Burns & McDonnell
SINCE 1898

April 5, 2011

Mr. Tom Shaw
Big Rivers Electric Corporation
201 Third Street
Henderson, KY 42420-2903

Re: Revised Final Report for Coal Combustion Residual Master Planning Study for Coleman, Sebree, and Wilson Stations and Project Completion

Dear Tom:

Enclosed (transmitted via US Mail) is one hard copy of our revised final report for the Coal Combustion Residual (CCR) Master Planning Study that we performed for the Coleman, Sebree, and Wilson Stations. We have also provided an electronic PDF copy via email.

We have enjoyed working with you on this study, and we look forward to working with you on future projects. Please contact me with any questions or additional comments.

Best regards,

Ed Tohill, P.E.
Project Manager

Enclosure
cc: (all via email)
J. Gander J. Eichenberger
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Coal Combustion Residuals
Master Planning Study

prepared for

Big Rivers Electric Corporation
Henderson, Kentucky

January 2011

Burns & McDonnell Project No. 57935

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

Burns & McDonnell
SINCE 1898

INDEX AND CERTIFICATION

Big Rivers Electric Corporation
Coal Combustion Residuals Master Planning Study

Project 58268

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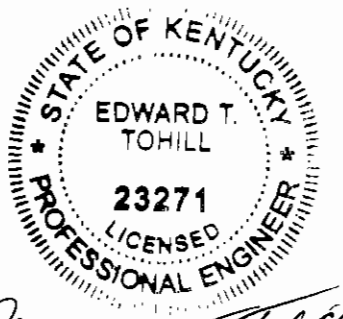
Certification

I hereby certify, as a Professional Engineer in the state of Kentucky, that the information in the document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by the Big Rivers Electric Corporation or others without specific verification or adaptation by the Engineer. This certification is made in accordance with the provisions of the laws and rules of the Kentucky State Board of Licensure for Professional Engineers and Land Surveyors under Kentucky Administrative Code.



Edward T. Tohill
04/04/11

Edward T. Tohill, P.E., Kentucky License #23271
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1.0 EXECUTIVE SUMMARY

Burns & McDonnell was selected by Big Rivers Electric Corporation (Big Rivers) to perform a Coal Combustion Residual (CCR) Master Planning Study for Big Rivers' coal fleet. The purpose of the CCR Master Planning Study is to assist Big Rivers in assessing their current CCR management and developing a preliminary plan, including budgetary costs and schedule, for complying with the proposed federal CCR rules.

Big Rivers' coal fleet includes units at Kenneth C. Coleman, D.B. Wilson, and Sebree that are evaluated in this study. The scope of this study includes the development of conceptual compliance alternatives for each facility along with planning level capital cost estimates and schedules for each alternative to assist Big Rivers in understanding the range of investment involved in compliance with the proposed regulations. Big Rivers should use the information presented in this study to evaluate implications of the proposed regulations on future plant viability. Should a regulation be promulgated and Big Rivers decide continued operation is merited, then Big Rivers should implement a project definition study to further define the preferred option including development of budget level costs and implementation schedules.

Both proposed regulatory scenarios and all proposed options will require the installation of groundwater monitoring wells around all CCR disposal facilities within 1 year of the effective date of the new CCR disposal regulations. Further, they will necessitate closure of the full portions of the existing ponds onsite to avoid required retrofitting the ponds with new composite liners.

Burns & McDonnell identified three conceptual alternatives that allow continued operation of the facilities and achieve compliance with the co-proposed RCRA Subtitle D regulations for the Coleman and Sebree plants:

Coleman:

- Option A: Installation of a composite liner to retrofit the remaining capacity of the existing ponds and allow for continued use of the existing facilities until all of their disposal capacity is utilized.
- Option B: Investment in a wet to dry ash handling conversion and the construction of a new landfill for CCR disposal.
- Option C: Construction of a new CCR disposal pond with a composite liner and lining of the sluice pond with a composite liner.

Sebree:

- Option A: Installation of a composite liner to retrofit the remaining capacity of the existing ponds and allow for continued use of the existing facilities until all of their disposal capacity is utilized.
- Option B: Investment in a wet to dry ash handling conversion.
- Option C: Complete removal of CCR material from the existing ponds and lining both ponds with a composite liner.

Burns & McDonnell identified only one option for Wilson that allows continued operation of the facilities and achieves compliance with the co-proposed RCRA Subtitle D regulations. That option would be to develop all future portions of the landfill in accordance with the adopted regulations after their effective date.

Each of these options are described in further detail in Sections 3.0, 4.0, 5.0 for Kenneth C. Coleman, D.B. Wilson, and Sebree, respectively. The planning level capital and operating cost estimates for Subtitle D compliance options are summarized in Table 1-1 along with the estimated service life assuming an effective date of January 1, 2017 for the new Subtitle D regulations.

The co-proposed RCRA Subtitle C regulations will not allow surface impoundments. If these regulations are adopted, Big Rivers would be required to cease operation within five years and cap and close the ponds within seven years of the effective date. The planning level capital and operating costs for compliance with Subtitle C are also shown in Table 1-1 along with the estimated service life assuming an effective date of January 1, 2019 for the new Subtitle C regulations (Note that the effective date for Subtitle C is estimated to be two years later that Subtitle D). Also included in Table 1-1 are the additional estimated annual costs for operations and maintenance with regards to groundwater monitoring and third party berm inspections which are in addition to Big Rivers' current operations and maintenance costs. There will be additional costs for storing, handling, and tracking the disposal of this material under Subtitle C, but those requirements have not been clearly defined by the EPA to date so these costs have been excluded from this study. The estimated service life for the Subtitle C option shown in Table 1-1 is based on an assumed compliance date of January 1, 2019 for the new Subtitle C regulations. Due to the fact that the ponds at Coleman and the landfill at Sebree are not expected to be in service for more than six years, Big Rivers would need to have their CCR disposal structures (landfills and/or ponds) built by January 1, 2017 even though they are not required to have this done until January 1, 2019 under the proposed Subtitle C regulations.

Table 1-1: Summary of Planning Level Capital and Operating Cost Estimates for Compliance with Co-proposed CCR Regulation Scenarios

Coleman	Estimated Capital Cost ($ Millions)	Additional Estimated Annual Operations & Maintenance ($ Millions)	Estimated End of Service Life	Estimated Closure Costs ($ Millions)
Subtitle D Compliance				
Option A	$70.4	$0.15	2018(1)	$3.7
Option B	$104.8	$0.01	2027(1)	$0.8
Option C	$68.7	$0.18	2027(1)	$2.2
Subtitle C Compliance	$104.8	$0.01	2027(2)(3)	$0.8
Wilson				
Subtitle D Compliance	$17.5	$0.13	2025(1)	$7.3
Subtitle C Compliance	$17.5	$0.13	2025(2)(3)	$7.3
Sebree				
Subtitle D Compliance				
Option A	$52.3	$0.15	2027(1)	$14.0
Option B	$96.5	$0.15	2027(1)	$12.8
Option C	$60.7	$0.15	2025(1)	$22.2
Subtitle C Compliance	$96.5	$0.15	2027(2)(3)	$12.8

(1) Assumes effective date of January 1, 2017

(2) Assumes effective date of January 1, 2019

(3) There will likely be additional capital and O&M costs for storing, handling, and tracking the disposal of this material under Subittle C, but those requirements have not been clearly defined by the EPA to date so these costs have been excluded from this study.

Big Rivers should note that the currently proposed Subtitle C regulations will not allow for the construction of new CCR landfills in a seismic impact zone. The EPA is proposing to define seismic impact zones as areas having a two percent or greater probability that the maximum expected horizontal acceleration in hard rock, expressed as a percentage of the earth's gravitation pull (g), will exceed 0.10g in 50 years. This would require that all CCRs be trucked to offsite disposal facilities developed a minimum of 55 miles from Coleman, 70 miles from Sebree, and 100 miles from Wilson (see Figure 3-5). This would result in additional annual dry disposal hauling costs of approximately $11.6 million for Coleman, $14.7 million for Wilson, and $61.8 million for Sebree. The proposed Subtitle D regulations

would allow for the construction of a landfill closer to the plants; however, Big Rivers would need to demonstrate that the landfill is designed to resist the maximum horizontal acceleration in lithified earth material. In this case, there would be little additional annual dry disposal hauling costs compared to those associated with the Subtitle C regulations.

* * * * *

2.0 ENVIRONMENTAL PROTECTION AGENCY PROPOSED RULES

In January 2009, the Environmental Protection Agency (EPA) began activity to develop federal rules to regulate coal combustion residuals (CCRs) in response to the December 2008 CCR surface impoundment failure at the TVA Kingston Plant. For the purposes of the proposed regulations, CCRs means fly ash, bottom ash, boiler slag, and flue gas desulfurization materials destined for disposal. After gathering information from a number of utilities across the country, the EPA developed the proposed federal CCR rules and published them to the Federal Register on June 21, 2010. The proposed federal CCR rules actually contain two co-proposed scenarios for regulating CCRs under the Resource Conservation and Recovery Act (RCRA). The first co-proposed scenario would list CCRs as a special waste and regulate them through RCRA Subtitle C. The second co-proposed scenario would regulate CCRs by establishing national minimum criteria and regulating them through RCRA Subtitle D. A summary of the co-proposed RCRA Subtitle C and RCRA Subtitle D options are provided in Sections 2.1 and 2.2.

With these federal CCR regulations, the EPA is not proposing to change the May 2000 Regulatory Determination for beneficially used CCRs. However, the EPA is clarifying this determination to only allow for encapsulated beneficial uses, such as the use of fly ash in concrete or gypsum in wallboard. Unencapsulated uses such as fills in sand and gravel pits and other mass fills, however, would be prohibited. The EPA is also not proposing to address the placement of CCRs in mines, or non-minefill uses of CCRs at coal mine sites with these regulations. Rather, the EPA will be working with the Office of Surface Mining to develop federal regulations to ensure that the placement of CCRs in minefill operations is adequately controlled.

2.1 SUMMARY OF CO-PROPOSED RCRA SUBTITLE C OPTION

Under the proposed RCRA Subtitle C regulations, the EPA is proposing to list CCRs as a special waste. The CCRs would be regulated from the point of their generation to the point of their final disposal, including during and after closure of any impoundment or landfill facility. One key component of this RCRA Subtitle C option is that the land disposal restrictions of handling wet phase materials effectively phases out CCR surface impoundments as disposal facilities. Per Part 268.21.(b) of the proposed Subtitle C regulations (located on page 35262 of the proposed rules published in the Federal Register), wastewaters specified as EPA Special Waste Number S001 (i.e., wastewaters containing coal combustion wastes generated by the electric power sector and with more than 100 mg/L total suspended solids) are prohibited from land disposal. The EPA believes these requirements will have the effect of prohibiting

disposal of wet-handled CCRs in surface impoundments after the prohibition takes effect five years after the effective date of the rules.

The RCRA Subtitle C option provides requirements for handling and managing of CCRs, such as location restrictions, composite liner requirements, leachate collection system requirements, fugitive dust control, groundwater monitoring, financial assurance, closure and post-closure care, and inspection requirements for CCR surface impoundments. These requirements are summarized in the sections that follow.

2.1.1 Location Restrictions

While the EPA is proposing to subject existing CCR landfills to only two location restrictions, floodplains and unstable areas, new landfills (or lateral expansions of existing landfills) would be required to comply with all of the location restrictions: wetlands, floodplains, fault areas, seismic impact zones, and unstable areas. The EPA definition of an existing CCR landfill is "a CCR landfill which was in operation on, or for which construction commenced prior to the effective date of the final rule. A CCR landfill has commenced construction if the owner or operator has obtained Federal, State, and local approvals or permits necessary to begin physical construction and either (1) a continuous onsite, physical construction program has begun or (2) the owner or operator has entered into contractual obligations which cannot be cancelled or modified without substantial loss for physical construction of the CCR landfill to be completed within a reasonable time."

These location restrictions are summarized as follows:

Wetlands

New CCR landfills (or lateral expansions of existing landfills) would require a demonstration that the disposal unit design mitigates any potential adverse impact on existing wetlands and is not in a prohibited area as defined by the regulation.

Floodplains

All CCR landfills would not be allowed to be located in a 100-year floodplain unless it is demonstrated that the unit would not restrict the flow of the 100-year base flood, reduce the temporary storage capacity of the floodplain, or result in washout of solid waste, so as to pose a hazard to human life, wildlife, or land or water resources.

Fault Areas

New CCR landfills (or lateral expansions of existing landfills) shall not be located within 200 feet of faults that have experienced displacement during the Holocene Epoch.

Seismic Impact Zones

New CCR landfills (or lateral expansions of existing landfills) shall not be located in a seismic impact zone. The EPA is proposing to define seismic impact zones as areas having a ten percent or greater probability that the maximum expected horizontal acceleration in hard rock, expressed as a percentage of the earth's gravitation pull (g), will exceed 0.10g in 250 years.

Unstable Areas

All CCR landfills would not be allowed to be located in unstable areas unless it is demonstrated that the integrity of the structural components of the unit will not be disrupted.

2.1.2 Bottom Liner and Leachate Collection System Requirements

The proposed bottom liner technology requirement is a composite liner system consisting of two components: a lower minimum two-foot layer of compacted soil with a maximum hydraulic conductivity of $1x10^{-7}$ cm/sec overlain by an upper minimum 30-mil flexible membrane liner (minimum 60-mil thickness if high density polyethylene is used). The leachate collection system must be designed and constructed to maintain less than a 12-inch depth of leachate over the composite liner.

The requirements would apply to new CCR landfills (or lateral expansions of existing CCR landfills) and existing CCR surface impoundments. These requirements would not apply to new CCR surface impoundments as they are effectively not allowed under the RCRA Subtitle C option. Existing CCR landfills are not subject to be retrofitted for these bottom liner and leachate collection system requirements. No mention has been made specifically in the proposed RCRA Subtitle C regulations as to whether or not runoff ponds associated with existing CCR landfills would be subject to these bottom liner requirements. It may become subject to the EPA's evaluation of these runoff ponds individually and ultimately may be dependent on the amount of CCR material carryover into these existing runoff ponds. For the purposes of this study, estimated costs for retrofitting runoff ponds associated with existing CCR landfills with bottom liner systems have not been included.

2.1.3 Fugitive Dust Control

For fugitive dust control, the EPA is establishing a minimum particulate matter level standard which they believe could be achieved with wet conditioning of the CCRs. The EPA defined wet conditioning of CCRs as adding water to a moisture content that prevents wind dispersal, facilitates compaction, but does not result in free liquids. Trucks or other vehicles transporting CCRs are to be covered or otherwise managed to control wind dispersal of dust.

2.1.4 Groundwater Monitoring

For all existing and new CCR landfills and existing surface impoundments, groundwater monitoring requirements include establishment of a network of monitoring wells around the CCR landfills and/or surface impoundments. During establishment of the groundwater monitoring network, four quarterly samples will be needed from each well to establish a background groundwater profile, and subsequent monitoring sampling is to occur semi-annually.

2.1.5 Financial Assurance

Financial assurance must be adequate to cover the estimated costs of closure and post-closure care, and specific levels of financial assurance are required to cover liability for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility.

2.1.6 Closure and Post-Closure Care

Closure of the disposal facilities requires a final cover system that must have a permeability less than or equal to the permeability of any bottom liner system and must minimize the migration of liquids through the closed landfill. Additionally, the regulations require 30 years of post-closure care, including maintenance of the final cover and groundwater monitoring, unless an alternative post-closure period is established by EPA or the authorized state.

2.1.7 Inspection Requirements for CCR Surface Impoundments

The EPA is proposing that inspections of existing CCR surface impoundments be conducted every seven days by a person qualified to recognize specific signs of structural instability and other hazardous conditions by visual observation and, if applicable, to monitor instrumentation. Further, the EPA is proposing to require an annual certification by an independent registered professional engineer that all construction, operation, and maintenance of CCR surface impoundments is in accordance with the approved state plan.

2.1.8 Implementation Schedule

In states such as Kentucky where the state is authorized to administer the RCRA program, the requirements that are a part of the RCRA program would become effective when that state adopts the rules into the program. This is required to occur within one year if that state can do so by regulation and two years if required by legislative action. The EPA does recognize, however, that historically this process has taken two to five years, if not longer, for rules to become federally enforceable.

For the purposes of this report, Burns & McDonnell has assumed that the proposed RCRA Subtitle C regulations are issued on July 1, 2011 (no indication this is a target deadline – used for discussion purposes here). Following this date, each state will have an estimated 30-month window assumed for adoption of the new state regulations. Based on these estimates and assumptions, the effective date for these RCRA Subtitle C regulations would be January 1, 2014, Big Rivers' disposal facilities would need to be modified to comply with the new Subtitle C regulations as early as January 1, 2019 based on the general 5-year implementation schedule for any operation and disposal changes proposed in the Subtitle C regulations.

2.1.8.1 Existing and New CCR Landfills

Existing landfills at the effective date of the requirements would be required to have groundwater monitoring installed within one year of the effective date of the rule, but they would not be subject to the location restrictions, bottom liner, or leachate collection system requirements of the proposed RCRA Subtitle C regulations. For new CCR landfills (or lateral expansions of existing landfills), all proposed RCRA Subtitle C regulation requirements would apply.

2.1.8.2 Existing and New CCR Surface Impoundments

Under the proposed RCRA Subtitle C regulations, existing and new CCR surface impoundments would effectively be prohibited due to land disposal restriction requirements. For existing CCR surface impoundments, groundwater monitoring would be required to be installed within one year of the effective date of the rule. Existing CCR surface impoundments would need to be removed from operation within five years of the effective date of the regulations and then capped within seven years of the effective date.

2.2 SUMMARY OF CO-PROPOSED RCRA SUBTITLE D OPTION

Under the proposed RCRA Subtitle D rule option, the EPA has generally proposed to regulate CCRs under the existing RCRA Subtitle D regulations with the establishment of national minimum criteria to ensure safe disposal of CCRs. Unlike the RCRA Subtitle C option which regulated both the handling and

disposal of the CCRs, in the RCRA Subtitle D regulation option only the disposal of the CCRs would be regulated. Because of the scope of RCRA Subtitle D authority, the rule would not require permits nor could the EPA enforce these requirements. Instead, citizens or states could enforce the rule requirements under RCRA citizen suit authority, or states could also enforce any state regulation under their independent state enforcement authority.

The RCRA Subtitle D option provides minimum requirements for disposal of CCRs, such as location restrictions, composite liner requirements, leachate collection system requirements, fugitive dust control, groundwater monitoring, financial assurance, closure and post-closure care, and inspection requirements for CCR surface impoundments. Many of these requirements are the same as the RCRA Subtitle C requirements for the disposal units, with a few exceptions.

2.2.1 Location Restrictions

The location restrictions for the proposed RCRA Subtitle D regulations are the same as the RCRA Subtitle C regulations except that for seismic impact areas, new CCR landfills and both existing and new CCR surface impoundments would be allowed to be located in a seismic impact zone if it is demonstrated that the unit is designed to resist the maximum horizontal acceleration in lithified earth material for the site.

2.2.2 Bottom Liner and Leachate Collection System Requirements

The requirements for the RCRA Subtitle D regulations are the same as the requirements for the RCRA Subtitle C regulations for bottom liner and leachate collection systems.

2.2.3 Fugitive Dust Control

The requirements for the RCRA Subtitle D regulations are the same as the requirements for the RCRA Subtitle C regulations for fugitive dust control.

2.2.4 Groundwater Monitoring

The requirements for the RCRA Subtitle D regulations are the same as the requirements for the RCRA Subtitle C regulations for groundwater monitoring.

2.2.5 Financial Assurance

The proposed RCRA Subtitle D regulations do not include proposed financial responsibility requirements. Any such requirements would be proposed separately.

2.2.6 Closure and Post-Closure Care

The requirements for the RCRA Subtitle D regulations are the same as the requirements for the RCRA Subtitle C regulations for closure and post-closure care.

2.2.7 Inspection Requirements for CCR Surface Impoundments

The requirements for the RCRA Subtitle D regulations are the same as the requirements for the RCRA Subtitle C regulations for inspection requirements of CCR surface impoundments.

2.2.8 Implementation Schedule

For the purposes of this report, Burns & McDonnell has assumed that the proposed RCRA Subtitle D regulations are issued on July 1, 2011 (no indication this is a target deadline – used for discussion purposes here). The effective date of the proposed RCRA Subtitle D regulations would be six months from promulgation of the final rule, which in this case would be January 1, 2012. This is irrespective of whether or not states have adopted these standards into their state programs. Based on these estimates, Big Rivers' disposal facilities would need to be modified to comply with the new Subtitle D regulations as early as January 1, 2017 based on the general five-year implementation schedule for any operation and disposal changes proposed in the Subtitle D regulations.

2.2.8.1 Existing and New CCR Landfills

Existing landfills at the effective date of the requirements would be required to have groundwater monitoring installed within one year of the effective date of the rule, but they would not be subject to the location restrictions, bottom liner, or leachate collection system requirements of the proposed RCRA Subtitle D regulations. For new CCR landfills (or lateral expansions of existing landfills), all proposed RCRA Subtitle D regulation requirements would apply.

2.2.8.2 Existing and New CCR Surface Impoundments

For existing CCR surface impoundments, groundwater monitoring would be required to be installed within one year of the effective date of the rule. Existing CCR surface impoundments would either need to retrofit the impoundment with a composite liner system or cease operation and close the impoundment within five years of the effective date of the regulations. The proposed rule does allow for a case-by-case extension for up to two more years if the facility can demonstrate that there is no alternative disposal capacity and there is no immediate threat to health or the environment. New CCR surface impoundments would need to be designed (including appropriate location restriction and dam safety demonstrations) and constructed in accordance with all of the requirements of the proposed RCRA Subtitle D regulations.

2.3 SUMMARY OF CO-PROPOSED RCRA SUBTITLE D PRIME OPTION

The EPA is also considering a modification to the Subtitle D option, termed the "D prime" option, which would allow existing CCR surface impoundments to continue to operate for their useful life rather than close within the RCRA Subtitle D option time period. All other elements of the RCRA Subtitle D option for existing CCR surface impoundments would still apply to the D prime option. The EPA did not define what they would consider the "useful life" of an existing CCR surface impoundment, and consequently it is unclear if their intent is to allow only those CCR surface impoundments which are used for final CCR disposal to operate for the relatively short remaining operational life of the impoundment or if the intent is to allow existing CCR surface impoundments to be regularly dredged, thereby allowing the existing CCR surface impoundments to remain in operation for up to the life of the plant facility. The EPA may provide more clarification on this D prime option in the final version of the federal CCR regulations should this be a part of their selected option.

* * * * *

3.0 KENNETH C. COLEMAN GENERATING STATION

Kenneth C. Coleman Generating Station (Coleman) is located northwest of Hawesville in Hancock County, Kentucky along the north bank of the Ohio River. Coleman has three coal-fired units (443 MW total) with a common scrubber. There are two older ash ponds built in the late 1970's/early 1980's, and a third newer pond that was built in 2008 north of the plant site. The newer pond was built to approximately half of its design elevation. The Coleman Site Plan is shown in Figure SK-001 in Appendix A.

Fly ash and bottom ash are co-mingled in the active pond and in all CCR ponds at the plant. The ponds are part of a closed loop system. Coleman has a forced oxidized scrubber that was built between 2006 and 2007. While Big Rivers has been able to sell their gypsum for wallboard in the past, gypsum is currently stacked out and trucked via county road to the north pond for disposal due to the lack of market for wallboard. There is an old ash pond at the west end of site (south of the current sluice pond) that has been converted into gypsum stackout and parking areas. Costs for capping and closing this area were not investigated as it is not clear from the proposed regulations whether this would need to be done to comply with the regulations. All coal comes in via barge at Coleman; no pet coke is burned. The site to the south of the plant is a former EPA Superfund site, so it would not be available for borrow or for disposal.

3.1 EXISTING ASH PONDS

Coleman currently has three (3) ash ponds, one southwest of the plant and two to the north. All three (3) ponds are unlined and are further described in the following subsections. The present production rate is approximately 200,000 tons per year (TPY) of fly and bottom ash material and 200,000 TPY of gypsum for a total of 400,000 TPY of CCR production, although most of the gypsum has been sold in the past.

3.1.1 South Pond

The south pond has nominal remaining capacity and is not lined. Big Rivers is keeping capacity in the south pond to keep it open as a pond. Material is occasionally dredged to the south pond when they clean out in front of the pump structure at the current sluice pond. As of now, no part of the south pond has been closed. A 161 kV transmission line runs through the middle of the south pond.

3.1.2 Sluice Pond

The current ash sluice pond is unlined and is estimated to have approximately half of its capacity left according to Big Rivers. According to a survey performed by Associated Engineers, Inc. on October 19,

2009, there was about 285,000 cubic yards of remaining capacity at that time. For purposes of this study, Burns & McDonnell assumed that the ash sluice pond currently has about 285,000 cubic yards of remaining capacity and that all CCRs produced within the past year have been hauled to the north pond. Current sluice discharge location for bottom and fly ash is on the south end of the pond. Ash is currently sluiced to this pond, where it is removed and dewatered before it is hauled by truck to the north pond.

3.1.3 North Pond

All gypsum is currently hauled from the stackout area at the plant to the new pond north of the plant (north pond) while ash is removed from the sluice pond and hauled to the north pond after it is dewatered. There is a separate property owner between the plant property and the north pond, and, to date, an agreement with the property owner to allow Big Rivers to install sluice piping has not been reached. Gypsum is disposed of separately from ash products at the north pond to potentially allow for future reclaiming of the gypsum for beneficial use. The north pond berms were only constructed to about half or their originally designed height and there are no current plans to extend to full height in the near future. The north pond does not have a constructed pond liner, but the interior slopes were lined with gypsum material to mitigate erosion.

The north pond was originally designed for only 22 years of disposal of fly and bottom ash at a combined disposal rate of 200,000 TPY. Big Rivers estimated the pond to have about 6 years of capacity left at present estimated disposal rates with fly and bottom ash (200,000 TPY) and gypsum (200,000 TPY) both being disposed in the north pond (i.e., 400,000 TPY total).

3.2 PROPOSED MODIFICATIONS

If the Subtitle C regulations are adopted, Big Rivers will need to switch to dry handling and disposal in a landfill facility. If the Subtitle D regulations are adopted, Big Rivers could 1) retrofit the existing ponds with a composite liner and continue operating, 2) construct a new lined pond, or 3) perform the necessary ash conversion and switch to dry disposal in a landfill, similar to the Subtitle C option. Both Subtitle C and Subtitle D scenarios would allow continued operation of the existing ponds in their current state for the five year period after the final regulations are placed in effect, with additional requirements for inspections and groundwater monitoring as described in Section 2.0 of this report.

The ponds at Coleman are currently used for CCR disposal and other process flows. If portions of the ponds were closed in order to avoid retrofitting the ponds with a composite liner, the remaining sluice pond capacity would need to be kept in service for the process flows. This would require the construction

of an isolation berm that would separate the ponded ash from the remaining pond capacity. Assuming that the filled portions of the ponds will be capped and closed after the five-year operating window is complete, Burns & McDonnell has developed the following base modification that will likely be required at Coleman regardless of which set of regulations are adopted.

3.2.1 Base Modification

Assuming a CCR production rate of 400,000 TPY (no sale of gypsum, fly ash, or bottom ash) and an in place density of 85 pounds per cubic foot, Coleman will require approximately 349,000 cubic yards of CCR disposal volume per year. Big Rivers believes that there is enough remaining capacity in the north pond to last until 2017, or another 6 years. Under the Subtitle D regulations, Big Rivers would be required to modify their current ash disposal system as early as January 1, 2017 (see Section 2.2.8). At that time, there would be no remaining capacity in the north pond.

The base modification for Coleman includes the cost for capping the remaining south pond, capping the existing north pond, constructing an isolation berm in the sluice pond, and dredging all of the ash in the sluice pond to the west side of this berm. The area west of this berm would then be closed and capped. The berm location would need to be selected such that the part of the pond being capped would be completely full before being closed so that the remaining pond capacity would be maximized. The approximate location of this berm is shown in Figure SK-001 in Appendix A. Burns & McDonnell assumed that the berm would have a width of ten feet at the top and side slopes of 3H:1V leading to an estimated soil quantity of 106,000 cubic yards for the sluice pond berm. In order to allow more space for discharging and dredging ash, Burns & McDonnell assumed that 577,000 cubic yards of ash would be transferred from the sluice pond. This would yield a remaining capacity of 756,000 cubic yards in the sluice pond after the berm is constructed.

A planning level estimated capital and operating cost for the base modification is summarized in Table 3-1. Additional details of the cost estimate are included in Appendix B. All costs shown are in 2010 dollars. An allowance has been included for permitting the base modification and a selected compliance option. The actual permitting effort and associated cost will vary depending on the regulations that are adopted and the site specific requirements. The estimate includes the cost to install eight monitoring wells for each existing pond to comply with the proposed groundwater monitoring requirements.

Table 3-1: Planning Level Capital and Operating Cost Estimate for Base Modification at Coleman

Sluice Pond Modifications	
General Earthwork	$8,432,000
Temporary Relocation for Discharge Point	$250,000
Capping Pond	$2,772,000
Isolation Berm	$2,260,000
Future Existing North Pond Closure	
Final Cover	$7,910,000
South Pond Closure	
Final Cover	$13,017,000
Temporary Settling Pond for Dewatering Sluice Pond	$844,000
Quality Assurance/Quality Control	$895,000
Groundwater Monitoring Wells	$73,000
Permitting	$1,000,000
Engineering (15%)	$5,460,000
Contingency (20%)	$7,277,000
***Base Modification Capital Cost**	**$50,190,000**
Additional Annual Operations and Maintenance	
Groundwater Monitoring	$125,000
Third Party Berm Inspections	$10,000
Total Additional Annual Operations and Maintenance	**$135,000**

*This estimate assumes that clay borrow source will be onsite. If the clay source is found up to 25 miles from the plant, the capital cost could increase by up to $8,837,000.

This estimate does include an allowance of $250,000 to temporarily relocate plant discharges to the outer portion of the sluice pond so that the remaining capacity can be dredged, dewatered, and cleaned up after the isolation berm is installed and prior to closure of the outer portion of the pond. The base modification would require an additional estimated annual operation and maintenance (O&M) cost of $125,000 for groundwater monitoring and $10,000 for annual third party berm inspections after the new regulations are issued. These estimates assume that outside contractors and laboratories will be used for the groundwater monitoring and berm inspections and these costs will likely be incurred after the ponds are capped as part of a post-closure monitoring program.

Figure 3-1 summarizes a conceptual schedule for the base modification at Coleman. This schedule provides an approximate timeline for the major milestone activities, based on the effective date of either set of the co-proposed CCR disposal regulations.

Activity	Planning Level Capital Costs (2010 dollars)						
	2012	2013	2014	2015	2016	2017	2018
Continued disposal of CCRs in the existing ponds							
Install groundwater monitoring and inspection plan	$73,000						
Permitting and design for closure of existing ponds		$4,593,000	$510,000				
Relocate plant discharges to outer portion of pond				$250,000			
Installation of berm and dredging of material				$5,916,000	$5,916,000		
Installation of composite final cover (cap ponds)						$23,052,000	$9,880,000
Cost Breakdown	$73,000	$4,593,000	$510,000	$6,166,000	$5,916,000	$23,052,000	$9,880,000

*Based on projected effective date of January 1, 2012.

Figure 3-1: Conceptual Schedule for Coleman Base Modification

Any further modifications done to the site beyond the base modification would be dictated by the adopted regulations and the resulting classification of CCRs. Therefore, the modifications outlined in the following subsections are based on the compliance needed for either proposed CCR classification, and these modifications would be performed in addition to the base modification described earlier.

3.2.2 Conformance to Subtitle D Classification

To conform to the proposed Subtitle D regulations, Burns & McDonnell investigated three options for compliance:

- Option A: Base modification along with retrofitting the east side of the sluice pond with a composite liner, extending the north pond berms to their originally designed height, constructing an isolation berm in the north pond, moving all of the ash and gypsum in the north pond to the south side of berm, and retrofitting the remaining capacity of the north pond with a composite liner to allow for continued use of the facility until 100% of its design disposal capacity is achieved.
- Option B: Base modification as well as the investment in a wet to dry ash handling conversion and a new landfill.
- Option C: Base modification along with the lining of the east side of the sluice pond and the construction of a new CCR disposal pond with a composite liner.

These options are described further in the sections that follow.

3.2.2.1 Option A – Retrofit Remaining Pond Capacity

Option A consists of performing the base modification described in Section 3.2.1 while also retrofitting the east side of the sluice pond with a composite liner, extending the north pond berms to their originally designed height, constructing an isolation berm in the north pond, moving all of the ash and gypsum in the north pond to the south side of berm, installing a composite liner to retrofit the north side of the north

pond, and capping the additional area of the north pond gained by extending the berms. Big Rivers would then continue to operate by discharging all bottom ash and process flows to the lined portion of the sluice pond before hauling it to the lined portion of the north pond. Under the Subtitle D regulations, Big Rivers would be required to start discharging into the lined portion of the north pond as early as January 1, 2017 (see Section 2.2.8). At that time, there would be an estimated capacity of 668,000 cubic yards remaining in the north pond with the berm extended to its originally designed height. This represents approximately 18% of the total north pond volume. The isolation berm of the north pond will take up approximately 225,000 cubic yards of the remaining capacity. For the purposes of this study, Burns & McDonnell has assumed that the composite liner will consist of two feet of compacted clay liner, a 60-mil geomembrane liner, and one foot of protective cover. This liner will take up approximately 7% of the remaining capacity in the pond, assuming the north pond has an average depth of 43 feet. The remaining capacity in the north pond is estimated at 394,000 cubic yards after the liner and the isolation berm are installed. This represents approximately 1.1 years of capacity based on Big Rivers' production rate of 400,000 TPY and an assumed in place density of 85 pounds per cubic foot.

A planning level estimated capital and operating cost for Option A is summarized in Table 3-2. Additional details of the cost estimate are included in Appendix B. All costs shown are in 2010 dollars. This modification would allow Big Rivers to dispose of the Coleman ash and gypsum in the remaining portion of the north pond from the projected compliance date of January 1, 2017 for a period of approximately 1.1 years, assuming the current disposal rate of 400,000 TPY. Due to the short service life of this option, Burns & McDonnell does not recommend this option as a feasible alternative.

Table 3-2: Planning Level Capital and Operating Cost Estimate for Option A at Coleman

Line East Portion of Sluice Pond	
Pond Liner	$1,440,000
North Pond with Berm Extension	
General Earthwork	$3,666,000
Final Cover (additional space created by berm extension)	$619,000
Isolation Berm and Berm Extension	$6,922,000
Line North Portion of North Pond	
Pond Liner	$748,000
Future Partial North Pond Closure	
Final Cover	$1,340,000
Quality Assurance/Quality Control	$235,000
Engineering (15%)	$2,247,000
Contingency (20%)	$2,995,000
Base Modification	$50,190,000
***Option A Capital Cost**	**$70,402,000**
Additional Annual Operations and Maintenance	
Groundwater Monitoring	$125,000
Third Party Berm Inspections	$20,000
Total Additional Annual Operations and Maintenance	**$145,000**
Future East Portion of Sluice Pond Closure	
Final Cover	$2,669,000
Quality Assurance/Quality Control	$100,000
Engineering (15%)	$416,000
Contingency (20%)	$554,000
Total Closure Costs	**$3,739,000**

*This estimate assumes that clay borrow source will be onsite. If the clay source is found up to 25 miles from the plant, the capital cost could increase by up to $15,050,000 and the closure cost could increase by up to $801,000.

Note that the estimate for Option A includes the projected costs to cap and close the new disposal facility and that this cost would not be incurred until the end of the facility's life. Option A would require an additional estimated annual O&M cost of $125,000 for groundwater monitoring and $20,000 for annual third party berm inspections after the new regulations are issued. These estimates assume that outside contractors and laboratories will be used for the groundwater monitoring and berm inspections.

Figure 3-2 summarizes a conceptual schedule for Option A at Coleman. This schedule provides an approximate timeline for the major milestone activities, based on the effective date of the proposed Subtitle D CCR disposal regulations.

Activity	Planning Level Capital Costs (2010 dollars)						
	2012	2013	2014	2015	2016	2017	2018
Continued disposal of CCRs in the existing ponds							
Install groundwater monitoring and inspection plan	$73,000						
Permitting and design for retrofit of existing sluice and north ponds		$317,000	$35,000				
Permitting and design for closure of existing ponds		$4,593,000	$510,000				
Permitting and design for north pond berm extension		$1,517,000	$169,000				
Relocate plant discharges to outer portion of sluice pond				$250,000			
Installation of berms and dredging of material				$12,656,000	$12,656,000		
Install composite liner in sluice and north ponds (remaining capacity)					$2,812,000		
Installation of composite final cover (cap ponds)						$15,308,000	$19,508,000
Cost Breakdown	$73,000	$6,427,000	$714,000	$12,906,000	$15,468,000	$15,308,000	$19,508,000

* Closure costs of $3,739,000 for the new landfill would be incurred at a later date.
**Based on projected effective date of January 1, 2012.

Figure 3-2: Conceptual Schedule for Coleman Option A

3.2.2.2 Option B – New Landfill

Option B consists of performing the base modification while also investing in a wet to dry ash handling conversion and a new landfill, west of the north pond. Big Rivers owns some property west of River Road (that is immediately west of the plant), but the area is in a floodplain and also contains wetlands in various areas. According to the Kentucky Administrative Regulations, a residual landfill can be constructed within the 100-year floodplain of the waters of the Commonwealth provided that it complies with Section 2 of 401 KAR 47:030 of the Environmental Performance Standards concerning base flow restriction, temporary water storage capacity reduction, and waste washout.

For the purposes of this study, Burns & McDonnell has assumed that a new landfill would be constructed with a minimum of ten years of capacity. Assuming a 43-acre site would be developed, the new landfill would hold approximately 3.5 million cubic yards, assuming that the ash is placed with 4H:1V slopes to a height of 100 feet. If the facility receives 400,000 tons of ash and gypsum from Coleman each year, the estimated life of this landfill would be ten years based on an average unit weight of 85 pounds per cubic foot for the compacted CCR material. This new landfill would need to be available to start receiving ash on January 1, 2017 based on the schedule presented for Subtitle D compliance (see Section 2.2.8). As part of the base modification, the existing north and south ponds and the full portion of the existing sluice pond would be capped and closed. The remaining portion of the sluice pond could be left unlined and could be used for other plant process flows after all of the ash has been moved to the full portion of the pond. However, if Option B were selected, the berm described in the base modification could be placed in a different location so that 577,000 cubic yards of ash would not need to be transferred as the sluice pond would only need enough capacity for process flows as opposed to process flows and ash disposal.

A planning level estimated capital and operating cost for Option B is summarized in Table 3-3. Additional details of the cost estimate are included in Appendix B. All costs shown are in 2010 dollars. This modification would allow Big Rivers to dispose of the Coleman ash and gypsum in the proposed landfill facility from the projected compliance date of January 1, 2017 for a period of approximately ten years, assuming the current disposal rate of 400,000 TPY. This estimate includes an allowance of $41.4 million for conversion from wet bottom ash to dry using a remote submerged flight conveyor (SFC) system and conversion from wet fly ash to dry fly ash, including a new fly ash silo for all three units at Coleman. This allowance is broken out to show ash conversion, engineering, and contingency costs.

Table 3-3: Planning Level Capital and Operating Cost Estimate for Option B at Coleman

New Landfill	
General Earthwork	$2,415,000
Perimeter Berm	$639,000
Composite Liner	$4,605,000
Stormwater Runoff Pond	$825,000
Leachate Collection Pond	$761,000
Electrical	$200,000
Quality Assurance/Quality Control	$300,000
Ash Conversion	$31,763,000
Engineering (15%)	$5,605,000
Contingency (20%)	$7,473,000
Base Modification	$50,190,000
***Option B Capital Cost**	**$104,776,000**
Additional Annual Operations and Maintenance	
Groundwater Monitoring	$175,000
Third Party Berm Inspections	$10,000
Total Additional Annual Operations and Maintenance	**$185,000**
Future Landfill Closure	
Final Cover	$3,726,000
Quality Assurance/Quality Control	$215,000
Engineering (15%)	$592,000
Contingency (20%)	$789,000
Total Closure Costs	**$5,322,000**

*This estimate assumes that clay borrow source will be onsite. If the clay source is found up to 25 miles from the plant, the capital cost could increase by up to $11,283,000 and the closure cost could increase by up to $1,794,000.

Note that the estimate for Option B includes the projected costs to cap and close the new landfill disposal facility and that this cost would not be incurred until the end of the facility's life. Also included are the

estimated costs for the required groundwater monitoring wells for the new facility. Option B would require an additional estimated annual O&M cost of $175,000 for groundwater monitoring and $10,000 for annual third party berm inspections. O&M costs associated with the SFC system were not investigated. These estimates assume that outside contractors and laboratories will be used for the groundwater monitoring and berm inspections.

Figure 3-3 summarizes a conceptual schedule for Option B at Coleman. This schedule provides an approximate timeline for the major milestone activities, based on the effective date of the proposed Subtitle D CCR disposal regulations.

Activity	Planning Level Capital Costs (2010 dollars)						
	2012	2013	2014	2015	2016	2017	2018
Continued disposal of CCRs in the existing ponds							
Install groundwater monitoring and inspection plan	$101,000						
Site investigation for new landfill site		$329,000	$37,000				
Permitting and design for closure of existing ponds		$4,593,000	$510,000				
Permitting and design for new landfill site		$987,000	$110,000				
Design for ash conversion				$4,143,000			
Relocate plant discharges to outer portion of pond				$250,000			
Landfill construction				$5,833,000	$5,833,000		
Installation of berm and dredging of material				$5,916,000	$5,916,000		
Perform ash conversion					$37,287,000		
Dry disposal in new landfill facility							
Installation of composite final cover (cap ponds)						$23,052,000	$9,880,000
Cost Breakdown	$101,000	$5,909,000	$657,000	$16,142,000	$49,036,000	$23,052,000	$9,880,000

* Closure costs of $5,322,000 for the new landfill would be incurred at a later date.
**Based on projected effective date of January 1, 2012.

Figure 3-3: Conceptual Schedule for Coleman Option B

3.2.2.3 Option C – New CCR Disposal Pond

Option C consists of performing the base modification while also constructing a new CCR disposal pond, west of the existing north pond, with a composite liner. As stated previously, this location is within the floodplain but is on the current Big Rivers property.

For the purposes of this study, Burns & McDonnell has assumed that a disposal pond would be constructed with a minimum of ten years of capacity. Assuming an 85-acre pond with a depth of thirty feet could be constructed, the pond would have a capacity of approximately 3.2 million cubic yards and a life of approximately ten years at the assumed CCR disposal rate of 400,000 tons of per year. This new

pond would need to be available to start receiving CCRs as early as January 1, 2017 based on the assumed schedule presented for Subtitle D compliance (see Section 2.2.8). As part of the base modification, the additional area gained in the north pond by extending the berms, the south pond, and the full portion of the existing sluice pond would be capped and closed. In addition to this, the remaining portion of the sluice pond would be lined so that ash could be sluiced to the east side of the pond and removed, dewatered, and hauled to the new pond, similar to current operations for disposal in the north pond. Another alternative to consider could be installing sluice piping to the new pond instead of lining the remaining portion of the sluice pond.

A planning level estimated capital and operating cost for Option C is summarized in Table 3-4. Additional details of the estimate are included in Appendix B. All costs shown are in 2010 dollars. This modification would allow Big Rivers to dispose of the Coleman ash and gypsum in the new disposal pond from the projected compliance date of January 1, 2017 for a period of approximately ten years.

Table 3-4: Planning Level Capital and Operating Cost Estimate for Option C at Coleman

Line East Portion of Sluice Pond	
Pond Liner	$1,440,000
New CCR Disposal Pond	
General Earthwork	$5,222,000
Perimeter Berm	$641,000
Pond Liner	$5,919,000
Quality Assurance/Quality Control	$505,000
Engineering (15%)	$2,060,000
Contingency (20%)	$2,746,000
Base Modification	$50,190,000
***Option C Capital Cost**	**$68,723,000**
Additional Annual Operations and Maintenance	
Groundwater Monitoring	$175,000
Third Party Berm Inspections	$10,000
Total Additional Annual Operations and Maintenance	**$185,000**
Future East Portion of Sluice Pond Closure	
Final Cover	$2,669,000
Future CCR Disposal Pond Closure	
Final Cover	$11,160,000
Quality Assurance/Quality Control	$505,000
Engineering (15%)	$2,151,000
Contingency (20%)	$2,867,000
Total Closure Costs	**$19,352,000**

*This estimate assumes that clay borrow source will be onsite. If the clay source is found up to 25 miles from the plant, the capital cost could increase by up to $13,041,000 and the closure cost could increase by up to $4,164,000.

Note that the estimate for Option C includes the projected costs to cap and close the new disposal facilities and that this cost would not be incurred until the end of the facilities' life. Option C would require an additional estimated annual O&M cost of $175,000 for groundwater monitoring and $10,000 for annual third party berm inspections during the life of the new disposal pond. These estimates assume that outside contractors and laboratories will be used for the groundwater monitoring and berm inspections.

Figure 3-4 summarizes a conceptual schedule for Option C at Coleman. This schedule provides an approximate timeline for the major milestone activities, based on the effective date of the proposed Subtitle D CCR disposal regulations.

Activity	Planning Level Capital Costs (2010 dollars)						
	2012	2013	2014	2015	2016	2017	2018
Continued disposal of CCRs in the existing ponds							
Install groundwater monitoring and inspection plan	$101,000						
Site investigation for new CCR disposal pond		$412,000	$46,000				
Permitting and design for retrofit of sluice pond		$208,000	$23,000				
Permitting and design for closure of existing ponds		$4,593,000	$510,000				
Permitting and design for new CCR disposal pond		$1,235,000	$137,000				
Relocate plant discharges to outer portion of west pond				$250,000			
Installation of berm and dredging of material				$5,916,000	$5,916,000		
Pond construction, including composite liner				$7,298,000	$7,298,000		
Install composite liner in sluice and north ponds (remaining capacity)					$1,848,000		
Installation of composite final cover (cap ponds)						$23,052,000	$9,880,000
Cost Breakdown	$101,000	$6,448,000	$716,000	$13,464,000	$15,062,000	$23,052,000	$9,880,000

* Closure costs of $19,352,000 for the new CCR disposal pond would be incurred at a later date.
**Based on projected effective date of January 1, 2012.

Figure 3-4: Conceptual Schedule for Coleman Option C

3.2.3 Conformance to D Prime Classification

The EPA is also considering a modification to the Subtitle D option, termed the "D prime" option, which would allow existing CCR surface impoundments to continue to operate for their useful life rather than close within the RCRA Subtitle D option time period. All other elements of the RCRA Subtitle D option for existing CCR surface impoundments would still apply to the D prime option. This alternative to the currently proposed regulations would allow Big Rivers to operate their existing ponds until 100% of their disposal capacity is reached. Big Rivers should note that the Subtitle D Prime scenario represent the "do nothing" alternative and would allow Big Rivers to continue operating as-is for approximately 2.5 years at Coleman.

3.2.4 Conformance to Subtitle C Classification

To conform to Subtitle C, surface impoundments would be permitted to receive CCRs for five years before being mandated to close. Subtitle C effectively phases out all wet handling, and consequently a new dry disposal facility would need to be available to start receiving ash as early as January 1, 2019 based on the schedule presented for Subtitle C compliance (see Section 2.1.8). The existing ponds would need to be capped and closed in the two following years. Therefore, Burns & McDonnell would propose using Option B as described in Section 3.2.2.2 with a schedule lag of approximately two years.

Figure 3-5 shows the peak acceleration for this region based on the 2008 USGS data. The Coleman site is located in a seismic impact area with a peak ground acceleration (2% Exceedance in 50 years) of

approximately 0.18g. Note that under the proposed Subtitle D regulations this landfill location would still be a viable alternative, but an analysis would need to be provided to show that the site has been designed for this seismic activity. Under the proposed Subtitle C rules, a landfill not already constructed or being constructed when the Subtitle C regulations for CCRs are adopted could not be constructed at this site since the peak ground acceleration would not be allowed to exceed 0.1g for a new landfill.

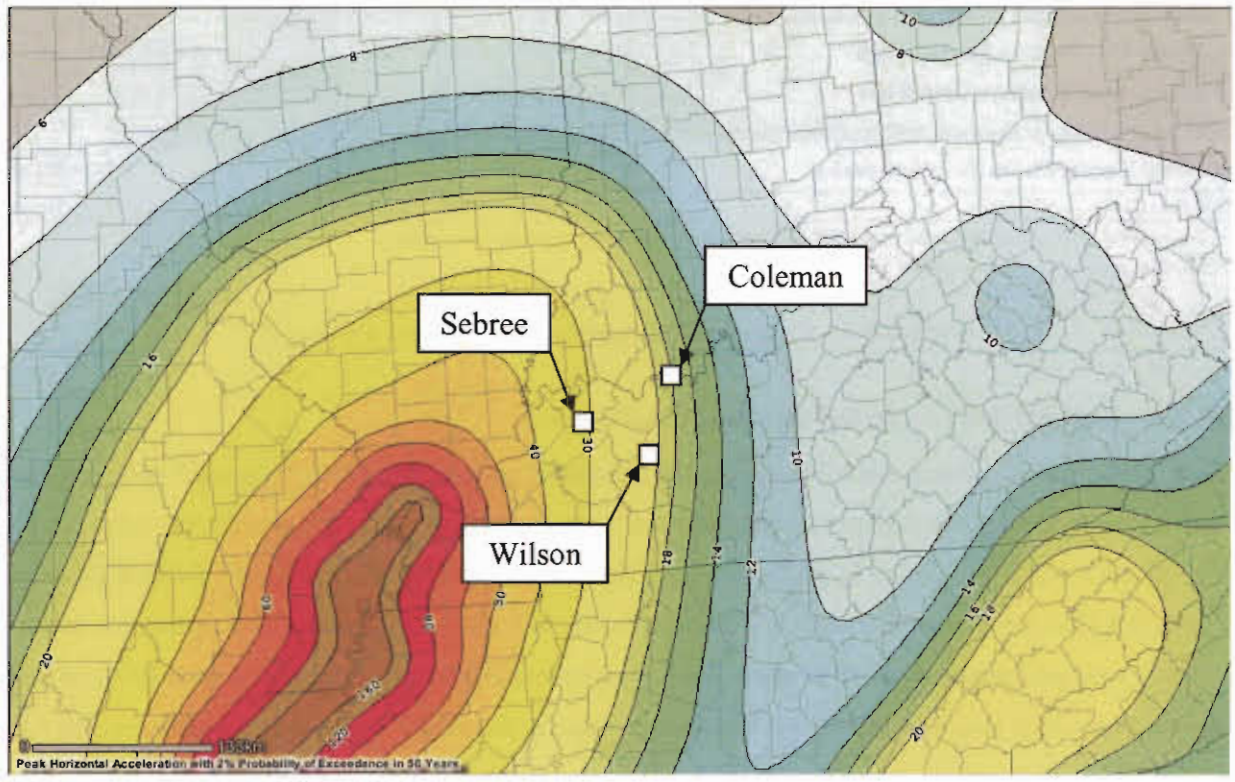

Figure 3-5: Regional Seismic Map - Peak Ground Acceleration (%g) with a 2% Exceedance Probability in 50 years

To meet this requirement, the haul distance would be increased to an estimated 55 miles one way or a round trip of 110 miles from the Coleman plant (see Figure 3-5). This would increase the annual O&M cost by an estimated $125,000 for groundwater monitoring and $11,700,000 for hauling and disposing of 400,000 TPY of CCRs at a new facility with a 110 mile round trip from the Coleman site.

3.2.4.1 Handling Requirements

Currently in Section IV.C.3 on page 35182 of the proposed rules published in the Federal Register, the EPA essentially acknowledges that they have not fully defined all of the storage and handling requirements and associated costs for the RCRA Subtitle C regulations, and they are soliciting comments on CCR handling and associated costs. Given this, currently only the estimated costs for hauling of the

CCRs to a landfill facility, which is known to be required to transition from surface impoundment to landfill disposal, have been included in the estimated costs. Additional costs for other potential handling requirements, such as weather enclosures, additional secondary containments, and washdown facilities are not included.

* * * *

4.0 D.B. WILSON GENERATING STATION

D.B. Wilson Generating Station (Wilson) is located northwest of Centertown in Ohio County, Kentucky. Wilson has one coal-fired unit (417 MW) with an enhanced scrubber (inhibitive oxidation process) from which they produce a true Poz-O-Tec material. The area north of Highway 85 was strip mined prior to plant construction, and it includes the coal pile and landfill. Most of the reclaimed soil from strip mining was used to build a 500-year levee around the main plant area south of the highway. Big Rivers does own some land to the south of the plant, but it is mostly if not all located within a floodplain and includes a creek and some wetlands. Big Rivers has been burning pet coke which has made the loss-on-ignition (LOI) too high to sell fly ash produced at Wilson. According to Big Rivers, the CCR production is approximately 25,000 TPY for bottom ash and 500,000 TPY for Poz-O-Tec including fly ash. The Wilson Site Plan is shown in Figure SK-002 in Appendix A.

4.1 LANDFILL SITE

The landfill has 1,100 acres permitted, but not all of it is bonded. The landfill operation started around 1985 when the unit went on-line. Current landfill cell development procedures primarily involve stripping of topsoil and minimal grading prior to operation. Big Rivers is currently placing CCR materials in Bond Area 2 of Phase II, which will ultimately be built out to approximately where the monitoring wells show up on Figure SK-002 in Appendix A. The current Big Rivers plan is to work from the north end southward. The northern portion of Phase I has been closed with a 24-inch vegetative soil cap (no permeability criteria on the cap), and Big Rivers is currently closing the remainder of Phase I with the goal of getting all of Phase I closed this year. The Phase I area provided 25 years of disposal, and Bond Area 2 of Phase II is expected to provide the same. Phase I and Phase II are separated by a 345 kV transmission line corridor, and consequently the Phase I and Phase II CCR fills are currently not connected to optimize air space. Groundwater is about 20 to 30 feet deep in the existing landfill area. The landfill runoff pond is off the northeast corner of Phase I. There is a culvert installed under the existing Phase I to convey Phase II flow to a ditch on the east side of Phase I and ultimately to the runoff pond.

Big Rivers is currently hauling closure soil material from north of the runoff pond to the Phase I closure area, although suitable material from that location will be completely removed in the near future. Once the current borrow source is exhausted, Big Rivers plans to start using material from the north end of Phase II for Phase I closure soil. Although Big Rivers indicated the area has predominantly clay soils, most of the existing clay soils in the landfill area have been stripped in mining operations, leaving

material that is likely too rocky for liner use. Alternate clay liner material borrow sources have not been, identified to date.

Figure 3-5 shows the peak acceleration for this region based on the 2008 USGS data. The site is located in a seismic impact area with a peak ground acceleration (2% Exceedance in 50 years) between 0.2g and 0.3g. Under the proposed Subtitle C rules, a landfill could not be constructed at this site since the peak ground acceleration would not be allowed to exceed 0.1g for a new landfill. Note that under the proposed Subtitle D regulations this landfill location would still be a viable alternative, but the analysis would need to be provided to show that the site has been designed for this seismic activity.

4.2 PROPOSED MODIFICATIONS

Once the proposed CCR rules are adopted, Big Rivers will only have one likely scenario to continue operation at Wilson. This scenario would be to develop all future portions of the landfill in accordance with the adopted regulations after their effective date.

4.2.1 Base Modification

The base modification for Wilson assumes that Big Rivers will continue to operate as they do now. We understand that Big Rivers' permit for the Wilson landfill allows them to have no more than 17 acres developed at any one time. Based on this, before the effective date of January 1, 2012, Big Rivers would develop the next 17 acres and continue to fill this area as they have been doing. Once this area has been filled to capacity, Big Rivers would need to dispose CCRs into a landfill that meets the new regulations. Burns & McDonnell assumed that it would take approximately 3 years to fill 17 acres and that a new landfill would need to be ready for CCR disposal by January 1, 2015.

For the purposes of this study, Burns & McDonnell has assumed that the new landfill would be constructed with a minimum of ten years of capacity. Assuming a 53-acre site would be developed, the new landfill would hold approximately 4,530,000 cubic yards, assuming that the ash is placed with 4H:1V slopes to a height of 100 feet. Based on the estimated Wilson CCR disposal rate of 525,000 TPY, the estimated life of the landfill would be 10 years, based on an average unit weight of 85 pounds per cubic foot for the compacted ash.

A planning level estimated capital and operating cost for the base modification is summarized in Table 4-1. Additional details of the cost estimate are included in Appendix B. All costs shown are in 2010 dollars. This modification would allow Big Rivers to dispose of Wilson CCRs in the proposed landfill

facility from the date of January 1, 2015 (two years before the projected compliance date of January 1, 2017) for a period of approximately ten years.

Table 4-1: Planning Level Capital and Operating Cost Estimate for Base Modification at Wilson

New Landfill	
General Earthwork	$2,832,000
Perimeter Berm	$679,000
Composite Liner	$6,317,000
Stormwater Runoff Pond	$952,000
Leachate Collection Pond	$912,000
Electrical	$200,000
Quality Assurance/Quality Control	$350,000
Permitting	$1,000,000
Engineering & Site Investigation (15%)	$1,837,000
Contingency (20%)	$2,449,000
***Base Modification Capital Cost**	**$17,528,000**
Additional Annual Operations and Maintenance	
Groundwater Monitoring	$125,000
Total Additional Annual Operations and Maintenance	**$125,000**
Landfill Closure	
Final Cover	$5,156,000
Quality Assurance/Quality Control	$265,000
Engineering (15%)	$814,000
Contingency (20%)	$1,085,000
Total Landfill Closure Costs	**$7,320,000**

*This estimate assumes that clay and closure source is within 5 miles of the site. If the clay and/or closure source is found up to 25 miles from the plant, the capital cost could increase by up to $2,856,000 and the closure cost could increase by up to $2,208,000.

Note that the estimate for the base modification includes the projected costs to cap and close the facility as well as the costs required for groundwater monitoring wells for the new facility. The base modification would require an additional estimated annual O&M cost of $125,000 for groundwater monitoring.

Figure 4-1 summarizes a conceptual schedule for the base modification at Wilson. This schedule provides an approximate timeline for the major milestone activities, based on the effective date of either set of the co-proposed CCR disposal regulations.

Activity	Planning Level Capital Costs (2010 dollars)						
	2012	2013	2014	2015	2016	2017	2018
Continued disposal of CCRs in current landfill							
Install groundwater monitoring and inspection plan	$28,000						
Site Investigation for new landfill site	$460,000						
Permitting and design for new landfill site	$2,140,000	$238,000					
Landfill construction		$7,331,000	$7,331,000				
Dry disposal in new landfill facility							
Cost Breakdown	$2,628,000	$7,569,000	$7,331,000	-	-	-	-

* Closure costs of $7,320,000 for the new landfill would be incurred at a later date.

**Based on projected effective date of January 1, 2012.

Figure 4-1: Conceptual Schedule for Wilson Base Modification

4.2.2 Conformance to Subtitle D Classification

To conform to the proposed Subtitle D regulations, Big Rivers would only have to perform the base modification as described in Section 4.2.1. However, Big Rivers would still be required to demonstrate that the landfill is designed to resist the maximum horizontal acceleration in lithified earth material for the site as described in Section 2.2.1.

4.2.3 Conformance to D Prime Classification

The EPA is also considering a modification to the Subtitle D option, termed the "D prime" option, which would allow existing CCR surface impoundments to continue to operate for their useful life rather than close within the RCRA Subtitle D option time period. All other elements of the RCRA Subtitle D option for existing CCR surface impoundments would still apply to the D prime option. Since Wilson has no CCR disposal ponds onsite, the D prime option would not apply.

4.2.4 Conformance to Subtitle C Classification

To conform to Subtitle C, Burns & McDonnell would propose using the base modification as described in Section 4.2.1. However, it is important to note, if portions of the landfill are not already constructed or being constructed when the Subtitle C regulations for CCRs are adopted, the remaining permitted landfill site at Wilson would not be able to be expanded since the plant is located in a seismic impact zone. According to the proposed Subtitle C rules, new landfills can only be located in seismic zones with a peak ground acceleration less than 0.1g. If the landfill is not being constructed when the Subtitle C regulations are adopted, all Wilson CCRs would need to be hauled an estimated 70 miles or a round trip of 140 miles from the Wilson plant (see Figure 3-5). This would increase the annual O&M cost by an estimated

$125,000 for groundwater monitoring and $14,800,000 for hauling and disposing of CCRs at a new facility with a 250 mile round trip from the Wilson site.

4.2.4.1 Handling Requirements

Currently in Section IV.C.3 on page 35182 of the proposed rules published in the Federal Register, the EPA essentially acknowledges that they have not fully defined all of the storage and handling requirements and associated costs for the RCRA Subtitle C regulations, and they are soliciting comments on CCR handling and associated costs. Given this, currently only the estimated costs for hauling of the CCRs to a landfill facility have been included in the estimated costs. Additional costs for other potential handling requirements, such as weather enclosures, additional secondary containments, and washdown facilities are not included.

* * * * *

5.0 SEBREE GENERATING STATION

Sebree Generating Station (Sebree) is located northeast of Sebree, Kentucky on the Henderson-Webster county line, Kentucky along the west bank of the Green River. Sebree includes three stations with a total of five coal-fired units (796 MW total): Reid, Green (Units 1 and 2), and HMPL (Units 1 and 2). The City of Henderson owns the two HMPL units and Big Rivers operates them. Big Rivers owns and operates the Reid and Green Stations. The Sebree Site Plan is shown in Figure SK-003 in Appendix A.

The HMPL and Green Stations have scrubbers and associated processing equipment that produce Poz-O-Tec material. The Poz-O-Tec stackout and fly ash silos are located northeast of the Green Station ash pond adjacent to the fly ash silos. The area has capacity for about 3 days of CCR material storage. Coal comes in by barge and truck. Approximately 1.1 million TPY of dry fly ash and Poz-O-Tec are produced at the five Sebree units. Green produces approximately 45,000 tons of bottom ash each year. HMPL bottom ash production is about 15,000 TPY. As Burns & McDonnell understands, the ash quantities are for Green and HMPL, and do not include the ash quantities associated with Reid.

Big Rivers owns approximately 400 acres on the other side of the Pennyrile Parkway (immediately west of the site), but, according to Big Rivers, only approximately 60 acres of it is likely "usable" for a landfill because the rest is a mix of wetlands, floodplain, and transmission or gas line corridors. For the purposes of this study, Burns & McDonnell has assumed that this area is not suitable for a new landfill but that it may be a possibility for a potential soil material borrow source.

5.1 EXISTING ASH PONDS

There are two ash ponds on site: the Reid unit and the two HMPL units share a common ash pond (built in the early 1970's), and the two Green units share a common ash pond (built in the late 1970's/early 1980's). There are piezometers at both ash ponds that were installed in 2009.

5.1.1 Reid/HMPL Bottom Ash Pond

The Reid/HMPL ash pond is currently around three-quarters full and operates as a once through pond. The pond does have silt curtains installed to increase residence time for enhanced settlement. The silt curtains will be removed permanently when pond modifications are made. The primary sluice discharge point is just northeast of the Reid/HMPL cooling towers, on the east side of the pond. The secondary sluice discharge point is northeast of the Reid/HMPL cooling towers, on the north side of the pond. The pond interior has a ditch around the north and west perimeter where ash has been excavated to form a

flow path so that water can be pumped from the south side of the pond. Based on the drawings provided by Big Rivers, the Reid/HMPL pond is about 35 feet deep with a total volume of approximately 1,110,000 cubic yards.

5.1.2 Green Bottom Ash Pond

The Green pond is approximately half to two-thirds full and is part of a recirculating water system. The sluice discharge point is on the east side of the pond about midway north-south. The pump structure is on north end of pond. Big Rivers pushes bottom ash material up from the sluice discharge area for dewatering and then hauls the material to the landfill via trucks. Based on the drawings provided by Big Rivers, the Green Pond is about 37 feet deep with a total volume of approximately 1,018,000 cubic yards.

5.2 LANDFILL SITE

The Sebree Landfill began operating sometime around 1979. The disposal area is approximately 110 acres. Big Rivers estimates that the landfill has approximately four to six years of capacity left. The south, west and east portion of the landfill is at finish grade, and Big Rivers will be building in the central areas to match the elevation of the portions at finish grade. The north end of the landfill has a couple of settling basin areas that include a pump structure to recycle water back to the ash pond system. The landfill has groundwater monitoring.

5.3 PROPOSED MODIFICATIONS

If the Subtitle C regulations are adopted, Big Rivers will need to switch to dry handling and disposal in a landfill facility. If the Subtitle D regulations are adopted, Big Rivers could 1) retrofit the existing ponds with a composite liner and continue operating, 2) construct a new lined pond, or 3) perform the necessary ash conversion and switch to dry disposal in a landfill similar to the Subtitle C option. Both scenarios (Subtitle C and Subtitle D) would allow continued operation of the existing ponds in their current state for the five-year period after the final regulations are placed in effect, with additional requirements for inspections and groundwater monitoring as described in Section 2.0 of this report.

The ponds at Sebree are currently used for ash disposal, as water supply for scrubber makeup, as water supply for the fly ash hydroveyor system which now serves as a backup system to a recently constructed dry fly ash system, and other process flows. If the full portions of the ponds were closed in order to avoid retrofitting the ponds with a composite liner, the remaining pond capacity would need to be kept in service for these process flows. This would require the construction of an isolation berm that would separate the ponded ash from the remaining pond capacity. Assuming that the filled portions of the

ponds will be closed and capped off after the five year operating window is complete, Burns & McDonnell has developed the following base modification that will likely be required at Sebree regardless of which set of regulations are adopted.

5.3.1 Base Modification

Under the Subtitle D regulations, Big Rivers would be required to modify their current ash disposal system as early as January 1, 2017 (see Section 2.2.8). At that time, there would be an estimated remaining capacity of 199,000 and 104,000 cubic yards in the Reid/HMPL and Green ponds, respectively, assuming a bottom ash disposal rate of 13,000 cubic yards per year and 39,000 cubic yards per year, respectively. The remaining life of the ponds, based on these rates, would be 15 years for the Reid/HMPL pond and 2.6 years for the Green pond.

The base modification for Sebree includes the cost for dredging 384,000 cubic yards of ash in order to strategically place an isolation berm in both the Reid/HMPL and Green ponds. The isolation berms would require 80,000 cubic yards of earth fill and the approximate location of these berms are shown in Figure SK-003 in Appendix A. The actual berm location would need to be selected such that the part of the pond being capped would be completely full before being closed so that the remaining pond capacity would be maximized. The remaining capacity of the Reid/HMPL pond east of the isolation berm is approximately 136,000 cubic yards. This portion of the pond could be retrofitted with a composite liner and used for ash disposal (see Option A) or left unlined and used for process water after all of the ash has been moved to the west end of the pond, outside the isolation berm.

For the purposes of this study, Burns & McDonnell has assumed that a new landfill would be constructed with a minimum capacity of ten years. This landfill would ideally be located in close proximity to the plant to prevent increased O&M costs associated with hauling CCR material. Assuming a 100-acre site would be developed and assuming a relatively rectangular shape, the new landfill could hold approximately 10 million cubic yards if the ash is placed with 4H:1V slopes to a height of 100 feet. The 10 year estimate is based on the facility receiving a total of 1.2 million tons of fly ash, bottom ash, and Poz-O-Tec from Sebree each year and compacted to an average unit weight of 85 pounds per cubic foot. This new landfill would need to be available to start receiving ash on January 1, 2017 based on the schedule presented for Subtitle D compliance (see Section 2.2.8). Since the existing onsite landfill is currently being filled and capped, Burns & McDonnell has not included any costs associated with the existing landfill including the hauling of materials to the landfill.

A planning level estimated capital and operating cost for the base modification is summarized in Table 5-1. Additional details of the cost estimate are included in Appendix B. The costs shown are in 2010 dollars. An allowance has been included for permitting the base modification and a selected compliance option. The actual permitting effort and associated cost will vary depending on the regulations that are adopted and the site specific requirements. The estimate includes the cost to install 6 monitoring wells for each existing pond in order to comply with the proposed groundwater monitoring requirements.

Table 5-1: Planning Level Capital and Operating Cost Estimate for Base Modification at Sebree

Green Pond Modifications	
General Earthwork	$2,263,000
Temporary Relocation for Discharge Point	$250,000
Capping Pond	$2,224,000
Isolation Berm	$436,000
Reid/HMPL Pond Modifications	
General Earthwork	$2,838,000
Temporary Relocation for Discharge Point	$250,000
Capping Pond	$1,998,000
Isolation Berm	$1,380,000
New Landfill	
General Earthwork	$6,918,000
Perimeter Berm	$824,000
Composite Liner	$10,721,000
Stormwater Runoff Pond	$825,000
Leachate Collection Pond	$1,181,000
Electrical	$200,000
Temporary Settling Pond for Dewatering Green Pond	$830,000
Temporary Settling Pond for Dewatering Reid/HMPL Pond	$830,000
Quality Assurance/Quality Control	$795,000
Groundwater Monitoring Wells	$37,000
Permitting	$1,000,000
Engineering (15%)	$5,217,000
Contingency (20%)	$6,954,000
***Base Modification Capital Costs**	**$47,971,000**
Additional Annual Operations and Maintenance	
Groundwater Monitoring	$125,000
Third Party Berm Inspections	$20,000
Total Additional Annual Operations and Maintenance	**$145,000**
Future Landfill Closure	
Final Cover	$8,986,000
Quality Assurance/Quality Control	$500,000
Engineering (15%)	$1,423,000
Contingency (20%)	$1,898,000
Total Closure Costs	**$12,807,000**

*This estimate assumes that clay borrow source will be onsite. If the clay source is found up to 25 miles from the plant, the capital cost could increase by up to $7,629,000 and the closure cost could increase by up to $4,184,000.

Note that the estimate for the base modification includes the projected costs to cap and close the disposal facility and that this cost would not be incurred until the end of the facility's life. This estimate also includes an allowance of $250,000 for relocating the process water lines for both the Reid/HMPL pond and the Green pond while the isolation berms are constructed and the ponded material is relocated. The base modification would require an additional estimated annual O&M cost of $125,000 for groundwater monitoring and $20,000 for annual third party berm inspections after the new regulations are issued. These estimates assume that outside contractors and laboratories will be used for the groundwater monitoring and berm inspections and these costs will likely be incurred after the ponds are capped as part of a post-closure monitoring program after the new regulations are issued.

Figure 5-1 summarizes a conceptual schedule for the base modification at Sebree. This schedule provides an approximate timeline for the major milestone activities, based on the effective date of either set of the co-proposed CCR disposal regulations.

Activity	Planning Level Capital Costs (2010 dollars)						
	2012	2013	2014	2015	2016	2017	2018
Continued disposal of CCRs in the existing ponds							
Install groundwater monitoring and inspection plan	$37,000						
Site investigation for new landfill site		$718,000	$80,000				
Permitting and design for closure of existing ponds		$1,600,000	$177,000				
Permitting and design for new landfill site		$3,053,000	$339,000				
Relocate plant discharges				$500,000			
Landfill construction				$12,753,000	$12,753,000		
Installation of berm and dredging of material				$4,580,000	$4,580,000		
Installation of composite final cover (cap ponds)						$4,762,000	$2,041,000
Cost Breakdown	$37,000	$5,371,000	$596,000	$17,833,000	$17,333,000	$4,762,000	$2,041,000

* Closure costs of $12,807,000 for the new landfill would be incurred at a later date.
**Based on projected effective date of January 1, 2012.

Figure 5-1: Conceptual Schedule for Sebree Base Modification

Any further modifications done to the site beyond the base modification would be dictated by the adopted regulations and the resulting classification of CCRs. Therefore, the modifications outlined in the following subsections are based on the compliance needed for either classification, and these modifications would be performed in addition to the base modification described earlier.

5.3.2 Conformance to Subtitle D Classification

To conform to the proposed Subtitle D regulations, Burns & McDonnell investigated three options for compliance.

- Option A: Base modification described previously along with the installation of a composite liner and armor lining to retrofit the remaining capacity of the existing Reid/HMPL and Green ponds to allow for continued use of the existing facilities (assuming annual cleanout) until a new landfill reaches its designed capacity.
- Option B: Base modification as well as the investment in a wet to dry ash handling conversion with disposal of all CCRs in the new landfill.
- Option C: Base modification along with the dredging of all ash currently in the Reid/HMPL and Green ponds, and the installation of a composite liner in both ponds.

These options are described further in the sections that follow.

5.3.2.1 Option A – Retrofit Remaining Pond Capacity

Option A consists of performing the base modification described in Section 5.3.1 while also retrofitting the remaining capacity of the Reid/HMPL and Green ponds with a composite liner and armor lining and modifying the sluice piping to allow all of the units to discharge to either pond. This option would allow Big Rivers to discharge all Sebree bottom ash to each pond for alternating periods of 1 to 2 years. One of the ponds would actively receive bottom ash while the inactive pond could be dewatered and all ash could be removed and disposed in the Sebree landfill. Under the Subtitle D regulations, Big Rivers would be required to start discharging into the lined portion of the ponds as early as January 1, 2017 (see Section 2.2.8).

At that time, there would be an estimated capacity of 199,000 cubic yards and 104,000 cubic yards remaining in the Reid/HMPL and Green ponds after dredging material from one side of the pond to completely fill the side of the pond being capped and closed. The isolation berm for the base modification will take up approximately 63,000 cubic yards of the remaining capacity in the Reid/HMPL pond and approximately 17,000 cubic yards of the remaining capacity in the Green pond. For the purposes of this study, Burns & McDonnell has assumed that the composite liner will consist of two feet of compacted clay liner, a 60-mil geomembrane liner, and one foot of protective cover. This composite liner will take up approximately 17,000 cubic yards of the remaining capacity in the Reid/HMPL pond and approximately 15,000 cubic yards of the remaining capacity in the Green pond. After the composite liner and isolation berms are installed, the remaining capacities for the Reid/HMPL and Green ponds are estimated at 119,000 cubic yards and 72,000 cubic yards.

Assuming Sebree's total estimated production rate of 52,000 cubic yards of bottom ash per year is disposed in the Reid/HMPL pond, the pond would have approximately 2.5 years of capacity. Making the same assumption for the Green pond, the pond would have approximately 1.4 years of capacity. Thus, it would be possible for Big Rivers to discharge all Sebree bottom ash to each pond for alternating periods of 1 to 2 years, cleaning out one pond while the other is being filled.

A planning level estimated capital and operating cost for Option A is summarized in Table 5-2. Additional details of the estimate are included in Appendix B. All costs shown are in 2010 dollars. This modification would allow Big Rivers to dispose of the Sebree bottom ash in the remaining portion of the ponds from the projected compliance date of January 1, 2017 for as long as needed provided future landfill(s) are developed once the landfill included in the base modification reaches capacity. This estimate includes an allowance of $292,000 for installing bottom ash lines so that Big Rivers has the capability of discharging into either pond. The estimate does not include costs associated with cleaning out each pond when full since this is already an ongoing O&M process for Big Rivers.

Table 5-2: Planning Level Capital and Operating Cost Estimate for Option A at Sebree

Line Portion of Green Pond	
Pond Liner	$1,316,000
Pumps/Piping	$104,000
Line Portion of Reid/HMPL	
Pond Liner	$1,474,000
Pumps/Piping	$266,000
Quality Assurance/Quality Control	$40,000
Engineering (15%)	$480,000
Contingency (20%)	$640,000
Base Modification Capital Costs	$47,971,000
***Option A Capital Costs**	**$52,291,000**
Additional Annual Operations and Maintenance	
Groundwater Monitoring	$125,000
Third Party Berm Inspections	$20,000
Total Additional Annual Operations and Maintenance	**$145,000**
Future Partial Green Pond Closure	
Final Cover	$414,000
Future Partial Reid/HMPL Closure	
Final Cover	$461,000
Quality Assurance/Quality Control	$35,000
Engineering (15%)	$138,000
Contingency (20%)	$183,000
Base Modification Closure Costs	$12,807,000
Total Closure Costs	**$14,038,000**

*This estimate assumes that clay borrow source will be onsite. If the clay source is found up to 25 miles from the plant, the capital cost could increase by up to $7,907,000 and the closure cost could increase by up to $4,448,000.

Note that the estimate for Option A includes the projected costs to cap and close the disposal facilities and that this cost would not be incurred until the end of the facilities' life. Option A would also require an additional estimated annual O&M cost of $125,000 for groundwater monitoring and $20,000 for annual third party berm inspections as described in the base modification.

Figure 5-2 summarizes a conceptual schedule for Option A at Sebree. This schedule provides an approximate timeline for the major milestone activities, based on the effective date of the proposed Subtitle D CCR disposal regulations.

Activity	Planning Level Capital Costs (2010 dollars)						
	2012	2013	2014	2015	2016	2017	2018
Continued disposal of CCRs in the existing ponds							
Install groundwater monitoring and inspection plan	$37,000						
Permitting and design for retrofit of existing ponds		$432,000	$48,000				
Permitting and design for closure of existing ponds		$1,600,000	$177,000				
Site investigation for new landfill site		$718,000	$80,000				
Permitting and design for new landfill site		$3,053,000	$339,000				
Relocate plant discharges				$500,000			
Landfill construction				$12,753,000	$12,753,000		
Installation of berm and dredging of material				$4,580,000	$4,580,000		
Install composite liner in existing ponds (remaining capacity)					$3,470,000		
Relocate plant discharges to retrofitted portion of pond					$370,000		
Installation of composite final cover (cap ponds)						$4,762,000	$2,041,000
Cost Breakdown	$37,000	$5,803,000	$644,000	$17,833,000	$21,173,000	$4,762,000	$2,041,000

* Closure costs of $14,038,000 for portions of both ponds and the new landfill would be incurred at a later date.
**Based on projected effective date of January 1, 2012.

Figure 5-2: Conceptual Schedule for Sebree Option A

5.3.2.2 Option B – Ash Conversion

Option B consists of performing the base modification while also investing in a wet to dry ash handling conversion. As discussed in the base modification (see Section 5.3.1), the ten-year, 100-acre landfill would have a capacity of approximately 10 million cubic yards. As part of the base modification, this new landfill would need to be available to start receiving ash on January 1, 2017 based on the schedule presented for Subtitle D compliance (see Section 2.2.8). The remaining portion of the Reid/HMPL and Green ponds would be left unlined and used for process water storage.

A planning level estimated capital and operating costs for a wet to dry ash handling conversion have been included in Table 5-3. Additional details of the cost estimate are included in Appendix B. All costs shown are in 2010 dollars. This modification would allow Big Rivers to dispose of the Sebree bottom ash in the proposed landfill facility from the projected compliance date of January 1, 2017 for a period of approximately ten years, assuming the current bottom ash disposal rate of 52,000 cubic yards per year continues. This estimate includes an allowance of $48.6 million for converting from wet bottom ash handling to dry using a submerged flight conveyor (SFC) system for all units at Sebree. This allowance is broken out to show ash conversion, engineering, and contingency costs.

Table 5-3: Planning Level Capital and Operating Cost Estimate for Option B at Sebree

Green Ash Conversion	$16,445,000
Reid/HMPL Ash Conversion	$20,780,500
Engineering (15%)	$4,855,500
Contingency (20%)	$6,474,000
Base Modification Capital Costs	$47,971,000
***Option B Capital Costs**	**$96,526,000**
Additional Annual Operations and Maintenance	
Groundwater Monitoring	$125,000
Third Party Berm Inspections	$20,000
Total Additional Annual Operations and Maintenance	**$145,000**
Base Modification Closure Costs	$12,807,000
Total Closure Costs	**$12,807,000**

*This estimate assumes that clay borrow source will be onsite. If the clay source is found up to 25 miles from the plant, the capital cost could increase by up to $7,629,000 and the closure cost could increase by up to $4,184,000.

Note that the estimate for Option B includes the projected costs to cap and close the disposal facilities and that this cost would not be incurred until the end of the facilities' life. Option B would require an additional estimated annual O&M cost of $125,000 for groundwater monitoring and $20,000 for annual third party berm inspections after the new regulations are issued. O&M costs associated with the SFC system were not investigated.

Figure 5-3 summarizes a conceptual schedule for Option B at Sebree. This schedule provides an approximate timeline for the major milestone activities, based on the effective date of the proposed Subtitle D CCR disposal regulations.

Activity	Planning Level Capital Costs (2010 dollars)						
	2012	2013	2014	2015	2016	2017	2018
Continued disposal of CCRs in the existing ponds							
Install groundwater monitoring and inspeetion plan	$37,000						
Permitting and design for closure of existing ponds		$1,600,000	$177,000				
Site investigation for new landfill site		$718,000	$80,000				
Permitting and design for new landfill site		$3,053,000	$339,000				
Relocate plant discharges				$500,000			
Design for ash conversion				$4,855,500			
Landfill construction				$12,753,000	$12,753,000		
Installation of berm and dredging of material				$4,580,000	$4,580,000		
Perform ash conversion					$43,699,500		
Dry disposal in new landfill facility							
Installation of composite final eover (cap ponds)						$4,762,000	$2,041,000
Cost Breakdown	$37,000	$5,371,000	$596,000	$22,688,500	$61,032,500	$4,762,000	$2,041,000

* Closure costs of $12,807,000 for the new landfill would be ineurred at a later date.

**Based on projected effeetive date of January 1, 2012.

Figure 5-3: Conceptual Schedule for Sebree Option B

5.3.2.3 Option C – Retrofit Entire Capacity of Each Pond

Option C includes the performance of the base modification less the construction of isolation berms and capping of the full portion of the ponds. It includes dredging and removal of all the ash currently stored in the ash ponds to the new landfill, the installation of a composite liner in both ponds, and the construction of a new landfill. Big Rivers would then continue to operate by discharging all bottom ash to the newly lined ponds.

Under the Subtitle D regulations, Big Rivers would be required to start discharging into the lined ponds as early as January 1, 2017 (see Section 2.2.8). At that time, the full capacity of the ponds would be available; 1,110,000 cubic yards and 1,018,000 cubic yards for the Reid/HMPL and Green ponds, respectively. For the purposes of this study, Burns & McDonnell has assumed that the composite liner will consist of two feet of compacted clay liner, a 60-mil geomembrane liner, and one foot of protective cover. This composite liner will take up approximately 115,000 cubic yards of the remaining capacity in the Reid/HMPL pond and approximately 123,000 cubic yards of the remaining capacity in the Green pond. The remaining capacity in the Reid/HMPL pond is estimated at 995,000 cubic yards after the composite liner is installed and 895,000 cubic yards for the Green pond. This represents approximately 90% of the existing total Reid/HMPL pond volume, or approximately 75 years of capacity based on HMPL's estimated production rate of 13,000 cubic yards of bottom ash per year. For Green, this represents approximately 88% of the existing total pond volume, or approximately 23 years of capacity

based on Green's estimated production rate of 39,000 cubic yards of bottom ash per year. In order to maximize the service life, Burns & McDonnell has included an allowance of $292,000 for installing bottom ash lines so that Big Rivers has the capability of discharging into either pond. This would allow Big Rivers to discharge into the two ponds for 49 years without dredging.

In the base modification, a 10-year landfill was proposed with the assumption that the capacity would hold Sebree's CCR production for 10 years. In Option C, the ash that is currently stored in both ponds would be removed and disposed in the landfill. Due to this additional volume, the expected service life of the landfill would be decreased to approximately 8.2 years.

A planning level estimated capital and operating cost for Option C is summarized in Table 5-4. Additional details of the cost estimate are included in Appendix B. All costs shown are in 2010 dollars. This modification would allow Big Rivers to dispose of the Sebree bottom ash in the either pond from the projected compliance date of January 1, 2017 for a period of approximately 49 years with no additional dredging required.

Table 5-4: Planning Level Capital and Operating Cost Estimate for Option C at Sebree

Line Complete Green Pond	
General Earthwork	$8,144,000
Pond Liner	$1,877,000
Pumps/Piping	$104,000
Line Complete Reid/HMPL Pond	
General Earthwork	$8,880,000
Pond Liner	$1,748,000
Pumps/Piping	$284,000
Quality Assurance/Quality Control	$250,000
Engineering (15%)	$3,194,000
Contingency (20%)	$4,258,000
Base Modification Capital Costs	$47,971,000
Less Isolation Berms	($15,998,000)
***Option C Capital Costs**	**$60,712,000**
Additional Annual Operations and Maintenance	
Groundwater Monitoring	$125,000
Third Party Berm Inspections	$20,000
Total Additional Annual Operations and Maintenance	**$145,000**
Future Green Pond Closure	
Final Cover	$3,467,000
Future Reid/HMPL Pond Closure	
Final Cover	$3,233,000
Quality Assurance/Quality Control	$245,000
Engineering (15%)	$1,042,000
Contingency (20%)	$1,390,000
Base Modification Closure Costs	$12,807,000
Total Closure Costs	**$22,184,000**

*This estimate assumes that clay borrow source will be onsite. If the clay source is found up to 25 miles from the plant, the capital cost could increase by up to $9,698,000 and the closure cost could increase by up to $6,204,000.

Note that the estimate for Option C includes the projected costs to cap and close the disposal facilities and that this cost would not be incurred until the end of the facilities' life. Option C would require an additional estimated annual O&M cost of $125,000 for groundwater monitoring and $20,000 for annual third party berm inspections. The pumping costs should be similar to the costs already incurred for the current operation of the bottom ash sluicing system.

Figure 5-4 summarizes a conceptual schedule for Option C at Sebree. This schedule provides an approximate timeline for the major milestone activities, based on the effective date of the proposed Subtitle D CCR disposal regulations.

Activity	Planning Level Capital Costs (2010 dollars)						
	2012	2013	2014	2015	2016	2017	2018
Continued disposal of CCRs in the existing ponds							
Install groundwater monitoring and inspection plan	$37,000						
Permitting and design for retrofit of existing ponds		$3,100,000	$344,000				
Site investigation for new landfill site		$718,000	$80,000				
Permitting and design for new landfill site		$3,053,000	$339,000				
Relocate plant discharges				$388,000			
Dewatering and dredging of material				$9,508,000	$9,508,000		
Landfill construction				$12,753,000	$12,753,000		
Existing pond improvement construction, including composite liner				$4,067,000	$4,067,000		
Dry disposal in new landfill facility							
Cost Breakdown	$37,000	$6,871,000	$763,000	$26,716,000	$26,328,000	-	-

* Closure costs of $22,184,000 for the twon ponds and the new landfill would be incurred at a later date.
**Based on projected effective date of January 1, 2012.

Figure 5-4: Conceptual Schedule for Sebree Option C

5.3.3 Conformance to D Prime Classification

The EPA is also considering a modification to the Subtitle D option, termed the "D prime" option, which would allow existing CCR surface impoundments to continue to operate for their useful life rather than close within the RCRA Subtitle D option time period. All other elements of the RCRA Subtitle D option for existing CCR surface impoundments would still apply to the D prime option. This alternative to the currently proposed regulations would allow Big Rivers to operate their existing ponds until 100% of their disposal capacity is reached. Big Rivers should note that the Subtitle D Prime scenario represent the "do nothing" alternative and would allow Big Rivers to continue operating as-is for approximately 5.5 years at Sebree.

5.3.4 Conformance to Subtitle C Classification

To conform to Subtitle C, surface impoundments would be permitted to receive CCRs for five years before being mandated to close. Subtitle C effectively phases out all wet handling and a new dry disposal facility would need to be available to start receiving ash as early as January 1, 2019 based on the schedule presented for Subtitle C compliance (see Section 2.1.8). The existing ponds would need to be capped and closed in the two following years. Therefore, Burns & McDonnell would propose using Option B as described Section 5.3.2.2, with a schedule lag of approximately two years. However, it is important to

note, for portions of the landfill not already constructed or being constructed when the Subtitle C regulations for CCRs are adopted, the remaining portions of the landfill site would not be able to be used since the plant is located in a seismic impact zone. According to the proposed Subtitle C rules, the landfill can only be located in seismic zones with a peak ground acceleration less than 0.1g. To meet this requirement, the haul distance would be increased to an estimated minimum of 100 miles or a round trip of 200 miles from the Sebree plant (see Figure 3-5). This would increase the annual O&M cost by an estimated $125,000 for groundwater monitoring and $61,900,000 for hauling and disposing of bottom ash at a new facility with a 200 mile round trip from the Sebree site.

5.3.4.1 Handling Requirements

Currently in Section IV.C.3 on page 35182 of the proposed rules published in the Federal Register, the EPA essentially acknowledges that they have not fully defined all of the storage and handling requirements and associated costs for the RCRA Subtitle C regulations, and they are soliciting comments on CCR handling and associated costs. Given this, currently only the estimated costs for hauling of the CCRs to a landfill facility, which is known to be required to transition from surface impoundment to landfill disposal, have been included in the estimated costs. Additional costs for other potential handling requirements, such as weather enclosures, additional secondary containments, and washdown facilities are not included.

* * * * *

6.0 QUALIFICATIONS

Note that estimates, forecasts, projections, and schedules prepared by Burns & McDonnell relating to costs, quantities, demand or pricing (including, but not limited to, property costs, construction, operations or maintenance costs, and/or energy or commodity demand and pricing), are opinions based on Burns & McDonnell's experience, qualifications, and judgment. Burns & McDonnell has no control over weather, cost and availability of labor, material and equipment, labor productivity, energy or commodity pricing, demand or usage, population demographics, market conditions, changes in technology, and other economic or political factors affecting such estimates or projections. Big Rivers should note that actual results may vary significantly from the representations and opinions herein, and nothing herein shall be construed as a guarantee or warranty of conclusions, results, or opinions. Burns & McDonnell makes no guarantee or warranty (actual or implied) that actual rates, demand, pricing, costs, performance, schedules, quantities, technology, and related items will not vary from the opinions contained in the estimates, forecasts, projections, schedules, results, or other statements or opinions prepared by Burns & McDonnell.

In the preparation of this report, the information provided to Burns & McDonnell by Big Rivers was used by Burns & McDonnell to make certain assumptions with respect to conditions which may exist in the future. While Burns & McDonnell believes the assumptions made are reasonable for the purposes of this study, Burns & McDonnell makes no representation that the conditions assumed will, in fact, occur. In addition, while Burns & McDonnell has no reason to believe that the information provided by Big Rivers, and on which this report is based, is inaccurate in any material respect, Burns & McDonnell has not independently verified such information and cannot guarantee its accuracy or completeness. To the extent that actual future conditions differ from those assumed herein or from the information provided to Burns & McDonnell, the actual results will vary from those forecast.

APPENDIX A – FIGURES

Burns & McDonnell
SINCE 1898

date OCTOBER 19, 2010
designed EICHENBERGER

BIG RIVERS
CCR MASTER PLANNING STUDY
COLEMAN GENERATING STATION
SITE PLAN

project 57935
contract

SK - 001

11/17/2010

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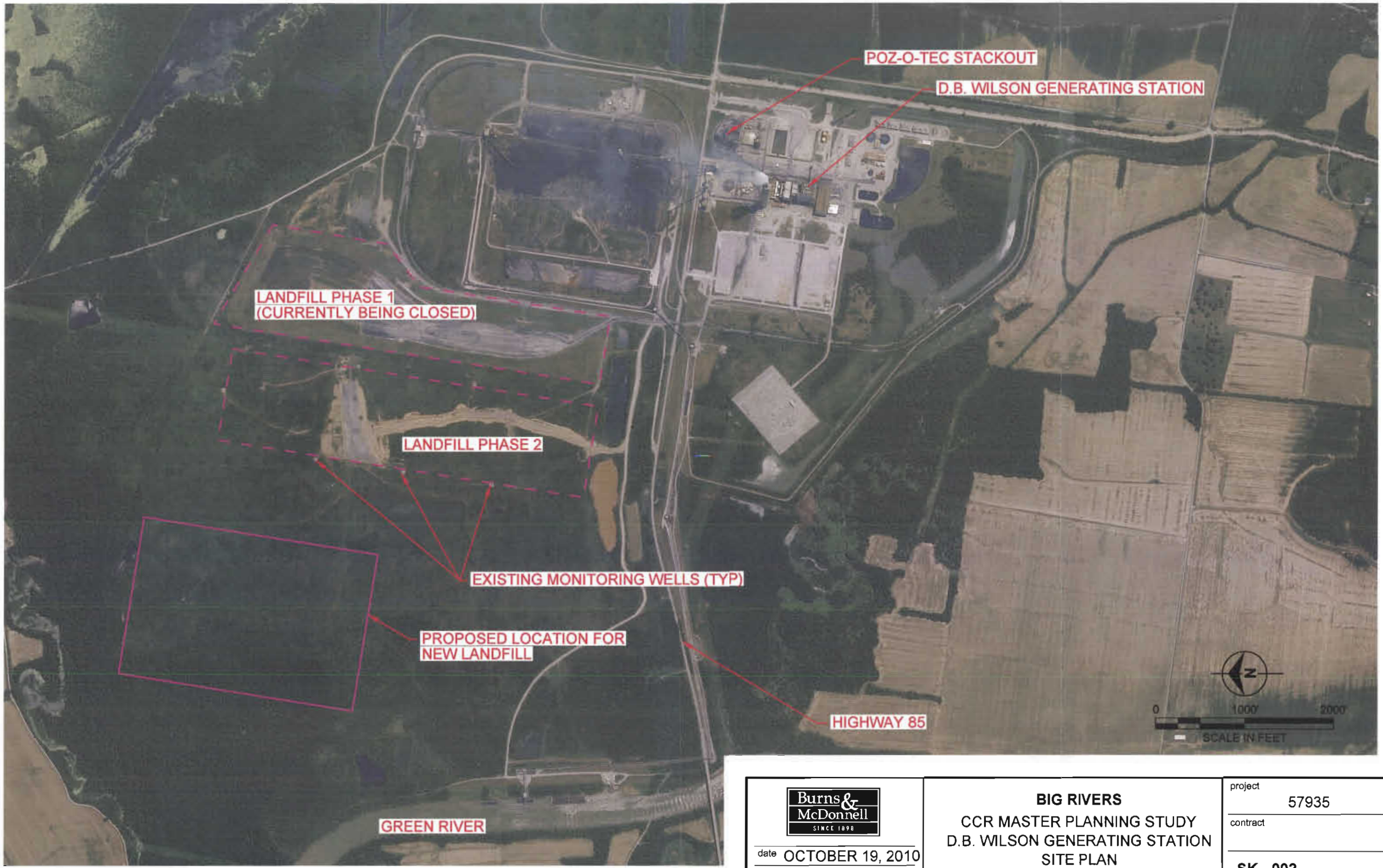

Burns & McDonnell
SINCE 1898

date OCTOBER 19, 2010
designed EICHENBERGER

BIG RIVERS
CCR MASTER PLANNING STUDY
D.B. WILSON GENERATING STATION
SITE PLAN

project 57935
contract

SK - 002

11/17/2010

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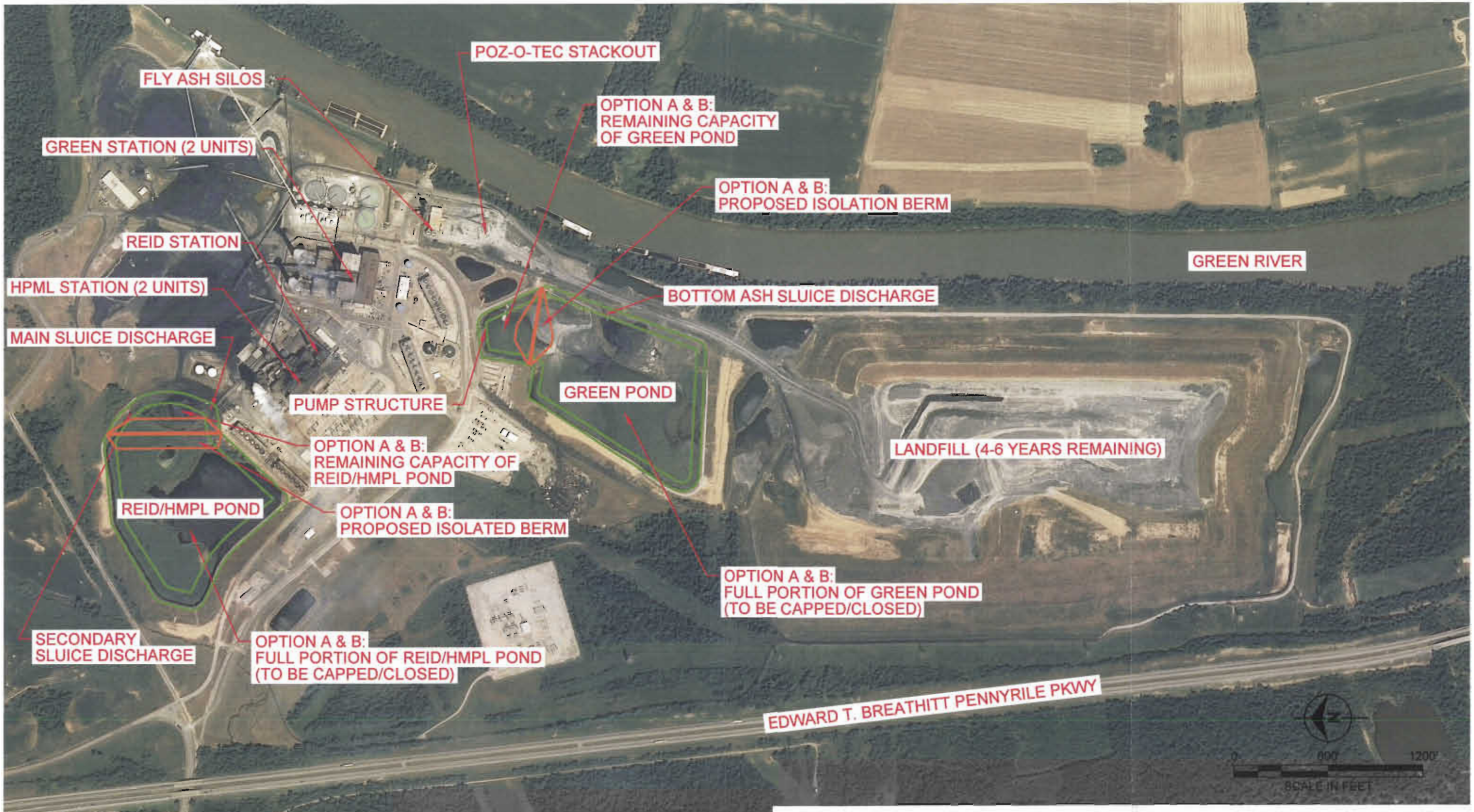

Burns & McDonnell
SINCE 1898

date OCTOBER 19, 2010
designed EICHENBERGER

BIG RIVERS
CCR MASTER PLANNING STUDY
SEBREE GENERATING STATION
SITE PLAN

project 57935
contract

SK - 003

11/17/2010

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APPENDIX B – COST ESTIMATES

Big Rivers Electric Corporation
Kenneth C. Coleman
Preliminary Cost Estimate
1/5/2011

Coleman Capital Cost Estimate for Base Modification

Sluice Pond Modifications	Qty	Unit	Unit Price		Price	Notes
General Earthwork						
Ash Grading - 3' Depth	132,500	CY	$8.00	CY	$1,060,000	
Cut and Dredge Ash	921,500	CY	$8.00	CY	$7,372,000	assumes ash 30' deep
Subtotal					**$8,432,000**	
Temporary Relocation for Discharge Point						
Temporary Relocation for Discharge Point	1	LS	$250,000.00	LS	$250,000	
Subtotal					**$250,000**	
Capping Pond						
24" Compacted Clay Liner (CCL)	101,600	CY	$10.65	CY	$1,082,040	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	1,251,500	SF	$0.60	SF	$750,900	assumes 5% of liner for anchoring/waste
Geogrid	139,056	SY	$4.00	SY	$556,222	
Anchor Trench	500	CY	$6.00	CY	$3,000	
18" Protective Soil Layer	66,300	CY	$4.00	CY	$265,200	
Topsoil - 6" Depth	22,100	CY	$3.00	CY	$66,300	
Seeding	132,500	SY	$0.25	SY	$33,125	
Conformance Testing	1	LS	$15,000.00	LS	$15,000	
Subtotal					**$2,772,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	28	ACRE	$5,000.00	ACRE	$140,000	
Subtotal					**$140,000**	
Isolation Berm						
Earthwork	121,900	CY	$17.65	CY	$2,151,535	assumes clay 30' deep with 3:1 slope, 2 mile round trip haul distance, and 15% shrinkage
Mobilization/Overhead	1	LS	$100,000.00	LS	$100,000	
Conformance Testing	1	LS	$8,000.00	LS	$8,000	
Subtotal					**$2,260,000**	
Subtotal Construction (w/o Contingency)					**$13,854,000**	
Engineering (15%)					$2,079,000	
Contingency (20%)					$2,771,000	
Subtotal Sluice Pond					**$18,704,000**	
Future Existing North Pond Closure						
Final Cover						
Ash Grading - 3' Depth	274,800	CY	$8.00	CY	$2,198,400	
24" Compacted Clay Liner (CCL)	210,700	CY	$10.65	CY	$2,243,955	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	2,596,400	SF	$0.60	SF	$1,557,840	assumes 5% of liner for anchoring/waste
Geogrid	288,489	SY	$4.00	SY	$1,153,956	
18" Protective Soil Layer	137,400	CY	$4.00	CY	$549,600	
Topsoil - 6" Depth	45,800	CY	$3.00	CY	$137,400	
Seeding	274,800	SY	$0.25	SY	$68,700	
Subtotal					**$7,910,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	57	ACRE	$5,000.00	ACRE	$285,000	
Subtotal					**$285,000**	
Subtotal Construction (w/o Contingency)					**$8,195,000**	
Engineering (15%)					$1,230,000	
Contingency (20%)					$1,639,000	
Subtotal Future Existing North Pond Closure					**$11,064,000**	
South Pond Closure						
Final Cover						
Ash Grading - 3' Depth	452,200	CY	$8.00	CY	$3,617,600	
24" Compacted Clay Liner (CCL)	346,700	CY	$10.65	CY	$3,692,355	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	4,273,200	SF	$0.60	SF	$2,563,920	assumes 5% of liner for anchoring/waste
Geogrid	474,800	SY	$4.00	SY	$1,899,200	
18" Protective Soil Layer	226,100	CY	$4.00	CY	$904,400	
Topsoil - 6" Depth	75,400	CY	$3.00	CY	$226,200	
Seeding	452,200	SY	$0.25	SY	$113,050	
Subtotal					**$13,017,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	94	ACRE	$5,000.00	ACRE	$470,000	
Subtotal					**$470,000**	
Subtotal Construction (w/o Contingency)					**$13,487,000**	
Engineering (15%)					$2,024,000	
Contingency (20%)					$2,698,000	
Subtotal South Pond Closure					**$18,209,000**	
Temporary Settling Pond for Dewatering Sluice Pond						
General Earthwork						
Clear and Grub	10	ACRE	$13,800	ACRE	$138,000	assumes enitre site
Stripping - 12" Depth	8,100	CY	$2.70	CY	$21,870	
Earthwork - 2' Depth Cut/Fill	16,200	CY	$7.00	CY	$113,400	
Topsoil - 6" Depth	2,800	CY	$3.00	CY	$8,400	assumes 50' beyond haul road
Seeding	16,800	SY	$0.25	SY	$4,200	assumes 50' beyond haul road
Dozer w/ Operator	360	HR	$105.00	HR	$37,800	
Subtotal					**$324,000**	
Pond Liner						
60-mil Textured HDPE Geomembrane Liner	230,500	SF	$0.60	SF	$138,300	assumes 5% of liner for anchoring/waste
Subtotal					**$139,000**	
Perimeter Berm						
Stripping - 6" Depth	800	CY	$2.70	CY	$2,160	
Earthwork - 5' Fill	7,300	CY	$4.80	CY	$35,040	
Crushed Rock Surfacing - 12" Depth	1,500	CY	$40.00	CY	$60,000	assumes 20' wide road/berm around pond
Subtotal					**$98,000**	
Pumps/Piping						
6' Dia. Precast Concrete Manhole - 12' Depth	2	EA	$40,000.00	EA	$80,000	
2 - 6" Pumps for Dewatering	15	DAYS	$680.00	DAY	$10,200	assumed pumps will run 24 hrs - RSMeans 01 54 33 440(
6" Dia Solid Pipe	2,000	LF	$21.00	LF	$42,000	assumed 2,000' needed
Subtotal					**$133,000**	
Temporary NPDES Permit						
Temporary NPDES Permit	1	EA	$150,000.00	LS	$150,000	
					$150,000	
Subtotal Construction (w/o Contingency)					**$844,000**	
Engineering (15%)					$127,000	
Contingency (20%)					$169,000	
Subtotal Temporary Settling Pond for Dewatering Sluice Pond					**$1,140,000**	

Summary of Capital Costs	
Sluice Pond Modifications	$13,714,000
Future Existing North Pond Closure	$7,910,000
South Pond Closure	$13,017,000
Dewatering Sluice Pond	$844,000
Quality Assurance/Quality Control	$895,000
Groundwater Monitoring Wells	$73,000
Permitting	$1,000,000
Engineering (15%)	$5,460,000
Contingency (20%)	$7,277,000
Base Modification Capital Cost	**$50,190,000**

Big Rivers Electric Corporation
Kenneth C. Coleman
Preliminary Cost Estimate
1/5/2011

Coleman Option A - retrofit remaining pond capacity w/ composite liner

Burns & McDonnell SINCE 1898

Line East Portion of Sluice Pond	Qty	Unit	Unit Price		Price	Notes
Pond Liner						
24" Compacted Clay Liner (CCL)	72,600	CY	$10.65	CY	$773,190	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	894,800	SF	$0.60	SF	$536,880	assumes 5% of liner for anchoring/waste
Anchor Trench	450	CY	$6.00	CY	$2,700	
12" Protective Soil Layer	31,600	CY	$4.00	CY	$126,400	
Subtotal					**$1,440,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	20	ACRE	$5,000.00	ACRE	$100,000	
Subtotal					**$100,000**	
Subtotal Construction (w/o Contingency)					**$1,540,000**	
Engineering (15%)					$231,000	
Contingency (20%)					$308,000	
Subtotal Line East Portion of Sluice Pond					**$2,079,000**	

North Pond with Berm Extension	Qty	Unit	Unit Price		Price	Notes
General Earthwork						
Cut and Dredge Ash	458,200	CY	$8.00	CY	$3,665,600	assumes ash 30' deep
Subtotal					**$3,666,000**	
Final Cover (additional space created by berm extension)						
Ash Grading - 3' Depth	21,500	CY	$8.00	CY	$172,000	
24" Compacted Clay Liner (CCL)	16,500	CY	$10.65	CY	$175,725	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	202,800	SF	$0.60	SF	$121,680	assumes 5% of liner for anchoring/waste
Geogrid	22,533	SY	$4.00	SY	$90,133	
18" Protective Soil Layer	10,800	CY	$4.00	CY	$43,200	
Topsoil - 6" Depth	3,600	CY	$3.00	CY	$10,800	
Seeding	21,500	SY	$0.25	SY	$5,375	
Subtotal					**$619,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	5	ACRE	$5,000.00	ACRE	$25,000	
Subtotal					**$25,000**	
Isolation Berm and Berm Extension						
Earthwork/Berm Extension	386,500	CY	$17.65	CY	$6,821,725	assumes clay 30' deep with 3:1 slope, 2 mile round trip haul distance, and 15% shrinkage
Mobilization/Overhead	1	LS	$100,000.00	LS	$100,000	includes equipment & crane
Subtotal					**$6,922,000**	
Subtotal Construction (w/o Contingency)					**$11,232,000**	
Engineering (15%)					$1,685,000	
Contingency (20%)					$2,247,000	
Subtotal North Pond with Berm Extension					**$15,164,000**	

Line North Portion of North Pond	Qty	Unit	Unit Price		Price	Notes
Pond Liner						
24" Compacted Clay Liner (CCL)	37,700	CY	$10.65	CY	$401,505	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	464,500	SF	$0.60	SF	$278,700	assumes 5% of liner for anchoring/waste
Anchor Trench	350	CY	$6.00	CY	$2,100	
12" Protective Soil Layer	16,400	CY	$4.00	CY	$65,600	
Subtotal					**$748,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	11	ACRE	$5,000.00	ACRE	$55,000	
Subtotal					**$55,000**	
Subtotal Construction (w/o Contingency)					**$803,000**	
Engineering (15%)					$121,000	
Contingency (20%)					$161,000	
Subtotal Line North Portion of North Pond					**$1,085,000**	

Future Partial North Pond Closure						
Final Cover						
Ash Grading - 3' Depth	46,500	CY	$8.00	CY	$372,000	
24" Compacted Clay Liner (CCL)	35,700	CY	$10.65	CY	$380,205	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	439,300	SF	$0.60	SF	$263,580	assumes 5% of liner for anchoring/waste
Geogrid	48,811	SY	$4.00	SY	$195,244	
18" Protective Soil Layer	23,300	CY	$4.00	CY	$93,200	
Topsoil - 6" Depth	7,800	CY	$3.00	CY	$23,400	
Seeding	46,500	SY	$0.25	SY	$11,625	
Subtotal					**$1,340,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	11	ACRE	$5,000.00	ACRE	$55,000	
Subtotal					**$55,000**	
Subtotal Construction (w/o Contingency)					**$1,395,000**	
Engineering (15%)					$210,000	
Contingency (20%)					$279,000	
Subtotal Partial North Pond Closure					**$1,884,000**	

Summary of Capital Costs

Line East Portion of Sluice Pond	$1,440,000
North Pond with Berm Extension	$11,207,000
Line North Portion of North Pond	$748,000
Future Partial North Pond Closure	$1,340,000
Quality Assurance/Quality Control	$235,000
Engineering (15%)	$2,247,000
Contingency (20%)	$2,995,000
Base Modification Capital Costs	$50,190,000
Option A Capital Cost	**$70,402,000**

Future East Portion of Sluice Pond Closure						
Final Cover						
Ash Grading - 3' Depth	92,200	CY	$8.00	CY	$737,600	
24" Compacted Clay Liner (CCL)	70,700	CY	$10.65	CY	$752,955	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	870,800	SF	$0.60	SF	$522,480	assumes 5% of liner for anchoring/waste
Geogrid	96,756	SY	$4.00	SY	$387,022	
18" Protective Soil Layer	46,100	CY	$4.00	CY	$184,400	
Topsoil - 6" Depth	15,400	CY	$3.00	CY	$46,200	
Seeding	92,200	SY	$0.25	SY	$23,050	
Conformance Testing	1	LS	$15,000.00	LS	$15,000	
Subtotal					**$2,669,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	20	ACRE	$5,000.00	ACRE	$100,000	
Subtotal					**$100,000**	
Subtotal Construction (w/o Contingency)					**$2,769,000**	
Engineering (15%)					$416,000	
Contingency (20%)					$554,000	
Subtotal Future East Portion of Sluice Pond Closure					**$3,739,000**	

Big Rivers Electric Corporation
Kenneth C. Coleman
Preliminary Cost Estimate
1/5/2011

Coleman Option B - convert to dry handling and disposal in a landfill

New Landfill	Qty	Unit	Unit Price		Price	Notes
General Earthwork						
Clear and Grub	8	ACRE	$13,800	ACRE	$110,400	assumes 10% of site
Stripping - 12" Depth	69,000	CY	$2.70	CY	$186,300	
Earthwork - 5' Avg. Depth Cut and Fill	467,300	CY	$4.00	CY	$1,869,200	
Groundwater Monitoring Wells	12	LS	$2,340.00	LS	$28,080	RSMeans 2010 01 45 23.50 7710
Topsoil - 6" Depth	2,900	CY	$3.00	CY	$8,700	assumes 15' beyond haul road
Seeding	17,400	SY	$0.25	SY	$4,350	assumes 15' beyond haul road
30' Double Swing Gate	1	EA	$3,500.00	EA	$3,500	
Fencing	8,400	LF	$19.00	LF	$159,600	
Trenching - Single Pipe Landfill	5,000	CY	$6.00	CY	$30,000	assumes trench w/ 7.5 sq ft area
Trenching - Single Pipe to SW Pond	250	CY	$6.00	CY	$1,500	assumes trench w/ 25 sq ft area
Trenching - Single Pipe to Leachate Pond	200	CY	$6.00	CY	$1,200	assumes trench w/ 18 sq ft area
Trenching - Electrical	2,000	CY	$6.00	CY	$12,000	assumes trench w/ 18 sq ft area
Subtotal					**$2,415,000**	
Perimeter Berm						
Stripping - 12" Depth	9,300	CY	$2.70	CY	$25,110	
Earthwork - 5' Fill	46,500	CY	$4.00	CY	$186,000	
Crushed Rock Surfacing - 12" Depth	9,300	CY	$46.00	CY	$427,800	assumes 25' wide road/berm around cells (avg. haul of 10 miles round trip)
Subtotal					**$639,000**	
Composite Liner						
24" Compacted Clay Liner (CCL)	159,100	CY	$10.65	CY	$1,694,415	assumes 2 mile round trip haul distance and 15% shrinkage
Anchor Trench	700	CY	$6.00	CY	$4,200	assumes a trench area of 3' x 1'
60-mil Geomembrane Liner	1,960,500	SF	$0.60	SF	$1,176,300	assumes 5% of liner for anchoring/waste
200-mil Geocomposite	1,960,500	SF	$0.60	SF	$1,176,300	assumes 5% of liner for anchoring/waste
24" Protective Soil Layer	138,400	CY	$4.00	CY	$553,600	
Subtotal					**$4,605,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	43	ACRE	$5,000.00	ACRE	$215,000	
Subtotal					**$215,000**	
Stormwater Runoff Pond						
Stripping - 12" Depth	16,400	CY	$2.70	CY	$44,280	
24" Compacted Clay Liner (CCL)	38,000	CY	$10.65	CY	$404,700	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	445,100	SF	$0.60	SF	$267,060	assumes 5% of liner for anchoring/waste
Anchor Trench	400	CY	$6.00	CY	$2,400	assumes a trench area of 3' x 1'
12" Protective Soil Layer	16,500	CY	$4.00	CY	$66,000	
6' Dia. Precast Concrete Manhole - 12' Depth	1	EA	$10,000.00	EA	$10,000	
Submersible Pump	1	EA	$10,000.00	EA	$10,000	
Truck Loadout Structure	1	LS	$10,000.00	LS	$10,000	
24" Dia. Solid Pipe	250	LF	$40.00	LF	$10,000	
Subtotal					**$825,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	11	ACRE	$5,000.00	ACRE	$55,000	
Subtotal					**$55,000**	
Leachate Collection Pond						
Stripping - 12" Depth	8,200	CY	$2.70	CY	$22,140	
24" Compacted Clay Liner (CCL)	19,000	CY	$10.65	CY	$202,350	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	223,100	SF	$0.60	SF	$133,860	assumes 5% of liner for anchoring/waste
Anchor Trench	300	CY	$6.00	CY	$1,800	assumes a trench area of 3' x 1'
12" Protective Soil Layer	8,300	CY	$4.00	CY	$33,200	
6" Dia. Perforated Leachate Collection Pipe	17,000	LF	$17.35	LF	$294,950	
6" Dia. Solid Leachate Collection Header Pipe	1,050	LF	$15.00	LF	$15,750	
12" Dia. Solid Leachate Collection Header Pipe	600	LF	$27.00	LF	$16,200	
6' Dia. Precast Concrete Manhole - 12' Depth	1	EA	$10,000.00	EA	$10,000	
Submersible Pump	2	EA	$10,000.00	EA	$20,000	
Truck Loadout Structure	1	LS	$10,000.00	LS	$10,000	
Subtotal					**$761,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	6	ACRE	$5,000.00	ACRE	$30,000	
Subtotal					**$30,000**	
Electrical						
Scope of Work	1	LS	$200,000.00	LS	$200,000	assumes connection to power supply (power to site by others)
Subtotal					**$200,000**	
Subtotal Construction (w/o Contingency)					**$9,745,000**	
Engineering & Site Investigation (15%)					$1,462,000	
Contingency (20%)					$1,949,000	
Subtotal New Landfill					**$13,156,000**	
Ash Conversion						
Submerged Flight Conveyor System						
Bottom Ash Conveyor System	1	LS	$6,000,000	LS	$6,000,000	
Bottom Ash Storage for SFC	1	LS	$600,000	LS	$600,000	
Economizer Ash Handling System	1	LS	$1,100,000	LS	$1,100,000	
Fly Ash Silo	1	LS	$1,400,000	LS	$1,400,000	
Fly Ash Equipment	1	LS	$2,000,000	LS	$2,000,000	
Demolition of Necessary Existing Equipment	1	LS	$600,000	LS	$600,000	
Structural	1	LS	$1,280,000	LS	$1,280,000	
Piping Modifications	1	LS	$1,440,000	LS	$1,440,000	
I/C Modifications	1	LS	$700,000	LS	$700,000	
Electrical Modifications	1	LS	$680,000	LS	$680,000	
DCS Modifications	1	LS	$400,000	LS	$400,000	
Installation Labor	1	LS	$10,040,000	LS	$10,040,000	
Technical Field Services	1	LS	$1,380,000	LS	$1,380,000	
Subtotal					**$27,620,000**	
Subtotal Construction (w/o Contingency)					**$27,620,000**	
Construction Indirect (10%)					$2,762,000	
Project Indirect (5%)					$1,381,000	
Engineering (15%)					$4,143,000	
Contingency (20%)					$5,524,000	
Subtotal Ash Conversion					**$41,430,000**	
Summary of Capital Costs						
New Landfill					$9,445,000	
Ash Conversion					$31,763,000	
Quality Assurance/Quality Control					$300,000	
Engineering (15%)					$5,605,000	
Contingency (20%)					$7,473,000	
Base Modification Capital Costs					$50,190,000	
Option B Capital Cost					**$104,776,000**	
Future Landfill Closure						
Final Cover						
24" Compacted Clay Liner (CCL)	158,500	CY	$10.65	CY	$1,688,025	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	1,953,600	SF	$0.60	SF	$1,172,160	assumes 5% of liner for anchoring/waste
18" Protective Soil Layer	103,400	CY	$4.00	CY	$413,600	
Topsoil - 6" Depth	34,500	CY	$3.00	CY	$103,500	
Seeding	206,800	SY	$0.25	SY	$51,700	
Letdown Channels Excavation	1,550	CY	$6.00	CY	$9,300	assumes channel area of 26 sq ft
Rip Rap	1,350	CY	$193.00	CY	$260,550	assumes 18" thick stone rip-rap (avg. haul of 10 miles round trip)
Letdown Drainage Pipes	280	LF	$40.00	LF	$11,200	assumes four (4) 12" pipes 70' long
Conformance Testing	1	LS	$15,000.00	LS	$15,000	
Subtotal					**$3,726,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	43	ACRE	$5,000.00	ACRE	$215,000	
Subtotal					**$215,000**	
Subtotal Construction (w/o Contingency)					**$3,941,000**	
Engineering (15%)					$592,000	
Contingency (20%)					$789,000	
Subtotal Future Landfill Closure					**$5,322,000**	

Big Rivers Electric Corporation
Kenneth C. Coleman
Preliminary Cost Estimate
1/5/2011

Coleman Option C - construct a new CCR disposal pond

Burns & McDonnell SINCE 1898

Line East Portion of Sluice Pond	Qty	Unit	Unit Price		Price	Notes
Pond Liner						
24" Compacted Clay Liner (CCL)	72,600	CY	$10.65	CY	$773,190	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	894,800	SF	$0.60	SF	$536,880	assumes 5% of liner for anchoring/waste
Anchor Trench	450	CY	$6.00	CY	$2,700	
12" Protective Soil Layer	31,600	CY	$4.00	CY	$126,400	
Subtotal					**$1,440,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	20	ACRE	$5,000.00	ACRE	$100,000	
Subtotal					**$100,000**	
Subtotal Construction (w/o Contingency)					**$1,540,000**	
Engineering (15%)					$231,000	
Contingency (20%)					$308,000	
Subtotal Line East Portion of Sluice Pond					**$2,079,000**	

New CCR Disposal Pond	Qty	Unit	Unit Price		Price	Notes
General Earthwork						
Clear and Grub	10	ACRE	$13,800	ACRE	$138,000	assumes 10% of site
Stripping - 12" Depth	129,300	CY	$2.70	CY	$349,110	
Earthwork - 5' Depth Cut/Fill	646,100	CY	$7.00	CY	$4,522,700	
Groundwater Monitoring Wells	12	EA	$2,340.00	EA	$28,080	
Topsoil - 6" Depth	2,300	CY	$3.00	CY	$6,900	assumes 15' beyond haul road
Seeding	13,700	SY	$0.25	SY	$3,425	assumes 15' beyond haul road
30' Double Swing Gate	1	EA	$3,500.00	EA	$3,500	
Fencing	8,300	LF	$19.00	LF	$157,700	
Trenching - Electrical	2,000	CY	$6.00	CY	$12,000	assumes 3000' of trenching
Subtotal					**$5,222,000**	
Perimeter Berm						
Stripping - 12" Depth	7,100	CY	$2.70	CY	$19,170	
Earthwork - 10' Fill	70,300	CY	$4.80	CY	$337,440	
Crushed Rock Surfacing - 12" Depth	7,100	CY	$40.00	CY	$284,000	assumes 25' wide road/berm around pond
Subtotal					**$641,000**	
Pond Liner						
24" Compacted Clay Liner (CCL)	298,900	CY	$10.65	CY	$3,183,285	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	3,684,200	SF	$0.60	SF	$2,210,520	assumes 5% of liner for anchoring/waste
Anchor Trench	850	CY	$6.00	CY	$5,100	assumes trench area of 3' x 1'
12" Protective Soil Layer	130,000	CY	$4.00	CY	$520,000	
Subtotal					**$5,919,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	81	ACRE	$5,000.00	ACRE	$405,000	
Subtotal					**$405,000**	
Subtotal Construction (w/o Contingency)					**$12,187,000**	
Engineering (15%)					$1,829,000	
Contingency (20%)					$2,438,000	
Subtotal New CCR Disposal Pond					**$16,454,000**	

Summary of Capital Costs

Line East Poriton of Sluice Pond	$1,440,000
New CCR Disposal Pond	$11,782,000
Quality Assurance/Quality Control	$505,000
Engineering (15%)	$2,060,000
Contingency (20%)	$2,746,000
Base Modification Capital Costs	$50,190,000
Option C Capital Cost	**$68,723,000**

Future East Portion of Sluice Pond Closure	Qty	Unit	Unit Price		Price	Notes
Final Cover						
Ash Grading - 3' Depth	92,200	CY	$8.00	CY	$737,600	
24" Compacted Clay Liner (CCL)	70,700	CY	$10.65	CY	$752,955	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	870,800	SF	$0.60	SF	$522,480	assumes 5% of liner for anchoring/waste
Geogrid	96,756	Sy	$4.00	SY	$387,022	
18" Protective Soil Layer	46,100	CY	$4.00	CY	$184,400	
Topsoil - 6" Depth	15,400	CY	$3.00	CY	$46,200	
Seeding	92,200	SY	$0.25	SY	$23,050	
Conformance Testing	1	LS	$15,000.00	LS	$15,000	
Subtotal					**$2,669,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	20	ACRE	$5,000.00	ACRE	$100,000	
Subtotal					**$100,000**	
Subtotal Construction (w/o Contingency)					**$2,769,000**	
Engineering (15%)					$416,000	
Contingency (20%)					$554,000	
Subtotal Future East Portion of Sluice Pond Closure					**$3,739,000**	

Future CCR Disposal Pond Closure	Qty	Unit	Unit Price		Price	Notes
Final Cover						
Ash Grading - 3' Depth	387,700	CY	$8.00	CY	$3,101,600	
24" Compacted Clay Liner (CCL)	297,200	CY	$10.65	CY	$3,165,180	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	3,663,300	SF	$0.60	SF	$2,197,980	assumes 5% of liner for anchoring/waste
Geogrid	407,033	SF	$4.00	SF	$1,628,133	
18" Protective Soil Layer	193,900	CY	$4.00	CY	$775,600	
Topsoil - 6" Depth	64,700	CY	$3.00	CY	$194,100	
Seeding	387,700	SY	$0.25	SY	$96,925	
Subtotal					**$11,160,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	81	ACRE	$5,000.00	ACRE	$405,000	
Subtotal					**$405,000**	
Subtotal Construction (w/o Contingency)					**$11,565,000**	
Engineering (15%)					$1,735,000	
Contingency (20%)					$2,313,000	
Subtotal Future CCR Disposal Pond Closure					**$15,613,000**	

Summary of Closing Costs

Future East Portion of Sluice Pond Closure	$2,669,000
Futre CCR Diisposal Pond Closure	$11,160,000
Quality Assurance/Quality Control	$505,000
Engineering (15%)	$2,151,000
Contingency (20%)	$2,867,000
Total Closure Costs	**$19,352,000**

Big Rivers Electric Corporation
D.B. Wilson
Preliminary Cost Estimate
1/5/2011

Wilson Capital Cost Estimate for Base Modification

New Landfill	Qty	Unit	Unit Price		Price	Notes
General Earthwork						
Clear and Grub	11	ACRE	$13,800	ACRE	$151,800	assumes 10% of site
Stripping - 12" Depth	84,600	CY	$2.70	CY	$228,420	
Earthwork - 5' Avg. Depth Cut and Fill	545,600	CY	$4.00	CY	$2,182,400	
Groundwater Monitoring Wells	12	LS	$2,340.00	LS	$28,080	RSMeans 2010 01 45 23.50 7710
Topsoil - 6" Depth	3,000	CY	$3.00	CY	$9,000	assumes 15' beyond haul road
Seeding	17,600	SY	$0.25	SY	$4,400	assumes 15' beyond haul road
30' Double Swing Gate	1	EA	$3,500.00	EA	$3,500	
Fencing	9,000	LF	$19.00	LF	$171,000	
Trenching - Single Pipe Landfill	6,300	CY	$6.00	CY	$37,800	assumes trench w/ 7.5 sq ft area
Trenching - Single Pipe to SW Pond	250	CY	$6.00	CY	$1,500	assumes trench w/ 25 sq ft area
Trenching - Single Pipe to Leachate Pond	200	CY	$6.00	CY	$1,200	assumes trench w/ 18 sq ft area
Trenching - Electrical	2,000	CY	$6.00	CY	$12,000	assumes trench w/ 18 sq ft area
Subtotal					**$2,832,000**	
Perimeter Berm						
Stripping - 12" Depth	9,900	CY	$2.70	CY	$26,730	
Earthwork - 5' Fill	49,200	CY	$4.00	CY	$196,800	
Crushed Rock Surfacing - 12" Depth	9,900	CY	$46.00	CY	$455,400	assumes 25' wide road/berm around cells (avg. haul of 10 miles round trip)
Subtotal					**$679,000**	
Composite Liner						
24" Compacted Clay Liner (CCL)	195,200	CY	$14.00	CY	$2,732,800	assumes 10 mile round trip haul distance and 15% shrinkage
Anchor Trench	700	CY	$6.00	CY	$4,200	assumes a trench area of 3' x 1'
60-mil Geomembrane Liner	2,405,000	SF	$0.60	SF	$1,443,000	assumes 5% of liner for anchoring/waste
200-mil Geocomposite	2,405,000	SF	$0.60	SF	$1,443,000	assumes 5% of liner for anchoring/waste
24" Protective Soil Layer	169,700	CY	$4.00	CY	$678,800	
Conformance Testing	1	LS	$15,000.00	LS	$15,000	
Subtotal					**$6,317,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	53	ACRE	$5,000.00	ACRE	$265,000	
Subtotal					**$265,000**	
Stormwater Runoff Pond						
Stripping - 12" Depth	16,400	CY	$2.70	CY	$44,280	
24" Compacted Clay Liner (CCL)	38,000	CY	$14.00	CY	$532,000	assumes 10 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	445,100	SF	$0.60	SF	$267,060	assumes 5% of liner for anchoring/waste
Anchor Trench	400	CY	$6.00	CY	$2,400	assumes a trench area of 3' x 1'
12" Protective Soil Layer	16,500	CY	$4.00	CY	$66,000	
6' Dia. Precast Concrete Manhole - 12' Depth	1	EA	$10,000.00	EA	$10,000	
Submersible Pump	1	EA	$10,000.00	EA	$10,000	
Truck Loadout Structure	1	LS	$10,000.00	LS	$10,000	
24" Dia. Solid Pipe	250	LF	$40.00	LF	$10,000	
Subtotal					**$952,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	11	ACRE	$5,000.00	ACRE	$55,000	
Subtotal					**$55,000**	
Leachate Collection Pond						
Stripping - 12" Depth	8,200	CY	$2.70	CY	$22,140	
24" Compacted Clay Liner (CCL)	19,000	CY	$14.00	CY	$266,000	assumes 10 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	223,100	SF	$0.60	SF	$133,860	assumes 5% of liner for anchoring/waste
Anchor Trench	300	CY	$6.00	CY	$1,800	assumes a trench area of 3' x 1'
12" Protective Soil Layer	8,300	CY	$4.00	CY	$33,200	
6" Dia. Perforated Leachate Collection Pipe	22,000	LF	$17.35	LF	$381,700	
6" Dia. Solid Leachate Collection Header Pipe	1,100	LF	$15.00	LF	$16,500	
12" Dia. Solid Leachate Collection Header Pipe	600	LF	$27.00	LF	$16,200	
6' Dia. Precast Concrete Manhole - 12' Depth	1	EA	$10,000.00	EA	$10,000	
Submersible Pump	2	EA	$10,000.00	EA	$20,000	
Truck Loadout Structure	1	LS	$10,000.00	LS	$10,000	
Subtotal					**$912,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	6	ACRE	$5,000.00	ACRE	$30,000	
Subtotal					**$30,000**	
Electrical						
Scope of Work	1	LS	$200,000.00	LS	$200,000	assumes connection to power supply (power to site by others)
Subtotal					**$200,000**	
Subtotal Construction (w/o Contingency)					**$12,242,000**	
Engineering & Site Investigation (15%)					$1,837,000	
Contingency (20%)					$2,449,000	
Subtotal New Landfill					**$16,528,000**	

Summary of Capital Costs

New Landfill	$11,892,000
Quality Assurance/Quality Control	$350,000
Permitting	$1,000,000
Engineering & Site Investigation (15%)	$1,837,000
Contingency (20%)	$2,449,000
Base Modification Capital Cost	**$17,528,000**

Future Landfill Closure						
Final Cover						
24" Compacted Clay Liner (CCL)	194,500	CY	$14.00	CY	$2,723,000	assumes 10 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	2,397,300	SF	$0.60	SF	$1,438,380	assumes 5% of liner for anchoring/waste
18" Protective Soil Layer	126,900	CY	$4.00	CY	$507,600	
Topsoil - 6" Depth	42,300	CY	$3.00	CY	$126,900	
Seeding	253,700	SY	$0.25	SY	$63,425	
Letdown Channels Excavation	1,550	CY	$6.00	CY	$9,300	assumes channel area of 26 sq ft
Rip Rap	1,350	CY	$193.00	CY	$260,550	assumes 18" thick stone rip-rap (avg. haul of 10 miles round trip)
Letdown Drainage Pipes	280	LF	$40.00	LF	$11,200	assumes four (4) 12" pipes 70' long
Conformance Testing	1	LS	$15,000.00	LS	$15,000	
Subtotal					**$5,156,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	53	ACRE	$5,000.00	ACRE	$265,000	
Subtotal					**$265,000**	
Subtotal Construction (w/o Contingency)					**$5,421,000**	
Engineering (15%)					$814,000	
Contingency (20%)					$1,085,000	
Subtotal Future Landfill Closure					**$7,320,000**	

Big Rivers Electric Corporation
Sebree
Preliminary Cost Estimate
1/5/2011

Sebree Capital Cost Estimate for Base Modification

Burns & McDonnell SINCE 1898

Green Pond Modifications	Qty	Unit	Unit Price		Price	Notes
General Earthwork						
Ash Grading - 3' Depth	106,100	CY	$8.00	CY	$848,800	
Cut and Dredge Ash	176,700	CY	$8.00	CY	$1,413,600	assumes ash 37' deep
Subtotal					**$2,263,000**	
Temporary Relocation for Discharge Point						
Temporary Relocation for Discharge Point	1	LS	$250,000.00	LS	$250,000	
Subtotal					**$250,000**	
Capping Pond						
24" Compacted Clay Liner (CCL)	81,400	CY	$10.65	CY	$866,910	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	1,002,500	SF	$0.60	SF	$601,500	assumes 5% of liner for anchoring/waste
Geogrid	111,389	SY	$4.00	SY	$445,556	
Anchor Trench	450	CY	$6.00	CY	$2,700	
18" Protective Soil Layer	53,100	CY	$4.00	CY	$212,400	
Topsoil - 6" Depth	17,700	CY	$3.00	CY	$53,100	
Seeding	106,100	SY	$0.25	SY	$26,525	
Conformance Testing	1	LS	$15,000.00	LS	$15,000	
Subtotal					**$2,224,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	22	ACRE	$5,000.00	ACRE	$110,000	
Subtotal					**$110,000**	
Isolation Berm						
Earthwork	19,000	CY	$17.65	CY	$335,350	assumes clay 37' deep with 3:1 slope, 2 mile roundtrip haul distance, and 15% shrinkage
Mobilization/Overhead	1	LS	$100,000.00	LS	$100,000	includes equipment & crane
Subtotal					**$436,000**	
Subtotal Construction (w/o Contingency)					**$5,283,000**	
Engineering (15%)					$793,000	
Contingency (20%)					$1,057,000	
Subtotal Green Pond Modifications					**$7,133,000**	

Reid/HMPL Pond Modifications	Qty	Unit	Unit Price		Price	Notes
General Earthwork						
Ash Grading - 3' Depth	96,000	CY	$8.00	CY	$768,000	
Cut and Dredge Ash	207,000	CY	$10.00	CY	$2,070,000	assumes ash 35' deep
Subtotal					**$2,838,000**	
Temporary Relocation for Discharge Point						
Temporary Relocation for Discharge Point	1	LS	$250,000.00	LS	$250,000	
Subtotal					**$250,000**	
Capping Pond						
24" Compacted Clay Liner (CCL)	73,600	CY	$10.65	CY	$783,840	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	906,800	SF	$0.60	SF	$544,080	assumes 5% of liner for anchoring/waste
Geogrid	100,756	SY	$4.00	SY	$403,022	
Anchor Trench	450	CY	$6.00	CY	$2,700	
18" Protective Soil Layer	48,000	CY	$4.00	CY	$192,000	
Topsoil - 6" Depth	16,000	CY	$3.00	CY	$48,000	
Seeding	96,000	SY	$0.25	SY	$24,000	
Subtotal					**$1,998,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	20	ACRE	$5,000.00	ACRE	$100,000	
Subtotal					**$100,000**	
Isolation Berm						
Earthwork	72,500	CY	$17.65	CY	$1,279,625	assumes clay 35' deep with 3:1 slope, 2 mile round trip haul distance, and 15% shrinkage
Mobilization/Overhead	1	LS	$100,000.00	LS	$100,000	includes equipment & crane
Subtotal					**$1,380,000**	
Subtotal Construction (w/o Contingency)					**$6,566,000**	
Engineering (15%)					$985,000	
Contingency (20%)					$1,314,000	
Subtotal Reid/HMPL Pond Modifications					**$8,865,000**	

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Sebree Capital Cost Estimate for Base Modification

New Landfill						
General Earthwork						
Clear and Grub	176	ACRE	$13,800	ACRE	$2,428,800	assumes enitre site
Stripping - 12" Depth	160,700	CY	$2.70	CY	$433,890	
Earthwork - 5' Avg. Depth Cut and Fill	926,300	CY	$4.00	CY	$3,705,200	
Groundwater Monitoring Wells	12	LS	$2,340.00	LS	$28,080	RSMeans 2010 01 45 23.50 7710
Topsoil - 6" Depth	3,600	CY	$3.00	CY	$10,800	assumes 15' beyond haul road
Seeding	21,600	SY	$0.25	SY	$5,400	assumes 15' beyond haul road
30' Double Swing Gate	1	EA	$3,500.00	EA	$3,500	
Fencing	11,300	LF	$19.00	LF	$214,700	
Trenching - Single Pipe Landfill	11,600	CY	$6.00	CY	$69,600	assumes trench w/ 7.5 sq ft area
Trenching - Single Pipe to SW Pond	250	CY	$6.00	CY	$1,500	assumes trench w/ 25 sq ft area
Trenching - Single Pipe to Leachate Pond	700	CY	$6.00	CY	$4,200	assumes trench w/ 18 sq ft area
Trenching - Electrical	2,000	CY	$6.00	CY	$12,000	assumes trench w/ 18 sq ft area
Subtotal					**$6,918,000**	
Perimeter Berm						
Stripping - 12" Depth	12,000	CY	$2.70	CY	$32,400	
Earthwork - 5' Fill	59,800	CY	$4.00	CY	$239,200	
Crushed Rock Surfacing - 12" Depth	12,000	CY	$46.00	CY	$552,000	assumes 24' wide road/berm around cells (avg. haul of 10 miles round trip)
Subtotal					**$824,000**	
Composite Liner						
24" Compacted Clay Liner (CCL)	370,500	CY	$10.65	CY	$3,945,825	assumes 2 mile round trip haul distance and 15% shrinkage
Anchor Trench	1,000	CY	$6.00	CY	$6,000	assumes a trench area of 3' x 1'
60-mil Geomembrane Liner	4,566,500	SF	$0.60	SF	$2,739,900	assumes 5% of liner for anchoring/waste
200-mil Geocomposite	4,566,500	SF	$0.60	SF	$2,739,900	assumes 5% of liner for anchoring/waste
24" Protective Soil Layer	322,200	CY	$4.00	CY	$1,288,800	
Subtotal					**$10,721,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	100	ACRE	$5,000.00	ACRE	$500,000	
Subtotal					**$500,000**	
Stormwater Runoff Pond						
Stripping - 12" Depth	16,400	CY	$2.70	CY	$44,280	
24" Compacted Clay Liner (CCL)	38,000	CY	$10.65	CY	$404,700	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	445,100	SF	$0.60	SF	$267,060	assumes 5% of liner for anchoring/waste
Anchor Trench	400	CY	$6.00	CY	$2,400	assumes a trench area of 3' x 1'
12" Protective Soil Layer	16,500	CY	$4.00	CY	$66,000	
6' Dia. Precast Concrete Manhole - 12' Depth	1	EA	$10,000.00	EA	$10,000	
Submersible Pump	1	EA	$10,000.00	EA	$10,000	
Truck Loadout Structure	1	LS	$10,000.00	LS	$10,000	
24" Dia. Solid Pipe	250	LF	$40.00	LF	$10,000	
Subtotal					**$825,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	11	ACRE	$5,000.00	ACRE	$55,000	
Subtotal					**$55,000**	
Leachate Collection Pond						
Stripping - 12" Depth	8,200	CY	$2.70	CY	$22,140	
24" Compacted Clay Liner (CCL)	19,100	CY	$10.65	CY	$203,415	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	223,700	SF	$0.60	SF	$134,220	assumes 5% of liner for anchoring/waste
Anchor Trench	300	CY	$6.00	CY	$1,800	assumes a trench area of 3' x 1'
12" Protective Soil Layer	8,300	CY	$4.00	CY	$33,200	
6" Dia. Perforated Leachate Collection Pipe	39,700	LF	$17.35	LF	$688,795	
6" Dia. Solid Leachate Collection Header Pipe	2,000	LF	$15.00	LF	$30,000	
12" Dia. Solid Leachate Collection Header Pipe	1000	LF	$27.00	LF	$27,000	
6' Dia. Precast Concrete Manhole - 12' Depth	1	EA	$10,000.00	EA	$10,000	
Submersible Pump	2	EA	$10,000.00	EA	$20,000	
Truck Loadout Structure	1	LS	$10,000.00	LS	$10,000	
Subtotal					**$1,181,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	6	ACRE	$5,000.00	ACRE	$30,000	
Subtotal					**$30,000**	
Electrical						
Scope of Work	1	LS	$200,000.00	LS	$200,000	assumes connection to power supply (power to site by others)
Subtotal					**$200,000**	
Subtotal Construction (w/o Contingency)					**$21,254,000**	
Engineering & Site Investigation (15%)					$3,189,000	
Contingency (20%)					$4,251,000	
Subtotal New Landfill					**$28,694,000**	
Temporary Settling Pond for Dewatering Green Pond						
General Earthwork						
Clear and Grub	10	ACRE	$13,800	ACRE	$138,000	assumes enitre site
Stripping - 12" Depth	8,100	CY	$2.70	CY	$21,870	
Earthwork - 2' Depth Cut/Fill	16,200	CY	$7.00	CY	$113,400	
Topsoil - 6" Depth	2,800	CY	$3.00	CY	$8,400	assumes 50' beyond haul road
Seeding	16,800	SY	$0.25	SY	$4,200	assumes 50' beyond haul road
Dozer w/ Operator	240	HR	$105.00	HR	$25,200	
Subtotal					**$312,000**	
Pond Liner						
60-mil Textured HDPE Geomembrane Liner	230,500	SF	$0.60	SF	$138,300	assumes 5% of liner for anchoring/waste
Subtotal					**$139,000**	
Perimeter Berm						
Stripping - 12" Depth	1,500	CY	$2.70	CY	$4,050	
Earthwork - 5' Fill	7,300	CY	$4.80	CY	$35,040	
Crushed Rock Surfacing - 12" Depth	1,500	CY	$40.00	CY	$60,000	assumes 20' wide road/berm around pond
Subtotal					**$100,000**	
Pumps/Piping						
6' Dia. Precast Concrete Manhole - 12' Depth	2	EA	$40,000.00	EA	$80,000	
2 - 6" Pumps for Dewatering	10	DAYS	$680.00	DAY	$6,800	assumed pumps will run 24 hrs - RSMeans 01 54 33 4400
6" Dia Solid Pipe	2,000	LF	$21.00	LF	$42,000	assumed 2,000' needed
Subtotal					**$129,000**	
Temporary NPDES Permit						
Temporary NPDES Permit	1	EA	$150,000.00	LS	$150,000	
					$150,000	
Subtotal Construction (w/o Contingency)					**$830,000**	
Engineering (15%)					$125,000	
Contingency (20%)					$166,000	
Subtotal Temporary Settling Pond for Dewatering Green Pond					**$1,121,000**	

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Sebree Capital Cost Estimate for Base Modification

Temporary Settling Pond for Dewatering Reid/HMPL Pond						
General Earthwork						
Clear and Grub	10	ACRE	$13,800	ACRE	$138,000	assumes enitre site
Stripping - 12" Depth	8,100	CY	$2.70	CY	$21,870	
Earthwork - 2' Depth Cut/Fill	16,200	CY	$7.00	CY	$113,400	
Topsoil - 6" Depth	2,800	CY	$3.00	CY	$8,400	assumes 50' beyond haul road
Seeding	16,800	SY	$0.25	SY	$4,200	assumes 50' beyond haul road
Dozer w/ Operator	240	HR	$105.00	HR	$25,200	
Subtotal					**$312,000**	
Pond Liner						
60-mil Textured HDPE Geomembrane Liner	230,500	SF	$0.60	SF	$138,300	assumes 5% of liner for anchoring/waste
Subtotal					**$139,000**	
Perimeter Berm						
Stripping - 12" Depth	1,500	CY	$2.70	CY	$4,050	
Earthwork - 5' Fill	7,300	CY	$4.80	CY	$35,040	
Crushed Rock Surfacing - 12" Depth	1,500	CY	$40.00	CY	$60,000	assumes 20' wide road/berm around pond
Subtotal					**$100,000**	
Pumps/Piping						
6' Dia. Precast Concrete Manhole - 12' Depth	2	EA	$40,000.00	EA	$80,000	
2 - 6" Pumps for Dewatering	10	DAYS	$680.00	DAY	$6,800	assumed pumps will run 24 hrs - RSMeans 01 54 33 4400
6" Dia Solid Pipe	2,000	LF	$21.00	LF	$42,000	assumed 2,000' needed
Subtotal					**$129,000**	
Temporary NPDES Permit						
Temporary NPDES Permit	1	EA	$150,000.00	LS	$150,000	
					$150,000	
Subtotal Construction (w/o Contingency)					**$830,000**	
Engineering (15%)					$125,000	
Contingency (20%)					$166,000	
Temporary Settling Pond for Dewatering Reid/HMPL Pond					**$1,121,000**	

Summary of Capital Costs	
Green Pond Modifications	$5,173,000
Reid/HMPL Pond Modifications	$6,466,000
New Landfill	$20,669,000
Temporary Settling Pond for Dewatering Green Pond	$830,000
Temporary Settling Pond for Dewatering Reid/HMPL Pond	$830,000
Quality Assurance/Quality Control	$795,000
Groundwater Monitoring Wells	$37,000
Permitting	$1,000,000
Engineering (15%)	$5,217,000
Contingency (20%)	$6,954,000
Base Modification Capital Cost	**$47,971,000**

Future Landfill Closure						
Final Cover						
24" Compacted Clay Liner (CCL)	369,700	CY	$10.65	CY	$3,937,305	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	4,555,900	SF	$0.60	SF	$2,733,540	assumes 5% of liner for anchoring/waste
18" Protective Soil Layer	241,100	CY	$4.00	CY	$964,400	
Topsoil - 6" Depth	80,400	CY	$3.00	CY	$241,200	
Seeding	482,100	SY	$0.25	SY	$120,525	
Letdown Channels Excavation	5,400	CY	$6.00	CY	$32,400	assumes channel area of 26 sq ft
Rip Rap	4,700	CY	$193.00	CY	$907,100	assumes 18" thick stone rip-rap (avg. haul of 10 miles round trip)
Letdown Drainage Pipes	840	LF	$40.00	LF	$33,600	assumes twelve (12) 12" pipes 70' long
Conformance Testing	1	LS	$15,000.00	LS	$15,000	
Subtotal					**$8,986,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	100	ACRE	$5,000.00	ACRE	$500,000	
Subtotal					**$500,000**	
Subtotal Construction (w/o Contingency)					**$9,486,000**	
Engineering (15%)					$1,423,000	
Contingency (20%)					$1,898,000	
Subtotal Future Landfill Closure					**$12,807,000**	

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Sebree Option A - retrofit remaining pond capacity w/ composite liner

Burns & McDonnell SINCE 1898

Line Portion of Green Pond	Qty	Unit	Unit Price		Price	Notes
Pond Liner						
Armor Lining	135,600	SF	$8.00	SF	$1,084,800	Armor Flex Class 30 (Small Block - $6/SF) w/ Installation ($2/SF)
24" Compacted Clay Liner (CCL)	11,600	CY	$10.65	CY	$123,540	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	142,400	SF	$0.60	SF	$85,440	assumes 5% of liner for anchoring/waste
Anchor Trench	200	CY	$6.00	CY	$1,200	
12" Protective Soil Layer	5,100	CY	$4.00	CY	$20,400	
Subtotal					**$1,316,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	4	ACRE	$5,000.00	ACRE	$20,000	
Subtotal					**$20,000**	
Pumps/Piping						
12" Dia Solid Pipe	3,000	LF	$33.00	LF	$99,000	assumed 3,000'
Directional Drilling	400	LF	$6.90	LF	$2,760	RSMeans 33 05 23.22 0110
Mobilization/Setup for Directional Drilling	1	LS	$1,540.00	LS	$1,540	RSMeans 33 05 23.22 0102 & 0105
Subtotal					**$104,000**	
Subtotal Construction (w/o Contingency)					**$1,440,000**	
Engineering (15%)					$216,000	
Contingency (20%)					$288,000	
Subtotal Line Portion of Green Pond					**$1,944,000**	

Line Portion of Reid/HMPL Pond	Qty	Unit	Unit Price		Price	Notes
Pond Liner						
Armor Lining	151,900	SF	$8.00	SF	$1,215,200	Armor Flex Class 30 (Small Block - $6/SF) w/ Installation ($2/SF)
24" Compacted Clay Liner (CCL)	13,000	CY	$10.65	CY	$138,450	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	159,500	SF	$0.60	SF	$95,700	assumes 5% of liner for anchoring/waste
Anchor Trench	200	CY	$6.00	CY	$1,200	
12" Protective Soil Layer	5,700	CY	$4.00	CY	$22,800	
Subtotal					**$1,474,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	4	ACRE	$5,000.00	ACRE	$20,000	
Subtotal					**$20,000**	
Pumps/Piping						
12" Dia Solid Pipe	3,000	LF	$27.00	LF	$81,000	assumed 3,000'
Directional Drilling	400	LF	$6.90	LF	$2,760	RSMeans 33 05 23.22 0110
Mobilization/Setup for Directional Drilling	1	LS	$1,540.00	LS	$1,540	RSMeans 33 05 23.22 0102 & 0105
Submersible Pump	2	EA	$40,000.00	EA	$80,000	
Pump Structure	1	LS	$100,000.00	LS	$100,000	
Subtotal					**$266,000**	
Subtotal Construction (w/o Contingency)					**$1,760,000**	
Engineering (15%)					$264,000	
Contingency (20%)					$352,000	
Subtotal Line Portion of Reid/HMPL Pond					**$2,376,000**	

Summary of Capital Costs	
Line Portion of Green Pond	$1,420,000
Line Portion of Reid/HMPL Pond	$1,740,000
Quality Assurance/Quality Control	$40,000
Engineering (15%)	$480,000
Contingency (20%)	$640,000
Base Modification Capital Costs	$47,971,000
Option A Capital Cost	**$52,291,000**

Future Partial Green Pond Closure	Qty	Unit	Unit Price		Price	Notes
Final Cover						
Ash Grading - 3' Depth	14,400	CY	$8.00	CY	$115,200	
24" Compacted Clay Liner (CCL)	11,000	CY	$10.65	CY	$117,150	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	135,400	SF	$0.60	SF	$81,240	assumes 5% of liner for anchoring/waste
Geogrid	15,044	CY	$4.00	CY	$60,178	
18" Protective Soil Layer	7,200	CY	$4.00	CY	$28,800	
Topsoil - 6" Depth	2,400	CY	$3.00	CY	$7,200	
Seeding	14,400	SY	$0.25	SY	$3,600	
Subtotal					**$414,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	3	ACRE	$5,000.00	ACRE	$15,000	
Subtotal					**$15,000**	
Subtotal Construction (w/o Contingency)					**$429,000**	
Engineering (15%)					$65,000	
Contingency (20%)					$86,000	
Subtotal Future Partial Green Pond Closure					**$580,000**	

Future Partial Reid/HMPL Pond Closure	Qty	Unit	Unit Price		Price	Notes
Final Cover						
Ash Grading - 3' Depth	16,000	CY	$8.00	CY	$128,000	
24" Compacted Clay Liner (CCL)	12,300	CY	$10.65	CY	$130,995	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	150,500	SF	$0.60	SF	$90,300	assumes 5% of liner for anchoring/waste
Geogrid	16,722	CY	$4.00	CY	$66,889	
18" Protective Soil Layer	8,000	CY	$4.00	CY	$32,000	
Topsoil - 6" Depth	2,700	CY	$3.00	CY	$8,100	
Seeding	16,000	SY	$0.25	SY	$4,000	
Subtotal					**$461,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	4	ACRE	$5,000.00	ACRE	$20,000	
Subtotal					**$20,000**	
Subtotal Construction (w/o Contingency)					**$481,000**	
Engineering (15%)					$73,000	
Contingency (20%)					$97,000	
Subtotal Future Partial Reid/HMPL Pond Closure					**$651,000**	

Summary of Closure Costs	
Future Partial Green Pond Closure	$414,000
Future Partial Reid/HMPL Pond Closure	$461,000
Quality Assurance/Quality Control	$35,000
Engineering (15%)	$138,000
Contingency (20%)	$183,000
Base Modification Closure Costs	$12,807,000
Total Closure Costs	**$14,038,000**

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Sebree Option B - convert to dry handling and disposal in a landfill

Burns & McDonnell SINCE 1898

Green Ash Conversion			
Ash Conversion			
Bottom Ash Conveyor System	1 LS	$5,000,000 LS	$5,000,000
Bottom Ash Storage for SFC	1 LS	$400,000 LS	$400,000
Demolition of Necessary Existing Equipment	1 LS	$500,000 LS	$500,000
Structural	1 LS	$750,000 LS	$750,000
Piping Modifications	1 LS	$900,000 LS	$900,000
I/C Modifications	1 LS	$400,000 LS	$400,000
Electrical Modifications	1 LS	$430,000 LS	$430,000
DCS Modifications	1 LS	$250,000 LS	$250,000
Installation Labor	1 LS	$4,860,000 LS	$4,860,000
Technical Field Services	1 LS	$810,000 LS	$810,000
Subtotal			**$14,300,000**
Subtotal Construction (w/o Contingency)			**$14,300,000**
Construction Indirect (10%)			$1,430,000
Project Indirect (5%)			$715,000
Engineering (15%)			$2,145,000
Contingency (20%)			$2,860,000
Subtotal Green Ash Conversion			**$21,450,000**
Reid/HMPL Ash Conversion			
Ash Conversion			
Bottom Ash Conveyor System	1 LS	$5,350,000 LS	$5,350,000
Bottom Ash Storage for SFC	1 LS	$600,000 LS	$600,000
Economizer Ash Handling System	1 LS	$1,100,000 LS	$1,100,000
Demolition of Necessary Existing Equipment	1 LS	$540,000 LS	$540,000
Structural	1 LS	$970,000 LS	$970,000
Piping Modifications	1 LS	$960,000 LS	$960,000
I/C Modifications	1 LS	$500,000 LS	$500,000
Electrical Modifications	1 LS	$450,000 LS	$450,000
DCS Modifications	1 LS	$270,000.00 LS	$270,000
Installation Labor	1 LS	$6,350,000.00 LS	$6,350,000
Technical Field Services	1 LS	$980,000.00 LS	$980,000
Subtotal			**$18,070,000**
Subtotal Construction (w/o Contingency)			**$18,070,000**
Construction Indirect (10%)			$1,807,000
Project Indirect (5%)			$903,500
Engineering (15%)			$2,710,500
Contingency (20%)			$3,614,000
Subtotal Reid/HMPL Ash Conversion			**$27,105,000**

Summary of Capital Costs	
Green Ash Conversion	$16,445,000
Reid/HMPL Ash Conversion	$20,780,500
Engineering (15%)	$4,855,500
Contingency (20%)	$6,474,000
Base Modification Capital Costs	$47,971,000
Option B Capital Costs	**$96,526,000**

Summary of Closure Costs	
Base Modification Closure Costs	$12,807,000
Total Closure Costs	**$12,807,000**

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Sebree Option C - retrofit entire ponds w/ composite liner

Line Complete Green Pond	Qty	Unit	Unit Price		Price	Notes
General Earthwork						
Cut and Dredge Ash	1,018,000	CY	$8.00	CY	$8,144,000	ash disposed to landfill
Subtotal					**$8,144,000**	
Pond Liner						
24" Compacted Clay Liner (CCL)	94,700	CY	$10.65	CY	$1,008,555	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	1,166,200	SF	$0.60	SF	$699,720	assumes 5% of liner for anchoring/waste
Anchor Trench	500	CY	$6.00	CY	$3,000	
12" Protective Soil Layer	41,200	CY	$4.00	CY	$164,800	
Subtotal					**$1,877,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	26	ACRE	$5,000.00	ACRE	$130,000	
Subtotal					**$130,000**	
Pumps/Piping						
12" Dia Solid Pipe	3,000	LF	$33.00	LF	$99,000	assumed 3,000'
Directional Drilling	400	LF	$6.90	LF	$2,760	RSMeans 33 05 23.22 0110
Mobilization/Setup for Directional Drilling	1	LS	$1,540.00	LS	$1,540	RSMeans 33 05 23.22 0102 & 0105
Subtotal					**$104,000**	
Subtotal Construction (w/o Contingency)					**$10,255,000**	
Engineering (15%)					$1,539,000	
Contingency (20%)					$2,051,000	
Subtotal Line Complete Green Pond					**$13,845,000**	

Line Complete Reid/HMPL Pond	Qty	Unit	Unit Price		Price	Notes
General Earthwork						
Cut and Dredge Ash	1,110,000	CY	$8.00	CY	$8,880,000	
Subtotal					**$8,880,000**	
Pond Liner						
24" Compacted Clay Liner (CCL)	88,200	CY	$10.65	CY	$939,330	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	1,086,000	SF	$0.60	SF	$651,600	assumes 5% of liner for anchoring/waste
Anchor Trench	450	CY	$6.00	CY	$2,700	
12" Protective Soil Layer	38,400	CY	$4.00	CY	$153,600	
Subtotal					**$1,748,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	24	ACRE	$5,000.00	ACRE	$120,000	
Subtotal					**$120,000**	
Pumps/Piping						
12" Dia Solid Pipe	3,000	LF	$33.00	LF	$99,000	assumed 3,000'
Directional Drilling	400	LF	$6.90	LF	$2,760	RSMeans 33 05 23.22 0110
Mobilization/Setup for Directional Drilling	1	LS	$1,540.00	LS	$1,540	RSMeans 33 05 23.22 0102 & 0105
Submersible Pump	2	EA	$40,000.00	EA	$80,000	
Pump Structure	1	LS	$100,000.00	LS	$100,000	
Subtotal					**$284,000**	
Subtotal Construction (w/o Contingency)					**$11,032,000**	
Engineering (15%)					$1,655,000	
Contingency (20%)					$2,207,000	
Subtotal Line Complete Reid/HMPL Pond					**$14,894,000**	

Summary of Capital Costs

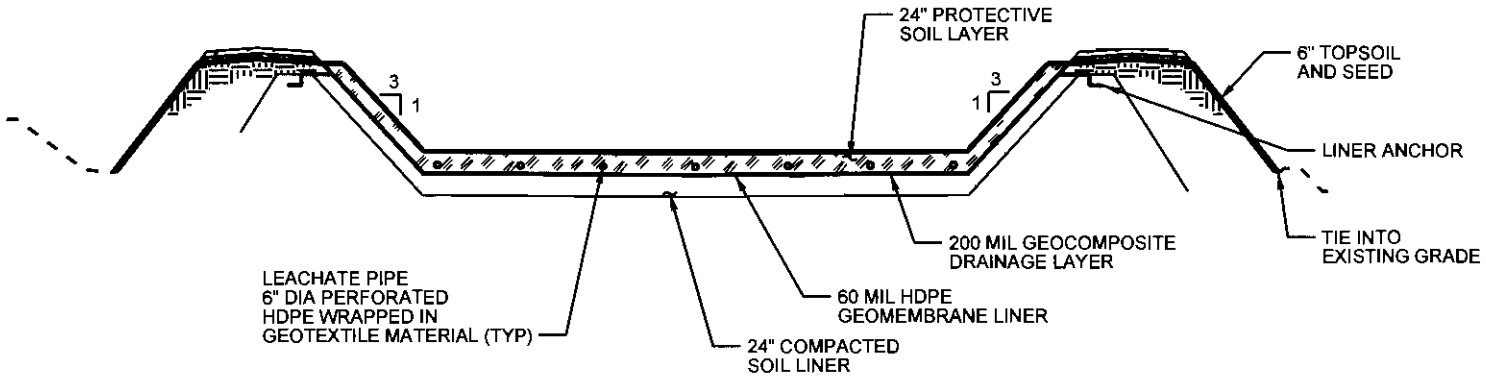
Line Complete Green Pond	$10,125,000
Line Complete Reid/HMPL Pond	$10,912,000
Quality Assurance/Quality Control	$250,000
Engineering (15%)	$3,194,000
Contingency (20%)	$4,258,000
Base Modification Capital Costs	$47,971,000
Less Isolation Berms	($15,998,000)
Option C Capital Costs	**$60,712,000**

Future Green Pond Closure	Qty	Unit	Unit Price		Price	Notes
Final Cover						
Ash Grading - 3' Depth	120,400	CY	$8.00	CY	$963,200	
24" Compacted Clay Liner (CCL)	92,400	CY	$10.65	CY	$984,060	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	1,137,800	SF	$0.60	SF	$682,680	assumes 5% of liner for anchoring/waste
Geogrid	126,422	SY	$4.00	SY	$505,689	
18" Protective Soil Layer	60,200	CY	$4.00	CY	$240,800	
Topsoil - 6" Depth	20,100	CY	$3.00	CY	$60,300	
Seeding	120,400	SY	$0.25	SY	$30,100	
Subtotal					**$3,467,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	25	ACRE	$5,000.00	ACRE	$125,000	
Subtotal					**$125,000**	
Subtotal Construction (w/o Contingency)					**$3,592,000**	
Engineering (15%)					$539,000	
Contingency (20%)					$719,000	
Subtotal Future Green Pond Closure					**$4,850,000**	

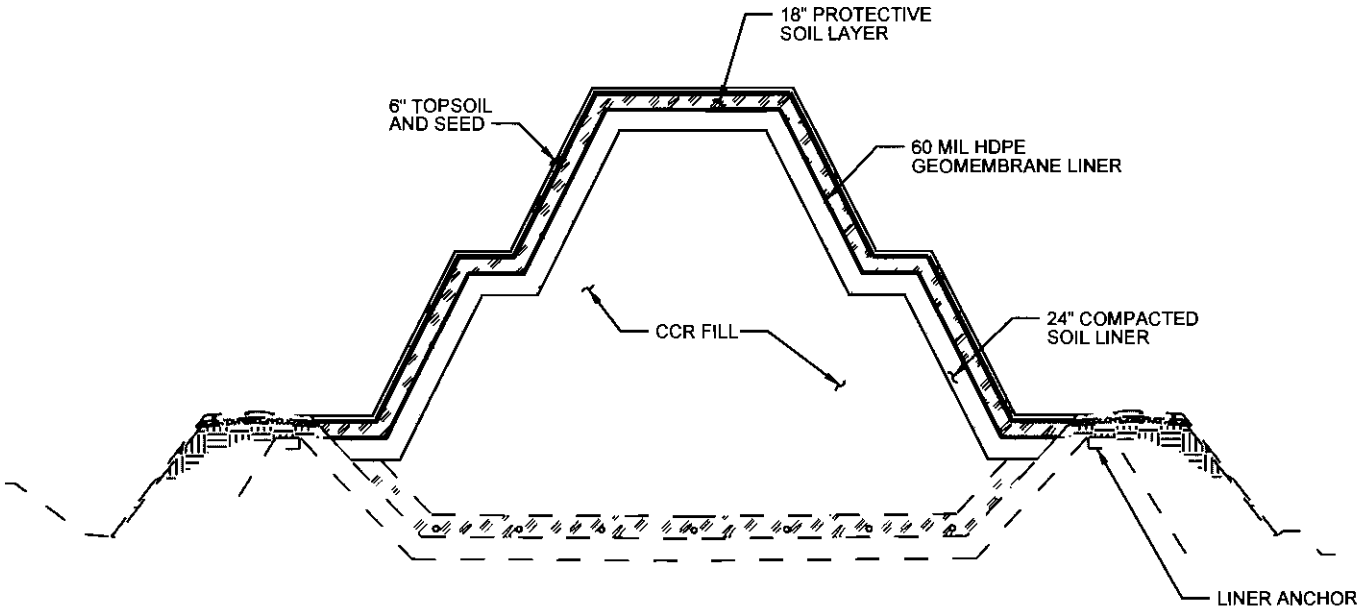
Future Reid/HMPL Pond Closure	Qty	Unit	Unit Price		Price	Notes
Final Cover						
Ash Grading - 3' Depth	112,300	CY	$8.00	CY	$898,400	
24" Compacted Clay Liner (CCL)	86,100	CY	$10.65	CY	$916,965	assumes 2 mile round trip haul distance and 15% shrinkage
60-mil Textured HDPE Geomembrane Liner	1,061,000	SF	$0.60	SF	$636,600	assumes 5% of liner for anchoring/waste
Geogrid	117,889	SY	$4.00	SY	$471,556	
18" Protective Soil Layer	56,200	CY	$4.00	CY	$224,800	assumes frost depth of 3'
Topsoil - 6" Depth	18,800	CY	$3.00	CY	$56,400	
Seeding	112,300	SY	$0.25	SY	$28,075	
Subtotal					**$3,233,000**	
Quality Assurance/Quality Control						
Quality Assurance/Quality Control	24	ACRE	$5,000.00	ACRE	$120,000	
Subtotal					**$120,000**	
Subtotal Construction (w/o Contingency)					**$3,353,000**	
Engineering (15%)					$503,000	
Contingency (20%)					$671,000	
Subtotal Future Reid/HMPL Pond Closure					**$4,527,000**	

Summary of Closure Costs

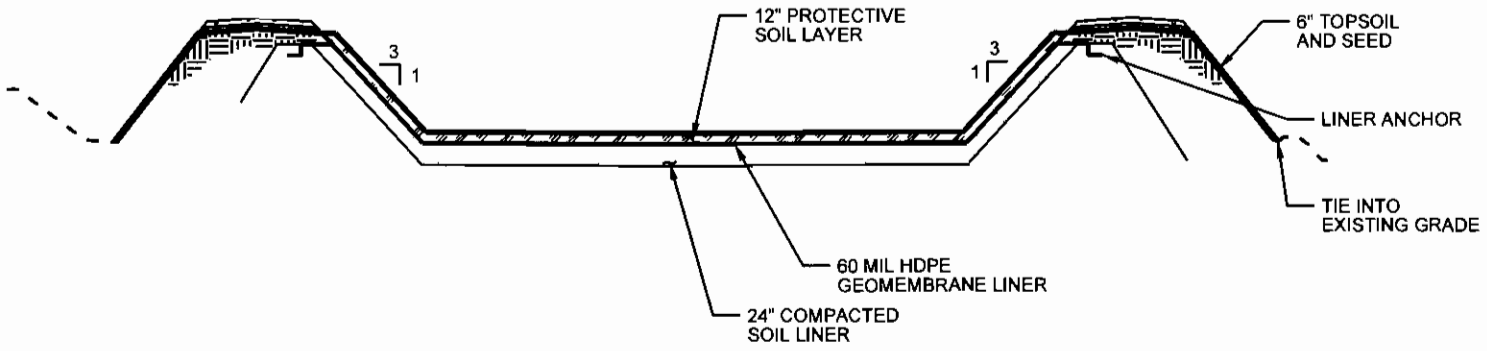
Future Green Pond Closure	$3,467,000
Future Reid/HMPL Pond Closure	$3,233,000
Quality Assurance/Quality Control	$245,000
Engineering (15%)	$1,042,000
Contingency (20%)	$1,390,000
Base Modification Closure Costs	12807000
Total Closure Costs	**$22,184,000**



LANDFILL LINER
NOT TO SCALE



LANDFILL CAP
NOT TO SCALE



POND LINER
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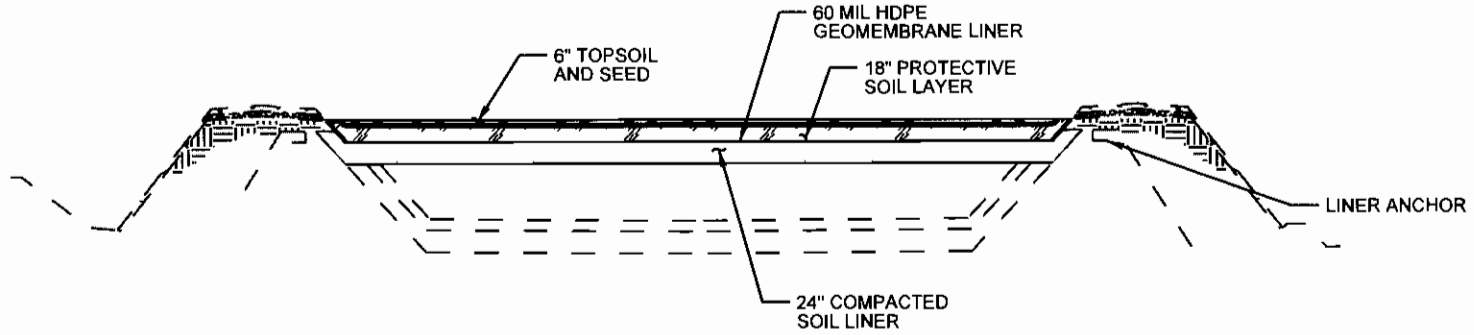

POND CAP
NOT TO SCALE