Locating and Permitting a CCR Landfill
Adjacent to the Missouri River

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\textbf{INTRODUCTION}

Ameren Missouri operates four coal-fired energy centers in Missouri. The largest is the 2,405-MW Labadie Energy Center (LEC). The LEC is located on the right descending bank of the Missouri River near river mile 58 in Franklin County, Missouri, approximately 40 miles west of the City of St. Louis. The LEC began operation in 1970 and sluiced the Coal Combustion Residuals (CCRs), primarily flyash, bottom ash, and boiler slag, into wet ash ponds adjacent to the plant for long term disposal. Over the last five years an average of over 60\% of the CCRs produced by the Labadie Energy Center have been reclaimed for beneficial use at off-site locations.

In the early 2000s Ameren Missouri determined that a landfill would be needed for long-term disposal of CCRs at each Energy Center and engaged Reitz & Jens, Inc. to evaluate alternative landfill locations. A Utility Waste Landfill Feasibility Study was completed in March 2004. After analysis of multiple sites, this study determined that the best location for a Utility Waste Landfill to manage CCRs from the Labadie Energy Center would be within a 1042-acre area immediately adjacent to the LEC. Reitz & Jens completed a second feasibility analysis for the LEC site in May 2007 that developed more detailed information regarding the requirements and schedule for development of a UWL adjacent to the LEC. In 2008, Ameren retained a team led by Reitz & Jens to complete design, permitting, and construction of the Labadie Utility Waste Landfill. This paper discusses the process that was followed for phased development of a 166.5-acre Utility Waste Landfill within the 813-acre permitted area adjacent to the Labadie Energy Center. The process began in October 2008 and ended in October 2017 when the first phase of the UWL at the Labadie Energy Center went into operation.

The Missouri Department of Natural Resources (MDNR) began regulating coal ash disposal in landfills in the 1970s and passed a law in the mid-1990s that established the separate category of Utility Waste Landfill (UWL). In 2004, UWLs were regulated by MDNR under 10 CSR 80-11.010. The US Environmental Protection Agency did not establish minimum criteria for CCR landfills until 40 CFR Part 257 and 261 (the “CCR Rule”) was adopted in April 2015.
**REQUIRED PERMITS**

The design rules for UWLs in 10 CSR 80-11.010 (Chapter 11) closely follow 40 CFR Part 258 for Municipal Solid Waste Landfills. Chapter 11 established minimum design requirements for UWLs and outlined a sequential process for approval of their design, construction, and operation. MDNR rules and regulations require a four-step permit process to approve and operate a Utility Waste Landfill. Because of their extensive regulatory experience with MDNR, GREDELL Engineering Resources led Reitz & Jens’ UWL team through the MDNR approval process that included:

1) A Preliminary Site Investigation (PSI) to evaluate whether the proposed 1042-acre site was potentially geologically and hydrologically suitable for a UWL. The PSI for the Labadie UWL was approved by MDNR on February 2, 2009.

2) A Detailed Site Investigation (DSI) that included extensive field investigation and analysis of site conditions to document that the proposed site was geologically and hydrologically suitable for a UWL. The DSI for the Labadie UWL was approved by MDNR on April 8, 2011.

3) A Construction Permit Application (CPA) that included detailed evaluation and design of all UWL features, operating procedures, and closure and post-closure care requirements. The CPA for the Labadie UWL was originally submitted on January 29, 2013 and subsequently modified in December 2013 to incorporate the CCR Rule requirements. The modified CPA for the Labadie UWL was approved by MDNR on January 2, 2015.

4) An Operating Permit after construction of the first cell and confirmation (via 3rd party CQA) that the UWL was constructed in accordance with the approved CPA. The Operating Permit for the first phase (Cell 1 and Pond 1) of the Labadie UWL was approved by MDNR on October 27, 2016.

10 CSR 80-11.010 also required that zoning approval for the UWL be obtained from the local authority, in this instance Franklin County, Missouri prior to MDNR’s approval of the Construction Permit Application. Prior to Ameren’s request for zoning approval in 2009, Franklin County did not have zoning regulations specifically for Utility Waste Landfills. In response to Ameren’s request, the County initiated a zoning amendment process in early 2010 to modify their Unified Land Use Regulations to allow a UWL adjacent to utility power generation facilities as permitted use, provided the UWL met all MDNR requirements as well as the additional Franklin County requirements established in the revised Land Use Regulations. The revised County regulations also established the position of an Independent Registered Professional Engineer (IPRE) to verify that the design and construction of a UWL was in compliance with MDNR and County regulations, and an Environmental Resource Officer (ERO) to assure that the ongoing operation of the Labadie UWL met these regulations. After a lengthy series of public hearings, testimony, and review and analysis by the County Commission, the revised Unified Land Use Regulations were adopted by Franklin County on October 25, 2011. As a result of the revised regulations, Franklin County issued a zoning approval letter for the Labadie UWL on August 21, 2012.
The Labadie UWL was also subject to other local, state, and federal approvals typical of any large-scale land development. The other primary regulatory approvals required verification that the UWL would create No-Rise within the regulatory 100-year floodplain of the Missouri River, and that the UWL would not impact any regulatory Waters of the United States (wetlands).

The location of the Labadie UWL was chosen to be immediately downstream of the LEC in the hydraulic “shadow” of the Missouri River that was created by the fill placed during original construction of the Labadie Energy Center. This existing fill created an ineffective flow area that was already protected from flooding during the 100-year and more frequent events by an agricultural levee. To meet the Federal Emergency Management Agency’s (FEMA) requirements, the Labadie UWL could not create a rise in the 100-year (Base Flood) elevation. According to the FEMA Flood Insurance Rate Map (FIRM); prior to October 18, 2011, the Labadie UWL site was in the 100-year floodplain of the adjacent Missouri River but outside of the regulatory floodway. However, FEMA adopted a new FIRM on October 18, 2011 which showed that the entire Labadie UWL site was now mapped within the regulatory 100-year floodplain and floodway the Missouri River. Subsequently, as part of Reitz & Jens’ UWL design team, CDG Engineers completed a detailed floodplain analysis that demonstrated that development of the UWL in the ineffective flow and levee protected areas would result in no impact to the regulatory floodplain and No-Rise in the Base Flood Elevation. In response, Franklin County, the local floodplain administrator, issued a Floodplain Development permit for the Labadie UWL on March 19, 2013.

The UWL’s proposed location within a levee protected area was also chosen to minimize the potential for impacts to Waters of the United States (jurisdictional wetlands). Reitz & Jens’ 2007 feasibility analysis suggested that the UWL would not impact jurisdictional wetlands based the National Wetlands Inventory Map produced by the US Army Corps of Engineers (USACE), and information provided by the Franklin County Natural Resources Conservation Service. To confirm this, the design team completed a detailed wetland delineation in March 2012 that was submitted to the USACE. In response, the USACE issued a Preliminary Jurisdictional Determination for the UWL site on September 10, 2012 that determined that jurisdictional wetlands did exist within the 813-acre UWL site boundary. The UWL footprint was subsequently modified to avoid impacts to all of the jurisdictional Waters of the United States. As a result, a Department of the Army (Section 404) permit was not be required for development of any phase of the Labadie UWL.

**CONCLUSION**

Design, permitting, and construction of the Utility Waste Landfill at the Labadie Energy Center began in October 2008 and ended in October 2017 when Cell 1 (phase one) began accepting CCRs. Adaptive management approaches were needed to address unforeseen issues as they arose while maintaining the overall schedule throughout this 9-year period. The major issues that were not anticipated at the beginning of the process were the design changes required by adoption of the CCR rule in April 2015, less than 1-1/2 years before the UWL went into operation; changes required to address Franklin County’s revised Land Use Regulations; revisions to FEMA’s Flood Insurance Rate Maps; and the presence of jurisdictional Waters of the United States (wetlands) within the original UWL footprint which required revisions to avoid them. Public engagement and education was a
critical part of the project that began in early 2009. Reitz & Jens’ team worked side-by-side with Ameren Missouri and their consultants throughout this process to develop and maintain an overall schedule for the project, identify and plan for unforeseen issues as early as possible, and address issues as they arose. Without the support and cooperation of all team members, the Utility Waste Landfill at the Labadie Energy Center would not be in operation today.