





**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM**

**ACCOMPLISHMENTS AND SITE UPDATES  
JANUARY 1, 2013 THROUGH DECEMBER 31, 2013**

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## LIST OF ACRONYMS

<b>ALC</b>	Aquatic Life Criteria
<b>AST</b>	Aboveground Storage Tank
<b>BER</b>	Bureau of Environmental Remediation
<b>BTA</b>	Brownfields Targeted Assessment
<b>BTEX</b>	Benzene, Toluene, Ethylbenzene, Xylene
<b>CA</b>	Contamination Assessment
<b>CAP</b>	Corrective Action Plan
<b>CAS</b>	Corrective Action Study
<b>CI</b>	Comprehensive Investigation
<b>1,1-DCE</b>	1,1-dichloroethylene
<b>1,2-DCA</b>	1,2-dichloroethane
<b>EUC</b>	Environmental Use Control
<b>EDB</b>	Ethylene Dibromide
<b>EPA</b>	U.S. Environmental Protection Agency
<b>FFRA</b>	Focused Former Refinery Assessment
<b>FFSA</b>	Focused Former Smelter Assessment
<b>FMGP</b>	Former Manufactured Gas Plant
<b>FUDS</b>	Formerly Utilized Defense Sites
<b>GAC</b>	Granulated Activated Carbon
<b>HABIT</b>	Hutchinson Air Base Industrial Tract
<b>KDHE</b>	Kansas Department of Health and Environment
<b>KDOT</b>	Kansas Department of Transportation
<b>LTM</b>	Long-Term Monitoring
<b>MCL</b>	Maximum Contaminant Level
<b>MTBE</b>	Methyl Tert-Butyl Ether
<b>PAHs</b>	Polynuclear Aromatic Hydrocarbons
<b>PCE</b>	Tetrachloroethylene
<b>PRP</b>	Potentially Responsible Party
<b>PSE</b>	Preliminary Site Evaluation

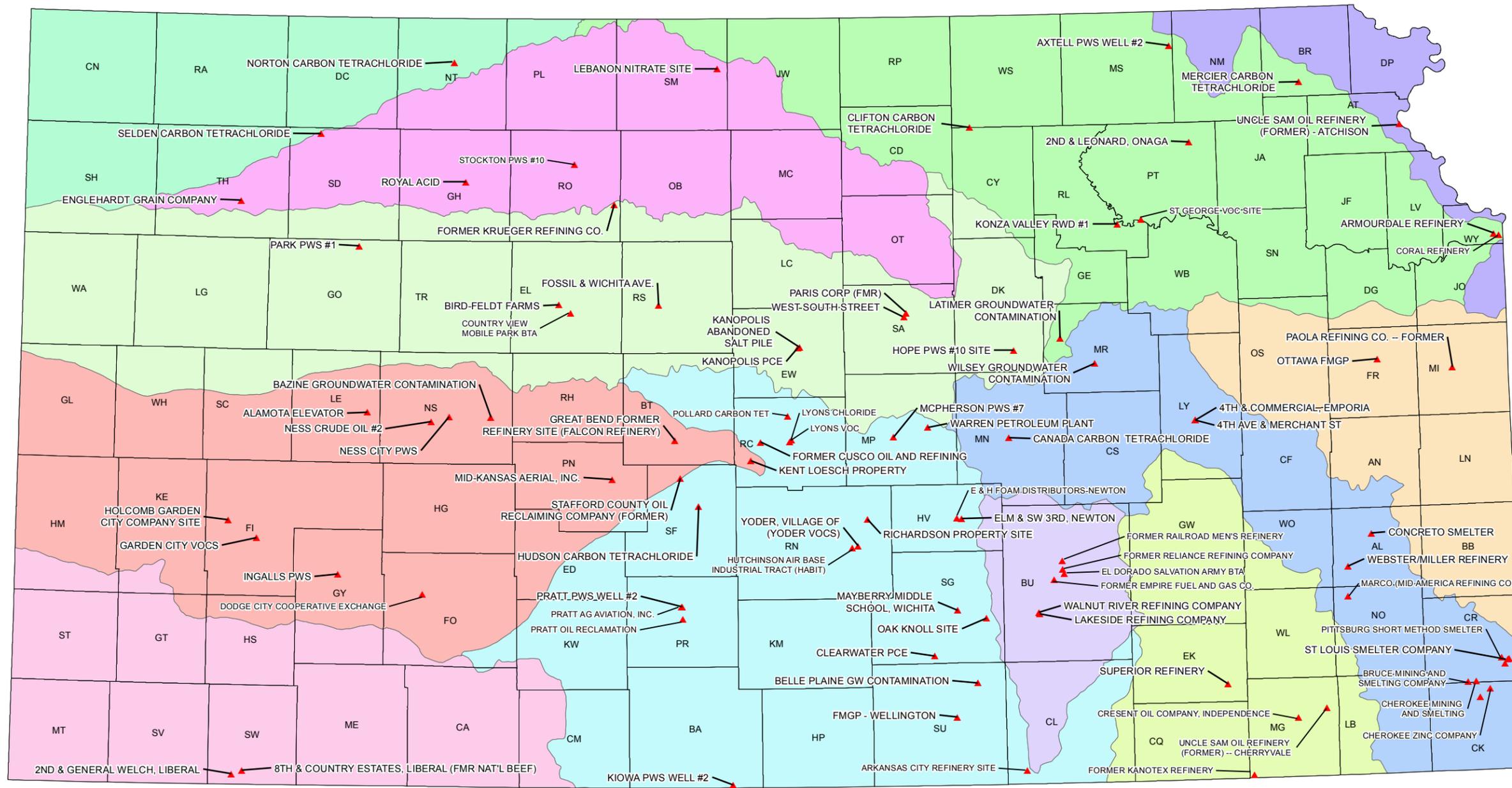
<b>PWS</b>	Public Water Supply
<b>RECs</b>	Recognized Environmental Conditions
<b>RSK</b>	Risk-based Standards for Kansas
<b>RWD</b>	Rural Water District
<b>SI</b>	Site Investigation
<b>SMCL</b>	Secondary Maximum Contaminant Level
<b>SRE</b>	Site Reconnaissance and Evaluation
<b>SSI</b>	Supplemental Site Inspection
<b>SWPCRP</b>	State Water Plan Contamination Remediation Program
<b>TCE</b>	Trichloroethylene
<b>TEC</b>	Threshold Effect Concentration
<b>TPH</b>	Total Petroleum Hydrocarbons
<b>TPH-DRO</b>	Total Petroleum Hydrocarbons-Diesel Range Organics
<b>TPH-GRO</b>	Total Petroleum Hydrocarbons-Gasoline Range Organics
<b>UFA</b>	Unified Focused Assessment
<b>USACE</b>	United States Army Corp of Engineers
<b>USDA</b>	United States Department of Agriculture
<b>USDA/CCC</b>	United States Department of Agriculture/Commodity Credit Corporation
<b>UST</b>	Underground Storage Tank
<b>VCPRP</b>	Voluntary Cleanup and Property Redevelopment Program
<b>VOC</b>	Volatile Organic Compound

**MAP OF STATE WATER PLAN CONTAMINATION REMEDIATION PROGRAM  
SITES**

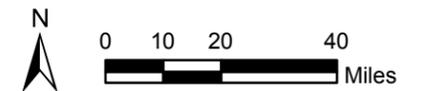
**2013 State Water Plan Sites by Basin Map:** The 2013 State Water Plan Sites by Basin Map provides an overview of the State of Kansas, the twelve river basins, and the location of the SWPCRP sites.



# 2013 Active State Water Plan Sites by River Basin



- LEGEND**
- State Water Plan Site
  - County Boundary
  - River Basin
    - Cimarron
    - Kansas-Republican
    - Lower Arkansas
    - Marais des Cygnes
    - Missouri
    - Neosho
    - Smoky-Saline
    - Solomon
    - Upper Arkansas
    - Upper Republican
    - Verdigris
    - Walnut



Map Source: Aerial Photograph 2012  
National Agriculture Imagery Program (NAIP)

	SITE: <b>State Water Plan Sites Kansas</b>	
	TITLE: <b>2013 State Water Plan Contamination Remediation Program</b>	
	PROJECT PHASE:	2013 Annual Report
	DRAWN BY: KS	11/26/2013
CHECKED BY: TW	11/26/2013	BASEMAP DATE: 2012
<b>Figure 1</b>		



# **STATE WATER PLAN CONTAMINATION REMEDIATION PROGRAM**

## **PROGRAM INFORMATION**

### **INTRODUCTION**

The State Water Plan Contamination Remediation Program (SWPCRP) provides funding for the evaluation, monitoring, and remediation of contaminated sites in the State of Kansas, where the responsible party is unknown or is unable or unwilling to undertake the necessary action. The program also provides funding to supply alternate water sources as an emergency response action to residences with contaminated drinking water sources. The SWPCRP was developed with the specific objective of providing a mechanism to address sites which for one reason or another fall outside the parameters of other programs. These sites, referred to as orphan sites, generally do not have federal, state, or other funding sources available for investigation and cleanup activities. The program is designed as a mechanism to balance the need to hold parties accountable for the cost of investigation and remediation of contamination they have caused, while avoiding pointless delays and further environmental damage when no responsible party can be found, or when such parties are recalcitrant and uncooperative.

Upon the addition of a contaminated site to the program, SWPCRP staff review available information about the site and evaluate the problem to determine the existence of contamination, the presence of affected or potentially affected health and environmental receptors, the source of the pollution, and the priority of the contaminated site based on the site's score on the Contaminated Sites Ranking System. If no previous investigation has been conducted, investigation may be necessary to obtain enough information to rank the site. Depending on the level of threat the site poses to the public, the contaminated site may be placed in a long-term monitoring (LTM) program, or proceed through one or more investigative phases which may result in a remedial action. SWPCRP funds may be used to determine sources of contamination, identify responsible parties, take legal or administrative actions tied to sites where SWPCRP funds have been expended, seek cost recovery from responsible parties for funds expended by the program on a site, and for the administration of the program.

At the end of 2013 there are 84 sites in the SWPCRP. Consultants and project managers have worked together to investigate seven SWPCRP sites in 2013. In addition, project managers have been monitoring contamination at 45 SWPCRP sites.

### **ACTIVITIES IN THE SWPCRP**

Due to funding limitations only those sites which pose the most serious threat to the public and/or the environment are remediated. Many sites are monitored to ensure that contamination does not migrate to receptors such as public and private water supply wells. Providing an alternative water supply is a common function of the SWPCRP where needed to protect public health. A site in the program may progress through one or more phases prior to reclassification or transfer out of the program. A table indicating the status of each site is included at the end of the report.

Limited funding for the 2013 year created challenges for the SWPCRP. Funding limitations led to reduced activities in the program and the SWPCRP was unable to accomplish all the goals of the 2013 plan. Sites will continue to be managed efficiently and evaluated based on priority to make sure potential and actual impacts to human health and the environment are adequately addressed.

In order to conserve resources for the SWPCRP's primary mission of protecting the citizens and environment of Kansas, this annual report is being delivered electronically. It may be downloaded from the Bureau of Environmental Remediation (BER) website at <http://www.kdheks.gov/remedial/swp/index.html>.

### **POTENTIALLY RESPONSIBLE PARTY SEARCH**

KDHE will determine whether a viable potentially responsible party (PRP), able to pay for the costs of investigation and cleanup, exists for each site. Should a PRP be identified, the site will be referred to another appropriate KDHE program.

Extensive research to identify PRPs has been conducted on six sites in 2013 (4<sup>th</sup> Ave & Merchant St., Concreto Smelter, El Dorado Salvation Army BTA, MARCO, Pollard Carbon Tet, and Selden Carbon Tetrachloride). A PRP has been identified through historical review for the Kanopolis Abandoned Salt Pile site.

### **EMERGENCY RESPONSE ACTIVITIES**

As an interim corrective action, a site may qualify for an emergency response if the sole source of drinking water is contaminated at levels exceeding the federally mandated Safe Drinking Water Standards, there are no alternate sources of water, and the responsible party is unknown, unwilling, or unable to respond. The SWPCRP emergency response program may fund a remedial action to provide safe drinking water, and may perform a PRP search for eventual cost recovery. Emergency responses may include providing bottled drinking water, connecting a household to a public water supply (PWS), installing a household filtration or treatment system, or installing a treatment system at a public water supply. There were no emergency response activities conducted during 2013.

### **INVESTIGATION ACTIVITIES**

#### **Preliminary Site Evaluation/Contamination Assessment**

If investigation is recommended, the site undergoes two separate investigation phases. The Preliminary Site Evaluation (PSE), generally conducted by environmental contractors, entails a complete historical records search and limited environmental sampling to determine the presence or absence of contamination. This sampling may include the collection and analysis of samples from existing water wells and, if necessary, an intensive phase involving surface and subsurface water and soil sample collection through direct push sampling techniques. If the site is determined to be contaminated and no responsible party is identified through the PSE, the site may progress to the Contamination Assessment (CA) phase. The CA is designed to delineate the lateral and vertical extent of contamination, and may include more intensive subsurface soil and

groundwater sample collection through direct push sampling techniques and/or the installation of monitoring wells. The contractor is required to submit a Work Plan to be reviewed for completeness, adequacy, and technical competency in accordance with state regulatory policies and guidelines. The investigations are intended to:

- characterize the type and extent of the contamination,
- identify and characterize contamination source area(s),
- identify the responsible party or parties, and
- identify any human and environmental targets impacted by the contamination.

Seven sites have undergone investigative activities in 2013 (Bruce Mining and Smelting Company, Cherokee Zinc Company, Hutchinson Air Base Industrial Tract (HABIT), Kanopolis Abandoned Salt Pile, Pollard Carbon Tet, Pratt Oil Reclamation, and Stockton PWS #10).

## **REMEDIATION ACTIVITIES**

### **Corrective Action Study**

Following a comprehensive investigation, if the responsible party remains unknown or is unwilling or unable to address the contamination, the SWPCRP may fund remediation. The Corrective Action Study (CAS) recommends a corrective action based on feasibility, effectiveness, and cost. Additional investigation may be required before a corrective action can be recommended. Some remedial actions evaluated include soil removal or in-place contaminant stabilization, groundwater treatment by air stripping or filtering, and monitored natural attenuation in which the contaminants are monitored while natural physical and biological processes reduce the contaminants to acceptable levels.

### **Corrective Action Plan**

Once a corrective action is chosen, the environmental contractor submits a Corrective Action Plan (CAP). The CAP very specifically describes the remedial procedure, costs, and an implementation schedule.

### **Corrective Action**

Once a cleanup plan has been prepared and approved, the on-site work can begin. The effectiveness of the corrective action is verified by post-cleanup sampling of the contaminated site and LTM.

Typically, large remediation projects may take two to three years to complete after a thorough investigation and evaluation of alternatives; some projects, particularly groundwater cleanups, will require even more time to reach cleanup objectives. A large majority of the initial time on a cleanup project is spent evaluating various cleanup alternatives in terms of effectiveness, cost, and cleanup plan development. Once a cleanup plan has been prepared and approved, the on-site work can begin.

There are ten sites currently undergoing or have underwent some form of remediation (8<sup>th</sup> and Country Estates (Former National Beef), Clearwater PCE, Crescent Oil Company, Kanopolis

PCE, Kent Loesch Property, Konza Valley RWD #1, Lyons Chloride Contamination, Lyons VOC Contamination, Pratt Oil Reclamation, and Webster/Miller Refinery).

There are three sites awaiting funds for remedial activities (Bruce Mining and Smelting Company, Cherokee Mining and Smelting, and Ness Crude Oil #2).

## **MONITORING AND CLOSURE ACTIVITIES**

### **Long-Term Monitoring**

Sites in which contamination has been documented and cleanup is currently not appropriate, based on available funding and/or priority, may be recommended for LTM. LTM provides periodic surveillance and re-evaluation of the sites. Sites in LTM are generally sampled on an annual or bi-annual basis. Sites can be removed from LTM in one of the following ways:

- The site is reclassified as resolved because monitoring demonstrates cleanup goals have been achieved and maintained for four consecutive, equally time-sequenced sampling episodes conducted under KDHE oversight over a period of no less than two years, or as otherwise approved by KDHE;

or

- The site is transferred to another KDHE program such as the Dry Cleaning Facility Release Trust Fund, the State Cooperative Program, the Voluntary Cleanup and Property Redevelopment Program (VCPRP), or an applicable program in the KDHE/BER Storage Tank Section.

There are 45 sites currently in LTM.

### **Transfer of Sites**

A site may be transferred to another KDHE/BER program if a PRP is identified, the use of an Environmental Use Control (EUC) will prevent exposure to remaining contamination, or a more appropriate funding mechanism is available for the site (i.e. the Dry Cleaning Facility Trust Fund or Storage Tank Trust Fund, etc.).

One site was transferred from this program in 2013 (Cherokee Zinc Company). Due to lack of SWPCRP funding, this site was referred to the Environmental Protection Agency (EPA) for an immediate response to the impact of old smelter waste in residential yards.

### **Resolution of Sites**

Sites are reclassified as resolved once cleanup goals have been met or once contamination at the site has fallen to levels within criteria established in KDHE's Reclassification Plan.

One site was resolved in 2013 (E&H Foam Distributors—Newton).

## **PROGRAM ACCOMPLISHMENTS FOR 2013**

Program efforts are focused on characterizing contamination problems, identifying PRPs, evaluating the risk to human health and the environment associated with the contamination, and remediation through cleanup or EUCs. The majority of the program's sites are being addressed in response to groundwater impacts which have affected or threaten public and/or private drinking water wells. There are 84 sites currently in the program.

Sites within the program continue to make progress beyond investigative stages and toward remediation. Fifteen of the program's 84 sites are in some phase of remediation or are waiting on funding for these activities. Sites are prioritized with a scoring system based on health risk to identify sites requiring immediate attention. Further, the scoring system provides a tool to ensure funds are available for continuing investigations and cleanup evaluations, while allowing funding for more cost-intensive cleanup activities.

Additional investigation activities were conducted at several sites this year. The purpose of the site investigations was to:

- identify potential source areas,
- provide additional data to help delineate a plume,
- establish additional groundwater data to better characterize the hydrogeology of the aquifer, and/or
- define the vertical and horizontal extent of contamination to establish a waste volume for proposal of a cap design.

Additional investigation activities were conducted at the Bruce Mining and Smelting Company, Cherokee Zinc Company, Hutchinson Air Base Industrial Tract (HABIT), Kanopolis Abandoned Salt Pile, Pollard Carbon Tet, Pratt Oil Reclamation, and Stockton PWS #10 sites.

Eight new sites (Arkansas City Refinery Site, Coral Refinery, Country View Mobile Park BTA, Dodge City Cooperative Exchange, E&H Foam Distributors—Newton, El Dorado Salvation Army BTA, Pollard Carbon Tet, and St. George VOC Site) were added to the program in 2013.

One site was transferred from the program in 2013. An investigation of the residential soils at the Cherokee Zinc Company site found several residential yards that had been impacted by the former smelter. The site was transferred to the EPA to address the clean-up activities.

One site was resolved from the program in 2013. Sampling at the E&H Foam Distributors—Newton site determined that VOC contamination was no longer detectable in the private lawn and garden well.

## **PLANNED PROGRAM ACCOMPLISHMENTS FOR 2014**

Remediation projects proposed at the Bruce Mining and Smelting Company, Cherokee Mining and Smelting, and Ness Crude Oil #2 sites may be awarded to consultants if funding becomes available.

Funding limitations have prevented the SWPCRP from adequately addressing all SWPCRP contaminated sites. Sites have been prioritized and addressed based on their priority ranking. Project managers have and will continue to deal with property access, PRP searches, public relations, and other activities associated with SWPCRP site management. KDHE will continue to prioritize and manage all SWPCRP sites in an efficient and streamlined manner.

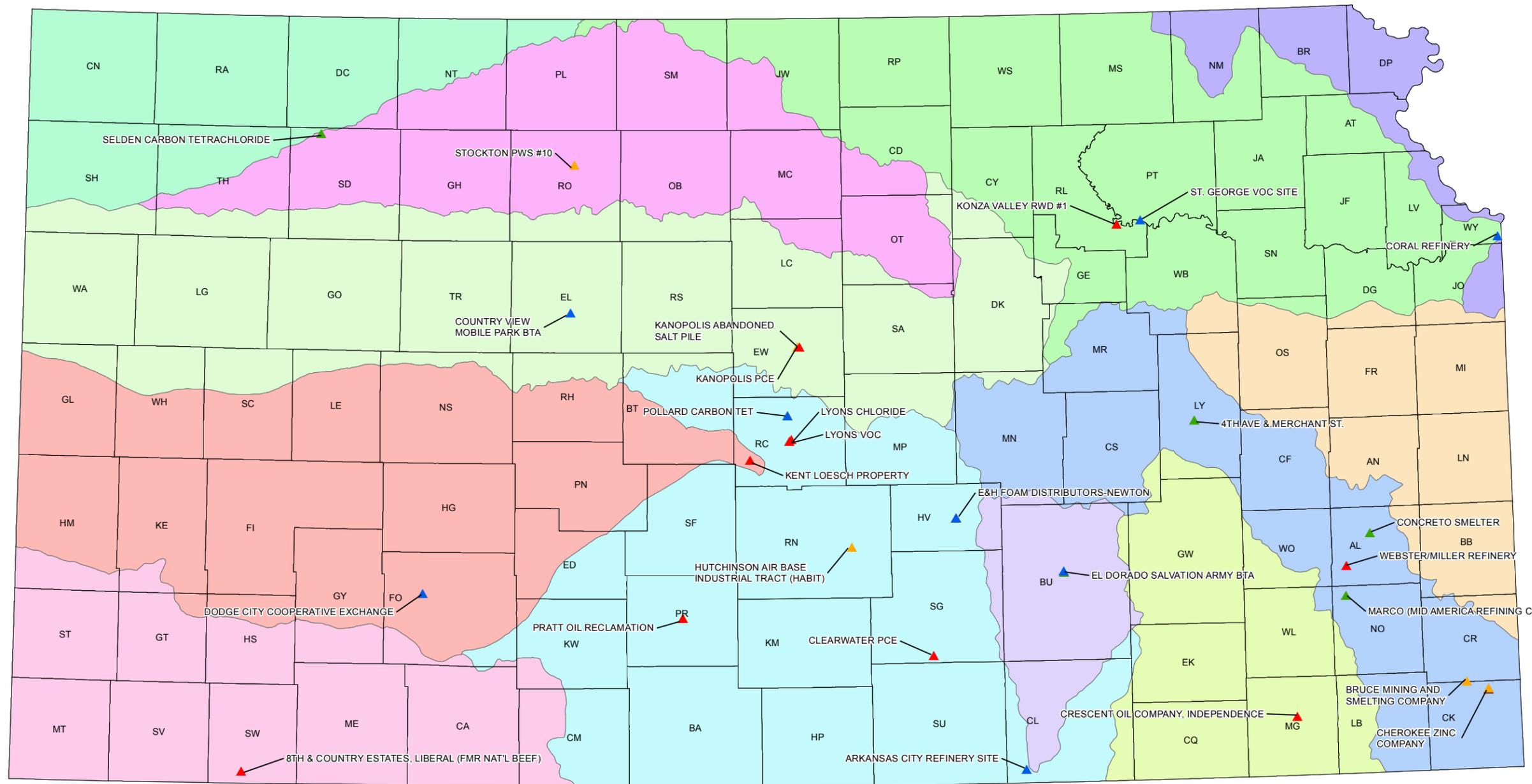
With limited resources available, the SWPCRP will be unable to address and investigate all sites in 2014. Some priority sites that may be investigated or remediated in 2014 include 2<sup>nd</sup> and Leonard, Onaga; Arkansas City Refinery Site; Belle Plaine Groundwater Contamination; Bruce Mining and Smelting Company; Cherokee Mining and Smelting; Country View Mobile Park BTA; Elm and Southwest 3<sup>rd</sup>, Newton; Englehardt Grain Company; Former Uncle Sam Oil Refinery; Hutchinson Air Base Industrial Tract (HABIT); McPherson PWS #7; Mercier Carbon Tetrachloride; Ness Crude Oil #2; Ottawa FMGP; Paola Refining Co.—Former; Pratt PWS Well #2; St. Louis Smelter Company; Stockton PWS #10; and the FMGP—Wellington sites.

## **PROGRAM ACCOMPLISHMENTS**

This section of the report highlights some of the program accomplishments for the year 2013.



# 2013 State Water Plan Accomplishments

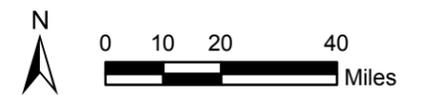


**LEGEND**

- ▲ New Site
- ▲ PRP Search
- ▲ Investigation
- ▲ Remediation
- ▲ Transferred
- ▲ Resolved
- County Boundary

**River Basin**

- Cimarron
- Kansas-Republican
- Lower Arkansas
- Marais des Cygnes
- Missouri
- Neosho
- Smoky-Saline
- Solomon
- Upper Arkansas
- Upper Republican
- Verdigris
- Walnut



Map Source: Aerial Photograph 2012  
National Agriculture Imagery Program (NAIP)

	SITE: <b>State Water Plan Sites Kansas</b>	
	TITLE: <b>2013 State Water Plan Contamination Remediation Program</b>	
	PROJECT PHASE:	2013 Annual Report
	DRAWN BY: TW	11/26/2013
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<b>Figure 2</b>		



# Kansas Department of Health and Environment

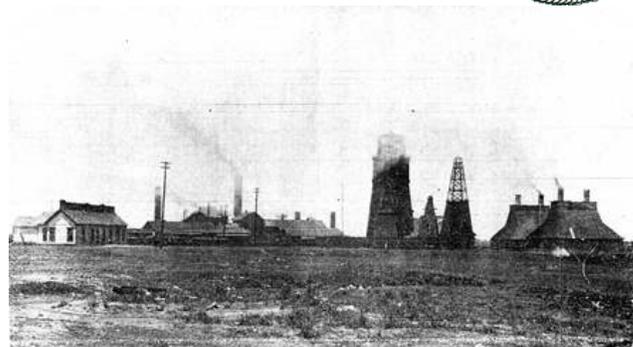
## Bureau of Environmental Remediation, Remedial Section

### State Water Plan Contamination Remediation Program



#### *Cherokee Zinc Company, Weir*

The Chicago Zinc Works began smelting operations in the City of Weir in 1872. According to historical maps there were six zinc smelting buildings with a total of fourteen furnaces; three buildings housing twelve ore roasting kilns and three brick kilns; one office building with scales, pottery storage, dry storage, and engine rooms; one building with kilns, an iron kiln, storage, clay rooms, a coke crusher, and a room for ore crushing; three sheds used for retort chipping; other smaller miscellaneous buildings; and a reservoir.



*The zinc smelter as it appeared while operating.*

KDHE identified the site in 2001 through historical review of the zinc industry. The northern portion of the site has not been extensively used since the smelting operations ended in 1902. The southern portion was occupied by Weir City Electric Light and Water Plant and Empire District Electric Company after the smelter operations closed.

Phase I and Phase II Focused Former Smelter Assessments (FFSAs) in 2004 and a Site Investigation (SI) in 2008 confirmed smelting operations. Arsenic, cadmium, lead, and zinc concentrations were detected in soil, smelter waste, groundwater, sediment, and surface water above state and federal action levels. About 18,274 cubic yards of impacted soils and smelter waste is onsite.



*Smelter waste found onsite.*

In 2010 a Supplemental Site Inspection collected and analyzed soil samples from nearby five residences, and sediment samples from an intermittent creek and an offsite pond. In 2011 KDHE resampled four residential yards and collected background surface soil samples. The investigations identified four yards with elevated chromium concentrations in soil, and two with elevated lead in soil. While upstream sediments appear to have naturally elevated metal concentrations, sediments from onsite and downstream have been impacted by smelter operations; sediments southwest of the site may be affected by another metal contamination source. Aquifer testing in 2011 showed the upper unconfined aquifer onsite to be non-potable, groundwater monitoring is not needed.

In January and February 2013, KDHE collected surface soil samples from 22 residential yards and defined the southern extent of the contamination. Twelve residential yards are impacted by lead, arsenic, or both above Risk-based Standards (RSK) for Kansas. KDHE completed an Integrated Assessment in June 2013 to collect more data.

The cost to encapsulate the smelter waste was estimated at \$295,861, and did not include remediation of sediments in a nearby stream or of the residential yards. The site was referred to EPA for cleanup activities because of SWPCRP's funding limitations.

# Kansas Department of Health and Environment

## Bureau of Environmental Remediation, Remedial Section

### State Water Plan Contamination Remediation Program



#### *Crescent Oil Company, Independence*

The Crescent Oil Refining Company was a bulk storage facility, located in an industrial area of western Independence, with aboveground storage tanks (ASTs) containing kerosene, diesel, oils, and solvents. KDHE's Storage Tanks Section discovered trichloroethylene (TCE) in an onsite monitoring well in 2005. Crescent Oil Company filed for bankruptcy in 2009, and KDHE could identify no other viable potentially responsible parties.

After several investigations to determine the source area, KDHE delineated TCE concentrations exceeding the soil-to-groundwater Risk-based Standards for Kansas (RSK) value in places from two to five feet below ground surface.

The SWPCRP began clean-up activities in January 2013, excavating approximately 300 cubic yards of impacted soil and disposing of the material in a nearby landfill. KDHE's Mobile Laboratory helped define the excavation extent and depth by doing onsite field screening. KDHE completed site restoration by backfilling the excavated area with gravel and soil. Part of the excavation that had been fenced and vegetated was backfilled with clean soil, reseeded with native vegetation, and the fence was reinstalled.



*Cleanup activities: Top left, excavation. Top right, collecting field screening samples. Bottom left, backfilling with clean gravel. Bottom right, soil cleanup is completed.*

# Kansas Department of Health and Environment

## Bureau of Environmental Remediation, Remedial Section

### State Water Plan Contamination Remediation Program



#### *Kanopolis Abandoned Salt Pile, Kanopolis*



*Salt scarring at the former salt pile location.*

Chloride contamination in the alluvial aquifer comes from historic salt mining around the Kanopolis Abandoned Salt Pile site. SWPCRP delineated the southern and eastern extents of the chloride plume between April and September 2013 by collecting 21 groundwater samples from 21 direct-push sample locations, and from 7 surface water samples the Smoky Hill River and from streams receiving runoff from the site.

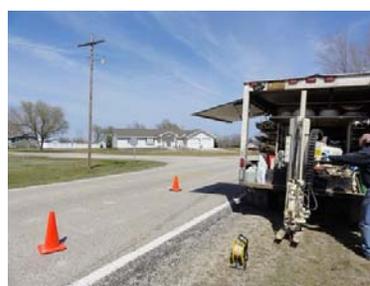
Field activities were conducted in three Phases: Phase I delineated the western-southwestern portion and part of the eastern portion of the chloride plume in April; Phase II delineated the chloride plume to the south and southeast in August; and Phase III collected upgradient and downgradient surface water samples in September.

SWPCRP compared the groundwater analytical results with the Secondary Maximum Contaminant Level (SMCL) for chloride in drinking water, which is 250 milligrams per liter (mg/L). The SMCL is based on the concentration at which the water begins to taste bad. Chloride concentrations in the groundwater samples ranged from 3.9 mg/L to 960 mg/L; 10 groundwater samples had chloride concentrations over the SMCL. The groundwater sample with the highest chloride concentration was collected next to an unnamed stream that runs south of the site to the Smoky Hill River.

SWPCRP compared the surface water analytical results with the Kansas Water Quality Standards, where the acceptable acute chloride concentration threshold for aquatic life is 860 mg/L. Chloride concentrations in the surface water samples from the streams ranged from 23 mg/L to 670 mg/L and in samples from the Smoky Hill River from 300 mg/L to 310 mg/L, all below the surface water quality standard.

Based on groundwater analytical data, the chloride plume appears to begin near the former abandoned salt pile, continues southwest to impact at least three known private wells in the southeastern portion of the city, and then follows an unnamed stream's influence southeast to the Smoky Hill River.

A comprehensive report documenting the history of the site and the 2013 chloride plume delineation activities is currently under review. A PRP was identified during the comprehensive review of the site and may be pursued.



*Collecting groundwater and surface water samples.*

*The data collected helps determine the size and concentration of the chloride plume.*



# Kansas Department of Health and Environment

## Bureau of Environmental Remediation, Remedial Section

### State Water Plan Contamination Remediation Program



#### *Konza Valley RWD #1, Manhattan*

In October 2013 the SWPCRP decommissioned the Granulated Activated Carbon treatment system on the Konza Valley Rural Water District public water supply well, located east of Manhattan, Kansas. In 2007 PCE contamination was detected in the public water supply well (PWS) at concentrations above drinking water standards. The SWPCRP used an emergency response action to install whole-house treatment systems on three private drinking water wells and to quickly install a treatment system designed to treat 65 gallons of water per minute onto the PWS well. The treatment system operated successfully for six years, removing the contamination and providing safe drinking water for the PWS users.



*Removing granulated activated carbon from the treatment vessel.*



*KDHE's trailer mounted treatment system can be moved to any site where it is needed.*

The City of Manhattan recently extended its public water system to provide water for Konza Valley RWD #1 customers and the treatment system was no longer needed. Decommissioning included disconnecting the mobile, trailer-mounted treatment system and transporting it to Topeka, where it will be reused on a similar site. The SWPCRP continues to maintain three whole-house treatment systems for private well owners with impacted wells.



*Site following treatment system removal.*

# Kansas Department of Health and Environment

## Bureau of Environmental Remediation, Remedial Section

### State Water Plan Contamination Remediation Program



#### *Pollard Carbon Tet—Source Investigation*

KDHE discovered the Pollard Carbon Tet site in 2013 after a neighboring property owner reported an unrelated unlicensed salvage yard. KDHE sampled the property owner's well and found carbon tetrachloride concentrations above Risk-based Standards for Kansas (RSK). In response, the SWPCRP surveyed water wells within one mile of Pollard. The survey found three wells impacted by carbon tetrachloride. None of the wells were used for drinking or bathing, so no emergency response was needed.

In May 2013 a source investigation used direct push technology to sample soil and groundwater

and locate and delineate the source of carbon tetrachloride. KDHE's mobile laboratory assisted by analyzing the soil and groundwater field samples.

The carbon tetrachloride source was located at a nearby grain elevator. Carbon tetrachloride has been extensively used as a grain fumigant. A responsible party search identified a potentially responsible party. The site was referred to the State Cooperative Unit, so the responsible party could address the contamination.



*Collecting soil and groundwater samples with a direct push rig.*



*Direct push sample locations are plugged with granular bentonite, a type of clay, to seal the hole.*

# Kansas Department of Health and Environment

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### State Water Plan Contamination Remediation Program



#### *Pratt Oil Reclamation—Tank and Soil Removal*

The SWPCRP completed a contamination assessment and tank and soil removal at the Pratt Oil Reclamation site, located in an industrial area of northern Pratt. Pratt Oil Reclamation was an oil field tank bottoms sludge reclaiming company that ceased operation in 1986. A 153,000 gallon above ground storage tank (AST) remained that was partially filled with approximately 35,000 gallons of oil field material. In June 2012 a vandal opened the valve at the base of the tank, which released an unknown amount of material. The spilled material was remediated and applied to lease roads by the current Pratt Oil Reclamation property owner in February 2013 with KDHE approval.



*Site after the completed remedial action.*

KDHE could not identify a viable responsible party to address the material remaining in the tank.



SWPCRP's assessment in April 2013 determined the extent of contamination caused by the facility operations. At the same time, part of the remaining oil sludge was removed by Wallace Energy for reclaiming. The rest of the oil sludge was solidified with cement kiln dust and hauled offsite to a nearby landfill. The tank was demolished and recycled.

The results of the contamination assessment indicated a small amount of contaminated soil remained from a leak on the bottom of the tank. SWPCRP removed approximately 80 cubic yards of soil in November 2013, then backfilled and regraded the site. Pending approval of the final remedial action report, SWPCRP will resolve the site to closed status.



*Mixing material within the tank with cement kiln dust to stabilize it.*

# Kansas Department of Health and Environment

## Bureau of Environmental Remediation, Remedial Section

### State Water Plan Contamination Remediation Program



#### 2013 Ongoing Investigations

##### Bruce Mining and Smelting Company, Cherokee

This former zinc smelter operated intermittently from 1897 to 1917, and the property was used by coal companies from 1940 to 1971. KDHE investigations from 2004 to 2008 confirmed the presence of smelter wastes and that no responsible party existed to handle a cleanup. There are approximately 25,000 cubic yards of impacted soils and smelter waste onsite.

In January and February 2013, KDHE collected surface soil samples from seven residential yards surrounding the site to determine if the properties had been impacted by historic smelting operations. Soils at six of the residential properties were not impacted above Risk-based Standards for Kansas (RSK). While one property had elevated chromium, the concentrations were comparable to naturally-occurring background levels and no other metals related to historic smelting activities were detected. No further action is recommended for the residential properties. The site is ready for remediation pending available funding.



*Vegetation cannot grow on piles of smelter waste left behind when the smelter closed.*

*Smelter waste includes bricks and rubble from the smelter plant.*



# Kansas Department of Health and Environment

## Bureau of Environmental Remediation, Remedial Section

### State Water Plan Contamination Remediation Program



#### 2013 Ongoing Investigations

##### Stockton PWS #10, Stockton

In 2011 the City of Stockton, hoping to reopen a well it had closed more than 10 years earlier, contacted KDHE to determine the source of chloride and sodium contamination in Stockton PWS Well #10.

SWPCRP installed four monitoring wells and collected surface water samples from a nearby creek in May 2013 in order to determine the contamination source. The investigation confirmed that contaminated soil and surface water runoff from a salt storage facility is impacting soil and vegetation on site and threatens the surface water quality of the nearby stream and the South Fork of the Solomon River.

SWPCRP initiated a Source Investigation in September and October 2013 in order to determine source areas of chloride contamination in the deeper portion of the alluvial aquifer. The site is being referred to the State Cooperative Program so the responsible party can address the contamination.



*Above: The salt storage facility in the background, near Stockton PWS #10, is a source of chloride contamination.*

*Below: Surface water runoff from the salt storage facility towards (below left) a nearby stream.*



## **SITE UPDATES BY RIVER BASIN**

This section of the report provides a summary of the work performed in 2013 at the SWPCRP sites.



**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
CIMARRON RIVER DRAINAGE BASIN**

**Site Name:** 2<sup>nd</sup> & General Welch, Liberal  
**Location:** Liberal, Seward County  
**KDHE District:** Southwest, Dodge City  
**Contamination:** Tetrachloroethylene  
**Status:** Monitoring

**Site Summary:** The 2<sup>nd</sup> & General Welch, Liberal site is located near the intersection of 2<sup>nd</sup> Street and General Welch Boulevard in Liberal, Seward County, Kansas, within the historical limits of the Liberal Army Airfield. The site was referred to KDHE's Remedial Section in 1999 when tetrachloroethylene (PCE) appeared in monitoring wells associated with a nearby Underground Storage Tank (UST) site. Some of these monitoring wells consistently contained PCE until groundwater levels dropped below the total depth of the wells in 2001, and they were abandoned and plugged.

In October 1999 the Site Assessment Unit investigated. Groundwater samples from five of the UST monitoring wells contained PCE at concentrations below KDHE Risk-based Standards for Kansas (RSK) levels. Soil samples indicated PCE detections at Building 639, a former engine-cleaning facility on the north side of the Liberal Combat Air Museum.

The SWPCRP and the KDHE Formerly Utilized Defense Sites (FUDS) Program jointly evaluated the site in 2004. The evaluation did not find PCE in the PWS wells or a nearby runway well. Lab results of soil samples suggested PCE contamination below RSK levels was limited to the area of former Building 639.

In October 2005 samples from two City of Liberal PWS wells showed no PCE impact to these wells, which extend more than 400 feet below ground surface.

On June 22, 2006, KDHE executed an EUC Agreement, restricting groundwater use and certain activities at the property. The EUC agreement required installing deeper monitoring wells and LTM sampling. Two monitoring wells were installed in February 2008; LTM activities include annual sampling of two monitoring wells and one PWS well.

**December 2013 Update:** Analytical results from the April 2013 LTM sampling event indicated PCE was detected in both monitoring wells; one well's detection was above RSK while the other well's detection was below RSK. No volatile organic compounds (VOCs) were detected in the PWS well. The site will remain in the LTM program until reclassification criteria are met.

**Site Name:** 8<sup>th</sup> & Country Estates (Former National Beef)  
**Location:** Liberal, Seward County  
**KDHE District:** Southwest, Dodge City  
**Contamination:** Volatile organic compounds  
**Status:** Remediation and monitoring

**Site Summary:** The 8<sup>th</sup> & Country Estates site entered the SWPCRP in 1994. The National Beef Packing Company identified VOC contamination in Well #3 above federal safe drinking water standards. Well #3 is classified as a PWS well. National Beef's Well #2 also had trace concentrations of these VOCs. Investigations conducted by the EPA, private entities, and the SWPCRP have been unable to identify a contamination source.

KDHE and National Beef executed a contract in February 1998. The SWPCRP designed and constructed a remedial air-stripper system to remove VOCs from water pumped from Well #3, and National Beef agreed to operate and maintain the air-stripper after installation. This approach allows National Beef to continue using Well #3 and helps restore the Ogallala aquifer by containing and removing the contaminant from the aquifer. Groundwater modeling indicates that using Well #3 helps contain and reduce the amount of VOCs in groundwater over time. The air-stripper system began operating in July 1999 and to date has treated over 2.5 billion gallons of water.

**December 2013 Update:** National Beef continues to operate the air stripper treatment system on Well #3. In April 2013, KDHE tested water samples from the treatment system and surrounding monitoring wells. The results indicate the treatment system is operating as designed, providing a safe water supply for the packing plant. KDHE will continue annual monitoring of the treatment system and the groundwater monitoring wells.

**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
KANSAS-REPUBLICAN RIVER DRAINAGE BASIN**

**Site Name:** 2<sup>nd</sup> & Leonard, Onaga  
**Location:** Onaga, Pottawatomie County  
**Contamination:** Tetrachloroethylene, trichloroethylene  
**KDHE District:** Northeast, Lawrence  
**Status:** Monitoring

**Site Summary:** The 2<sup>nd</sup> & Leonard, Onaga site was established in June 2000 when trichloroethylene (TCE) was identified in a groundwater sample collected from a monitoring well at the Lawrence Potter UST Site. Assessments were completed in December 2000 and July 2002. Analytical results from groundwater samples revealed PCE and TCE. No responsible party could be identified. The alley behind 2<sup>nd</sup> & Leonard Street was identified as the likely source area.

The site was transferred to the SWPCRP and placed into the LTM program in September 2002. The first LTM sampling event in January 2004 indicated the continued presence of PCE and TCE. KDHE closed the Lawrence Potter UST site and plugged its monitoring wells in January 2005; in August SWPCRP installed six new monitoring wells. Annual LTM sampling events since 2005 have detected PCE and TCE above RSK levels in two monitoring wells.

**December 2013 Update:** Analytical results from the August 2013 LTM sampling event indicated PCE and TCE were detected above RSK in two monitoring wells. The source area appears to be along the alley. Focused soil and groundwater sampling to determine the size of the source area and potential remedial options is planned for 2014, subject to funding availability and priority. Otherwise, the site will remain in the LTM program until reclassification criteria are met.

**Site Name:** Armourdale Refinery (Former)  
**Location:** Kansas City, Wyandotte County  
**Potential Contamination:** Refinery waste including polynuclear aromatic hydrocarbons  
**KDHE District:** Northeast, Lawrence  
**Status:** Investigation

**Site Summary:** KDHE identified refineries statewide in 2005 through historical reviews and reconnaissance. Historical records indicate these facilities generally operated between 1900 and 1940. KDHE delegated SWPCRP funds to assess site conditions and associated human health and environmental risks, and evaluate PRPs if contamination were found.

The Armourdale Refinery (Former) site is located at 2105 Kansas Avenue in Kansas City, Kansas, and is now occupied by the unused coal-fired power plant owned by the City of Kansas City, Kansas, for use by the Board of Public Utilities. A Phase I Focused former Refinery

Assessment (FFRA) in March 2007 concluded that historic and current uses of the subject property and several surrounding properties may pose environmental impacts. A Phase II FFRA has not yet been conducted.

**December 2013 Update:** Due to its low priority ranking and limited resources/funds, the SWPCRP did not work at the Armourdale Refinery (Former) site in 2013. The site will be evaluated for possible Phase II investigation activities in 2014.

**Site Name:** Axtell PWS Well #2  
**Location:** Axtell, Marshall County  
**Contamination:** Nitrate  
**KDHE District:** Northeast, Lawrence  
**Status:** Monitoring

**Site Summary:** The Axtell PWS Well #2 site was discovered during statewide sampling of public water supplies when 1,2,-dichloroethane (1,2-DCA) was identified in PWS Well #2. KDHE identified nitrate and 1,2-DCA in local groundwater, but identified no sources. The 1,2-DCA concentrations were attributed to well-head contamination during maintenance on the well or the well house and the well was taken out of service.

The site entered the SWPCRP and the LTM program in 1995. Sampling indicates no more contamination by VOCs, but nitrate continues to be above the Maximum Contaminant Level (MCL) in one private lawn and garden well and the former PWS Well #2.

KDHE collected subsurface and surface soil and groundwater samples in 2002 and 2003 to investigate the localized nitrate problem. The problem may be due to a former poultry operation on the property. Nitrate levels continue to be elevated.

**December 2013 Update:** The Axtell PWS Well #2 site is sampled biennially to monitor nitrate contamination in one lawn and garden well and the former PWS well. The site was sampled in May 2013. Nitrate was detected above its MCL value in both wells. Nitrate levels have fluctuated since 1988, particularly in the private lawn and garden well. Nitrate levels in PWS Well #2 are more stable and, while above the MCL, are steadily decreasing. The site will remain in the LTM program until reclassification criteria are met.

**Site Name:** Clifton Carbon Tetrachloride  
**Location:** Clifton, Washington County  
**Contamination:** Carbon tetrachloride, nitrate  
**KDHE District:** North Central, Salina  
**Status:** Monitoring

**Site Summary:** The Clifton Carbon Tetrachloride site was referred by KDHE's Storage Tank Section after sampling at the Caldwell's 66 UST site indicated that a monitoring well contained carbon tetrachloride. The UST site is adjacent to a grain elevator. A November 2005 Site Reconnaissance and Evaluation (SRE) sampled six existing monitoring wells and two private

wells. Two monitoring wells were contaminated with carbon tetrachloride, while elevated nitrates were detected throughout the site area. The nitrates are highly sporadic and do not appear to be attributable to point source releases.

In December 2005 the site entered the LTM program. Carbon tetrachloride concentrations, which had persisted in one monitoring well, have dropped to below RSK since 2010.

**December 2013 Update:** Analytical results from the May 2013 LTM sampling event indicated carbon tetrachloride detections in two monitoring wells below the RSK level. This was the fourth consecutive event where carbon tetrachloride concentrations were below RSK in the monitoring wells. The site will be evaluated for reclassification to resolved status.

<b>Site Name:</b>	<b>Coral Refinery</b>
<b>Location:</b>	Kansas City, Wyandotte County
<b>Contamination:</b>	Total petroleum hydrocarbons, volatile organic compounds, metals
<b>KDHE District:</b>	Northeast, Lawrence
<b>Status:</b>	Monitoring

**Site Summary:** The Coral Refinery site is located north of the Kansas River and just east of the 7th Street Trafficway in Kansas City. From 1970 to 1978, the facility was a waste oil refinery using an acid-clay process. The refinery generated a thick, strong-smelling, acid-hydrocarbon sludge that was disposed of in two on-site sludge pits. In June 1982, the sludge pits were filled with agricultural lime and partially neutralized; however, unneutralized pockets of sludge remained.

In 1983 a Site Inspection found sludge seeping from the west side of the site. Another KDHE inspection in 1985 found waste oil accumulating in a nearby gutter and draining into a storm sewer. In 1986 a KDHE Preliminary Assessment found seepage at the surface and along the western flanks of the pit dike. A Site Investigation (SI) installed four monitoring wells, collected soil and sludge samples, and completed a geophysical survey. The SI identified extensive un-mixed, un-stabilized material in the former pits. In 1993 the site entered the SWPCRP. Samples collected from existing wells indicated only trace levels of contamination.

The Coral Refinery site entered the State Cooperative Program in the mid-2000s. A 2007 Site Inspection identified unstabilized sludge, impacted with lead, seeping to the surface. A Unified Focused Assessment in May 2011 further characterized the waste on site. The State Cooperative Program is working with current property owners to address the residual contamination with a proper cap. The SWPCRP is monitoring the groundwater on a semi-annual basis.

**December 2013 Update:** SWPCRP began groundwater monitoring in 2013 and has collected samples twice. Neither sampling event detected any contaminants of concern above the respective RSK. The State Cooperative Program continues to work with the property owner to place a cap and EUC on the former sludge pit area.

**Site Name:** Konza Valley RWD #1  
**Location:** Manhattan, Riley County  
**Contamination:** Tetrachloroethylene  
**KDHE District:** North Central, Salina  
**Status:** Remediation and monitoring

**Site Summary:** The Konza Valley RWD #1 site was referred to the SWPCRP in September 2007 by KDHE's Bureau of Water after PCE was detected above RSK. The initial investigation confirmed contamination in three private wells and PWS#3R.

A KDHE contractor installed whole-house carbon treatment systems onto three private drinking water wells to provide a safe water supply for the residents. There was no other water source available; therefore, PWS#3R continued operation after residents were notified of the contamination by the Konza Valley Rural Water District (RWD) #1. Plans were developed to install a mobile carbon treatment system onto PWS#3R to remove the PCE from the water and provide safe drinking water for Konza Valley RWD customers.

Additional investigations in 2007 and 2008 collected direct push probe groundwater samples and installed monitoring wells.

In March and April 2008, a KDHE contractor installed a water treatment system on PWS#3R that consists of two 1500 pound Granulated Activated Carbon (GAC) vessels designed to treat 65 gallons of water per minute. The carbon vessels were in an enclosed mobile trailer that allowed KDHE to reuse the system at another site. Pre-treatment and post-treatment sampling confirms the treatment systems are removing all of the PCE from PWS#3R and the private wells. In 2012, the City of Manhattan planned to extend its PWS pipeline to replace water supplied by Konza PWS#3R. Konza Valley PWS#3R and its treatment system were scheduled to be decommissioned in 2013.

**December 2013 Update:** In October 2013, after City of Manhattan public water was piped in to replace the aging RWD well, KDHE decommissioned the GAC treatment system on Konza PWS#3R. Decommissioning included removing the mobile trailer-mounted GAC treatment system and transporting it to Topeka, to be re-used when similar circumstances arise at another site. See the site accomplishment sheet on page 24.

SWPCRP also continues to monitor and maintain three whole-house water treatment systems. Recent monitoring indicates the systems will soon need to be replaced. SWPCRP is evaluating options to replace the water treatment systems or hook up the residents to the PWS.

**Site Name:** **Latimer Groundwater Contamination**  
**Location:** Latimer, Morris County  
**Contamination:** Carbon tetrachloride, ethylene dibromide, trichloroethylene, perchlorate  
**KDHE District:** North Central, Salina  
**Status:** Monitoring

**Site Summary:** Groundwater impacts were first discovered in the City of Latimer during a 1989 buried tank leak assessment at the Latimer Agri-Services facility. TCE and carbon tetrachloride concentrations exceeded RSK in a private well.

Between 1994 and 1996, the Tri-County Public Airport site was discovered in connection with the United States Army Corps of Engineers (USACE) investigation of the former Herington Army Airfield base, located approximately three miles upgradient and southeast of the city of Latimer. During the investigation, the USACE identified TCE contamination in the groundwater. The property was used by the Department of Defense from 1942 to 1945 as a staging facility for aircraft and crews preparing for overseas deployment. Following facility closure in 1945, the Department of Defense transferred the property to the City of Herington in 1948 for use as a public airport and for industrial development. The Beech Aircraft Company (now Raytheon Aircraft Corporation) operated at the airport for a decade during the 1950s to 1960s and used TCE for degreasing activities. A blackpowder manufacturer and other light industries also operated at the property.

KDHE's 1996 Preliminary Assessment/Screening Site Investigation at the Tri-County Public Airport site detected TCE in monitoring and supply wells. A TCE groundwater plume extends northwest from the former air base to private wells in the city of Latimer. In response, KDHE initiated a Preliminary Removal Evaluation at the Latimer Groundwater Contamination site while the EPA conducted an Expanded Site Investigation of the Tri-County Public Airport site. KDHE executed a Consent Agreement with Raytheon Aircraft Company, identified as a PRP, to address remaining TCE impacts under the KDHE State Cooperative Program. KDHE has since updated the Consent Order to assign Hawker-Beechcraft Corporation as the PRP.

The SWPCRP provided bottled water and carbon water treatment systems to Latimer residents with contaminated water supplies. KDHE also initiated a Comprehensive Investigation (CI) in 1998 to further investigate carbon tetrachloride and ethylene dibromide (EDB) impacts. The CI identified the former Latimer Agri-Services facility as a source for an EDB/carbon tetrachloride groundwater plume extending approximately 0.5 miles northwest. The CI also reported elevated nitrate levels, probably from non-point sources.

The Latimer Groundwater Contamination site entered the LTM program in October 1998. Early monitoring data reported TCE, carbon tetrachloride, and EDB above respective RSKs and indicated relatively stable groundwater plumes. Private well sample data proved the effectiveness of the in-house treatment systems.

LTM analytical data collected in 2002 and 2003 found perchlorate impacts to groundwater. EPA's 1998 findings prompted additional perchlorate sampling that eventually delineated a

perchlorate groundwater plume extending to Latimer and surrounding areas. The Hodgdon Powder facility, also located at the Tri-County Public Airport, is a source of perchlorate releases to soil, sediment, surface water, and groundwater. KDHE executed a Consent Agreement with Hodgdon Powder Company in 2002 to address remaining perchlorate impacts under the KDHE State Cooperative Program.

Due to the extent of groundwater impacts within the Latimer area EPA, KDHE, and Hodgdon Powder dedicated funds to construct a water supply line from the City of Herington to the City of Latimer. Water line construction and connection to all residences in Latimer was completed in early 2007. EPA gave Raytheon permission to remove the carbon filtration systems.

**December 2013 Update:** In May 2013 KDHE sampled seventeen monitoring wells, two livestock wells, and one lawn and garden well for VOCs. Carbon tetrachloride was detected in four well samples, above RSK in two. EDB exceeded RSK in two monitoring wells and was detected below RSK in one of the livestock wells. SWPCRP proposes conducting a Source Investigation in 2014, pending sufficient funding.

<b>Site Name:</b>	<b>Mercier Carbon Tetrachloride</b>
<b>Location:</b>	Mercier, Brown County
<b>Contamination:</b>	Carbon tetrachloride, nitrate
<b>KDHE District:</b>	Northeast, Lawrence
<b>Status:</b>	Monitoring

**Site Summary:** The Mercier Carbon Tetrachloride site was discovered in 1998 when investigative screening of a former United States Department of Agriculture/Commodity Credit Corporation (USDA/CCC) grain bin storage facility discovered carbon tetrachloride above RSK levels in a livestock well. KDHE's Site Assessment Program investigated in June and August 1998, confirming groundwater impacts by carbon tetrachloride, chloroform, and nitrates. Contaminant source areas were not identified. The site was referred to the SWPCRP in September 1999.

Further investigation in July 2000 sampled nearby private wells and installed and sampled six monitoring wells. The results indicated elevated concentrations of carbon tetrachloride in two wells and elevated nitrate concentrations throughout the study area. The investigation did not identify any source areas.

Annual LTM since 2001 sampled private and monitoring wells for VOCs and nitrate. By landowner request, four monitoring wells without a history of carbon tetrachloride detections were abandoned and plugged in May 2002. Carbon tetrachloride is consistently above RSK in one monitoring well. Nitrate levels remain elevated above the MCL in nearly all wells sampled, suggesting non-point source nitrate contamination.

Although a PWS is available in and near Mercier, one residence had chosen not to connect to it. It was reported that water from the unconnected residence's well is treated prior to use. All other residences were reportedly connected to the PWS.

**December 2013 Update:** Only one monitoring well was sampled during the August 2013 LTM sampling event. SWPCRP plans a 2014 Site Investigation, subject to available funding and priority, to delineate the carbon tetrachloride plume and to determine its downgradient and sidegradient extents, as well as focus on source investigations within the historic location of the former USDA/CCC grain bin site. The site will remain in the LTM program until reclassification criteria are met.

<b>Site Name:</b>	<b>St. George VOC Site</b>
<b>Location:</b>	St. George, Pottawatomie County
<b>Contamination:</b>	1,2-dichloroethane
<b>KDHE District:</b>	Northeast, Lawrence
<b>Status:</b>	Investigation

**Site Summary:** The St. George VOC Site was identified in July 1998 during a statewide sampling of private water wells located near former USDA/CCC grain storage facilities. The study detected 1,2-DCA below RSK in the Taylor Store (a former general store) well; and TCE below RSK in a private lawn and garden well. A confirmatory sampling of the wells in September 1998 indicated that 1,2-DCA was below RSK in the Taylor well and TCE below RSK in the private well. Both the Taylor Store and the private well residence obtain their drinking water from the Pottawatomie County RWD #1. A search of the Resource Conservation and Recovery Act records did not identify any users of 1,2-DCA or TCE in the vicinity of the documented groundwater contamination.

KDHE's Site Assessment Unit conducted a SRE in October 1999, which verified TCE detections in the private well below RSK, and identified several trace detections of petroleum hydrocarbons at the former gas station located south of the former Taylor Store. The former gas station was a KDHE Storage Tank Program site (Former Meinhardt Station) closed after gasoline tanks were removed and no further action was needed. The SRE did not detect 1,2-DCA or TCE in nine groundwater samples collected using direct-push technology, or identify a source area for the TCE contamination found in the private well.

The investigation identified 1,2-DCA above RSK in a sample taken from a pressure tank at the Taylor well. The Taylor well was not in service at the time because the basement was flooded, and the sample was taken without purging the well. This contamination may have been related to the former gas station; or, since 1,2-DCA was not detected in any other groundwater samples, may be limited to the Taylor well or the pressure tank.

KDHE conducted a Supplemental Sampling Assessment in August 2007 to evaluate the localized contamination. Groundwater samples were collected from five direct-push sample locations, the Black Jack Spring, and the private well; the Taylor well was abandoned and unavailable for sampling. The investigation identified no 1,2-DCA, trace detections of petroleum hydrocarbons immediately adjacent to the former gas station UST site, and TCE detections below RSK in the private well, but in no other groundwater sample.

*Kansas-Republican Basin Update*

Because TCE had been detected at low levels every time the private well has been sampled and no detections of TCE were present in upgradient groundwater samples, the site was referred to SWPCRP for LTM.

**December 2013 Update:** Concentrations of TCE observed in the private lawn and garden well were consistently below RSK from 1998 to 2007. The occurrence of elevated 1,2-DCA is suspect due to the sampling and collection method from the holding tank, and nearby groundwater samples adjacent to the well location could not duplicate the elevated concentrations. Since this sampling event, the Taylor Store well has been abandoned. The TCE concentrations are below RSK and the well is not used for domestic purposes. The site is being considered for reclassification to resolved status. Before reclassification, SWPCRP has been trying to determine the status of the Taylor well in order to collect a final groundwater sample for VOC analysis.

**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
LOWER ARKANSAS RIVER DRAINAGE BASIN**

**Site Name:** Arkansas City Refinery Site  
**Location:** Arkansas City, Cowley County  
**Contamination:** Hydrocarbons  
**KDHE District:** South Central, Wichita  
**Status:** Investigation

**Site Summary:** From 1916 until 1925, the Milliken Company operated an oil refinery on the western edge of Arkansas City. Fire destroyed most of the refinery operations in 1925 and the site was abandoned in 1931. The site was subsequently used for unregulated dumping of household and solid wastes until 1981. The EPA placed Arkansas City Dump Site on the National Priorities List in 1984. Two distinct areas of waste were identified by the EPA. An acidic sludge pond, identified as the Northern Waste Area, was neutralized in place in 1992. It was determined that the remaining petroleum waste materials in the southern waste area were not eligible for treatment under the Comprehensive Environmental Response Compensation Liability Act (CERCLA). The site was deleted from the National Priorities List in 1996. The remaining petroleum contamination, a daughter site named the Arkansas City Refinery Site, was assigned to the SWPCRP in June 2003. A PSE identified localized groundwater contamination in 2004. KDHE evaluated historical ownership and operations and did not identify a viable responsible party.

**December 2013 Update:** Since no viable responsible party has been found, SWPCRP is reviewing all available information to determine the next course of action.

**Site Name:** Belle Plaine Groundwater Contamination  
**Location:** Belle Plaine, Sumner County  
**Contamination:** Nitrate, pesticides  
**KDHE District:** South Central, Wichita  
**Status:** Monitoring

**Site Summary:** The Belle Plaine Groundwater Contamination site was discovered in 1997 when a KDHE investigation of a former grain storage facility identified excessive nitrate concentrations in a nearby lawn and garden well. The site entered the SWPCRP for further evaluation.

Subsequent SWPCRP investigations conducted in 1999 and 2002 verified nitrate point source impacts to soil and groundwater, including impacts to several domestic lawn and garden wells. Investigation findings indicated the abandoned Agri-Data facility, located on railroad right-of-way property, as a source area. The site remains in the SWPCRP because there is no viable PRP.

KDHE assigned the site LTM status in 2003. Annual sampling events since then indicate relatively steady to decreasing nitrate concentrations.

**December 2013 Update:** Groundwater samples collected from four monitoring wells and one lawn and garden well during the July 2013 LTM sampling event show nitrate concentrations exceeding MCL in five wells. SWPCRP proposes conducting a Supplemental Source Investigation in 2014, pending sufficient funding. The site will remain in the LTM program until reclassification criteria are met.

<b>Site Name:</b>	<b>Clearwater PCE</b>
<b>Location:</b>	Clearwater, Sedgwick County
<b>Contamination:</b>	Tetrachloroethylene
<b>KDHE District:</b>	South Central, Wichita
<b>Status:</b>	Remediation and monitoring

**Site Summary:** The Clearwater PCE site was identified in 1985 through routine PWS well sampling for VOCs. In response to PCE levels above the drinking water standards, the City of Clearwater disconnected PWS Well #2 from the public water system. Two other PWS wells nearby have no reported impacts. PWS Well #2 was occasionally used for the public swimming pool and for park irrigation. Area investigations conducted by the SWPCRP between 1990 and 1998 confirmed the presence of a PCE source in northeastern Clearwater and delineated a groundwater plume approximately 0.5 mile in length. Several irrigation and lawn and garden wells have also been impacted.

Based on groundwater data, the source area is located between the public swimming pool and the intersection of Heller Avenue and Elaine Avenue; however there have been no potential source facilities identified. The PCE contamination appears to be from indiscriminate waste dumping in the area. KDHE initiated a CAS in 1999 that recommended ex-situ groundwater treatment at the apparent source and natural attenuation in downgradient areas. Additional investigations were conducted in 1999 and 2000 suggested there is an ongoing contaminant source in areas adjacent to the Clearwater Historical Museum and the pool. A historical review of the area identified no source facilities. The impacted wells do not supply drinking water, but PCE in the groundwater is widespread and extends beneath several residential areas, including the Clearwater High School and the Clearwater Middle School.

The site entered the LTM program in June 2003.

In June 2007 a shallow tray air stripping treatment system, piping, and a new concrete block well house were installed on PWS #2 to remove PCE from the groundwater. The system operates seven days per week and treats approximately 21,000 gallons of water per day; regular sampling shows its effectiveness.

Long-term groundwater monitoring since 2005 has included sampling PWS #2 pre-treatment and post-treatment, private lawn and garden wells, and eight monitoring wells. The private lawn and

garden wells that are sampled vary from year to year as some property owners may be unavailable and unable to grant access during the sampling event.

**December 2013 Update:** Analytical results from the July 2013 LTM sampling event indicated PCE detections in the monitoring wells, private lawn and garden wells, and the PWS #2 well below the RSK level. This sampling event marks the second consecutive event since the installation of the air stripper treatment system that PCE has been detected below RSK in all the sampled wells. PCE concentrations in the PWS #2 pre-treatment samples have been slowly decreasing, and no break-through has been observed in the PWS #2 post-treatment samples. The site will remain in the LTM program until reclassification criteria are met.

**Site Name:** E&H Foam Distributors—Newton  
**Location:** Newton, Harvey County  
**Contamination:** 1,1-Dichloroethylene  
**KDHE District:** South Central, Wichita  
**Status:** Resolved

**Site Summary:** The former E&H Foam Distributors facility entered KDHE's UST Trust Fund Program after a 1,000-gallon diesel tank was removed from the site in 1990 or 1991. The UST site was monitored from December 1995 to April 2000, when the site was closed. Laboratory results from groundwater samples collected during the final sampling event indicated that chlorinated hydrocarbons were detected in groundwater below RSK.

KDHE's Site Assessment Unit conducted a SRE in August 2007. Laboratory results identified naphthalene in groundwater near RSK in the area of a former UST monitoring well. The naphthalene contamination came from the former UST, and it was referred to KDHE's Storage Tank Section. 1,1-Dichloroethylene (1,1-DCE) was detected in a nearby private lawn and garden well below RSK, and again during resampling in December 2007.

Due to the trace detections of 1,1-DCE in the private well, the site was referred to SWPCRP in 2013 for LTM.

**December 2013 Update:** KDHE sampled the private well in August 2013. No VOCs were detected in the groundwater sample. The historic low detections and present non-detections of 1,1-DCE satisfy the reclassification criteria, and the site was reclassified as resolved.

**Site Name:** Elm & SW 3<sup>rd</sup>, Newton  
**Location:** Newton, Harvey County  
**Contamination:** Tetrachloroethylene, trichloroethylene  
**KDHE District:** South Central, Wichita  
**Status:** Monitoring

**Site Summary:** The Elm & SW 3<sup>rd</sup> Newton site was discovered in 1988 when PCE and TCE were detected in two monitoring wells associated with the primarily diesel-related Burlington

Northern Santa Fe Railmill site. From 1991 through 1996, Burlington Northern Santa Fe files indicate no PCE or TCE present in samples collected the two monitoring wells. In April 1997 PCE again appeared in one monitoring well, and in the second monitoring well in October.

KDHE's Site Assessment Program conducted a SRE investigation in 1998 and unsuccessfully attempted to identify potential source areas. PCE was identified in one monitoring well. The site entered the SWPCRP in 2000.

Site access negotiations delayed a PSE until May 2004. The PSE did not identify any sources for PCE, and the site entered the LTM program in May 2005.

Since 2005 SWPCRP has annually sampled the four monitoring wells for PCE and TCE. Three monitoring wells are repeatedly non-detect. One monitoring well has a history of PCE and TCE above RSK levels since 1997. Between 2010 and 2011, PCE and TCE concentrations in one monitoring well greatly increased, indicating a spill or an active source of contamination nearby.

**December 2013 Update:** Analytical results from the August 2013 LTM sampling event indicated PCE and TCE in one monitoring well above their respective RSK levels, while the other monitoring wells have no detections. SWPCRP proposes investigating the contamination source through water well surveys, domestic well sampling, and groundwater and soil sampling in order to delineate the vertical and horizontal extent of the VOC plume. This work may occur in 2014, pending funding and site priorities. The site will remain in the LTM program until reclassification criteria are met.

<b>Site Name:</b>	<b>FMGP—Wellington</b>
<b>Location:</b>	Wellington, Sumner County
<b>Contamination:</b>	Volatile organic compounds, polynuclear aromatic hydrocarbons, arsenic
<b>KDHE District:</b>	South Central, Wichita
<b>Status:</b>	Investigation and monitoring

**Site Summary:** In 1993 Western Resources investigated a number of Former Manufactured Gas Plant (FMGP) sites across Kansas to determine if they were a PRP for these historical facilities. The investigation determined that the Wellington FMGP was not a facility in which Western Resources had a historic involvement. The site was referred to KDHE's Site Assessment Unit. A Preliminary Assessment/Screening Site Inspection, completed in 1998, found VOCs, Polynuclear Aromatic Hydrocarbons (PAHs), and metal contaminants in onsite soil and groundwater, as well as a substance thought to be coal tar (a by-product of the production of coal gas). Since no PRP was identified, the site entered the SWPCRP.

SWPCRP concluded a CI in February 2000, installing and sampling several nested (shallow and deep) monitoring wells. Results indicated that the FMGP had caused benzene, toluene, ethylbenzene and xylene (BTEX); Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO); PAHs; and certain metals contamination, concentrated near the former gas holder. The CI

also found free-phase hydrocarbons, consistent with coal tar, in three deep wells near the gas holder.

A CAS and preliminary CAP in April 2002 found detectable levels of benzene and naphthalene in indoor air results at the former FMGP building. The SWPCRP contractor modified the ventilation system to introduce more fresh air into the building.

The CAS recommended a soil ventilation system to reduce indoor air exposure but pilot testing indicated this system would be ineffective. KDHE considered removing the existing gas holder and contaminated soil, but further investigation in November 2003 suggested the gas holder was not the only source of contamination.

In February 2009 KDHE found coal tar in three deep monitoring wells and volatile petroleum hydrocarbons and PAH contamination far above RSK levels in deep and shallow wells nearest the FMGP gas holder. These and other site wells also had elevated arsenic.

A phased Source Investigation examined the horizontal and vertical extent of soil and groundwater contamination and located buried FMGP structures contributing to site contamination. The August 2010 Phase I collected soil cores for subsurface profiling, soil samples, and perimeter groundwater samples. Soil cores located buried process wastes from FMGP operations north of the FMGP building, between the building and gas holder, and inside the gas holder along with historically disposed of municipal waste. The primary contaminants were PAHs, benzene, naphthalene and arsenic; the waste tested as non-hazardous.

A Phase II Source Investigation in March and April 2011 consisted of subsurface trenching, monitoring well installation, and well sampling. Trenching confirmed buried wastes north of the FMGP building, located two sides of the FMGP gas holder and confirmed the buried wastes inside. The investigation installed additional nested monitoring wells further upgradient and along the perimeter of the property downgradient of known contamination. Organic contaminants remained in the central portion of the site while there were elevated concentrations of arsenic within, downgradient, and upgradient of the area of impact.

**December 2013 Update:** Sample collection in November 2013 found free product in two shallow and three deep wells near the FMGP gas holder. At the time of this report, SWPCRP is waiting on analytical results. KDHE plans to sample background arsenic levels and evaluate remediation options in 2014.

<b>Site Name:</b>	<b>Former Cusco Oil and Refining</b>
<b>Location:</b>	Chase, Rice County
<b>Contamination:</b>	Naphthalene, heavy metals
<b>KDHE District:</b>	North Central, Salina
<b>Status:</b>	Investigation

**Site Summary:** The Former Cusco Oil and Refining site was identified when KDHE identified and ranked former oil refinery facilities in Kansas. The refinery operated from 1916 to 1926.

In May 2011 KDHE's Sector Assessment Program conducted a UFA, collecting and analyzing groundwater and soil samples for radiation, VOCs, TPH-DRO, chloride, and metals. Analytical results for the soil samples resulted in detections below RSK values. Groundwater sample analysis results had detections of naphthalene, arsenic, and manganese above their respective RSK values.

The Former Cusco Oil and Refining site entered the SWPCRP in 2011 after a PRP search found no viable responsible parties.

**December 2013 Update:** The next proposed events will include investigations to determine the extent of VOC and metal contamination. Due to its priority ranking and limited resources/funds, the SWPCRP did not work on the site in 2013.

<b>Site Name:</b>	<b>Hudson Carbon Tetrachloride</b>
<b>Location:</b>	Hudson, Stafford County
<b>Contaminations:</b>	Carbon tetrachloride, trichloroethylene, chloroform
<b>KDHE District:</b>	Southwest, Dodge City
<b>Status:</b>	Monitoring

**Site Summary:** Sampling at the Stafford County Flour Mill Trust Fund site identified carbon tetrachloride, TCE, and chloroform contamination in an untreated restaurant well. The Hudson Carbon Tetrachloride site entered the SWPCRP in April 2005.

In May 2005 KDHE installed a carbon treatment system at the restaurant that effectively treats the restaurant water supply. Since February 2006 KDHE has treated and sampled the restaurant water.

After several investigations, the SWPCRP identified a likely source area in the vicinity of an old shed, brush, and small drainage ditch. In 2008 KDHE installed and began annual LTM of seven monitoring wells to define the contaminant plume.

Quarterly sampling shows the treatment system at the restaurant continues to be effective.

**December 2013 Update:** In 2012 KDHE began sampling the treatment system annually instead of quarterly. Influent and effluent water samples were collected from the restaurant well, coinciding with the annual sampling of the monitoring wells. The 2013 sampling event confirms the water treatment system is operating as designed and provides safe drinking water for the restaurant. Monitoring well sampling results confirm the contamination plume is localized near the restaurant well and MW-2. SWPCRP proposed a supplemental source investigation in 2014. The site will remain in the LTM program until reclassification criteria are met.

**Site Name:** Hutchinson Air Base Industrial Tract (HABIT)  
**Location:** Yoder, Reno County  
**Contamination:** Carbon tetrachloride, trichloroethylene  
**KDHE District:** South Central, Wichita  
**Status:** Investigation and monitoring

**Site Summary:** The HABIT site entered the SWPCRP in 1994 after an EPA investigation discovered carbon tetrachloride and TCE migrating from the former air naval base. No responsible parties were identified at the time. In 1988 the EPA connected affected homes and the City of Yoder to the newly created Reno County RWD #101. In 1996 the SWPCRP installed several monitoring wells to evaluate plume migration toward RWD #101. The monitoring discovered impacted wells at homes not connected to the rural water district. As an interim measure, SWPCRP installed carbon filter units at homes where contaminants were above the federal MCL.

RWD #101 and the adjacent RWD #3 were evaluated to determine a long-term solution for the area residences. KDHE decided to upgrade RWD #3 so area homes could be connected. The plans also provided for an interconnection between the two adjacent rural water districts in case RWD #101 should become impacted by contaminants at levels exceeding the federal MCLs. RWD #3 and RWD #101 signed an agreement for a sale of water and temporary transfer of water rights as part of the plan.

KDHE tested RWD #3 and made repairs to its two supply wells, pressurizing and automating the system and installing service lines to homes. The contingency interconnection between RWD #3 and RWD #101 was installed; it will not be used unless contamination is discovered in RWD #101's well. Area residents were notified that connection to the RWD #3 could be made in April 1999.

The Department of Defense added the HABIT site to their list of FUDS requiring investigation. The SWPCRP and the FUDS Program completed a joint investigation in 2004 in order to identify source areas. No definitive source was encountered, but investigation data defined a narrow plume originating at the site.

Since KDHE monitoring activities indicate the contamination has migrated closer to the RWD #101 well, a CAS in 2004 evaluated several different options, including using recovery wells to intercept the contaminant plume and installing a remedial system at the RWD #101 well. In December 2004 the SWPCRP connected a previously unidentified private residence to RWD #3.

A direct-probe investigation in the spring of 2005 detected very high levels of carbon tetrachloride and TCE in groundwater near a seed storage operation. KDHE reviewed and approved a CAS Work Plan to address remedial actions at the seed storage operation, but this plan was put on hold.

Further investigation in 2007 attempted to differentiate groundwater plumes on the former base in order to locate possible sources attributable to historical use. The investigation identified another TCE plume in the eastern portion of the HABIT property.

In January 2009 the SWPCRP installed whole-house treatment systems in two homes whose shared water supply well had been contaminated with TCE above the MCL. In June 2009 a soil-gas source investigation was initiated. Data from this investigation was supplemented by soil and groundwater samples collected in October 2009 and sewer sediment samples collected in December 2009.

In May 2010 a comingled TCE and carbon tetrachloride plume was traced to an area where historical aerial photographs indicate dumping by the Navy. Geophysical surveys conducted in November 2010 discovered three anomalies near the area of highest shallow groundwater contamination.

In January 2011 due to budgetary constraints within SWPCRP, another KDHE program conducted exploratory trenching in the area with the anomalies. The investigation discovered kitchen refuse, engraved Navy tableware, Navy watch mugs, and bottles and trash cans dating to World War II, as well as drums containing beef bones, pork bones, and TCE. KDHE presented the findings to the USACE. In December 2011 SWPCRP installed whole-house treatment systems in three homes where private water supplies were contaminated with TCE, carbon tetrachloride, and/or EDB.

In 2012 SWPCRP added eight more private wells to its monitoring network in response to the continued migration of the contaminant plume.

**December 2013 Update:** In response to SWPCRP findings, the USACE excavated the burial trench in March 2013 as the first phase of a removal/in situ remedial plan. The SWPCRP added fourteen nested monitoring wells to its spring 2013 network, which will enable evaluation of groundwater quality changes resulting from the USACE's remedial efforts. SWPCRP continues to sample PWS, private drinking supply, and sentry wells semiannually to monitor contaminant movement through the aquifer. The fall 2013 monitoring event sampled 37 private water supply wells, 4 water treatment systems, 3 PWS wells, and 58 monitoring wells.

<b>Site Name:</b>	<b>Kiowa PWS Well #2</b>
<b>Location:</b>	Kiowa, Barber County
<b>Contamination:</b>	Carbon tetrachloride
<b>KDHE District:</b>	Southwest, Dodge City
<b>Status:</b>	Monitoring

**Site Summary:** The Kiowa PWS Well #2 site was discovered in August 1986 during a statewide screening of Kansas PWS wells. PWS Well #2 had carbon tetrachloride exceeding RSK levels, and the City of Kiowa discontinued using the well in October 1986. A Preliminary Assessment in 1989 confirmed excessive carbon tetrachloride in PWS Well #2 and 1,2-DCA above the drinking water standard in a private well. At that time the City of Kiowa was using a new well field near the City of Sharon to obtain its drinking water.

The issue of water quality for the former Kiowa PWS wells resurfaced in September 1999 when the City of Kiowa requested KDHE to sample several former wells to evaluate their suitability as a PWS. Groundwater samples collected from the former PWS wells contained high concentrations of carbon tetrachloride and nitrate in PWS Wells #2 and #11 and inorganic compounds above drinking water standards in several other PWS wells. Based on the results, the Kiowa PWS Well #2 site entered the SWPCRP in September 1999.

A 2001 investigation found elevated petroleum constituents, carbon tetrachloride, and nitrate in various wells. The SWPCRP installed monitoring wells in spring 2002. A possible nitrate point source was identified, but not for carbon tetrachloride. The site entered the LTM program in 2002.

A Supplemental Investigation in December 2005 and groundwater sampling in January 2006 tried to fully define the upgradient extent of the carbon tetrachloride groundwater plume. Carbon tetrachloride was farther upgradient than previously known and the source may be a former grain bin. In May 2007 KDHE transferred the nitrate portion of the site to the State Cooperative Program.

LTM analytical results indicate carbon tetrachloride concentrations have generally remained steady or decreased in all monitoring wells except two. In PWS Well #2, carbon tetrachloride was last over RSK in 1999, and has been non-detect since 2009. Carbon tetrachloride concentrations in the private well have been decreasing since 2002, but remain slightly over RSK.

**December 2013 Update:** Analytical results from the July 2013 LTM sampling event detected carbon tetrachloride below RSK in two of nine monitoring wells, and above RSK in the private well. PWS Well #2 is used for bulk oil field and agriculture water usage only and was non-detect for carbon tetrachloride. This site will remain in the LTM program until reclassification criteria are met.

<b>Site Name:</b>	<b>Lyons Chloride Contamination</b>
<b>Location:</b>	Lyons, Rice County
<b>Contaminant:</b>	Chloride
<b>KDHE District:</b>	North Central, Salina
<b>Status:</b>	Remediation and monitoring

**Site Summary:** A 1996 investigation indicated a chloride plume potentially threatened three Lyons PWS wells. The investigation determined the source area was the Old Lyons Salt Mine located in the northeastern portion of Lyons.

In July and August 1997 KDHE installed two groundwater recovery wells in strategic locations to intercept the chloride plume. This containment system effectively monitors and captures the chloride plume, preventing its migration.

In the fall of 2002 SWPCRP staff began to consider installing a second containment system north of the existing containment area. Preliminary results indicated a two-well northern containment system could stop the chloride plume within the Lyons city limits and increase the amount of chloride captured. Eventually pumping in the southern area could be discontinued. The northern system would need to pump only a small fraction of the water to achieve plume containment.

An agreement between KDHE, the City of Lyons, and North American Salt Company identified the contributions and responsibilities of each party with regard to operation, maintenance, and long-term funding of the conveyance pipeline and recovery well systems. The final system design was attached to this agreement in May 2005. The system was installed and began operation by November 2005.

The northern containment wells are positioned in an area with higher chloride concentrations and remove highly contaminated water. The contaminated water is disposed of at North American Salt's disposal wells. Continued operation and monitoring of the cleanup system has confirmed its effectiveness.

**December 2013 Update:** A SWPCRP contractor sampled monitoring and recovery wells at the Lyons Chloride Contamination site in April 2013; the recovery wells continue to capture the chloride contaminated groundwater. This site will remain in the LTM program until reclassification criteria are met.

<b>Site Name:</b>	<b>Lyons VOC Contamination</b>
<b>Location:</b>	Lyons, Rice County
<b>Contaminant:</b>	Volatile organic compounds
<b>KDHE District:</b>	North Central, Salina
<b>Status:</b>	Remediation and monitoring

**Site Summary:** Routine monitoring of two recovery wells installed for corrective action activities at the Lyons Chloride site detected low levels of PCE and carbon tetrachloride. The SWPCRP investigated in late May 1999 to determine the extent of the VOC contamination and to identify sources.

The investigation identified a former drycleaner as the PCE source, but could not find a source for the carbon tetrachloride. The investigation discovered two other contamination plumes and associated them with petroleum releases from USTs. The VOC release was apparently some time ago, resulting in large diluted plumes with concentrations exceeding federal safe drinking water levels in only a few places. The VOC plumes tend to extend from north Lyons to over one half mile south of Lyons and overlap the Lyons Chloride Contamination site plume to some extent. It is possible that the VOC plumes could impact the three Lyons PWS wells. It appears the recovery wells installed to capture the chloride plume have also captured the VOC plumes.

An additional Phase II VOC Plume Delineation Project in June 2001 attempted to identify a source for carbon tetrachloride in northern Lyons and determine whether the Lyons Chloride

Contamination site recovery wells continue to contain the VOC plumes as well. The investigation did not identify a source area for the carbon tetrachloride. VOC distribution was consistent with the previous sampling event in 1999. The results confirmed that VOCs migrating into the area south of Lyons are being contained by the recovery wells, protecting the Lyons PWS wells. Another round of sampling in April 2004 continued to confirm these results.

Efforts continue through KDHE's Dry Cleaning Facility Trust Fund and the Storage Tank Programs to address source area identification.

**December 2013 Update:** VOC impacts continue to be monitored as part of the Lyons Chloride Contamination site and its Northern Containment System recovery wells. The Northern Containment System continues as expected to capture and contain both the chloride plume from the Old North Lyons Mine and VOCs migrating through the same area of Lyons.

<b>Site Name:</b>	<b>Mayberry Middle School</b>
<b>Location:</b>	Wichita, Sedgwick County
<b>Contamination:</b>	Tetrachloroethylene, naphthalene
<b>KDHE District:</b>	South Central, Wichita
<b>Status:</b>	Monitoring

**Site Summary:** The Mayberry Middle School site was referred to KDHE's Site Assessment Program by KDHE's Storage Tank Section to investigate PCE detected in monitoring wells at Mayberry Middle School. A KDHE field team collected groundwater samples from locations between several historical and active dry cleaning and laundry facilities in 2005. The data suggested that none of the identified potential source facilities was a contributor to the site.

KDHE returned to the Mayberry Middle School site in 2005 to evaluate groundwater at the school and to determine a migration pathway for the PCE. The investigation found no VOCs in any of the direct-push samples. Two UST monitoring wells had low concentrations of PCE. The absence of PCE in groundwater immediately upgradient of the impacted monitoring wells suggests that the contamination is isolated to the vicinity. No source for the contamination was identified.

Concentrations of PCE decreased to below RSK levels between 2000 and 2005 and no human or environmental targets had been identified. In December 2005 the site entered the SWPCRP LTM program.

Since March 2006 SWPCRP annually analyzes groundwater samples for VOCs. Petroleum contamination is being addressed by KDHE's Storage Tank Section. PCE concentrations had decreased to below RSK levels and the site was being considered for reclassification to resolved status.

In September 2008 three monitoring wells were plugged in order to resurface the school's parking lot. The UST Program replaced and renamed two monitoring wells and installed three

new monitoring wells. Only one well showed PCE above RSK levels. Since the 2008 installation, this well has had PCE detections consistently above RSK.

SWPCRP could not gain access from USD #259 to conduct LTM in 2012. An access agreement has been signed that allows KDHE access for LTM events through December 31, 2017.

**December 2013 Update:** Analytical results from the July 2013 LTM sampling event detected PCE below RSK in one monitoring well. One monitoring well could not be located. It appeared that the ground around where monitoring well was located had been greatly disturbed and a new sewer cap was placed in the well's general vicinity. A metal detector was used but did not locate the well, which is assumed to be destroyed. A Supplemental Site Investigation has been proposed in order to delineate the PCE plume around the new monitoring well. This site will remain in the LTM program until reclassification criteria are met.

<b>Site Name:</b>	<b>McPherson PWS #7</b>
<b>Location:</b>	McPherson, McPherson County
<b>Contamination:</b>	Volatile organic compounds
<b>KDHE District:</b>	North Central, Salina
<b>Status:</b>	Monitoring

**Site Summary:** The McPherson PWS #7 site was discovered in 1997 during an SRE investigation of an aerial pesticide application facility at the McPherson City/County Airport. PCE, 1,1-dichloroethene, and 1,1,1-trichloroethane were discovered in a monitoring well north of the facility and west of the PWS #7 well. The chlorinated compounds were attributed to the aerial pesticide application facility.

KDHE performed a Preliminary Assessment/Screening Site Investigation in 2000-2001. Data suggested a source in an open area on airport property south of PWS #7. Two types of geophysical surveys, a magnetometer survey and a terrain conductivity survey, yielded no evidence of buried containers or wastes. Since the source area could not be attributed to any apparent discharge facility, the site entered the SWPCRP in 2001.

In September 2001 a CI sampled area wells and advanced direct-push probes for soil and groundwater samples. Similar VOCs were detected in one groundwater probe and one monitoring well below RSK levels. Apparent historical source areas cannot be attributed to any specific facility or apparent discharge area. The site entered the LTM program in 2002.

Since 2002 the SWPCRP annually monitors two monitoring wells and PWS #7 for VOCs. Analytical results for one monitoring well show an increase in PCE concentrations from 2002 to 2007, but a decline since 2008. Groundwater in the other monitoring well showed no detections of VOCs from 2002 to 2004, but has been dry since 2005. PCE had been non-detect in PWS #7 until 2010 when concentrations appeared below RSK levels.

**December 2013 Update:** Analytical results from the February 2013 LTM sampling event detected PCE below RSK in PWS #7. Methyl tert-butyl ether was detected below RSK in PWS

#7. This is the first appearance of the contaminant since LTM began in 2002. One monitoring well was dry and the other monitoring well did not have enough water present to collect a sample. SWPCRP plans to plug the two monitoring wells and drill deeper monitoring wells in 2014. The site will remain in the LTM program until reclassification criteria are met.

**Site Name:** Oak Knoll  
**Location:** Wichita, Sedgwick County  
**Contamination:** Volatile organic compounds, metals  
**KDHE District:** South Central, Wichita  
**Status:** Monitoring

**Site Summary:** In January 1990 an Environmental Site Assessment identified VOCs and metals contamination in temporary wells installed along the western boundary of the Oak Knoll Addition. Installing and sampling permanent wells in September 1990 confirmed the contamination. A Phase II Environmental Site Assessment, conducted on the adjacent property to the west in 1994, confirmed VOC contamination near a disposal lagoon formerly used by an automotive and radiator repair business.

In 1997 KDHE's SRE investigation sampled existing wells at both properties for VOC analysis, low levels of several VOCs in some site wells and significant contamination in the lagoon area. By then the facility was occupied by a concrete pumping service and the lagoon was no longer present.

The site entered the SWPCRP to determine potential source areas. A CI in 2000 installed eight additional monitoring wells and sampled existing wells. Soil and groundwater sample results indicated that four VOCs, lead, and cadmium were the main contaminants at the former lagoon; the former automotive repair business was identified as the PRP.

KDHE attempted to contact the former auto repair business and determined it was not a PRP, so added the site to the LTM program in 2003. Over time, monitoring wells have been plugged or destroyed, or not sampled due to temporary conditions. However, concentrations of VOCs and metals in wells sampled have been below RSK since 2006.

A 2011 PRP search identified no viable PRPs and the LTM sampling indicated that VOCs remained below RSK. The samples were not analyzed for metals.

In June 2012 SWPCRP conducted a Limited Site Investigation along with LTM sample collection in order to assess remnant impacts on groundwater. The investigation collected several soil samples and one groundwater sample near the former lagoon. Soil VOCs were below RSK, but four VOCs were in groundwater above RSK.

**December 2013 Update:** In July 2013 monitoring well samples showed five VOCs near and downgradient of the former lagoon below RSK. KDHE may pursue an EUC in order to resolve the site.

**Site Name:** Pollard Carbon Tet  
**Location:** Pollard, Rice County  
**Contamination:** Carbon tetrachloride  
**KDHE District:** North Central, Salina  
**Status:** Investigation and potentially responsible party search

**Site Summary/December 2013 Update:** The Pollard Carbon Tet site entered the SWPCRP in March 2013 when KDHE discovered a domestic well impacted by carbon tetrachloride. SWPCRP conducted a water well survey of domestic wells in the area. Of the three wells impacted, none are used for drinking or bathing; no emergency response was needed. In May 2013 a KDHE source investigation located the source of the contamination at the nearby grain elevator. A PRP has been identified and the State Cooperative Program may pursue a consent order. See the site accomplishment sheet on page 25.

**Site Name:** Pratt Ag Aviation, Inc.  
**Location:** Pratt, Pratt County  
**Contamination:** Volatile organic compounds, pesticides  
**KDHE District:** Southwest, Dodge City  
**Status:** Investigation

**Site Summary:** Located at the Pratt Airport/Industrial Park, Pratt Ag Aviation, Inc. was an aerial applicator of agricultural chemicals. Pratt Ag Aviation, Inc., ceased operations temporarily in late 1998, when the facility owner died. KDHE conducted a Buried Tank Leak Assessment and in 1999 removed a UST tank and product lines used for aviation fuel. The removal included excavating petroleum contaminated soils. The Pratt Ag Aviation, Inc., Petroleum Storage Tank Release Trust Fund site entered KDHE's Storage Tank Section program in May 1999. Operations at Pratt Ag Aviation, Inc., resumed in May 1999 under a new owner, and continued until approximately August 2001. In January 2002 aerial spraying services resumed under the business name Pratt Ag Aviation.

In April and May 2001, KDHE sampled soil and groundwater and installed four monitoring wells related to the UST tank site. The sampling identified carbon tetrachloride, chloroform and TCE in the monitoring wells and carbon tetrachloride in PWS #2. This contamination was assigned to the newly created Pratt PWS Well #2 site.

A soil sample collected in July 2001 at the Pratt Ag Aviation UST site contained several pesticides. Groundwater samples confirmed pesticide and petroleum contamination. This contamination was assigned to the newly created Pratt Ag Aviation, Inc., site which was referred to KDHE's State Cooperative Program in April 2002.

KDHE excavated fuel-impacted soil at the Pratt Ag Aviation UST site in 2002, and installed monitoring wells in 2002 and 2003 to better delineate the dissolved petroleum phase plume.

In 2004 the Storage Tanks Section program installed remedial wells and determined that vapor extraction and air sparging are only marginally effective at remediating contaminated soil below 50 feet. Groundwater sample results showed that contamination had migrated northwest and northeast. The Storage Tank Section program abandoned and plugged some monitoring wells and the unsuccessful remedial wells and began semi-annual monitoring in 2006.

Several attempts were made between 2005 and 2007 to have the Pratt Ag Aviation, Inc., owner enter the KDHE State Cooperative Program and conduct investigation and remediation of the pesticide contamination. A 2007 Ability to Pay Analysis indicated she had insufficient financial resources. No other PRPs were identified. The site was transferred to SWPCRP for additional investigation.

KDHE sampled monitoring wells and PWS #1 for pesticides and VOCs in March and April 2012 during a PSE that also provided supplemental data for the Pratt PWS Well #2 site. Seven wells (located near the remaining Pratt Ag Aviation facility building where former pesticide storage, mixing and distribution equipment had been located) had alachlor, atrazine, and/or cyanazine above RSK. Atrazine was in Pratt PWS Well #1 below RSK. Petroleum hydrocarbons in a few monitoring wells and free phase aviation fuel in one well confirmed historical data from the active Pratt Ag Aviation Storage Tank Release Trust Fund site.

**December 2013 Update:** Due to limited resources/funds, SWPCRP did not work at the Pratt Ag Aviation, Inc., site in 2013.

<b>Site Name:</b>	<b>Pratt Oil Reclamation</b>
<b>Location:</b>	Pratt, Pratt County
<b>Contamination:</b>	Hydrocarbon sludge, total petroleum hydrocarbons-diesel range organics
<b>KDHE District:</b>	Southwest, Dodge City
<b>Status:</b>	Investigation and remediation

**Site Summary:** The Pratt Oil Reclamation site consists of approximately 1.3 acres located on the north-central edge of Pratt. The site entered the SWPCRP in 2006. There was an Aboveground Storage Tank (AST) onsite that reportedly contained approximately 30,700 gallons of tank bottom sludge left behind by a former oil reclaiming business in the mid-1980s. A previous site visit July 2006 saw evidence of releases from the tank valve and along the tank base. A PSE planned for 2007 was delayed due to limited funding. Due to its low priority ranking and limited resources/funds, the SWPCRP did not work at the Pratt Oil Reclamation site in subsequent years. A PRP search in January 2011 did not identify a viable PRP.

Vandals opened the valve on the tank and spilled a large amount of tank bottom sludge in June 2012 and the property owner notified KDHE.

**December 2013 Update:** In February 2013 in conjunction with KDHE, the property owner developed and implemented a beneficial use plan to apply the spilled material to the owner's lease roads. KDHE then proceeded to conduct a CA and Tank Removal in April 2013.

SWPCRP's contractor removed the tank contents through a combination of recovery and solidification with cement kiln dust and disposal. The CA discovered TPH-DRO impacted soil directly under the tank. Groundwater and soil surrounding the tank are not impacted. The SWPCRP removed the impacted soil, backfilled, and regraded the clean soil in November 2013. Pending approval of the final Remedial Action report, SWPCRP will resolve the site. See the site accomplishment sheet on page 26.

**Site Name:** Pratt PWS Well #2  
**Location:** Pratt, Pratt County  
**Contamination:** Carbon tetrachloride, trichloroethylene  
**KDHE District:** Southwest, Dodge City  
**Status:** Investigation

**Site Summary:** The site is located within the Pratt Airport/Industrial Park, formerly the Pratt Army Air Field. The Pratt Airport Authority owns the property and leases it to private companies. In May 2001 carbon tetrachloride was detected in Pratt PWS Well #2, one of two PWS wells serving a non-drinking water supply to the industrial park. In 2001 and 2002, KDHE's Preliminary Assessment/Screening Site Investigation identified two hangars as potential source areas for carbon tetrachloride and TCE. The site was referred to KDHE's Assessment and Restoration Section for further response by the USACE.

Additional investigation and sampling identified carbon tetrachloride in private wells located east of Hwy 281. In spring 2003 the USACE installed granulated activated carbon filters at two private wells containing carbon tetrachloride above RSK. KDHE recommended further investigation to identify source areas and determine if other contaminants were present. Limited investigation confirmed carbon tetrachloride and TCE contamination near the North Hangar but not at the other potential source areas.

KDHE's Site Assessment Unit extensively sampled groundwater during an Expanded Site Inspection in 2010. Groundwater results suggested at least four potential source areas for low levels of carbon tetrachloride, including three hangars, but did not find the source of high concentrations of carbon tetrachloride in the private wells to the east.

The site entered the SWPCRP in September 2011. A Phase I Source Investigation in November included private well sampling east of Hwy 281 and direct-push soil and groundwater sampling near two former Army mess halls and garbage storage areas. The investigation did not identify a source area for the contamination and well sample results confirmed carbon tetrachloride above RSK at the two private wells. The USACE continued to monitor and maintain the two treatment units.

KDHE sampled monitoring wells and PWS #1 for pesticides and VOCs in March and April 2012 during a PSE performed for the Pratt Ag Aviation, Inc., site that also provided supplemental data for this site. Groundwater samples collected found pesticides and hydrocarbons associated with aviation fuel in some monitoring wells but no carbon tetrachloride or TCE. SWPCRP will

continue to investigate the source of the contamination, monitor the private carbon treatment systems, and is currently evaluating the results of a PRP search.

**December 2013 Update:** Due to limited resources/funds, SWPCRP did no on-site work at the Pratt PWS Well #2 site in 2013. SWPCRP has conducted a PRP search and is undergoing a thorough site review in order to plan further remedial action. The USACE has turned ownership and maintenance of the carbon treatment systems over to the private well owners.

<b>Site Name:</b>	<b>Richardson Property</b>
<b>Location:</b>	Hutchinson, Reno County
<b>Contamination:</b>	Total petroleum hydrocarbons
<b>KDHE District:</b>	South Central, Wichita
<b>Status:</b>	Investigation

**Site Summary:** The Richardson Property site was discovered in May 2001 when the KDHE South Central District Office was notified of onsite oil sludge, kerosene, and refuse. A district office representative informed the Reno County Health Department of the refuse and referred the remainder of the site to KDHE for further action.

An assessment performed by KDHE's Site Assessment Program in 2001 found petroleum in soil, groundwater, and lagoon samples. Numerous corroded drums were tested and the contents were determined to be non-hazardous.

The assessment did not identify a viable PRP, so the site entered the SWPCRP in December 2001. A phased CAS cleared the site of trash and drums with the help of a KDHE Bureau of Waste Management grant in June 2003.

Further cleanup activities in May 2004 emptied, crushed, and disposed of bulk storage tanks at the Reno County Landfill. Approximately 800 cubic yards of sludge were stabilized with cement kiln dust onsite and approximately cubic 1000 yards of stabilized sludge and contaminated soil was disposed of at the Reno County Landfill. The excavated area was then backfilled and reseeded to native grass. Groundwater contamination remains above federal drinking water standards, but below non-residential RSK levels. KDHE continues to work with the property owner to place an EUC on the property.

**December 2013 Update:** Due to its low priority ranking and limited resources/funds, SWPCRP did not work at the Richardson Property site in 2013.

**Site Name:** Warren Petroleum Plant  
**Location:** Galva, McPherson County  
**Contamination:** Total petroleum hydrocarbons, metals  
**KDHE District:** North Central, Salina  
**Status:** Investigation

**Site Summary:** Several refineries across the state were identified in the fall of 2005 through historical reviews and reconnaissance activities. The former Warren Petroleum Plant, identified through historical records, operated from 1935 to 1942 in an area one mile northeast of Galva, Kansas. The plant produced propane, butane, and gasoline that were shipped by truck and rail.

In May 2006 the KDHE completed the Phase I Focused Former Gas Plant Assessment. The Phase I assessment report identified potential environmental impacts from former petroleum plant operations and multiple ASTs present on site since the 1930s.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did not work at the Warren Petroleum Plant site in 2013. KDHE may conduct a site investigation in 2014.

**Site Name:** Yoder, Village of  
**Location:** Yoder, Reno County  
**Contamination:** Carbon tetrachloride  
**KDHE District:** South Central, Wichita  
**Status:** Investigation and monitoring

**Site Summary:** The Village of Yoder site is located in the same vicinity as the HABILIT site. In 1988 the EPA connected impacted homes in the City of Yoder to the newly created Reno County RWD #101 in response to the discovery of VOCs in private water supply wells.

Because a responsible party was not identified during the EPA investigations, the site was referred to the SWPCRP in 1994. In 1996 KDHE installed 13 monitoring wells upgradient of the RWD #101 and RWD #3 wells to create an early warning system for the two water districts. Due to the proximity of the two sites, the Village of Yoder site entered the LTM program with the HABILIT site in 1999, with private water supply and monitoring wells sampled semiannually.

A CAS in 2004 evaluated the safety of the RWD #101 water supply, located in the path of the contaminant plume migrating from the HABILIT site. The CAS proposed several remedial options, including installing recovery wells to intercept the contaminant plume and installing a remedial system at the RWD #101 well. Budgetary constraints prevented any remedial action at that time.

In January 2009 the SWPCRP installed whole-house treatment systems in two homes whose shared water supply well had been contaminated with TCE above RSK. In June 2009 a soil-gas source investigation was initiated. Data from this investigation was supplemented by soil and groundwater samples collected in October 2009 and sewer sediment samples collected in

*Lower Arkansas Basin Update*

December 2009. In 2011 three more whole-house treatment systems were installed by SWPCRP as the contaminant plume migrated eastward.

In 2012 SWPCRP added eight more private wells to its monitoring network in response to the continued migration of the contaminant plume.

**December 2013 Update:** SWPCRP continues to sample PWS, private drinking supply and sentry wells semiannually to monitor contaminant movement through the aquifer. Investigation of this site is being managed concurrently with the HABIT site.



**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
MARAIS DES CYGNES RIVER DRAINAGE BASIN**

**Site Name:** Ottawa FMGP  
**Location:** Ottawa, Franklin County  
**Contamination:** Polynuclear aromatic hydrocarbons, volatile organic compounds, metals  
**KDHE District:** Northeast, Lawrence  
**Status:** Investigation

**Site Summary:** The Ottawa FMGP was discovered in a KDHE statewide evaluation of historical manufactured gas plants in the state. The site entered the SWPCRP for further investigation.

An investigation in June 2005 collected six soil borings and six groundwater samples and analyzed them for cyanide, metals, VOCs, and PAHs. PAHs were above the federal MCL in two soil samples. VOCs and PAHs were above the MCL in four of the six groundwater samples collected. Soil samples collected in January 2006 indicated metals and PAH concentrations above RSK levels. Groundwater samples contained metals, VOCs, and PAHs below RSK levels. It could not be determined if PAH and metals concentrations were due to FMGP operations or materials placed at the site when it was reportedly used as a dump.

A May 2008 review of historical records indicated VOC contamination was from bulk gasoline storage tanks adjacent to the site, not FMGP operations. The VOC contamination was subsequently transferred to the Storage Tank Section. A 2010 CI indicated metals, PAHs, and VOCs exceed RSK in soil and/or groundwater. Coal tar identified on site did not exceed the maximum concentration levels for toxicity characteristics. The majority of contamination appears limited to the subject property.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did no onsite work at the Ottawa FMGP site in 2013. SWPCRP is currently conducting a PRP search and, subject to funding limitations, plans additional investigation in 2014 to delineate the contamination source and determine future remedial efforts.

**Site Name:** Paola Refining Co.—Former  
**Location:** Paola, Miami County  
**Contamination:** Total petroleum hydrocarbons  
**KDHE District:** Northeast, Lawrence  
**Status:** Investigation

**Site Summary:** During a November 2002 VCPRP investigation, KDHE identified Total Petroleum Hydrocarbons—Gasoline Range Organics (TPH-GRO) and TPH-DRO at the Miami County Coop. A property history determined that a petroleum refinery had once been located on the Coop property. The site entered the SWPCRP in April 2003.

### *Marais Des Cygnes Basin Update*

Investigation found soil and groundwater contaminated by benzene, TPH-GRO, and TPH-DRO but could not define groundwater plumes or determine groundwater flow due to the inadequate volume of water recovered. It appeared the water encountered was not representative of actual groundwater, but rather seasonal, perched water on the shale bedrock. A 2004 evaluation of the aquifer concluded it could not be considered potable based on quality and quantity.

In June 2005 a review of historical information taught KDHE personnel more about former refinery operations. KDHE determined that contamination on the northern portion of the Coop property likely resulted from former Coop operations rather than the former refinery and transferred several impacted sample locations to the Storage Tank Section.

In November 2005 soil samples collected in an area of former refinery storage tanks indicated TPH-GRO, TPH-DRO, motor oil, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene above RSK. Soil samples collected further downgradient of the former refinery were non-detect or below RSK.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did not work at the Paola Refining Co.—Former site in 2013. KDHE may conduct a site investigation in 2014.

**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
MISSOURI RIVER DRAINAGE BASIN**

**Site Name:** Uncle Sam Oil Refinery (Former)—Atchison  
**Location:** Atchison, Atchison County  
**Potential Contamination:** Refinery waste including polynuclear aromatic hydrocarbons  
**KDHE District:** Northeast, Lawrence  
**Status:** Investigation

**Site Summary:** KDHE identified refineries statewide in 2005 through historical reviews and reconnaissance. Historical records indicate these facilities generally operated between 1900 and 1940. KDHE delegated SWPCRP funds to assess site conditions and associated human health and environmental risks, and evaluate PRPs if contamination were found.

A May 2012 FFRA evaluated historical activities and recommended Phase II activities. KDHE awaits funding for further investigation.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did not work at the Uncle Sam Refinery—Atchison (Former) site in 2013. A Phase II site investigation may be conducted in 2014.



**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
NEOSHO RIVER DRAINAGE BASIN**

**Site Name:** 4<sup>th</sup> & Commercial, Emporia  
**Location:** Emporia, Lyon County  
**Contamination:** Volatile organic compounds  
**KDHE District:** Southeast, Chanute  
**Status:** Monitoring and environmental use control

**Site Summary:** The 4<sup>th</sup> & Commercial, Emporia site was reported in April 2000 when construction workers installing pier borings for expansion of the Lyon County Courthouse discovered a tarry/oily material with strange odors. Samples collected from the soil and contained VOCs, petroleum hydrocarbon compounds, and PAHs. KDHE's Site Assessment Unit completed an SRE investigation in July 2000 that found petroleum hydrocarbon compounds, chlorinated solvents, and PAHs. Historically, numerous USTs had been removed in the vicinity of the construction site. The site was referred to the SWPCRP in October 2000.

During a CI in 2001, KDHE identified elevated levels of PCE and TCE in one monitoring well; the well was transferred to the Dry Cleaning Facility Trust Fund Program. No other wells contained VOCs above drinking water standards. The contamination related to the courthouse appeared to be limited to the soil at the courthouse property.

In April 2005 construction workers excavating within the courthouse encountered strange odors from a drilling shaft. Soil core sample analysis indicated high levels of BTEX and naphthalene. In July 2005 an additional investigation concluded that a nearby former service station was not a likely source of site contamination.

In March 2006 a Supplemental Sampling Event confirmed the contamination was limited to subsurface soils beneath the courthouse. Analytical results of the soil and groundwater samples indicated no contaminants above RSK levels.

In September 2010 a Vapor Intrusion Assessment of the Lyon County Courthouse collected six air samples to assess indoor air quality at the courthouse. The results indicated the indoor air quality is acceptable, with no vapor intrusion from the subsurface and indoor air concentrations below KDHE indoor air RSK levels.

Annual LTM sampling since 2001 found no VOCs above RSK levels in any monitoring wells, aside from the well transferred to the Dry Cleaning Facility Trust Fund Program.

**December 2013 Update:** KDHE will encourage Lyon County to place an EUC on the courthouse property to prevent future exposure to contamination. A LTM sampling event took place in November 2013. At the time of this report, SWPCRP is waiting for analytical results of the event.

**Site Name:** 4<sup>th</sup> Ave & Merchant St.  
**Location:** Emporia, Lyon County  
**Contamination:** Carbon tetrachloride  
**KDHE District:** Southeast, Chanute  
**Status:** Monitoring and potentially responsible party search

**Site Summary:** The 4<sup>th</sup> Ave & Merchant St. site was referred to KDHE Remedial Section by KDHE's Storage Tank Section after finding carbon tetrachloride above RSK levels in two monitoring wells at the Lyon-Coffey Electrical Coop UST Site in January 2004.

An SRE in February 2005 identified a source area at the northeast corner of the property at 104 West 4<sup>th</sup> Avenue but did not find a responsible party. Groundwater data indicates that the lateral extent of carbon tetrachloride contamination appears to be limited to within 120 feet of the apparent source area.

In March 2005 the site entered the LTM program. LTM sampling activities since 2005 have detected carbon tetrachloride in two monitoring wells above RSK levels. The remaining monitoring wells have had no detections of carbon tetrachloride.

**December 2013 Update:** A LTM sampling event took place in November 2013. At the time of this report, SWPCRP is waiting for analytical results of the event. The site will remain in the LTM sampling program until reclassification criteria are met.

**Site Name:** Bruce Mining and Smelting Company  
**Location:** Cherokee, Crawford County  
**Contamination:** Heavy metals  
**KDHE District:** Southeast, Chanute  
**Status:** Investigation and remediation

**Site Summary:** The Bruce Mining and Smelting Company site was identified in 2003 through historical reviews and reconnaissance activities. KDHE conducted these efforts to identify several former smelter facility locations documented to exist throughout southeast Kansas. The site was placed in the SWPCRP.

Phase I and Phase II Focused Former Smelter Assessment (FFSA) activities in 2004 confirmed smelting operations and smelter wastes on site. Two intermittent tributaries of Wolf Creek were cutting into slag piles. Surface soil, subsurface soil, smelter waste, and sediment samples have arsenic, cadmium, lead, and zinc concentrations well above background concentrations. Cadmium, lead, and zinc concentrations in one groundwater sample exceeded RSK. Cadmium and zinc concentrations in a surface water sample were above the EPA's Aquatic Life Criteria (ALC) values.

KDHE was unable to identify a PRP in 2006.

In April 2008 a SI evaluated the horizontal and vertical extent of smelter wastes onsite, collecting surface soil, subsurface soil (trench), sediment, and surface water samples. No groundwater was found. Soil and sediment samples contained arsenic, lead, cadmium, and zinc concentrations above RSK for soils and Threshold Effect Concentration (TEC) values for sediments. Upstream surface water samples had zinc concentrations above the EPA's ALC values; while downstream surface water samples had concentrations of cadmium and zinc above ALC values. An estimated volume of 25,000 cubic yards of impacted soils and smelter waste is onsite.

**December 2013 Update:** In January and February 2013 KDHE collected surface soil samples for metal analysis from seven residential yards surrounding the site to determine if the properties had been impacted by historic smelting operations. Laboratory analysis indicated surface soils at six of the residential properties were below RSK. One residential property had elevated detections of chromium; however, the concentrations were comparable to background levels in the associated soil series and no other metals related to historic smelting activities were detected. No further action was recommended for the residential properties. The site is ready for remediation pending available funding. See the ongoing investigations accomplishment sheet on page 27.

<b>Site Name:</b>	<b>Canada Carbon Tetrachloride</b>
<b>Location:</b>	Canada, Marion County
<b>Contamination:</b>	Carbon tetrachloride, nitrate
<b>KDHE District:</b>	North Central, Salina
<b>Status:</b>	Monitoring

**Site Summary:** The Canada Carbon Tetrachloride site was discovered in 1997 during domestic well sampling conducted to inventory former USDA/CCC grain bin sites in Kansas. KDHE investigated in 1998, confirming carbon tetrachloride and nitrate in groundwater above federal drinking water standards. Elevated nitrate levels appeared to be associated with non-point sources and possibly a Coop facility located on site; carbon tetrachloride appeared to originate from the former USDA/CCC facility. The USDA extended rural water connections to Canada residents in 1999.

Additional investigation conducted by the USDA in 1999 suggested a private grain storage facility as the carbon tetrachloride source, rather than the former USDA/CCC facility. The Canada Carbon Tetrachloride site entered the SWPCRP for further evaluation. An investigation in 2002 indicated both the former USDA/CCC facility and the private facility as likely carbon tetrachloride source areas. The investigation, however, described exposure risks as limited since excessive carbon tetrachloride levels were localized and domestic wells are no longer used to supply drinking water.

Due to limited exposure risks and inconclusive nitrate and carbon tetrachloride source area data, KDHE assigned the Canada Carbon Tetrachloride LTM status in 2002. Monitoring data collected since indicates that carbon tetrachloride and nitrate concentrations persist above drinking water standards.

**December 2013 Update:** Analytical results from the February 2013 LTM sampling event indicates carbon tetrachloride contamination exceeds RSK in two monitoring wells and one lawn and garden well. Nitrate levels exceed MCL in all but one well sampled. The site will remain in the LTM sampling program until reclassification criteria are met.  
(See Accomplishment Page)

<b>Site Name:</b>	<b>Cherokee Mining and Smelting</b>
<b>Location:</b>	Cherokee, Crawford County
<b>Contamination:</b>	Heavy metals
<b>KDHE District:</b>	Southeast, Chanute
<b>Status:</b>	Remediation

**Site Summary:** The Cherokee Mining and Smelting site was identified during research of former smelter sites in Kansas completed in April 2006. The site operated as a smelter from 1894 to 1905 and has been used primarily as agricultural land since.

KDHE's Site Assessment Unit conducted an SRE in May 2006 which identified smelter waste and slag. Surface soil samples contained arsenic, lead, cadmium, and zinc above the RSK soil values. There are no viable PRPs. The site entered the SWPCRP in July 2008.

In April 2009 a SI evaluated the horizontal and vertical extent of smelter wastes by collecting surface soil, subsurface soil (trench), sediment, and surface water samples. Soil and sediment samples contained arsenic, lead, cadmium, and zinc concentrations above RSK for soils and TEC values for sediments. A surface water sample contained cadmium and lead above the EPA's ALC values. A calculated volume of 13,850 cubic yards of impacted soils and smelter waste is present onsite.

In April 2010 the SWPCRP collected additional sediment samples along the intermittent creek and two background sediment samples. Most sediment samples contained arsenic, cadmium, lead, and zinc above their respective TEC values. Zinc was highest in the background sediment sample located farthest upstream.

In October 2010 KDHE conducted a Supplemental Site Inspection (SSI) to collect and analyze surface soil samples for total metals from three nearby residential properties, the Southeast High School USD #247, and background locations. The SSI focused on determining if historic smelting operations had impacted surface soils on properties bordering the site. Initial results indicated elevated total chromium at two residential properties and the high school. Additional work in July 2011 resampled the elevated residential properties and the school and collected background surface soil samples. Data collected during the SSI suggest that no surface soils at properties adjacent to the site had been impacted by the historic smelting operations. The data indicate that arsenic and total chromium on adjacent properties is native and naturally elevated rather than the result of smelter operations.

Aquifer testing in August 2011 showed the upper unconfined aquifer onsite to be non-potable, thus requiring no future need for groundwater monitoring.

A Wetland Delineation in September 2012 identified two areas of fringe wetlands. The report was submitted to the USACE for a preliminary jurisdictional determination of the wetlands. The site is ready for remediation pending available funding.

**December 2013 Update:** Due to limited resources/funds, the SWPCRP did not work at the Cherokee Mining and Smelting site in 2013.

<b>Site Name</b>	<b>Cherokee Zinc Company</b>
<b>Location:</b>	Weir, Cherokee County
<b>Contamination:</b>	Heavy metals
<b>KDHE District:</b>	Southeast, Chanute
<b>Status:</b>	Investigation and transfer

**Site Summary:** The Cherokee Zinc Company site was identified in 2001 through historical reviews and reconnaissance activities. The northern portion had been native grassland since smelting operations ended in 1902. The southern portion of the site was occupied by the Weir City Electric Light and Water Plant and the Empire District Electric Company.

A March 2004 Phase I FFSA confirmed smelting operations and smelter wastes. A November 2004 Phase II FFSA identified arsenic, cadmium, lead, and zinc concentrations in soil, smelter waste, and groundwater samples above their respective residential RSK values, in sediment above TEC values, and in surface water above the EPA's ALC values.

In April 2008 a SI evaluated the horizontal and vertical extent of smelter wastes, collecting surface soil, subsurface soil (trench), sediment, and surface water samples. Soil and sediment samples contained arsenic, lead, cadmium and zinc concentrations above RSK for soils and TEC values for sediments. Surface water samples contained zinc concentrations above the EPA's ALC value. About 18,274 cubic yards of impacted soils and smelter waste is onsite.

In October 2010 KDHE conducted an SSI to collect and analyze soil samples from five residential properties near the site, sediment samples from an intermittent creek and an offsite pond. The SSI focused on determining if nearby residential properties had been impacted by historic smelting operations and gathering upstream and downstream sediment data. Initial results indicated elevated total chromium concentrations at four residences. Additional work in July 2011 resampled the elevated residential quadrants and collected background surface soil samples. Data suggested that surface soils at two residential properties have been impacted by lead contamination. Recommendations included resampling these yards and extending sampling to the south. The remaining residential properties did not appear affected. Upstream sediments appear to have naturally elevated metals. Sediments located onsite and downstream have been impacted by smelter operations; sediments southwest of the site may be affected by an additional metal contamination source.

*Neosho Basin Update*

Aquifer testing in August 2011 showed the upper unconfined aquifer onsite to be non-potable, thus requiring no future need for groundwater monitoring.

**December 2013 Update:** In January and February 2013, SWPCRP collected surface soil samples from 22 residential yards and defined the southern extent of the site area was further defined through gridded surface soil sampling. The investigation identified 12 residential yards impacted by lead, arsenic, or both above RSK and other areas of metal contamination above RSK in the southern extent of the site.

KDHE completed an Integrated Assessment in June 2013 that confirmed metals contamination in up to 22 yards. The cost to encapsulate the smelter waste was estimated at \$295,861, and did not include remediation of sediments in a nearby stream or of the residential yards. The site was referred to EPA for cleanup activities because of SWPCRP's funding limitations. See the site accomplishment sheet on page 21.

**Site Name:** Concrete Smelter  
**Location:** Gas, Allen County  
**Contamination:** Heavy metals  
**KDHE District:** Southeast, Chanute  
**Status:** Potentially responsible party search

**Site Summary:** The Concrete Smelter site entered the SWPCRP in 2006. The site was identified during research of former smelter sites in Kansas completed in April 2006. The site was originally developed as a Portland cement factory in the early 1900s, and was used as a smelter by the Iola Zinc Company from 1915 to 1916. It was largely dismantled in 1917.

A 2006 SRE identified visual slag smelter waste and identified lead, cadmium, and arsenic concentrations above RSK values in surface soil. EPA Region 7 conducted a PRP search in August 2010.

**December 2013 Update:** KDHE has been reviewing the EPA PRP search report as well as conducting an independent PRP Search. A proposed SI will be postponed until the PRP search is complete.

**Site Name:** MARCO (Mid-America Refining Co.)  
**Location:** Chanute, Neosho County  
**Contaminations:** Petroleum, petroleum wastes, volatile organic compounds  
**KDHE District:** Southeast, Chanute  
**Status:** Monitoring and potentially responsible party search

**Site Summary:** The MARCO site was a former oil refinery located on the north edge of Chanute, Kansas. The site has historically been a source of surface water, groundwater, and soil contamination by gasoline, crude oil and oil products, and other VOCs. The site included an adjacent property containing a tank bottoms sludge disposal pit accessible to the public. When

the site was discovered, it was unsecured and children were able to enter and play on the property. One child reportedly slipped into the bottom sludge pit, which is approximately eight feet deep.

For a period of several years, firms contracted by the property owner salvaged metal from the site. Salvage operations stopped in the early 1990s when KDHE Southeast District Office personnel discovered improper disposal of petroleum wastes into a Class II disposal well, numerous spills of tank and piping contents, and burning tank contents.

In 1998 the EPA used funding available through the Oil Spill Prevention and Control Act to address source areas for contamination that had migrated off the MARCO property. The EPA completed the cleanup of the site; removing tanks, product, piping, and several thousand tons of contaminated soil.

In 1998 the SWPCRP discovered two areas east and southeast of the MARCO property that were significantly contaminated. The CI defined areas of surface and subsurface soil and groundwater contaminated with VOCs and semi-volatile organic compounds above recommended cleanup levels. The SWPCRP placed the site in the LTM program in 2000 and began a CAS in 2004.

Two groundwater probe events in 2005 investigated free product thickness offsite and levels of petroleum constituents remaining onsite. An SI in 2005 collected data from areas that had not been previously characterized. Most contamination is limited to the southern half of the site and areas directly east. This information was used to evaluate corrective action alternatives proposed in the 2004 CAS.

A Work Plan for a Focused CAS was prepared in May 2006. Additional investigations to be performed included limited hydraulic aquifer testing, hydraulic slug testing and groundwater sampling to assess in-situ bioremediation. The groundwater sampling for the focused CAS was performed along with the LTM event in December 2006. The analytical results from the groundwater samples collected indicate a continued presence of petroleum constituents in groundwater. Additional limited hydraulic aquifer testing has not been conducted. The work plan for the CAS was placed on hold due to financial restraints. Annual monitoring events have been conducted through 2013.

**December 2013 Update:** Analytical results from the May 2013 LTM sampling event detected the continued presence of petroleum contaminants above RSK in the southeast and eastern portion of the site.

In 2012, KDHE had contacted the property owner to encourage them to conduct remedial action at the site. This led to a PRP search being conducted in 2013 for past operators/owners of the site property. A PRP has been contacted. At the time of this report, KDHE was waiting for a response from the PRP.

*Neosho Basin Update*

**Site Name:** **Pittsburg Short Method Smelter**  
**Location:** Pittsburg, Crawford County  
**Contamination:** Heavy metals  
**KDHE District:** Southeast, Chanute  
**Status:** Investigation

**Site Summary:** The Pittsburg Short Method Smelter site was identified in 2003 through historical reviews and reconnaissance activities. The Pittsburg Short Method Smelter apparently operated as a silver and gold smelter rather than a lead and zinc smelter. A Phase I FFSA completed in 2004 confirmed smelting operations and smelter wastes onsite.

After resolving access issues, KDHE performed a Phase II FFSA in 2005. Sample results confirmed arsenic, lead, and mercury in soil and shallow subsurface soil. There was no groundwater on site. KDHE searched for, but did not find a PRP.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did not work at the Pittsburg Short Method Smelter Site in 2013. The site will be evaluated for possible site investigation activities in 2014.

**Site Name:** **St. Louis Smelter Company**  
**Location:** Pittsburg, Crawford County  
**Contamination:** Heavy metals  
**KDHE District:** Southeast, Chanute  
**Status:** Investigation

**Site Summary:** Phase I and Phase II FFSA activities for the St. Louis Smelter Company in 2004 confirmed smelting operations and smelter wastes. There were lead, arsenic, and cadmium concentrations in surface soils above RSK and lead and cadmium above RSK in subsurface soils. Funding limitations delayed follow-up assessment and the site was ranked for future work.

In May 2010 a SI estimated smelter waste volumes and analyzed surface soils at 31 nearby residences, surface water and sediment from nearby ponds, a drainage way to an intermittent stream, and the stream. There are approximately 34,400 cubic yards of smelter waste and impacted soils onsite. Sediments and surface water in the drainage way and the intermittent stream are impacted by former smelter operations. Six of the residential properties surrounding the site had elevated detections of arsenic, but this was attributed to naturally elevated background arsenic concentrations.

Aquifer testing in August 2011 showed the upper unconfined aquifer onsite is non-potable, and does not require future groundwater monitoring.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did not work at the St. Louis Smelter Company site in 2013.

**Site Name:** Webster/Miller Refinery  
**Location:** Humboldt, Allen County  
**Contamination:** Refinery waste including polynuclear aromatic hydrocarbons  
**KDHE District:** Southeast, Chanute  
**Status:** Remediation

**Site Summary:** The former Webster/Miller Refinery site entered the SWPCRP in 1997; the site is a former oil refinery that has been out of operation since the late 1920s and is now agricultural land. An investigation discovered VOCs, PAHs, pesticides, nitrate, and metals in soil and groundwater.

Although the site posed minimal threat to human health, exposed sludge pits posed an environmental problem for waterfowl. A CAS in September 1999 considered excavating the waste sludge with off-site disposal or on-site stabilization. In 2002 KDHE removed sludge material from two sludge pits and a “chemist pit” area, as well as a sludge breakout area discovered during the project. The work was designed to eliminate the threat to surface water and address impacts to animals in the area.

The cleanup excavated over 3,100 cubic yards of waste material, mixed it with cement kiln dust from a nearby cement plant to neutralize the low pH and make it less mobile, then encapsulated it at a waste treatment cell on the western portion of the property. Vegetation was established on a clay and soil cap. The landowner signed a restrictive covenant that prevents excavation on portions of the site containing treated and untreated sludge material and requires reasonable maintenance of the clay cover materials to ensure that these wastes remain environmentally contained. The project was completed below budget, resulting in significant savings that were reinvested in the SWPCRP. KDHE is encouraging the property owner to file an EUC.

**December 2013 Update:** Since the 2002 removal and stabilization of waste material at the site, the property owner has not yet cooperated with KDHE and signed an EUC agreement. The site will remain in the SWPCRP with unchanged status until the EUC process has been completed.

**Site Name:** Wilsey Groundwater Contamination  
**Location:** Wilsey, Morris County  
**Contaminations:** Nitrate  
**KDHE District:** North Central, Salina  
**Status:** Monitoring

**Site Summary:** In 1991 groundwater sampling in the city of Wilsey found elevated nitrate concentrations in several private wells. In 1997 SWPCRP began to identify nitrate source areas. A Phase I CI in November 1997 included soil and private well sampling. Some soil samples indicated elevated nitrate concentrations near a vacated grain and farm chemical storage facility. Samples collected from many of the private wells indicated nitrate concentrations above RSK. Neither VOCs nor pesticides were detected in the private wells.

## *Neosho Basin Update*

A Phase II CI in April 1999 installed and sampled several monitoring wells. Analytical results for groundwater samples appeared to indicate that the nitrate contamination was the result of both non-point source pollution as well as the nitrate-contaminated soil. The site was placed in the LTM program in April 1999.

The site was temporarily transferred to KDHE's VCPRP in November 2001. KDHE sent letters to current and past landowners inviting them to participate in the VCPRP, but none were able to pay for a cleanup. The site was transferred back to the SWPCRP and the LTM program.

The City of Wilsey was put on a public water supply in 2005, and all residences were connected by spring 2006. A site visit in July 2005 identified a source area near three corroded liquid fertilizer ASTs, impacted vegetation, and an area of nitrate-impacted soil. KDHE's 2005-2006 investigation confirmed and delineated an estimated 2,333 cubic yards of contaminated soil and recommended excavation and land application as a cleanup strategy.

Corrective action in March 2007 included excavating approximately 1,615 cubic yards of contaminated soil, testing soil samples by field screening and lab confirmation, land application, and backfilling.

LTM sampling events since the soil remediation in 2007 have consistently shown nitrate concentrations above the MCL in one upgradient monitoring well, and nitrate concentrations in a downgradient monitoring well have fallen below RSK from 2010 to 2012.

**December 2013 Update:** Analytical results from the May 2013 LTM sampling event detected nitrate above the MCL in one upgradient monitoring well, at the MCL in one onsite monitoring well, and below the MCL in two monitoring wells with the remaining monitoring wells having no detections. The nitrate detection in the upgradient well is unrelated to the site. The nitrate at the MCL level in the onsite monitoring well may be considered an outlier. SWPCRP will resample the site again in May 2014. If nitrate in the onsite well is detected below the MCL, the site may be considered for reclassification to resolved status.

**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
SMOKY HILL-SALINE RIVER DRAINAGE BASIN**

**Site Name:** Bird-Feldt Farms  
**Location:** Hays, Ellis County  
**Contamination:** Carbon tetrachloride  
**KDHE District:** Northwest, Hays  
**Status:** Monitoring

**Site Summary:** Carbon tetrachloride contamination was discovered in the Bird-Feldt farms area during a City of Hays groundwater investigation to determine new PWS well locations. Subsequent response by KDHE's Site Assessment Unit identified a former seed cleaning facility as a potential carbon tetrachloride source.

In June 1998 the SWPCRP investigated the extent and source area of contamination, detecting carbon tetrachloride impacts near the former seed cleaning area, although a definitive point source was not identified. Domestic well sampling revealed carbon tetrachloride contamination in two wells and subsequently KDHE installed a whole-house water treatment system.

A CAS evaluated remedial options. LTM was chosen as the remedial action since the impacted residence had already been equipped with a water treatment system. LTM data indicates that the treatment system effectively removes carbon tetrachloride from the drinking water and contaminant concentrations have been decreasing in site monitoring wells.

**December 2013 Update:** Analytical results from the November 2013 LTM sampling event detected carbon tetrachloride above RSK in two monitoring wells. Groundwater samples were collected from seven monitoring wells and three private wells. The site will remain in the LTM program until reclassification criteria are met.

**Site Name:** Country View Mobile Park BTA  
**Location:** Hays, Ellis County  
**Contamination:** Volatile organic compounds, manganese  
**KDHE District:** Northwest, Hays  
**Status:** Investigation

**Site Summary:** In October 2010 KDHE's Brownfields Program conducted a Phase I Brownfields Targeted Assessment (BTA). Recognized environmental conditions (RECs) were initially identified as hazardous substances and petroleum products associated with a former septic lagoon and discarded metal piping from an oil field service company that left the property in 2008 and 2009.

A Phase II BTA in February 2011 identified manganese (dissolved) in groundwater above RSK. It appeared that manganese potentially originated from an upgradient source. Elevated

manganese detections near the former septic lagoon could have been attributed to substances disposed in the lagoon or reducing conditions created by the lagoon. The manganese and PCE detections were referred to KDHE's Site Assessment Program for further assessment and source identification. It was recommended that the owner file an EUC to restrict groundwater use.

KDHE's Site Assessment Program conducted a Site Evaluation in August 2011 to identify possible upgradient sources of manganese and PCE. Groundwater samples collected using direct-push techniques and from existing wells did not identify a concentrated manganese plume. The elevated levels appeared to be naturally occurring in area sediments, and no further assessment was recommended for manganese. PCE was detected below RSK in a private company's domestic well, leading to additional investigation to determine the upgradient source of PCE.

The Site Assessment Program conducted a Preliminary Assessment in November 2012 to collect groundwater using direct-push techniques and from monitoring wells. Personnel with KDHE's Northwest District Office collected groundwater samples from the Country View North PWS well and the Country View West PWS well in January 2013. PCE was detected below RSK in groundwater samples collected along Highway 40, downgradient of the APAC asphalt facility. There were no detections of PCE in any direct-push groundwater samples collected upgradient or sidegradient of APAC. However, the Preliminary Assessment did not identify a source for the PCE. The site was transferred to SWPCRP in April 2013.

**December 2013 Update:** SWPCRP reviewed agency files for APAC and identified a history of PCE detections in monitoring wells since 2009. These monitoring wells were installed in response to a 1992 fuel tank leak at what was then the Allied, Inc.-Asphalt Division property. APAC purchased Allied, Inc. in 1999. A Limited Risk Based Corrective Action Assessment in April 2009 identified PCE in two monitoring wells. The monitoring wells were subsequently plugged. APAC has filed a hazardous waste generator form with KDHE's Bureau of Waste Management which lists PCE as a waste produced onsite. All historic detections of PCE associated with the site have been below RSK, samples collected upgradient and sidegradient of the APAC property have been non-detect and samples collected downgradient have had low levels of PCE. SWPCRP plans a source investigation of the APAC property to identify PCE source areas, subject to funding limitations and site priorities.

<b>Site Name:</b>	<b>Fossil &amp; Wichita Ave.</b>
<b>Location:</b>	Russell, Russell County
<b>Contamination:</b>	Volatile organic compounds
<b>KDHE District:</b>	Northwest, Hays
<b>Status:</b>	Monitoring

**Site Summary:** The Fossil & Wichita Ave. site was identified in July 1999 after PCE was detected in a monitoring well at the former Kerr McGee UST site.

KDHE's Site Assessment Program conducted a SRE in January 2001. The investigation detected PCE above RSK in one temporary well but did not determine a source. A used car lot operated at the facility in 2002, but closed in January 2003.

*Smoky Hill-Saline Basin Update*

In June 2003 KDHE performed a Preliminary Assessment/Screening Site Inspection which confirmed PCE above RSK in one temporary well. Since the source of contamination could not be traced to a responsible party, the site was transferred to SWPCRP's LTM program in August 2003.

In July 2005 KDHE's UST Program plugged all monitoring wells. In November 2005 SWPCRP installed four new monitoring wells and sampled these as the first LTM sampling event. PCE was detected above RSK in one monitoring well. Two monitoring wells had detections of petroleum based hydrocarbons that were initially attributed to the former Kerr McGee UST site.

Annual LTM events from 2006 to 2009 indicated PCE below RSK in one monitoring well. Petroleum constituents in two monitoring wells were attributed to the former Kerr McGee UST site.

In April 2010 SWPCRP conducted annual LTM sampling and also sampled three monitoring wells from the Sellens Auto Repair UST site. PCE was below RSK in one of the UST monitoring wells. Petroleum constituents were detected.

After reviewing the petroleum constituent data and UST Program files, KDHE determined that the petroleum constituents did not come from a known UST site. Groundwater samples collected in the vicinity in April 2010 supported this conclusion. Historical research identified several potential petroleum sources but no single source was identified. A SSI in April 2011 did not identify a source area for petroleum contamination east of the site.

**December 2013 Update:** The September 2013 LTM sampling event identified PCE above RSK in one monitoring well. KDHE should look for a PCE source upgradient and west-southwest of the impacted monitoring well, determine if the groundwater plume has migrated, and determine the extent of the plume. The site will remain in the LTM program until reclassification criteria are met.

<b>Site Name:</b>	<b>Hope PWS Well #10</b>
<b>Location:</b>	Hope, Dickinson County
<b>Contaminations:</b>	Carbon tetrachloride, nitrate, chloride
<b>KDHE District:</b>	North Central, Salina
<b>Status:</b>	Monitoring

**Site Summary:** Carbon tetrachloride was detected above RSK in a groundwater sample collected from the Hope Well #10 in 1986. KDHE completed a Preliminary Assessment in 1987. The site entered the SWPCRP LTM program in 1995.

In 1996 SWPCRP conducted a CI and installed monitoring wells. KDHE has collected groundwater samples annually from 1996 to 2004 and from 2010 to present, and biannually from 2006 to 2010 from monitoring wells, two private wells, and the former PWS Well #10.

*Smoky Hill-Saline Basin Update*

Groundwater results indicated carbon tetrachloride concentrations consistently exceeded RSK in two monitoring wells and one private well. Over time, carbon tetrachloride concentrations decreased significantly in the two impacted monitoring wells, but concentrations in the private well remained above RSK.

In January, June, and August 2009, KDHE collected nitrate and chloride samples. Nitrate samples, historical documentation, and previous analytical results identified the North Central Kansas Coop as the PRP for nitrate contamination. In January 2010 the Coop entered the VCPRP to address the nitrate contamination. The Kansas Geological Survey analyzed the chloride samples and attributed the high chloride levels to naturally occurring formation brines.

In February and March 2010 KDHE investigated the former USDA/CCC property to determine if carbon tetrachloride contamination was present at previously unsampled locations. Analytical results confirmed the former USDA/CCC grain bins are probably not a significant source of carbon tetrachloride contamination.

In April 2010 the deep monitoring wells were plugged and abandoned. Additionally, one lawn and garden well, the previously impacted private well, and PWS #10 were removed from the LTM sampling plan due to lack of significant detections of carbon tetrachloride, inoperability of the well pump, and the upgradient position of PWS #10 to the carbon tetrachloride plume.

**December 2013 Update:** Analytical results from the August 2013 LTM sampling event indicated carbon tetrachloride was detected above RSK in one monitoring well and below RSK in two monitoring wells. The site will remain in the LTM program until reclassification criteria are met.

<b>Site Name:</b>	<b>Kanopolis Abandoned Salt Pile</b>
<b>Location:</b>	Kanopolis, Ellsworth County
<b>Contaminations:</b>	Chloride
<b>KDHE District:</b>	North Central, Salina
<b>Status:</b>	Investigation

**Site Summary:** Kanopolis has historic activity of salt mining. Several salt mines have operated; only one remains in operation today. In the past salt companies disposed of their wastes on the surface and contaminated soil, surface water, and groundwater. The first documented complaint of contamination was in 1945 when a property owner adjacent to the Morton Salt Company Mine complained that seepage from the mine's impoundment pond was impacting his private well. The Kansas State Board of Health investigated. Another similar complaint was also investigated in 1947. Elevated levels of chloride above the Secondary Maximum Contaminant Level (SMCL) were detected.

In 1972 the Morton Salt Company Shaft #1 collapsed. Material around the shaft slumped into the shaft and continued to enlarge a pit at the surface.

## *Smoky Hill-Saline Basin Update*

The site entered the SWPCRP in 1997, when KDHE's North Central Regional Office received a complaint that salt was leaching out of the abandoned salt pile and contaminating nearby fields. The ground surrounding the pile was devoid of vegetation.

A Limited Phase I CI/CAS 1997 investigated impacts from salt mining activities to soil and groundwater. Two suspected sources of chloride included the abandoned salt pile and Shaft #1. KDHE installed nine monitoring wells and surveyed the pile, estimated to contain 6,694 cubic yards of material.

In 1998 a Phase II CI installed thirteen monitoring wells. Analytical results indicated that domestic wells downgradient of the former Morton Salt Company Mine were potentially impacted with chlorides. Salt leaching from the pile, Shaft #1, and possibly a nearby former waste salt pile appeared to be the primary sources of chloride contamination in the alluvial aquifer. Former surface impoundments associated with the mines may also have contributed chloride contamination.

In 1998 a CAS and Reclamation Field Test evaluated remedial options for the pile and determined whether the salt could be removed and used by the Kansas Department of Transportation (KDOT). The volume of salt below the cap was estimated at 2,227 cubic yards.

Corrective Action in 1999 excavated and stockpiled the non-engineered cap, then separated, graded, and screened 3,205 tons of salt to uniform size, adding an anti-caking agent. Workers placed the stockpiles in the footprint of the former pile and covered the material with plastic sheeting, 1,500 tons of unsalvageable salt, and a clay cap. They compacted and reggraded the surface, leaving an earthen berm in place around the mound. Acme Brick did the final grading and seeding of the site as part of their landfill closure plan through KDHE's Bureau of Waste Management.

In 2000 Shaft #2 collapsed and vented, the blowout of air strong enough to throw bricks and dust several hundred feet in the air for 10-20 minutes. KDHE studied mine conditions to determine whether installing a venthole would prevent additional air pressure from building up within the mine.

The site entered the LTM Program from 2001 until 2008. In 2007 the State Cooperative Program site contacted Morton Salt Company as a PRP. Negotiations with Morton Salt Company failed to produce a Consent Agreement, and the site was transferred back to the SWPCRP in 2011.

In 2012 KDHE installed two new sentry wells between the site and PWS #1 and conducted a well sampling and survey to determine the extent of contamination prior to returning the site to LTM. Groundwater samples from 21 private lawn and garden wells, 11 monitoring wells, and the 2 new sentry wells indicated that chloride contamination extends along the eastern side of Kanopolis from the site to at least the southeastern corner of the city. The new sentry wells indicated that the chloride plume was not influenced by the pumping of PWS #1.

**December 2013 Update:** Chloride plume delineation activities from April through September 2013 collected twenty-one groundwater samples from direct-push locations, and seven surface

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water samples from streams receiving surface water runoff from the site and the Smoky Hill River. The data would delineate the southern and eastern extents of the chloride plume in the groundwater.

Based on groundwater analytical data, the chloride plume appears to begin near the former abandoned salt pile, continues southwest where it has impacted at least three known private wells located in the southeastern portion of the city, and then appears to follow an unnamed stream's influence southeast to the Smoky Hill River. No chloride concentrations in surface water samples exceeded the surface water quality standard. See the site accomplishment sheet on page 23.

A comprehensive report documenting the history of the site and the 2013 activities is currently under review. KDHE has identified a PRP and will begin negotiating an agreement in 2014.

**Site Name:** Kanopolis PCE  
**Location:** Kanopolis, Ellsworth County  
**Contaminations:** Tetrachloroethylene  
**KDHE District:** North Central, Salina  
**Status:** Remediation and Monitoring

**Site Summary:** In 2009 KDHE's Site Assessment Unit investigated the Kanopolis PCE site in response to PCE detections in PWS #1. The investigation identified the source of the PCE as a former City of Kanopolis power plant on the property. The SWPCRP and the City of Kanopolis cooperated to install a treatment system on PWS #1 to provide a safe drinking water supply. Due to lack of available funding from the City of Kanopolis, the SWPCRP provided a used, two-tray aeration treatment system for the well, currently operated by the City of Kanopolis.

**December 2013 Update:** The City of Kanopolis continues to use PWS #1. In April 2013 KDHE collected pre- and post-treatment water samples from PWS #1. The treatment system continues to provide a safe water supply.

**Site Name:** Paris Corp (Fmr)  
**Location:** Salina, Saline County  
**Contamination:** 1,1-Dichloroethene, 1,1,2-trichloroethane, trichloroethylene  
**KDHE District:** North Central, Salina  
**Status:** Monitoring

**Site Summary:** An August 2001 investigation of the Salina PWS Well #11 site detected VOC contamination in groundwater. A KDHE file review revealed a nearby electronics manufacturing business, known as Paris Corporation, had generated hazardous wastes containing chlorinated and petroleum based solvents. KDHE research has identified no viable PRP. The site entered the SWPCRP in November 2008. Investigation has confirmed chlorinated solvents above RSK.

In 2009 KDHE conducted an SI and installed three monitoring wells. Chlorinated solvents remain in groundwater above RSK in two wells.

**December 2013 Update:** Analytical results from the March 2013 LTM sampling event detected 1,1-dichloroethene and 1,1,2-trichloroethane above RSK in two monitoring wells. The site will remain in the LTM program until reclassification criteria are met.

**Site Name:** Park PWS #1  
**Location:** Park, Gove County  
**Contamination:** Carbon tetrachloride, nitrate  
**KDHE District:** Northwest, Hays  
**Status:** Monitoring

**Site Summary:** Since 1991 carbon tetrachloride and BTEX have been detected at trace levels in the Park PWS system. In 1996 KDHE installed monitoring wells near potential carbon tetrachloride sources and detected carbon tetrachloride above RSK levels in one monitoring well near a grain elevator. The UST Program installed GAC filters on the PWS to remove BTEX compounds; the filters have also effectively removed carbon tetrachloride.

In 1999 an impacted monitoring well displayed a significant increase in carbon tetrachloride concentrations. A KDHE Preliminary Investigation confirmed petroleum and carbon tetrachloride releases, warranting an additional site assessment.

In 2001 KDHE confirmed elevated carbon tetrachloride concentrations in groundwater at the former Collingwood Grain Elevator and identified the elevator as the likely source of carbon tetrachloride. The site entered KDHE's State Cooperative Program.

Negotiations with the responsible party continued through 2006. In September 2006 the State Cooperative Program installed and sampled two new monitoring wells. Analytical results identified VOCs in groundwater but not carbon tetrachloride. Since a carbon tetrachloride contamination source could not be confirmed, the Park PWS #1 site reentered the SWPCRP.

The site entered the LTM program in 2007. Semiannual sampling results indicated all VOCs below RSK, but nitrate was above drinking water standards. In May 2009 KDHE found carbon tetrachloride in two monitoring wells below RSK and nitrate concentrations above MCL in seven monitoring wells and one domestic well.

In March and April 2010, KDHE conducted a Nitrate Source Investigation in Park, identifying two separate elevator facilities as nitrate source areas. KDHE is currently working with the two elevator facilities to address the nitrate contamination through the State Cooperative Program.

In May 2012 KDHE's UST Program planned a final groundwater sampling event before closing out the UST site and removing the GAC filters from the PWS system. Carbon tetrachloride had not been detected in the PWS Well #1 since September 2007. A comprehensive groundwater sampling event was coordinated between KDHE's UST, SWPCRP, and State Cooperative Programs, which sampled for VOCs, nitrate, and ammonia from nineteen monitoring wells, PWS Well #1, and three upgradient private wells. Carbon tetrachloride was not detected in any

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groundwater samples. In October 2012 a new monitoring well was installed nested to an older, obsolete monitoring well with historically high detections of carbon tetrachloride.

**December 2013 Update:** Analytical results from the September 2013 LTM sampling event indicated carbon tetrachloride below RSK in one monitoring well. The site will remain in the LTM program until reclassification criteria are met.

<b>Site Name:</b>	<b>West South Street</b>
<b>Location:</b>	Salina, Saline County
<b>Contamination:</b>	Carbon tetrachloride
<b>KDHE District:</b>	North Central, Salina
<b>Status:</b>	Monitoring

**Site Summary:** The West South Street site was first identified in 1996 during an investigation of the Salina PWS Wells site. A plume of carbon tetrachloride had impacted Salina PWS Well #3. KDHE's Site Assessment Program traced the groundwater plume from PWS Well #3 to an apparent source area in a small, undeveloped field in west Salina. Since no PRPs were identified, the site entered the SWPCRP for further investigation in November 1998.

In February 1999 the SWPCRP collected direct-push groundwater, soil, and soil gas samples and installed and sampled eleven monitoring wells. Groundwater data indicated an apparent source area at a motel, but it could not be confirmed by the soil data.

The site entered the LTM program in 2000. Results from LTM sampling events indicate carbon tetrachloride levels above the MCL in at least three monitoring wells. Concentrations of carbon tetrachloride in Salina PWS Well #3 are generally near or below the MCL.

**December 2013 Update:** Analytical results from the March 2013 LTM sampling event detected carbon tetrachloride above RSK in two monitoring wells. The site will remain in the LTM program until reclassification criteria are met. SWPCRP will conduct a supplemental source investigation in 2014 to better delineate the contamination.

**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
SOLOMON RIVER DRAINAGE BASIN**

**Site Name:** Englehardt Grain Company  
**Location:** Mingo, Thomas County  
**Contaminations:** Nitrate, pesticides  
**KDHE District:** Northwest, Hays  
**Status:** Investigation

**Site Summary:** An environmental evaluation in November 1990 identified nitrate over MCL and TPH-DRO in soil. The site was the Englehardt Grain Company, Bambino Bean and Seed, and Allen Grain facilities. ASTs south of the Allen Grain fertilizer building contained diesel fuel and the ground beneath a diesel tank was stained. The fertilizer building had been used to store carbon tetrachloride and mix liquid fertilizer and pesticides. The assessment sampled two stained areas for nitrate and atrazine and collected six soil samples. Atrazine was not detected. TPH-DRO was identified under the diesel tank.

Further sampling in December 1990 collected soil gas samples near a former wooden grain elevator where carbon tetrachloride had been used, detecting carbon tetrachloride at 30 feet below ground surface. Soil samples from where liquid fertilizers were transferred between the fertilizer building and anhydrous ammonia storage tanks had elevated nitrate. The TPH-DRO contamination near the diesel tank appeared to be localized and shallow.

In January and February 1991 an environmental property assessment installed two monitoring wells and analyzed groundwater and soil samples for nitrate, TPH-DRO, carbon tetrachloride, and pesticides. The assessment identified localized areas of soil contaminated with nitrate, atrazine, and TPH-DRO. Nitrate was above the MCL in many soil samples, while TPH-DRO was above RSK in an area of discarded used oil filters. Carbon tetrachloride was not detected. Nitrate levels were below the MCL in all groundwater samples. In 1992 Mr. Englehardt filed for Chapter 7 bankruptcy.

A KDHE May 1996 SRE analyzed six wells for nitrate, ammonia, VOCs, and pesticides and four surface soil samples for nitrate, ammonia, and pesticides. Three onsite soil samples had elevated nitrate above the MCL, and one sample had elevated ammonia. Some pesticides were detected below their respective RSK levels. There was nitrate below the MCL and no VOCs in all groundwater samples. KDHE found atrazine above its RSK level in the Englehardt's domestic well and recommended that the well not be used for domestic purposes. Three abandoned pesticide containers were identified in the fertilizer building.

In October 1998 KDHE sent a voluntary encouragement letter to Mingo Co-op to join KDHE's VCPRP. Co-Ag replied stating that they had not purchased the property. In May 1999, KDHE contacted Co-Ag stating they were being referred to the State Cooperative Program. In July 2000, an information request letter was sent to Union Pacific Railroad, Co-Ag, and Collingwood

Grain Company. Co-Ag indicated that they had purchased the southern elevators and not the northern portion of the site containing the fertilizer building.

In May 2012 SWPCRP analyzed samples from two monitoring wells and five private wells for nitrate, ammonia, VOCs, pesticides, and herbicides, and another private well in July 2012 for the same contaminants. Nitrate was in all wells, but was over MCL in one monitoring well; ammonia was in one monitoring well. The only VOC detected was chloromethane, below its RSK in two monitoring wells. The analysis detected no herbicides. Pesticide screening found only atrazine below RSK in one monitoring well, propazine (Milogard) in one monitoring well and one private well below its RSK, and deethylatrazine (CIAT) in one monitoring well and two private wells below its RSK. Onsite soils have historically been elevated above MCL for nitrate and ammonia.

**December 2013 Update:** SWPCRP has proposed a SI in 2014 to evaluate the presence of nitrate and ammonia in onsite soils and is trying to obtain access from Union Pacific Railroad.

<b>Site Name:</b>	<b>Former Krueger Refining Co.</b>
<b>Location:</b>	Natoma, Rooks County
<b>Contamination:</b>	Total petroleum hydrocarbons, chloride, heavy metals
<b>KDHE District:</b>	Northwest, Hays
<b>Status:</b>	Investigation

**Site Summary:** KDHE identified the Former Krueger Refining Co. site as part of an effort to identify and rank former oil refinery facilities in Kansas. The refinery operated from 1934 to 1939.

In January 2011 KDHE's Sector Assessment Program conducted a UFA that collected and analyzed soil samples for radiation, VOCs, TPH-DRO, chloride, and metals. Analytical results detected TPH-DRO, chloride, and metals above RSK values.

The Former Krueger Refining Co. site entered the SWPCRP in 2011 after a PRP search found no viable responsible parties. Plans include investigations to determine the extent of the TPH-DRO, chloride, and metal contamination.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did not work this site in 2013. Further investigation into the extent of contamination may be performed in 2014.

**Site Name:** Lebanon Nitrate Site  
**Location:** Lebanon, Smith County  
**Contaminant:** Nitrate  
**KDHE District:** Northwest, Hays  
**Status:** Investigation

**Site Summary:** The Lebanon Nitrate site entered the SWPCRP when groundwater samples collected in May 1998 indicated high nitrate levels in the City of Lebanon landfill monitoring well and at the Independent Oil Company.

In April 2005 an initial investigation identified numerous potential sources for nitrate contamination; however none of these sources appeared to be the cause of the problem at the Independent Oil Company. KDHE sampled wells the following July to confirm levels and determine if they were due to a regional source. Groundwater samples collected at the city landfill and Independent Oil Company were non-detect for nitrate. A groundwater sample collected at the Lebanon/Peterson Oil Company indicated a nitrate concentration above the MCL.

In March 2006 KDHE sampled the Lebanon/Peterson Oil Company monitoring wells and confirmed elevated nitrate levels.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did not work at the Lebanon Nitrate site in 2013. An investigation to identify a nitrate source may be conducted in 2014.

**Site Name:** Royal Acid  
**Location:** Hill City, Graham County  
**Contaminant:** Chloride  
**KDHE District:** Northwest, Hays  
**Status:** Monitoring

**Site Summary:** The Royal Acid site was discovered in 1986 when a complaint was filed with KDHE regarding possible salt contamination of a domestic well. KDHE sampled the domestic well and discovered chloride concentrations in excess of the federal secondary drinking water standard. A former industrial operation located near the domestic well was suspected as a source area.

KDHE conducted periodic sampling of the area from 1987 to 1989, which indicated increasing concentrations of chloride. From 1988 to 1992 KDHE sampled several domestic wells to monitor the chloride plume migration. The Royal Acid site was added to the LTM program in September 1995 to further monitor chloride contamination. Since September 1995 annual sampling reports have indicated steady to increasing chloride levels.

**December 2013 Update:** Analytical results from the August 2013 LTM sampling event detected chloride concentrations above the SMCL in 11 of 26 domestic wells. These levels are consistent

## *Solomon Basin Update*

with previous LTM sampling results. The site will remain in the LTM program until reclassification criteria are met.

<b>Site Name:</b>	<b>Stockton PWS #10</b>
<b>Location:</b>	Stockton, Rooks County
<b>Contamination:</b>	Chloride
<b>KDHE District:</b>	Northwest, Hays
<b>Status:</b>	Investigation

**Site Summary:** In September 2011 KDHE's Northwest District Office reported chloride and sodium contamination in the Stockton PWS Well #10. The well had not been used for more than ten years due to the elevated concentrations. The City of Stockton requested assistance from KDHE to determine the contamination source, hoping to restore the well. The site was assigned to the SWPCRP.

In January 2012 KDHE toured the Stockton PWS #10 well house and surrounding area, including the KDOT Stockton Subarea facilities and the City of Stockton water treatment plant. Personnel took note of road salt storage facilities (shed and dome) and salt brine mixing equipment and salt crystals, brine precipitation, and distressed vegetation on the ground at the KDOT facility.

In May 2012 KDHE conducted a PSE which included collecting surface and subsurface soil samples and groundwater samples from direct-push sample locations and PWS wells #9 and #10. In places where the soil showed visible traces of salt spills and runoff, chloride contamination exceeded the soil-to-groundwater pathway concentration. Chloride concentrations in groundwater were above the SMCL near the KDOT facility. Elevated chloride concentrations in PWS #10 and samples collected upslope and upgradient of the KDOT facility and water treatment plant suggest a separate source of contamination.

**December 2013 Update:** Subsequent research identified a water softening business and oil production activities in and around Stockton. In April 2013 the Northwest District Office sampled monitoring wells from a UST site upgradient from PWS Well #10. Only the deepest monitoring well had chloride concentrations above the SMCL. Shallower groundwater adjacent to the water softening business was not impacted; the business does not appear to be a source.

A Supplemental Sampling Event in May 2013 installed four monitoring wells, one upgradient of PWS #10. All four monitoring wells had detections of chloride above the SMCL. Six surface water samples were collected from a nearby creek and in areas receiving surface water runoff from a road salt storage facility. One surface water sample had chloride concentrations above the surface water quality standard value. The sampling event confirmed that contaminated soil and surface water runoff from the salt storage facility is impacting soil and vegetation on site and threatens the surface water quality of the nearby stream and the South Fork of the Solomon River.

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SWPCRP initiated a Source Investigation in September and October 2013 in order to determine the source area(s) of the chloride contamination in the deeper portion of the alluvial aquifer. At the time of this report, the results of the Source Investigation were pending. See the ongoing investigations accomplishment sheet on page 28.



**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
UPPER ARKANSAS RIVER DRAINAGE BASIN**

**Site Name:** Alamota Elevator  
**Location:** Alamota, Lane County  
**Contamination:** Nitrate, 1,2-dichloroethane  
**KDHE District:** Southwest, Dodge City  
**Status:** Investigation

**Site Summary:** The Alamota Elevator began as the Farmer's Coop Elevator. In 1966 Garvey, Inc., purchased the elevator and operated it until 1994. Garden City Coop, Inc., purchased the elevator from Garvey in early 1994 and has been the owner/operator ever since. Garvey, Inc., had a history of purchasing and using carbon tetrachloride at its other grain elevators and carbon tetrachloride has been detected in groundwater at other former Garvey grain elevators.

A 2008 SRE at the Alamota Elevator did not find carbon tetrachloride in groundwater from area domestic wells or collected by direct push techniques. One sample had 1,2-DCA above RSK. Trace levels of fluorotrichloromethane, chloromethane, ethylbenzene, toluene, and xylene were detected below their respective RSKs. Nitrate was detected in all groundwater samples and ranged from below MCL to above MCL in the samples collected downgradient and upgradient of the elevator. Chloromethane in groundwater samples may be attributed to the degradation of carbon tetrachloride. All other VOC detections may come from a former fueling station upgradient of the elevator, which has been referred to the Kansas Petroleum Storage Tank Release Trust Fund. Nitrate above the MCL in groundwater may come from the elevator; however, there is not enough evidence for an enforcement program to negotiate a cleanup agreement.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did not work at the Alamota Elevator site in 2013.

**Site Name:** Bazine Groundwater Contamination  
**Location:** Bazine, Ness County  
**Contamination:** Carbon tetrachloride, nitrate  
**KDHE District:** Northwest, Hays  
**Status:** Monitoring

**Site Summary:** The Bazine Groundwater Contamination site entered the SWPCRP in early 1997 after the City of Bazine reported carbon tetrachloride and nitrate contamination in PWS wells above drinking water standards.

A 1997 Phase I CI did not identify a carbon tetrachloride source and the investigation concluded there may be residual impact from a contaminant plume no longer present. Elevated nitrate levels were detected near an area Coop and adjacent railroad tracks.

A 1998 Phase II CI assessed potential nitrate source areas, specifically the nearby Coop, and found elevated nitrate and ammonia in the soil along the railroad tracks, near the sanitary sewer line, and southwest of the Coop grain elevators. Elevated ammonia levels suggested a release of urea or other ammonia-containing fertilizer. None of the subsurface soil samples tested positive for fecal coliform bacteria. Groundwater south of the Coop along the sanitary sewer line and in four monitoring wells contained elevated phosphorous and boron. The contamination appeared to come from the old cast iron sewer line underneath the railroad south of the Coop. The sewer line passed a smoke test; however, precipitation around a leak can invalidate test results. Historical nitrate results for the PWS wells indicate that nitrate concentrations have gradually increased since 1994, suggesting either non-point source contamination or a continuous point source with low to moderate concentrations.

The City of Bazine and the SWPCRP applied for and received a Community Development Block Grant for the City to locate and install a new PWS well in an area without nitrate impact.

The site entered the SWPCRP's LTM program in 1999. The nitrate levels in the monitoring wells continued to decline. During the 2005 LTM sampling event, the groundwater sample from a monitoring well located along the sewer line was the only sample with nitrate detections above MCL.

In 2006 KDHE collected soil samples when the City of Bazine replaced a sewer line running under the railroad tracks, finding no ammonia and only low levels of nitrate. KDHE has since discounted the sewer line as a source. Later in 2006 the City of Bazine and KDHE collected water samples for nitrate analysis. One monitoring well, apparently placed in a concentration of nitrate in the soil, contained increasing levels of nitrate that exceeded MCL. This monitoring well is nearby and upgradient of PWS Well #1. All other wells sampled contained nitrate concentrations below the drinking water standard.

Nitrate is present in all monitoring wells and some private wells every year. The largest increase in nitrate concentration is in a monitoring well located directly south of the Coop, indicating an active nitrate source is still present.

**December 2013 Update:** Analytical results from the October 2013 LTM sampling event indicated nitrate above the MCL in one monitoring well and one private lawn and garden well. Nitrate was detected below the MCL in one monitoring well and the three PWS wells. The site will remain in the LTM program until reclassification criteria are met.

*Upper Arkansas Basin Update*

**Site Name:** Dodge City Cooperative Exchange  
**Location:** Dodge City, Ford County  
**Contamination:** Nitrate  
**KDHE District:** Southwest, Dodge City  
**Status:** Investigation

**Site Summary:** In 1905 the Farmers Elevator and Supply Company built a grain elevator on the site property. The Dodge City Cooperative Exchange took over the grain elevator facility in 1914.

In January 1990 seven USTs were removed from the service station located northwest of Trail Street and Santa Fe Avenue. A remedial system to address soil contamination was designed for the facility. The site entered KDHE's UST Program monitoring program as the Dodge City Cooperative site; the UST Program closed out the site in April 2008.

Southwest District Office sampled three UST monitoring wells where nitrate had been elevated above its MCL. The Dodge City Cooperative Exchange site was referred to KDHE's Site Assessment Unit in July 2008.

An SRE from August 2008 to January 2009 collected groundwater samples from five existing monitoring wells and one direct-push sample location. All groundwater samples contained nitrate above RSK. The highest detection of nitrate was in a monitoring well located at the Coastal Mart #2536 UST site, north and sidegradient of the site. The limited data generated from the SRE did not confirm a release from the Dodge City Cooperative Exchange facility. It is unclear if the nitrate levels represent discrete releases or a regional problem.

The site entered the SWPCRP to determine the source for nitrate releases to groundwater and the extent of the nitrate contamination.

**December 2013 Update:** A SI is recommended in order to analyze groundwater samples for nitrate upgradient, sidegradient, and downgradient of the Dodge City Cooperative Exchange facility. This investigation would help to confirm whether nitrate concentrations in the groundwater are naturally elevated due to sporadic non-point sources, or if the Dodge City Cooperative Exchange facility and its historical use as a grain elevator has contributed to the nitrate contamination as a point source.

Due to its priority ranking and limited resources/funds, the SWPCRP did not work at the Dodge City Cooperative Exchange site in 2013. A SI may be conducted in 2014.

**Site Name:** Garden City VOCs  
**Location:** Garden City, Finney County  
**Contamination:** Volatile organic compounds  
**KDHE District:** Southwest, Dodge City  
**Status:** Monitoring

**Site Summary:** The Garden City VOCs site was referred to the SWPCRP in May 2002 by the UST Program after finding PCE, TCE, acetone, and methyl ethyl ketone at a UST site. An investigation in 2002-2003 collected soil and groundwater samples to identify potential source areas. Adjacent properties have contained businesses that may have used PCE, including a former laundry facility and a machine shop.

A January 2006 investigation collected soil samples from near sewer lines and potential source areas and installed seven permanent monitoring wells. Soils did not contain detectable amounts of the contaminants of concern but groundwater contained PCE above the RSK level. In February 2006 the Garden City VOCs site entered the LTM program.

In February 2009 a KDHE contactor collected soil and groundwater samples from monitoring wells and direct-push sampling to determine the source area. The investigation included on-site laboratory sample analysis using a mobile gas chromatograph, and found PCE in shallow soil samples near a building which may have been a former dry cleaner.

**December 2013 Update:** All monitoring wells were dry during the April 2013 LTM sampling event. Deeper monitoring wells may be drilled in 2014 to obtain representative groundwater samples. The site will remain in the LTM program until reclassification criteria are met.

**Site Name:** Great Bend Former Refinery Site (Falcon Refinery)  
**Location:** Great Bend, Barton County  
**Contamination:** Petroleum hydrocarbons, heavy metals, polynuclear aromatic hydrocarbons  
**KDHE District:** Northwest, Hays  
**Status:** Monitoring

**Site Summary:** The Great Bend Former Refinery (Falcon Refinery) site was identified in 1991 when the site was being assessed as a former UST location. KDHE's Site Assessment Unit performed several investigations between 1992 and 1994 to assess petroleum impacts and discovered that the site had once been the location of a refinery. Likely contaminant sources include former containment lagoon and refinery plant areas. Storm sewer excavations in 1996 encountered low levels of petroleum near a former refinery processing area. Soils contaminated above RSK were excavated and treated offsite.

A CAS in 1997 recommended LTM and the site was given LTM status in 1998. Recent LTM analytical results indicate TPH-DRO concentrations are below RSK levels and are declining. TPH-GRO, VOCs, and metals concentrations remain below RSK levels.

**December 2013 Update:** Analytical results for September 2013 LTM sampling event indicate TPH-DRO concentrations continue to fluctuate. The site will remain in the LTM program until reclassification criteria are met.

**Site Name:** Holcomb Garden City Company Site  
**Location:** Holcomb, Finney County  
**Contamination:** Carbon tetrachloride, chloroform  
**KDHE District:** Southwest, Dodge City  
**Status:** Monitoring

**Site Summary:** In April 1998 KDHE district staff sampled private wells adjacent to a former USDA/CCC grain storage facility and discovered carbon tetrachloride. Sampling the on-site Garden City Company well also found carbon tetrachloride above RSK and the nearby Garden City Coop well had trace levels. The USDA/CCC grain storage facility operated from 1946 to 1968.

In 1998 KDHE investigated possible sources of carbon tetrachloride by collecting soil samples. No groundwater could be collected. The soil samples did not contain significant levels of carbon tetrachloride, but the onsite well continued to indicate carbon tetrachloride levels above RSK. KDHE offered to provide an alternate drinking water supply for the Garden City Company, but the offer was declined.

Since no source area was identified, the site entered the SWPCRP for further characterization. After no carbon tetrachloride was detected in any drinking water well within a one-mile radius in May 2002, the site entered the LTM program. Monitoring continues to identify contaminants in the Garden City Coop and Garden City Company wells. Bottled water is being used for drinking purposes at both of these locations.

**December 2013 Update:** Analytical results from the May 2013 LTM sampling event indicated carbon tetrachloride below RSK in both Garden City Coop and Garden City Company wells. Carbon tetrachloride has been below RSK for four consecutive sampling events and the site may qualify for reclassification to resolved status. However, carbon tetrachloride concentrations, while below RSK, have been slowly increasing in the Garden City Coop well since 2009. No other wells, aside from the Garden City Company and Garden City Coop wells, have been sampled since 2001. Downgradient wells at similar screened intervals should be sampled to determine if the carbon tetrachloride plume is impacting downgradient wells before the site is considered for resolution. The site will remain in the LTM program until reclassification criteria are met.

*Upper Arkansas Basin Update*

**Site Name:** Ingalls PWS  
**Location:** Ingalls, Gray County  
**Contamination:** Carbon tetrachloride  
**KDHE District:** Southwest, Dodge City  
**Status:** Monitoring

**Site Summary:** The Ingalls PWS site was assigned to SWPCRP after City of Ingalls personnel encountered low levels of carbon tetrachloride and atrazine in the City of Ingalls PWS #3 in December 2003.

A PSE in February 2004 found impacted groundwater in the eastern and southeastern portions of the investigation area. Nitrate concentrations exceeded the MCL in five wells. Carbon tetrachloride and atrazine concentrations were below their RSKs.

A phased CA in July 2004 installed five monitoring wells around the Dodge City Cooperative Exchange, and collected groundwater samples from 17 previously existing PWS, domestic, irrigation, or livestock wells. The investigation collected soil samples from six locations at the Dodge City Cooperative Exchange. Analytical results identified carbon tetrachloride in two wells and atrazine in three wells below RSK, but did not identify source areas for these contaminants. The investigation also identified elevated nitrate concentrations above RSK in soil and above MCL in groundwater. Elevated nitrate in the soil was traced to a release of liquid nitrogen fertilizer from the Dodge City Cooperative Exchange in the 1980s. The Dodge City Coop Site entered KDHE's State Cooperative Program to address the nitrate contamination.

The VOC portion of the site entered LTM in 2006 to monitor atrazine and carbon tetrachloride in groundwater below RSK. Annual LTM sampling events have included sampling PWS #2, PWS #3, PWS #4, PWS#3/PWS #4 blend sample, and two private wells.

**December 2013 Update:** Analytical results from the April 2013 LTM sampling event indicated carbon tetrachloride below RSK in PWS #3, the PWS #3/PWS #4 blend, and in one private well. Since 2011 the carbon tetrachloride concentration in PWS #3 has increased while still staying below RSK. The PWS #3/PWS #4 blend has maintained consistent concentrations of carbon tetrachloride below RSK. Recommendations include identifying and sampling nearby wells with similar total well depths for VOCs, and installing a monitoring well or wells west of PWS #3 if concentrations continue to increase. The site will remain in the LTM program until reclassification criteria are met.

**Site Name:** Kent Loesch Property  
**Location:** Raymond, Rice County  
**Contamination:** Nitrate  
**KDHE District:** North Central, Salina  
**Status:** Investigation and remediation

**Site Summary:** In February 2004 a fertilizer application truck leaked an undetermined quantity of 28% nitrogen fertilizer onto the ground while parked at the site. The responsible party

conducted an investigation in 2006 but later declared bankruptcy and the site entered the SWPCRP.

A Remediation by Excavation in June 2009 removed 987 cubic yards of soil up to 15 feet deep in the area of the spill and its associated runoff. The excavated soil was spread on nearby fields as a nitrogen source. A direct-probe investigation in October 2010 determined the extent of remaining nitrate in soil. An EUC will be recorded for areas where sidewall collapse and the presence of trees prevented complete removal of contaminated soil.

**December 2013 Update:** Due to its priority ranking and limited resources and funding, the SWPCRP did not work at the Kent Loesch Property site in 2013. The SWPCRP may sample to delineate the remaining contaminated soil in 2014 before recording an EUC.

<b>Site Name:</b>	<b>Mid-Kansas Aerial, Inc.</b>
<b>Location:</b>	Larned, Pawnee County
<b>Contaminant:</b>	Pesticides, nitrate
<b>KDHE District:</b>	Southwest, Dodge City
<b>Status:</b>	Monitoring

**Site Summary:** The Mid-Kansas Aerial site was discovered in 1991 during the remediation of an AST leak at an aerial spraying business at the Larned-Pawnee County Airport. Impacted soil was associated with runoff from a plane wash-down/loading pad area and a liquid nitrogen fertilizer tank. Further investigation eventually identified a PRP, but the PRP was unable to respond to a draft consent order.

The site was transferred in 2003 to KDHE's Site Assessment Unit. Soil from near the liquid fertilizer tank contained extremely high levels of ammonia and soil impacted by runoff from the wash-down/loading pad area contained pesticides below their respective cleanup standards.

With no viable PRP, the site entered the SWPCRP in May 2004. An investigation in October 2004 confirmed pesticide contamination and delineated the area of nitrogen contamination. It was decided to conduct a Characterization by Excavation to remove nitrogen contamination and further delineate the pesticide contamination. This work was postponed to summer 2006 to allow for adequate acreage on which to spread the nitrogen-enhanced soil. Field activities included direct-push soil and groundwater sampling, water well sampling, excavation and characterization by field-screening, and land application of nitrogen-contaminated soil.

Soil sampling at the runoff area identified pesticide concentrations above the RSK. Direct push sampling did not reach groundwater, so a groundwater sample was collected from the Larned/Pawnee County Airport well. The well water contained no pesticides.

Approximately 3,170 cubic yards of nitrogen-contaminated soil was excavated and land-applied at the airport. Sampling confirmed that cleanup goals had been attained at the base and along the northern and eastern extents of the excavation, while concentrations above KDHE cleanup guidelines remained along parts of the southern and western extents due to restrictions caused by

the presence of a 10,000-gallon AST and the north water supply well. The excavation was backfilled with 3,400 cubic yards of soil. The report recommended either removal of the AST and water supply well followed by additional characterization and excavation, or placement of an EUC on the remaining contaminated soil, provided groundwater is not impacted by the contaminants.

**December 2013 Update:** In October 2012 groundwater samples collected from the Mid-Kansas Aerial and Larned Airport water supply wells were analyzed for nitrates and pesticides. Both samples were at or below the nitrate MCL and did not contain detectable levels of pesticides. The next sampling event is scheduled for spring 2014. The site will remain in LTM until reclassification criteria are met.

**Site Name:** Ness City PWS  
**Location:** Ness City, Ness County  
**Contamination:** Carbon tetrachloride, ethylene dibromide, nitrate, methyl tert-butyl ether, 1,2-dichloroethane  
**KDHE District:** Northwest, Hays  
**Status:** Monitoring

**Site Summary:** Routine sampling identified carbon tetrachloride and 1,2-DCA below MCLs in Ness City PWS Well #19 in the mid-1980s. As a result, the EPA investigated in 1993 and 1994, confirming contaminants in private wells in the southern half of Ness City and upgradient of PWS Well #19. Potential source areas included leaking UST sites, grain elevators, and a chemical storage facility.

KDHE investigated under the SWPCRP. The results suggested grain elevators as potential source areas for carbon tetrachloride and EDB contamination; leaking UST sites as potential sources for EDB and 1,2-DCA contamination; and agricultural fertilizer storage and leaking sanitary sewers as potential sources for nitrate contamination. No facility was positively confirmed as a source.

The site entered the LTM program in 1999. LTM data from 1999 to 2007 have generally indicated decreased carbon tetrachloride and EDB levels to below MCLs. MTBE concentrations have been detected in private wells and monitoring wells at levels above MCLs. Nitrate contamination continues to impact groundwater in the eastern and southern portions of the site, including PWS Well #19, which continues to be used as an emergency backup well for Ness City.

A site reconnaissance and interviews with facility owners and operators in January 2006, documented the use and/or storage of grain fumigants and nitrogen fertilizers at local Coops. Split groundwater samples collected in February and April 2006 from two UST sites revealed carbon tetrachloride, EDB, and gasoline constituents at one facility and 1,2-DCA, methyl tert-butyl ether, and other gasoline constituents at the second facility.

**December 2013 Update:** LTM sampling conducted in October 2013 detected nitrate above RSK in three monitoring wells and PWS #19. The city only uses PWS #19 for emergency use. No VOCs were detected above respective RSKs in any well.

**Site Name:** Ness Crude Oil #2  
**Location:** Ness City, Ness County  
**Contamination:** Total petroleum hydrocarbons, 1,2,4-trimethylbenzene  
**KDHE District:** Northwest, Hays  
**Status:** Remediation

**Site Summary:** The Ness Crude Oil #2 site was identified following a complaint filed with the Kansas Corporation Commission in 1997. Ness Crude Oil, Inc. had two inactive and abandoned crude oil reclamation facilities located in Ness City, but filed for bankruptcy in 1993. Both sites had ASTs that were in poor condition and leaking. Sludge had escaped and spread out on the ground surface and neither site had adequate containment structures.

In July 1997 KDHE forwarded the information it had gathered to the EPA. In December 1997 the EPA investigated both facilities and determined they posed a threat to navigable waters of the United States. Further, EPA stated removal actions at both sites were warranted to “abate the threat of future releases to waterways and threats to the public health and the environment.”

During a file review in 2004, KDHE determined it had no information regarding the disposition of the Ness Crude Oil #2 site. The EPA was contacted and responded it had conducted removal/clean-up actions only at the Ness Crude Oil #1 site in July 1998, and not at the Ness Crude Oil #2 site, because “... there was not a direct path to a waterway.”

KDHE personnel looked at the property in November 2004. Since the site visit in 1997, the abandoned ASTs had been cleaned and moved to the northwest corner of the property. A new crude oil storage facility had been installed in the northeast portion of the property, consisting of four ASTs enclosed by a containment structure. Surface soils at the original Ness Crude Oil #2 facility appeared to have been cleaned up and vegetation was growing with no sign of stress. There were no visible areas of staining or oil spillage. However, no records were available to document past clean-up actions.

KDHE investigated in 2005 to determine if petroleum products were present at the original locations of the petroleum ASTs. Results indicate sludge wastes and soils impacted by petroleum contamination above RSK extended approximately 6,500 square feet and eight feet deep.

A CAS in April 2006 indicated that sludge wastes and soil contamination are limited to the original Ness Crude Oil #2 operations area. Sludge wastes and impacted soils contained TPH-GRO, TPH-DRO and 1,2,4-trimethylbenzene above RSK. The contamination is estimated to be 5,400 square feet and up to ten feet deep, with most of the contamination at eight feet deep or less. Groundwater was not encountered in probe holes, trenches, or test pits during either the PSE or the CAS investigations. Groundwater from a livestock well located one-eighth mile east of the site was non-detect for all analytes.

Corrective action options include the use of waste material for road construction, on-site stabilization/treatment, and landfill disposal. The recommended corrective action entails the excavation of approximately 2000 cubic yards of sludge and impacted soil. The excavated area would be backfilled with soil, covered with a two-foot thick, low-permeability cap, and reseeded with grass.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did not complete corrective actions in 2013. Corrective actions may take place in 2014.

<b>Site Name:</b>	<b>Stafford County Oil Reclaiming Company (Former)</b>
<b>Location:</b>	Stafford County
<b>Contamination:</b>	Total petroleum hydrocarbons, heavy metals, volatile organic compounds
<b>KDHE District:</b>	Southwest, Dodge City
<b>Status:</b>	Monitoring

**Site Summary:** The oil reclaiming facility now identified as the Stafford County Oil Reclaiming Company site started operating during or before 1975 and was closed and abandoned in 1995. Sludge was disposed in three pits, while brine was injected into a salt-water disposal well.

The site came to KDHE in 2002 in response to U.S. Fish and Wildlife Service concerns that the sludge pits were a danger to migratory birds. The site is located about 10 miles west of the Quivira National Wildlife Refuge, a designated Wetland of International Importance.

A Removal Site Evaluation in June 2002 found that tanks onsite contained around 41,118 gallons of oil reclaiming waste. The disposal sludge pits contained an estimated 1,780 cubic yards of material. The groundwater at the site was contaminated with petroleum and chlorinated hydrocarbons. The site was transferred to SWPCRP in October 2003.

A PSE in February 2004 identified VOC, TPH-DRO, and TPH-GRO concentrations in soil above RSK and barium, cadmium, and lead in groundwater above RSK. Because groundwater was not readily accessible due to subsurface conditions, the groundwater plume was not defined.

A CA from February to October 2005 detected TPH-GRO, TPH-DRO, and VOCs above RSK in soils from the AST area. Soil samples collected from the former salt-water disposal area exhibited high chloride concentrations that decreased with depth. Testing indicated that the sludge could be treated using solidification/stabilization treatment. The investigation identified two additional sludge pits near the site, installed four monitoring wells at the AST area and installed and sampled four monitoring wells at the three sludge pits. Groundwater contained VOCs, arsenic, lead, TPH-GRO, and TPH-DRO at concentrations above RSK and chloride at concentrations above the SMCL.

Circle T Oil purchased the former oil reclaiming facility and applied an EUC to the deed in March 2007.

*Upper Arkansas Basin Update*

The five sludge pits were subject to corrective action in 2008. The activities consolidated the sludge in one location where 3,952 tons of sludge was stabilized with 592 tons of cement kiln dust, mixed with soil, compacted, and covered with approximately 750 cubic yards of cover material. The two small pits were backfilled with native soil. The landowner applied an EUC to the deed in April 2008. SWPCRP began LTM.

**December 2013 Update:** Results from the September 2013 LTM sampling event show VOCs above RSK in one monitoring well and below RSK in two monitoring wells; TPH-GRO above RSK in one monitoring well; TPH-DRO above RSK in one monitoring well; and chloride above SMCL in six monitoring wells and below SMCL in two monitoring wells. The site will remain in the LTM program until reclassification criteria are met.



**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
UPPER REPUBLICAN RIVER DRAINAGE BASIN**

**Site Name:** Norton Carbon Tetrachloride  
**Location:** Norton, Norton County  
**Contamination:** Carbon tetrachloride  
**KDHE District:** Northwest, Hays  
**Status:** Monitoring

**Site Summary:** The Norton Carbon Tetrachloride site entered the SWPCRP in 2003 when KDHE's Storage Tank Section consistently detected carbon tetrachloride in a lawn and garden well in use at a former dry cleaning business.

An investigation in 2003 and 2004 looked for a contaminant source and the extent of soil and groundwater contamination. Carbon tetrachloride was detected downgradient of the former Garvey Grain Elevator and Norton Coop East Silo. Carbon tetrachloride concentrations decreased from these areas then increased near the former dry cleaning facility.

In February 2005 the site was transferred to the State Cooperative Unit for enforcement and to prepare a draft consent order. Past and present owners and lessees received information request letters inquiring about their use of carbon tetrachloride.

After internal discussions concerning PRPs, the site was transferred back to the SWPCRP for additional investigations. Site reconnaissance in March 2007 inspected the impacted lawn and garden well, took and reviewed digital and historical aerial photos, and acquired sewer and water blueprints.

In May 2010 KDHE investigated multiple source areas and identified the former Garvey Elevator liquid fumigant storage area as the sole source of carbon tetrachloride contamination. The carbon tetrachloride plume extends approximately 2,500 feet from its source area.

In May 2012 KDHE installed seven monitoring wells to further delineate and monitor the contamination.

**December 2013 Update:** SWPCRP sampled the fourteen monitoring wells and a private well in October 2013. Negotiations continue with a PRP; the site may again be transferred to the State Cooperative Unit.

**Site Name:** Selden Carbon Tetrachloride  
**Location:** Selden, Sheridan County  
**Contamination:** Carbon tetrachloride  
**KDHE District:** Northwest, Hays  
**Status:** Monitoring and potentially responsible party search

**Site Summary:** The Selden Carbon Tetrachloride site entered the SWPCRP in October 2000 after KDHE's Storage Tank Program detected carbon tetrachloride in several monitoring wells at the Home Oil Bulk Plant site. Carbon tetrachloride has historically been detected in several monitoring wells at the Home Oil Bulk Plant site at concentrations ranging from non-detect to above RSK.

A Phase I CI in January 2001 sampled existing wells and collected soil samples near several source areas. The Phase II CI installed monitoring wells in August and November 2001. The investigations evaluated soil and groundwater conditions; soil samples collected near potential source areas did not contain VOCs, but the groundwater had carbon tetrachloride over RSK. The analytical data identified three separate grain storage facilities as potential source areas for carbon tetrachloride. Garvey Elevator, Inc., was identified as a PRP. The site entered KDHE's State Cooperative Program.

In 2007, after an administrative appeal, the Secretary of KDHE signed a final order requiring Garvey Elevator, Inc., to investigate and clean up the Selden Carbon Tetrachloride site. Garvey Elevator, Inc., appealed the order to state district court, but then filed for Chapter 7 bankruptcy in March 2008. KDHE filed a claim in October 2008. In July 2009 the site was transferred from the State Cooperative Program back to SWPCRP for LTM.

SWPCRP monitoring wells have been sampled quarterly by KDHE's Storage Tank Program as part of the air-sparge remedial sampling at the Home Oil Bulk Plant Site. Carbon tetrachloride concentrations continue to exceed RSK value in three monitoring wells.

**December 2013 Update:** In May 2013 SWPCRP sampled 13 monitoring wells and PWS #2 for VOCs. One monitoring well was plugged with corn and another monitoring well had a broken casing. Carbon tetrachloride was detected above RSK in five of the monitoring wells, but was not detected in PWS #2. The most downgradient monitoring well continues to have elevated carbon tetrachloride. A PRP has been encouraged to address the site.

**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
VERDIGRIS RIVER DRAINAGE BASIN**

**Site Name:** Crescent Oil Company, Independence  
**Location:** Independence, Montgomery County  
**Contamination:** Volatile organic compounds  
**KDHE District:** Southeast, Chanute  
**Status:** Remediation

**Site Summary:** The Crescent Oil Refining Company was a bulk storage facility with ASTs for kerosene, diesel, oils, and solvents. A diesel fuel spill from an AST was reported to KDHE in 2001, the site entered KDHE's AST Trust Fund Program, and KDHE installed ten monitoring wells. A 2005 pre-closure monitoring event found TCE in a monitoring well. The monitoring wells were subsequently plugged and abandoned or covered with crushed limestone. The site entered KDHE's Site Assessment Program in 2007.

An SRE in 2008 detected TCE and carbon tetrachloride above their respective RSK values in some of the monitoring wells. The SRE did not positively identify a source area, and recommended a Preliminary Assessment.

Crescent Oil Refining Company filed for bankruptcy in 2009. In response, KDHE collected samples to determine whether to file a claim under the bankruptcy and found VOCs above and below RSK levels in the groundwater.

In March 2011 KDHE personnel conducted a Preliminary Assessment. The assessment detected TCE, 1,2-DCE and vinyl chloride above RSK and other VOCs associated with a known fuel spill, and found source areas for TCE, PCE, and carbon tetrachloride. A PRP search did not identify a viable PRP.

**December 2013 Update:** KDHE conducted a removal action in early January 2013, excavating 300 cubic yards of TCE contaminated soil. KDHE's Mobile Laboratory performed onsite field sample analysis. KDHE restored the site to the original grade with clean soil and gravel. See the site accomplishment sheet on page 22.

**Site Name:** Kanotex Refinery (Former)  
**Location:** Caney, Montgomery County  
**Contamination:** Heavy metals, total petroleum hydrocarbons-gasoline range organics  
**KDHE District:** Southeast, Chanute  
**Status:** Investigation

## Verdigris Basin Update

**Site Summary:** KDHE identified several refineries in 2005 through historical reviews and reconnaissance activities. The Former Kanotex Refinery was built in 1907 and operated from 1909 to about 1919. There have been several subsequent corporate and private property owners.

In 2006 a Phase 1 FFRA confirmed the historical refinery's presence and recommended sampling. A 2009 Phase II FFRA identified impacts from former refinery operations, including metals and TPH-GRO in soils exceeding RSK. Between May 2010 and August 2011 KDHE performed a phased Supplemental Sampling Assessment to delineate the extent of contamination.

**December 2013 Update:** The first phase of determining the extent of metals contamination in soil is still in progress. KDHE will continue the investigation in 2014 after obtaining access to adjacent properties.

<b>Site Name:</b>	<b>Superior Refinery</b>
<b>Location:</b>	Longton, Elk County
<b>Contamination:</b>	Potential refinery waste
<b>KDHE District:</b>	Southeast, Chanute
<b>Status:</b>	Investigation

**Site Summary:** KDHE identified several refineries in 2005 through historical reviews and reconnaissance activities. A Phase I FFRA in April 2006 confirmed the historical refinery's presence. Phase II activities were schedule to begin July 2006 but funding limitations prevented its completion.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, the SWPCRP did not work at the Superior Refinery-Longton Site in 2013. A Phase II FFRA may be performed in 2014.

<b>Site Name:</b>	<b>Uncle Sam Oil Refinery (Former)—Cherryvale</b>
<b>Location:</b>	Cherryvale, Montgomery County
<b>Contamination:</b>	Heavy metals, total petroleum hydrocarbons, polynuclear aromatic hydrocarbons
<b>KDHE District:</b>	Southeast, Chanute
<b>Status:</b>	Investigation

**Site Summary:** KDHE identified several refineries in 2005 through historical reviews and reconnaissance activities. A Phase I FFRA in April 2006 confirmed that the site was a former petroleum refining facility. Current use includes a pasture and two livestock ponds.

A site visit in October 2006 found remnant structures and waste materials potentially associated with the former refinery, such as sludge-like material below dry sediment in an apparent former sludge pit.

### *Verdigris Basin Update*

In September 2008 a Phase II FFRA collected samples of soil, sediment, surface water, and waste and found heavy metal and TPH contamination in areas associated with former refinery operations, including the sludge pit, AST, facility structures and railroad spurs. Dissolved concentrations of PAHs were above RSK in groundwater.

**December 2013 Update:** The 2009 Phase II FFRA report recommended an additional investigation to delineate the contamination. Due to its priority ranking and limited resources/funds, the SWPCRP did not investigate in 2013. The site may be investigated and remediated in 2014 if sufficient funding becomes available.



**STATE WATER PLAN  
CONTAMINATION REMEDIATION PROGRAM  
WALNUT RIVER DRAINAGE BASIN**

**Site Name:** El Dorado Salvation Army BTA  
**Location:** El Dorado, Butler County  
**Contamination:** Tetrachloroethylene  
**KDHE District:** South Central, Wichita  
**Status:** Potentially responsible party search

**Site Summary:** In May 2008 the KDHE Brownfields Program approved a BTA application for the Salvation Army property in El Dorado, Kansas.

A Phase I in July 2008 found RECs including a historic filling station at the site and multiple facilities nearby. A Phase II BTA in November 2008 and a Phase III BTA in February 2009 identified low levels of PCE and petroleum-related VOCs below RSK. In July 2009 the site was transferred to KDHE's Site Assessment Unit.

In August 2009 a Site Evaluation identified PCE above RSK in one sample located north of the site and below RSK in the other samples surrounding the site.

In September and December 2010 a Preliminary Assessment identified PCE above RSK directly east of the site and south and further east of the site. A coin-operated laundry facility located directly south of the Salvation Army property may have been the PCE source area.

In November and December 2012 a Site Inspection detected PCE above RSK, with the highest detection in groundwater located directly east of the Super Sudz Laundromat. The investigation detected PCE above the RSK soil-to-groundwater value in subsurface soil samples collected from the alley west of the Super Sudz Laundromat and in the alley north of 1st Street. The Site Inspection concluded that there had been two releases of PCE near the site. The first release was in the alley west of the Super Sudz Laundromat, attributable to historical dry cleaning operations on the property. A responsible party was recommended to join KDHE's Dry Cleaner Facility Release Trust Fund. The second release occurred north of 1st Street in the alley near the former Bill's Engine Service.

**December 2013 Update:** A PRP search conducted in 2013 did not identify any successors for Bill's Engine Service. SWPCRP recommended transferring the Super Sudz Laundromat to the Dry Cleaner Facility Release Trust Fund, the creation of the former Bill's Engine Service as a separate site under the direction of SWPCRP, and the resolution of the El Dorado Salvation Army BTA site since it was not a source of contamination. SWPCRP is currently waiting on a decision from the Dry Cleaner Facility Release Trust Fund.

*Walnut Basin Update*

**Site Name:** Former Empire Fuel and Gas Company  
**Location:** El Dorado, Butler County  
**Contamination:** Potential refinery waste  
**KDHE District:** South Central, Wichita  
**Status:** Investigation

**Site Summary:** KDHE identified several refineries in 2005 through historical reviews and reconnaissance activities. In 2010 through historical research, KDHE positively identified the location of the former Empire Fuel and Gas Company facility.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, work was not conducted in 2013. A Phase I FFRA may be conducted in 2014.

**Site Name:** Lakeside Refining Company  
**Location:** Augusta, Butler County  
**Potential Contamination:** Potential refinery waste  
**KDHE District:** South Central, Wichita  
**Status:** Investigation

**Site Summary:** KDHE identified several refineries in 2005 through historical reviews and reconnaissance activities. A Phase I FFRA Report in May 2006 confirmed the historical presence of the Lakeside Refining Company oil refinery.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, work was not conducted in 2013. A Phase I FFRA may be conducted in 2014.

**Site Name:** Railroad Men's Refinery (Former)  
**Location:** El Dorado, Butler County  
**Potential Contamination:** Total petroleum hydrocarbons-diesel range organics  
**KDHE District:** South Central, Wichita  
**Status:** Monitoring

**Site Summary:** KDHE identified several refineries in 2005 through historical reviews and reconnaissance activities. The Railroad Men's Refining Company was organized in 1917 and began operations in 1918. Ownership and operation of the refinery was transferred to the Tri-State Oil and Refining Corporation in July 1919. The refinery was closed by 1923.

A Phase I FFRA 2007 did not identify any distressed areas, refinery waste, or structures associated with refinery operations. A Phase II FFRA 2009 could not identify any apparent impact attributable to the former refinery in soil, surface water, or sediment in the West Branch of the Walnut River. TPH-DRO exceeded RSK in one groundwater sample and was below RSK in a private domestic well.

## Walnut Basin Update

A Supplemental Sampling Event in 2010 collected 10 groundwater samples and resampled the domestic well; DRO was not detected in any sample. These results were confirmed with LTM sampling in 2011, 2012, and 2013.

**December 2013 Update:** The SWPCRP sampled the domestic well in November 2013 for VOCs and TPH-DRO. Analytical results indicate no detectable VOC or TPH-DRO contamination. The site will be evaluated for resolution in 2014.

**Site Name:** Reliance Refining Company (Former)  
**Location:** El Dorado, Butler County  
**Potential Contamination:** Heavy metals, total petroleum hydrocarbons, polynuclear aromatic hydrocarbons  
**KDHE District:** South Central, Wichita  
**Status:** Investigation

**Site Summary:** KDHE identified several refineries in 2005 through historical reviews and reconnaissance activities. The Reliance Refining Company was built on the Piper farm northeast of El Dorado and was in operation from 1917 until about 1935. The site currently consists of approximately 23 residential parcels.

A Phase I FFRA in June 2007 and a Phase II FFRA site investigation in July 2009 detected TPH-GRO, TPH-DRO, PAHs, and metals in groundwater above RSK. Groundwater samples collected in November 2010 indicate that groundwater contamination may be migrating from an upgradient source.

**December 2013 Update:** Due to limited resources and funding, the SWPCRP did not work at the Reliance Refining Company Site in 2013.

**Site Name:** Walnut River Refining Company  
**Location:** Augusta, Butler County  
**Potential Contamination:** Potential refinery waste  
**KDHE District:** South Central, Wichita  
**Status:** Investigation

**Site Summary:** KDHE identified several refineries in 2005 through historical reviews and reconnaissance activities. A Phase I FFRA in May 2006 confirmed the historical presence of the Walnut River Refining Company.

**December 2013 Update:** Due to its priority ranking and limited resources/funds, work was not conducted in 2013. A Phase II FFRA may be conducted in 2014.



**LISTING OF STATE WATER PLAN CONTAMINATION REMEDIATION PROGRAM  
SITES**

**State Water Plan Contamination Remediation Program Sites Table:** The SWPCRP Site Table lists the 2013 sites in alphabetical order and provides the project status, the name of the project manager, the name of the river basin in which the site is located, and the page number of the site activities update.



<b>State Water Plan Contamination Remediation Program</b>				
<b>Sites Listed Alphabetically</b>				
<b>Site Name, City</b>	<b>Site Status</b>	<b>Project Manager</b>	<b>River Basin</b>	<b>Page</b>
2 <sup>nd</sup> & General Welch, Liberal	Monitoring	Wells, T.	Cimarron	31
2 <sup>nd</sup> & Leonard, Onaga	Monitoring	Wells, T.	Kansas-Republican	33
4 <sup>th</sup> & Commercial, Emporia	Monitoring and EUC	Wells, T.	Neosho	65
4 <sup>th</sup> Ave & Merchant St., Emporia	Monitoring and PRP Search	Wells, T.	Neosho	66
8 <sup>th</sup> & Country Estates (Former Nat'l Beef), Liberal	Remediation and Monitoring	Doubek, D.	Cimarron	32
Alamota Elevator, Alamota	Investigation	Haring, B.	Upper Arkansas	89
Arkansas City Refinery Site, Arkansas City	Investigation	Haring, B.	Lower Arkansas	41
Armourdale Refinery (Former), Kansas City	Investigation	Haring, B.	Kansas-Republican	33
Axtell PWS Well #2, Axtell	Monitoring	Haring, B.	Kansas-Republican	34
Bazine Groundwater Contamination, Bazine	Monitoring	Wells, T.	Upper Arkansas	89
Belle Plaine Groundwater Contamination, Belle Plaine	Monitoring	Haring, B.	Lower Arkansas	41
Bird-Feldt Farms, Hays	Monitoring	Haring, B.	Smoky Hills-Saline	75
Bruce Mining and Smelting Company, Cherokee	Investigation and Remediation	Wells, T.	Neosho	66
Canada Carbon Tetrachloride, Canada	Monitoring	Haring, B.	Neosho	67
Cherokee Mining and Smelting, Cherokee	Remediation	Wells, T.	Neosho	68
Cherokee Zinc Company, Weir	Investigation and Transferred	Wells, T.	Neosho	69
Clearwater PCE, Clearwater	Remediation and Monitoring	Wells, T.	Lower Arkansas	42
Clifton Carbon Tetrachloride, Clifton	Monitoring	Wells, T.	Kansas-Republican	34
Concreto Smelter, Gas	PRP Search	Wells, T.	Neosho	70
Coral Refinery, Kansas City	Monitoring	Haring, B.	Kansas-Republican	35
Country View Mobile Park BTA, Hays	Investigation	Wells, T.	Smoky Hills-Saline	75

<b>State Water Plan Contamination Remediation Program</b>				
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Crescent Oil Company, Independence	Remediation	Haring, B.	Verdigris	103
Dodge City Cooperative Exchange, Dodge City	Investigation	Wells, T.	Upper Arkansas	91
E&H Foam Distributors-Newton, Newton	Resolved	Wells, T.	Lower Arkansas	43
El Dorado Salvation Army BTA, El Dorado	PRP Search	Wells, T.	Walnut	107
Elm & SW 3 <sup>rd</sup> , Newton	Monitoring	Wells, T.	Lower Arkansas	43
Englehardt Grain Company	Investigation	Wells, T.	Solomon	83
FMGP – Wellington, Wellington	Investigation and Monitoring	Haring, B.	Lower Arkansas	44
Former Cusco Oil and Refining, Chase	Investigation	Haring, B.	Lower Arkansas	45
Former Empire Fuel and Gas Company, El Dorado	Investigation	Haring, B.	Walnut	108
Former Krueger Refining Co., Natoma	Investigation	Haring, B.	Solomon	84
Fossil & Wichita Ave., Russell	Monitoring	Wells, T.	Smoky Hills-Saline	76
Garden City VOCs, Garden City	Monitoring	Wells, T.	Upper Arkansas	92
Great Bend Former Refinery Site (Falcon Refinery), Great Bend	Monitoring	Haring, B.	Upper Arkansas	92
Holcomb Garden City Company Site, Holcomb	Monitoring	Wells, T.	Upper Arkansas	93
Hope PWS Well #10, Hope	Monitoring	Wells, T.	Smoky Hills-Saline	77
Hudson Carbon Tetrachloride, Hudson	Monitoring	Haring, B.	Lower Arkansas	46
Hutchinson Air Base Industrial Tract (HABIT), Hutchinson	Investigation and Monitoring	O’Halloran, M.	Lower Arkansas	47
Ingalls PWS, Ingalls	Monitoring	Wells, T.	Upper Arkansas	94
Kanopolis Abandoned Salt Pile, Kanopolis	Investigation	Wells, T.	Smoky Hills-Saline	78
Kanopolis PCE	Remediation and Monitoring	Doubek, D.	Smoky Hills-Saline	80
Kanotex Refinery (Former), Caney	Investigation	Haring, B.	Verdigris	103
Kent Loesch Property, Raymond	Investigation and Remediation	Haring, B.	Upper Arkansas	94
Kiowa PWS Well #2, Kiowa	Monitoring	Wells, T.	Lower Arkansas	48

<b>State Water Plan Contamination Remediation Program</b>				
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Konza Valley RWD #1, Manhattan	Remediation and Monitoring	Doubek, D.	Kansas-Republican	36
Lakeside Refining Company, Augusta	Investigation	Haring, B.	Walnut	108
Latimer Groundwater Contamination, Latimer	Monitoring	Haring, B.	Kansas-Republican	37
Lebanon Nitrate Site, Lebanon	Investigation	Haring, B.	Solomon	85
Lyons Chloride Contamination, Lyons	Remediation and Monitoring	Haring, B.	Lower Arkansas	49
Lyons VOC Contamination, Lyons	Remediation and Monitoring	Haring, B.	Lower Arkansas	50
MARCO (Mid America Refining Co.), Chanute	Monitoring and PRP Search	Wells, T.	Neosho	70
Mayberry Middle School, Wichita	Monitoring	Wells, T.	Lower Arkansas	51
McPherson PWS #7, McPherson	Monitoring	Wells, T.	Lower Arkansas	52
Mercier Carbon Tetrachloride, Mercier	Monitoring	Wells, T.	Kansas-Republican	38
Mid-Kansas Aerial, Inc., Larned	Monitoring	Haring, B.	Upper Arkansas	95
Ness City PWS, Ness City	Monitoring	Haring, B.	Upper Arkansas	96
Ness Crude Oil #2, Ness City	Remediation	Haring, B.	Upper Arkansas	97
Norton Carbon Tetrachloride, Norton	Monitoring	Haring, B.	Upper Republican	101
Oak Knoll, Wichita	Monitoring	Haring, B.	Lower Arkansas	53
Ottawa FMGP, Ottawa	Investigation	Haring, B.	Marais des Cygnes	61
Paola Refining Co.—(Former), Paola	Investigation	Haring, B.	Marais des Cygnes	61
Paris Corp (Fmr), Salina	Monitoring	Haring, B.	Smoky Hills-Saline	80
Park PWS #1, Park	Monitoring	Wells, T.	Smoky Hills-Saline	81
Pittsburg Short Method Smelter, Pittsburg	Investigation	Wells, T.	Neosho	72
Pollard Carbon Tet, Pollard	Investigation and PRP Search	Haring, B.	Lower Arkansas	54
Pratt Ag Aviation, Inc., Pratt	Investigation	Wells, T.	Lower Arkansas	54
Pratt Oil Reclamation, Pratt	Investigation and Remediation	Haring, B.	Lower Arkansas	55
Pratt PWS Well #2, Pratt	Investigation	Wells, T.	Lower Arkansas	56

<b>State Water Plan Contamination Remediation Program</b>				
<b>Sites Listed Alphabetically</b>				
<b>Site Name, City</b>	<b>Site Status</b>	<b>Project Manager</b>	<b>River Basin</b>	<b>Page</b>
Railroad Men's Refinery (Former), El Dorado	Monitoring	Haring, B.	Walnut	108
Reliance Refining Company (Former), El Dorado	Investigation	Haring, B.	Walnut	109
Richardson Property, Hutchinson	Investigation	Wells, T.	Lower Arkansas	57
Royal Acid, Hill City	Monitoring	Haring, B.	Solomon	85
Selden Carbon Tetrachloride, Selden	Monitoring and PRP Search	Wells, T.	Upper Republican	102
St. George VOC Site, St. George	Investigation	Wells, T.	Kansas-Republican	39
St. Louis Smelter Company, Pittsburg	Investigation	Wells, T.	Neosho	72
Stafford County Oil Reclaiming Company (Former), Stafford County	Monitoring	Wells, T.	Upper Arkansas	98
Stockton PWS #10, Stockton	Investigation	Wells, T.	Solomon	86
Superior Refinery, Longton	Investigation	Haring, B.	Verdigris	104
Uncle Sam Oil Refinery (Former)—Atchison, Atchison	Investigation	Haring, B.	Missouri	63
Uncle Sam Oil Refinery (Former)—Cherryvale, Cherryvale	Investigation	Haring, B.	Verdigris	104
Walnut River Refining Company, Augusta	Investigation	Haring, B.	Walnut	109
Warren Petroleum Plant, Galva	Investigation	Haring, B.	Lower Arkansas	58
Webster/Miller Refinery, Humboldt	Remediation	Wells, T.	Neosho	73
West South Street, Salina	Monitoring and Investigation	Haring, B.	Smoky Hills-Saline	82
Wilsey Groundwater Contamination, Wilsey	Monitoring	Wells, T.	Neosho	73
Yoder, Village of, Yoder	Investigation and Monitoring	O'Halloran, M.	Lower Arkansas	58