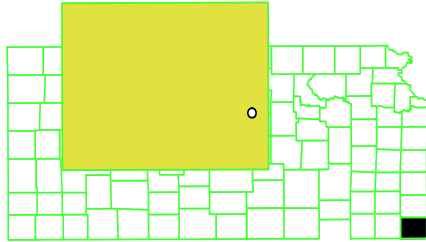


## **CHEROKEE COUNTY**

**KANSAS**

**EPA ID# KSD980741862**



**EPA Region 7**

**City: Galena, Baxter Springs, Treece,  
Badger, Lawton, Waco, Crestline**

**County: Cherokee County**

**Other Names: Tri-State Mining District,  
Tar Creek Area**

**05/17/2010**

## **SITE DESCRIPTION**

The Cherokee County site is a former mining area covering about 115 square miles. It is part of a larger area sometimes called the Tri-State Mining District, which encompasses approximately 2,500 square miles in southeastern Kansas, southwestern Missouri, and northeastern Oklahoma. Over one hundred years of widespread lead and zinc mining created piles of mine tailings which covered over 4,000 acres in southeastern Cherokee County. The mine tailings contain lead, zinc, and cadmium which have leached into the shallow groundwater. Run-off from the waste piles also moves contaminants into nearby streams. The EPA has divided this mega-site into seven subsites that correspond to seven general mining locations: Galena; Baxter Springs; Treece; Badger; Lawton; Waco; and Crestline. These subsites have been divided or grouped into the following seven operable units: OU-1, Galena Alternate Water Supply; OU-2, Spring River Basin; OU-3, Baxter Springs subsite; OU-4, Treece subsite; OU-5, Galena Groundwater/Surface Water; OU-6, Badger, Lawton, Waco, and Crestline subsites; and OU-7, Galena Residential Soils.

Cleanup work under existing Records of Decision (RODs) is complete at the three operable units (OU-1, 5, 7) of the Galena subsite in the east-central portion of the entire site. This 25 square mile area had large tracts of mine and mill wastes, water filled craters where the ground collapsed, open mine shafts, and pits, all of which have now been remediated as part of a 900 acre mine waste cleanup (OU-5). Residential soils in the town of Galena were impacted by mining and milling wastes in addition to wind deposited smelter wastes from a former operating smelter. The residential areas were remediated by excavating and replacing the soils at over 700 properties (OU-7). Wastes have affected the quality of the shallow groundwater which was a primary drinking source for rural residents of the area. A rural water supply district was built (OU-1) and is now serving over 500 residential hook-ups. Surface water and surficial soils were impacted by mining wastes, several heavy metals were found in water samples from private wells, and residential soils were impacted with metals prior to completion of remedial activities to address all of these problem areas. Surrounding lands are used for residences, business, light industry, farming, and grazing. Of the approximate 23,000 people living in Cherokee County,

3,800 of them reside in Galena.

Residential and mine waste cleanup work under a Consent Decree with responsible parties is complete at the Baxter Springs (OU-3) subsite and residential cleanup work is complete at the Treece subsite (OU-4). The completed OU-3 work transitioned to the Operation and Maintenance (O&M) phase in 2004. A ROD Amendment was released in 2006 for the remaining non-residential mining wastes at OU-3 and OU-4. The EPA Phase 1 fund-lead remedial design process began in 2007 for select areas of OU-3 and OU-4 and was completed in 2008 followed by the initiation of cleanup activities in late 2008. Phase 1 cleanup activities are ongoing and the Phase 2 remedial design for additional mine waste cleanups at the Baxter Springs and Treece subsites began in 2009 and is ongoing. The final phase of remedial design (Phase 3) for the Baxter Springs and Treece subsites will begin in 2010. Air monitoring resumed at the Treece subsite in 2009 and is continuing in 2010. A Consent Decree for the PRP portion of the Treece subsite was successfully negotiated and lodged in 2008 with final entry expected in 2010. An Explanation of Significant Differences (ESD) was completed in 2010 for the adjacent Tar Creek Superfund site in Oklahoma. This ESD is for voluntary residential relocations at the Treece subsite portion of the Cherokee County Superfund site due to impacts in Kansas resulting from wastes in Oklahoma. Residential relocation trust board members have been named/confirmed and initial work will begin in 2010. It should be noted that the general site conditions described for the Galena area were similar throughout the Cherokee County site prior to completing environmental cleanups in different locations of the site. Characterization and cleanup work at all of the subsites have many common elements.

The cleanup decision document (ROD) was released in 2004 for the Badger, Lawton, Waco, and Crestline subsites of OU-6. The Badger and Lawton subsites will be addressed by EPA and the Crestline subsite will be addressed by potentially responsible parties (PRPs). The Waco subsite will be jointly addressed by EPA and PRPs. Negotiations with PRPs for the performance of remedial design and remedial action at the Crestline and Waco subsites resulted in two remedial design/remedial action (RD/RA) Consent Decrees in 2007. The PRP remedial design for the Crestline subsite was completed in 2007 and the subsequent cleanup began in 2007 and will be completed in 2010 with the exception of the sediment remediation portion which will occur in 2011. The PRP remedial design for the Waco subsite began in 2007 and was completed in 2009 followed by the start of a PRP-lead cleanup which is currently ongoing. A portion of the Waco subsite is currently being addressed by EPA as a fund-lead action because there are no viable PRPs for the entire Waco subsite. The EPA fund-lead remedial design for the non-PRP portion of the Waco subsite was completed in 2007 and the cleanup began in 2008. This clean-up will be completed in 2011. The EPA fund-lead remedial design for the Badger and Lawton subsites began in 2007 and was completed in 2009. The EPA fund-lead cleanup at the Badger and Lawton subsites began in 2009 and is ongoing.

OU-2 will be one of the final areas to be addressed at the site. Characterization activities (Spring River and Empire Lake studies by the U.S. Geological Survey) were conducted in 2004 to 2007 and select Tri-State Watershed study results were released in 2006 to 2008. Tri-State Watershed work related to the selection of appropriate clean-up numbers continued in 2009 and 2010. A floodplain characterization study began in 2009 and is ongoing. The floodplain study is being conducted by the U.S. Geological Survey on behalf of EPA. Work is in a preliminary stage at

this operable unit and potential cleanup alternatives will be assessed following the completion of most remedial activities in the other areas. Wastes from many locations drain or migrate to the Spring River basin thus creating a need to cleanup the contributing areas prior to the Spring River.

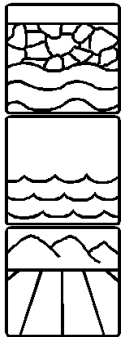
**Site Responsibility:**

This site is being addressed through federal and potentially responsible parties' actions.

NPL LISTING HISTORY	
<b>Proposed Date:</b>	12/30/82
<b>Final Date:</b>	09/08/83
<b>Deleted Date:</b>	

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## THREATS AND CONTAMINANTS



Acidic waters in mine shafts throughout the site, chat piles, tailings impoundments, surface waters in the mine pits, and streams draining the site contain significant concentrations of lead, zinc, and cadmium. Surficial soils are contaminated with mining, milling, and smelting wastes exclusive of areas where remediation is now complete. Risks to public health include incidentally ingesting soil, mine wastes, and contaminated dust, or ingesting contaminated surface waters, foodstuffs, or groundwater. Acid mine drainage containing dissolved heavy metals contributes to the transport of heavy metals into the Spring River, Short Creek, Tar Creek, Shoal Creek, and other lesser drainages and water bodies. Ecological impacts have been demonstrated and the uppermost aquifer is contaminated. Polluted mine water also surfaces in Oklahoma's portion of Tar Creek. The former Eagle-Picher smelter near Galena was responsible for the airborne distribution of lead and cadmium in residential areas near this community. Mining and milling wastes have also been imported into residential areas throughout the site for use as fill, landscaping, and road construction materials. Wind and water action have also transported the various types of mining wastes into other areas. Some portions of the site have been fully remediated, work is ongoing in certain locations, and future actions are planned for areas not yet addressed.

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## CLEANUP APPROACH

**Response Action Status**

**Immediate Actions:** The EPA installed water treatment units on eight contaminated wells in

Galena in 1986. In 1987, the EPA conducted a county-wide study of wells and a water supply monitoring program for public and private sources of water. This study showed that two more homes needed the treatment units. These temporary units were put in place and later removed upon completion of a permanent alternate water supply remedy. The water treatment units were a groundwater removal action that is complete and was a precursor to the permanent rural water supply district (OU-1).

The EPA completed a time-critical removal action for metals-impacted residential soils in 1995. This action was performed in the residential areas of Galena and consisted of a total of 62 properties which included six day-care centers. This removal action is complete and was a precursor to the long-term remedial action in Galena that addressed over 600 properties (OU-7).

All immediate actions (removal actions) have been completed and were performed in the Galena subsite portion of the site.

**Alternate Water Supply:** The EPA selected an approach for supplying an alternate source of water to rural Galena residents in 1987. It featured the following components: collecting clean groundwater through existing wells owned by the city; distributing that water through a pipeline network to the houses, businesses, and farms within the subsite, but outside the municipal water system; rehabilitating two wells needed for the project; and drilling a new well if the existing wells could not be modified. Based on public comments, the EPA decided to modify the cleanup approach to include construction of two new deep aquifer wells to collect water, the construction of two water storage tanks, and the formation of a rural water district. These wells are being maintained and operated by a local rural water district independently of the City of Galena. Construction of the two deep aquifer wells and the two water storage tanks was completed in 1992. Water line easement acquisition activities began in 1991 and were completed in 1993. This work is complete and is in the O&M phase. Over 400 residences were provided with a permanent source of clean drinking water. Later additions to the system have increased the total number of hook-ups to over 500. This completed cleanup is designated as OU-1, Galena Alternate Water Supply, and was completed as an EPA fund-lead action.

**Treece Subsite:** The EPA initiated investigation activities at the Treece subsite in 1988. The parties potentially responsible for contamination of this area took over the study in early 1990. This investigation explored the nature and extent of soil and water pollution at the subsite and recommended the best strategies for final cleanup. The study of the Baxter Springs Subsite was grouped with the Treece subsite. The investigation was completed in the summer of 1994 and a remedy was selected in August, 1997. Negotiations with the responsible parties were conducted in 1998/1999. The responsible parties agreed to perform the cleanup in 1999 and formalized this commitment by entering into a Consent Decree with the EPA. Remedy implementation began in late 1999 and was completed in 2000. Approximately 150 residential properties were sampled and 41 properties were remediated. The Treece residential cleanup was fully complete in 2000. This cleanup is designated as OU-4, Treece subsite, and was conducted as a potentially responsible party (PRP)-lead effort under a Consent Decree. A ROD Amendment for the non-residential mining wastes at the Treece subsite was released in 2006. An EPA fund-lead remedial design for a portion of these wastes (Phase 1) began in 2007 and was completed in

2008. The EPA Phase 1 fund-lead remedial action construction began in 2008 and is ongoing. The Phase 2 remedial design began in 2009 and is ongoing. The final design (Phase 3) will begin in 2010. The ROD Amendment also covers the remaining non-residential wastes at the Baxter Springs subsite. A Consent Decree addressing the non-residential PRP portions of the Treece subsite was successfully negotiated and lodged with the court in 2008. The Consent is expected to be entered and final in 2010 followed by the initiation of PRP-lead remedial design activities for non-residential mining wastes at the Treece subsite. Air monitoring activities resumed at the Treece subsite in 2009 and are continuing in 2010. An ESD for voluntary residential relocations at the Treece subsite was released in 2010 by EPA Region 6 for the Tar Creek Superfund site. Mine wastes in Oklahoma impact areas in Kansas thus the decision document was released by EPA Region 6 and covers the Treece subsite in EPA Region 7. Residential relocation trust members have been named/confirmed and work activities are planned to begin in 2010.

**Baxter Springs Subsite:** The EPA initiated an investigation at the Baxter Springs subsite in 1987. The parties potentially responsible for contamination of this area took over the study in conjunction with the Treece investigation in early 1990. This study explored the nature and extent of soil and water pollution at the subsite and recommended the best strategies for final cleanup. As with the Treece subsite, a remedy was selected in August 1997. The Baxter Springs and Treece subsite cleanup actions were grouped into a single ROD. The cleanup of the Baxter Springs subsite began in late 1999 and was completed in 2004. Over 440 residential properties were tested and 46 properties remediated. The Baxter Springs and Treece remedies also included the abandonment of wells. One deep well and approximately five shallow wells in the Baxter Springs subsite were abandoned; no wells were identified for abandonment in the Treece subsite (earlier Tar Creek actions included the abandonment of Treece wells, no new wells were found). The Baxter Springs PRP-lead mine waste design was completed in 2001 followed by the start of a PRP-lead mine waste cleanup in 2002 that was complete in 2004. The work transitioned to the O&M phase in 2004. Over 160 acres of mining wastes were addressed by the PRP cleanup in the Baxter Springs area. The Consent Decree discussed in the Treece subsite summary also includes the Baxter Springs actions. The Baxter Springs cleanup is designated as OU-3, Baxter Springs subsite, and was conducted by PRPs under a Consent Decree that also included the Treece subsite. A ROD Amendment for the remaining non-residential mining wastes was released in 2006 and a Phase 1 remedial design for the EPA fund-lead portion of these wastes was started in 2007 and completed in 2008. The EPA Phase 1 fund-lead remedial action construction began in 2008 and is ongoing. The Phase 2 remedial design began in 2009 and is ongoing. The final Phase 3 design will begin in 2010.

**Galena Groundwater and Surface Water:** In 1989, the EPA, with the agreement of the State of Kansas, selected a remedy for reducing impacts to the groundwater and surface water in the Galena subsite. It included the following: selectively moving and placing mine wastes in areas away from surface water bodies; capping wastes with less impacted materials followed by re-vegetation; diverting surface streams away from contaminated areas; re-contouring the land surface to control run-off and erosion; and investigating/plugging deep aquifer wells. The investigation and design of cleanup activities were completed in early 1993. Implementation of cleanup activities began in June 1993 and involved plugging four wells and cleaning up one well while the mine tailings actions included the cleanup of approximately 900 acres of mining and

milling wastes surrounding the community of Galena. This work was completed in late 1994 as an EPA fund-lead action and is designated as OU-5, Galena Groundwater/Surface Water. This cleanup is complete and is now in the O&M phase.

**Galena Residential Soils:** Residential yards were contaminated in Galena from a historic primary lead/zinc smelter (Eagle-Picher) in addition to the presence and importation of mine wastes. The EPA investigated the nature and extent of contamination and completed characterization reports in 1996. The EPA released the ROD for the cleanup approach for metals-impacted residential yards in July, 1996. The remedy included excavation and disposal of contaminated soils followed by placement of clean backfill and grass sod or seed. The approach also included an evaluation of the feasibility of using phosphate treatment methods in the future in lieu of excavation. A total of 602 residential properties were remediated from 1997 to 1999. This cleanup was essentially completed in 1999; however, 38 additional properties were remediated in 2000 and 2001. The total number of properties remediated in Galena, inclusive of removal work, is 702; over 1,500 properties were tested. This cleanup is designated as OU-7, Galena Residential Soils, and was conducted as an EPA fund-lead action. The O&M phase began in 2002.

**Badger, Lawton, Waco, and Crestline Subsites:** These subsites are grouped into a single operable unit and are located in rural areas away from population centers. The characterization phase for these subsites began in late 1998 and was complete in 2001. All fieldwork was completed in 1999 and the draft characterization report was submitted in 1999. Review of the draft report necessitated the collection of additional field data in 2000 and the submission of an expanded report in 2001. Residential testing in OU-6 has indicated that there are no residential properties that require remediation. The residential population is very small and not located in close proximity to mine waste areas. The cleanups exclusively address mining wastes in nonresidential settings. The draft feasibility study report was completed in 2002, modified, and approved as a final document in 2004. The cleanup at this operable unit is similar to the historic remedies conducted at other subsites and operable units of the site. The final cleanup decision document (ROD) was released in late 2004. Consent Decree negotiations with PRPs were initiated in 2005, completed in 2006, and resulted in two remedial design/remedial action (RD/RA) Consent Decrees in 2007 for the Waco and Crestline subsites. Remedial designs for the Crestline subsite (PRP-lead) and the EPA fund-lead portion of the Waco subsite were completed in 2007 and the Waco PRP-lead design was completed in 2009. The Badger and Lawton fund-lead remedial design began in 2007 and were completed in 2009 followed by the initiation of EPA fund-lead clean-up activities in 2009 that are ongoing. PRP-lead remedial action construction began at the Crestline site in 2007 and will be completed in 2010 with the exception of the stream sediment portion which will be completed in 2011. The fund-lead remedial action began at the Waco subsite in May, 2008 and is ongoing. The PRP-lead cleanup at the Waco subsite began in 2009 and is ongoing.

**Spring River Basin:** This will be the final operable unit (OU-2) to be addressed at the Cherokee County site. Most of the other cleanup areas drain to the Spring River basin, excluding the Treece subsite which drains to Tar Creek, thus; it is targeted for cleanup following the completion of most work in the other areas. Characterization work was conducted in 2004 - 2007 (Spring River and Empire Lake studies conducted by the U.S. Geological Survey) and

certain Tri-State Watershed study results were released in 2006 to 2008 with additional watershed results related to the recommendation of potential clean-up numbers released in 2009 and 2010. A Spring River floodplain soil characterization study began in 2009 and is ongoing. This study is being conducted by the U.S. Geological Survey on behalf of EPA.

**Site Facts:** The EPA issued a Unilateral Administrative Order to the potentially responsible parties in May, 1990 to design the groundwater and surface water cleanup activities at the Galena subsite. However, the EPA assumed control of the remedy design in July 1990, because the parties did not comply with the Order. Subsequent cost recovery and bankruptcy actions have successfully recovered funds from potentially responsible parties for work conducted at the Galena subsite.

The EPA and the potentially responsible parties executed an Administrative Order on Consent in May 1990 that required the parties to investigate the Baxter Springs and Treece subsites. Following the completion of investigation activities in 1994, the EPA and the responsible parties entered into a Consent Decree in 1999. The Consent Decree required the responsible parties to complete remedial designs and remedial actions at the Baxter Springs and Treece subsites. All work at the subsites under the Consent Decree is complete. The Consent Decree also required the PRPs to partially fund EPA's oversight costs. Additional EPA fund-lead and PRP-lead work at these subsites is required and is not included in the 1999 Consent Decree. A second Consent Decree addressing PRP non-residential mine waste areas at the Treece subsite is expected to be final in early 2009 followed by the start of a PRP remedial design.

Another Administrative Order on Consent was executed in September, 1998 which required responsible parties to characterize the Badger, Lawton, Waco, and Crestline subsites (remedial investigation study) and conduct a feasibility study to evaluate potential cleanup alternatives. The remedial investigation and feasibility study process was completed in 2004 and a ROD was released. Negotiations with

responsible parties for remedial design and remedial action were completed in 2006 for the Waco and Crestline subsites which resulted in two RD/RA Consent Decrees in 2007. The PRP completed the design work at the Crestline subsite in 2007 and started the cleanup. The PRPs initiated the design work at the Waco subsite in 2007 and are expected to complete the effort in 2009 followed by initiation of the cleanup in late 2009.

A total of five RODs, one ROD Amendment, and one ESD (seven total decision documents) have been released for various operable units of the Cherokee County site. Four of the RODs have been fully implemented and work under the fifth ROD is in the design and construction phases. Work under the ROD Amendment is in the design and construction phase. Work under the ESD is in the design phase. A final ROD or ROD Amendment (the eighth decision document for the site) for the Spring River Basin (OU-2) will likely be the final operable unit cleanup decision document at the site.

A local EPA field office was established at the site in 2007. The office is located at the City Hall in Galena, Kansas and provides enhanced support and coordination with the local community. The office remains operational.

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## ENVIRONMENTAL PROGRESS



Three RODs have been fully implemented in the Galena subsite portion of the site and are now in the O&M phase. A fourth ROD has been fully implemented at the Baxter Springs and Treece subsites and is also in long-term O&M. Two removal actions have been completed at the Galena subsite and work under a fifth ROD (Badger, Lawton, Waco, and Crestline subsites) is in the design and construction phases. A ROD Amendment (sixth decision document at the site) was released for the Baxter Springs and Treece subsites and construction is underway. An ESD was released for the Treece subsite by EPA Region 6 and this work is in the design phase. An additional ROD or ROD Amendment is planned for the site at OU-2 for a total of eight decision documents pertaining to the site.

The activities to date have resulted in completion of most site characterization at the 115 square mile site as well as the environmental cleanup of most of the site. The completed cleanups have reduced the potential for exposure to contaminants at the Cherokee County Superfund site. Post-cleanup blood lead studies have demonstrated a 43% reduction in elevated blood lead levels of children at the site and multi-year ecological studies have demonstrated the benefits of the mine waste cleanups. Health education, blood lead screening, physician/health care worker education/training, and dissemination of lead hazard/identification information has been prolific. Mining waste is no longer used as road surface material on the 1,000 miles of unpaved roads throughout the county. There are a total of 1,300 miles of roads in the county; thus, the use of non-mining wastes for 1,000 miles is a significant environmental benefit. A summary of site progress to date includes the following:

- \* Nearly 1,400 acres of mining-impacted land restored;
- \* Over 4,000,000 cubic yards of wastes have been remediated;
- \* Nearly 3,000 residential properties sampled;
- \* Nearly 800 residential properties remediated;
- \* Over 500 homes provided with a permanent source of clean drinking water;
- \* Chemical characterization of several thousand samples of water, wastes, and soil;
- \* Significant 43% reduction of elevated blood lead levels of children;
- \* Cessation of the use of mining wastes on 1,000 miles of roads throughout the county; and
- \* Several million dollars collected or recovered from responsible parties.
- \* Several hundred air samples have been collected and analyzed in various areas of the site.

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## **COMMUNITY INVOLVEMENT**

Several public meetings and availability sessions have been conducted for the various cleanups at the Cherokee County Superfund site in addition to many discussions and meetings with citizens and local officials at several city council meetings held in the various communities at the site. The Cherokee County Health Department, County Commission, and County Engineer have been very instrumental in supporting the EPA's environmental characterization and cleanup efforts. In general, the community, inclusive of local officials, have been very supportive of all environmental cleanup response actions conducted at the site. The establishment of a local field office in 2007 has facilitated the community involvement process.

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## SITE REPOSITORY



Galena Public Library, 315 W.  
Seventh Street, Galena, KS (OU-1, 5,  
and 7).

Superfund Records Center  
901 N. 5th St.  
Kansas City, KS 66101  
Mail Stop SUPR

Johnston Public Library, 210 West  
10th Street, Baxter Springs, KS (OU-3  
and 4).

(913)551-7166

Columbus Public Library, 205 N.  
Kansas Avenue, Columbus, KS  
(OU-6).

## REGIONAL CONTACTS

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**STATE CONTACT:**

Bob Jurgens

**PHONE NUMBER:**

(785) 296-1914

## MISCELLANEOUS INFORMATION

**STATE:**

KS

KS

0737

**CONGRESSIONAL DISTRICT:**

02

**EPA ORGANIZATION:**

SFD-SUPR/FFSE

## MODIFICATIONS

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