Utility: Ameren

Plant: Meramec Energy Center

CCR Units: 9 ash ponds

Capacity: 2,437,000 cubic yards for 5 of the 9 ponds

Since 1953, Ameren has dumped coal ash into 9 ash ponds at Meramec; 4 are still in use. The ponds are unlined (except for one pond with a liner that does not meet modern standards and is considered unlined under EPA regulations), and sit in the floodplain at the confluence of the Meramec and Mississippi Rivers, putting coal ash in regular contact with groundwater. Ameren intends to close all 9 of the ash ponds in place, leaving the CCR to continue to contaminate groundwater and the Meramec and Mississippi Rivers.[1] One pond (Pond 489, aka Surface Impoundment MCPE) was closed in April of 2018.[2] Five of the ash ponds have a total capacity of 2,437, 000 cubic yards.[3] Capacity information on the other 4 ponds is not available. Groundwater data for Meramec shows significant exceedances of the state's groundwater standard for boron and the Federal drinking water standard for arsenic. **This document only addresses arsenic, boron and sulfate. Most plants including Meramec also have groundwater exceedances of other pollutants.**

Downgradient Groundwater Samples Exceeding State Groundwater (Boron) and Federal Drinking Water (Arsenic) Standards[4]		
	Boron[5]	*Arsenic*[6]
Standard	2,000 µg/l	10 µg/l
Total # Samples[7]	72	64
# Exceedances	63	15
Concentration Range of Exceedances	3,800-30,300 µg/l	10.5-21.9 µg/l

[1] CCR Surface Impoundment MCPA (Pond 492) CCR Unit Closure Plan, Meramec Energy Center, Burns & McDonnell Engineering Company, Inc., November 2016, p 2-1; CCR Surface Impoundment MCPB (Pond 493) CCR Unit Closure Plan, Meramec Energy Center, Burns & McDonnell Engineering Company, Inc., November 2016, p 2-1; CCR Surface Impoundment MCPC (Pond 496) CCR Unit Closure Plan, Meramec Energy Center, Burns & McDonnell Engineering Company, Inc., November 2016, p 2-1; CCR Surface Impoundment MCPD (Pond 498) CCR Unit Closure Plan, Meramec Energy Center, Burns & McDonnell Engineering Company, Inc., November 2016, p 2-1; CCR Surface Impoundment MCPE (Pond 489) CCR Unit Closure Plan, Meramec Energy Center, Burns & McDonnell Engineering Company, Inc., April 2018, p 2-1.

[2] Closure Certification, Burns & McDonnell, Inc., April 11, 2018.

[3] Closure plans for MCPA (Pond 492), MCPB (Pond493), MCPC (Pond 496), MCPD (Pond 498) and MCPE (Pond 489).

[4] 2017 Annual Groundwater Monitoring Report, Meramec Energy Center, Golder Associates, Inc, January 30, 2018, Tables 2 - 10.

[5] The Missouri groundwater standard for boron is 2,000 µg/l, 10 CSR 20-7.031 Table A1.

[6] The federal Maximum Contaminant Level (MCL) for arsenic under the Safe Drinking Water Act is 10 µg/l, 40 C.F.R. § 141.62(b). *See also* https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations.

[7] Samples are from downgradient wells at Meramec. Upgradient well data are not included.

Utility: Ameren

Plant: Rush Island Energy Center

CCR Units: 1 ash pond

Capacity: RCPA Ash Pond - 12,725,000 cubic yards

Ameren operates one unlined ash pond at the Rush Island Energy Center. Ameren has been dumping ash into this 114-acre unlined ash pond since 1976.[8] The ash pond sits in the Mississippi River floodplain with ash at least 50 feet below the water table.[9] Ameren intends to close the ash pond in place which will leave CCR in contact with and contaminating groundwater indefinitely.[10] Groundwater monitoring at Rush Island shows significant exceedances of the state's groundwater standard for boron and the Federal drinking water standard for arsenic. Monitoring reveals arsenic levels more than 25 times the federal drinking water standard and boron levels more than 7 times the state groundwater standard.[11]

Downgradient Groundwater Samples Exceeding State Groundwater (Boron) and Federal Drinking Water (Arsenic) Standards[12]		
	Boron	*Arsenic*
Standard	2,000 µg/l	10 µg/l
Total # Samples[13]	63	54
# Exceedances	40	28
Concentration Range of Exceedances	2,110-15,700 µg/l	10.3-257 µg/l

[8] Ameren Missouri, Structural Integrity Criteria & Hydrologic/ Hydraulic Capacity Assessment, Rush Island Energy Center (October 3, 2016), available at https://q9u5x5a2.ssl.hwcdn.net/-/Media/Corporate-Site/Files/environment/CCR-rule/ri-structural-integrity-assessment.pdf?la=en

[9] Ameren Missouri, Conceptual Study for Landfill on a Pond at Meramec and Rush Island Energy Centers (Feb. 2012)

[10] Closure Plan/Post-Closure Plan for CCR Surface Impoundment, Rush Island Energy Center, Haley & Aldrich, Inc., November 2016, p 2.

[11] 2017 Annual Groundwater Monitoring Report, RCPA Surface Impoundment, Rush Island Energy Center, Golder Associates, Inc., January 30, 2018, Tables 2 – 10.

[12] 2017 Annual Groundwater Monitoring Report, RCPA Surface Impoundment, Rush Island Energy Center, Golder Associates, Inc., January 30, 2018, Tables 2 – 10.

[13] Samples are from downgradient wells at Rush Island. Upgradient well data are not included.

Utility: Ameren

Plant: Labadie Energy Center

CCR Units: 2 ash ponds and 1 landfill

Capacity: LCPA (Bottom Ash) pond – 15,836,000 cubic yards[14]; LCPB (Fly Ash) Pond – 3,362,000 cubic yards[15], Landfill – 15,500,000 cubic yards.[16]

Labadie has two ash ponds and one utility waste landfill. One pond, the bottom ash pond, dates to 1970, is completely unlined, and is 165 acres.[17] The other pond, the fly ash pond, dates to 1993, is 77 acres, and is treated as unlined under EPA regulations because its liner does not meet modern standards.[18] Both ash ponds sit in the Missouri River floodplain, with coal ash in regular contact with groundwater. The utility waste landfill began operating in 2016. Ameren intends to close all three units with CCR in place.[19] Groundwater monitoring data for the two ash ponds show significant contamination around both ash ponds. Monitoring reveals boron concentrations more than 9 times the state groundwater standard and arsenic concentrations 3.5 times the federal drinking water standard.[20]

[14] Labadie Energy Center Closure Plan LCPA (Bottom Ash Pond) CCR Surface Impoundment, Gredell Engineering Resources, Inc., October 2016, Table 1.
[15] Labadie Energy Center Closure Plan LCPB (Fly Ash Pond) CCR Surface Impoundment, Gredell Engineering Resources, Inc., October 2016, Table 1.
[16] Construction Permit Application for a Proposed Utility Waste Landfill, Ameren Missouri Labadie Energy Center, Reitz & Jens, Inc. and Gredell Engineering Resources, Inc., revised November 2013, p 3-6. The landfill will have 4 cells. Currently, only Cell 1 has been constructed and is in operation.
[17] Labadie Energy Center Closure Plan LCPA (Bottom Ash Pond) CCR Surface Impoundment, Gredell Engineering Resources, Inc., October 2016.
[18] Labadie Energy Center Closure Plan LCPB (Fly Ash Pond) CCR Surface Impoundment, Gredell Engineering Resources, Inc., October 2016.
[19] Closure Plan, Bottom Ash Pond (LCPA) CCR Surface Impoundment, Labadie Energy Center, Gredell Engineering Resources, Inc., October 2016, p 2; Closure Plan, Bottom Ash Pond (LCPB) CCR Surface Impoundment, Labadie Energy Center, Gredell Engineering Resources, Inc., October 2016, p 2; and Closure Plan/Post-Closure Plan for CCR Landfill LCL1, Labadie Energy Center, Gredell Engineering Resources, Inc., October 2016, p 1.
[20] 2017 Annual Groundwater Monitoring Report, LCPA, Labadie Energy Center, Golder Associates, Inc., January 31, 2018, Tables 2-10; and 2017 Annual Groundwater Monitoring Report, LCPB, Labadie Energy Center, Golder Associates, Inc., January 31, 2018, Tables 2-10.

Ash Ponds Downgradient Groundwater Samples Exceeding State Groundwater (Boron) and Federal Drinking Water (Arsenic) Standards[21]		
	Boron	*Arsenic*
Standard	2,000 µg/l	10 µg/l
Total # Samples[22]	153	136
# Exceedances	101	65
Concentration Range of Exceedances	2,130-18,200 µg/l	10.6-35.6 µg/l

Sampling at the landfill shows two exceedances of the Federal drinking water standard for arsenic.[23] No exceedances for boron or sulfate were detected.

Landfill Downgradient Groundwater Samples Exceeding Federal Drinking Water (Arsenic) Standards[24]	
	Arsenic
Standard	10 µg/l
Total # Samples[25]	32
# Exceedances	2
Concentration Range of Exceedances	11.0-20.5 µg/l

[21] 2017 Annual Groundwater Monitoring Report, LCPA, Labadie Energy Center, Golder Associates, Inc., January 31, 2018, Tables 2-10; and 2017 Annual Groundwater Monitoring Report, LCPB, Labadie Energy Center, Golder Associates, Inc., January 31, 2018, Tables 2-10.
[22] Samples are from downgradient wells at Labadie. Upgradient well data are not included.
[23] 2017 Annual Groundwater Monitoring Report, LCL1 – Utility Waste Landfill Cell 1, Labadie Energy Center, Golder Associates, Inc., January 31, 2018, Tables 2 – 10.
[24] 2017 Annual Groundwater Monitoring Report, LCL1 – Utility Waste Landfill Cell 1, Labadie Energy Center, Golder Associates, Inc., January 31, 2018, Tables 2 – 10.
[25] Samples are from downgradient wells at Labadie. Upgradient well data are not included.

Utility: Ameren

Plant: Sioux Energy Center

CCR Units: 3 ash ponds, 1 utility waste landfill

Capacity: SCPA Ash Pond – 3,338,000 cubic yards,[26] SCPB Ash Pond – 1,548,800 cubic yards,[27] SCPC Ash Pond – 2,800,000 cubic yards,[28] Landfill – 21,900,000 cubic yards.[29]

The Sioux Energy Center has two old ash ponds, an unlined 49-acre pond built in 1967 and a 62-acre pond built in 1994 with a liner that does not meet modern standards and is treated as unlined under EPA regulations.[30] The ponds sit in a wet environment in the floodplain east of the confluence of the Missouri and Mississippi Rivers. Ameren also operates a utility waste landfill at the Sioux Energy Center. Only the first cell of the landfill is currently in operation. The landfill will ultimately have 6 cells. Ameren intends to close the ponds and landfill with CCR in place.[31]

Groundwater monitoring revealed significant exceedances of the state groundwater standard for boron and the drinking water standard for sulfate.[32]

Downgradient Groundwater Samples Exceeding State Groundwater Standard for Boron and State Drinking Water Standard for Sulfate[33]		
	Boron	*Sulfate*
Standard	2,000 µg/l	250 mg/l
Total # Samples[34]	135	135
# Exceedances	77	79
Concentration Range of Exceedances	2,230-31,200 µg/l	260-1,100 mg/l

[26] SCPA CCR Impoundment – Closure Plan, Sioux Energy Center, Golder Associates, Inc., October 2016, p 2.
[27] SCPB CCR Impoundment – Closure Plan, Sioux Energy Center, Golder Associates, Inc., October 2016, p 2.
[28] SCPC CCR Impoundment, Initial Closure Plan for CCR Surface Impoundment SCPC, Sioux Energy Center, Ameren Missouri, p 3.
[29] Construction Permit Application for a Proposed Utility Waste Landfill, AmerenUE Sioux Power Plant, Gredell Engineering Resources, Inc., September 2007, p 4-1.
[30] Ameren Missouri, Structural integrity criteria & Hydrologic/Hydraulic Capacity Assessment https://q9u5x5a2.ssl.hwcdn.net/-/Media/Corporate-Site/Files/environment/CCR-rule/sioux-structural-integrity-assessment.pdf?la=en. In addition, the Sioux plant includes a lined recycle pond (SCPC) built in 2010 as part of the plant's coal ash landfill.
[31] SCPA CCR Impoundment Closure Plan, Sioux Energy Center, Golder Associates, Inc., October 2016, p 2; SCPB CCR Impoundment Closure Plan, Sioux Energy Center, Golder Associates, Inc., October 2016, p 2; Initial Closure Plan for CCR Surface Impoundment SCPC, Sioux Energy Center, Reitz & Jens, Inc., October 2016, p 1; and Initial Closure Plan for CCR Surface Impoundment SCL4A, Reitz & Jens, Inc., October 2016, p 1.
[32] 2017 Annual Groundwater Monitoring Report, SCPA, Sioux Energy Center, Golder Associates, Inc., January 31, 2018, Tables 2 – 10.
[33] 2017 Annual Groundwater Monitoring Report, SCPB, Sioux Energy Center, Golder Associates, Inc., January 31, 2018, Tables 2 – 10.
[34] Samples are from downgradient wells at Sioux. Upgradient well data are not included.

Groundwater monitoring at the new landfill did not show any exceedances.[35]

Utility: Kansas City Power & Light

Plant: Iatan Generating Station

CCR Units: 2 ash impoundments and 1 landfill

CCR Capacity: Two ash ponds – 1,700,000 cubic yards,[36] Landfill – 12,600,000 cubic yards[37]

The Iatan Generating Station has two coal-fired units that produce fly ash, bottom ash, and gypsum. CCR not beneficially used is transported to the on-site landfill for disposal.[38] The two ash impoundments are North Ash Impoundment and South Ash Impoundment. Both impoundments are unlined.[39] The South Ash impoundment received decant water from North impoundment for recycling.[40] The two impoundments are often referred to as one impoundment.

Approximately 1.7 million cubic yards of CCR were stored in the impoundment prior to commencing closure construction.[41] Impoundment closure design began in 2015 with closure construction starting in April of 2016.[42] CCR from the impoundments is deposited in the on-site landfill or used beneficially.[43] Closure will be completed second quarter 2021.[44] Groundwater monitoring will be conducted to confirm that CCR removal and decontamination has been completed pursuant to §257.102(c) of the CCR Rule.[45]

The landfill currently contains approximately 2.1 million cubic yards of CCR.[46] The maximum capacity of CCR for the active life of the CCR landfill is approximately 12.6 million cubic yards.[47]

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[35] 2017 Annual Groundwater Monitoring Report, SCL4A, Sioux Energy Center, Golder Associates, Inc., January 31, 2018, Tables 2 – 10.
[36] CCR Closure Plan, Ash Impoundment, Iatan Generating Station, Kansas City Power & Light Company, Burns & McDonnell, Inc., April 13, 2018, p 3-1.
[37] CCR Closure Plan, Iatan CCR Landfill, Iatan Generating Station, Kansas City Power & Light Company, October 14, 2016, p 6.
[38] CCR Closure Plan, Iatan CCR Landfill, Iatan Generating Station, Kansas City Power & Light Company, October 14, 2016, p 1.
[39] Notification of Intent to Initiate Closure of Inactive CCR Surface Impoundments, Kansas City Power & Light Company, Iatan Generating Station, Burns & McDonnell, Inc., December 17, 2015.
[40] CCR Closure Plan, Ash Impoundment, p 3-1.
[41] CCR Closure Plan, Ash Impoundment, Iatan Generating Station, Kansas City Power & Light Company, Burns & McDonnell, Inc., April 13, 2018, p 3-1.
[42] CCR Closure Plan, Ash Impoundment, p 3-1.
[43] CCR Closure Plan, Ash Impoundment, p 3-1.
[44] CCR Closure Plan, Ash Impoundment, p 3-1.
[45] CCR Closure Plan, Ash Impoundment, p 4-1.
[46] 2017 Annual Inspection of CCR Landfill, Iatan Generating Station, Kansas City Power & Light Company, January 9, 2018.
[47] CCR Closure Plan, Iatan CCR Lanfill, Iatan Generating Station, Kansas City Power & Light Company, October 14, 2016, p 6.

7 groundwater monitoring wells located around the perimeter of the CCR landfill. No monitors around the CCR impoundments at this time though closure plan states that monitoring will occur.

Nine (9) sampling events showed no boron or sulfate exceedances.[48] Arsenic exceedances occur at all downgradient wells.[49] The highest arsenic exceedance was 52.4 ppb.[50]

Landfill Downgradient Groundwater Samples Exceeding Federal Drinking Water (Arsenic) Standards[51]	
	Arsenic
Standard	10 µg/l
Total # Samples[52]	45
# Exceedances	32
Concentration Range of Exceedances	10.4-52.4 µg/l

[48] 2017 Groundwater Monitoring and Corrective Action Report, CCR Landfill Table 1.
[49] 2017 Groundwater Monitoring and Corrective Action Report, CCR Landfill, Table 1.
[50] 2017 Groundwater Monitoring and Corrective Action Report, CCR Landfill, Table 1.
[51] 2017 Groundwater Monitoring and Corrective Action Report, CCR Landfill, Table 1.
[52] Samples are from downgradient wells at Iatan. Upgradient well data are not included.

Utility: Kansas City Power & Light

Plant: Montrose Generating Station

CCR Units: 2 ash ponds and 1 landfill

Capacity: North Ash Pond – 18,400 cubic yards,[53] South Ash Pond – 14,530,[54] Landfill – 4,200,000 cubic yards[55]

The Montrose Generating Station has two impoundments (North and South and South 2) and one CCR landfill.[56] The North and South ash impoundments were commissioned in 1958, are incised into the existing ground and are unlined.[57] The South ash pond is approximately 2.7 acres and the North ash pond is approximately 1.7 acres.[58] Ash is sluiced to the two ash ponds. The ponds are dredged and the ash disposed in the landfill. Both ash ponds discharge to Montrose Lake which is managed as a Missouri Department of Conservation Wildlife Area.

The ash impoundments will be clean closed.[59]

All downgradient groundwater samples at the ash ponds showed exceedances of the state drinking water standard for sulfate (36 of 36 samples).[60] Groundwater monitoring showed seventeen (17) exceedances of the federal drinking water standard for arsenic.[61] The highest arsenic exceedance was 15.5 micrograms per liter. All arsenic exceedances were at two wells.[62]

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[53] CCR Closure Plan, North Ash Impoundment, Montrose Generating Station, Kansas City Power & Light Company, October 14, 2016, p 4.
[54] CCR Closure Plan, South Ash Impoundment, Montrose Generating Station, Kansas City Power & Light Company, October 14, 2016, p 4.
[55] CCR Closure Plan, Montrose CCR Landfill, Montrose Generating Station, Kansas City Power & Light Company, October 14, 2016, p 6.
[56] 2017 Annual Groundwater Monitoring and Corrective Action Report, North and South Ash Impoundments, Montrose Generating Station, Kansas City Power & Light Company, SCS Engineers, Inc., January 30, 2018, Figure 1.
[57] Coal Ash Impoundment Site Assessment Final Report, Montrose Generating Stations, KCP & L Greater Missouri Operations Company, Kleinfelder, December 2011, pp 2 and 13.
[58] Coal Ash Impoundment Site Assessment Final Report, pp 13-14.
[59] CCR Closure Plan, North Ash Impoundment, Montrose Generating Station, Kansas City Power & Light Company, October 14, 2016, p 4 and CCR Closure Plan, South Ash Impoundment, Montrose Generating Station, Kansas City Power & Light Company, October 14, 2016, p 4.
[60] 2017 Annual Groundwater Monitoring and Corrective Action Report, North and South Ash Impoundments, Table 1.
[61] 2017 Annual Groundwater Monitoring and Corrective Action Report, North and South Ash Impoundments, Table 1.
[62] 2017 Annual Groundwater Monitoring and Corrective Action Report, North and South Ash Impoundments, Table 1.

Ash Pond Downgradient Groundwater Samples Exceeding Federal Drinking Water Standard for Arsenic and State Drinking Water Standard for Sulfate		
	Arsenic	*Sulfate*
Standard	10 µg/l	250 mg/l
Total # Samples[63]	36	36
# Exceedances	17	36
Concentration Range of Exceedances	11.5-15.5 µg/l	460-1,150 µg/l

Groundwater monitoring at the landfill shows exceedances of the state's groundwater standard for boron and the state's drinking water standard for sulfate.[64]

Landfill Downgradient Groundwater Samples Exceeding Federal Drinking Water Standard for Arsenic and State Drinking Water Standard for Sulfate		
	Boron	*Sulfate*
Standard	2,000 µg/l	250 mg/l
Total # Samples[65]	36	36
# Exceedances	30	36
Concentration Range of Exceedances	2,020-7,060 µg/l	1,190-2,760 µg/l

[63] Samples are from downgradient wells at Montrose. Upgradient well data are not included.
[64] 2017 Annual Groudnwater Monitoring and Corrective Action Report, CCR Landfill, Montrose Generating Station, SCS Engineers, Inc., January 30, 2018, Table 1.
[65] Samples are from downgradient wells at Montrose. Upgradient well data are not included.

Utility: Kansas City Power & Light

Plant: Sibley Generating Station

CCR Units: 2 ash ponds (fly ash and slag) and 1 utility waste landfill

Capacity: fly ash impoundment – 380,000 cubic yards, slag settling impoundment – 67,655 cubic yards, utility waste landfill – 2,300,000 cubic yards

The fly ash impoundment has a 2-foot clay liner.[66] Part of the impoundment was covered for an ash silo and for work pads.[67] The impoundment discharges to the Missouri River.[68] The estimated maximum capacity of CCR and impounded water for the active life of the impoundment is approximately 380,000 cubic yards.[69] Closure for the fly ash pond and the slag pond will be accomplished through removal of CCR. The CCR material will be removed, and either beneficially used or disposed in the on-site CCR landfill.[70]

Groundwater monitoring at the fly ash impoundment revealed exceedances of the state groundwater standard for boron.[71]

Fly Ash Impoundment Downgradient Groundwater Samples Exceeding State Groundwater Standards for Boron[72]	
	Boron
Standard	2,000 µg/l
Total # Samples[73]	36
# Exceedances	27
Concentration Range of Exceedances	2,690-5,250 µg/l

Groundwater monitoring at the slag settling impoundment revealed exceedances of the Federal drinking water standard for arsenic.[74]

[66] History of Construction, Fly Ash Impoundment, Sibley Generating Station, KCP&L Greater Missouri Operations Company, AECOM, October 6, 2016, p 3.
[67] History of Construction, Fly Ash Impoundment, p 6.
[68] History of Construction, Fly Ash Impoundment, p 6.
[69] CCR Closure Plan, Sibley Fly Ash Impoundment, Sibley Generating Station, KCP&L Greater Missouri Operations Company, October 14, 2016, p 4.
[70] CCR Closure Plan, Sibley Fly Ash Impoundment, p 4; CCR Closure Plan, Sibley Slag Settling Impoundment, Sibley Generating Station, KCP&L Greater Missouri Operations Company, October 14, 2016, p 4.
[71] 2017 Annual Groundwater Monitoring and Corrective Action Report, Fly Ash Impoundment, Sibley Generating Station, SCS Engineers, Inc., January 30, 2018, Table 1.
[72] 2017 Annual Groundwater Monitoring and Corrective Action Report, Fly Ash Impoundment, Sibley Generating Station, SCS Engineers, Inc., January 30, 2018, Table 1.
[73] Samples are from downgradient wells at Montrose. Upgradient well data are not included.

Slag Settling Impoundment Downgradient Groundwater Samples Exceeding Federal Drinking Water Standards for Arsenic[75]	
	Arsenic
Standard	10 µg/l
Total # Samples[76]	27
# Exceedances	11
Concentration Range of Exceedances	10.5-250 µg/l

Groundwater monitoring showed no exceedances of standards at the CCR landfill at the Sibley Generating Station.[77]

[74] 2017 Annual Groundwater Monitoring and Corrective Action Report, Slag Settling Impoundment, Sibley Generating Station, SCS Engineers, Inc., January 30, 2018, Table 1.
[75] 2017 Annual Groundwater Monitoring and Corrective Action Report, Slag Settling Impoundment, Sibley Generating Station, SCS Engineers, Inc., January 30, 2018, Table 1.
[76] Samples are from downgradient wells at Sibley. Upgradient well data are not included.
[77] 2017 Annual Groundwater Monitoring and Corrective Action Report, CCR Landfill, Sibley Generating Station, KCP&L Greater Missouri Operations Company, SCS Engineers, Inc., February 5, 2018, Table 1.

Utility: Springfield City Utilities

Plant: James River Power Station

CCR Units: East and West ash ponds and 1 utility waste landfill

Capacity: landfill – 1,867,000 cubic yards

When the James River Power Station burned coal, CCR were sluiced to two onsite temporary holding ponds, the East and West temporary holding ponds. CCR was temporarily stored in the ponds.[78] The ponds were then drained and the CCR excavated and placed within the on-site utility waste landfill.[79] Both ponds were closed in 2017 with CCR and liners removed.[80]

JRPS landfill had approximately 1,552,000 cubic yards of CCR within the landfill leaving the remaining volume of approximately 315,000 cubic yards available for CCR placement.[81] The liner in the original portion of the landfill (permit 707704) consists of native silty clay soils.[82] The western landfill expansion liner system consists of two feet of in-situ clay and a 60 mil HDPE liner.[83]

No groundwater monitoring data is available yet for the ash ponds.

Groundwater monitoring at the landfill indicated no exceedances of standards.[84] However, some elevated levels of boron (greater than 1,000 µg/l were detected.[85]

[78] JRPS Temporary Holding Ponds Clean Closure Verification, James River Power Station, City Utilities of Springfield, August 8, 2017, p 1.
[79] JRPS Temporary Holding Ponds Clean Closure Verification, James River Power Station, City Utilities of Springfield, August 8, 2017, p 1.
[80] JRPS Temporary Holding Ponds Clean Closure Verification, James River Power Station, City Utilities of Springfield, August 8, 2017, p 1.
[81] JRPS Landfill Inspection Report, City Utilities of Springfield, Missouri, January 11, 2018, p 4.
[82] Closure and Post Closure Plan, James River Power Station Utility Waste Landfill, p 1.
[83] Closure and Post Closure Plan, James River Power Station Utility Waste Landfill, p 1.
[84] Annual Groundwater Monitoring and Corrective Action Report, James River Power Station, City Utilities of Springfield, Jacobs Engineering, Inc., January 2018, Table 2.
[85] Annual Groundwater Monitoring and Corrective Action Report, James River Power Station, City Utilities of Springfield, Jacobs Engineering, Inc., January 2018, Table 2.

Utility: Springfield City Utilities

Plant: John Twitty Energy Center

CCR Units: Two ash storage ponds and 1 CCR landfill

Capacity: 3,131,600 cubic yards

The utility waste landfill is approximately 40 acres in size. The north phase is 12.5 acres and has received final cover (1990).[86] The permitted capacity of the CCR landfill is 3,131,600 cubic yards.[87]

Two bottom ash ponds are temporary storage ponds similar to JRPS ponds and received sluiced bottom ash from the plant.[88] Each pond is approximately 7-9 acres.[89] Both ponds have been clean closed with the CCR disposed in the on-site CCR landfill.[90]

No groundwater monitoring data is available for the ash ponds.

Groundwater monitoring at the landfill shows no boron exceedances but high boron levels at two wells but not above state groundwater standard for boron.[91] Sulfate exceedances were detected at several downgradient monitors.[92]

Landfill Downgradient Groundwater Samples Exceeding State Drinking Water Standards for Sulfate[93]	
	Sulfate
Standard	250 µg/l
Total # Samples[94]	56
# Exceedances	14
Concentration Range of Exceedances	260-590 µg/l

[86] Closure and Post Closure Care Plan, John Twitty Energy Center, p 1.
[87] Initial JTEC Landfill Inspection Report, City Utilities of Springfield, Missouri, January 14, 2016, p 4 and p 9.
[88] JTEC Temporary Holding Ponds Clean Closure Verification, John Twitty Energy Center, City Utilities of Springfield, Missouri, April 4, 2017, p 1.
[89] JTEC Temporary Holding Ponds Clean Closure Verification, p 1.
[90] JTEC Temporary Holding Ponds Clean Closure Verification, p 1.
[91] Annual Groundwater and Corrective Action Report, John Twitty Energy Center (JTEC), Table 2 and Table 3.
[92] Annual Groundwater and Corrective Action Report, John Twitty Energy Center (JTEC), Table 2 and Table 3.
[93] Annual Groundwater and Corrective Action Report, John Twitty Energy Center (JTEC), Table 2.
[94] Samples are from downgradient wells at John Twitty Energy Center. Upgradient well data are not included.

Utility: Sikeston Board of Municipal Utilities, City of Sikeston

Plant: Sikeston Power Station

CCR Units: 2 ash ponds: Fly Ash Pond and Scrubber Sludge/Bottom Ash Pond

Capacity: Fly Ash Pond – 890,000 cubic yards, Bottom Ash Pond - 1,534,000 cubic yards

The Sikeston Power Station has two ash ponds. Neither pond meets the federal liner requirements so both are considered unlined.[95] The clay liner of the fly ash pond does not meeting the hydraulic conductivity requirements of the federal CCR regulation.[96] The fly ash pond is inactive. Residential areas are located 350 feet from the fly ash pond.[97] The fly ash pond was constructed between 1978 and 1979. There is no groundwater monitoring data for the fly ash pond. The closure plan indicates that the fly ash pond will be closed with CCR in place.[98] Sikeston plans to close the fly ash pond in 2024.[99]

Residential areas are as close as 150 feet from the bottom ash pond.[100] Sikeston plans to close the bottom ash pond in place.[101]

Groundwater monitoring indicates two exceedances of the state drinking water standard for sulfate and one exceedance of the state groundwater standard for boron. High boron levels in excess of 1,000 micrograms/l were detected.[102]

[95] Clay Liner Evaluation, Sikeston Power Station, Sikeston Board of Municipal Utilities, Certified by Thomas R. Gredell, Gredell Engineering Resources, Inc., April 15, 2018 and Clay Liner Evaluation, Bottom Ash Pond, , Sikeston Power Station, Sikeston Board of Municipal Utilities, Gredell Engineering Resources, Ind., October 17, 2016, p 2.
[96] Clay Liner Evaluation, Sikeston Power Station, Sikeston Board of Municipal Utilities, Certified by Thomas R. Gredell, Gredell Engineering Resources, Inc., April 15, 2018.
[97] History of Construction, p 4.
[98] Closure Plan, Fly Ash Pond, Sikeston Power Station, Sikeston Board of Municipal Utilities, Gredell Engineering Resources, Ind., April 2018, p 3.
[99] Closure Plan, Fly Ash Pond, p 9.
[100] History of Construction, Bottom Ash Pond, p 3.
[101] Closure Plan, Bottom Ash Pond, Sikeston Power Station, Sikeston Board of Municipal Utilities, Gredell Engineering Resources, Inc., October 17, 2016, p 3.
[102] 2017 Annual Groundwater Monitoring and Corrective Action Report for Bottom Ash Pond, Appendix 6.

Utility: Associated Electric Cooperative, Inc.

Plant: New Madrid Power Plant

CCR Units: Three ash ponds and one utility waste landfill

Capacity: Ash Pond 003 – 3,100,000 cubic yards, Ash Pond 004 – 201,667 cubic yards, Ash pond 2 – 2,700,000 cubic yards, Landfill – 21,000,000 cubic yards

CCR storage at the New Madrid Power Plant consists of three unlined ash ponds (Pond 003 and Pond 004 and ash pond 2) and one utility waste landfill.[103] Pond 003 was constructed in 1972 and is approximately 110 acres.[104] Pond 003 receives boiler slag, fly ash, coal pile runoff, and process water.[105] AECI intends to close Pond 003 with CCR in place.[106] Pond 003 is located in the floodplain of the Mississippi River.[107]

Groundwater monitoring shows 56 exceedances (out of 90 downgradient samples) of the state groundwater standard for boron.[108] Sampling data shows extremely high levels of boron up to 20 milligrams per liter.[109] Twenty-nine (29) exceedances (out of 90 downgradient samples) of the state drinking water standard for sulfate were recorded.[110] Sampling showed one exceedance of the federal MCL for arsenic.[111]

Ash Pond 003 Downgradient Groundwater Samples Exceeding State Groundwater Standard for Boron and State Drinking Water Standard for Sulfate		
	Boron	*Sulfate*
Standard	2,000 µg/l	250 mg/l
Total # Samples[112]	90	90
# Exceedances	56	29
Concentration Range of Exceedances	2,040-20,000 µg/l	260-443 µg/l

[103] https://www.aeci.org/clean/ccr-rule-compliance-data-and-information/
[104] Annual CCR Surface Impoundment PE Inspection, Pond 003, New Madrid Power Plant, New Madrid, MO, Associated Electric Cooperative, Inc., January 19, 2018.
[105] History of Construction, New Madrid Power Plant Pond 003, Haley & Aldrich, Inc., October 16, 2016, p 2.
[106] 2017 Annual Groundwater Monitoring and Corrective Action Report for Pond 003, New Madrid Power Plant, Haley & Aldrich, Inc., January 31, 2018, p 1.
[107] 2017 Annual Groundwater Monitoring and Corrective Action Report for Pond 003, Figure 1.
[108] 2017 Annual Groundwater Monitoring and Corrective Action Report for Pond 003, Table 1.
[109] 2017 Annual Groundwater Monitoring and Corrective Action Report for Pond 003, Table 1.
[110] 2017 Annual Groundwater Monitoring and Corrective Action Report for Pond 003, Table 1.
[111] 2017 Annual Groundwater Monitoring and Corrective Action Report for Pond 003, Table 1.
[112] Samples are from downgradient wells at New Madrid. Upgradient well data are not included.

Pond 004 was constructed in 1984 and stores bottom ash and boiler slag.[113] The pond is the closest to the Mississippi River of the New Madrid CCR units.[114]

Groundwater monitoring at Pond 004 showed no exceedances for boron, sulfate or arsenic.[115] However, high levels of boron (> 1,000 µg/l) and sulfate (> 200 µg/l) were detected.

Ash pond 2 (aka the inactive "lined" pond, ash pond 2 or AP2) was constructed in 1994, stored fly ash and is inactive.[116] The pond is adjacent to the south end of Pond 003.[117] It will be closed in place in 2019-2020.[118] No groundwater monitoring data available.

The utility waste landfill was constructed in 2008.[119] The utility waste landfill will be closed in place.[120]

Groundwater monitoring at the utility waste landfill showed no exceedances for boron, sulfate or arsenic.[121]

[113] History of Construction, New Madrid Power Plan Pond 004, Haley & Aldrich, Inc., October 16, 2016, p 2-3.
[114] History of Construction, New Madrid Power Plan Pond 004, Appendix A.
[115] 2017 Annual Groundwater Monitoring and Corrective Action Report for Pond 004, Table 1.
[116] History of Construction, New Madrid Power Plan Inactive Lined Pond, Haley & Aldrich, Inc., April 17, 2018, p 1-3.
[117] History of Construction, New Madrid Power Plant Inactive Lined Pond, Appendix A, Figure 1.
[118] Written Closure Plan, New Madrid Power Plant - Inactive Lined Pond, Haley & Aldrich, Inc., April 17, 2018, p 3 and 6.
[119] MO-0001171, Missouri State Operating Permit, AECI – New Madrid Power Plant, April 22, 2011.
[120] Written Closure Plan, New Madrid Power Plant – Utility Waste Landfill, Haley & Aldrich, Inc., October 16, 2016, p 1.
[121] 2017 Annual Groundwater Monitoring and Corrective Action Report for the Utility Waste Landfill, Table 1.

Utility: Associated Electric Cooperative, Inc.

Plant: Thomas Hill Energy Center

CCR Units: 4 ash ponds (Slag Pond 1, Pond 002, Pond 003 and Pond 004)

Capacity: Slag Pond 1 – 16,000 cubic yards, Pond 002 – 50,000 cubic yards, Pond 003 – 258,133 cubic yards, Pond 004 – 201,667 cubic feet

Four CCR units are located at Thomas Hill Energy Center. The CCR impoundments were constructed in 1978-79.[122] All impoundments appear to be unlined per the federal definition.[123] Although there are references to a landfill at the site,[124] there is no landfill information on AECI's CCR compliance website.[125]

Cell 001 is also known as Slag Pond 1 or Slag Dewatering Basin.[126] It receives bottom ash, boiler slag and process wastewater.[127]

Cell 002 West is inactive and contains fly ash, bottom ash, boiler slag and coal pile runoff.[128] Pond 003 and Pond 004 receive decant water from Slag Pond 1 and Pond 002.[129] Therefore, Pond 003 and Pond 004 do not directly receive fly ash or bottom ash.

The groundwater monitoring network covers the ash pond system though the four downstream groundwater monitors are along the southern end (presumably down gradient) of Pond 004.[130]

High boron levels were identified in sampling but no exceedances were detected.[131] Very high levels of sulfate were detected in both upgradient and downgradient wells.[132] A total of 55 sulfate exceedances of the state drinking water standard were detected, with values as high as

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[122] Specific Site Assessment for Coal Combustion Waste Impoundments at Thomas Hill Energy Center, GEI Consultants, June 2011, p 7.
[123] Specific Site Assessment for Coal Combustion Waste Impoundments at Thomas Hill Energy Center, p 7.
[124] Specific Site Assessment for Coal Combustion Waste Impoundments at Thomas Hill Energy Center, GEI Consultants, Inc. for USEPA, June 2011, p 3.
[125] https://www.aeci.org/clean/ccr/
[126] History of Construction Cell 001, Thomas Hill Energy Center, Associated Electric Cooperative Inc.,
[127] History of Construction Cell 001, p 2.
[128] History of Construction Cell 001, p 10 of pdf.
[129] MO-0097675, Missouri State Operating Permit, AECI – Thomas Hill Energy Center, January 1, 2018, Fact Sheet Page 14 of 55.
[130] 2017 Annual Groundwater Monitoring and Corrective Action Report for the Ash Pond System, Thomas Hill Energy Center, Associated Electric Cooperative, Inc., January 31, 2018, Table 1.
[131] 2017 Annual Groundwater Monitoring and Corrective Action Report for the Ash Pond System, Thomas Hill Energy Center, Associated Electric Cooperative, Inc., January 31, 2018, Table 1.
[132] 2017 Annual Groundwater Monitoring and Corrective Action Report for the Ash Pond System, Table 1.

2360 micrograms per liter.[133] All upgradient samples exceeded the standard. Downgradient monitoring identified two exceedances of the federal MCL for arsenic.[134]

Ash Impoundment Downgradient Groundwater Samples Exceeding State Drinking Water Standards for Sulfate[135]	
	Sulfate
Standard	250 µg/l
Total # Samples[136]	47
# Exceedances	35
Concentration Range of Exceedances	306-2,340 µg/l

[133] 2017 Annual Groundwater Monitoring and Corrective Action Report for the Ash Pond System, Table 1.
[134] 2017 Annual Groundwater Monitoring and Corrective Action Report for the Ash Pond System, Table 1.
[135] 2017 Annual Groundwater Monitoring and Corrective Action Report for the Ash Pond System, Table 1.
[136] Samples are from downgradient wells at Thomas Hill Energy Center. Upgradient well data are not included.

Utility: Independence Power & Light

Plant: Blue Valley Generating Station

CCR Units: 3 ash impoundments (North Fly Ash Pond, South Fly Ash Pond and Bottom Ash Pond)

Capacity: The three ash impoundments total 41 acres. Volume of the impoundments is not available.

Blue Valley Generating Station has three ash impoundments: North Fly Ash Pond, South Fly Ash Pond, and Bottom Ash Pond.[137] The North Fly Ash Pond taken out of service in 2008 and the South Fly Ash Pond was taken out of service in 1991.[138] The Bottom Ash Pond ceased receiving ash prior to October 14, 2015.[139] All ponds were closed with CCR in place per a Closure Completion Notice dated September 27, 2016.[140] No monitoring data is available on the Independence Power & Light CCR compliance website. However, groundwater monitoring is required by the facility's NPDES permit (MO-0115924).[141]

[137] Notice of Intent to Initiate Closure, City of Independence Power & Light, Blue Valley Power Station, October 16, 2015.
[138] Notice of Intent to Initiate Closure, City of Independence Power & Light, Blue Valley Power Station, October 16, 2015.
[139] Notice of Intent to Initiate Closure, City of Independence Power & Light, Blue Valley Power Station, October 16, 2015.
[140] Notification of Closure Completion, City of Independence Power & Light, Blue Valley Power Station, December 19, 2017.
[141] MO-0115924, Independence Power and Light, Independence Blue Valley Power Plant, November 1, 2016 modified May 1, 2017, Special Condition 16.

Utility: Independence Power & Light

Plant: Missouri City Generating Station

CCR Units: One ash impoundment

Capacity: 22 acres (volume unknown)

The one ash pond has been closed.[142] Notice of Closure Completion dated September 27, 2016.[143] No significant information available on the Independence Power & Light Missouri City site. No groundwater monitoring data is available.

[142] Notice of Intent to Initiate Closure, City of Independence Power & Light, Missouri City Plant, September 25, 2015 and Notice of Closure Completion, City of Independence Power & Light, Missouri City Plant, September 27, 2017.

[143] Notice of Intent to Initiate Closure, City of Independence Power & Light, Missouri City Plant, September 25, 2015 and Notice of Closure Completion, City of Independence Power & Light, Missouri City Plant, September 27, 2017.

Utility: Empire District Electric Company

Plant: Asbury Power Plant

CCR Units: One impoundment divided into three sub-ponds (Lower Pond, Upper Pond, South Pond)

Capacity: 2,461,000 cubic yards for all ponds

The Asbury CCR impoundment is subdivided into three smaller units named the Lower Pond, Upper Pond and South Pond.[144] Earthen levees separate the three sub-ponds.

The sub-ponds are located next to a closed strip mine.[145]

The impoundment is unlined.[146] Although Empire District initially indicated that 2 of 3 sub-ponds would be clean closed, [147] it now plans to close all sub-ponds in place.[148]

The groundwater monitoring system includes 9 wells: Two (2) upgradient wells, one (1) sidegradient and six (6) downgradient.[149]

Historical groundwater monitoring has been conducted at Asbury. In 1996 Empire District installed 5 groundwater monitoring wells (MW-1 to MW-5). In 2003 two additional wells were installed (MW-6 and MW-7). In 2015 two more wells were installed (MW-5A and MW-6A).[150]

Groundwater monitoring revealed high levels of sulfate at all wells, and 42 exceedances of the state drinking water standard for sulfate.[151] Elevated boron was detected at some monitoring wells but not exceeding groundwater state standard of 2 mg/l. Seven exceedances of the federal MCL for arsenic at well MW-3 which is an upgrdient well.[152]

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[144] History of Construction, Existing CCR Impoundments, Asbury Power Plant, Palmerton & Parrish, Inc., October 17, 2016, p 2.
[145] History of Construction, Figure 1.
[146] Liner Design Criteria, Existing CCR Impoundments, Asbury Power Plant, Palmerton & Parrish, Inc., October 17, 2016, p 1.
[147] Closure Plan Existing CCR Impoundment, Asbury Power Plant, Midwest Environmental Consultants, Inc., October 17, 2016, p 2.
[148] Closure Plan Existing CCR Impoundment, Asbury Power Plant, Midwest Environmental Consultants, Inc., November 16, 2018.
[149] Groundwater Monitoring for Existing Surface Impoundments, Empire District Electric Company - Ashbury Power Plant, Midwest Environmental Consultants, Inc., October 17, 2017.
[150] 2017 Groundwater Monitoring, Sampling & Statistics, Asbury Generating Station CCR Impoundments, Midwest Environmental Consultants, Inc., January 2018, p 2.
[151] 2017 Groundwater Monitoring, Sampling & Statistics, Appendix 2.
[152] 2017 Groundwater Monitoring, Sampling & Statistics, Appendix 2.

Ash Impoundment Downgradient Groundwater Samples Exceeding State Drinking Water Standards for Sulfate[153]	
	Sulfate
Standard	250 µg/l
Total # Samples[154]	48
# Exceedances	33
Concentration Range of Exceedances	550-2,400 µg/l

[153] 2017 Annual Groundwater Monitoring and Corrective Action Report for the Ash Pond System, Table 1.
[154] Samples are from downgradient wells at Asbury. Upgradient well data are not included.

Utility: City of Columbia

Plant: Columbia Municipal Power Plant

CCR Units: One ash impoundment

Capacity: 72,600 cubic yards

The City of Columbia plant repowered to natural gas in 2015. The ash pond is no longer in use and is being clean closed. [155]

The CCR pond is called More's Lake. It is unlined. The pond was constructed in 1896. Columbia Water and Light purchased the property and constructed the plant in 1914.[156]

No groundwater monitoring data is currently available.

[155] Columbia Municipal Power Plant, CCR Surface Impoundment Closure Plan, Burns & McDonnell, October 2015.
[156] Public Notification, More's Lake - Construction and Liner Details, City of Columbia, April 12, 2018.