



## Location Restrictions Demonstration Report Bottom Ash Landfill

### Jeffrey Energy Center

Prepared for: Westar Energy  
Jeffrey Energy Center  
St. Marys, Kansas

Prepared by:  
APTIM Environmental & Infrastructure, Inc.

October 2018



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## 1.0 INTRODUCTION AND PURPOSE

The Disposal of Coal Combustion Residuals (CCR) from Electric Utilities Final Rule (CCR Rule) 40 CFR §257.64 requires owner/operators of existing CCR landfills to make demonstrations in the event a unit is located in certain areas. The purpose of this report is to demonstrate whether the Bottom Ash Landfill (Unit) at Westar Energy's (Westar) Jeffrey Energy Center (JEC) is located in any of those areas, and if so, to make certain demonstrations per the CCR Rule that will permit continued CCR disposal/management operations.

The Unit, which is an existing CCR Landfill, is located at the JEC near St. Marys, Kansas, as indicated in **Figure 1**.

APTIM Environmental & Infrastructure, Inc. (APTIM) has reviewed available historical reports as provided in **Section 3.0**, as well as undertaken a site visit in May 2018 to develop this report. This report provides the demonstrations necessary to document CCR Rule requirements outlined in 40 CFR §257.64 to determine if the Unit is located in an unstable area.

The applicable CCR Rule requirement is listed in the **Section 2.0** in italics followed by an explanation of the review and determinations completed by APTIM.



## **2.0 UNSTABLE AREAS (§257.64)**

*§257.64 (a) An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted.*

APTIM evaluated the location of the Unit for the presence of on-site or local unstable areas as defined in §257.53. Evaluations of the conditions listed in §257.64(b)(1) through (3) were evaluated and are discussed below. Based on this review, APTIM determined the Unit is not located within an unstable area as defined in §257.53. Consequently, no additional demonstration is necessary.

*257.64 (b) The owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable:*

### **2.1 Unstable Factors Considered: Differential Settling (§257.64(b)(1))**

*On-site or local soil conditions that may result in significant differential settling;*

APTIM has visited the Unit and evaluated site-specific reports detailing the conditions of the on-site and local soils for conditions that could result in significant differential settling. The Unit is located on less than approximately 10 feet of weathered shale overlying bedrock composed of alternating shale and limestone (Burns & McDonnell, 2009). Based on this information, a review of the available geologic data for the Unit, and a lack of significant overburden material above the bedrock, APTIM's professional opinion is that the Unit should not experience significant differential settlement and is not located within an area that should result in significant differential settlement. Pertinent documents and sections of documents reviewed are provided in **Appendix A.1**.

### **2.2 Unstable Factors Considered: Geologic/Geomorphologic Features (§257.64 (b)(2))**

*On-site or local geologic or geomorphologic features; and*

APTIM visited the Unit in May 2018 in addition to evaluating the most recent USGS Topographic Map; and reviewing site-specific reports characterizing the site geology (Burns & McDonnell, 2009) for the presence of on-site or local geologic and geomorphologic features such as karst terrain, steep slopes, and sinkholes. The Unit is underlain by less than approximately 10 feet of weathered shale, and alternating layers of shale and limestone bedrock ranging in thickness from approximately 10 to 40 feet each. The groundwater flow is predominantly towards the West, with the uppermost aquifer characteristics consisting of limestone approximately 20 to 33 ft in thickness (Burns & McDonnell, 2009, Haley & Aldrich, 2017). A review of the terrain at or near the Unit indicated no steep slopes, terrain features, or other local geologic or geomorphologic features that could feasibly result in an unstable condition. The visit and references indicated that while the Unit is underlain by limestone, there are no known near surface karst terrain or sinkholes in the area, nor is this area of Kansas known to have near-surface karst terrain or sinkholes. Based on a review of this information and the site visit, APTIM has concluded that there are no steep slopes, terrain features, or other local



geologic or geomorphologic features that could feasibly result in an unstable condition. Pertinent documents and sections of documents reviewed are provided in **Appendix A.2**.

### **2.3 Unstable Factors Considered: Human-made Features or Events (§257.64 (b)(3))**

*On-site or local human-made features or events (both surface and subsurface).*

APTIM visited the Unit in May 2018 as well as evaluated published data and site-specific reports for the presence of on-site or local human-made features or events (both surface and subsurface), including surface and subsurface mining, extensive oil and gas extractions, and sources of rapid groundwater drawdown that could feasibly impact the Unit. Documents and websites reviewed include:

- Kansas Geological Survey, Water Wells Interactive Map
- Kansas Geological Survey, Oil and Gas Wells and Fields Interactive Map
- Kansas Geological Survey, Industrial Minerals – Pottawatomie County
- Haley & Aldrich (2017), CCR Groundwater Monitoring Network Description for the Jeffrey Energy Center.

It is noted that there are no records of any surface or subsurface mining, oil and gas extractions and/or groundwater drawdowns near the Unit. Following a review of these documents, APTIM determined that there are no on-site or local human-made features or events (both surface and subsurface) that could feasibly result in an unstable condition at the Unit. Pertinent documents and sections of documents reviewed are provided in **Appendix A.3**, and indicate the location of the Unit in relation to the known on-site or local human-made features or events (both surface and subsurface).



### 3.0 REFERENCES

Burns & McDonnell Engineering Company, Inc. (2009), Final Phase II Hydrogeologic Investigation and Bottom Ash Pond Characterization, Permit No. 359 Update, Jeffrey Energy Center, Westar Energy, Inc., Pottawatomie, Kansas.

Haley & Aldrich (2017), CCR Groundwater Monitoring Network Description for the Jeffrey Energy Center.

U.S. Environmental Protection Agency (2015), Hazardous Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, Federal Register Volume 80, No. 74 40 CFR Parts 257 and 261, April 17, 2015.



**4.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION (§257.64(c))**

The undersigned registered professional engineer is familiar with the requirements of the CCR Rule and has visited and examined the Unit and/or has supervised examination of the Unit and development of this report by appropriately qualified personnel. I hereby certify based on a review of available information and observations, that this report meets the requirement of paragraph §257.64(a).

Name of Professional Engineer: Richard Southorn, P.E., P.G.

Company: APTIM

PE Registration State: Kansas

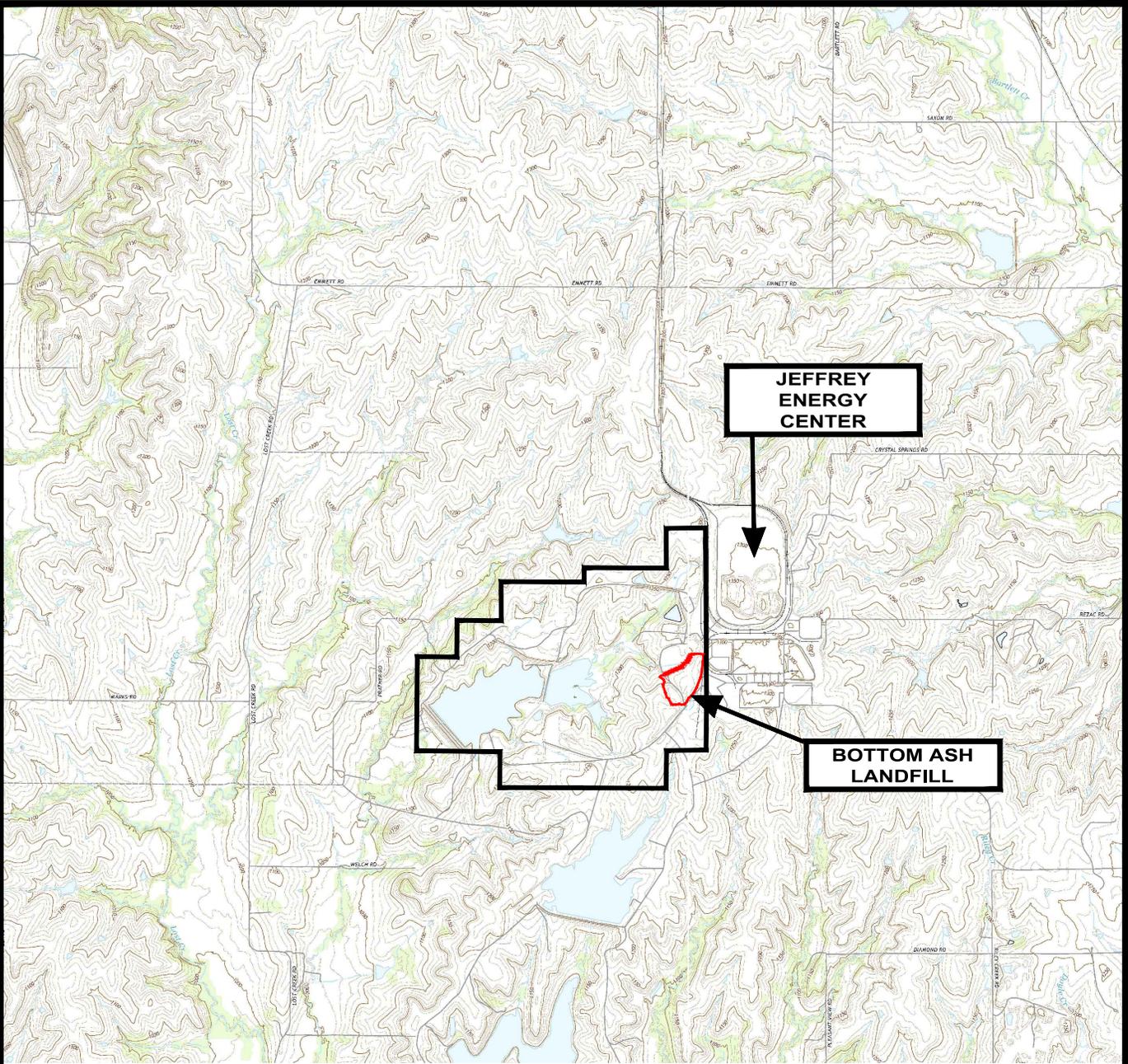
PE Registration Number: 25201

Professional Engineer Seal:



# FIGURES

Figure 1 – Site Location Map



**LEGEND**

-  APPROXIMATE CCR UNIT BOUNDARY
-  APPROXIMATE KDHE-BWM INDUSTRIAL LANDFILL PERMIT NO. 0359 BOUNDARY

**NOTES**

1. AERIAL TOPO OBTAINED FROM USGS 7.5-MINUTE SERIES, EMMETT AND LACLEDE QUADRANGLE, KANSAS, 2014.
2. ALL BOUNDARIES ARE APPROXIMATE.



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**WESTAR ENERGY**  
**25905 JEFFREY RD., ST. MARYS, KS**

**FIGURE 1**  
**SITE LOCATION MAP**

APPROVED BY: RDS PROJ. NO.: 631236340 DATE: SEPT. 2018

# APPENDIX A

## Unstable Areas

# APPENDIX A.1

## Differential Settling

Range 12E are occurring based on an understanding, with KDHE and Westar Energy, that these areas will be legally defined and included in the permit update requested under the Special Conditions issued under Permit No. 359 on April 2, 2004. The permitted boundary depicted on Figure 1 is the approximate proposed boundary for the ongoing permit update. The permitted boundary is shown in relation to the JEC Power Plant on Figure 1.

## **1.5 SOILS, TOPOGRAPHY, AND SURFACE DRAINAGE**

The JEC is covered with mostly silty clay loam, which has low to high plasticity (NRCS Soil Survey, 1987). The topsoil at the Permitted Landfill Site consists of terrace alluvium, glaciolacustrine deposits, and the Sandborn formation. The thickness varies over the JEC based on location in regards to hilltops and fill operations. The approximate thickness of topsoil is one to 16 feet below ground surface (bgs).

The natural highest soil elevation within the permitted landfill boundary, located along the northeast portion of the boundary, is approximately 1300 feet above msl. The lowest natural elevation within the permitted landfill boundary, located along the southwest portion of the boundary, is approximately 1100 feet above msl (See Figure 1).

Several small streams have their headwaters on the slopes surrounding the JEC property. Those to the north and east are tributaries of Bartlett and Cross Creeks, while those to the south merge to form Deep Creek, and streams to the west join either Lost Creek or Vermillion Creek. The tributaries within the permitted landfill boundary join with Lost Creek. At lower elevations around the streams, the grades are uniform with generally well developed alluvial flood plains and meanders. The upper elevations of the streams are generally youthful with small benches across limestone and deep V-shaped valleys incised into the shales and glacial deposits.

## **1.6 CLIMATE**

The coldest month occurs in January where the average daily temperature is 32.2 degrees Fahrenheit (°F) and the warmest month occurs in July where the average daily temperature is 77.6 °F. Based on the precipitation record in Wamego, Kansas, for the years of 1951-1976, two years in ten will experience annual precipitation less than 16.45 inches. The average total annual precipitation is 33 inches, and of this, approximately 23.8 inches, or about 72 percent, of the annual precipitation falls during the period April through September. The average annual snowfall is 21.5 inches. The heaviest 24-hour rainfall event was 6.93 inches at Wamego on

# APPENDIX A.2

## Geologic/Geomorphologic Features Documentation

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### **1.7.2 Site Geology**

Permian shale makes up approximately 70 percent of the stratigraphy below the JEC. The remainder of the stratigraphy consists of limestone beds and topsoil. In the area of the Permitted Landfill Site (shown in Figure 3) the following formations in the stratigraphic column (from youngest to oldest) were encountered during drilling: Blue Rapids shale, Crouse limestone, Easley Creek shale, Bader limestone, Stearns shale, Beattie limestone, Eskridge shale, Grenola limestone, Roca shale, Red Eagle limestone, Johnson shale, Foraker limestone, and the Janesville shale.

The shale formations are generally known to be medium to moderately hard, thin to very thin bedded, calcareous, widely jointed shale (Scott, Glenn R., 1959 and Shannon and Wilson, 1974). The limestone formations are generally known to be divided into alternating limestone and shale members. The limestone members can generally be described as hard, slightly weathered, sometimes exhibiting vugs and fracturing. The limestone formations become more massive with increasing depth and age. The limestone members are fairly individual in weathering pattern, with some members exhibiting blocky features while others have cavernous or cellular characteristics (Shannon and Wilson, 1974).

### **1.7.3 Regional Hydrogeology**

Regionally, the groundwater occurs in the bedrock strata, but the shale units are so impermeable that there is little or no movement of groundwater. Some of the limestone units transmit small quantities of water that discharge in many small springs in the valleys of the intermittent creeks. The numerous small springs in the stream valleys discharge from 0.1 gallons per minute (gpm) to 10 gpm (Shannon and Wilson, 1974). Local recharge to the limestone aquifers is likely to come from snow drifts or other local concentrations of infiltrations. The low permeability of the limestone and shales in the region makes it difficult to identify a horizontally continuous saturated unit. Regionally, groundwater is supplied through alluvial and glacial outwash materials underlying the plains of the main valley floors of Vermillion Creek (five miles west of the JEC) and the Kansas River, located seven miles south of the JEC (Shannon and Wilson, 1974). Eleven domestic wells are within a three mile radius of the permitted landfill site and listed with the Kansas Geological Survey (KGS). All eleven wells are located upgradient from the permitted landfill site, within Sections 19 and 30, Township 9 South, Range 10 East. The wells range in estimated yield from 20 to 70 gpm and the depths range from 58 feet to 110 feet below ground surface (bgs). The majority of the wells are screened through alluvium and a few

# APPENDIX A.3

## Human-made Features or Events Documentation



## Forest City Coal Gas Area--Oil and Gas Production

Additional information on this field is available in the [Digital Petroleum Atlas](#)

### Discovery currently listed:

**Operator:**

**Lease:** , Well

**Location:** S-W:

**Discovery Date:** 01/01/1873

**Producing zone:** Forest City coal gas

**Counties:** Anderson, Atchison, Brown, Coffey, Doniphan, Douglas, Franklin, Jackson, Jefferson, Johnson, Leavenworth, Linn, Lyon, Miami, Morris, Nemaha, Osage, Pottawatomie, Shawnee, Wabaunsee, Wyandotte

[View Field Boundary](#)

**Leases and Wells:** [View Production by Lease for this Field](#) || [View Wells Assigned to this Field](#)

### Producing Formations

Name	Depth (ft.)	Thickness (ft.)	Oil Grav	Produces	Temperature
COAL	-	-	-	Gas	-

**Field Map** (opens in new window): [View Field Map](#)

**Production Bubble Map** (opens in new window, requires Java): [View Bubble Map](#)

### Production Charts

[View Flash chart](#)

[Java Chart](#)

Year	Oil			Gas		
	Production (bbls)	Wells	Cumulative Production (bbls)	Production (mcf)	Wells	Cumulative (mcf)
1998	-	-	0	-	2	3,749
1999	-	-	0	2,344	2	6,093
2000	-	-	0	84,782	22	90,875
2001	-	-	0	95,402	24	186,277
2002	-	-	0	121,446	28	307,723
2003	-	-	0	158,593	47	466,316
2004	138	2	138	253,889	51	720,205
2005	251	6	389	273,126	68	993,331
2006	345	5	734	392,871	181	1,386,202
2007	2,242	10	2,976	417,663	237	1,803,865

2008	836	5	3,812	497,569	329	2,301,434
2009	424	12	4,236	353,341	282	2,654,775
2010	424	4	4,660	252,193	253	2,906,968
2011	286	4	4,946	161,384	232	3,068,352
2012	153	4	5,099	25,356	35	3,093,708
2013	184	6	5,283	1,047	1	3,094,755
2014	112	5	5,395	699	1	3,095,454
2015	254	3	5,649	762	1	3,096,216
2016	42	3	5,691	38,340	21	3,134,556
2017	-	-	5,691	131,786	33	3,266,342
2018	-	-	5,691	28,667	31	3,295,009

Updated through 4-2018.

Note: bbls is barrels; mcf is 1000 cubic feet.

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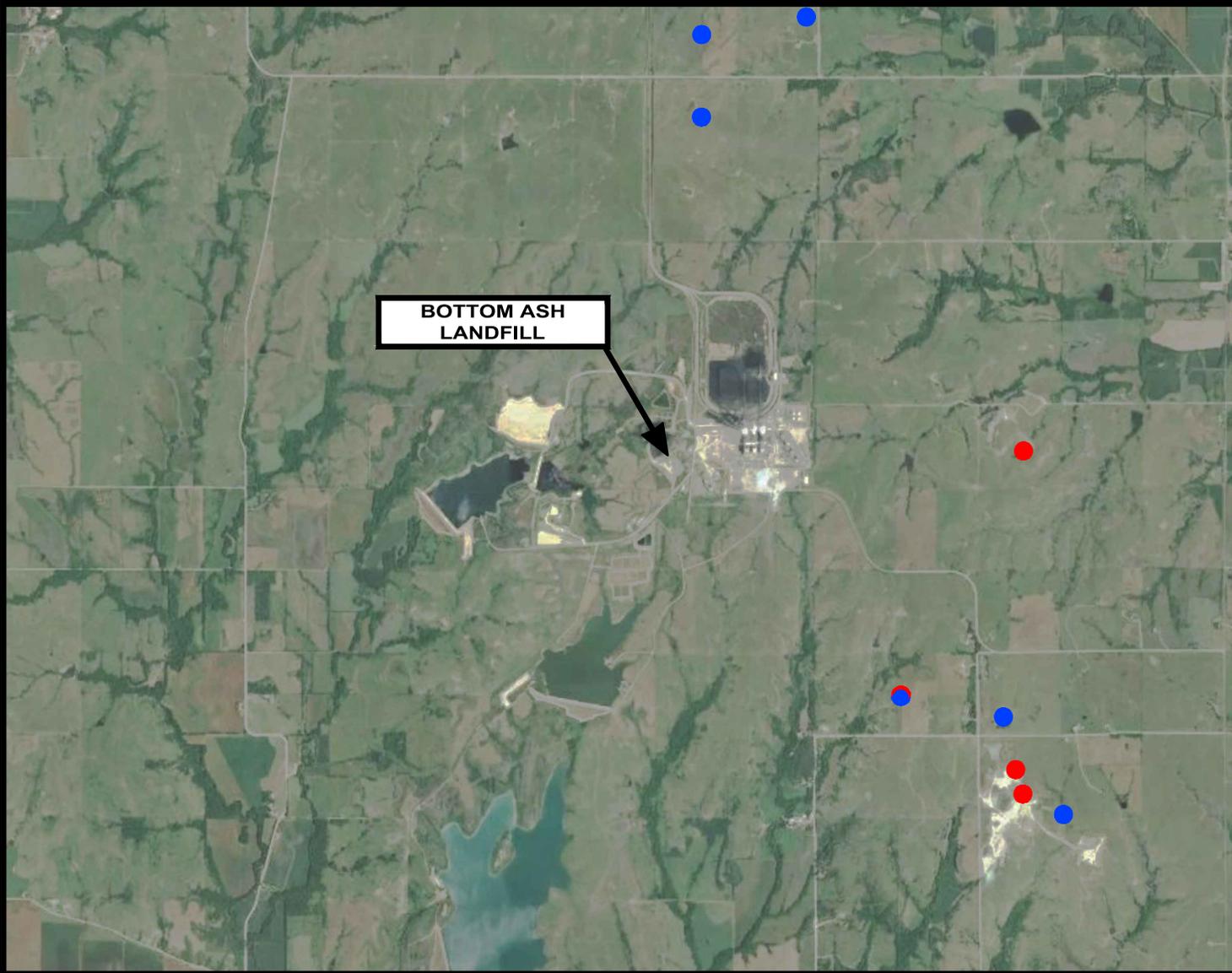
Kansas Geological Survey

Comments to [webadmin@kgs.ku.edu](mailto:webadmin@kgs.ku.edu)

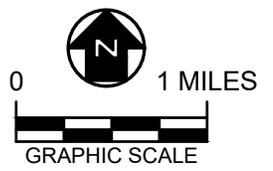
URL=<http://www.kgs.ku.edu/Magellan/Field/index.html>

Programs Updated Aug. 28, 2014.

Data from Kansas Dept. of Revenue files monthly.



**BOTTOM ASH  
LANDFILL**



**LEGEND**

- ACTIVE
- ABANDONED

**NOTES**

1. AERIAL PHOTO FROM GOOGLE EARTH, AUGUST 2014.
2. QUARRY LOCATIONS ARE APPROXIMATE.
3. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.



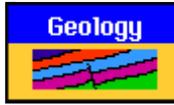
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25905 JEFFREY RD., ST. MARYS, KS**

**QUARRIES NEAR BOTTOM ASH LANDFILL**

<b>DRAWN BY:</b>	<b>ORC</b>	<b>APPROVED BY:</b>	<b>RDS</b>	<b>PROJ. NO.:</b>	<b>631236340</b>	<b>DATE:</b>	<b>SEPTEMBER 2018</b>
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## Industrial Minerals--Pottawatomie County; Active Quarries

18 records returned. You may also choose to [save this data to a file.](#)

Active Quarries Shown || [Show Abandoned Quarries](#) || [Show Abandoned and Active Quarries](#)

### Building Limestone

Company	Type	Location
<b>Bayer Stone Inc</b> 120 N 6th Street St Marys, Ks 66536-1509 785-437-2781	Surface Active	T9S, R12E, Sec. 26, N2SE Long: -96.03993, Lat: 39.23648

### Limestone

Company	Type	Location
<b>Bayer Construction Company, Inc.</b> 120 Deep Creek Road P.O.Box 889 Manhattan, Kansas 66502 785-776-8839	Surface Active	T9S, R9E, Sec. 18, SW Long: -96.45882, Lat: 39.26541
<b>Bayer Stone, Inc.</b> 120 N. 6th St. Marys, Kansas 66536 913-437-2781	Surface Active	T7S, R12E, Sec. 22, Long: -96.06284, Lat: 39.42738
<b>N.R. Hamm Quarries, Inc.</b> P. O. Box 17 One Perry Plaza Perry, KS 66073-0017 785-597-5111	Surface Active	T7S, R7E, Sec. 11, SE SW SW Long: -96.62188, Lat: 39.45105
	Surface Active	T7S, R7E, Sec. 11, SW NW SW Long: -96.62427, Lat: 39.45467
	Surface Active	T7S, R10E, Sec. 3, SE Long: -96.28137, Lat: 39.46783
	Surface Active	T7S, R10E, Sec. 10, NE Long: -96.28131, Lat: 39.46049
	Surface Active	T9S, R12E, Sec. 9, NW Long: -96.08667, Lat: 39.28567
	Surface Active	T9S, R12E, Sec. 9, NW Long: -96.08667, Lat: 39.28567
	Surface Active	T9S, R12E, Sec. 17, S2 Long: -96.10076, Lat: 39.26383

	Surface Active	T9S, R12E, Sec. 21, NW Long: -96.0867, Lat: 39.25661
	Surface Active	T9S, R12E, Sec. 21, SWN2 Long: -96.0867, Lat: 39.25479

## Sand & Gravel

Company	Type	Location
<b>Roberts And Hale</b> Westmoreland, Kansas 66549 913-457-3365	Surface Active	TS, R, Sec. , Long: , Lat:
<b>Wamego Sand Company, Inc.</b> P. O. Box 119 Wamego, Kansas 66547 785-456-9888	Pit or Lake Dredge Active	T10S, R10E, Sec. 10, SW SE NW Long: -96.28984, Lat: 39.19683
	Active	T10S, R12E, Sec. 7, SW Long: -96.12404, Lat: 39.19151
<b>Bayer Construction Company, Inc.</b> 120 Deep Creek Road P.O. Box 889 Manhattan, KS 66502 785-776-8839	Active	T7S, R9E, Sec. 19, Long: -96.45411, Lat: 39.42849
<b>Ebert Construction Co.</b> P.O. Box 198 Wamego, KS 66547 785-456-2455	Surface Active	T10S, R9E, Sec. 8, NW Long: -96.44003, Lat: 39.1995
<b>Marten, Kenneth</b> Rt. #2 Onaga, Kansas 66521 913-889-4854	Pit or Lake Dredge Active	TS, R, Sec. , Long: , Lat:

Kansas Geological Survey

Comments or questions to [webadmin@kgs.ku.edu](mailto:webadmin@kgs.ku.edu)

URL=<http://www.kgs.ku.edu/Magellan/Minerals/index.html>

Display Programs Updated Aug. 12, 2003

Data added periodically.



## Industrial Minerals--Pottawatomie County; Abandoned Quarries

89 records returned. You may also choose to [save this data to a file.](#)

[Show Active Quarries](#) || **Abandoned Quarries Shown** || [Show Abandoned and Active Quarries](#)

### Coal

Company	Type	Location
<b>Name Unknown</b>	Abandoned	T9S, R9E, Sec. 4, SE Long: -96.41219, Lat: 39.29369

### Limestone

Company	Type	Location
<b>George Oxandale</b>	Abandoned	T6S, R12E, Sec. 34, SW Long: -96.0679, Lat: 39.48181
	Abandoned	T7S, R11E, Sec. 14, NW Long: -96.1603, Lat: 39.44625
	Abandoned	T8S, R12E, Sec. 22, SE Long: -96.05782, Lat: 39.33632
<b>Hallett Construction</b>	Abandoned	T7S, R7E, Sec. 10, SE SE SE Long: -96.6261, Lat: 39.45096
	Abandoned	T7S, R7E, Sec. 29, NE Long: -96.66727, Lat: 39.419035
<b>Anderson Oxandale</b>	Abandoned	T6S, R10E, Sec. 7, Long: -96.34173, Lat: 39.544
	Abandoned	T8S, R9E, Sec. 10, SE Long: -96.39361, Lat: 39.36624
<b>(Roy Lasswell)</b>	Abandoned	T7S, R12E, Sec. 27, SW Long: -96.06734, Lat: 39.40903

<b>Bayer Construction Company, Inc.</b> 120 Deep Creek Road P.O. Box 889 Manhattan, KS 66502	Abandoned	T8S, R7E, Sec. 4, SW NE SW Long: -96.65524, Lat: 39.38125
	Abandoned	T9S, R8E, Sec. 18, Long: -96.57277, Lat: 39.26941
<del>785-776-8839</del> <b>(E.A.Johnson)</b>	Abandoned	T8S, R12E, Sec. 30, SW Long: -96.12314, Lat: 39.32185
<b>(Jennie Nightwine)</b>	Abandoned	T8S, R12E, Sec. 31, NW Long: -96.12322, Lat: 39.31461
<b>Ebert Construction Co.</b> P. O. Box 198 Wamego, Kansas 66547 785-456-2455	Surface Abandoned	T10S, R9E, Sec. 12, S2SW, W2SE Long: -96.35869, Lat: 39.1918
	Surface Abandoned	T10S, R9E, Sec. 13, NW NE Long: -96.35849, Lat: 39.18637
	Surface Abandoned	T10S, R10E, Sec. 7, SE SE SW Long: -96.34361, Lat: 39.18912
	Surface Abandoned	T10S, R10E, Sec. 18, NE NW Long: -96.34479, Lat: 39.18639
<b>Bayer Stone, Inc.</b> 120 N. 6th St. Marys, Kansas 66536 785-437-2781	Abandoned	T6S, R10E, Sec. 12, SW Long: -96.25331, Lat: 39.54043
	Surface Abandoned	T7S, R12E, Sec. 15, SE SE SW Long: -96.06399, Lat: 39.43552
	Abandoned	T7S, R12E, Sec. 22, Long: -96.06284, Lat: 39.42738
<b>Name Unknown</b>	Abandoned	T6S, R7E, Sec. 26, NESW Long: -96.61819, Lat: 39.49883
	Abandoned	T6S, R10E, Sec. 16, SE Long: -96.29991, Lat: 39.52582
	Abandoned	T6S, R10E, Sec. 22, SW Long: -96.29059, Lat: 39.51132
	Abandoned	T6S, R10E, Sec. 27, NE Long: -96.28138, Lat: 39.5041
	Abandoned	T6S, R10E, Sec. 36, SESE Long: -96.24161, Lat: 39.48071
	Abandoned	T6S, R11E, Sec. 34, NESE Long: -96.16727, Lat: 39.48426
	Abandoned	T7S, R7E, Sec. 13, SW Long: -96.60204, Lat: 39.43922
	Abandoned	T7S, R7E, Sec. 26, NE Long: -96.61137, Lat: 39.41749

	Abandoned	T7S, R9E, Sec. 32, SESE Long: -96.42846, Lat: 39.39386
	Abandoned	T7S, R10E, Sec. 19, NENW Long: -96.34426, Lat: 39.43317
	Abandoned	T7S, R11E, Sec. 3, NENW Long: -96.17661, Lat: 39.47697
	Abandoned	T8S, R9E, Sec. 27, SE Long: -96.39379, Lat: 39.32275
	Abandoned	T8S, R9E, Sec. 30, SE Long: -96.44965, Lat: 39.32321
	Abandoned	T8S, R10E, Sec. 27, NESW Long: -96.28903, Lat: 39.32438
	Abandoned	T8S, R12E, Sec. 19, NW Long: -96.12297, Lat: 39.34361
	Abandoned	T8S, R12E, Sec. 30, NESE Long: -96.11163, Lat: 39.32358
	Abandoned	T9S, R7E, Sec. 1, SE Long: -96.59309, Lat: 39.29461
	Abandoned	T9S, R7E, Sec. 14, NE Long: -96.61173, Lat: 39.27284
	Abandoned	T9S, R8E, Sec. 13, SW Long: -96.47766, Lat: 39.26563
	Abandoned	T9S, R9E, Sec. 19, SENE Long: -96.44714, Lat: 39.25621
	Abandoned	T9S, R9E, Sec. 20, NW Long: -96.44018, Lat: 39.25791
	Abandoned	T9S, R10E, Sec. 28, SE Long: -96.30052, Lat: 39.23528
	Abandoned	T9S, R12E, Sec. 3, SWSE Long: -96.06074, Lat: 39.29111
	Abandoned	T10S, R9E, Sec. 15, NW Long: -96.40277, Lat: 39.18466
<b>(Ed Miller )</b>	Abandoned	T7S, R12E, Sec. 21, NW Long: -96.08621, Lat: 39.43124
<b>N.R. Hamm Quarries, Inc.</b> P. O. Box 17 One Perry Plaza Perry, KS 66073-0017 785-597-5111	Surface	T6S, R10E, Sec. 34, SE
	Abandoned	Long: -96.28145, Lat: 39.48236
	Abandoned	T7S, R10E, Sec. 10, Long: -96.28597, Lat: 39.45692
	Surface	T9S, R12E, Sec. 16, SW SW
	Abandoned	Long: -96.08911, Lat: 39.26204

	Abandoned	T9S, R12E, Sec. 17, S2 Long: -96.10076, Lat: 39.26383
	Surface Abandoned	T9S, R12E, Sec. 21, Long: -96.08202, Lat: 39.25301
	Abandoned	T10S, R9E, Sec. 8, NW Long: -96.44003, Lat: 39.1995
<b>( A.D.Dodd)</b>		T6S, R12E, Sec. 18, SW Abandoned Long: -96.12338, Lat: 39.52588
<b>Concrete Materials</b>		T10S, R9E, Sec. 15, NW Abandoned Long: -96.40277, Lat: 39.18466
		T10S, R9E, Sec. 15, NE Abandoned Long: -96.39349, Lat: 39.18467
<b>Reno Construction Co.</b>	Abandoned	T7S, R8E, Sec. 28, NE Long: -96.52437, Lat: 39.41767
<b>(Mary A Snyder)</b>	Abandoned	T7S, R9E, Sec. 32, NW Long: -96.44019, Lat: 39.40304

## Sand & Gravel

Company	Type	Location
<b>George Oxandale</b>	Abandoned	T8S, R12E, Sec. 35, SE Long: -96.03929, Lat: 39.30736
<b>(Louis Smith)</b>	Abandoned	T6S, R12E, Sec. 9, NE Long: -96.07789, Lat: 39.54698
<b>Bayer Construction Company, Inc.</b> 120 Deep Creek Road P.O. Box 889 Manhattan, KS 66502 785-776-8839	Abandoned	T7S, R9E, Sec. 19, Long: -96.45411, Lat: 39.42849
<b>Geo. Machin</b>	Abandoned	T7S, R11E, Sec. 20, NW Long: -96.21637, Lat: 39.4316

<b>Anderson Oxandale</b>	Abandoned	T9S, R10E, Sec. 9, SW Long: -96.30956, Lat: 39.27868
<b>(W. Shields)</b>	Abandoned	T6S, R12E, Sec. 8, SE Long: -96.09654, Lat: 39.54005
<b>Wamego Sand Co.</b>	Abandoned	T10S, R10E, Sec. 9, NE Long: -96.30008, Lat: 39.19942
	Abandoned	T10S, R10E, Sec. 10, NESW Long: -96.28873, Lat: 39.19393
	Abandoned	T10S, R10E, Sec. 15, NE Long: -96.28204, Lat: 39.18467
	Abandoned	T10S, R12E, Sec. 7, SW Long: -96.12404, Lat: 39.19151
<b>Name Unknown</b>	Abandoned	T6S, R8E, Sec. 8, SE Long: -96.54295, Lat: 39.54084
	Abandoned	T6S, R12E, Sec. 3, NE Long: -96.05894, Lat: 39.56215
	Abandoned	T6S, R12E, Sec. 10, Long: -96.06366, Lat: 39.54324
	Abandoned	T6S, R12E, Sec. 15, NW Long: -96.06831, Lat: 39.53244
	Abandoned	T6S, R12E, Sec. 18, SW Long: -96.12338, Lat: 39.52588
	Abandoned	T7S, R6E, Sec. 25, NW Long: -96.7132, Lat: 39.41774
	Abandoned	T7S, R7E, Sec. 8, NW Long: -96.67685, Lat: 39.46078
	Abandoned	T7S, R8E, Sec. 1, SW Long: -96.47749, Lat: 39.46832
	Abandoned	

		T7S, R8E, Sec. 9, W2 Long: -96.53381, Lat: 39.45763
		T7S, R9E, Sec. 27, NE Abandoned Long: -96.39326, Lat: 39.41766
		T7S, R9E, Sec. 27, SW Abandoned Long: -96.40259, Lat: 39.41029
		T7S, R9E, Sec. 28, SE Abandoned Long: -96.41195, Lat: 39.41028
		T8S, R9E, Sec. 1, SE Abandoned Long: -96.35606, Lat: 39.38057
		T8S, R9E, Sec. 11, NE Abandoned Long: -96.37476, Lat: 39.37328
		T8S, R9E, Sec. 16, SW Abandoned Long: -96.42187, Lat: 39.35203
		T8S, R9E, Sec. 20, Abandoned Long: -96.43578, Lat: 39.34124
		T8S, R9E, Sec. 28, SW Abandoned Long: -96.42181, Lat: 39.32298
		T9S, R9E, Sec. 19, NW Abandoned Long: -96.45882, Lat: 39.25816
		T10S, R9E, Sec. 3, SENE Abandoned Long: -96.39128, Lat: 39.212
		T10S, R10E, Sec. 5, NW Abandoned Long: -96.32889, Lat: 39.21369
<b>Ebert Construction Co.</b> P.O. Box 198 Wamego, KS 66547 785-456-2455	Abandoned	T10S, R9E, Sec. 8, NW Long: -96.44003, Lat: 39.1995
<b>Pottawatomie County</b>	Abandoned	T6S, R12E, Sec. 15, SW Long: -96.06825, Lat: 39.52521
<b>(V.Budenbender)</b>	Abandoned	

	T6S, R8E, Sec. 8, NE Long: -96.54298, Lat: 39.54808
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Kansas Geological Survey

Comments or questions to [webadmin@kgs.ku.edu](mailto:webadmin@kgs.ku.edu)

URL=<http://www.kgs.ku.edu/Magellan/Minerals/index.html>

Display Programs Updated Aug. 12, 2003

Data added periodically.