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Bill Buscher
Illinois Environmental Protection Agency
Groundwater Protection
Division of Water Pollution Control
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Dear Mr. Buscher:

Subject: Ash Pond Closures at AmerenUE's Venice Plant

Union Electric Company d/b/a AmerenUE ("AmerenUE"), pursuant to 35 Ill. Adm. Code 620.250(a)(2), proposes to close the inactive ash pond system[1] at AmerenUE's Venice Power Plant, until recently subject to Illinois Environmental Protection Agency ("IEPA" or "Agency") Permit No. 2005-EO-3215. The approximately 300 acre plant site is located adjacent to the Mississippi River and straddles the county lines of St. Clair and Madison County. AmerenUE requests that the IEPA confirm that the proposed corrective action is being undertaken in a timely and appropriate manner, and establish a Groundwater Management Zone as a three-dimensional region containing groundwater being managed to mitigate impairment caused by the release of contaminants from this site. This letter and the referenced attachments are provided in support of AmerenUE's proposal. We note that our intent to pursue closure in this manner was discussed with IEPA staff in meeting late last year and described conceptually in my prior letter of January 19, 2010.

I. PROPOSED CLOSURE

Details regarding the proposed final capping and closure of the ash pond system at the Venice Power Plant ("Venice" or the "Site") and

[1] The ash pond system is located at the very southern end of the Venice Power Plant site and is comprised of two ash pond cells[1] (Nos. 2 and 3) (collectively, and unless specifically indicated otherwise, "the ash pond system").

requirements for the ongoing management of impacted groundwater in and around that impoundment system are provided in this document.
The former operation of ash ponds was regulated pursuant to the Board's Water Pollution Control rules. However, upon closure the ash ponds do not explicitly fit any of the types of facilities covered by the Illinois Pollution Control Board's regulations, including the Waste Disposal rules of Subtitle G. They are not landfills as defined in the Board's solid waste regulations. Recently, the Agency has determined that approval of an adequate corrective action and establishment of a Groundwater Management Zone (GMZ), in accordance with Title 35, Subtitle F, Chapter I, Part 620, Appendix D is an appropriate mechanism for closure of these ash impoundments. As described in detail below and shown in Figure 1, we have delineated the boundaries of a proposed GMZ associated with the inactive ash pond system at Venice. The proposed GMZ is conservative in that it covers a larger area than the mapped extent of Class I exceedances.

Figure 1
Proposed Monitoring Network and Groundwater Management Zone

- Existing MW Location
- Proposed Deep Well
- Proposed Watertable Well
- Existing MW Location Proposed for Abandonment
- Boron 2.0 mg/L concentration contour (Class I standard)
- Proposed Groundwater Management Zone

The dark blue line across the top of the page is an artifact of the I-70 overlay on the aerial photo

Pending before the Board is a proposed site-specific rule with respect to the closure of Ash Pond D at the Hutsonville Power Station (*Ameren Ashpond Closure Rules (Hutsonville Power Station) Proposed: 35 Ill. Adm. Code 840.101 through 840.144*, R09-21). That proposal also set out to create a new Subchapter to Subtitle G specific to Surface Impoundments and create a new Part 840, Site-Specific Closure of Surface Impoundments, under Subchapter j.[2] Based on Agency input, AmerenUE is not proposing to close the Venice impoundments via a site-specific rulemaking, however this proposal incorporates many of the agreed upon concepts and approaches embodied in the Hutsonville rulemaking (PCB R09-21) while recognizing the unique geographic characteristics and surrounding land uses of the Venice site. The Site is located in an industrialized region, groundwater on-site and off-site has been impacted from sources other than the ash pond system, and the use of groundwater for potable purposes is restricted by groundwater ordinances enacted by the surrounding municipalities of Brooklyn, Venice, and Granite City. In addition, a commercial/industrial use restriction for a portion of the Venice site has been recorded with the St. Clair County Recorder of Deeds ("Land Use Restrictions – Lot 101 Restricted to Industrial/Commercial", Book 3552, Pages 1105 to 1108, A01622412). Further, there are numerous physical constraints at the site including river levees, active rail lines and transmission towers which impact the closure of the ash impoundment system. The groundwater at and down gradient of the Site is not used for human consumption, irrigation, or any known industrial purpose. In fact, groundwater impacted by the ash pond system is for all practical purposes, inaccessible.

II. TECHNICAL SUPPORT DOCUMENTS

AmerenUE has performed two hydrogeologic investigations of the ash pond system including the installation and expansion of a groundwater monitoring well network and numerous soil borings. We have monitored groundwater quality associated with the ash pond system since 1996. Recently we performed direct-push groundwater sampling to determine, in part, the impact of the 2005 dewatering of the ponds on off-site impairments. In preparation for final closure of the ash pond system, AmerenUE evaluated capping and groundwater management alternatives and modeled their likely outcomes. Supporting documentation is contained in a number of Reports and Technical Memorandums which are referenced throughout this letter and included as Appendices.

[2] Ameren recognizes that the Board must obtain the number of the new Part from the Secretary of State who may determine that 840 is not the appropriate number for the new Part.

III. THE SITE AND THE AREA AFFECTED BY THE CONTAMINANT PLUME

The Venice Power Plant site is located along the banks of the Mississippi River and across the river from the City of St. Louis, Missouri in a heavily industrialized stretch of the river[3]. Industrial facilities have populated this area since the early 1900s. Due to the lack of industrial waste treatment during much of the twentieth century, former lakes and stream channels in the vicinity of industrial waste sources, past or present, are possible repositories of industrial wastes. In recognition of these historical practices and that certain chemical constituents in the groundwater beneath much of Madison and St. Clair Counties may exceed Class 1 water quality standards for potable resource ground water, the City of Venice and the Village of Brooklyn have enacted ordinances prohibiting the use of groundwater as a potable water supply.[4]

AmerenUE's property holdings in this area are bordered by the Mississippi River to the west and an active rail line corridor and rail yards to the south and east. See the enclosed "Venice Property Control Map" Rev 3 dated 03/2010. It is, therefore, physically segregated from the residential municipalities located east of the rail corridor. The ash pond system was constructed in the early 1950s in conjunction with the flood levee system that was upgraded and relocated to the banks of the Mississippi River. The western berm (approximately 1100 feet) of the ash ponds forms the dike that is part of the United States Army Corps of Engineers ("Corps") flood levee system.[5] As such, it cannot be structurally compromised; any modifications are subject to the Corps jurisdiction. The southern berm of Ash Pond No. 3 is just inside the southern property boundary. The Venice Site is west of the City of Venice and the Village of Brooklyn, Illinois. Drinking water for these municipalities is supplied by the Illinois American Water Company through a surface water intake located at the Mississippi River, upstream of the Site. Adjacent property owners and easement holders include the Terminal Rail Road Association, Kansas City Southern, Missouri Central Railroad, and the Norfolk Southern Railroad. Natural gas and oil pipeline easements are located on the river bank just west of the

[3] Historical records such as Sanborn maps from 1907, 1950 and 1962 reflect that surrounding land use included creosote plants, corn products refining, rail yards, rail tie storage yards and plaster mills. All of these facilities are up gradient of the site. Virtually all of these operations are now defunct. The 2000 Hydrogeologic Assessment provides an interpretation of the features depicted on these Sandborn maps.

[4] In recognition of the industrial nature of the area and historical waste practices, the cities of East Saint Louis, Wood River, Granite City and the Villages of Brooklyn and Sauget – located in St. Clair and Madison counties – have all enacted groundwater use restriction ordinances.

[5] While located on Ameren property, the river levee was constructed for flood control purposes in the 1950s and is maintained by the Metroeast Sanitary Levee District (per agreements dated May 9, 1952 and March 1, 1956). It is certified by the Corps who must approve all activities that could potentially impact the stability or integrity of the levee.

levee and ash ponds. Various AmerenUE high voltage transmission lines cross the area and at least one transmission tower is located within the ash pond basin. The industrial character of the area is unlikely to change.

The Illinois and Missouri Departments of Transportation intend to construct a new Mississippi River Bridge that will be located approximately 1000 feet south of the Venice site. The Illinois Department of Transportation ("IDOT") requested an easement from AmerenUE to build an access road for the bridge project. The road will be located on top of ash pond berms to the east. Construction contractors for the project will be utilizing railroad property immediately south of Ash Pond No. 3 for a lay-down area and continuation of the bridge access road.

Ameren has been in communication with the local municipalities regarding the closure of the ash pond system and there are no zoning restrictions or municipal requirements which preclude implementation of this proposed rule. Since the river levee forms the western berm of the ash pond system and once engineering designs have been completed, the Corps will need to approve aspects of the closure plans so as to ensure the structural integrity of the levee. The Venice Power Plant is the only source affected by this proposal.

Historical Operation of Ash Pond System

From approximately 1942 until the mid-1970's, the Company operated Venice as a coal-fired electric generating facility. The primary water source for the facility is the Mississippi River via two intake structures. In the 1970's, the Company converted the plant generators to burn either natural gas or oil.[6] Prior to the fuel conversion, the Company managed coal-combustion wastes, along with waste waters from the boilers, water treatment plant, and various other process waters plus storm water runoff, in a series of ponds referred to as Ash Pond Nos. 2 and 3 (collectively, "the ash pond system"). The ash pond system was constructed in the 1950s and is unlined, consistent with the engineering and design practices of that time. The ash pond berms were constructed from indigenous earthen materials. Ash has not been disposed of in the system since 1977.

During active operations, Ash Pond No. 2 and Ash Pond No.3 (collectively the ash pond system) were permitted to handle 116 and 194 million gallons, respectively, of boiler process waters and storm waters. Coal ash, a by-product of the combustion process, was removed from the boilers and wet sluiced to the impoundment system via pipelines. During the operation of the ash pond system, coal ash and other coal combustion byproducts

[6] In 2003, as a result of a catastrophic fire at the site, the Company abandoned the power plant building and associated generating equipment. Beginning in 2004, AmerenUE installed three additional simple-cycle combustion turbine generators (Units 3, 4 and 5) which are located north of the ash pond system. The Venice Plant operates only intermittently as a peaking facility.

(CCBs) settled within Pond Nos. 2 and 3 and supernatant was discharged to the Mississippi River. After the fuel conversion (to natural gas or oil), the Plant continued to discharge process wastewater and storm water runoff into the ash ponds, however the outfall to the River was eliminated. As a result, water ponded within the basins and eventually dissipated.[7] Authorization for operation of the ash ponds continued until expiration of the facility's Water Pollution Control Permit (No. 2005-EO-3215) on January 31, 2010. The two ponds are connected via an overflow pipe. There are approximately 1,425,500 cubic yards of CCBs located within the ash pond system. The depth of CCBs within the ponds is approximately 27 feet. As described below, borings advanced by Hanson Engineers, indicate the base of ash is at an elevation of approximately 400 feet MSL. Based on a review of groundwater monitoring well data conducted by Natural Resource Technology (also described below) ash is in contact with the groundwater during high water river stages that typically occur approximately 15% of the time.

Current Storm and Wastewater Treatment System

Beginning in 2004, AmerenUE installed three additional combustion turbine generating units (CTGs) at the Venice plant site. To both accommodate the CTGs and to isolate and dewater the ash pond system, AmerenUE constructed a storm water and waste water treatment system which is located north of Ash pond No. 2. In 2005, the Agency issued a revised NPDES permit for this new outfall to accommodate and regulate discharges to the Mississippi River from this wastewater system (NPDES Permit No. IL0000175). At the same time, the Agency re-issued a State Operating Permit allowing the ongoing use of the ash pond system for a full five-year term which terminated on January 31, 2010.[8] The wastewater treatment facility is a concrete structure consisting of several settling cells including a pre-sedimentation, an oil/water separator, and a sand filtration basin. The capital costs associated with constructing the treatment facility were approximately $750,000. With the installation of this treatment system, Ameren eliminated all discharges into the ash pond system. Thus, the ash pond system has been completely isolated since 2005. The water table beneath the ponds (and amount of saturated ash) has dropped considerably since that time. As it has remained out of service for many years, portions of the ash pond system are heavily vegetated.

[7] All of the plant's process wastewater and storm water runoff (e.g. building roofs, paved plant yards) continued to be transferred to the ash pond system until a new water treatment facility and outfall was constructed in 2005.

[8] In early 2005, the Company requested an interim six month extension to operate the ash pond system while the new treatment facility was being constructed and duly permitted. This followed an earlier commitment from the Company to the Agency to close the ash pond system and not seek renewal of the State Operating permit.

Hydrogeologic Assessments of Ash Pond System

Site Hydrogeology

The site is underlain by about 80 feet of alluvial deposits associated with the Mississippi River. The upper 20 to 30 feet of these deposits contain alternating layers of silt, sand, and clay; while the lower 60 to 50 feet primarily consist of sand and gravel. Groundwater is typically encountered at a depth of 20 to 30 feet.

Groundwater flow in the region is controlled by the Mississippi River. During normal river stage and the majority of the year, groundwater flow is towards and discharges into the river. During high river stage, ground water flow is reversed, with the river recharging the aquifer. Water levels within the monitoring wells rise and fall with the river stages.

1996 Assessment and Groundwater Monitoring System

In 1996 the Company retained Hanson Engineering to perform a hydrogeologic investigation to evaluate groundwater impacts associated with the ash pond system, as a condition of Venice's State Operating Permit (No. 1995-EO-3037). Their report "Hydrogeologic Investigation Former Ash Disposal Pond System, AmerenUE Venice Power Plant" describes the monitoring well system, data collected and site geology. A copy of this report was provided to the Agency in 2000 and is included as Appendix A. The three well groundwater monitoring network installed in 1996 was ultimately expanded to seventeen monitoring wells at varying depths and locations in and around the ash pond system. Monitoring wells 7 and 7P were installed to monitor off-site impacts to the south. Monitoring wells 2, 2P and 3 are located near the river bank to the east, and monitoring wells 8 and 9 are located off-site on railroad property to the west. Additional wells were installed along the perimeter of the ash ponds (MW 1, 4, 5, 5P, 6), and within the basins (MW AP-1, AP-1A, and AP-2). AmerenUE performs groundwater sampling on a quarterly basis and has submitted monitoring results to the Agency since 1996.[9]

2009 Assessment

In early 2009, the Agency issued requests to all of Ameren's Illinois power plants to establish groundwater monitoring systems and to perform hydrogeologic evaluations in connection with active ash pond systems. The Agency letter regarding Venice Plant was dated April 10, 2009 and it requested a hydrogeologic assessment and potable well survey for the Site. In response to that request and in anticipation of the expiration of the State Operating Permit and the need to initiate additional closure activities,

[9] Since 1996, the Company has monitored for arsenic, barium, boron, cadmium, chromium, copper, lead, manganese, nickel, zinc, pH and TDS.

Ameren retained NRT to update Hanson's 2000 assessment. The Company has been unable to draw groundwater samples from several shallow perched-zone monitoring wells on a consistent basis because the perched-zone has dissipated due to the dewatering of the ash pond system. NRT complied "Technical Memorandum No. 1, Potable Well Survey Hydrogeologic Assessment, and Modifications to the Groundwater Monitoring Program, Venice Ash Impoundment" dated September 17, 2009 to document this work and their findings. Ameren submitted this memorandum previously (with a letter to Mr. Alan Keller, dated September 18, 2009); a copy is included as Appendix B.

Subsequently, additional soil borings and groundwater grab samples were taken south of the Site and beyond the limits of the existing monitoring well network to delineate the extent of the off-site plume associated with the ash pond system. Ameren also asked NRT to identify or re-establish well locations to address the drop in the water table and identify sources of contamination and their contribution to concentrations detected in monitoring wells located down gradient of the ash pond system. NRT complied "Technical Memorandum No. 2, Supplemental Hydrogeological Assessment, Venice Ash Ponds" dated March 3, 2010 to document this work and their findings; it is included as Appendix C. NRT's memorandum delineates the extent of the off-site groundwater contamination and identifies potential up gradient sources of groundwater contamination and their contribution to the groundwater conditions near and adjacent to the ash impoundment system. It also includes an evaluation of the current monitoring well network and recommendations for establishing a monitoring well network appropriate to monitor the effectiveness of the proposed closure approach. This document summarizes the monitoring program AmerenUE intends to submit as part of the site closure plan.

Groundwater Impairments

Groundwater monitoring data show impairments above Class I Groundwater Quality Standards for the following parameters: iron, arsenic, boron, TDS and manganese.[10] Boron will be used as the representative constituent for ongoing groundwater assessments. Boron is typically used as an indicator of coal combustion byproduct plume migration since it is readily available from coal ash and relatively mobile. Direct-push groundwater samples obtained in October 2009 indicate that the extent of any southern groundwater impairments extend approximately 500 feet south of the southern property boundary. These off-site impairments only nominally exceed the Class I standard for boron of 2 mg/l.

[10] Manganese appears to be ubiquitous and therefore is not a reliable indicator of coal ash leachate.

Arsenic is present inside and outside of the boron plume at levels above the Class I standard. These data suggests that the ash pond system does not contribute a significant source of arsenic to groundwater. Instead, NRT concludes there is likely an alternative source of arsenic. Iron is also present inside and outside the plume in excess of the Class I standard, indicating that the ash ponds are not the source of iron. Manganese is also present inside and outside the boron plume in excess of the Class I standard. Because manganese is present in up gradient wells above Class I standards, but below detection limits in leachate, NRT concludes that there is another source of manganese as well, but the source may be natural rather than anthropogenic. Levels of TDS in the groundwater reflect dissolved concentrations of major ions in groundwater and, therefore, elevated concentrations are not necessarily associated with the ash ponds. Therefore, the data suggests that the ash pond system does not present a significant source of arsenic, iron, manganese, or TDS at these monitoring points.

Offsite, Ameren has confirmed that there is no possible use of the impacted groundwater. In addition, Ameren has been in communication with the adjacent property owner to the south, Terminal Rail Road Association (TRRA), regarding the proposed GMZ, future access to monitoring wells, and the prohibition of future installation of wells on TRRA's property for use of groundwater. On a portion of Ameren's site, a groundwater use restriction limits the future use of groundwater to industrial purposes only. Furthermore, Ameren believes that none of the groundwater impairments associated with the ash pond system significantly impact water quality within the Mississippi River. The estimated low flow of the Mississippi River at the Site is 46,500 cubic feet per second (cfs) and is four million times greater than the estimated groundwater flow into that receiving body. NRT calculated boron loading from the ash pond system to the river and compiled a report entitled "Technical Memorandum No. 3, Boron Loading to the Mississippi River from Venice Ponds 2 and 3" dated March 3, 2010; it is included as Appendix D. As stated previously, boron was chosen because it is readily available and is a very mobile indicator constituent of coal ash leachate. NRT used conservative assumptions as to hydraulic conductivity, water flow conditions and the highest observed concentration value (of 41 mg/l boron at MW4)[11] to calculate an estimate of the resulting incremental increase in boron in the Mississippi River due to discharge from the Venice ash ponds. The result was 0.0019 mg/L boron and this concentration is approximately an order of magnitude lower than the detection limit for boron as listed by USEPA. Accordingly, the loading calculations indicate that boron released from the ash pond system and by extension all other coal ash constituents are negligible and have no perceptible impact on water quality within the Mississippi River.

[11] The 41 mg/L boron concentration from MW4 is considered suspect because this monitoring well was drilled through coal ash. Monitoring wells that were not drilled through coal ash returned a maximum concentration of 14 mg/L. The use of a potentially anomalously high value is a conservative assumption in the loading calculation.

Based on the groundwater monitoring data and hydrogeologic assessment concluding that several of the groundwater exceedances are not likely attributable to the ash pond system, Ameren is proposing a closure scenario incorporates a protective cap, a GMZ, institutional controls, and groundwater monitoring. The intent of the selected closure scenario is to mitigate the source of groundwater contamination and reduce impacts from the ash pond system to the extent practical.[12]

Ameren anticipates that the approved GMZ will require monitoring of groundwater quality associated with the ash ponds to ensure that the selected closure scenario is working effectively. As discussed below we will submit a Closure Plan for Agency approval, which will include an obligation to perform ongoing trend analyses to identify statistically significant increasing trends in the impacted groundwater. Our plan will also commit Ameren to conduct additional investigation to determine the cause and possibly trigger corrective action if it is determined that a statistically significant increasing trend is attributable to the ash pond system.

IV. AVAILABLE TREATMENT OR CONTROL OPTIONS

As discussed above, in 2005 Ameren initiated its first phase of closure by eliminating discharges into the ash pond system and constructing and operating a storm water and waste water treatment facility. The re-routing of such storm and wastewaters has reduced the physical mechanism by which additional pollutant loading into the groundwater from the ash pond system can occur. Exceedences of Class I groundwater quality standards remain on and offsite. And until the ash pond system is capped, the release of additional leachate from precipitation onto and percolation through the impounded ash into the groundwater will continue.

Ameren has investigated a variety of control options to close the ash pond system in a way that protects human health and the environment. As discussed above, the ash ponds were constructed in the 1950s prior to the adoption of modern environmental regulations and requirements. As the Board acknowledged in Petition of Ameren Energy Generating Company for Adjusted Standards from 35 Ill. Adm. Code Parts 811, 812, and 814, AS 09-1 (Mar. 5, 2009), compliance with current landfill engineering and design standards is not feasible for ash ponds.

Ameren tasked NRT with analyzing alternatives that would bring the Site into compliance and included consideration as to the feasibility of various groundwater hydraulic controls. The alternatives are described in NRT's

[12] The use of a GMZ to address groundwater impacts from ash ponds has been used in connection with the closure of impoundments at generating facilities formerly owned by Illinois Power Company.

report entitled "Technical Memorandum No. 4, Evaluation of Closure Alternatives, Venice Ash Ponds" dated March 12, 2010 (included as Appendix E) and are discussed below. The viable closure options included three capping alternatives (compacted clay, geomembrane, earthen) and a variety of groundwater management options including institutional controls and installation of groundwater extraction wells. Ash removal and disposal was also considered.

The alternatives were evaluated by AmerenUE based upon a variety of considerations including (a) feasibility of construction and implementation; (b) effectiveness for (i) reducing surface water infiltration and resulting leachate generation and/or (ii) hydraulic capture; (c) economic considerations including capital cost and ongoing maintenance expenses when compared to the potential environmental benefit; and (d) appropriate and reasonableness of the alternative given external factors such as lack of human exposure to groundwater, the availability of restrictive ordinances and covenants, the potential for groundwater contamination from external sources and expected future land uses.

As mentioned previously, the physical configuration of the Venice site impacts the feasibility of implementing the available closure alternatives. The western berm comprises part of the river levee system. It cannot be compromised. In fact, the toe of the levee extends approximately 30 to 60 feet under the ash ponds. Accordingly, all subsurface construction activities that could impact the structural integrity of the levee are prohibited. In practice, the installation of slurry walls, collection trenches or extraction wells within 500 feet of the levee would require approval by the Corps and could be prohibited without extensive engineering analysis.

In addition, the IDOT access road and AmerenUE transmission towers are permanent physical features that must be accommodated under all closure scenarios. The final cap design and installation along the levee must be approved by the Corps as the membrane cap and slope would need to tie into the river levee. Ameren recognizes the Corps' jurisdiction at this site and will accommodate modification of the closure or post-closure care plans in the event the two agencies conflict regarding closure requirements.

Groundwater Management Alternatives Considered

Groundwater impacts from the ash pond system are not adversely impacting the Mississippi River and are predicted to decrease over time after the closure plan is implemented. Monitoring data reflects minor exceedances of Class 1 standards to the south of the property boundary. Furthermore, heavy industrial sources in the region may have contributed to historical groundwater contamination which eventually flows eastward towards the Mississippi River and beneath the site. Ameren's consultant, NRT, prepared a comparison of the available groundwater management alternatives. Based on this comparison and for the reasons set forth below,

Ameren determined that a cap in conjunction with a GMZ for managing on-site and off-site groundwater impacts and environmental land use restrictions will be protective of human health and the environment while also being economically reasonable and technically feasible. Each of the groundwater management alternatives is discussed in more detail below.

1. Groundwater Extraction

AmerenUE evaluated the feasibility of installing five extraction wells along the southern property boundary to hydraulically capture groundwater. Because the groundwater in the area is presumed to be contaminated from a variety of industrial sources unrelated to AmerenUE, the extracted water would need to be fully characterized in quantity and quality before it could be discharged to a sanitary sewer system. In 2003, a consultant investigated the possibility of discharging to the Metro East Sewer District ("MESD") Venice Pump Station and transfer to the Granite City Regional Wastewater Treatment Plant. Establishing this discharge would require inclusion of Venice Plant in the sewer district and physically connecting to the sanitary sewer located approximately one mile from the proposed wells. Due to the unknowns regarding the quantity and quality of groundwater the sewer district is able to receive, this alternative has tremendous technical uncertainty.

As an additional consideration, the variable groundwater flow due to the proximity to and influences from the Mississippi River bring the effectiveness of groundwater extraction wells into question. The direction of groundwater flow is dependent on Mississippi River flow/stage conditions which changes seasonally and in response to storm events. Over the long term, groundwater extraction wells would not be consistently mitigating impacts to groundwater caused by the ash pond system. It is the extremely high operating and maintenance costs, however, that make this alternative economically unreasonable for Ameren. The sanitary district calculates discharge fees based on property tax rates and the quantity of wastewater flows. NRT estimates Operation and Maintenance fees at $600,000 per year based on these sanitary sewer discharge fees. Such costs are economically unreasonable and not justified from any perspective. There are no groundwater receptors or potential human health impacts since there are no users of groundwater down gradient of the Site. The ash pond system is not negatively impacting water quality within the receiving body, the Mississippi River. Further, even if AmerenUE were able to implement some sort of groundwater extraction system, Class I Groundwater Quality Standards for various chemical constituents would still be exceeded due to historical industrial practices in the region, as evidenced by the local groundwater usage ordinances.

2. Ash Removal and Disposal

As part of its preliminary screening of viable alternatives, AmerenUE evaluated the feasibility of removing the source material and disposing of the ash in an off-site solid waste landfill. This alternative is neither technically feasible nor economically reasonable.

As estimated by NRT, costs associated with ash removal and off-site disposal is prohibitive and the technical feasibility of implementing this option is questionable. The costs associated with the excavation, removal, and transport, of nearly 3 million tons of ash for disposal at a solid waste landfill are exorbitant. The cost of excavation and off-site disposal is estimated at approximately $200 million. The Cahokia-Roxford transmission line run north-south across the ash ponds and two transmission towers are located within the basins. In order to excavate ash, these towers would need to be relocated and there is simply no suitable substitute location. Furthermore, the removal of any significant amount of ash creates a surface depression behind the levee that will create a "sink" for ground and surface water to pool. Such ponding increases seepage and could adversely impact the structural integrity of the river levee. To minimize such risk, suitable fill material would need to be trucked to the site to fill in the depression. Therefore, this alternative was not considered viable because of the technical uncertainties and the very high cost compared to other alternatives.

3. GMZ and On and Off-Site Land Use Restrictions

Ameren is requesting establishment of a GMZ extending over the footprint of the ash pond system to manage the on-site contamination and reliance on institutional controls and groundwater monitoring to manage offsite impacts to groundwater. A GMZ recognizes specified areas and contaminants on a site that are not in compliance with applicable groundwater quality standards and contemplates appropriate corrective actions for long periods of time.

Institutional controls are already in place for the municipalities of Brooklyn, Granite City, and Venice. And, as stated previously, Ameren is in discussion with TRRA regarding the need to avoid the use of impaired groundwater at their site. Offsite institutional controls already prohibit the use of groundwater for potable or irrigation purposes. Because they are currently in place, such groundwater ordinances and deed restrictions offer immediate and permanent control of access to the impacted groundwater.

The proposed on and off-site groundwater management approach recognizes the historical industrial land use of the area and the inherent difficulty in establishing background baseline concentrations at the Site. The selected groundwater management scenario is also appropriate given the potential for off-site contamination from sources unrelated to

AmerenUE. Groundwater in the area is not used for human consumption and the local municipalities are connected to a public water supply system operated by American Water Company of Illinois and which draws from the Mississippi River as its water source, not the groundwater aquifer. Finally, groundwater use restrictions already exist on and off-site.

Selected Closure Scenario

After consideration of the available groundwater management and cap alternatives considered, and based on the technical, economic, and environmental considerations discussed in more detail below, Ameren proposes to allow the existing ash to remain in place. Installation of an engineered cap will reduce the production of leachate and provide further groundwater protection which will improve the current environmental condition. Ameren selected a geosynthetic membrane cap and final cover system as this closure option is both technically feasible and economically reasonable. Ameren's Closure Plan will propose a final slope to meeting the stability criteria of 35 Ill. Adm. Code 811.304 and the cap and final cover system will be designed in accordance with the performance criteria for geosynthetic membrane caps set forth in 35 Ill. Adm. Code 811.314. This solution is protective of the environment by requiring capping techniques that comport with performance and stability criteria from the landfill regulations. Our proposal is conditioned upon the establishment of a GMZ and commits to ongoing trend analyses which are intended to recognize the existing, on-going impacts to the groundwater as well as monitor groundwater to ensure that the final closure scenario is protective. Ameren's proposed closure scenario includes the features summarized below:

- A geosynthetic membrane with soil cover.
- Stormwater management during and post-construction.
- A GMZ established both on and offsite (assuming TRRA endorses this proposal).
- Nine additional monitoring wells to be installed to the west, north, and south.
- Monitoring for all 35 Ill. Adm. Code 620.410(a) and (d) constituents except radium 226 and 228 and cadmium, copper, lead, nickel and zinc, as noted in Appendix C, Technical Memorandum No. 2.
- Boron selected as the indicator contaminant for assessment monitoring of concern due to its high mobility and association with ash pond leachate.

Final Cover System Design

As stated above Ameren has determined that the geosynthetic membrane cap is an economically viable and environmentally justified option because it will mitigate the infiltration of surface water.

Before reaching this decision, Ameren evaluated a number of materials including the synthetic geomembrane product, compacted clay, and layered earth. NRT used the Hydrologic Evaluation of Landfill Performance (HELP) model to estimate and compare the rate and volume of percolation from the ash pond system using various cap materials (see NRT's "Technical Memorandum No. 5, Predicted Change in Percolation, Venice Ash Impoundment" dated March 12, 2010 which is included as Appendix F). While the underlying variables and estimated contingencies varied among the particular options, preliminary estimates of construction capital costs to cap the pond system ranged from $7.5 to $13.7 million dollars. Ameren selected the geomembrane product, at an estimated capital cost of $11.2 million, as it is a known and certain technology that is readily available, meets the performance criteria set forth in the landfill regulations (35 Ill. Adm. Code 811.314(b)), and outperforms the other options. NRT's modeling of surface water infiltration estimates that the current percolation volume of 1,120,000 cubic feet per year (ft^3/yr) will be reduced to approximately 116 ft^3/yr after installation of the proposed synthetic cap.

We note that at present, the current grade of the impoundments is below the surface height of both the western (levee) berm and railroad embankment to the east. The stability of both berms must be maintained and therefore considerable material movement within the ponds may need to occur in order to establish appropriate slope and grading for surface water management and installation of the cap.

V. ENVIRONMENTAL IMPACT OF PROPOSED RULE

Ameren has assessed the environmental impact of the selected closure scenario, and found it to be protective of human health and the environment.

As discussed in Hanson's 2000 assessment and confirmed in NRT's 2010 update, groundwater flows towards the Mississippi River. Ameren determined potential impacts of groundwater discharge to the river and concluded that the ash pond system does not adversely impact the Mississippi River as the site-specific loading calculations show the impact of the Venice ash pond system on River water quality to be negligible.

The proposed rule will also be protective of human health and the environment because there is no use of the groundwater in or around the site and no future use is possible given the presence of the railroad on adjacent property, environmental land use controls, and municipal

ordinances including: the City of Venice (Ordinance No. 00-6), the Village of Brooklyn (Ordinance 09-006), and the City of Granite City (Ordinance No. 7529) which preclude the potable use of groundwater. Further impacts to groundwater will be mitigated by the installation of a cap and cover system which will prevent future infiltration and allow for natural attenuation. Moreover, due to the adjacent railroad, future property uses of that site are expected to remain the same without any anticipated use of the groundwater. Despite all of these circumstances, AmerenUE has established appropriate groundwater use restrictions for the site to ensure that the groundwater is not used for potable purposes in the future.

Accordingly, the rare circumstances of extraordinarily high costs to remediate groundwater coupled with the lack of potable uses of groundwater now or in the future at the Venice site merit the use of the proposed final closure scenario. Moreover, the technical justification in support of this proposal demonstrates that this combination of compliance alternatives will be protective of human health and the environment.

In order to predict the change in contaminant concentrations following implementation of the proposed final cover system, NRT was tasked with modeling the fate and transport of the existing boron plume. Their report, entitled "Technical Memorandum No. 6, Groundwater Modeling of Venice Former Ash Ponds" dated March 12, 2010 is included as Appendix G. As described in this technical memorandum, NRT was tasked with developing a fate and transport model to simulate changes in groundwater quality resulting from capping the Venice Plant ash ponds. The "Base Case" was assumed to be the geosynthetic final cap as proposed in this request, with installation occurring in 2011. Three model codes were used to simulate groundwater flow and contaminant transport: leachate percolation and aquifer recharge was modeled using the Hydrologic Evaluation of Landfill Performance (HELP) model; groundwater flow was modeled using MODFLOW; and contaminant transport was modeled using MT3DMS. The model was calibrated to simulate observed groundwater head data, and then to observed concentration data and trends from 2000 to 2009. Boron was modeled for the reasons cited previously. The model was configured to simulate the fluctuations in groundwater elevation and flow direction caused by changes in Mississippi River stage. The model predicts that groundwater quality will improve over time, as leachate percolation from the impoundments is reduced following installation of the geosynthetic cover. Under the Base Case scenario the model suggests that concentrations in all monitoring wells will stabilize below the 2 mg/l Class I boron standard within 13 to 20 years, with the sole exception of on-site well MW-6. Concentrations on-site at MW-6 were slowly decreasing at the end of the 20 year period and a linear interpolation of the trend suggests that concentrations will be lower than the Class I standard at this location after approximately 28 years.

Finally, Ameren's proposed Closure Plan will ensure that the synthetic cap is effective and will not result in further degradation of groundwater quality by requiring ongoing groundwater monitoring obligations based on the results of trend analyses. The Plan would require investigation of increasing trends and if a trend is determined to be statistically significant and attributable to the ash pond system, it will require Ameren to take corrective action. The groundwater monitoring data and analyses will be submitted to the Agency on an ongoing basis throughout the closure and post-closure care periods.

VII. REQUESTED AGENCY ACTIONS

Following Agency review of this submittal, and assuming that you concur with the proposed remedy as described above, we understand that you will issue a public notice regarding your intent to establish a GMZ for the Venice site. At that time, we would forward both the Agency notice, and a copy of this request to the Corps of Engineers, to initiate substantive discussions regarding the cap and cover design to evaluate and resolve any concerns the Corps may have regarding the levee. Again, assuming comments from both the public and the Corps can be addressed, we ask that a final decision be reached to establish the GMZ.

VIII. AMEREN'S RESPONSE TO THE ESTABLISHMENT OF A GMZ

Upon establishment of the GMZ, Ameren will finalize and submit a Closure Plan and Completion of Closure Report and Post-Closure Care Plan, for review and approval by the Agency. The principal components of these plans are outlined below:

1) Closure Plan

a) Summary of Supporting Documents (i.e. Technical Memorandums including the Supplemental Hydrogeologic Assessment, Predicted Change in Percolation Rates, Boron Loading to the Mississippi River, and the Modeled Change in Contaminant concentrations Following Closure)
b) Final Delineation of the GMZ
c) Groundwater Monitoring Plan
    i) Monitoring Well System
    ii) Monitoring Program
        (1) Parameters
        (2) Monitoring intervals
        (3) Reporting
        (4) Analytical and Quality Assurance/Quality Control methods

d) Performance Assessment Plan (trend analyses methodology)
e) Final Cover System Design (60%)
f) Construction Quality Assurance Plan
g) Final Slope and Berm Stability Analysis

2) Completion of Closure Report and Post Closure Care Plan

a) Report/Certification of Completion (of final cover installation)
b) Post Closure Care Plan
   i) Maintenance of the Cover System
   ii) Inspections and Corrective Actions
   iii) Groundwater Monitoring Program
   iv) Performance Assessment Plan

IX. CONCULSIONS

We believe the discussion above in conjunction with the technical documents contained in the appendices, adequately and appropriately characterize the groundwater contamination associated with the historic operation of the AmerenUE's Venice Power Plant. As replacement water treatment facilities for the Plant are in-place and fully functioning, Ameren is proposing to close in-place the old ash ponds, utilizing a final cover consisting of a geosynthetic membrane, overlain by three feet of soils, and followed by establishment of vegetation. Ameren believes that the proposed closure plan constitutes "an adequate corrective action, equivalent to a corrective action process approved by the Agency" (in accordance with 35 Ill. Adm. Code 620.Appendix D). We therefore request the Agency to establish a Groundwater Management Zone to facilitate implementation of this remedy. Finally, we note that as part of the *Missouri-Illinois Bridge Project*, the Illinois Department of Transportation ("IDOT") has requested an easement along the eastern and southern edge of the ash impoundments system to construct an access road for bridge construction and/or maintenance. The final closure plan proposed by Ameren and approved by the Agency must therefore allow for modifications to accommodate any future IDOT requests. Please do not hesitate to call me or Michael Bollinger at 314-554-3652, if you have any question or comments this proposal, or believe a meeting to discuss our request would be helpful.

Sincerely,

Michael F. Bollinger for

John C. Pozzo, Managing Supervisor
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cc: Nathaniel O'Bannon III
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