAL		\$ 105,923.0 K
<b>DURATION:</b>	YEAR OF IRP INCEPTION,		1979
	YEAR OF RA COMPLETION		2009
	YEAR OF IRP COMPLETION		2035

# INSTALLATION INFORMATION

## LOCALE

LCAAP is located in Independence, (population 100,000) Missouri (in Jackson County). It is located 23 miles east of Kansas City, Missouri (population 500,000), 3 miles north of Blue Springs (population 42,000), 2 miles southwest of Buckner (population 3,040) and adjacent to Lake City (population 50). Installation is 3,935 acres in area.

## COMMAND ORGANIZATION

**MAJOR COMMAND:** U.S. Army Materiel Command; Engineering, Housing, Environmental and Installation Logistics, Environmental Quality Division (AMCEN-A)

**SUBCOMMAND:** U.S. Army Operations Support Command (OSC)

**INSTALLATION:** LCAAP, Engineering Division (SMALC-EN)

## INSTALLATION RESTORATION PROGRAM (IRP) EXECUTING AGENCY

- Installation and U.S. Army Corps of Engineers, Kansas City District.
- Alliant Lake City Small Arms Company (ATK)

## REGULATOR PARTICIPATION

**FEDERAL:** U.S. Environmental Protection Agency (EPA), Region VII, Superfund Branch.

**STATE:** Missouri Department of Natural Resources (MDNR), Division of Environmental Quality and Division of Geology and Land Survey.

## REGULATORY STATUS

- NPL Installation with an FFA (IAG).

## MAJOR CHANGES TO ACTION PLAN FROM PREVIOUS YEAR (FY 00)

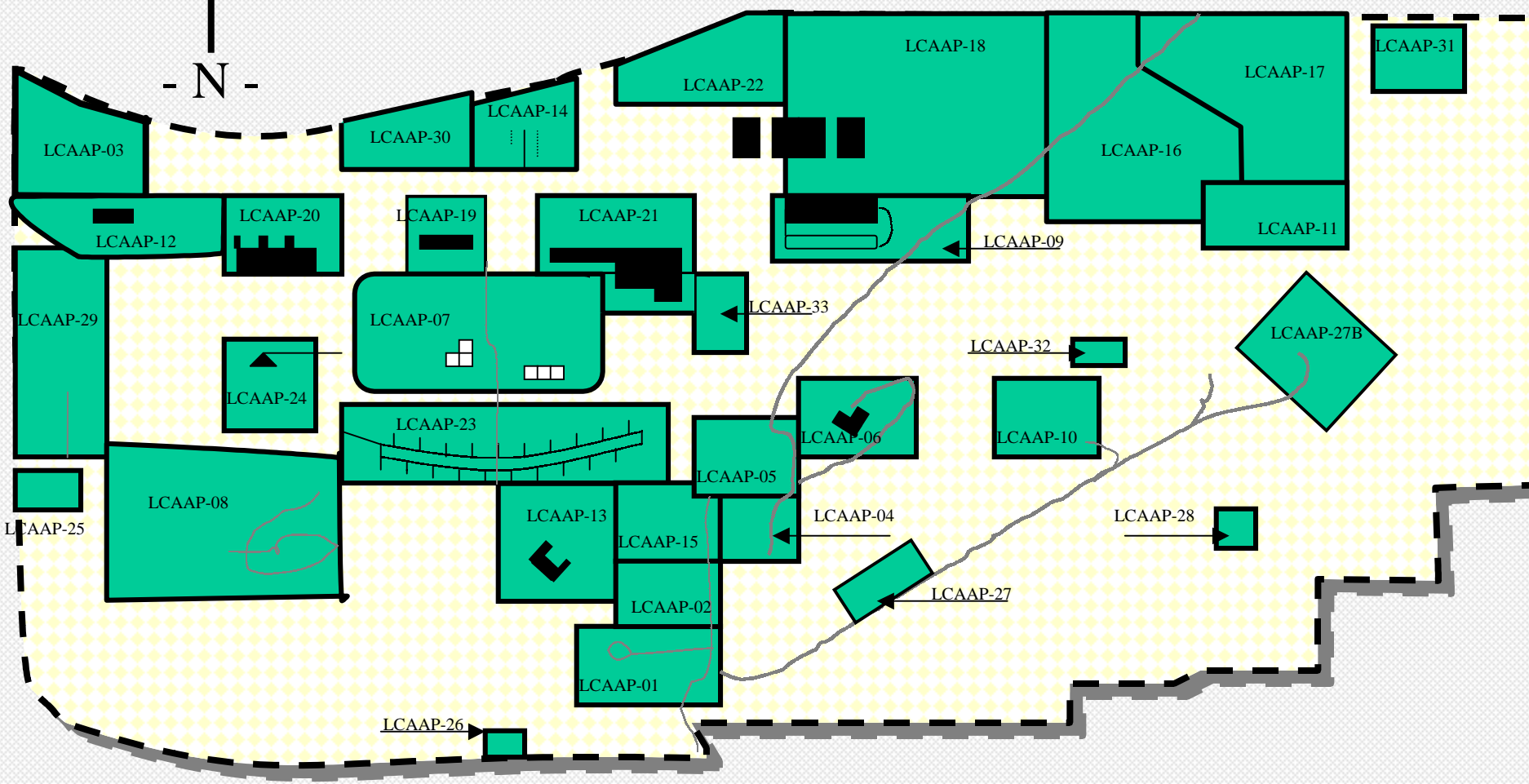
- LCAAP-16, 17 Interim Remedial Action construction was completed October 2000.
- LCAAP-16 (Abandoned Landfill) Action Memorandum was signed June 2000.

# INSTALLATION DESCRIPTION

Lake City Army Ammunition Plant (LCAAP) is an active U.S. Army Operations Support Command (OSC) Installation, which manufactures small caliber ammunition, including 5.56mm, 7.62mm, 20mm, and .50 caliber rounds. It is a Government-owned contractor-operated (GOCO) facility that is operated by ATK.

LCAAP was the first new Government-owned facility established in the early 1940's to expand small caliber ammunition production in the United States. Construction at this 3,935-acre facility was initiated on 26 Dec 40 and completed on 11 Oct 41. The plant has operated continuously since 1941, except for a five-year period between World War II, and the Korean Conflict. The operating contractor from 1941 to 1985 was Remington Arms. In November 1985, plant operations were assumed by Olin Corporation. ATK assumed plant operations in April 2000.

LCAAP has produced a variety of small arms ammunition since 1941, including .30 caliber, .38 caliber, .50 caliber, 5.56mm, 7.62mm, 20mm, and 30mm ammunition. During WWII, 5.7 billion cartridges were produced; during the Korean Conflict, 1.1 billion, and during the Vietnam conflict, 14.4 billion. In 2000, production was approximately 400 million cartridges.



# LAKE CITY ARMY AMMUNITION PLANT

-  Installation Boundary
-  Roads
-  Buildings
-  LCAAP Sites

# CONTAMINATION ASSESSMENT

LCAAP is an NPL site and is jointly regulated by the U.S. EPA Region VII, and MDNR. A SARA 120 Inter-agency Agreement (IAG) was signed by DA, EPA and MDNR, and went into effect on 28 Nov 89. LCAAP is divided into three operable units: Area 18 OU, Northeast Corner OU (NECOU), and Installation-Wide OU (IWOU).

An installation assessment of LCAAP was conducted by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) in 1979 to assess the environmental quality of the facility. This report recommended that the installation should monitor the groundwater beneath the sandpits in the northwest corner of the installation.

In 1985, USATHAMA initiated a preliminary assessment/site investigation (PA/SI) program at LCAAP. Several areas of possible contamination were identified and a sampling plan was implemented. The PA/SI involved the installation of 24 groundwater monitoring wells at seven sites and the analysis of 48 soil and water samples. All seven areas sampled detected contaminants in the groundwater, including volatile chemicals, semivolatiles, explosives and metals.

A Three Phase Remedial Investigation (RI) was initiated in August 1987. The first phase of fieldwork was completed in August 1988, the second phase in September 1990, and the third phase in December 1992. A total of 35 DSERTS Sites have been identified for LCAAP (See Table 1 and Figure 1).

The results of the fieldwork showed low-level groundwater contamination in several areas across LCAAP. Constituents included volatile organic chemicals, metals and explosives. The Area 18 Operable Unit (LCAAP-018) has several old burn pits/trenches contaminated with organics and metals, as well as a groundwater contamination plume. The Northeast Corner Operable Unit (LCAAP-011,-016,-017) contains heavily contaminated oil and solvents pits; a 17-acre abandoned landfill with contaminated leachate seeps; a waste glass, paints and solvents area; and a (RCRA closed) metals-and explosives-contaminated burning ground. The Installation-Wide Operable Unit (remaining 31 DSERTS sites) has a number of areas with surface and subsurface contamination, primarily metals.

Water from several of the plant's production/potable wells contains volatile organics in excess of drinking water standards. Air strippers to treat this problem were installed for three wells in January 1990 and for four additional wells in 1992.

Approximately eight off-post residential potable water wells north of Lake City were included in a quarterly monitoring program which was in operation from 1987 until October of 1993. Low level explosive and volatile organic contamination has been sporadically detected in the residential wells, but levels remained below applicable criteria until recently. One sample containing TCE in December 1992, three samples containing cadmium in March 1993, and two samples containing lead in September 1993, were above Safe Drinking Water Standards. Continuing programs to sample the perimeter groundwater monitoring wells have not detected any significant contamination.

In the Fall of 1992, eight offpost groundwater monitoring wells were installed in strategic locations to intercept any contaminants that may migrate from LCAAP. A 'Comprehensive Groundwater Monitoring Program' began in June 1994 (the next "regularly scheduled" sampling event) to monitor CERCLA perimeter wells and RCRA wells.

In 1996, Groundwater contaminated primarily with trichloroethylene and 1,2-dichloroethane was discovered at the northern LCAAP perimeter in Area 16. Investigations are under way to determine if off-post contamination has occurred, and Phase 2 of a time critical removal action to contain the contaminated water on post using a pump and

# CONTAMINATION ASSESSMENT

treat well system has been completed.

The Area 18 pump and treat system (which began as a Removal Action) began operations in March 1997. The system became the object of a ROD in April of 1999, and continues to operate as part of the Final Remedy for the Area 18 Operable Unit, which also includes multi-phase vapor extraction and remediation of lead contaminated soil. This portion is currently in the design phase.

An Interim Remedial Action ROD was signed in September 1998 for installation of a permeable reactive barrier to treat groundwater from NECOU. This action is currently in Remedial Design. Additional data collection for the Feasibility Study is underway. An Interim Removal Action for the installation of a leachate collection system at the Area 16 Abandoned Landfill is moving into design.

A Removal Action is currently ongoing to address Installation-Wide Characterization/Removal of sumps. LCAAP has also proposed an Interim Remedial Action to build an onplant repository for metals-contaminated soils generated by CERCLA cleanup activities. The nonhazardous soils will be placed in a new landfill to be built on the existing RCRA dump site located in Area 8. The construction of the new repository will result in RCRA Closure of the existing dump site and installation of liners and a leachate collection system to bring the entire site up to current landfill standards.

# PREVIOUS STUDIES

Title	Author	Date
Installation Assessment of Lake City Army Ammunition Plant, Aberdeen Proving Ground, Maryland.	USATHAMA	May 1980
Lake City Army Ammunition Plant Preliminary Assessment/Site Inspection, Aberdeen Proving Ground, Maryland.	USATHAMA	January 1989
Final Phase I Remedial Investigation Report for Lake City Army Ammunition Plant, Volumes I and 11, Aberdeen Proving Ground, Maryland.	USATHAMA	, June 1990
Installation Restoration Program Conceptual Program for Lake City Army-Ammunition Plant, Aberdeen Proving Ground, Maryland	USATHAMA	1-Dec-90
Assessment of Applicable or Relevant and Appropriate Requirements, (ARARS) for Lake City Army Ammunition Plant, Aberdeen Proving Ground, Maryland.	USATHAMA,	December 1990,
Data Deliverables for the Northeast Corner Operable Unit Lake City Army Ammunition Plant, Aberdeen Proving Ground, Maryland.	USATHAMA	1-Mar-91
Data Deliverables for the Phase II Remedial Investigations Lake City Army Ammunition Plant, Aberdeen Proving Ground, Maryland.	USATHAMA	March 1991.
Final Phase I Remedial Investigation Report on Lake City Army Ammunition Plant, Volume III, Aberdeen Proving Ground, Maryland.	USATHAMA	May 1991, 9
Draft Final Remedial Investigation Report of the Area 18 Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume 2.- Appendices, Aberdeen Proving Ground, Maryland.	USAEC,	August 1993,
Draft Final Remedial investigation Report of the Northeast Corner Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume 2: Appendices, Aberdeen Proving Ground, Maryland.	USAEC	October 1993,
Draft Remedial Investigation Report of the Installation-Wide Operable Unit at Lake City Army Ammunition Plant, Volume 1, Part I: Text, Part II: Figures and Tables, Volume 2: Appendices., Aberdeen Proving Ground, Maryland.	USAEC	October 1993,
Draft Feasibility Study Workplan of the Installation-Wide Operable Unit at Lake City Army Ammunition Plant, Aberdeen Proving Ground, Maryland.	USAEC	November 1993,
Draft Feasibility-Study Report of the Area 18 Operable Unit at Lake City Army Ammunition Plant, Aberdeen Proving Ground, Maryland.	USAEC	December 1993,
Draft Remedial Investigation Report of Area 8 Operable unit at Lake City Army Ammunition Plant, Volume I Text, Volume 2: Appendices, Aberdeen Proving Ground, Maryland.	USAEC	December 1993,
Draft-Final Remedial Investigation Report of the Installation-Wide Operable Unit at Lake City Army Ammunition Plant, Volume 1, Part I: Text,-Part 11: Figures and Tables, Volume 2: Appendices, Aberdeen Proving Ground, Maryland.	USAEC	1-Feb-94
Draft Remedial Investigation Report of the Area 18 Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume 2: Appendices, Aberdeen Proving Ground, Maryland.	USAEC	October 1994,



# PREVIOUS STUDIES

Title	Author	Date
Draft Remedial Investigation Report of the Northeast Corner Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume 2: Appendices, Aberdeen Proving Ground, Maryland.	USAEC	November 1994,
Final Engineering Evaluation/Cost-Analysis Report for a Non-Time-Critical Removal Action for the Area 18 Operable Unit at Lake City Army Ammunition Plant, Aberdeen Proving Ground, Maryland.	USAEC	November 1994,
Final Remedial Investigation Report of the Area 18 Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume 2, Appendices, Aberdeen Proving Ground, Maryland	USAEC	January 1995,.
Final Remedial Investigation Report of the Northeast Corner Operable Unit at Lake City Army Ammunition Plant, Volume 1: Text, Volume2: Appendices, Aberdeen Proving Ground, Maryland	USAEC	March 1995,.
Draft Action Memorandum-for the Non-Time-Critical Removal Action for the Area 18 Operable Unit Lake City Army Ammunition Plant (LCAAP), Independence, Missouri.	LCAAP	April 1995,
Draft Feasibility Study Report of the Area 18 Operable Unit at LCAAP, Independence, Missouri	LCAAP	May 1995.
Final Action Memorandum for the Non-Time-Critical Removal Action for the Area 18 Operable Unit at LCAAP, Independence, Missouri	LCAAP	June 1995,
Final Feasibility Study Report of the Area 18 Operable Unit at LCAAP, Independence, Missouri.	LCAAP	September 1995,
Draft Final Feasibility Study Report of the Northeast Corner Operable Unit at LCAAP, Independence, Missouri.	LCAAP	June 1996,
Draft Final Proposed Plan for the Area 18 Operable Unit, Independence, Missouri. Supplemental Assessment of Groundwater Contamination in the NECOU, Independence, Missouri.	LCAAP	November 1996,
Engineering Evaluation/Cost Analysis, Non-Time-Critical Removal Action for the Area 16 Abandoned Landfill at the Northeast Corner Operable Unit, Independence, Missouri.	LCAAP	January 1997,
Landfarming Treatability Pilot Study Report, Independence, Missouri.	LCAAP	March 1997,
, Draft Final Proposed Plan for the Area 18 Operable Unit, Independence, Missouri.	LCAAP	April 199731.
Action Memorandum, Lake City Army Ammunition Plant, Non-Time-Critical Removal Action for the Northeast Corner Operable Unit Area 16 Abandoned Landfill, Independence, Missouri.	LCAAP	June 1997,
Village of Lake City Residential Well Evaluation, Independence, Missouri.	LCAAP	June 1997,
Final Record of Decision for an Early Remedial Action at the Northeast Corner Operable Unit, Independence, Missouri.	LCAAP	September 1998



# NORTHEAST CORNER-OPERABLE UNIT (LCAAP-011, -016, AND -017).

## OU DESCRIPTION

The Northeast Corner Operable Unit (NECOU) consists of the (RCRA-closed) Burning Ground (LCAAP-011), Abandoned Landfill (LCAAP-016); and Sanitary Landfill/Oil and Solvent Pits (LCAAP-017), which are all located in the northeast portion of the installation. The main concern of the OU is the TCE contamination that is migrating off-post.

LCAAP-011, the Burning Grounds, is a site is a RCRA-Closed (for soils only) facility formerly used for the open burning of propellants and waste pyrotechnics mixtures.

LCAAP-016, contains the 12-acre Abandoned Landfill, solvent pits, old burning ground area, two temporary solvent RCRA storage areas and an old firing range.

LCAAP-017 contains three former oil and solvents pits; a waste glass, paints, and solvents area; an old burning pad; the Current 16-acre Sanitary Landfill; and an active pistol range.

The Interim Remedial Action construction was completed in August 2000 that included installation of a Permeable Reactive Wall (PRW) to intercept a solvent plume and installation of a soil cover over the Area 17 Oil and Solvent Pits.

A Groundwater Containment System (Well 17S and Bldg 163 Treatment plant) is in operation to contain the plume downgradient from the PRW. At the Area 16 Abandoned Landfill a soil cover and leachate collection system is being planned as a REM.

The final action for the OU is currently in the Feasibility Study/Proposed Plan stage.

## PROPOSED PLAN

- Continued operation and monitoring of GW containment system and PRW
- Operations of the Area 16 ABLF leachate collection system.
- Completion of RI/FS (ROD)  
Groundwater treatment at LCAAP-016, 017

# LCAAP-011 BURNING GROUND

## SITE DESCRIPTION

This site is part of the NECOU.

LCAAP-011, the Burning Grounds, is a RCRA-Closed (for soils only) facility formerly used for the open burning of propellants and waste pyrotechnics mixtures.

Explosives have been detected in the groundwater. A Groundwater Containment System (Well 17S and Bldg 163 Treatment plant) is in operation to contain the plume downgradient from the PRW.

## IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

Explosives

**MEDIA OF CONCERN:**

Groundwater

**COMPLETED IRP PHASE:**

PA/SI, REM (Well 17S)

**CURRENT IRP PHASE:**

RC

**FUTURE IRP PHASE:**

RC

## PROPOSED PLAN

This site will be carried as part of the NECOU final action and funded under LCAAP-017.

# LCAAP-016

## ABANDONED LANDFILL/WASTE GLASS, PAINTS, SOLVENTS AREA

### SITE DESCRIPTION

This is part of the NECOU.

This area contains the following Solid Waste Management Units:

1. An open burning ground which was operated from 1952 through 1957.
2. Several small trenches which received solvents during the 1950s.
3. An area where five above-ground Waste Oil and Solvents tanks were operated from 1980 through 1982. This is collocated with a RCRA site.
4. An abandoned solid waste landfill which accepted Plant-generated industrial/construction waste from 1970 through 1979.
5. A pistol range, which the LCAAP security force used from 1952 through 1963.
6. A drum storage area which operated from 1979 until 1982. This is collocated with a RCRA site.

A Permeable Reactive Wall (PRW) was installed in August 2000 to remove VOCs from groundwater. The PRW installation is part of the selected remedy in an Interim Action ROD signed in September 1998. An Action Memorandum and RAMP have been completed for the installation of a leachate collection system and soil cover at the Area 16 Abandoned Landfill. A Groundwater Containment System (Well 17S and Bldg 163 Treatment plant) is in operation to contain the plume downgradient from the PRW.

### PROPOSED PLAN

Finish leachate collection system and soil cover at the ABLF.

Continue operation and monitoring of the Groundwater Containment System. These actions are funded under LCAAP-018.

Performance monitoring of the PRW.

Complete RI/FS (PP, ROD), RD, RA as part of the NECOU final action. With the current information, source remediation is the expected RA.

### IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Explosives, Solvents, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI, IRA (PRW), RD (ABLF), REM (Well 17S)

**CURRENT IRP PHASE:**

RI/FS, RA(O), REM (ABLF)

**FUTURE IRP PHASE:**

RI/FS(PP, ROD), RD, RA, RA(O), LTM



### CONSTRAINED COST TO COMPLETE

PHASE	2001	2002	2003	2004	2005	2006	2007+
RI/FS	25	25					
RD		150	200				
RA(C)				1050	1150	2000	
RA(O)	350	500	500	500	500	675	12700
IRA	120						
LTM				100	100	100	2320

**PROJECTED TOTAL: \$20,040,000**

# LCAAP-017

## CURRENT SANITARY LANDFILL/OIL & SOLVENTS PITS

### SITE DESCRIPTION

This is part of the NECOU.

This area contains the following Solid Waste Management Units/ Areas of Concern:

1. Three Oil & Solvents Pits which received IWTP oil and grease, waste solvents, and waste oil from 1960 until 1979. Pit received an estimate of 6 million gallons of oil and solvents.
2. An area where Waste Glass, Paint, and Solvents were buried in shallow pits and a stream bed. This area was active from 1960 through 1970. This area contains an estimate of 10,000cy of solvent, POL-contaminated soil.
3. Off-post VOC-contaminated groundwater.
4. Isolated VOC plume in the East Gate Area.
5. An open burning pad which operated for a short time during 1975.

This area contains the most VOC-contaminated site on Plant. A Permeable Reactive Wall (PRW) and soil cover over the Area 17 Oil and Solvent Pits were installed in August 2000. These were part of the selected remedy in an Interim Action ROD signed in September 1998. A Groundwater Containment System (Well 17S and Bldg 163 Treatment plant) is in operation to contain the plume downgradient from the PRW.

Other areas in Area 17, but not eligible for IRP funding, are the pistol range, which is currently used by the LCAAP security force, and a closed MDNR-permitted Sanitary Landfill which was operated from 1980 to 1999.

### PROPOSED PLAN

Continue operation and monitoring of the Groundwater Containment System. These actions are funded under LCAAP-018.

Performance monitoring of the PRW.

Complete RI/FS (PP, ROD), RD, RA as part of the NECOU final action. With the current information, source remediation is the expected RA.

### IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Solvents, Metals, POL

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI, IRA (PRW), REM (Well 17S)

**CURRENT IRP PHASE:**

RI/FS

**FUTURE IRP PHASE:**

RI/FS (PP, ROD), RD, RA, LTM



### CONSTRAINED COST TO COMPLETE

PHASE	2001	2002	2003	2004	2005	2006	2007+
RI/FS	25	25					
RD		154	196				
RA(C)				2231	1000	1775	544
RA(O)							
IRA							
LTM				100	100	100	2320

**PROJECTED TOTAL: \$8,570,000**

# AREA 18 OPERABLE UNIT (LCAAP-018)

## OU DESCRIPTION

This OU consists of a single DSERTS site (LCAAP-018).

Area 18 is located in the north-northeast portion of the installation. Eight surface impoundments (bulldozer pits) existed in this area in the 1950's, in which Industrial Wastewater Treatment Plant (IWTP) waste grease and oil, solvents, and trash were burned. Fifteen additional small earthen pits used for burning and disposal of IWTP and other wastes were located throughout the area.

A VOC plume lies in the groundwater beneath Area 18. A removal action (REM) to install a Groundwater Containment System (pump and treat system) is in operation. The system was expanded to include Well 17S, that extracts water from the NECOU.

The remedial design data collection indicated the VOC contamination is significantly larger and deeper than indicated in the ROD. The Army has requested a ROD Amendment to determine if the current remedy is still appropriate.

## PROPOSED PLAN

- Continued operation of GW pump and treat system
- Lead contaminated soil removal/disposal in new onplant soil repository
- Long-term Groundwater Monitoring

# LCAAP-018 BURN PITS/LAGOONS/TRENCHES AREA

## SITE DESCRIPTION

This area contains the following Solid Waste Management Units:

1. A central area of eight burn pits located along "Ditch B". The pits were used to burn Plant construction debris and solvents. The pits were operated from 1952 through 1975.
2. Surrounding the central burn pit area are 15 smaller pits, trenches, and lagoons which accepted solvents, IWTP oil and grease, and other Plant-generated industrial wastes. These pits were used intermittently from 1952 through 1975.
3. Lead-containing material has been spread in a thin layer over the ground in the area of the pits. This activity is believed to have been part of the pit capping operations taking place during 1975.

The ROD signed in April 1999 called for three actions: the Groundwater Containment System (pump & treat [P&T]); a Multi-Phase Extraction and Treatment System; and removal/cover of lead-contaminated soil.

The purpose of the P&T is to contain a VOC-contaminated plume in the deep aquifer. The P&T system, consisting of a former Water Supply Well (17FF) and one new Water Extraction Well (17R), was installed and officially began operation in April 1997. It was designed and constructed as a Removal Action, but, with the signing of the Area 18 ROD in April 1999, it has become part of the Final Remedy for the Area 18 Operable Unit.

The purpose of the Multi-Phase Extraction and Treatment System is for mass reduction of the VOCs, SVOCs (MIBK) and TPH-contaminated soil and shallow groundwater. Although the existing treatment system addresses most contaminants, the presence of MIBK will require additional treatment of the Multi-Phase effluent to meet the local sewer district's discharge requirement.

## PROPOSED PLAN

Operate Multi-Phase Extraction System and P&T System. Remove/cover lead contaminated soils. Continue LTM.

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Solvents, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil

**COMPLETED IRP PHASE:**

PA/SI, RI/FS, RD

**CURRENT IRP PHASE:**

RA(C)

**FUTURE IRP PHASE:**

RA(C), RA(O), LTM



## CONSTRAINED COST TO COMPLETE

PHASE	2001	2002	2003	2004	2005	2006	2007+
RI/FS							
RD							
RA(C)	3654	146	400				
RA(O)	780	880	880	730	730	730	15300
IRA							
LTM		150	230	150	150	150	4355

**PROJECTED TOTAL: \$28,585,000**



# INSTALLATION-WIDE (I-W) OPERABLE UNIT (LCAAP 001 TO 010, 012 TO 015, 019 TO 035)

## OU DESCRIPTION

The Installation-Wide Operable Unit consists of the remaining 31 sites. These are divided into 5 groups:

**Sumps Group: LCAAP-035.** An REM is underway to delineate contamination and remove or close 123 inactive sumps.

**IRA Soils Group: LCAAP-002, 008, 013, 015, 030, 031 includes the 'Proposed NFA' Sites: LCAAP-006, 009, 014, 020, 023, 024, 028, 029, 032.** These sites contain primarily metal-contaminated soils that may be relocated to LCAAP-008 as part of a on-site soil repository. The 'Proposed NFA' sites will be included as part of the IRA Soils Group ROD, after confirmatory sampling.

**Final Action Soils Group: LCAAP-001, 003, 004, 005, 007, 019, 021, 022, 025, 026, 033, 034.** These sites include areas with multiple contaminants that may require additional sampling and possible soil treatment.

**Groundwater Group: LCAAP-12.** A Groundwater REM to contain a VOC-plume on the western side of the installation and small VOC-plume in the center of the installation using existing production wells is underway. This group also includes periodic groundwater monitoring.

**Firing Range Group: LCAAP-010, 027.** LCAAP-010 is a firing range waste sand disposal pile containing mixed waste (DU and metals). LCAAP-010 will be remediated through an IRA and NRC Decommissioning. LCAAP-027 is a firing range backstop that contains mixed waste, and two active impact areas.

# INSTALLATION-WIDE (I-W) OPERABLE UNIT SUMPS GROUP- LCAAP-035

**Sumps Group: LCAAP-035.** An REM is underway to delineate contamination and remove or close 123 inactive sumps.

## PROPOSED PLAN

- Complete REM (sampling, removal or closure).
- The IWOU Final Action ROD will include this site.



# LCAAP-035 SUMPS

## SITE DESCRIPTION

One hundred twenty three (123) sumps have been identified as part of the Plant construction in the 1940s and 1950s. Of those, 19 are currently connected to storm sewers, 64 formerly discharged to surface drainage (now plugged), 27 have been converted to drain into the Industrial Wastewater System, 4 are currently pumped regularly, and 5 are under building floors. Approximately fifty of these sumps are still 'active' as manholes.

The original processes associated with the sumps were related to tracers (34 sumps), primers (34 sumps), igniters (5 sumps), incendiaries (5 sumps), high explosive incendiaries (5 sumps), indoor firing range (15 sumps), maintenance areas (10 sumps), and miscellaneous activities (12 sumps).

An REM is ongoing and includes: Sampling of the contents of the inactive sumps has been completed. Based on the sampling, sumps contents will be cleaned out and disposed of in an appropriate manner. Sumps will then be visually examined and the surrounding media will then be sampled for specific contaminants. The sumps will be removed or closed as needed.

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Explosives, Metals, VOCs, PCBs

**MEDIA OF CONCERN:**

Groundwater, Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RI/FS (PP, ROD)

**FUTURE IRP PHASE:**

REM

## PROPOSED PLAN

Complete REM (sampling, removal or closure).

The IWOU Final Action ROD will include this site.

LTM for this site will be funded under LCAAP-012.

## CONSTRAINED COST TO COMPLETE

PHASE	2001	2002	2003	2004	2005	2006	2007+
RI/FS	50						
RD							
RA(C)							
RA(O)							
IRA							2650
LTM							
<b>PROJECTED TOTAL:</b>					<b>\$2,700,000</b>		

# INSTALLATION-WIDE (I-W) OPERABLE UNIT IRA SOILS GROUP

**IRA Soils Group: LCAAP-002, 008, 013, 015, 030, 031 includes the 'Proposed NFA' Sites: LCAAP-006, 009, 014, 020, 023, 024, 028, 029, 032.** These sites contain primarily metal-contaminated soils that may be relocated to LCAAP-008 as part of a on-site soil repository. The 'Proposed NFA' sites will be included as part of the IRA Soils Group ROD, after confirmatory sampling.

All funding for these sites will be recorded under LCAAP-008.

## PROPOSED PLAN

- Removal and cap soil.

# LCAAP-002 BUILDING 85 WASTEWATER LAGOONS

## SITE DESCRIPTION

Neutralized wastewater from the production of lead-based initiating compounds (tetrazene, lead styphnate) at Building 85 was discharged into two large lagoons and one small lagoon. The lagoons operated intermittently in this area from about 1960 through 1988. The two large lagoons were removed in 1990.

Soil sampling performed as part of the closure activities indicated that all of the soil remaining in the lagoon areas after closure passed EP Toxicity criteria for lead (the indicator parameter).

The original small lagoon (which was not removed) continues to contain metals at levels above background values, as well as a trace of VOCs.

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Metals

**MEDIA OF CONCERN:**

Groundwater, Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (RD, RA, LTM)

## PROPOSED PLAN

Soil (~1400cy) from the small lagoon will be removed, stabilized and disposed at LCAAP-008 as part of the IWOU IRA. This action will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-008 SOLID WASTE LANDFILL

## SITE DESCRIPTION

This site consists of 17 pits that were used sporadically from the 1950s until (for nonhazardous wastes) 1994.

- Eight unlined pits were used to dispose of oil and grease from the IWTP.
- Four earth pits, two of which had engineered clay liners, were used to dispose of sludge from the IWTP Basins (Area 7). These four pits are part of ongoing RCRA/ CERCLA/MDNR overlapping jurisdiction.
- Five earth pits north and west of the IWTP disposal area were used to dispose of IWTP-related material, and to dispose of construction debris created by the Corps of Engineers (USACE) during construction of the "Big Ditch".

The eight unlined oil and grease pits were removed in 1990 under an approved RCRA closure plan. Three of the four IWTP sludge disposal pits (which are operated under a Landfill Permit from MDNR) are currently covered. The fourth pit was constructed, but never used. The remaining five CERCLA disposal pits are covered.

The Area was the subject of a RI/FS as a proposed separate Operable Unit. The preliminary findings of the RI were that no unacceptable risks to humans or the environment were present at Area 8. This site will receive soil from other IRP sites around the Plant.

In April 1999, LCAAP presented a plan to EPA and MDNR to close the Area 8 Solid Waste Landfill (4 IWTP Sludge Disposal Cells) with the waste remaining in place according to MDNR Solid Waste and RCRA regulations. Closure of the Landfill will consist of a permanent cap on the filled cells, and the use of the unfilled cell and the area over the three filled cells to construct a new landfill to accept stabilized metals-containing soil generated by ongoing CERCLA cleanup activities on Plant.

## PROPOSED PLAN

As part of the IWOU IRA ~30,700cy of metal-contaminated soil from IWOU and other sites may be relocated to this site and capped as part of a RCRA Subtitle C closure. The total volume of stabilized soil may be larger (~45,000cy).

LTM for this site will be funded under LCAAP-012.

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water, Sediments

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RI/FS, RD, (LTM)

**FUTURE IRP PHASE:**

RA, RA(O), (LTM)



## CONSTRAINED COST TO COMPLETE

PHASE	2001	2002	2003	2004	2005	2006	2007+
RI/FS	50						
RD	50						
RA(C)		750	1410			899	1301
RA(O)				75	75	75	1425
IRA							
LTM							

**PROJECTED TOTAL: \$6,110,000**

# LCAAP-013 BUILDING 35 DRAINAGE AREA

## SITE DESCRIPTION

This area accepted wash water and wastewater containing sodium dichromate from metal parts manufacturing in Building 35. The water emptied into a drainage ditch. This site also includes a small solvents disposal pit and a drum handling and storage area.

A variety of metals have been detected in the soil above background levels. The area of highest concentration for metals is at the head of the drainage ditch.

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Sediments

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (RD, RA, LTM)



## PROPOSED PLAN

Soil (~200cy) from the ditch will be removed, stabilized and disposed at LCAAP-008 as part of the IWOU IRA. This action will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-015 TEMPORARY SURFACE IMPOUNDMENT

## SITE DESCRIPTION

This area contains a surface impoundment built to temporarily contain wastewater from Buildings 35, 90C and 90D during lift station repairs. The wastewater contained Listed K044 and K046 wastes.

Metals, particularly lead and antimony, have been detected at elevated levels in soil.

## IRP STATUS

**RRSE RATING:** Medium Risk

**CONTAMINANTS OF CONCERN:**

Metals

**MEDIA OF CONCERN:**

Soil, Groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (RD, RA, LTM)

## PROPOSED PLAN

Soil (~100cy) from the ditch will be removed, stabilized and disposed at LCAAP-008 as part of the IWOU IRA. This action will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-030 BURNING PITS ASH DISPOSAL

## SITE DESCRIPTION

This area was used by the Plant Fire Department to burn wooden ammunition boxes from 1951 to 1967. The area has also accepted broken glassware and debris from the Plant chemical laboratories.

A variety of VOCs, metals, and explosives have been detected in the area at concentrations above background levels. The primary cleanup driver is lead in soil at high levels.

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Explosives, Metals, VOCs

**MEDIA OF CONCERN:**

Soil, Groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (RD, RA, LTM)



## PROPOSED PLAN

Soil (~15,000cy) from the ditch will be removed, stabilized and disposed at LCAAP-008 as part of the IWOU IRA. This action will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-031 FIREBREAK LANDFILLS

## SITE DESCRIPTION

This area contains two dumps. They are the remnants of dumping in shallow open pits across a broad U-shaped area. The waste is assorted household debris, empty drums, and empty ammunition boxes. There is also evidence of some burning in the area. The area was probably sporadically active during the 1940s through 1960s. Some material may also have been added after that time.

Lead, antimony, and arsenic were detected at elevated levels. A variety of polycyclic aromatic hydrocarbons (PAH) (from roofing tar and shingles) and explosives have been detected in the area at concentrations above background levels.

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Metals, Explosives, PAH

**MEDIA OF CONCERN:**

Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (RD, RA, LTM)

## PROPOSED PLAN

Soil (~1400cy) from the ditch will be removed, stabilized and disposed at LCAAP-008 as part of the IWOU IRA. This action will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.



# INSTALLATION-WIDE (I-W) OPERABLE UNIT IRA SOILS GROUP - 'NFA' SITES

**IRA Soils Group: LCAAP-002, 008, 013, 015, 030, 031 includes the 'Proposed NFA' Sites: LCAAP-006, 009, 014, 020, 023, 024, 028, 029, 032.** These sites contain primarily metal-contaminated soils that may be relocated to LCAAP-008 as part of a on-site soil repository. The 'Proposed NFA' sites will be included as part of the IRA Soils Group ROD, after confirmatory sampling.

## PROPOSED PLAN

- No further action proposed, carry through in Installation Wide IRA RI/FS, PP, ROD. Area close out subject to confirmatory sampling which will be funded under LCAAP-008.

# LCAAP-006 BUILDING 65 IMPOUNDMENT

## SITE DESCRIPTION

This single lagoon was used for disposal of wastewater from the load/assemble/pack activities for 20MM ammunition. The area was used for these disposal activities from 1941 until the late 1970s. Contaminants included metals and explosives. The lagoon was removed under an approved RCRA closure plan during 1990. The indicator parameter for closure was Chemical Oxygen Demand less than or equal to 10 times background.

Groundwater sampling performed since the lagoon was removed indicates that the values for the contaminants discovered above detection limits (primarily metals) are steadily falling, indicating that the source of contamination has been removed.

## IRP STATUS

**RRSE RATING:** Medium Risk

**CONTAMINANTS OF CONCERN:**

Explosives, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)

## PROPOSED PLAN

No further action proposed, carry through in Installation Wide IRA RI/FS, PP, ROD. Area close out subject to confirmatory sampling which will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-009 BUILDING 60 TREATMENT FACILITY

## SITE DESCRIPTION

This area contains five in-ground tanks for treatment of mercurous nitrate generated from crack testing of small arms cartridges. It also contains a sludge drying bed for zinc cyanide sludge generated from chromium plating of steel cartridge cases. These units operated during the 1950s and 1960s.

An Area 9 draft RI/FS (1990) concluded that there is no hazard to human health or the environment.

## IRP STATUS

**RRSE RATING:** Medium Risk

**CONTAMINANTS OF CONCERN:**

Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)



## PROPOSED PLAN

No further action proposed, carry through in Installation Wide IRA RI/FS, PP, ROD. Area close out subject to confirmatory sampling which will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-014 TANK FARM

## SITE DESCRIPTION

This area contains a burning ground which was used by the Plant fire department to dispose of wooden ammunition boxes. The area also contains an IWTP Sludge disposal area. The burning ground operated from 1951 through 1967. The sludge disposal area ceased operation in 1965.

Groundwater sampling shows no contamination.

## IRP STATUS

**RRSE RATING:** Medium Risk

**CONTAMINANTS OF CONCERN:**

Metals

**MEDIA OF CONCERN:**

Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)



## PROPOSED PLAN

No further action proposed, carry through in Installation Wide IRA RI/FS, PP, ROD. Area close out subject to confirmatory sampling which will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-020 BUILDING 2 VICINITY

## SITE DESCRIPTION

This area comprises the “grounds” around and adjacent to currently-active Building 2. Solvents were reported spilled in an area south of Building 14 (garage). The date of the spill and the quantity of material spilled is unknown.

Soil sampling in the area indicated no traces of VOCs, but arsenic and mercury were detected above background values. Contaminants do not pose an unacceptable risk.

## IRP STATUS

**RRSE RATING:** Medium Risk

**CONTAMINANTS OF CONCERN:**

Metals, VOC's

**MEDIA OF CONCERN:**

Groundwater, Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)



## PROPOSED PLAN

No further action proposed, carry through in Installation Wide IRA RI/FS, PP, ROD. Area close out subject to confirmatory sampling which will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-023 SLUDGE BURIAL PITS

## SITE DESCRIPTION

This area contains four IWTP sludge burial pits. The pits were operated during the mid 1960s, to 1967.

Sampling indicates trace levels of VOCs and metals, particularly zinc and copper. Contaminants do not pose an unacceptable risk.

## IRP STATUS

**RRSE RATING:** Medium Risk

**CONTAMINANTS OF CONCERN:**

Metals, VOC's

**MEDIA OF CONCERN:**

Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)



## PROPOSED PLAN

No further action proposed, carry through in Installation Wide IRA RI/FS, PP, ROD. Area close out subject to confirmatory sampling which will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-024

## SANITARY WASTEWATER TREATMENT PLANT

### SITE DESCRIPTION

This area is the site of the now-inactive Sanitary Wastewater Treatment Plant. The Plant operated from 1941 until the industrial wastewater and sanitary wastewater streams were combined to go to Little Blue Valley Sewer District in 1990.

No sampling has been performed in this area. The Sanitary Wastewater Treatment Plant did not treat any industrial wastes.

### IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

VOC's, Metals

**MEDIA OF CONCERN:**

Soil, Groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)



### PROPOSED PLAN

No further action proposed, carry through in Installation Wide IRA RI/FS, PP, ROD. Area close out subject to confirmatory sampling which will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-028 PIPELINE LEAKS

## SITE DESCRIPTION

This area comprises an ARCO pipeline leak that was reported to have occurred during the 1950s.

There is no current or past evidence of the leak's location.

## IRP STATUS

**RRSE RATING:** Not Evaluated

**CONTAMINANTS OF CONCERN:**

Petroleum Hydrocarbons

**MEDIA OF CONCERN:**

Groundwater, Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)

## PROPOSED PLAN

No further action proposed, carry through in Installation Wide IRA RI/FS, PP, ROD. Area close out subject to confirmatory sampling which will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.



# LCAAP-029 WESTERN BORDER DUMPS

## SITE DESCRIPTION

This area contains two dumps situated along the western boundary of the Plant. The northern dump reportedly received debris from the original Plant construction activities. The southern dump was used by the Corps of Engineers during construction of the Big Ditch (from 1984 through 1987).

Soil borings indicated traces of VOCs and slightly elevated metals values above background in the southern pit area. Continuing groundwater monitoring has not shown any values above detection limits.

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

VOC's, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)

## PROPOSED PLAN

No further action proposed, carry through in Installation Wide IRA RI/FS, PP, ROD. Area close out subject to confirmatory sampling which will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# LCAAP-032 HOUSE BASEMENTS

## SITE DESCRIPTION

Scattered throughout the wooded area of the Plant are the remnants of several houses that existed prior to 1940 when the Installation was founded. A survey of the area revealed five intact houses or house basements. One of the basements contained empty drums and a tarry residue. Another one had a domestic waste dump adjacent to the foundation.

The empty drums have been removed, and the tarry material has been sampled and tested. Soil sampling was also performed at the domestic waste dump. It indicated elevated values for lead and for one of the PAHs. Contaminants do not pose an unacceptable risk.

## IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

Metals

**MEDIA OF CONCERN:**

Groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)

## PROPOSED PLAN

No further action proposed, carry through in Installation Wide IRA RI/FS, PP, ROD. Area close out subject to confirmatory sampling which will be funded under LCAAP-008.

LTM for this site will be funded under LCAAP-012.

# INSTALLATION-WIDE (I-W) OPERABLE UNIT FINAL ACTION SOILS GROUP

**Final Action Soils Group: LCAAP-001, 003, 004, 005, 007, 019, 021, 022, 025, 026, 033, 034.** These sites include areas with multiple contaminants that may require additional sampling and possible soil treatment.

## PROPOSED PLAN

- Additional characterization is required. The site will be carried through in the IWOU Final Action ROD. RD and RA (excavate and dispose) for this and other sites is anticipated (~15,000 cy total.)
- Any currently unidentified soil-contamination that could act as a source to GW will be addressed under this site.

# LCAAP-001 BUILDING 83 WASTEWATER LAGOONS

## SITE DESCRIPTION

Neutralized wastewater from the production of Trinitroresorcinal (TNR) at Building 83 was discharged into lagoons. A total of five (5) lagoons were operated intermittently in this area from 1941 through 1986. Four of the five lagoons were removed under an approved closure plan between 1986 and 1988. The fifth lagoon is still in place.

Soil sampling performed as part of the closure activities indicated that all of the soil remaining in the lagoon areas after closure passed EP Toxicity criteria for lead (the indicator parameter).

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Metals

**MEDIA OF CONCERN:**

Groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)



## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# LCAAP-003 SAND PITS

## SITE DESCRIPTION

A series of sand quarry pits (the sand was used as building foundation material) and small lagoons were used for disposal of construction materials and demolition/remodeling debris, Industrial Wastewater Treatment Plant (IWTP) sludge, and some off-site material (from DOE's Kansas City Plant). The area was used for disposal activities from about 1950 into the early 1970s.

Soil sampling in the area has shown elevated values of polyaromatic hydrocarbons (PAH), metals above background values, and the presence of explosives. It does not appear that any of the contaminants of concern have entered the groundwater in the area. Sampling indicated no VOCs in groundwater above detection limits.

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Explosives, PAH's, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)



## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# LCAAP-004 BUILDING 139 BACKLINE PONDS

## SITE DESCRIPTION

A series of small lagoons were used for disposal of wastewater from the neutralization of lead styphnate slurry, lead azide, primer mix, and RDX. The area was used for these disposal activities from 1941 until 1985. Two small lagoons also accepted chemical laboratory wastes consistent with the products being manufactured during the same time period. The wastewater lagoons were removed under an approved closure plan between 1985 and 1987. Soil sampling indicated that the remaining soil met background criteria for lead, the indicator parameter.

Soil sampling in the remaining lagoons indicated the presence of metals (primarily arsenic) at levels above background. Explosives compounds have also been detected in groundwater at low levels.

## IRP STATUS

**RRSE RATING:** High Risk

**CONTAMINANTS OF CONCERN:**

Explosives, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)

## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# LCAAP-005 BUILDING 139 IMPOUNDMENTS

## SITE DESCRIPTION

Neutralized wastewater from the production of explosive compounds (TNR, RDX, PETN) at Building 139 was discharged into a lagoon. The lagoon operated intermittently in this area from about 1941 through 1988. There were also solvent-cleaning and disposal activities in the area during the 1950s. It was removed in 1990.

Soil sampling performed as part of the closure activities indicated that all of the soil remaining in the lagoon areas after closure passed EP Toxicity criteria for lead (the indicator parameter). Follow-on sampling showed no soil contamination. Continuing groundwater sampling, however, indicates the presence of explosives, VOCs, and metals.

## IRP STATUS

**RRSE RATING:** Medium Risk

**CONTAMINANTS OF CONCERN:**

Explosives, Metals, VOC's

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)

## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# LCAAP-007 INDUSTRIAL WASTEWATER LAGOONS AREA

## SITE DESCRIPTION

Nine unlined lagoons were used as settling basins for "finished" wastewater from the IWTP. The lagoons were used from 1941 to 1988. The northern-most set of 3 lagoons became inactive and was covered in 1952 but were never remediated.

The two remaining sets of 3 lagoons were RCRA-closed in 1989. Soil samples taken during the 1989 closure activities indicated that the soil beneath the lagoons passed EP Toxicity tests for metals.

One set of closed lagoons was retrofitted with double liners and a leachate collection system. It currently accepts finished wastewater from the IWTP.

In addition to the lagoons, this area contains a former burning ground, a 6,000 gallon fuel oil spill (1983), a buried oil and grease burning pit, a container cleanup area, and the currently active LCAAP explosive waste incinerator.

Sampling conducted in 1998 indicated the presence of explosives in sediments and surface water. Groundwater samples contain elevated levels of VOCs and explosives. Soil is heavily contaminated with metals.

## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD. RD and RA (excavate and dispose) for this and other sites is anticipated (~15,000 cy total.)

Any currently unidentified soil-contamination that could act as a source to GW will be addressed under this site.

LTM will be funded under LCAAP-012.

## IRP STATUS

**RRSE RATING:** Medium Risk

**CONTAMINANTS OF CONCERN:**

Explosives, VOCs, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water, Sediment

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RI/FS

**FUTURE IRP PHASE:**

RD, RA, (LTM)



## CONSTRAINED COST TO COMPLETE

PHASE	2001	2002	2003	2004	2005	2006	2007+
RI/FS	50	25					
RD			150				
RA(C)							810
RA(O)							
IRA							
LTM							

**PROJECTED TOTAL: \$1,035,000**



# LCAAP-019 BUILDING 1 VICINITY

## SITE DESCRIPTION

This area comprises the “grounds” around and adjacent to currently-active Building 1. A transformer pad at Building 5 and a former pole yard at Building 12A are also potential contaminant locations. A small underground storage tank is present at Building 1. It accepted mercurous nitrate wastes from a Mercury Crack Laboratory (mercury was used to artificially “age” cases to check for stress cracking).

Only VOCs were found above background levels.

## IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

Metals, VOC's

**MEDIA OF CONCERN:**

Groundwater, Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)



## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# LCAAP-021 BUILDING 3 VICINITY

## SITE DESCRIPTION

This area comprises the “grounds” around and adjacent to currently-active Building 3. This area also includes Buildings 3A and 12A, which were used during the 1960s for the machining and assembly of Depleted Uranium-containing .50 caliber and 20mm ammunition. Buildings 3A and 12A were “decontaminated” during 1985 and 1986. Subsequent inspection by Nuclear Regulatory Agency verified that building 12A was decontaminated, but indicated that additional cleanup activities were required for Building 3A.

## IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

Radioactive

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)



## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# LCAAP-022 DEMOLITION WASTE DUMP

## SITE DESCRIPTION

This area contains a “demolition waste dump” which is thought to have been active during the 1940s and, perhaps, the early 1950s. The exact operating dates and the characteristics of the wastes the dump received are unknown.

VOCs and metals, particularly arsenic and cadmium, have been detected at levels above background.

## IRP STATUS

**RRSE RATING:** Medium Risk

**CONTAMINANTS OF CONCERN:**

Metals, VOC

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)



## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# LCAAP-025 DEMOLITION WASTE

## SITE DESCRIPTION

This area contains a disposal area which received “transite” asbestos wastes from Plant construction activities. The transite material is spread out on the ground and some was put into a ditch at the dump location. The date when the material was disposed is unknown.

Surface water and sediment sampling indicated no contamination above action levels.

## IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

VOC's, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water, Sediment

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)

## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# LCAAP-026 DEMOLITION DUMP

## SITE DESCRIPTION

This area contains a disposal area which received roofing material from Plant construction activities. The material is spread out on the ground and some was put into a ditch at the dump location. The date when the material was disposed is unknown.

Soil samples from the area indicated the presence of poly-aromatic hydrocarbons (PAH) (from roofing tar) at elevated levels. Metals were detected above background levels.

## IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

PAH, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water, Sediment

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)

## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# LCAAP-033 BLENDING PELLETIZING AREA

## SITE DESCRIPTION

Area 33 is located in the north-central region of the Installation. Blending/pelletizing operation for RDX are carried out within several building at the area including Building 20A-B, 22A-C, 23A-B, 24A-E, and 25A. Sumps were used for wash-down water during operations. Drains in the area were cemented closed in the 1970's.

Four surface soil samples taken in the vicinity of the sumps found PAHs and metals.

## IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

RDX, Propellants, PAHs, Metals

**MEDIA OF CONCERN:**

Soil, Groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)

## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# LCAAP-034 DITCH A, DITCH B

## SITE DESCRIPTION

Ditch A is the channelized remnant of West Fire Prairie Creek. It provides storm water/runoff drainage for the western half of the Plant. Prior to 1990, Ditch A was the outfall receiver for the Industrial Wastewater Treatment Plant and for the Sanitary Sewage Plant.

Results of surface water and sediment sampling have shown no contamination.

Ditch B is the channelized remnant of East Fire Prairie Creek. It provides storm water/runoff drainage for the eastern half of the Plant. Ditch B receives runoff from the firing range, the Building 139 Fuze Manufacturing Area, and from several of the Plant's main production and warehouse buildings. It also runs through Area 18 and the Northeast Corner Operable Unit.

Previous surface water and sediment sampling have indicated sporadic detections of VOCs and explosives.

## IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

Explosives, Metals, VOCs

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water, Sediment

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC (RI/FS)

**FUTURE IRP PHASE:**

RC (LTM)

## PROPOSED PLAN

Additional characterization is required. The site will be carried through in the IWOU Final Action ROD and potential RD/RA (funded under LCAAP-007.)

LTM will be funded under LCAAP-012.

# INSTALLATION-WIDE (I-W) OPERABLE UNIT INSTALLATION GW GROUP - LCAAP-012

**Groundwater Group: LCAAP-12.** A Groundwater REM to contain a VOC-plume on the western side of the installation and small VOC-plume in the center of the installation using existing production wells is underway. This group also includes periodic groundwater monitoring.

## PROPOSED PLAN

- Continue current GW monitoring.



# LCAAP-012 LABORATORY WASTE LAGOON

## SITE DESCRIPTION

Two lagoons were used from the late 1950s through the mid 1960s to dispose of liquid wastes from LCAAP's chemical and metallurgical laboratories located in Building 6. Chemical analyses from groundwater monitoring wells in Area 3 thought to be associated with the laboratory waste lagoons were responsible for LCAAP's being placed on the National Priorities List. LCAAP's paint shop is located in the eastern part of this area of investigation, and a small flyash disposal pit is located to the west.

Chemical Analyses from Water Supply Wells 17AA and 17CC report consistent detections of VOCs. Additional groundwater monitoring and SCAPS data (on 250 foot centers) also show detections of VOCs.

## IRP STATUS

**RRSE RATING:** Medium Risk

**CONTAMINANTS OF CONCERN:**

Explosives, VOCs, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil

**COMPLETED IRP PHASE:**

PA/SI, RI/FS

**CURRENT IRP PHASE:**

LTM

**FUTURE IRP PHASE:**

LTM



## PROPOSED PLAN

Groundwater for all of the IWOU will be funded under this site.

GW REM to contain VOC-contaminated plumes in the western and central portion of the installation using existing production wells.

Continue current GW monitoring.

## CONSTRAINED COST TO COMPLETE

PHASE	2001	2002	2003	2004	2005	2006	2007+
RI/FS							
RD							
RA(C)							
RA(O)							
IRA							
LTM		200	240	200	200	200	5800

**PROJECTED TOTAL: \$6,840,000**

# INSTALLATION-WIDE (I-W) OPERABLE UNIT FIRING RANGE GROUP

**Firing Range Group: LCAAP-010, 027.** LCAAP-010 is a firing range waste sand disposal pile containing mixed waste (DU and metals). LCAAP-010 will be remediated through an IRA and NRC Decommissioning. LCAAP-027 is a firing range backstop that contains mixed waste, and two active impact areas.

## PROPOSED PLAN

- Separate and dispose of the low level radioactive component under NRC decommissioning (non-IRP funds.)

# LCAAP-010 FIRING RANGE WASTE DUMP

## SITE DESCRIPTION

This area, known generically as the Sand Pile, contains waste sand from the backstops at the outdoor firing range. During the 1960s, depleted uranium rounds were demilitarized by firing them into a sand backstop. From the early 1950s through the late 1970s, sand and bullet material were periodically removed from the backstops and disposed of in Area 10. The debris from the depleted uranium demilitarization effort was included in the material disposed of in Area 10.

The sand pile consists of approximately 30,000 cy of mixed waste (DU, heavy metals, UXO). The low-level radioactive component was undergoing cleanup activities under a NRC decommissioning plan. Removal of isolated piles of DU-containing sand and soil was initiated in 1999. Further excavation and removal activities have been suspended because the cleanup volume was determined to be much larger than planned. Further removal of the low-level radioactive component would also trigger an immediate cleanup of the remaining hazardous waste under RCRA. The hazardous waste component has low risk, whose cleanup would be prohibitively expensive in the short term.

## IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

Radiation, Metals

**MEDIA OF CONCERN:**

Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RI/FS

**FUTURE IRP PHASE:**

RD, RA

## PROPOSED PLAN

Separate and dispose of the low level radioactive component under NRC decommissioning (non-IRP funds.)

With current information a RD/RA of treatment and disposal of metal-contaminated soil is expected.

## CONSTRAINED COST TO COMPLETE

PHASE	2001	2002	2003	2004	2005	2006	2007+
RI/FS			175				
RD							200
RA(C)							2000
RA(O)							
IRA							
LTM							

**PROJECTED TOTAL: \$2,375,000**

# LCAAP-027 FIRING RANGE

## SITE DESCRIPTION

The firing range has been in operation since the early 1950s to test all of the types of ammunition produced at LCAAP for function and accuracy. In addition to the “main” 2,600 yard range, tracer bullets were tested until the 1950s at the “Tracer Range” south of Building 45. Depleted uranium-containing rounds were tested at the 600 yard bullet trap and at impact areas along the range from the late 1950s until 1978.

The only soil samples taken from this area to date have been as part of the NRC decommissioning program to remove radioactive material (depleted uranium) from the area.

## IRP STATUS

**RRSE RATING:** Low Risk

**CONTAMINANTS OF CONCERN:**

Radioactive, Metals

**MEDIA OF CONCERN:**

Groundwater, Soil, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC

**FUTURE IRP PHASE:**

RC

## PROPOSED PLAN

This site is active and is not eligible for IRP funding.

# SCHEDULE

## PAST MILESTONES

<u>IRP Phase</u>	<u>Completion Date</u>
INSTALLATION ASSESSMENT	MAY 1980
REM (CLOSE 25 LAGOONS)	1987-1990
PA/SI	JAN 1989
PHASE I RI/FS FIELDWORK	AUG 1988
PHASE IIA RI FIELDWORK	SEP 1990
PHASE IIB RI FIELDWORK	DEC 1992
INSTALL 6 AIR STRIPPERS	1990-1992
DRAFT I-W RI:	OCT 1993
AREA 18 RI	MARCH 1995
AREA 18 FS	MARCH 1996
NECOU RI	MARCH 1996
DRAFT NECOU FS:	JUNE 1996
AREA 18 PROPOSED PLAN	APRIL 1997
FINAL NECOU INTERIM ACTION ROD	SEPTEMBER 1998
FINAL AREA 18 ROD	APRIL 1999
NECOU IRA DRAFT RAMP	DECEMBER 1999

## PROJECTED MILESTONES

RA at LCAAP-007, 008, 010, 016, 017, 018  
IRA at LCAAP-016, 035

Estimated completion of all RA activities: 2009

Estimated completion of all IRP activities: 2035

# SCHEDULE

## NO FURTHER ACTION SITES

The following sites currently require no further action (no funding) under the ER,A program:

LCAAP-01	AREA 1 - BUILDING 83 WASTEWATER LAGOONS
LCAAP-02	AREA 2 - BUILDING 85 WASTEWATER LAGOONS
LCAAP-03	AREA 3 - SANDPITS
LCAAP-04	AREA 4 - BUILDING 139 - BACKLINE PONDS
LCAAP-05	AREA 5 - BUILDING 139 IMPOUNDMENTS
LCAAP-06	AREA 6 - BUILDING 65 IMPOUNDMENT
LCAAP-09	AREA 9 - BUILDING 60 TREATMENT FACILITY
LCAAP-11	AREA 11 - BURNING GROUND
LCAAP-13	AREA 13- BUILDING 35 DRAINAGE AREA
LCAAP-14	AREA 14 - TANK FARM
LCAAP-15	AREA 15 - TEMPORARY SURFACE IMPOUNDMENT
LCAAP-19	AREA 19 - BUILDING 1 VICINITY
LCAAP-20	AREA 20 - BUILDING 2 VICINITY
LCAAP-21	AREA 21 - BUILDING 3 VICINITY
LCAAP-22	AREA 22 - DEMOLITION-WASTE DUMP
LCAAP-23	AREA 23 - SLUDGE BURIAL PITS
LCAAP-24	AREA 24 - SANITARY WASTEWATER TREATMENT PLANT
LCAAP-25	AREA 25 - DEMOLITION WASTE DUMP
LCAAP-26	AREA 26 - DEMOLITION DUMP
LCAAP-27	AREA 27 - FIRING RANGE
LCAAP-28	AREA 28 - PIPELINE LEAKS
LCAAP-29	AREA 29 - WESTERN BORDER DUMPS
LCAAP-30	AREA 30 - BURING PITS ASH DISPOSAL
LCAAP-31	AREA 31 - FIREBREAK LANDFILLS
LCAAP-32	AREA 32 - HOUSE BASEMENT
LCAAP-33	DITCH A
LCAAP-34	DITCH B

# Lake City Army Annunition Plant IRP Schedule

(Based on current funding constraints)

		Current Phase			Future Phase			
		FY01	FY02	FY03	FY04	FY05	FY06	FY07+
LCAAP-7	RI/FS	Current	Future					
	RD			Future				
	RA							Future
LCAAP-8	RI/FS	Current						
	RD	Current						
	RA		Future	Future			Future	Future
	RAO				Future	Future	Future	Future
LCAAP-10	RI/FS			Future				
	RD							Future
	RA							Future
LCAAP-12	LTM		Future	Future	Future	Future	Future	Future
LCAAP-16	RI/FS	Current	Future					
	IRA/REM	Current						
	RD		Future	Future				
	RA				Future	Future	Future	
	RAO	Current	Future	Future	Future	Future	Future	Future
LCAAP-17	LTM				Future	Future	Future	Future
LCAAP-18	RA	Current	Future	Future				
	RAO	Current	Future	Future	Future	Future	Future	Future
	LTM		Future	Future	Future	Future	Future	Future
LCAAP-035	RI/FS	Current						
	IRA/REM							Future

**DEFENSE SITE ENVIRONMENTAL RESTORATION TRACKING SYSTEM**

**Site, 4. Installation Phase Summary Report**

12/19/00

Installation: LAKE CITY AAP

**Programs:** BRAC I, BRAC II, BRAC III, BRAC IV, IRP

**Subprograms:** Compliance, Restoration, UXO

**Installation count for Programs:** 1

**NPL Options:** Delisted, No, Proposed, Yes

**Installations count for Programs and NPL:** 1

**Site count for Programs and NPL:** 35

Phase / Status / Sites

	PA					SI			
C	U	F	RC		C	U	F	RC	
35	0	0	0		35	0	0	0	
	RI / FS					RD			
C	U	F	RC		C	U	F		
28	7	0	27		0	1	6		
	RA(C)					RA(O)			
C	U	F	RC		C	U	F	RC	
0	2	5	0		0	0	2	0	
			LTM						
			C	U	F	N			
			0	0	2	33			

Remedy / Status / Sites (Actions)

	IRA		
	C	U	F
6 (6)		1 (1)	1 (1)
	FRA		
C	U	F	
0 (0)		1 (1)	7 (9)

**RIP Total:** 0

**RC Total:** 27

**Reporting Period End Date: 09/30/2000**





LCAAP-017	1A	GW SL WH	PA SI	RAC RI	RD	1	1	F		200612
LCAAP-018	1A	GW SL	PA RI SI		RD		RAC RAO	1	N	200303 202712
LCAAP-019	3A	SL	PA RI SI						N	200009
LCAAP-020	2A	GW SL	PA RI SI						N	200009
LCAAP-021	3A	SL	PA RI SI						N	200009
LCAAP-022	2A	GW SL	PA RI SI						N	200009
LCAAP-023	2A	GW SL	PA RI SI						N	200009
LCAAP-024	3A	SL	PA RI SI						N	200009
LCAAP-025	3A	SL	PA RI SI						N	200009
LCAAP-026	3A	SL	PA RI SI						N	200009
LCAAP-027	3A	GW SL	PA RI SI						N	198901
LCAAP-028	NE		PA RI SI						N	200003
LCAAP-029	1A	GW SL	PA RI SI						N	200009
LCAAP-030	1A	GW SL	PA RI SI						N	200009
LCAAP-031	1A	SL	PA RI SI						N	200009
LCAAP-032	3A	SL	PA RI SI						N	200009
LCAAP-033	3A	GW	PA RI SI						N	200009
LCAAP-034	3A	SL	PA RI SI						N	200009
LCAAP-035	1A	SL	PA SI	RI	RAC RD				N	200712

RRSE - Relative Risk Site Evaluation; Risk Category - 1=High, 2=Medium, 3=Low;

Legal Agreement - A = with agreement, B = without agreement; C = Complete, U = Underway, F = Future, N = Not Applicable

**Reporting Period End Date: 03/31/2001**

# REM/IRA/RA ASSESSMENT

## PAST REM/IRA/RA

Total Sites Assessed: 35

- Installation (all sites), LCAAP closed 25 lagoons and trenches by waste removal under RCRA (1986-89), \$17,760K.
- Area 18 (LCAAP-018) pump and treat system constructed (1997), \$5,597K.
- LTM of groundwater (Installation Wide) began in 1988, \$1,639K.
- Area 16 Groundwater Extraction Well EW-2 (1998), \$857K.

## CURRENT REM/IRA/RA

- Area 18 (LCAAP-018), Removal Action pump and treat system for contaminated groundwater has been in operation since March 1997.
- NECOU (LCAAP-016, 17), Removal Action pump and treat system to intercept contaminated groundwater moving off the installation is currently operating.
- I-W (LCAAPI-W OU), Sumps Removal Action is underway. Sampling of sump contents was completed in July 1999. The project now moves to an EE/CA.
- NECOU (LCAAP-016, 017) Early Remedial Action to install a permeable reactive barrier to treat groundwater is in Remedial Design. Construction is anticipated summer 2000.

## FUTURE REM/IRA/RA

- RA at LCAAP-007, 008, 010, 016, 017, 018
- IRA at LCAAP-016, 035

# PRIOR YEAR FUNDING

FY79	Initial Assessment	\$50.0K
FY85	Preliminary Assessment/Site Investigation(PA/SI)	33.6
FY86	PA/SI	315.1
FY87	PA/SI	74.1
	Radiological Sample Analysis	6.0
	Remedial investigation (RI)	1,221.0
	Remedial Design-4 Lagoon Closures	<u>13.0</u>
		1,314.1
FY88	RI	343.2
	Radiological Sample Analysis	0.9
	Remedial Action (RA) - IWTP Lagoons, Oil Grease Trenches, 2 Air Strippers	6,615.5
	RA - Explosive Lagoons	10,450.0
	Off-post Sampling	<u>12.7</u>
		17,422.3
FY89	RI/FS	3,418.8
	Groundwater Model	78.5
	Groundwater Assessment for and RA: 4 Air Strippers for	671.6K
	Lagoon Closure - Sampling and Analysis	850K
	Conceptual Program Plan	336.2
	COE Closure of 4 Surface Impoundments	143.0
		<u>38.0</u>
		5,536.1
FY90	RI/FS	448.4
	Cyanide Waste Treatment Facility RI/FS	29.9
	Lagoon Closure - Sampling and Analysis	<u>300.7</u>
		778.3

# PRIOR YEAR FUNDING

<b>FY91</b>	RI/FS - Installation-wide follow-on (Olin)	1,263.3
	RI/FS - Installation-wide follow-on	585.8
	RI/FS - Mercurous Nitrate-Zinc' Cyanide (COE)	228.8
	Monitoring	165.5
	Lagoon Closure S & A - COE	<u>2.4</u>
		2,242.8
<b>FY92</b>	1 to 5, Installation-Wide RI/FS	2,848.7
	Monitoring (Leases)	<u>11.0</u>
		2,829.7
<b>FY93</b>	GW Modelling Study	44.9
	I-W RI/FS	2,000.0
	Monitoring	100.0
	REM Area 18, NECOU	400.0
	Leases for Offpost Wells	1.9
	Interim Pump & Treat Area 18	<u>496.0</u>
		3,042.8
<b>FY 95</b>	Leases for Offpost Wells	1.5
	GW Monitoring/Modelling	<u>438.0</u>
		439.5
<b>FY 96</b>	Leases for Offpost Wells	6.0
	Groundwater (GW) Monitoring	180.4
	Installation-Wide(I-W) RI/FS	741.4
	REM for I-W GW	417.5
	REM in Area 18	4,701.8
	PP/ROD for NECOU	109.7
	PP/ROD for Area 18	104.6
	RA(O)for Area 18	<u>578.6</u>
		6840.0

# PRIOR YEAR FUNDING

<b>FY 97</b>	Leases for Offpost Wells	3.5
	GW Monitoring	339.0
	RA(O)for Area 18	364.6
	RAB	9.2
	FS for NECOU	231.2
	RD for Area 18	286.2
	I-W RI/FS	935.6
	REM I-W GW	84.5
	REM NECOU	<u>856.9</u>
		3,110.7

<b>FY 98</b>	Leases for Offpost Wells	3.5
	GW Monitoring	360.0
	RA(O) for Area 18	734.6
	RAB	21.6
	FS for NECOU	231.2
	RD for Area 18	250.0
	I-W RI/FS	1,516.8
	REM I-W GW	84.5
	REM Sumps	<u>353.8</u>
		3,556.0

<b>FY99</b>	Leases for Off post Wells	4.0
	GW Monitoring	509.0
	I-W RI/FS	810.0
	RD for Area 8	200.0
	RA for NECOU	2,200.0
	RAB	19.0
	RD for NECOU	400.0
	RA(O) for Area 18	<u>850.0</u>
		4,992.0

<b>TOTAL PRIOR YEAR FUNDING</b>		<b>\$24,810.0</b>
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# PRIOR YEAR FUNDING

## **FY00**

RI/FS at LCAAP-017, LCAAP-035	\$ 130.0K
RD at LCAAP-008, LCAAP-018	\$ 175.0K
RA at LCAAP-017, LCAAP-018	\$ 3,788.0K
LTO at LCAAP-002,005,007, 008, LCAAP-012,013,015, 016,030, LCAAP-031,035	\$ 370.0K
LTM at LCAAP-002,005,007,008, LCAAP-010,012,013,015,016, LCAAP-017,018,030,031,035	\$ 370.0K
RAB	\$ 25.0K
	\$ 4,858.0K

**Estimated Future Requirements**

**\$ 76,255.0K**

**Total Estimated Cost**

**\$ 105,923.0K**

Constrained Cost To Complete

DSERTS NUMBER	SITE TITLE	PHASE	2001	2002	2003	2004	2005	2006	2007+	PHASE TOTAL	SITE TOTAL	PHASE DESCRIPTION	
LCAAP-007	Ind. Wastewater Lagoon Area	RI/FS	50	25						75		S & R	
		RD			150					150		Design for LCAAP-001,3,4,5,7,19,21,22,25,26,33,34	
	RA							810	810	1035	excavate and dispose on site(15,000cy @ \$50/cy)		
LCAAP-008	Solid Waste Landfill	RI/FS	50							50		PP & ROD S&R	
		RD	50							50		design of soil removal from other sites S&R	
		RAC		750	1410			899	1301	4360		Build repository (2160K), excavate & treatment (~45,000cy) (1.1M), cap repository (~4 acres, with leachate collection) (1.1M)	
		RAO				75	75	75	1425	1650	6110	leachate collection, grounds maintenance	
LCAAP-010	Firing Range Waste Dump	RI/FS			175					175		Complete characterization, PP, ROD, S&A	
		RD							200	200		Design	
		RA							2000	2000	2375	Separate lead cont. soil (~30,000 cy), stabilize, dispose (~10,000 cy)	
LCAAP-012	Laboratory Waste Lagoon	LTM		200	240	200	200	200	5800	6840	6840	LTM for all of IW area at 160K/yr, well maint. 40K/yr, 5 yr review @40K	
LCAAP-016	Area 16 - Abandoned	RI/FS	25	25						50		Half of cost for the 80+50K FS/PP/ROD	
		IRA/REM	120							120		S&A for construction of soil cover and leacgate collection	
	Landfill	RD		150	200						350		Half of cost for RD of in-situ oxidation, in-situ thermal, GW treatment, PRW extension, dig & haul
		RAC				1050	1150	2000			4200		200K for pilot studiesWPGA source remediation (in-situ oxidation & in-situ thermal) 1.5M, West plume (in-situ oxidation & in-situ thermal) 2.5M (see FS)
		RAO	350	500	500	500	500	675	9675	12700		ABL Leachate collection 150K (until 2034), Operations of RAs, replacement of iron in PRW 2M, Installation tech Support 275K	
		LTM				100	100	100	2320	2620	20040		Half of cost for LTM semi-annual, ~60 wells, 5 year reviews 80K



Constrained Cost To Complete

DSERTS NUMBER	SITE TITLE	PHASE	2001	2002	2003	2004	2005	2006	2007+	PHASE TOTAL	SITE TOTAL	PHASE DESCRIPTION
LCAAP-017	Sanitary Landfill & Solvent Pits	RI/FS	25	25						50		Half of cost for the 80+50K FS/PP/ROD
		RD		154	196					350		Half of cost for RD of in-situ oxidation, in-situ thermal, GW treatment, PRW extension, dig & haul
		RAC				2231	1000	1775	544	5550		200K pilot studies, in-situ oxidation & in-situ thermal at O&S area (5M), and East Gate 350K (see FS)
		LTM				100	100	100	2320	2620	8570	Half of cost for LTM semi-annual, ~60 wells, 5 year reviews 80K
LCAAP-018	Burning Pits	RAC	3654	146	400					4200		Multi-Phase Extraction & Treatment System (3.8M), Lead removal/cover (400K)
		RAO	780	880	880	730	730	730	15300	20030		Operations of P&T (starting at 780K, reducing by not discharging to Little Blue, and reducing more later), Operations of Extraction System (200K) for 10 years
		LTM		150	230	150	150	150	3525	4355	28585	LTM semi-annual, ~40 wells, 5 year reviews
LCAAP-035	Sumps	RI/FS	50							50		EE/CA S&R (50K)
		IRA/REM							2650	2650	2700	RD (250K), Removal of ~60 sumps (2.4M), disposal of ~500cy of soil & concrete
<b>YEAR TOTALS IN THOUSANDS OF DOLLARS</b>			<b>5154</b>	<b>3005</b>	<b>4381</b>	<b>5136</b>	<b>4005</b>	<b>6704</b>	<b>47870</b>	<b>76255</b>	<b>76255</b>	
		<b>POM</b>	<b>5154</b>	<b>3005</b>	<b>4381</b>	<b>5136</b>	<b>4005</b>	<b>6704</b>			<b>76255</b>	
		Difference	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>				

# COMMUNITY INVOLVEMENT

A Technical Review Committee met quarterly from December 1987 until December 1996. In 1996, LCAAP held a public meeting to determine interest in forming a Restoration Advisory Board (RAB). The RAB first met in March 1997 and has met regularly every two months. Since January 1999, RAB meetings have been held quarterly.

## Highlights of RAB:

- Average attendance of five RAB members and 6 members of the community.
- No public interest has been expressed yet in Technical Assistance for Public Participation (TAPP).
- Site tours of Area 8 and the Northeast Corner.
- Presentation of Installation Action Plan at April 1999 RAB.
- Generally favorable comments on Army's restoration efforts at the plant.

**DEFENSE SITE ENVIRONMENTAL RESTORATION TRACKING SYSTEM**

**Installation, 7. RAB REPORT**

12/19/2000

**Command:** AMC

**SubCommand:** OSC

**Installation:** LAKE CITY AAP

**RAB Established Date:** 199703 **Reason RAB Not Establish:**

**RAB Adjourned Date:** **Reason RAB Adjourned:**

**TRC Date:** 198706

**RAB Community Members:**

**Total RAB Community Members:** 7

Business Community

**RAB Government Members:**

**Total RAB Government Members:** 5

Environmental Protection Agency

**RAB Activities:**

Est. Operating Procedures

**RAB Advice**

Remedy Selection

**TAPP Application Approval Date:**

**TAPP Project Title:**

09/30/2000

**TAPP Project Description:**

Purchase Order

**Award Number**

**Award Date**

**Completion Date**