Exhibit:	
Issues:	Labadie Electric Plant UWL
Witness:	Charles Norris
Sponsoring Party:	Intervenors Labadie Environmental Organization and Sierra Club
Type of Exhibit:	Rebuttal Testimony
Case No.:	EA-2012-0281
Date Testimony Prepared:	September 13, 2013

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. EA-2012-0281

CROSS- SURREBUTTAL TESTIMONY

OF

CHARLES H. NORRIS, P.G.

ON BEHALF OF

LABADIE ENVIRONMENTAL ORGANIZATION

AND

SIERRA CLUB

St. Louis, Missouri
September 13, 2013

CROSS-SURREBUTTAL TESTIMONY

OF

CHARLES H. NORRIS, P.G.

Case No. EA-2012-0281

Q. Please state your name and business address.

A. My name is Charles H. Norris and my business address is Geo-Hydro, Inc., 1928 East 14th Avenue, Denver, Colorado 80206.

Q. What is your position with Geo-Hydro Inc.?

A. I am its principal and its vice president, secretary, treasurer and CEO. I also am employed there as a professional geologist and as a hydrogeologist.

Q. What is your educational and professional licensing background?

A. I received my B.S. degree in Geology from the University of Illinois, and my M.S. degree in Geology from the University of Washington, where I was a National Science Foundation Fellow. I have completed all requirements for a Ph.D. in hydrogeology at the University of Illinois except for my dissertation. I am a licensed professional geologist in Missouri, Wisconsin, Wyoming, Indiana, Illinois, Kentucky, Virginia, Pennsylvania, and Utah, and a licensed environmental professional in Colorado.

Q. Describe your employment experience.

A. I began my career as a geologist in 1972 and have worked continuously in the field ever since. I spent the first 15 years in the petroleum industry working for petroleum producers such as Amoco International and Shell, and then as an industry consultant, owning my own company in the early 1980s. From 1987-1992, I was employed by the University of Illinois in the Laboratory for Supercomputing in Hydrogeology with a non-teaching faculty appointment. In 1996 I founded Geo-Hydro, Inc., where I have since worked as a geologist with specialization in physical, geochemical and environmental geology and hydrogeology. Geo-Hydro provides RI/FS & general site investigations, landfill services, and water resource development services. A copy of my CV is attached as Exhibit 1.

Q. Are you familiar with the disposal of coal combustion waste?

A. Yes. Over the last 20 years, I have worked extensively with landfills and coal ash, coal combustion waste management issues, and waste isolation, including landfill lining issues. During that time my firm's clients have included utilities needing assistance with the disposal of coal wastes and clean up of coal-waste contamination, a municipality reviewing proposals for coal ash landfills, and coal mining companies, in addition to citizen's groups like Intervenors LEO and the Sierra Club.

Q. Have you ever been qualified as an expert witness with regard to the disposal of coal ash from a coal-fired power plant?

A. Yes. I have testified as an expert at several administrative hearings in Indiana with regard to the disposal of coal ash from coal-fired power plants.

Q. Have you ever been qualified as an expert witness with regard to the hydrology, performance, and monitoring of landfills designed with composite liner systems?

A. Yes. I have qualified as an expert at several dozen siting hearings in Illinois in the fields of geology, hydrogeology, geochemistry as the apply to the hydrology, performance, and monitoring of municipal solid waste landfills with composite liners.

Q. What is the purpose of your Cross-Surrebuttal Testimony in this proceeding?

A. The purpose of my testimony is to respond to the Rebuttal Testimony of Staff witnesses John Cassidy and Claire Eubanks in this matter regarding the proposed expansion of Ameren's Labadie power plant in order to construct and operate a coal-combustion-waste-landfill. My testimony also responds to the Commission's Order of August 14, 2013 on pages 2 and 3 regarding the existence of "studies, reports, or other documents examining alternative sites, options, or possibilities" for the disposal of coal ash from the Labadie power plant.

Q. How is your testimony organized?

A. My testimony will cover four specific topics. The first topic is the economic feasibility of Ameren's proposed UWL at the Labadie site. The second describes Ameren's qualifications to operate the proposed UWL. The third relates to the public interest and the final topic discusses alternatives to the proposed UWL.

ECONOMIC FEASIBILITY OF PROPOSAL

Q. Mr. Cassidy's Rebuttal Testimony (p. 5) states that "Ameren Missouri has provided analysis and cost studies to Staff that indicates that the Company has sufficiently evaluated the necessary capital costs and ongoing operating costs associated with the proposed project." To the best of your knowledge, have you reviewed all of the documents submitted by Ameren in response to the Staff's Data Requests in this proceeding?

A. Yes.

Q. Has Ameren accounted for all of the capital and operating costs that will be associated with its proposed construction and operation of a utility waste landfill at the proposed Labadie site?

A. No.

Q. Please describe the nature of the costs for which Ameren has not accounted, and explain your basis for determining that such costs will likely be associated with the proposed Labadie landfill?

A. The documents provided by Ameren fail to identify capital and operating costs associated with at least three categories of activity. Not all costs associated with construction are included in the documents provided by Ameren. The costs associated with operations do not include all anticipatable and quantifiable expenses. And, the costs associated with closure and post closure activities do not reflect what will be needed.

Q. What costs related to construction are not included in the documents provided by Ameren?

A. Many of the construction materials necessary for the UWL will need to be imported because they are not available on-site. MPSC Staff identified that the clay soils needed for the compacted clay liner under the landfill and the ponds, as described in Ameren's Construction Permit Application (CPA) filed with the Missouri Department of Natural Resources, would be imported. Staff requested in DR 12 that the cost of transporting that clay from Ameren's Callaway facility be included. Although the detailed cost estimates provided in response to DR 12 indicate that the clays for the liner are from offsite, Ameren declined to include the cost of transporting the clay from the only known location because it may be able to find a contractor that would provide it from some other location. Whether the clays for the liner come from

Callaway or some other offsite location, there will be transportation costs and those are not presently in the construction costs.

Q. Other than the transportation costs for importing the clay soils for the liner for the UWL, are there other missing costs?

A. Yes, it appears so.

Q. What other costs appear to be missing?

A. As described in the CPA, there are insufficient available on-site soils of proper characteristics to construct the berms. Similarly, there are insufficient available on-site soils of proper characteristics to construct the platform beneath the waste disposal areas that are needed to lift the bottom of the landfill at least 2 feet above the natural water table. Some of those soil volumes will have to be imported from offsite as well. The detailed cost estimates provided in response to the DRs do not indicate that some of the general subgrade fill and berm soils will come from offsite, unlike line items for the liner clays. Further, the same price is indicated for all soils used for subgrade and berms, suggesting that the transportation costs of the offsite soils are not included in the costs provided to the MPSC.

Q. What costs related to operations are not included in the documents provided by Ameren?

A. The documents provided by Ameren do not include risk-adjusted costs associated with repairs to damage caused by known and quantifiable hazards specific to this site. These hazards include damage caused by flooding, damage caused by direct seismic impacts, and indirect seismic damage caused by subsequent earth movements such as liquefaction, subsidence, and slope failure.

Q. How should Ameren have accounted for those costs?

A. Floods and earthquakes occur with statistical patterns of magnitude and frequency, so the risk of a particular event is quantifiable. For a given event and a given design of a facility, the damage is predictable and so is the associated cost of the repair. If there is a defined risk of a particular event and a resulting cost of that event, there is an assignable risk-adjusted cost to the facility that should be included as part of repair and maintenance. Since different locations carry different risks and different repair costs, the risk-adjusted cost of statistical events such as earthquakes and floods should be included in costs of the proposed landfill. Without it, meaningful comparisons among potential sites with different levels of flood and earthquake risk cannot meaningfully be made.

Q. What costs related to closure and post-closure activities are not included in the documents provide by Ameren?

A. The costs that are not included are those likely to arise after the formal post-closure monitoring and maintenance period. Unlike municipal landfills, for which danger declines as a function of time due to biogenic decay, intact UWLs show little or no decline of toxicity with time; their inorganic contaminants persist indefinitely. The costs for risk-adjusted damage repair described above resulting from flood and seismic activities that occur after the UWL is closed are not among the costs shown in the documents provided. The costs do not include monitoring for and remediating any ground- and surface water contamination and fugitive utility waste after the post-closure period.

Q. Are there any other waste-related costs associated with the proposed UWL that are not included in the documents provided by with the CCN application?

A. Yes.

Q. And what are they?

A. Historical utility waste placement at the Labadie plant has produced a legacy of large volumes of utility wastes without containment that must be addressed and for which no plan and no associated budget is offered. The MPSC Staff recognized the significance of this legacy with DR 7 and DR 14.3, seeking an understanding of their ultimate fate. Ameren provided no answer beyond acknowledging there was no plan, no budget, and no action at this point beyond seeing what new regulations on the Federal level might entail. The response to DR 7 indicated a willingness by Ameren to simply leave these wastes in the existing ash ponds.

Q. How does the fate of the existing ash ponds impact the costs of the planned UWL?

A. It does so in at least two ways. First, unlined ash ponds pollute groundwater and, often, surface water. This contamination is demonstrated across the country where such facilities have been monitored. As documented elsewhere in my testimony, Ameren is well aware of this contamination at its own facilities in Missouri and in Illinois. Although Ameren has yet to report on any investigations for groundwater contamination associated with its existing ash ponds, such contamination would affect the same alluvial aquifer that underlies the planned UWL. The Detailed Site Investigation (DSI) for the UWL demonstrates that contamination from the existing ash ponds would migrate from the ponds to and across the area of the UWL. This requires a substantially more sophisticated, and therefore expensive, monitoring program than Ameren has proposed to demonstrate that the UWL is not contaminating groundwater.

Q. What is the second way the existing ash ponds impact the cost of the UWL?

A. The unlined ash ponds contain the same utility wastes as will be disposed of in the UWL. Contamination in the leachate of those ponds contains the same constituents as will leachate from the UWL. Groundwater contamination sourced from the utility wastes in the existing ash

ponds would be indistinguishable from any leachate that was to escape the UWL. By interfering with the ability of Ameren to successfully monitor the UWL's performance, the existing ash ponds amplify the risks and costs of contamination and any subsequent remediation that becomes necessary. The documents provided by Ameren do not include these costs.

AMEREN'S QUALIFICATIONS TO OPERATE THE PROPOSED LABADIE UWL

Q. Do you agree with Ms. Eubanks' Rebuttal Testimony (p.4) that Ameren's experience thus far with the UWL at the Sioux power plant indicates that it is qualified to operate a UWL at Labadie?

A. No.

Q. Why not?

A. There is no information in the documents submitted in response to the DRs from the Staff that supports Ameren's ability to construct or operate a UWL. Most of the requests for information about the Sioux power plant were met with silence, whereas similar queries related to Rush Island or Meramec generated the requested information. In two responses that do include some Sioux information, the responses to DR 8 and DR 17, the answers regarding the approval and start of construction of a dry-waste storage cell, which would be analogous to the planned UWL at Labadie, are inconsistent on the time line. They are consistent, however, in stating that the cell is still under construction and won't start operations until sometime next year.

Q. Do you have concerns about Ameren's qualifications to operate the proposed Labadie UWL?

A. Yes.

Q. In summary, what are the bases for your concerns?

A. Ameren's current and past handling of coal ash at Labadie does not support its qualifications to operate the planned UWL. Ameren has not addressed the implications of potential, and likely, groundwater contamination from its historic management of utility wastes at Labadie migrating from its existing ash pond toward and under the proposed UWL. The groundwater monitoring plan proposed by Ameren in Appendix Q of its CPA for the Labadie landfill demonstrates it is not qualified to operate the proposed UWL. Finally, Ameren's departures from responsible management of utility wastes at Labadie are not limited to Labadie. Ameren has a record of environmental problems operating utility waste facilities, evidenced elsewhere in Missouri but perhaps best documented in Illinois.

Q. Please describe your concerns about Ameren's qualifications to operate the proposed Labadie UWL based on your knowledge of Ameren's current and past coal ash handling experience at the Labadie plant.

A. When Ameren began generation at the Labadie plant it began disposal of its utility wastes in the unlined ash pond located on or excavated into alluvial sediments in the floodplain of the Missouri River, adjacent to the plant. In the early 1970s, this configuration was a common approach. It is now understood that utility waste disposal in unlined ponds on alluvial floodplains was not a good idea. The utility wastes readily leach inorganic contaminants into infiltrating water and contaminate the potable water resource of the alluvial aquifer. While this problem is thoroughly documented today at dozens or hundreds of facilities across the country, it was first identified at multiple sites by the early 1990s. Ameren became aware of the problem at least at its Meramec plant by the late 1980s. There, monitoring data collected in 1988 document utility waste leachate penetrating not only into the alluvial sediments below and downgradient of

the ash ponds, but reaching the bottom of the 80-100 ft thick alluvial aquifer. Appendix 1, CH2MHILL, 1997, Hydrogeologic Assessment of Potential Impacts of Meramec Ash Ponds on Local Groundwater and Surface Water, prepared for Union Electric. This document, including Appendix 1 thereof, is attached hereto as Exhibit 2.

Ameren apparently operated groundwater monitoring wells around the original Labadie ash pond subsequent to the documentation of groundwater contamination at Meramec, although no monitoring data has, to my knowledge, been made available. In response to DR 14, Ameren provided the June 1992 construction permit for the newer ash pond. Page two of the permit suggests that there existed in 1992 groundwater monitoring wells that would be sealed during construction of the new ash pond. Union Electric's April 1992 "Specification No. EC-2574 for Construction of New Ash Pond, Labadie Plant," a document not provided to MPSC Staff in response to DR 14, establishes there were monitoring wells and provides specifications for their abandonment as part of the construction. The Specification document also discusses in detail soils, depths of excavation, use and borrow of soils for berms and liner, and other design and construction details responsive to DR 14 but not produced by Ameren. The Specification document is attached hereto as Exhibit 3.

The 2011 NPDES permit reapplication provided in response to DR 14.2 discusses lateral leakage from the flanks of the original ash pond, which leakage was first acknowledged by Ameren in 1992 in an earlier NPDES permit reapplication. In the 1992 reapplication, the larger of the lateral leaks was estimated at 32 gallons per minute. In 1992 Ameren dismissed the leak as not significant enough to regulate, because the water seeped into the ground (i.e., became groundwater) and did not discharge as surface water. In the 2011 reapplication, the leak was characterized as having been remediated because the area of the leak and infiltration seepage had

been covered with fill. Burying a seep does not remediate it; it merely hides it from sight. The ongoing leakage from this unlined ash pond could be causing significant groundwater contamination. Ameren has neither disclosed the results of the pre-1992 groundwater monitoring nor, to my knowledge, undertaken any monitoring to characterize the impact of the ash ponds on the groundwater at or leaving the plant site.

Q. Please describe your concerns about Ameren's qualifications to operate the proposed Labadie UWL based on the possibility that coal ash pollutants may have contaminated or may be migrating toward groundwater at the proposed Labadie UWL site.

A. As just discussed, coal ash disposed in unlined ponds discharges leachate from the pond bottoms vertically into underlying groundwater, especially when those ponds are located above or excavated into permeable soils such as alluvial sediment. There may also be leachate discharging laterally from an ash pond that infiltrates to groundwater, as occurs at Labadie, or discharges to surface water. The contamination from such discharges is observed with such frequency when monitored, it must be considered the norm or the expectation.

The groundwater flow direction at Labadie in the alluvial aquifer is from the existing ash ponds and toward and through the area of the proposed UWL. This flow direction was documented over the full course of the year for which water elevation data were collected for the DSI (Figures 18 through 29) and provided to the MPSC Staff in response to DR 2.2. Any contamination that leaks from the existing ponds is being transported toward and across the area of the planned UWL. The documented flow pattern is consistent across seasons and there is no reason to believe it has not existed for decades.

Although there is no ambiguity as to where contamination in groundwater would be flowing, there are no data indicating the concentrations of that contamination. Each of over 100 piezometers was visited monthly over a period of a year to collect data for the DSI, but there is not a single chemical analysis reported for any piezometer as part of that investigation. Documents from 1992, discussed above, indicate there were, for a period prior to 1992, groundwater monitoring wells east of the original Labadie ash pond. If there was water quality monitoring from those wells, it has not been made available.

Groundwater data regarding the existing plant site and the proposed UWL site are now expected to be collected, but will not be available before the Commission is expected to make its decision in this matter or before the MDNR is expected to make its decision regarding the Construction Permit Application. Based on a draft permit published in February 2013 and withdrawn in March 2013, MDNR is expected to include groundwater monitoring permits in a revised NPDES permit for the Labadie plant. The current permit expired in 1999. The draft provisions would not require Ameren to commence groundwater monitoring until 3 years after the revised permit is issued, or to submit monitoring data until 4 ½ years after the permit is issued.

The existence, location, and concentration of any contaminant plume passing under the UWL are not academic curiosities. They are material to the function of the UWL monitoring plan and, most importantly, the protection of the potable water resource of the alluvial aquifer on which the community relies. In my opinion, Ameren's plan to build a large new coal ash landfill before obtaining meaningful groundwater data regarding the existing plant and the proposed UWL site demonstrates that it is not qualified to operate the proposed UWL in a responsible manner.

Q. Please describe your concerns about Ameren's qualifications to operate the proposed Labadie UWL based on the adequacy of its plan to monitor groundwater at the proposed UWL site.

A. In addition to the concerns discussed above, there are issues related to the design of the groundwater monitoring program proposed by Ameren for the UWL. As the program is designed, it will unable to detect a breach or flaw in the liner system that allows leachate to leak into the alluvial aquifer. That inability to detect contamination is a fundamental characteristic of the monitoring plan that is independent of any preexisting or yet-to-arrive contaminant plume from the existing ash ponds. The danger of this monitoring plan is compound. It will not detect contamination if, or when, it occurs.

Q. Please describe your concerns about Ameren's qualifications to operate the proposed Labadie UWL based on documented groundwater contamination at Ameren's Illinois coal plants.

A. Ameren's Illinois subsidiaries/affiliates have developed an extensive list of coal ash disposal sites contaminating ground- and/or surface water. Persistent groundwater contamination at some of these sites has resulted in Violation Notices issued to Ameren by the Illinois Environmental Protection Agency (IEPA). In each of the four examples cited below, the notices of violation given in 2012 have been followed by Notices of Intent to Pursue Legal Action this year.

At the Grand Tower Generating Station in Grand Tower IL, IEPA issued a notice of violation in June 2012 for groundwater exceedences by multiple contaminants at 4 monitoring wells during years 2010-2012. The facility is an unlined ash pond put it service in 1951. The station is adjacent to the Mississippi River.

At Coffeen Generating Station in Montgomery County IL, the IEPA issued a notice of violation in June 2012 for groundwater exceedences by multiple contaminants at 3 monitoring wells during years 2010-2012. The facility uses an unlined ash pond put it service in 1979 and a lined landfill put in service in 2010. The station is adjacent to Coffeen Lake in south-central Illinois.

At the Meredosia Generating Station in Meredosia IL, IEPA issued a notice of violation June 2012 for groundwater exceedences by multiple contaminants at 4 monitoring wells over a period of 2010-2012. The facility uses an unlined fly ash pond put in service in 1968 and an unlined bottom ash pond put in service in 1972. The station is adjacent to the Illinois River.

At the Newton Generating Station in Newton IL, IEPA issued a notice of violation in June 2012 for groundwater exceedences by multiple contaminants at 3 monitoring wells over a period of 2010-2012. The facility has two unlined ash ponds put in service in 1977 and a lined landfill with cells put in service in 1997 and 2011. The station is adjacent to Newton Lake.

PUBLIC INTEREST

Q. Do you agree with Ms. Eubanks' statement in pre-filed Rebuttal Testimony (pp. 4-5) that Ameren's proposed Labadie UWL promotes the public interest?

A. No.

Q. Please explain.

A. The Labadie site carries risks of environmental and human health damage that can and should be avoided. As is discussed elsewhere in my testimony, choosing an alternative location can readily reduce the earthquake risk. It is even more transparent how to reduce the risk of damage by flooding; choose an alternative site outside the floodplain of one of Missouri's major rivers. Putting reactive wastes atop huge, unprotected shallow aquifers is not in the public

interest. Utility wastes essential last forever. The engineered containment does not. If the utility waste is set on or in an alluvial aquifer, that aquifer will likely eventually be contaminated by it. Remediating the contamination of such an aquifer, if it can be done, will likely be far more expensive than using an alternative site.

Q. Ms. Eubanks states (p. 6) that the proposed UWL is an improvement over the existing ponds. She seems to acknowledge (p.7) that there currently are no closure requirements for the existing ash ponds at the Labadie power plant. Does Ameren's construction permit application for the proposed Labadie UWL indicate that Ameren plans to keep the existing ash ponds in operation or close them?

A. Ameren's CPA includes operations that clearly anticipate the existing ponds are expected to remain open, or at least the ash will remain in place. In addressing the potential episodic need for rapid placement of waste in new cells, particularly in response to uplift threats from imminent flooding before a new cell has sufficient fill, the CPA uses borrow from the existing ash ponds as an option. In another part of the CPA, the existing ash ponds, and their discharge to Outlet 002, are used for discharge of excess contact water that may under some circumstances exceed needs of the UWL.

In the response to DR 7, Ameren indicated it did not know what would happen to the ash in the existing ponds or the ponds themselves. Ameren stated that closure in place was an option that might prove viable. In that case, the ash ponds would not be active, but the ash would still remain at the site permanently.

Q. If the ash ponds are not closed, what risks might they pose both to Ameren and to its neighbors in the future?

A. The risks from the ash ponds in the future are what the risks are now; that they are, or will in the future, leak and contaminate ground- and or surface water. That risk will persist so long as the ash remains in the ponds.

Q. To what extent would the proposed UWL next to the Labadie power plant add to, rather than reduce, the risks posed by the existing ash ponds?

A. The risks associated with the proposed UWL are risks associated with seismic damage, up to and including catastrophic failure; damage related to flooding, up to and including failure of waste containment; and detected or undetected groundwater contamination resulting from failure of, or flaws in, the liner systems and/or leachate management. Each and all of these risks are attributable to the UWL and are additive to risks associated with the existing ash ponds.

Q. Ms. Eubanks states (p.7) that the liner for the proposed UWL "is based on future environmental regulations," referring (p. 6) to proposed regulations published by the United States Environmental Protection Agency (EPA) in June 2010. Are you familiar with the EPA's June 2010 proposed regulations that, when finalized, would constitute the first federal regulations governing coal ash disposal?

A. Yes.

Q. Does Ameren's proposed Labadie UWL comply with the requirement in EPA's proposed regulations that the base of a UWL's liner must be at least two feet above the upper limit of the natural water table?

Proposed new 40 CFR §257.60 Placement above the natural water table

> (a) New CCR landfills and new CCR surface impoundments and lateral expansions must be constructed with a base that is located a minimum of two feet above the upper limit of the natural water table.

(b) For purposes of this section, natural water table means the natural level at which water stands in a shallow well open along its length and penetrating the surficial deposits just deeply enough to encounter standing water at the bottom. This level is uninfluenced by groundwater pumping or other engineered activities.

No, it does not.

Q. Based on your review of Ameren's most recent construction permit application submitted to the Department of Natural Resources in August 2013, what is Ameren proposing in terms of the separation, if any, between the base of the proposed UWL and the upper limit of the natural water table?

A. For the purposes of answering this question, I will accept the erroneous assumption of the DSI authors that the potential data of the DSI represent the elevation of the water table. The observed potentials on June 10, 2010 in the vicinity of the sumps for the proposed UWL were approximately 464.75. Appendix Z of the CPA projects the post-settlement elevation of the base of the liner under the sumps to be 462.2 feet. If the same settlement estimate is applied to the bottom of a cell as to the sump, 0.8 ft, the elevation of the bottom of the cell would be projected to be at an elevation of 465.2 ft.

For the upper limit of the natural water table as observed in 2010, the bottom of the liner in the sump area is about 2.55 ft below the water table. Alternatively expressed, the natural water table at the upper limit is about 0.55 ft above the HDPE liner. At the low point of the cell, the upper limit of the natural water table observed in 2010 is separated from the bottom of the liner by 0.45 ft.

Q. What costs could that design pose for Ameren that are not addressed in the documents submitted in this proceeding?

A. In order to bring the post-settlement separation of the liner bottom at the sumps from the upper limit of the natural water table recorded June 10, 2010, the fill platform upon which the UWL is to be built would need to be raised by about 4.5 feet. At a minimum, that change would require bringing significant additional off-site soils to the site.

NEED FOR LANDFILL AT LABADIE LOCATION/ALTERNATIVES

Q. Have you read and are you familiar with the Rebuttal Testimony of Staff Witness John Cassidy and Claire Eubanks?

A. Yes.

Q. In response to the question," Has the Company examined the costs associated with its proposed construction of an additional landfill to dispose of coal combustion residuals ("CCR's") on land adjacent to the current land occupied by the Labadie Energy Center in **comparison with other waste disposal options?" (Cassidy, p. 4), Mr. Cassidy testified, in part, "Ameren indicated to Staff in Response to Staff Data Request No. 2 that it had engaged the services of Reitz & Jens Consulting Engineers ("R&J") while in the planning stages of the Labadie Energy Center UWL project to review alternatives for disposal of CCR's produced at the Labadie Energy Center. R&J completed such a study for Ameren Missouri which examined 22 possible sites across the region." Based upon your review of the documents, are these correct summarizations of the Ameren response and submitted documents in response to Data Request 2?**

A. No.

Q. Why not?

A. Mr. Cassidy's response does not accurately reflect the contents of the attachments to DR 2, the relationships among the attachments, or the significance of the time line of their generation. As a result, the conclusions he draws from these documents further in this answer ("Therefore, according to the R&J study, the proposed Ameren Missouri owned UWL located adjacent to the Labadie Energy Center represents the lowest cost option for a UWL that is available to Ameren Missouri at this time.") is without support and is in error.

Q. Is Ms Eubanks' understanding of the documents submitted with the Ameren response to DR 2 similar to Mr. Cassidy's?

A. No, it appears to differ significantly?

Q. In what way does Ms Eubanks' understanding of the DR 2 documents differ?

A. Mr. Cassidy's testimony and conclusions are consistent with a perception that all of the documents submitted with DR 2 relate to cost considerations for siting the UWL on-site at Labadie. Ms Eubanks' testimony on the siting of the UWL at Labadie (pp. 7 and 8) clearly indicate she appreciated that some of the DR 2 documents are from technical studies and deal with technical issues and some are from financial or cost studies. Her conclusions reflect that understanding.

Q What information did DR 2 seek?

A. Staff DR 2 seeks verification and documentation that a company owned landfill on-site at Labadie Energy Center is "the best option which minimizes cost as well as environmental and land use impacts …"

Q. What documents were requested of Ameren and what documents were included in in Ameren's response to DR2?

A. DR 2 requested an explanation of the answer and copies of all documentation and studies relied upon by Ameren to reach its determination. In response, Ameren provided 5 documents: (1) a one-page spreadsheet generated by Ameren surveying dumping fees from 6 commercial landfills and hauling costs from two trucking firms, identified with the initials WEK and dated September 25, 2003; (2) an 11-page feasibility study done by Reitz & Jens, Inc., dated June 8, 2004; (3) a one-page spreadsheet and accompanying locations map documenting 22 "Sites Evaluated for possible Utility Waste Landfill" produced by Reitz & Jens, Inc., for AmerenUE Rush Island Plant, dated June 13, 2008; (4) an undated power point presentation by Reitz & Jens, Inc., for AmerenUE, presenting and evaluating the data from item (3); and (5) an email exchange between Paul Reitz of Reitz & Jens, Inc., and Doug Weible of FWI dated August 18, 2010, verifying a non-binding proposal of rates for disposing of Labadie ash at FWI's North Landfill.

Q. Do these documents support the conclusion that the proposed on-site UWL is the lowest cost option for the disposal of coal ash from the Labadie plant?

A. No. They do not.

Q. What does each of these documents show with respect to the cost of disposing on-site at Labadie?

A. The 2003/2004 documents indicate that an onsite landfill operated by Ameren may be a cheaper option than disposing of the coal ash generated by each of Ameren's four St. Louis area power plants when compared to disposal at a landfill operated by a third party. The 2010 tipping-fee shows that 3rd party rates have remained generally consistent since the 2003 survey and that waste transport by rail is substantially cheaper than that by truck.

Q. Do the documents provide any comparisons for the cost of disposing of Labadie utility wastes at Labadie with doing so at an alternative site?

A. No.

Q. Do you see any evidence that Ameren considered "22 possible sites across the region" as alternatives to the proposed Labadie site?

A. No. The evidence does not support this conclusion. The feasibility study identified waste hauling as a key cost factor in landfill disposal of ash. Had there been a search for alternatives to onsite disposal of Labadie ash, that search would logically have centered, at least approximately, on the Labadie Plant, with a bias westward toward less developed areas, more easily traveled roads, and presumably cheaper land. Yet each of the 22-matrix sites is across the St. Louis metropolitan area from Labadie, and the closest site on the matrix is 29 miles from Labadie. If only from the geography, it appears that the 22-site matrix was not an evaluation of options for a UWL at Labadie. The 22-site matrix was an initial, non-financial evaluation of sites in the vicinity of Rush Island to find location for a self-managed UWL for ash from Ameren's Rush Island and Meramec power plants.

Q. What did Ameren consider when looking for a site to dispose of the Rush Island and Meramec plant ash?

A. In addition to basic identification and geographic data, the layout of the 2008 22-site matrix indicates Ameren considered at each site's Strengths, Weaknesses, and Comments in the last three columns of the matrix. The most consistently cited weaknesses are floodplains, the need for berms, the unavailability of onsite clay, wetlands, and geology (i.e., karst). The most consistently cited strengths were proximity to the plant and geology (i.e., lack of karst).

Q. Using the criteria Ameren used on the 22-site matrix it considered for the Rush Island and Meramec ash, would the proposed Labadie site be a strong choice for UWL?

A. Based upon what were pluses and minuses in the site comparisons for Rush Island ash, Labadie would seemingly be an unlikely choice for a UWL. Other than its proximity to the Labadie Plant, there are only weaknesses. The Labadie site is on a floodplain, it is full of wetlands, it needs berms, it requires clay importation and it has bedrock geology beneath the alluvium that commonly exhibits karst features.

Q. What results did Ameren produce using the matrix to evaluate alternative locations for disposal of Rush Island and Meramec waste?

A. As reported in the undated power point presentation on the 22 sites on the matrix, 7 sites at four locations made the cut as potential UWL sites (page 6 of 23). Of these, two were at Rush Island itself and 5 sites at three locations were within 6.4 miles of Rush Island. However, another site, not from the 22-site matrix also made the cut -- Labadie Regional. Although no documents indicate how or when the decision was made, Labadie was clearly a "go", as a regional UWL, by the time of the power point presentation.

Q. Did Ameren evaluate the Labadie Regional site's strengths and weaknesses as it did the other 22 sites?

A. No, it does not appear on the 22-site matrix. In spite of its environmental, location and geologic weaknesses and in spite of it being 43 miles away (Response to DR 2.5), across an urban corridor, the Labadie Regional site was added to the short list of sites considered for disposal of Rush Island and Meramec waste. The 22-site matrix was not generated or used to decide whether Ameren would pursue onsite disposal at Labadie. Any comparisons were

focused on whether or not disposal of Rush Island and Meramec ash at Labadie could be justified.

Q. Does Ameren claim to have considered "22 possible sites across the region" as alternatives to the proposed Labadie site? Schedule 3, at 1

A. No, it doesn't. Ameren's response to part 2 of DR 2 does, however, blur the distinctions among the purposes, activities, and timelines of the submitted documents and discrete events impacting or being impacted by the documents. Ameren's answer might create that perception only if one does not look closely enough. The 2003 tipping fee survey and the 2004 feasibility study considered whether or not it might make sense for Ameren to self-manage utility wastes as opposed to using a third-party's landfill, and if so, under what circumstances and settings would the choice make sense. The 2008 matrix comparison was a tool to evaluate potential sites around Rush Island for self-disposal of Rush Island ash and resulted from Ameren's previous decision to self-manage utility wastes. The expected Labadie Regional UWL was considered as one possibility for self-management of the Rush Island ash. The 2010 spot price check of one commercial alternative appears to have been motivated to test the impacts of reducing Labadie from a regional self-management UWL to one only serving the Labadie Plant, in the light of the Franklin County zoning decision.

Q. Could Ameren find alternative sites for the proposed Labadie landfill that were not in the floodplain?

A. Yes. Avoiding floodplains is straightforward and easily accomplished.

Q. Could Ameren find alternative sites for the proposed Labadie landfill that were not in a seismic impact zone?

A. Yes. In Missouri, as one moves west and further from the New Madrid seismic area, the severity and frequency of seismic events decline. Not far west of Franklin County, that risk has declined to the point that, while there may still be earthquakes, the activity falls below that defined as a seismic impact zone.

Q. Could Ameren find alternative sites for the proposed Labadie landfill that were along rail lines?

A. Yes, readily. The rail lines that bring PRB coal trains to Labadie return empty to the west and have available trunk routes cross Missouri outside the confines of major floodplains.

Q. Has your firm looked at places within a 166-mile distance of the Labadie site that are not in the floodplain, not in a seismic impact zone, not in karst or sinkhole-prone areas and located along rail transportation?

A. Yes, at a qualitative level. We have generated maps that composite GIS data from public and governmental data sets many and large areas that meet those criteria. We have not attempted to identify individual sites. I have attached three maps that show where those areas are located. The first, Exhibit 4, shows the seismic hazard map across Missouri. The second map, Exhibit 5, shows railroads and major rivers within 165 miles west of the Labadie site. The third map, Exhibit 6, shows railroads, faults, sinkholes and landslide potential within 165 miles west of the Labadie site.

Q. Does this conclude your Cross- Surrebuttal Testimony?

A Yes.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Permission and Approval and a Certificate of Public Convenience and Necessity Authorizing it to Construct, Install, Own, Operate, Maintain and Otherwise Control and Manage A Utility Waste Landfill and Related Facilities at its Labadie Energy Center	))))))	File No. EA-2012-0281

AFFIDAVIT OF CHARLES H. NORRIS, P.G.

STATE OF COLORADO)
) ss
CITY OF DENVER)

Charles H. Norris, being first duly sworn on his oath, states:

1. My name is Charles H. Norris. I work in Denver, Colorado and am employed by Geo-Hydro, Inc. as a professional geologist and a hydrogeologist.
2. Attached hereto and made a part hereof is my Cross-Surrebuttal Testimony on behalf of Intervenors Labadie Environmental Organization and Sierra Club. The testimony consists of 24 pages and has been prepared for introduction into evidence in the above-referenced matter.
3. I hereby swear and affirm that my answers contained in the attached testimony are true and correct to the best of my knowledge and belief.

Charles H. Norris

Subscribed and sworn to before me this 13 day of September, 2013.

Notary Public

My Commission expires: 9/15/15

PAMELA GREY NOTARY PUBLIC STATE OF COLORADO

My Commission Expires 09/15/2015