

COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

INVESTIGATION OF KENTUCKY UTILITIES )  
COMPANY'S AND LOUISVILLE GAS & ELECTRIC )  
COMPANY'S RESPECTIVE NEED FOR AND COST ) CASE NO. 2015-00194  
OF MULTIPHASE LANDFILLS AT THE TRIMBLE )  
COUNTY AND GHENT GENERATING STATIONS )

NOTICE OF FILING

Notice is given to all parties that the following materials have been filed into the record of this proceeding:

- The digital video recording of the evidentiary hearing conducted on September 14 - September 15, 2015 in this proceeding;
- Certification of the accuracy and correctness of the digital video recordings;
- All exhibits introduced at the evidentiary hearing conducted on September 14 - September 15, 2015 in this proceeding;
- The written logs listing, *inter alia*, the date and time of where each witness' testimony begins and ends on the digital video recording of the evidentiary hearing conducted on September 14 - September 15, 2015.

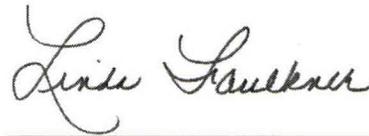
A copy of this Notice, the certifications of the digital video records, hearing logs, and exhibits have been electronically served upon all persons listed at the end of this Notice. Parties desiring electronic copies of the digital video recordings of the hearing in Windows Media format may download a copy at:

[http://psc.ky.gov/av\\_broadcast/2015-00194/2015-00194\\_14Sep15\\_Inter.asx](http://psc.ky.gov/av_broadcast/2015-00194/2015-00194_14Sep15_Inter.asx)

[http://psc.ky.gov/av\\_broadcast/2015-00194/2015-00194\\_15Sep15\\_Inter.asx](http://psc.ky.gov/av_broadcast/2015-00194/2015-00194_15Sep15_Inter.asx)

Parties wishing annotated digital video recordings may submit a written request by electronic mail to [pscfilings@ky.gov](mailto:pscfilings@ky.gov). A minimal fee will be assessed for copies of these recordings.

Done at Frankfort, Kentucky, this 23<sup>rd</sup> day of September 2015.



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COMPANY'S AND LOUISVILLE GAS & ELECTRIC )  
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CERTIFICATE

I, Sonya Harward, hereby certify that:

1. The attached DVD contains a digital recording of the Hearing conducted in the above-styled proceeding on September 14, 2015. Hearing Log, Exhibits, Exhibit List, and Witness List are included with the recording on September 14, 2015 (excluding confidential segments).

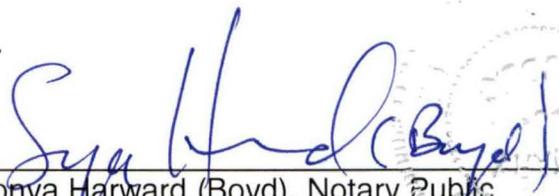
2. I am responsible for the preparation of the digital recording.

3. The digital recording accurately and correctly depicts the Hearing of September 14, 2015 (excluding confidential segments).

4. The "Exhibit List" attached to this Certificate correctly lists the Exhibits introduced at the Hearing of September 14, 2015.

5. The "Hearing Log" attached to this Certificate accurately and correctly states the events that occurred at the Hearing of September 14, 2015 (excluding confidential segments) and the time at which each occurred.

Given this 21<sup>st</sup> day of September, 2015.

  
Sonya Harward (Boyd), Notary Public  
State at Large  
My commission expires: August 27, 2017





# Session Report - Detail

2015-00194\_14Sept2015

## Louisville Gas & Electric/Kentucky Utilities

Date:	Type:	Location:	Department:
9/14/2015	Other	Public Service Commission	Hearing Room 1 (HR 1)

Judge: Jim Gardner; Dan Logsdon  
 Witness: John E. Feddock - for LG&E/KU; Richard J. Kinch - for LG&E.KU; Gary H. Revlett - LG&E/KU; David S. Sinclair - LG&E/KU; John N. Voyles - LG&E/KU  
 Clerk: Sonya Harward

Event Time	Log Event
9:57:14 AM	Session Started
9:57:19 AM	Session Paused
9:58:17 AM	Session Resumed
9:58:18 AM	Vice Chairman Gardner - Opening Remarks Note: Harward, Sonya Introduces the case. Note: Harward, Sonya Introduces himself and Commissioner Dan Logsdon.
9:58:55 AM	Attys. Allyson Sturgeon and Kendrick Riggs for Louisville Gas & Electric Company and Kentucky Utilities Company ("LG&E/KU" or "the Companies") Note: Harward, Sonya [Also accompanied by Attys. Duncan Crosby and Lindsey Ingram.]
9:59:16 AM	Attys. Gregory Dutton and Larry Cook for the Ofc. of the Attorney General ("AG")
9:59:21 AM	Attys. Dennis Howard and Joshua Farley for Sterling Ventures ("Sterling")
9:59:44 AM	Atty. John Walters for Sterling Ventures Note: Harward, Sonya Note: Later, the Commission ruled that he would not act as attorney for Sterling.
9:59:55 AM	Atty. Mike Kurtz for Kentucky Industrial Utilities Company (KIUC)
10:00:01 AM	Attys. Quang Nguyen and Molly Katen Note: Harward, Sonya Explains that the case was combined and states the new case style for CN 2015-00194.
10:00:43 AM	Comments Regarding Publishing of Public Notice Note: Harward, Sonya Atty. Riggs states that Public Notice was not ordered by the Commission and is not required, but LG&E/KU did publish notice anyhow, though one paper did not publish it.
10:01:52 AM	Outstanding Motion Note: Harward, Sonya Atty. Riggs stated that there is an outstanding motion for confidentiality, and the Companies will file their reply by COB today.
10:02:37 AM	Outstanding Motion Note: Harward, Sonya Atty. Howard stats that there is a motion that may need to be addressed concerning burden brought up at the first informal conference.
10:03:14 AM	Atty. Riggs - Has a Oral Motion to be Addressed Note: Harward, Sonya Motion concerns Atty. Walters representing Sterling as both counsel and member of the Sterling staff that provided testimony in this case.
10:04:01 AM	Practice of Law Handout (from Atty. Riggs) Note: Harward, Sonya Note: Was later collected and not entered as an exhibit in this case.
10:09:04 AM	Atty. Walters - Response to Oral Motion
10:09:21 AM	Ethics Hotline Committee Handout (from Atty. Walters)
10:13:20 AM	Atty. Riggs - Reply to Atty. Walters' Response to Oral Motion
10:15:19 AM	Recess to Discuss Oral Motion
10:15:24 AM	Session Paused
10:40:31 AM	Session Resumed

10:40:32 AM	Vice Chairman Gardner - Ruling on Oral Motion Note: Harward, Sonya	States the Commission's ruling on the motion - Sterling does not present a substantial hardship for numerous reasons and, therefore, is overruled and Mr. Walters may not participate as counsel in this case.
10:46:20 AM	Public Comments Begin	
10:46:40 AM	Sonya McElroy - Public Comment Note: Harward, Sonya	Milton, Kentucky resident and a member of the Sierra Club and Kentucky Water Way Alliances. Concerned about the cost of the landfill and wants all alternatives to be explored.
10:48:51 AM	Wallace McMullen - Public Comment Note: Harward, Sonya	Louisville resident and member of the Sierra Club. Asks that the Commission fully investigate the situation.
10:50:04 AM	Witness John N. Voyles takes the stand and is sworn in. Note: Harward, Sonya	Vice President of Transmission and Generation Services for LG&E/KU
10:50:46 AM	Atty. Riggs Direct Exam of Witness Voyles Note: Harward, Sonya	Corrections to response to Sterling's Request, 2-18(3), 3rd line, "not" should be inserted in that line; and the response to Commission Staff Request, 1-8.b.(1), "accurate" should be "inaccurate."
10:52:47 AM	Atty. Howard Cross Exam of Witness Voyles Note: Harward, Sonya	Asks Witness about the summaries of his testimony not being allowed in this proceeding, per Commission Order.
10:53:00 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing the Application, Exhibit 5 -Public Version, p. 5 of 13, Summaries of Alternatives, and asks Witness to read part of this page into the record.
10:57:00 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness how many cubic yards they are seeking per year over the next 37 years.
10:57:39 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing the page before the one that was just read from, 2nd paragraph that begins "Over the last three years...."
10:59:18 AM	Sterling - Exhibit 01 Note: Harward, Sonya	4 pages: LG&E/KU's Responses to Sterling's First Request, Item 3, pg. 2 of 2; Item 4, p. 2 of 2; Item 5, page 1 of 1. The last page is a document created by Sterling, compiling the information of first 3 pages.
11:02:38 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	States that this last page of Sterling - Exhibit 01 to this Hearing was produced by Sterling, attempting to summarize the information from the first three pages.
11:03:14 AM	Atty. Riggs - Objection Note: Harward, Sonya	Objection to the fourth page of Sterling - Exhibit 01 to this Hearing.
11:03:27 AM	Vice Chairman Gardner - Objection Noted	
11:03:35 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Going over Sterling - Exhibit 01 with the Witness.
11:08:21 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness about Trimble CCRs.
11:10:40 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing the Application, Exhibit 5 -Public Version, p. 5 of 13, Summaries of Alternatives, and asks Witness about the landfill being built for 910,000 cubic yards.

11:12:01 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing Sterling's Complaint, Exhibit B, Full Combustion By-Product Plan for Ghent Station, p. 7 of 37.
11:17:31 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing Sterling's Complaint, Exhibit B, p. 15 of 37.
11:21:59 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Still discussing the graph in Exhibit B of Sterling's Complaint.
11:24:02 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness why LG&E/KU filed the declaratory action in this matter.
11:25:00 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness about his participation in the 2014 case, when the companies were asked to consider filing additional information with the Commission.
11:26:29 AM	Atty. Riggs - Objection Note: Harward, Sonya	Calls for legal opinion.
11:26:40 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness if the companies felt they were required to file anything at the Commission per the question by staff in the 2014 case.
11:28:35 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking if the cost for Phase 1 had increased from \$94 million to \$430 million.
11:30:20 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing the Declaratory Action, p. 13, Phase 1 on the chart regarding Capital Estimate Comparison.
11:32:06 AM	Sterling - Exhibit 02 Note: Harward, Sonya	LG&E KU's Attachment to Response to AG-1, Item 106, pp. 1104, [unable to ready page number], 792, 820, 491, 525, 107, 141; and LG&E/KU's Attachment to Filing Requirement 807 KAR 5:001, Section 16(7)(c), pp. 185 and 228.
11:33:35 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing Sterling - Exhibit 02 to this Hearing, second page.
11:34:59 AM	Atty. Riggs - Clarifying Question Note: Harward, Sonya	Confirms that the highlights on Sterling - Exhibit 02 to this Hearing are made by Sterling.
11:36:13 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing Sterling - Exhibit 02 to this Hearing, third and fourth pages, Project Engineering, 2012-2016 MTP, October 13, 2011, regarding Variance to ECR Filing.
11:38:13 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing LG&E/KU Application, Exhibit 4, Update to Environmental Compliance Plans, Nov. 4, 2010, p. 9 of 85.
11:45:20 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing Sterling - Exhibit 02 to this Hearing, Project Engineering - 2013 Business Plan, pp. 491 and 525.
11:49:45 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing Sterling - Exhibit 2 to this Hearing, Project Engineering - 2014 Business Plan, pp. 107 and 141.
11:52:14 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness if the Companies went back to the Commission in June 2013 to make a presentation.
11:54:21 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Clarifies the location in the June 14, 2014 Presentation to the Commission being referenced, pp. 21-52 of 85.

11:57:11 AM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness if the Companies thought it was important to inform Commission Staff that it was \$205 million over budget.
11:59:10 AM	Atty. Howard - Requests a Recess	
12:00:06 PM	Short Recess	
12:00:10 PM	Session Paused	
12:10:14 PM	Session Resumed	
12:10:23 PM	Hearing Recommenced	
12:12:15 PM	Atty. Howard Resumes Cross Exam of Witness Voyles Note: Harward, Sonya	Referencing Witness's Testimony, filed August 6, 2015, p. 10, lines 15-20, and asks Witness to read aloud.
12:14:24 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness who the chief litigant has been when there are complaints or environmental issues filed against the Companies.
12:15:15 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing Witness's Testimony, filed August 6, 2015, p. 13, beginning at line 9, regarding the Companies considering the Sterling option as requested by the Corp of Engineers.
12:18:48 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness how the Companies will go about seeking alternatives versus the landfill option.
12:20:06 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking if the Companies approached Sterling or if Sterling approached the Companies.
12:25:43 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing the Application, p. 13, table, and asking why the Phase 1 number is so much higher than Phases 2, 3, and 4 cap.
12:33:44 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness about the Companies stating that they would possibly use CCR to close surface impoundments.
12:36:19 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness to quantify "alot" regarding the use of CCR in the impoundment.
12:39:58 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking if there is a chance if Phases 3 and 4 will be eliminated if the Companies use the CCRs currently in the impoundment lots.
12:43:16 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing the Application, p. 67 of 85, Exhibit 4. bullet c, regarding the Companies having six years of capacity left to resolve the issue here today.
12:46:37 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing the Application, Exhibit 4, Update of the Least-Cost Analysis, marked as p. 16 at the bottom, column labeled Onsite Less Offsite.
12:47:50 PM	Vice Chairman Gardner - Question to Witness Voyles Note: Harward, Sonya	Referencing the chart regarding beneficial reuse, and asking if it includes any assumption with respect to the use of the CCR with respect to the impoundment closures.
12:51:53 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing the Application, p. 79 of 85, Exhibit 4, Trimble Co. Ash Reuse History, regarding beneficial use having surged from 2013 to 2014.
12:54:33 PM	POST HEARING DATA REQUEST by Atty. Howard Note: Harward, Sonya	Provide the cost associated with the barge facility.

12:55:36 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness if the Companies have good quality control processes relative to meeting the specs for fly ash.
12:57:56 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness who would have been notified if there was a problem with the specs for the fly ash.
12:59:27 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing the Application, p. 68 of 85, Exhibit 4, regarding the Companies' PBR costs at the landfill being several million dollars cheaper than the Sterling alternative.
1:04:06 PM	Sterling - Exhibit 03 Note: Harward, Sonya	Two maps from Trimble County Generating Station Landfill Supplement to Alternatives Analysis; a Google map; and a table from the Supplement to Alternative Analysis labeled Table III.D-3.
1:09:50 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness what type of discussions the Companies' had with Sterling regarding the plans.
1:11:25 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referring to the second map to Sterling - Exhibit 03 to this Hearing.
1:12:56 PM	Atty. Riggs - Objection Note: Harward, Sonya	Objects to line of questioning and how it's relevant to this case.
1:13:28 PM	Atty. Howard - Response to Objection	
1:14:49 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referring to the third map of Sterling - Exhibit 03 to this Hearing.
1:17:14 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referring to the last page, the table, of Sterling - Exhibit 03 to this Hearing.
1:18:36 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Referencing the Application, p. 68 of 85, Exhibit 4, and how it relates to the last page of Sterling - Exhibit 03 to this Hearing.
1:19:44 PM	Sterling - Exhibit 04 Note: Harward, Sonya	Two pictures.
1:21:14 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness if the two pictures in Sterling - Exhibit 04 to this Hearing depict the Warsaw facility.
1:22:05 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness if building at an existing facility would be cheaper than building at a site that has only a river bank, like a site the Companies have suggested.
1:25:10 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Asking Witness if Sterling has tried to meet with LG&E/KU to try to get the permit for the Warsaw site modified.
1:28:29 PM	Atty. Howard to Witness Voyles Note: Harward, Sonya	Going over the question regarding the Warsaw site that was suggested by Sterling and permits for barge unloading, etc. Begins with email communications on this subject, then asks about the Companies' wanting to choose the least-cost alternative.
1:32:50 PM	Brief discussion about order of Witnesses.	
1:33:07 PM	Recess for Lunch	
1:33:11 PM	Session Paused	
2:44:07 PM	Session Resumed	
2:44:11 PM	Atty. Howard - Procedural Issues Note: Harward, Sonya	Asks to submit Sterling - Exhibit 05 into the record.

2:44:27 PM Sterling - Exhibit 05  
Note: Harward, Sonya Letter from Ethics Hotline Committee (Kentucky Bar Association), dated Sept. 10, 2015

2:44:55 PM Atty. Howard - Moved to have Sterling Exhibits 01 through 05 admitted into the Record.

2:45:10 PM Atty. Riggs - Sterling Exhibit 05 is incomplete.

2:46:08 PM Vice Chairman Gardner - Accepted Exhibits Into the Record  
Note: Harward, Sonya With the exception that the complete copy of Sterling - Exhibit 05 must be provided in order to be part of the record.

2:46:34 PM Atty. Howard Resumes Cross Exam of Witness Voyles  
Note: Harward, Sonya Referencing the Companies' response to Comm. Staff's Second Request for Information, Item 3, regarding a euro silo.

2:46:49 PM Camera Lock Deactivated

2:53:31 PM Atty. Howard to Witness Voyles  
Note: Harward, Sonya Asking Witness for his role in the decision to choose the euro silo.

2:54:50 PM Atty. Howard to Witness Voyles  
Note: Harward, Sonya Continuing to ask about the consideration of using a euro silo.

2:58:21 PM Atty. Howard to Witness Voyles  
Note: Harward, Sonya Asking about the Ghent facility regarding the gypsum stream.

3:01:37 PM Atty. Howard - Motion for Reconsideration  
Note: Harward, Sonya Asks for reconsideration of the ruling on the oral motion regarding Mr. Walters acting as attorney for Sterling Ventures due to it being a hardship due to the time it is taking to question the witness.

3:04:13 PM Atty. Riggs - Response to Motion for Reconsideration

3:05:38 PM Vice Chairman Gardner - Motion for Reconsideration is Overruled

3:06:08 PM Atty. Howard - Response to Ruling

3:06:58 PM Sterling - Exhibit 06 -- Not Accepted into Record Due to Ruling on Objection  
Note: Harward, Sonya Letter. [Later accepted into the Record as part of Sterling - Exhibit 11.]

3:08:44 PM Atty. Howard to Witness Voyles  
Note: Harward, Sonya Asking Witness about the Exhibit that was just handed out.

3:09:51 PM Atty. Riggs - Objection  
Note: Harward, Sonya Regarding the relevancy of this examination.

3:11:13 PM Atty. Howard - Response to Objection

3:11:55 PM Atty. Riggs - Reply to Response to Objection

3:12:46 PM Vice Chairman Gardner - Substains Objection  
Note: Harward, Sonya Provides reasoning, and does not allow the Exhibit into the record at this time.

3:15:36 PM Atty. Howard to Witness Voyles  
Note: Harward, Sonya Asking Witness to explain the economic analysis he provided to the Army Corps of Engineers and how it differs from that the Commission requires.

3:22:48 PM Atty. Howard to Witness Voyles  
Note: Harward, Sonya Asking Witness if the Companies provided the Commission and the Army Corps of Engineers with the same cost.

3:23:12 PM Atty. Riggs - Objection  
Note: Harward, Sonya Asked and answered.

3:23:20 PM Atty. Howard - Requesting a 'Yes' or 'No' Response

3:23:34 PM Vice Chairman Gardner - Response  
Note: Harward, Sonya Asks Atty. Howard to move on from this line of questioning.

3:24:17 PM Atty. Howard to Witness Voyles  
Note: Harward, Sonya Asking Witness about the Companies' using the PBRR analysis to determine the least-cost alternative.

3:26:17 PM Atty. Nguyen Cross Exam of Witness Voyles  
Note: Harward, Sonya Asking Witness what the original cost was for CCR facility at Trimble was when the Companies applied for the CPCN in 2009.

3:27:00 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Asking Witness for the initial cost estimate for the Ghent landfill CCRT.
3:27:15 PM	POST HEARING DATA REQUEST by Atty. Nguyen Note: Harward, Sonya	Provide the initial cost estimate for the Ghent landfill CCRT.
3:28:32 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Asking Witness for the main driver for the increase in the CCRT facility.
3:29:59 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Stating that the original timeline was provided in late 2009 and then the Companies met with Commission Staff in November 2010, and asking when the Companies determined that the euro silo would not be the most feasible option.
3:34:15 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Asking Witness about the cost being a factor in the economic analysis.
3:34:38 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Referencing the Application, p. 13, table, and asking Witness about a driver for the increase in cost being due to permitting delays.
3:38:42 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Asking Witness about the \$41 million increase in design change, and the \$102 million increase for CCR treatment and transport costs.
3:40:21 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Asking Witness about the differential in the CCR costs, listed as \$102 million in one place and adds up to over \$150 million elsewhere.
3:43:42 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Asking Witness if he recalls, in his Rebuttal Testimony, compacted nature of the volume of coal combustion residual the Companies had estimated, and asks him to quantify the amount of the understatement of the trucking volumes of the uncompacted residual.
3:46:35 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Referencing Sterling - Exhibit 01 to this Hearing, regarding the 2010 numbers for compacted cubic yards.
3:47:45 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Asking about some differences in trucking needs between compacted and uncompacted residuals when increasing the amount by 20 percent.
3:50:22 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Referencing the Companies' response to Commission Staff's First Request, Item 17.a., p. 2 of 2, second table, regarding the May 2015 costs being the most updated.
3:52:27 PM	POST HEARING DATA REQUEST by Atty. Nguyen Note: Harward, Sonya	Provide the updated September 2015 budget amounts for Trimble County landfill, for all phases and broken down by categories.
3:53:55 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Referring back to the Application, p. 13, regarding the Phase 1 February 2015 estimate.
3:56:18 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Asks Witness to explain what it means to be "nominal as fit."
3:56:50 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Comparing the Application, p. 13, and the Companies' response to Commission Staff's First Request, Item 17, regarding the \$7 million dollar difference in the dollar amount referenced on each.

3:58:18 PM	POST HEARING DATA REQUEST by Atty. Nguyen Note: Harward, Sonya	Provide the difference between the \$321.9 million listed in the Application, p. 13, and the \$282 million listed in the Companies' response to Commission Staff's First Request, Item 17.
3:58:40 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Referencing the Companies' response to Commission Staff's Second Request, Item 10, p. 2 of 3, second bullet point, regarding Sterling having adequate storage space.
4:01:05 PM	Atty. Nguyen to Witness Voyles Note: Harward, Sonya	Referencing the Companies' response to Commission Staff's Second Request, Item 11, regarding the Companies making the determination about Sterling's offers potentially having merit in deferring the labor phases of the Ghent station.
4:02:21 PM	Commission Logsdon Cross Exam of Witness Voyles Note: Harward, Sonya	Asking for the biggest driver for the delay at the landfill.
4:03:16 PM	Commission Logsdon to Witness Voyles Note: Harward, Sonya	Asking Witness about the air permits, even if using trucking for transportation. And asking about air permits for barging.
4:05:23 PM	Vice Chairman Gardner Cross Exam of Witness Voyles Note: Harward, Sonya	Referencing the Application, chart on p. 13, regarding Phases 2 and 3 being virtually identical.
4:06:57 PM	Vice Chairman Gardner to Witness Voyles Note: Harward, Sonya	Asking about the differences in the final cap and the significant drop in the February 2015 estimate.
4:09:06 PM	Vice Chairman Gardner to Witness Voyles Note: Harward, Sonya	Referencing the Joint Application, p. 15, near bottom of the page, regarding being on target to issue bids.
4:10:17 PM	Vice Chairman Gardner to Witness Voyles Note: Harward, Sonya	Asking if Ghent Phase 1 is complete, and when work on Phase 2 will begin.
4:11:08 PM	Vice Chairman Gardner to Witness Voyles Note: Harward, Sonya	Asking Witness, in general, which are the lowest-cost units that get dispatched first.
4:12:13 PM	Commission Logsdon - Interjected Question Note: Harward, Sonya	Asking Witness for the expected life left on Trimble 2.
4:13:31 PM	Vice Chairman Gardner to Witness Voyles Note: Harward, Sonya	Asking Witness which coal unit is dispatched last.
4:14:05 PM	Vice Chairman Gardner to Witness Voyles Note: Harward, Sonya	Asking about the 2011 Environmental Surcharge Settlement case, and what the cost was for particulate matter control system for TC1.
4:15:36 PM	Atty. Riggs Re-Direct Exam of Witness Voyles Note: Harward, Sonya	Referencing response to Commission's Second for Information, Item 3.i., and asking Witness if it represents a breakdown for the cost of Trimble Co. CCRT.
4:17:06 PM	Atty. Riggs to Witness Voyles Note: Harward, Sonya	Asking Witness about ECR recovery requests to the Commission, and if he believes that the Commission is approving the specific cost of the recovery or the project itself for cost recovery.
4:17:42 PM	Atty. Riggs to Witness Voyles Note: Harward, Sonya	Referencing Sterling - Exhibit 02 to this Hearing, regarding the Project Engineering 2013 Business Plan, dated Sept. 19, 2012, and the presentation made to the Commission made in June 2012 of that year preceeding the plan's date.

4:19:04 PM	Atty. Howard Re-Cross Exam of Witness Note: Harward, Sonya	Asking for clarification regarding the project being approved versus the cost of the project being approved.
4:20:41 PM	Atty. Kurtz Cross Exam of Witness Voyles Note: Harward, Sonya	Asking if there has ever been a time when the actual cost has been less than the projected cost in CPCNs.
4:22:05 PM	Witness Voyles is dismissed from the stand.	
4:22:21 PM	Short Recess	
4:22:33 PM	Session Paused	
4:32:59 PM	Session Resumed	
4:33:06 PM	Witness John E. Feddock takes the stand and is sworn in. Note: Harward, Sonya	Senior Principal and Vice President at Cardno, Inc. (Consultant for LG&E/KU)
4:33:36 PM	Vice Chairman Gardner - Comment Regarding Hearing Time Frame Note: Harward, Sonya	Finish around 7:00 p.m. tonight and tomorrow it will continue until it is completed.
4:34:04 PM	Atty. Ingram Direct Exam of Witness Feddock	
4:34:31 PM	Atty. Howard Cross Exam of Witness Feddock	
4:35:02 PM	Sterling - Exhibit 07 Note: Harward, Sonya	Document titled "Practical techniques to improve the air quality in underground stone mines."
4:36:14 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Referring to Sterling - Exhibit 07 to this Hearing, and asking Witness to read portion on p. 2 highlighted by Sterling.
4:38:17 PM	Sterling - Exhibit 08 - Not Accepted into Record Due to Ruling on Objection Note: Harward, Sonya	Pages from website.
4:39:42 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Referring to Sterling - Exhibit 08 to this Hearing, second and third pages, and asks Witness to read portions highlighted by Sterling.
4:40:54 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness to define 'backfiling.'
4:41:48 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Referencing Witness's Testimony, pp. 6-7, and asking about the velocity of the air increasing if broad areas in the mine were reduced by placement of CCRs.
4:43:03 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Referencing Witness's Testimony, p. 7, line 19, regarding the replacement of CCR reducing electrical consumption by fans being dubious and unsubstantiated.
4:44:58 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Referencing Witness's Testimony, p. 8, lines 1-7, and asks Witness what fumes are being released from CCRs.
4:46:21 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness to explain 'tier-four equipment and it's effect on diesel.'
4:51:41 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness how fumes that are released underground versus above ground at a landfill differ.
4:54:46 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness how his opinion would be impacted if there was new equipment to move CCRs underground.
4:59:40 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Continuing to ask Witness about controlling dust.
5:00:53 PM	Atty. Atty. Ingram - Objection Note: Harward, Sonya	Calls for speculation.

5:01:05 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness about LG&E having complaints about dust leaving its property.
5:01:30 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness about fugitive dust.
5:03:20 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness if he would expect 15 to 20 percent moisture content to cause dust problems at the landfill or underground mine.
5:04:09 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Referencing Witness's Testimony, p. 9, lines 6-9, regarding filling lines of voids behind the pillars being an excessive use of CCRs.
5:05:29 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Referring back to Sterling - Exhibit 08 to this Hearing, regarding the statement the Witness's statement.
5:08:22 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness about using stoppings to improve future ventilation in a mine.
5:12:16 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Referencing Witness's Testimony, p. 9, lines 16-18, regarding diesel particulate matter and exhaust in the airstream due to additional trucks and equipment being used.
5:14:01 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness about underground mining having a regulatory system in place to ensure that equipment used is safe for employees.
5:15:06 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness if it is his testimony that filling voids will not reduce ventilation
5:15:23 PM	Atty. Ingram - Objection Note: Harward, Sonya	Question already asked and answered.
5:17:31 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness if the regulations define or limit excessive use of CCR for beneficial use as it relates to stoppings.
5:18:45 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness about fugitive dust.
5:22:15 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness about his statement regarding backfill being excessive use, and what regulatory framework that finding is based on.
5:23:04 PM	Atty. Ingram - Comment to Atty. Howard Note: Harward, Sonya	Suggests that questions be asked to Mr. Kinch regarding regulations.
5:25:02 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Referencing Witness's Testimony, p. 12, regarding shot rock and run of mine.
5:28:12 PM	Atty. Ingram - Objection Note: Harward, Sonya	Question not understood.
5:29:49 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Referencing Witness's Testimony, p. 12 (lines 19-23) and p. 13 (lines 1-2), regarding any evidence of little ground water seepage.
5:36:35 PM	Atty. Howard to Witness Feddock Note: Harward, Sonya	Asking Witness for a general estimate of the total reserves that would be available to Sterling, based on his general experience.
5:39:23 PM	Post Hearing Data Request by Atty. Howard - Withdrawn	

5:39:59 PM Atty. Howard to Witness Feddock  
Note: Harward, Sonya Asking Witness if he knows that Sterling's current sales are predominantly for aggregate use.

5:41:12 PM Atty. Cook Cross Exam of Witness Feddock  
Note: Harward, Sonya Asking Witness if he is aware of any regulations applicable to trucks hauling CCR on public roadways in regards to fly ash or related materials.

5:43:01 PM Atty. Nguyen Cross Exam of Witness Feddock  
Note: Harward, Sonya Asking Witness about shot rock and run of mine, and if those materials can be used for stoppings.

5:43:44 PM Atty. Nguyen to Witness Feddock  
Note: Harward, Sonya Asking Witness if there is anything tha would prevent Sterling's mines from being able to use stoppings as ventilation for their system.

5:45:26 PM Atty. Nguyen to Witness Feddock  
Note: Harward, Sonya Asking Witness if CCR materials can be used in place of shot rock or run of mine materials in the construction of stoppings.

5:48:23 PM Atty. Nguyen to Witness Feddock  
Note: Harward, Sonya Referencing Witness's Rebuttal Testimony, p. 6 ( line 4) and p. 7 ( line 16), asking Witness to expand upon his testimony here.

5:50:23 PM Witness Feddock - Using Enlarged Visual Aid 1 (from Feddock Testimony)  
Note: Harward, Sonya Explains the enlarged visual exhibits in order to answer Atty. Nguyen's question.

5:55:57 PM Witness Feddock - Using Enlarged Visual Aid 2 (from Feddock Testimony)

5:56:57 PM Witness Feddock - Using Enlarged Visual Aids 3 (from Feddock Testimony)

5:59:42 PM Commissioner Logsdon Cross Exam of Witness Feddock  
Note: Harward, Sonya Asking Witness about the level of fugitive air in mines.

6:02:17 PM Commissioner Logsdon to Witness Feddock  
Note: Harward, Sonya Asking Witness about the consistency of particulate matter.

6:03:24 PM Witness Feddock dismissed from the stand.

6:03:49 PM Short Recess

6:03:54 PM Session Paused

6:14:12 PM Session Resumed

6:14:21 PM Atty. Howard - Moved to have Sterling - Exhibits 07 and 08 admitted.

6:15:07 PM Atty. Riggs - Objection to Sterling - Exhibit 08

6:15:51 PM Atty. Howard - Response to Objection to Sterling - Exhibit 08  
Note: Harward, Sonya Exhibit only used for definiton of ventilation.

6:16:18 PM Vice Chairman Gardner - Sustains the Objection to Sterling - Exhibit 08  
Note: Harward, Sonya Sterling - Exhibit 08 will not be part of the record.

6:16:56 PM Witness David S. Sinclair takes the stand and is sworn in.  
Note: Harward, Sonya Vice President, Energy and Supply Analysis for LG&E/KU

6:17:22 PM Atty. Crosby Direct Exam of Witness Sinclair  
Note: Harward, Sonya Made a few corrections to Witness's Rebuttal Testimony.

6:20:56 PM Sterling - Exhibit 09  
Note: Harward, Sonya Trimble County Landfill (Phase I), Attachment to Response to KIUC Question No. 1-6(a); and Ghent Landfill (Phase I), Attachment to Response to KIUC Question No. 1-4(a), pages 1-3.

6:23:25 PM Atty. Howard Cross Exam of Witness Sinclair  
Note: Harward, Sonya Referring to Sterling - Exhibit 09 to this Hearing, and explaining what they are from.

6:25:25 PM Atty. Riggs - Comments Concerning Exhibit  
Note: Harward, Sonya Regarding whether it is confidential.

6:26:11 PM Atty. Howard - Response to Comments about Exhibit

6:26:19 PM Vice Chairman Gardner - Questions about Exhibit

6:27:17 PM Atty. Howard - Gives Location of Documents in this Case  
Note: Harward, Sonya The pages concerning Ghent Landfill come from Sterling Complaint, Exhibit F. The page concerning Trimble Landfill is not currently filed in the case, but was filed in the 2009 CPCN case.

6:29:06 PM Discussion Regarding Potential Confidential Treatment of Sterling - Exhibit 09

6:38:55 PM Atty. Howard Resumes Cross Exam of Witness Sinclair  
Note: Harward, Sonya Asking Witness if the information in Sterling - Exhibit 09 to this Hearing would be part of the information used in a CPCN case.

6:40:59 PM Atty. Howard to Atty. Riggs - Confirming Information is Not Confidential

6:43:00 PM Sterling - Exhibit 10  
Note: Harward, Sonya Attachment\_to\_SV\_1-2a\_and\_g\_(ECR\_Bill\_Impact\_FINAL) (Print Version) Testimony Summary, 39 pages

6:44:18 PM Atty. Howard to Witness Sinclair  
Note: Harward, Sonya Asking Witness if Sterling - Exhibit 10 to this Hearing is information that was filed in the 2009 CPCN case.

6:50:37 PM Atty. Howard - Has Confidential Questions for Witness Sinclair  
Note: Harward, Sonya Atty. Howard is not prepared to present confidential questions at this time and suggesting confidential questioning resume in the morning.

6:52:24 PM Parites Conferencing about Witnesses

6:53:47 PM Witness Sinclair is dismissed from stand - will testify tomorrow.

6:54:01 PM Witness Gary H. Revlett takes the stand and is sworn in.  
Note: Harward, Sonya Director, Environmental Affairs for LG&E/KU

6:54:31 PM Atty. Ingram Direct Exam of Witness Revlett

6:55:35 PM Atty. Nguyen Cross Exam of Witness Revlett  
Note: Harward, Sonya Referencing the Witness's Rebuttal Testimony, p. 4 (line 19) through p. 6, (line 2), regarding permitting requirements and asking him to expand on the process and timeline.

6:58:42 PM Vice Chairman Gardner Cross Exam of Witness Revlett  
Note: Harward, Sonya Referencing Witness's Direct Testimony, p. 4, regarding CCR Final Rule.

6:59:54 PM Vice Chairman Gardner to Witness Revlett  
Note: Harward, Sonya Asking Witness if there is a difference between "beneficial use" and "beneficial reuse."

7:03:19 PM Atty. Ingram Re-Direct Exam of Witness Revlett  
Note: Harward, Sonya Asking Witness for his opinion regarding the Sterling proposal being beneficial use under the Federal CCR Final Rule.

7:04:07 PM Atty. Howard Cross Exam of Witness Revlett  
Note: Harward, Sonya Asking Witness if the state's definition of "beneficial reuse" and the federal definition are different.

7:05:15 PM Atty. Ingram Re-Direct Exam of Witness Revlett  
Note: Harward, Sonya Asking Witness if the state of Kentucky has made any changes to its regulation regarding beneficial reuse.

7:06:54 PM Atty. Nguyen Re-Cross Exam of Witness Revlett  
Note: Harward, Sonya Asking what the state's criteria is for beneficial reuse.

7:08:41 PM POST HEARING DATA REQUEST by Atty. Nguyen  
Note: Harward, Sonya Provide the cite for the state beneficial reuse regulation.

7:09:04 PM Atty. Nguyen to Witness Revlett  
Note: Harward, Sonya Asking Witness about proposals regarding beneficial use, and who makes the final determination if it meets the criteria for beneficial use.

7:10:34 PM Atty. Nguyen to Witness Revlett  
Note: Harward, Sonya Asking Witness if Kentucky is drafting any regulations regarding "beneficial use."

7:11:11 PM Vice Chairman Gardner Re-Cross Exam of Witness Revlett  
Note: Harward, Sonya Asking Witness if Federal regulations are met, would it still have to go through the state.

7:13:30 PM Atty. Kurtz Re-Cross Exam of Witness Revlett  
Note: Harward, Sonya Asking Witness about the first lline of defense for a citizen suit.

7:13:57 PM Witness Revlett dismissed from the stand.

7:14:32 PM Witness Richard J. Kinch takes the stand and is sworn in.  
Note: Harward, Sonya Independent Environmental Consultant for LG&E/KU, Previously employed by EPA for 41 years.

7:15:13 PM Atty. Ingram Direct Exam of Witness Kinch  
Note: Harward, Sonya Some minor formatting errors in Rebuttal Testimony, pp. 13-14.

7:16:48 PM Sterling - Exhibit 11  
Note: Harward, Sonya Letters to Colonel Christopher G. Beck, Louisville District Corps of Engineers, from U. S. Environmental Protection Agency, dated Aug. 7, 2014 and July 11, 2014.

7:17:48 PM Atty. Howard Cross Exam of Witness Kinch  
Note: Harward, Sonya Referring to Sterling - Exhibit 11 to this Hearing.

7:18:26 PM Atty. Ingram - Comment Regarding Sterling - Exhibit 11  
Note: Harward, Sonya Enclosure missing from Sterling - Exhibit 11.

7:19:20 PM Atty. Howard - Response

7:19:51 PM Atty. Riggs - Objection to Exhibit

7:20:19 PM Atty. Howard to Witness Kinch  
Note: Harward, Sonya Referencing Sterling - Exhibit 11 to this Hearing.

7:21:20 PM Atty. Howard to Witness Kinch  
Note: Harward, Sonya Asking Witness if he knows Ms. Toney, author of letter, and asking the responsibility of the regional administrator.

7:25:44 PM Atty. Howard to Witness Kinch  
Note: Harward, Sonya Asking Witness about changes to beneficial reuse.

7:26:51 PM Atty. Howard to Witness Kinch  
Note: Harward, Sonya Asking Witness if anyone from Region 4 would have contacted the federal EPA regarding whether Sterling still qualified for beneficial reuse.

7:28:05 PM Vice Chairman Gardner - Question to Witness Kinch  
Note: Harward, Sonya Asking about rule regarding beneficial reuse.

7:29:53 PM Atty. Howard to Witness Kinch  
Note: Harward, Sonya Referencing Sterling - Exhibit 11 to this Hearing.

7:31:21 PM Atty. Howard to Witness Kinch  
Note: Harward, Sonya Asking Witness how disposal will fit into the new rule if CCR in Sterling's mines meet certain criteria.

7:36:47 PM Atty. Howard to Witness Kinch  
Note: Harward, Sonya Asking Witness what would be the effect of the permit if the state issues a "benefit use" permit to Sterling.

7:39:44 PM Atty. Howard to Witness Kinch  
Note: Harward, Sonya Referencing Sterling - Exhibit 11 to this Hearing, second page, second paragraph, and asks the Witness to read.

7:39:56 PM Sterling - Exhibit 12  
Note: Harward, Sonya Environmental Protection Agency, 40 CFR Parts 257 and 261, pages 1-3, 163-165, 167, and 172. (Published 04/17/2015) (Portions highlighted by Sterling)

7:41:10 PM Atty. Howard to Witness Kinch  
Note: Harward, Sonya Continues to reference Sterling - Exhibit 11 to this Hearing.

7:46:43 PM Atty. Howard to Witness Kinch  
Note: Harward, Sonya Asking Witness if Sterling should have put weight on the letter since it was coming from the EPA.

7:48:44 PM	Atty. Howard - Moved to have Sterling - Exhibit 11 admitted. Note: Harward, Sonya	Also asked that the previous Sterling - Exhibit 06 (that was not accepted into the record earlier) be added as part of this Exhibit since it is referenced as an enclosure in the first paragraph. (Sterling - Exhibit 06 is admitted into record as an addition to Sterling - Exhibit 11.)
7:51:13 PM	Atty. Howard to Witness Kinch Note: Harward, Sonya	Referencing Sterling - Exhibit 11 to this Hearing.
7:55:22 PM	Atty. Howard to Witness Kinch Note: Harward, Sonya	Referring to Sterling - Exhibit 12 to this Hearing. Asks Witness to go to p. 163 and read the highlighted area.
7:58:54 PM	Atty. Howard to Witness Kinch Note: Harward, Sonya	Referring to Sterling - Exhibit 12 to this Hearing. Asks Witness to go to p. 167, second paragraph, and read.
8:04:21 PM	Atty. Riggs - Asking for Clarity of Question	
8:05:08 PM	POST HEARING DATA REQUEST by Atty. Howard Note: Harward, Sonya	State whether the Companies have any "beneficial reuse" permits.
8:06:30 PM	Atty. Howard to Witness Kinch Note: Harward, Sonya	Asking if the Companies have any permits under the old rules, and if so, what the status is now.
8:08:07 PM	Atty. Ingram - Objection Note: Harward, Sonya	Calls for legal conclusion.
8:09:06 PM	Atty. Katen Cross Exam of Witness Kinch Note: Harward, Sonya	Asking Witness if there were any changes regarding beneficial use between the Aug. 2014 letter and the Dec. 2014 letter.
8:11:52 PM	Atty. Katen to Witness Kinch Note: Harward, Sonya	Referencing Witness's Rebuttal Testimony, p. 6, lines 12-15, asking Witness to expand on why Sterling cannot use prior state actions to claim compliance to the CCR Final Rule.
8:12:31 PM	Witness Kinch Note: Harward, Sonya	Refers Atty. Katen to his Testimony, p. 5, quote he reads, and p. 7, quote he reads from the CCR Final Rule.
8:16:41 PM	Atty. Ingram Re-Direct Exam of Witness Kinch Note: Harward, Sonya	Asking Witness whether EPA is able to waive parts of the process when an entity seeks beneficial use approval.
8:18:12 PM	Atty. Ingram to Witness Kinch Note: Harward, Sonya	Sterling - Exhibit 11 to the Hearing and asking if the Witness is the author of the beneficial portion of the CCR Final Rule.
8:21:10 PM	Atty. Ingram to Witness Kinch Note: Harward, Sonya	Asking Witness if he has any doubt whether the Sterling proposal is beneficial or disposal.
8:22:23 PM	Atty. Howard Cross Exam of Witness Kinch Note: Harward, Sonya	Asking Witness about knowledge of the first three criteria.
8:22:55 PM	Atty. Ingram - Objection	
8:23:40 PM	Atty. Howard to Witness Kinch Note: Harward, Sonya	Restated question: Asking if the first three criteria were well known before the Aug. 2014 letter.
8:25:51 PM	Atty. Howard - Moves for introduction of Exhibit 12	
8:26:15 PM	Vice Chairman Gardner requests Mr. Revlett's presence tomorrow at the Hearing.	
8:26:34 PM	Atty. Ingram asks if Mr. Kinch can be excused and not return to the Hearing tomorrow.	
8:26:49 PM	Hearing Recessed Until Tomorrow at 9:00am	
8:26:59 PM	Session Paused	
8:34:02 AM	Session Ended	



## Exhibit List Report

2015-00194\_14Sept2015

Louisville Gas & Electric/Kentucky  
Utilities

<b>Name:</b>	<b>Description:</b>
Sterling - Exhibit 01	4 pages: LG&E/KU's Responses to Sterling's First Request, Item 3, pg. 2 of 2; Item 4, p. 2 of 2; Item 5, page 1 of 1. The last page is a document created by Sterling, compiling the information of first 3 pages.
Sterling - Exhibit 02	LG&E KU's Attachment to Response to AG-1, Item 106, pp. 1104, [unable to ready page number], 792, 820, 491, 525, 107, 141; and LG&E/KU's Attachment to Filing Requirement 807 KAR 5:001, Section 16(7)(c), pp. 185 and 228.
Sterling - Exhibit 03	Two maps from Trimble County Generating Station Landfill Supplement to Alternatives Analysis; a Google map; and a table from the Supplement to Alternative Analysis labeled Table III.D-3.
Sterling - Exhibit 04	Two pictures.
Sterling - Exhibit 05	Letter from Ethics Hotline Committee (Kentucky Bar Association), dated Sept. 10, 2015
Sterling - Exhibit 06 -Accepted inRecord as Ex. 11	Letter.
Sterling - Exhibit 07	Document titled "Practical techniques to improve the air quality in underground stone mines."
Sterling - Exhibit 08 - Not Accepted into Record	Pages from website.
Sterling - Exhibit 09	Trimble County Landfill (Phase I), Attachment to Response to KIUC Question No. 1-6(a); and Ghent Landfill (Phase I), Attachment to Response to KIUC Question No. 1-4(a), pages 1-3.
Sterling - Exhibit 10	Attachment_to_SV_1-2a_and_g_(ECR_Bill_Impact_FINAL) (Print Version) Testimony Summary, 39 pages
Sterling - Exhibit 11	Letters to Colonel Christopher G. Beck, Louisville District Corps of Engineers, from U. S. Environmental Protection Agency, dated Aug. 7, 2014 and July 11, 2014.
Sterling - Exhibit 12	Environmental Protection Agency, 40 CFR Parts 257 and 261, pages 1-3, 163-165, 167, and 172. (Published 04/17/2015) (Portions highlighted by Sterling)

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

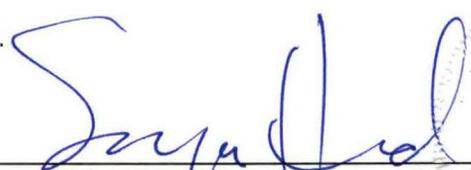
INVESTIGATION OF KENTUCKY UTILITIES )  
COMPANY'S AND LOUISVILLE GAS & ELECTRIC )  
COMPANY'S RESPECTIVE NEED FOR AND COST OF ) CASE NO. 2015-00194  
MULTIPHASE LANDFILLS AT THE TRIMBLE COUNTY )  
AND GHENT GENERATING STATIONS )

CERTIFICATE

I, Sonya Harward, hereby certify that:

1. The attached DVD contains a digital recording of the Hearing conducted in the above-styled proceeding on September 15, 2015. Hearing Log, Exhibits, Exhibit List, and Witness List are included with the recording on September 15, 2015 (excluding confidential segments).
2. I am responsible for the preparation of the digital recording.
3. The digital recording accurately and correctly depicts the Hearing of September 15, 2015 (excluding confidential segments).
4. The "Exhibit List" attached to this Certificate correctly lists the Exhibits introduced at the Hearing of September 15, 2015.
5. The "Hearing Log" attached to this Certificate accurately and correctly states the events that occurred at the Hearing of September 15, 2015 (excluding confidential segments) and the time at which each occurred.

Given this 21<sup>st</sup> day of September, 2015.

  
Sonya Harward (Boyd), Notary Public  
State at Large

My commission expires: August 27, 2017





# Session Report - Detail

2015-00194\_15Sept2015

Louisville Gas & Electric/Kentucky Utilities

Date:	Type:	Location:	Department:
9/15/2015	Other	Public Service Commission	Hearing Room 1 (HR 1)

Judge: Jim Gardner; Dan Logsdon  
 Witness: Robert M. Conroy - LG&E/KU; J. Steven Gardner - for Sterling; Gary Revlett - LG&E/KU; David S. Sinclair - LG&E/KU; John W. Walters, Jr. - Sterling  
 Clerk: Sonya Harward

Event Time	Log Event
8:38:21 AM	Session Started
8:38:23 AM	Session Paused
8:58:19 AM	Session Resumed
8:58:20 AM	Hearing Resumes
8:58:22 AM	Atty. Dennis Howard - Regarding Sterling - Exhibit 05 Note: Harward, Sonya Provides the letter to complete Sterling - Exhibit 05 to this Hearing.
8:58:39 AM	Camera Lock Deactivated
8:59:57 AM	Atty. Howard Note: Harward, Sonya Moves to have Sterling - Exhibit 05 entered in the record.
9:00:36 AM	Vice Chairman Jim Gardner - Admits Exhibit
9:00:47 AM	Witness David S. Sinclair takes the stand and is still under oath from previous day.
9:01:15 AM	Atty. Howard Resumes Cross Exam of Witness Sinclair
9:01:36 AM	Sterling - Exhibit 13 Note: Harward, Sonya Evaluation of Trimble County Coal Combustion Residual Storage Options, LG&E/KU, Generation Planning & Analysis, 2015 (Highlighting done by Sterling)
9:02:45 AM	Atty. Howard to Witness Sinclair Note: Harward, Sonya Referencing to Sterling - Exhibit 13 to this Hearing, noting that it was handed out at the first informal conference in this case.
9:04:44 AM	Request for Confidential Session
9:05:19 AM	Vice Chairman Gardner - Comments to All Attendees Note: Harward, Sonya Asking if all attendees in room have signed confidential agreement; this iss confirmed.
9:06:27 AM	Private Recording Activated
10:08:51 AM	Session Paused
10:24:21 AM	Session Resumed
10:24:23 AM	Hearing Resumes in Confidential Session
10:24:30 AM	Atty. Howard to Witness Sinclair - Resumes Cross Exam.
10:27:06 AM	Camera Lock Deactivated
10:27:06 AM	Private Recording Activated
10:27:09 AM	Atty. Howard to Witness Sinclair Note: Harward, Sonya Referencing a electronic version of a spreadsheet that Witness has accessed on his laptop, and asking Witness for the calculations regarding the CCR volumes.
11:14:45 AM	Session Paused
11:24:29 AM	Session Resumed
11:44:17 AM	Public Recording Activated
11:44:19 AM	Resuming in Public Session
11:44:28 AM	Atty. Howard Note: Harward, Sonya Moves to have Sterling - Exhibits 13, 16, and 17 entered in the record.

11:45:00 AM	Vice Chairman Gardner - Admits Exhibits	
11:45:35 AM	Atty. Howard to Witness Sinclair	
	Note: Harward, Sonya	Referencing Sterling - Exhibit 16, regarding a road in the picture.
11:46:52 AM	Sterling - Exhibit 18	
	Note: Harward, Sonya	Picture from Google Maps titled Bedord, KY 40006
11:48:09 AM	Atty. Howard to Witness Sinclair	
	Note: Harward, Sonya	Asking Witness if he is familiar with the Trimble Plant pictured in Sterling - Exhibit 18 to this Hearing.
11:49:54 AM	Atty. Riggs - Objection	
	Note: Harward, Sonya	Witness is an economist and is unable to answer engineering questions.
11:50:23 AM	Atty. Howard - Response to Objection	
11:51:08 AM	Vice Chairman Gardner - Sustains Objection	
11:57:49 AM	Atty. Howard to Atty. Riggs	
	Note: Harward, Sonya	Asking which Witness can respond to Sterling - Exhibit 17.
11:59:19 AM	Sterling - Exhibit 19	
	Note: Harward, Sonya	Support Document III.D-1-16, Fenner Dunlop Project Cost Report Dated October 24, 2014 - River Loading/Transport/Unloading Operations
12:01:05 PM	Atty. Riggs - Requests Source of the Document	
12:02:40 PM	Discussion about Sterling - Exhibit 19	
12:04:50 PM	Atty. Howard to Witness Sinclair	
	Note: Harward, Sonya	Asking Witness about Sterling - Exhibit 19 to this Hearing, and his familiarity with the document and if he's a responding Witness for the document.
12:06:24 PM	Atty. Howard - Requests a Recess	
	Note: Harward, Sonya	Needs time to discuss with Atty. Riggs which witnesses are able to respond to particular questions.
12:06:58 PM	Atty. Riggs - Expresses a View	
	Note: Harward, Sonya	Regarding pace of the Hearing.
12:07:51 PM	Atty. Howard - Response to Atty. Riggs's Remarks	
12:08:57 PM	Vice Chairman Gardner - Response	
	Note: Harward, Sonya	The Hearing will be finished today.
12:10:11 PM	Recess for Lunch	
12:10:22 PM	Session Paused	
1:16:30 PM	Session Resumed	
1:16:34 PM	Atty. Howard - No further questions for Witness Sinclair	
1:17:15 PM	Vice Chairman Gardner - Proceed in Public Session	
1:17:37 PM	Atty. Mike Kurtz Cross Exam of Witness Sinclair	
	Note: Harward, Sonya	Referencing Witness's Direct Testimony, p. 8, Table 2, regarding on-site vs. Sterling proposal costs. Also referencing Sterling - Exhibit 13, p. 10, involving the same numbers.
1:19:09 PM	Atty. Kurtz to Witness Sinclair	
	Note: Harward, Sonya	Referencing Sterling - Exhibit 13, p. 7, Table 2, regarding the capital cost. Also references Tables 3,4, and 5 of the same Exhibit.
1:22:31 PM	Atty. Kurtz to Witness Sinclair	
	Note: Harward, Sonya	Referencing Sterling - Exhibit 13, p. 10, Item 3 at the bottom, regarding present value benefits.
1:25:18 PM	Vice Chairman Gardner - Clarifying Question to Witness Sinclair	
1:26:51 PM	Atty. Kurtz to Witness Sinclair	
	Note: Harward, Sonya	Asking Witness about Sterling only receiving a tipping fee, referencing Sterling - Exhibit 13, p. 8, Table 4.
1:27:23 PM	Atty. Kurtz to Witness Sinclair	
	Note: Harward, Sonya	Referencing Witness's Rebuttal Testimony, p. 13, line 14, regarding the tipping fee being increased.

1:30:13 PM	Atty. Kurtz to Witness Sinclair Note: Harward, Sonya	Referencing Sterling - Exhibit 13, p. 9, Table 6, and the Witness's Rebuttal Testimony, and requesting the minimum and maximum volumes of CCR. (Witness references his Direct Testimony, p. 20, Table 10.)
1:34:09 PM	POST HEARING DATA REQUEST by Atty. Kurtz Note: Harward, Sonya	Provide the value of a contract between Sterling and the Companies to dispose of all CCR from the Trimble unit.
1:34:40 PM	Atty. Kurtz to Witness Sinclair Note: Harward, Sonya	Asking Witness about entering into a contract for nearly \$270 million with escalation at 3 percent over 30 years with someone you don't know anything about.
1:35:48 PM	Atty. Howard - Objection Note: Harward, Sonya	Asking for a legal opinion.
1:37:17 PM	Atty. Kurtz to Witness Sinclair Note: Harward, Sonya	Asking Witness about other issues if the contract were terminated.
1:37:56 PM	Atty. Kurtz to Witness Sinclair Note: Harward, Sonya	Asking Witness about how negotiations would go if the Commission ordered the Companies to enter into the contract with Sterling.
1:39:34 PM	Atty. Kurtz to Witness Sinclair Note: Harward, Sonya	Asking Witness about Trimble County plant being very efficient, and asking if the Companies expect it to run at a higher or lower capacity factor.
1:41:43 PM	Atty. Quang Nguyen Cross Exam of Witness Sinclair Note: Harward, Sonya	Referencing the Witness's Rebuttal Testimony, p. 4, regarding difference in book life assumptions use in the PBR analysis and the building impact for the ECR computations for the Ghent landfill, and asking Witness why the Companies would use different book life assumptions for the analysis when related to the same project.
1:44:59 PM	Vice Chairman Gardner Cross Exam of Witness Sinclair Note: Harward, Sonya	Referencing the Witness's Rebuttal Testimony, p. 12, above the Table, regarding a change he made in to this testimony yesterday. And asking Witness if there is much difference between \$6 million to \$30 million over 66 years.
1:47:57 PM	Vice Chairman Gardner to Witness Sinclair Note: Harward, Sonya	Asking Witness about the numbers not quantifying some of the risks involved for the Company.
1:51:24 PM	Vice Chairman Gardner to Witness Sinclair Note: Harward, Sonya	Asking Witness about the ROE being the same between the Warsaw and on-site options.
1:51:57 PM	Vice Chairman Gardner to Witness Sinclair Note: Harward, Sonya	Asking Witness about a PBRR being done about what the cost of a combined cycle would be.
1:53:19 PM	Vice Chairman Gardner to Witness Sinclair Note: Harward, Sonya	Asking Witness for the reason why one option was far more costly was because the Trimble units have a much longer useful life. (Witness referencing his Direct Testimony, p. 14.)
1:55:30 PM	Atty. Crosby Direct Exam of Witness Sinclair Note: Harward, Sonya	Referencing Witness's Direct Testimony, p. 9, Table 3, regarding the Companies not retiring the units and that is should continue with the landfill.
1:56:40 PM	Atty. Crosby to Witness Sinclair Note: Harward, Sonya	Asking Witness if there is any testimony in this case suggesting the Companies not building the Trimble Co. CCRT.

1:57:27 PM	Atty. Crosby to Witness Sinclair Note: Harward, Sonya	Referencing Witness's Rebutal Testimony, p. 9, Table 3, regarding column titled Warsaw Assumptions Based on Walters Testimony.
1:58:39 PM	Atty. Crosby to Witness Sinclair Note: Harward, Sonya	Referencing Sterling's response to Commission Staff's Second Request, Item 16, last sentence.
2:00:53 PM	Atty. Crosby to Witness Sinclair Note: Harward, Sonya	Asking Witness about the Warsaw facility, and whether it is the Companies position that they would build and own these facilities.
2:03:53 PM	Vice Chairman Gardner Re-Cross Exam of Witness Sinclair Note: Harward, Sonya	Asking Witness whether Trimble 2 is typically being dispatched first, and also asks about Trimble 1.
2:07:02 PM	Witness Sinclair dismissed from the stand.	
2:07:10 PM	Vice Chairman Gardner - Exhibits Note: Harward, Sonya	Admits Sterling - Exhibits 15 - CONFIDENTIAL, 18, and 19 into the record.
2:08:57 PM	Witness Robert M. Conroy takes the stand and is sworn in. Note: Harward, Sonya	Director of Rates for LG&E/KU
2:09:42 PM	Atty. Riggs Direct Exam of Witness Conroy Note: Harward, Sonya	Witness has a minor correction the Companies' response to Sterling's Request, Items 40.a. and c., should have referenced 30 instead of 31.
2:10:48 PM	Atty. Dutton Cross Exam of Witness Conroy Note: Harward, Sonya	Asking Witness whether previous work done in regards to the CPCN has already been recovered through the ECR.
2:12:40 PM	Vice Chairman Gardner Cross Exam of Witness Conroy Note: Harward, Sonya	Referencing Witness's Rebuttal Testimony, p. 3, lines 11-14, regarding two analysis done.
2:15:57 PM	Vice Chairman Gardner to Witness Conroy Note: Harward, Sonya	Asking Witness if he thinks the Commission should do a least-cost analysis from scratch when additional capital is being requested.
2:17:54 PM	Vice Chairman Gardner to Witness Conroy Note: Harward, Sonya	Asking Witness for the status of permits with respect to the Trimble landfill.
2:18:45 PM	Witness Conroy dismissed from the stand.	
2:18:56 PM	Witness Gary Revlett retakes the stand and is still under oath.	
2:18:59 PM	Vice Chairman Gardner Re-Cross Exam of Witness Revlett Note: Harward, Sonya	Asking Witness for the status of permits with respect to the Trimble on-site landfill.
2:21:55 PM	Commissioner Dan Logsdon Cross Exam of Witness Revlett Note: Harward, Sonya	Asking Witness about the 404 permit.
2:23:00 PM	Witness Revlett dismissed from the stand.	
2:23:09 PM	Witness Steve Gardner takes the stand and is sworn in. Note: Harward, Sonya	President and CEO of ECSI, LLC (Consultant for Sterling)
2:24:07 PM	Atty. Howard Direct Exam of Witness Gardner	
2:25:07 PM	Atty. Riggs - Requests Recess	
2:25:27 PM	Session Paused	
2:34:47 PM	Session Resumed	
2:35:03 PM	Atty. Nancy Vinsel Cross Exam of Witness Gardner Note: Harward, Sonya	Asking Witness to explain, from his experience, how handling aggregate is similar to handling CCR.
2:37:30 PM	Atty. Vinsel to Witness Gardner Note: Harward, Sonya	Asking Witness to explain the process of compacting CCRs.

2:38:24 PM	Atty. Vinsel to Witness Gardner Note: Harward, Sonya	Asking Witness to explain why he doesn't feel that fugitive dust will be an issue.
2:41:25 PM	Atty. Vinsel to Witness Gardner Note: Harward, Sonya	Asking Witness about any analysis of traffic.
2:42:02 PM	Atty. Vinsel to Witness Gardner Note: Harward, Sonya	Asking Witness about any consideration given to a middle and high school that are located across the street from the facility.
2:42:57 PM	Atty. Vinsel to Witness Gardner Note: Harward, Sonya	Asking Witness if there have been any discussions with any governmental officials about the plan.
2:43:25 PM	Atty. Vinsel to Witness Gardner Note: Harward, Sonya	Referencing Sterling's response to Commission Staff's Second Request, Item 18, regarding complying with CCR rules if there were any sort of collection system or ground water monitoring if there was a staging area.
2:45:34 PM	Atty. Vinsel to Witness Gardner Note: Harward, Sonya	Asking Witness if Sterling is usings ventilation stoppings.
2:47:32 PM	Atty. Vinsel to Witness Gardner Note: Harward, Sonya	Asking Witness for more details about the ventilation system at Sterling.
2:50:08 PM	Atty. Vinsel to Witness Gardner Note: Harward, Sonya	Asking Witness about the three options Sterling had to handle the CCR, and if a method has been chosen.
2:51:16 PM	Commissioner Logsdon Cross Exam of Witness Gardner Note: Harward, Sonya	Asking Witness if he thinks that Sterling's plan would be considered a beneficial use.
2:53:28 PM	Witness Gardner - Using Enlarged Visual Aid Note: Harward, Sonya	Additionally uses one of Witness Feddock's Visual Aids from the previous day.
2:53:37 PM	Atty. Riggs - Asking about Witness Gardner's Enlarged Visual Aid	
2:57:19 PM	Commissioner Logsdon to Witness Gardner Note: Harward, Sonya	Asking Witness to discuss the criteria for meeting beneficial use.
2:59:19 PM	Atty. Lindsey Ingram Re-Direct Exam of Witness Gardner Note: Harward, Sonya	Asking Witness if he felt like Region IV of the EPA thinks that there will be beneficial use.
3:00:37 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Asking Witness when he spoke to Mr. Summerville at the EPA and when he was retained by Sterling in this case.
3:01:42 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Asked Witness if Mr. Summerville shared his thoughts about the Sterling proposal being of beneficial use under the CCR rule.
3:02:40 PM	LG&E/KU - Exhibit 01 Note: Harward, Sonya	Two pages of emails between Eric Summerville and J. Steven Gardner, dated August 3, 2015.
3:03:33 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Asking Witness about LG&E/KU - Exhibit 01 to this Hearing,
3:04:22 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Asking Witness to read the second full paragraph on Aug. 3, 2015, 2:59pm email.
3:07:03 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Referencing Sterling - Exhibit 11 to this Hearing.
3:08:44 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Asking Witness to point to any place in the letter where it speaks of the CCR Final Rule in context to beneficial use.

3:09:13 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Asking Witness about the trucking logistics, referencing the Witness's Testimony, p. 14.
3:12:36 PM	Atty. Howard - Objection	
3:12:47 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Asking Witness to describe the truck route as it relates to the schools.
3:13:55 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Asking Witness if he has driven the route from the barge to the Sterling facility.
3:15:01 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Referencing Sterling's reponse to Commission Staff's Second Request, Item 14, and the Witness's Testimony, p. 10. line 20, regarding the average annual production over the life of the Sterling's mines in tons.
3:18:15 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Asking Witness if he prepared his own testimony.
3:18:48 PM	POST HEARING DATA REQUEST by Atty. Ingram Note: Harward, Sonya	Provide the earlier copy of the Gardner Testimony - the copy Witness Gardner had on the stand. Request later withdrawn.
3:20:29 PM	Atty. Ingram to Witness Gardner Note: Harward, Sonya	Referencing Witness's Testimony, p. 3, and asking Witness about doing various calculations.
3:24:32 PM	Atty. Howard Re-Direct Exam of Witness Gardner Note: Harward, Sonya	Asking Witness if the Final Rule is enforced by a citizen lawsuit, rather than the EPA.
3:25:40 PM	POST HEARING DATA REQUEST for Sterling Note: Harward, Sonya	Provide a copy of the enlarged visual aid (permit map) used by Mr. Gardner in his testimony at the Hearing.
3:30:29 PM	Atty. Howard to Witness Gardner Note: Harward, Sonya	Asking Witness how the use of energy ___??___ compares to the original placement in the landfill versus the placement in the mine.
3:33:02 PM	Atty. Howard to Witness Gardner Note: Harward, Sonya	Asking Witness about the trucking route.
3:33:48 PM	Atty. Howard to Witness Gardner Note: Harward, Sonya	Asking Witness to explain how haul trucks are tarped.
3:35:07 PM	Atty. Howard to Witness Gardner Note: Harward, Sonya	Asking Witness about diesel particulate matter and tier four engines.
3:36:09 PM	Atty. Kurtz Re-Cross Exam of Witness Gardner Note: Harward, Sonya	Asking Witness who would be responsible if they lost a citizen suit due to not meeting a beneficial use.
3:37:36 PM	Atty. Howard - Objection Note: Harward, Sonya	Asking for a legal opinion.
3:38:25 PM	Atty. Vinsel Re-Cross Exam of Witness Gardner Note: Harward, Sonya	Referencing Sterling - Exhibit 04 to this Hearing, and asking where the school is in the picture.
3:41:33 PM	Atty. Vinsel to Witness Gardner Note: Harward, Sonya	Asking Witness to describe the size of truck that could be used.
3:42:28 PM	Atty. Ingram - moves to have LG&E/KU - Exhibit 01 admitted into the record.	
3:42:36 PM	Vice Chairman Gardner - Admits Exhibit	
3:42:41 PM	Witness Gardner is dismissed from the stand.	
3:42:49 PM	Short Recess	
3:42:57 PM	Session Paused	
3:54:40 PM	Session Resumed	

3:54:47 PM	Witness John W. Walters, Jr. takes the stand and is sworn in. Note: Harward, Sonya	General Counsel and CFO for Sterling
3:55:37 PM	Atty. Howard - Direct Exam of Witness Walters Note: Harward, Sonya	Corrects document that lists Witness as CFO only, and adds that he is also General Counsel.
3:57:11 PM	Atty. Vinsel Cross Exam of Witness Walters Note: Harward, Sonya	Asking Witness who the owners are of Sterling Ventures, LLC.
3:58:27 PM	POST HEARING DATA REQUEST by Atty. Vinsel Note: Harward, Sonya	Provide a corporate structure or organizational chart for Sterling Ventures, including executive officers and management.
3:59:38 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asking Witness about disposal becoming a beneficial use.
4:05:13 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asking Witness how they would handle the gypsum in terms of fugitive dust control.
4:07:07 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asking if Sterling owns the property where the Warsaw facility is located.
4:09:33 PM	Atty. Riggs - Objection	
4:11:20 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asking Witness if he has any written correspondence with the owner of the property.
4:11:52 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asking Witness about the property, the need for significant construction, and exactly what improvements will be needed.
4:14:07 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Referencing Sterling - Exhibit 04 to this Hearing, and asking about the property owned by the family that also owns the Warsaw facility site.
4:15:49 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asking Witness what permits would be needed for the Warsaw facility site.
4:22:48 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asking Witness about having pause going forward since they could be denied a permit for beneficial use.
4:24:21 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asking Witness about not getting the permit until after the Commission decides on this case.
4:30:06 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asking Witness to explain Sterling's plan to mitigate risk, in terms of the bonding.
4:34:02 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asked Witness to provide an audited financial statement as a post hearing data request...Witness declined to provide this to the Companies.
4:35:02 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Provide an audited financial statement, to be placed under seal. Request later withdrawn.
4:36:00 PM	Atty. Vinsel to Witness Walters Note: Harward, Sonya	Asked for clarity regarding what Sterling is asking for due to the Witness's response to providing a financial statement.
4:37:49 PM	Atty. Riggs - Objection Note: Harward, Sonya	Not answering the question.
4:39:10 PM	Atty. Dutton Cross Exam of Witness Walters Note: Harward, Sonya	Asking Witness about litigation by third parties.

4:43:32 PM Atty. Kurtz Cross Exam of Witness Walters  
Note: Harward, Sonya Asking Witness how the Commission's revoking the Companies' CPCN will help Sterling.

4:47:58 PM Atty. Kurtz to Witness Walters  
Note: Harward, Sonya Continues to ask Witness if he wants the Commission to order the Companies to contract with Sterling.

4:49:26 PM Atty. Howard - Objection  
Note: Harward, Sonya Argumentative.

4:50:11 PM Atty. Riggs Cross Exam of Witness Walters  
Note: Harward, Sonya Asking Witness if the mine is a customer of KU or LG&E.

4:52:32 PM Atty. Vinsel Re-Cross Exam of Witness Walters  
Note: Harward, Sonya Asking Witness why the costs for transporting CCR were not included in the analysis.

4:53:39 PM Atty. Riggs - Objection

4:57:20 PM Atty. Vinsel to Witness Walters  
Note: Harward, Sonya Asking Witness if Sterling can obtain the same amount of ventilation with less CCR.

5:00:04 PM Discussion regarding providing Sterling's Financial Statement.

5:00:47 PM Walters dismissed

5:00:53 PM POST HEARING DATA REQUESTS  
Note: Harward, Sonya Atty. Riggs will provide a list of all Post Hearing Data Requests by 9/16/15, COB.

5:02:28 PM POST HEARING DATA REQUESTS due 9/24/15

5:04:38 PM Vice Chairman Gardner to Atty. Riggs  
Note: Harward, Sonya Asking about the October deadline for an Order. Needs an Order by the end of October. Bids end on Oct. 8, and the Companies must respond by the end of the year.

5:06:06 PM Discussion of Briefs - Briefs due Oct. 16

5:11:17 PM Vice Chairman Gardner's Closing Remarks

5:11:57 PM Hearing Adjourned.

5:12:02 PM Session Paused



## Exhibit List Report

2015-00194\_15Sept2015

Louisville Gas & Electric/Kentucky  
Utilities

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<b>Name:</b>	<b>Description:</b>
LG&E/KU - Exhibit 01	Two pages of emails between Eric Summerville and J. Steven Gardner, dated August 3, 2015.
Sterling - Exhibit 13	Evaluation of Trimble County Coal Combustion Residual Storage Options, LG&E/KU, Generation Planning & Analysis, 2015 (Highlighting done by Sterling)
Sterling - Exhibit 14 - CONFIDENTIAL	Ten spreadsheets
Sterling - Exhibit 15 - CONFIDENTIAL	Eight spreadsheets
Sterling - Exhibit 16	Picture titled CCRT/Landfill Layout Comparison (Current vs. 2009)
Sterling - Exhibit 17	Spreadsheet titled Trimble County Generating Station Landfill Project, Supplement to Alternatives Analysis, Table Appendix III.D-1 - Unit Cost Development. 3 pages.
Sterling - Exhibit 18	Picture from Google Maps titled Bedord, KY 40006
Sterling - Exhibit 19	Support Document III.D-1-16, Fenner Dunlop Project Cost Report Dated October 24, 2014 - River Loading/Transport/Unloading Operations

**Pearce, Jennifer**

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**From:** Somerville, Eric  
**Sent:** Monday, August 03, 2015 2:19 PM  
**To:** J. Steven Gardner  
**Cc:** Doug Myneer; Edmundo Laporte; Jeff Baird  
**Subject:** RE: Sterling Materials & CCR

Yes, Steve. That's true. I have been corresponding with John Walters about the Sterling Ventures Mine. However, I may have misinterpreted your previous email to suggest that LG&E has in fact proposed to send the CCR to the mine, which as far as I know is not the case at all.

That said, I can speak with you about CWA 404, but I am less able to discuss "beneficial use" as that term is used in the final EPA rule on CCR. That rule was promulgated under an EPA regulation that I have no experience with. In fact, I am likely no more familiar with the nuances of beneficial reuse as you might be; my only exposure to the term as it applies here is reading the above referenced rule.

If you would still like to chat, I am available this afternoon and all day tomorrow, except for 11:45am – 12:45pm.

-Eric

Eric Somerville  
U.S. EPA Region 4 | Ocean, Wetlands & Streams Protection Branch  
c/o SESD (F120-6) | 980 College Station Road | Athens, GA 30605-2720  
tel 706.355.8514 | [somerville.eric@epa.gov](mailto:somerville.eric@epa.gov)

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**From:** J. Steven Gardner [mailto:[jsgardner@engrservices.com](mailto:jsgardner@engrservices.com)]  
**Sent:** Monday, August 03, 2015 2:12 PM  
**To:** Somerville, Eric  
**Cc:** Doug Myneer; Edmundo Laporte; Jeff Baird  
**Subject:** RE: Sterling Materials & CCR

Eric,

We were under the impression that you had been talking with John Walters of Sterling Materials about this proposal. I had some additional clarification questions on Beneficial Use that I thought you could help with.

Thanks,

Steve

**J. Steven Gardner, PE, PS, SME-AM**  
**President/CEO**  
**ECSI, LLC**  
**Engineers-Consultants-Scientists-International**  
*an e&e partner company*

340 South Broadway, Suite 200  
Lexington, KY 40508  
859-233-2103 (direct office X 103)  
859-806-5826 (mobile)

**From:** Somerville, Eric  
**Sent:** Monday, August 03, 2015 11:56 AM  
**To:** 'J. Steven Gardner'  
**Cc:** Doug Mynear; Edmundo Laporte; Jeff Baird  
**Subject:** RE: Sterling Materials & CCR

Good Day Steven-

I am afraid that I am unaware of any proposal for LG&E to send its CCR from the Trimble County Generating Station to the Sterling Ventures Mine. To my knowledge, LG&E has consistently discounted any such idea as Impractical. So, I am not sure exactly what information you might have that I am unaware of, and in any event I am certainly not familiar enough with any new plans or proposal from LG&E to discuss them.

I am also compelled to reiterate that the Army Corps of Engineers is the lead federal agency on any permitting matters pursuant to Section 404 of the Clean Water Act, and so I would advise that you touch base with them. Ms. Kimberly Simpson is the Louisville District POC for this project, and you may reach her at (502) 315-6691 or [kimberly.j.simpson@usace.army.mil](mailto:kimberly.j.simpson@usace.army.mil).

Regards.

-Eric

Eric Somerville  
U.S. EPA Region 4 | Ocean, Wetlands & Streams Protection Branch  
c/o SESD (F120-6) | 980 College Station Road | Athens, GA 30605-2720  
tel 706.355.8514 | [somerville.eric@epa.gov](mailto:somerville.eric@epa.gov)

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**From:** J. Steven Gardner  
**Sent:** Monday, August 03, 2015 11:39 AM  
**To:** [somerville.eric@epa.gov](mailto:somerville.eric@epa.gov)  
**Cc:** Doug Mynear; Edmundo Laporte; Jeff Baird  
**Subject:** Sterling Materials & CCR

Eric,

We would like to set up a time to discuss the proposal for LG&E to send their CCR from the Trimble plant to the Sterling underground operation today or tomorrow if possible.

Thanks,

Steve

**J. Steven Gardner, PE, PS, SME-RM**  
**President/CEO**  
**ECSI, LLC**  
**Engineers-Consultants-Scientists-International**  
*an **e&c** partner company*

340 South Broadway, Suite 200  
Lexington, KY 40508

CCR Production by Type

	2010		2011		2012	
	Tons	Compacted Cubic Yards	Tons	Compacted Cubic Yards	Tons	Compacted Cubic Yards
<b>Trimble</b>						
Fly ash produced	146,995	127,822	252,605	219,657	230,769	200,669
Bottom ash produced	36,316	27,450	63,151	47,733	57,613	43,547
Gypsum produced	288,639	237,563	518,441	426,701	515,549	424,320
<b>Ghent</b>						
Fly ash produced	483,480	420,417	472,137	410,554	469,034	407,856
Bottom ash produced	120,315	90,941	118,034	89,217	117,258	88,630
Gypsum produced	910,354	749,262	934,427	769,076	922,862	759,557

	2013		2014		Jan-May 2015	
	Tons	Compacted Cubic Yards	Tons	Compacted Cubic Yards	Tons	Compacted Cubic Yards
<b>Trimble</b>						
Fly ash produced	236,658	205,790	218,011	189,575	100,992	87,819
Bottom ash produced	59,164	44,720	54,455	41,160	25,233	19,073
Gypsum produced	522,814	430,299	509,476	419,321	247,759	203,917
<b>Ghent</b>						
Fly ash produced	506,354	440,308	461,994	401,734	174,697	151,910
Bottom ash produced	126,588	95,683	115,499	87,301	43,674	33,011
Gypsum produced	1,063,395	875,222	815,949	671,563	309,213	254,496

Calculations were based on the following density

Compacted Density (Tons/Yd3)	
Bottom Ash	1.323
Fly Ash	1.15
Gypsum	1.215

**CCR Beneficial Use by Type and Use**

Plant	CCR	Use	2010		2011		2012	
			Compacted		Compacted		Compacted	
			Tons	Cubic Yards	Tons	Cubic Yards	Tons	Cubic Yards
Trimble	Bottom Ash	Shingle granules & blasting grit	3,442	2,602	100	76	2,507	1,895
Trimble	Bottom Ash	Ash pond construction	48,000	36,281	2,825	2,135		
Trimble	Bottom Ash	Anti-skid material						
Trimble	Fly Ash	Concrete	6,520	5,670	11,908	10,355	29,156	25,353
Trimble	Fly Ash	Cement kiln feed					43,980	38,243
Trimble	Gypsum	Wallboard	141,026	116,071	142,695	117,444	109,793	90,365
Trimble	Gypsum	Agriculture						
Ghent	Gypsum	Wallboard	218,541	179,869	287,876	236,935	324,802	267,327
Ghent	Fly Ash	Concrete						

Plant	CCR	Use	2013		2014		Jan-May 2015	
			Compacted		Compacted		Compacted	
			Tons	Cubic Yards	Tons	Cubic Yards	Tons	Cubic Yards
Trimble	Bottom Ash	Shingle granules & blasting grit	3,500	2,646	2,188	1,654		
Trimble	Bottom Ash	Ash pond construction						
Trimble	Bottom Ash	Anti-skid material	100	76	6,000	4,535		
Trimble	Fly Ash	Concrete	21,539	18,730	14,129	12,286	4,339	3,773
Trimble	Fly Ash	Cement kiln feed	130,762	113,706	123,017	106,971	41,444	36,039
Trimble	Gypsum	Wallboard	89,691	73,820	114,593	94,315	57,036	46,943
Trimble	Gypsum	Agriculture	15,210	12,519	5,047	4,154		
Ghent	Gypsum	Wallboard	308,448	253,867	285,306	234,820	118,773	97,756
Ghent	Fly Ash	Concrete					5,139	4,469

Calculations were based on the following density

Compacted Density (Tons/Yd3)	
Bottom Ash	1.323
Fly Ash	1.15
Gypsum	1.215

**CCR Beneficial Use by Type, Use, and Transportation Mode**

Plant	CCR	Use	2010				2011				2012									
			Compacted		Truck	Barge	Compacted		Truck	Barge	Compacted		Truck	Barge						
			Tons	Cubic Yards	Loads*	Loads**	Tons	Cubic Yards	Loads*	Loads**	Tons	Cubic Yards	Loads*	Loads**						
Trimble	Bottom Ash	Shingle granules & blasting grit	3,442	2,602	191					100	76	6					2,507	1,895	139	
		Ash pond																		
Trimble	Bottom Ash	construction	48,000	36,281	2,667					2,825	2,135	157								
Trimble	Bottom Ash	Anti-skid material																		
Trimble	Fly Ash	Concrete	6,520	5,670	261					11,908	10,335	476					29,156	25,353	1,166	
Trimble	Fly Ash	Cement kiln feed															43,980	38,243		28
Trimble	Gypsum	Wallboard	141,026	116,071	7,835					142,695	117,444	7,928					109,793	90,365	6,100	
Trimble	Gypsum	Agriculture																		
Ghent	Gypsum	Wallboard	218,541	179,869	12,141					287,876	236,935	15,993					324,802	267,327	18,045	

Plant	CCR	Use	2013				2014				Jan-May2015									
			Compacted		Truck	Barge	Compacted		Truck	Barge	Compacted		Truck	Barge						
			Tons	Cubic Yards	Loads*	Loads**	Tons	Cubic Yards	Loads*	Loads**	Tons	Cubic Yards	Loads*	Loads**						
Trimble	Bottom Ash	Shingle granules & blasting grit	3,500	2,646	194					2,188	1,654	122								
		Ash pond																		
Trimble	Bottom Ash	construction																		
Trimble	Bottom Ash	Anti-skid material	100	76	6					6,000	4,535	333								
Trimble	Fly Ash	Concrete	21,539	18,730	862					14,129	12,286	565					4,339	3,773	174	
Trimble	Fly Ash	Cement kiln feed	130,762	113,706						123,017	106,971						41,444	36,039		25
Trimble	Gypsum	Wallboard	89,691	73,820	4,983					114,593	94,315	6,366					57,036	46,943	1,706	
Trimble	Gypsum	Agriculture	15,210	12,519						5,047	4,154									10
Ghent	Gypsum	Wallboard	308,448	253,867	17,136					285,306	234,820	15,850					118,773	97,756	6,599	
Ghent	Fly Ash	Concrete															5,139	4,469	206	

\*Truck loads estimated at 18 tons per tri-axle and 25 tons per tractor-trailor

\*\*Barge loads estimated at 1,550 tons per barge

Calculations were based on the following density	
<b>Compacted Density (Tons/Yd3)</b>	
Bottom Ash	1.323
Fly Ash	1.15
Gypsum	1.215

## CCR Production by Type

Source: Response to SV DR 1-Question Nos. 3 and 4, Pfeiffer - Note \*2015 Annualized

Station	Fly Ash Production Tons	Bottom Ash Production Tons	Gypsum Production Tons	Total Production Tons	Fly Ash Beneficial Use Tons	Bottom Ash Beneficial Use Tons	Gypsum Beneficial Use Tons	Total Beneficial Use Tons	Remaining CCR	Year
Trimble	146,995	36,316	288,639	471,950	6,520	51,442	141,026	198,988	272,962	2010
Trimble	252,605	63,151	518,441	834,197	11,908	2,925	142,695	157,528	676,669	2011
Trimble	230,769	57,613	515,549	803,931	73,136	2,507	109,793	185,436	618,495	2012
Trimble	236,658	59,164	522,814	818,636	152,301	3,600	104,901	260,802	557,834	2013
Trimble	218,011	54,455	509,476	781,942	137,146	8,188	119,640	264,974	516,968	2014
Trimble	242,381	60,559	594,622	897,562	109,879	-	136,886	246,766	650,796	2015*
<b>Total</b>	<b>1,327,419</b>	<b>331,258</b>	<b>2,949,541</b>	<b>4,608,218</b>	<b>490,890</b>	<b>68,662</b>	<b>754,941</b>	<b>1,314,494</b>	<b>3,293,724</b>	

\*Annualized

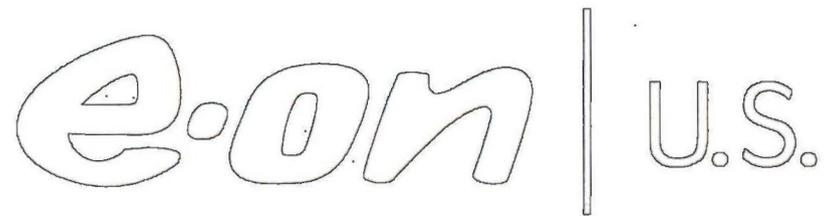
Station	Fly Ash Production Cubic Yards	Bottom Ash Production Cubic Yards	Gypsum Production Cubic Yards	Total Production Cubic Yards	Fly Ash Beneficial Use Cubic Yards	Bottom Ash Beneficial Use Cubic Yards	Gypsum Beneficial Use Cubic Yards	Total Beneficial Use Cubic Yards	Remaining CCR	Year
Trimble	127,822	27,450	237,563	392,835	5,670	38,883	116,071	160,624	232,211	2010
Trimble	219,657	47,733	426,701	694,091	10,355	2,211	117,444	130,010	564,081	2011
Trimble	200,669	43,547	424,320	668,536	63,596	1,895	90,365	155,856	512,680	2012
Trimble	205,790	44,720	430,299	680,809	132,436	2,722	86,339	221,497	459,312	2013
Trimble	189,575	41,160	419,321	650,056	119,257	6,189	98,469	223,915	426,141	2014
Trimble	210,766	45,775	489,401	745,942	95,549	-	112,663	208,212	537,730	2015*
<b>Total</b>	<b>1,154,279</b>	<b>250,385</b>	<b>2,427,605</b>	<b>3,832,269</b>	<b>426,863</b>	<b>51,900</b>	<b>621,351</b>	<b>1,100,114</b>	<b>2,732,155</b>	

\*Annualized

Station	Fly Ash Production Tons	Bottom Ash Production Tons	Gypsum Production Tons	Total Production Tons	Fly Ash Beneficial Use Tons	Bottom Ash Beneficial Use Tons	Gypsum Beneficial Use Tons	Total Beneficial Use Tons	Remaining CCR	Year
Ghent	483,480	120,315	910,354	1,514,149	-	-	218,541	218,541	1,295,608	2010
Ghent	472,137	118,094	934,427	1,524,658	-	-	287,876	287,876	1,236,782	2011
Ghent	469,084	117,258	922,862	1,509,204	-	-	324,802	324,802	1,184,402	2012
Ghent	506,354	126,588	1,063,395	1,696,337	-	-	308,448	308,448	1,387,889	2013
Ghent	461,994	115,499	815,949	1,393,442	-	-	285,306	285,306	1,108,136	2014
Ghent	419,273	105,538	742,111	1,266,922	12,334	-	285,055	297,389	969,533	2015*
<b>Total</b>	<b>2,812,322</b>	<b>703,292</b>	<b>5,389,098</b>	<b>8,904,712</b>	<b>12,334</b>	<b>-</b>	<b>1,710,028</b>	<b>1,722,362</b>	<b>7,182,350</b>	

\*Annualized

Station	Fly Ash Production Cubic Yards	Bottom Ash Production Cubic Yards	Gypsum Production Cubic Yards	Total Production Cubic Yards	Fly Ash Beneficial Use Cubic Yards	Bottom Ash Beneficial Use Cubic Yards	Gypsum Beneficial Use Cubic Yards	Total Beneficial Use Cubic Yards	Remaining CCR	Year
Ghent	420,417	90,941	749,262	1,260,620	-	-	179,869	179,869	1,080,751	2010
Ghent	410,554	89,217	769,076	1,268,847	-	-	236,935	236,935	1,031,912	2011
Ghent	407,856	88,630	759,557	1,256,043	-	-	267,327	267,327	988,716	2012
Ghent	440,308	95,683	875,222	1,411,213	-	-	253,867	253,867	1,157,346	2013
Ghent	401,734	87,301	671,563	1,160,598	-	-	234,820	234,820	925,778	2014
Ghent	364,584	79,226	610,790	1,054,601	10,726	-	234,614	245,340	809,261	2015*
<b>Total</b>	<b>2,445,453</b>	<b>530,998</b>	<b>4,435,470</b>	<b>7,411,922</b>	<b>10,726</b>	<b>-</b>	<b>1,407,432</b>	<b>1,418,158</b>	<b>5,993,764</b>	



Project Engineering

2011-2015 MTP

October 13, 2010

## Capital Review - Trimble County CCP BAP/GSP, Phase I Landfill, Transport & Holcim Barge Loading

Investment Cash (w/COR), \$Millions

### Sanction Comparison

	Total Projection	Sanction	Variance to Sanction
BAP/GSP	\$26	\$25	(\$1)
Phase I Landfill/Transport	\$129	\$73	(\$56)
Holcim Barge Loading	\$8	\$8	\$0

### MTP Comparison

	Pre-2010	2010	2011	2012	Total
BAP/GSP					
2010 MTP	\$8	\$17	\$0	\$0	\$25
2011 MTP	\$9	\$15	\$2	\$0	\$26
Variance to 2010 MTP	(\$1)	\$2	(\$2)	\$0	(\$1)
<b>Phase I Landfill</b>					
2010 MTP	\$2	\$0	\$32	\$7	\$42
2011 MTP	\$0	\$3	\$35	\$19	\$57
Variance to 2010 MTP	\$2	(\$2)	(\$3)	(\$12)	(\$15)
<b>Transport</b>					
2010 MTP	\$0	\$0	\$0	\$31	\$31
2011 MTP	\$0	\$0	\$0	\$71	\$71
Variance to 2010 MTP	\$0	\$0	\$0	(\$41)	(\$41)
Holcim Barge Loading					
2010 MTP	\$1	\$7	\$0	\$0	\$8
2011 MTP	\$0	\$1	\$7	\$0	\$8
Variance to 2010 MTP	\$1	\$6	(\$7)	\$0	\$0
<b>Total</b>					
2010 MTP	\$11	\$25	\$32	\$38	\$106
2011 MTP	\$9	\$19	\$44	\$91	\$163
Variance to 2010 MTP	\$2	\$6	(\$12)	(\$53)	(\$57)

### Key Messages

- All numbers are net IMPA/IMEA.
- Cost increases driven primarily by refinement of Transport System scope.

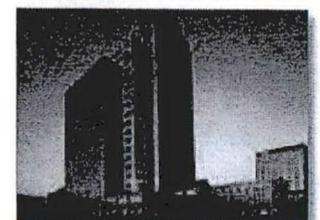
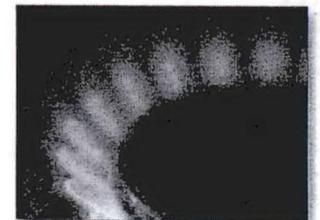
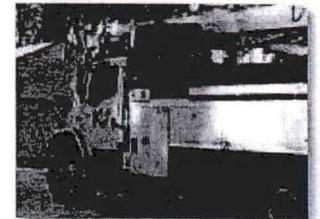
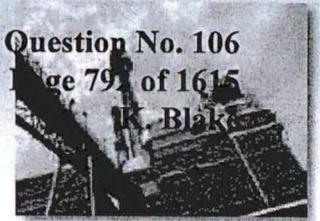


PPL companies

# Project Engineering

## 2012 – 2016 MTP

*October 13, 2011*



# Capital Review – Trimble County CCR

## Accrual Basis, \$Millions

### Authority/ECR Comparison

	Total Projection	Current Authority	ECR Filing	Variance to Authority	Variance to ECR Filing
BAP/GSP	\$30	\$30	\$25	\$0	(\$5)
Landfill Phase I/Fines & Transport	\$210	\$73	\$73	(\$137)	(\$137)
Landfill Phase II, III, & IV	\$186	\$0	\$0	(\$186)	(\$186)
Holcim	\$11	\$8	\$8	(\$3)	(\$3)
Total	\$436	\$110	\$106	(\$326)	(\$331)

### MTP Comparison

	Pre-2011	2011	2012	2013	2014	2015	2016	Post 2016	Total
<b>2011 MTP</b>									
BAP/GSP	\$25	\$2	\$0	\$0	\$0	\$0	\$0	\$0	\$26
Landfill Phase I	\$3	\$37	\$17	\$0	\$0	\$0	\$0	\$0	\$57
Fines & Transport	\$0	\$0	\$71	\$0	\$0	\$0	\$0	\$0	\$71
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$230	\$230
Holcim	\$1	\$7	\$0	\$0	\$0	\$0	\$0	\$0	\$8
Total 2011 MTP	\$29	\$45	\$89	\$0	\$0	\$0	\$0	\$230	\$393
<b>2012 MTP</b>									
BAP/GSP	\$21	\$9	\$0	\$0	\$0	\$0	\$0	\$0	\$30
Landfill Phase I	\$2	\$4	\$46	\$20	\$10	\$0	\$0	\$0	\$84
Fines & Transport	\$0	\$3	\$37	\$58	\$28	\$0	\$0	\$0	\$126
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$186	\$186
Holcim	\$1	\$2	\$8	\$0	\$0	\$0	\$0	\$0	\$11
Total 2012 MTP	\$24	\$19	\$92	\$78	\$37	\$0	\$0	\$186	\$436
<b>Variance to 2011 MTP</b>									
BAP/GSP	\$4	(\$8)	\$0	\$0	\$0	\$0	\$0	\$0	(\$3)
Landfill Phase I	\$1	\$32	(\$29)	(\$20)	(\$10)	(\$0)	(\$0)	\$0	(\$27)
Fines & Transport	(\$0)	(\$3)	\$34	(\$58)	(\$28)	\$0	\$0	\$0	(\$55)
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$44	\$44
Holcim	\$0	\$5	(\$8)	\$0	\$0	\$0	\$0	\$0	(\$3)
Total Variance to 2011 MTP	\$5	\$26	(\$3)	(\$78)	(\$37)	(\$0)	(\$0)	\$44	(\$43)

### Key Messages

- All numbers are net of IMPA/IMEA reimbursement.
- The 2012 MTP is based on the assumption the landfill and transport and treatment will be operational in late 2013.
- The increase over the ECR Filing is due refined engineering on the Transport System, however conceptual design will not be complete until late 2011.
- The 2012 MTP is based on 50% completion of the Landfill Detailed Design.



PPL companies

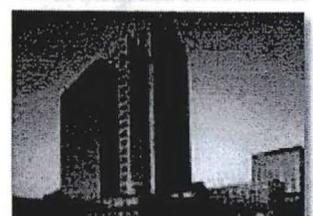
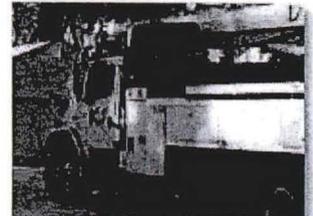
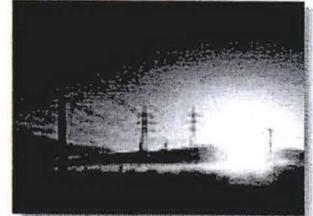
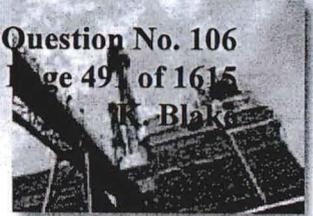


PPL companies

# Project Engineering

# 2013 Business Plan

*September 19, 2012*



# Capital Review – Trimble County CCR

## Accrual Basis, \$Millions

### Authority/ECR Comparison

	<u>Total Projection</u>	<u>Current Authority</u>	<u>ECR Filing</u>	<u>Variance to Authority</u>	<u>Variance to ECR Filing</u>
BAP/GSP	\$29	\$30	\$25	\$1	(\$4)
Landfill Phase I/Fines & Transport	\$185	\$73	\$73	(\$112)	(\$112)
Landfill Phase II, III, & IV	\$175	\$0	\$0	(\$175)	(\$175)
Holcim	\$9	\$9	\$8	\$0	(\$1)
Total	\$397	\$111	\$106	(\$286)	(\$292)

### Business Plan Comparison

	<u>Pre-2012</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>Post 2017</u>	<u>Total</u>
<b>2012 BP</b>									
BAP/GSP	\$30	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$30
Landfill Phase I	\$6	\$46	\$20	\$10	\$0	\$0	\$0	\$0	\$84
Fines & Transport	\$4	\$37	\$58	\$28	\$0	\$0	\$0	\$0	\$126
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$6	\$180	\$186
Holcim	\$3	\$8	\$0	\$0	\$0	\$0	\$0	\$0	\$11
Total 2012 BP	\$43	\$92	\$78	\$37	\$0	\$0	\$6	\$180	\$436
<b>2013 BP</b>									
BAP/GSP	\$28	\$1	\$0	\$0	\$0	\$0	\$0	\$0	\$29
Landfill Phase I	\$6	\$3	\$17	\$55	\$10	\$1	\$0	\$0	\$92
Fines & Transport	\$0	\$6	\$18	\$46	\$23	\$0	\$0	\$0	\$93
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$6	\$169	\$175
Holcim	\$2	\$7	\$0	\$0	\$0	\$0	\$0	\$0	\$9
Total 2013 BP	\$37	\$16	\$35	\$101	\$33	\$1	\$6	\$169	\$397
<b>Variance to 2012 BP</b>									
BAP/GSP	\$2	(\$1)	\$0	\$0	\$0	\$0	\$0	\$0	\$1
Landfill Phase I	\$1	\$43	\$3	(\$45)	(\$10)	(\$0)	\$0	\$0	(\$8)
Fines & Transport	\$3	\$31	\$40	(\$19)	(\$23)	\$0	\$0	\$0	\$33
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11	\$11
Holcim	\$1	\$1	(\$0)	\$0	\$0	\$0	\$0	\$0	\$2
Total Variance to 2012 BP	\$6	\$76	\$43	(\$64)	(\$33)	(\$0)	\$0	\$11	\$39

### Key Messages

- All numbers are net of IMPA/IMEA reimbursement.
- The increase over the ECR Filing is due to refined engineering on the Transport System.
- Permitting issues have delayed Phase I until at least mid-2013.
- Removed all contingencies relating to Phase I and Transport.



PPL companies

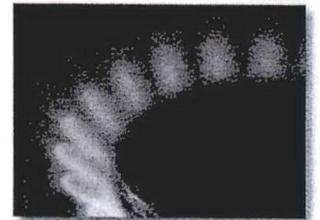
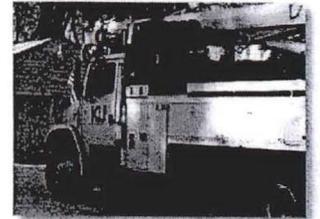
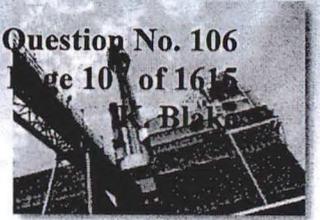


PPL companies

# Project Engineering

# 2014 Business Plan

*September 12, 2013*



# Capital Review – Trimble County CCR

## Accrual Basis, \$Millions

### Authority/ECR Comparison

	Total Projection	Current Authority	ECR Filing	Variance to Authority	Variance to ECR Filing
BAP/GSP	\$29	\$30	\$25	\$1	(\$4)
Landfill Phase I/Treatment & Transport	\$277	\$73	\$73	(\$205)	(\$205)
Landfill Phase II, III, & IV	\$148	\$0	\$0	(\$148)	(\$148)
Holcim	\$9	\$9	\$8	(\$0)	(\$1)
Total	\$463	\$111	\$106	(\$352)	(\$358)

### Business Plan Comparison

	Pre-2013	2013	2014	2015	2016	2017	2018	Post 2018	Total
<b>2013 BP</b>									
BAP/GSP	\$29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$29
Landfill Phase I	\$9	\$17	\$55	\$10	\$1	\$0	\$0	\$0	\$92
Treatment & Transport	\$6	\$18	\$46	\$23	\$0	\$0	\$0	\$0	\$93
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$174	\$175
Holcim	\$9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9
Total 2013 BP	\$53	\$35	\$101	\$33	\$1	\$0	\$0	\$174	\$397
<b>2014 BP</b>									
BAP/GSP	\$28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$29
Landfill Phase I	\$9	\$2	\$2	\$19	\$28	\$32	\$8	\$12	\$112
Treatment & Transport	\$7	\$1	\$1	\$29	\$86	\$42	\$0	\$0	\$165
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$148	\$148
Holcim	\$9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9
Total 2014 BP	\$53	\$3	\$3	\$48	\$113	\$74	\$9	\$160	\$463
<b>Variance to 2013 BP</b>									
BAP/GSP	\$1	(\$0)	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Landfill Phase I	\$0	\$16	\$53	(\$9)	(\$27)	(\$32)	(\$8)	(\$12)	(\$21)
Treatment & Transport	(\$1)	\$16	\$46	(\$6)	(\$86)	(\$42)	(\$0)	\$0	(\$72)
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$26	\$26
Holcim	(\$0)	(\$0)	\$0	\$0	\$0	\$0	\$0	\$0	(\$0)
Total Variance to 2013 BP	(\$0)	\$32	\$98	(\$15)	(\$113)	(\$74)	(\$8)	\$14	(\$66)

### Key Messages

- All numbers are net of IMPA/IMEA reimbursement.
- The increase over the ECR Filing is due to refined engineering on the Transport System, permit delays, new landfill layout, and project contingencies added.
- Permitting issues have delayed Phase I at least 2 years.



PPL companies

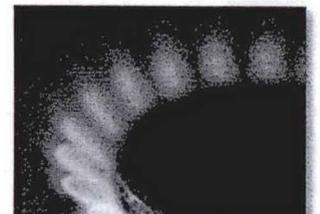
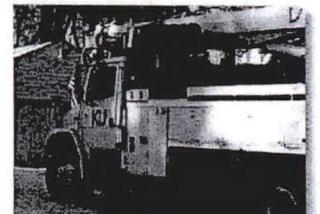
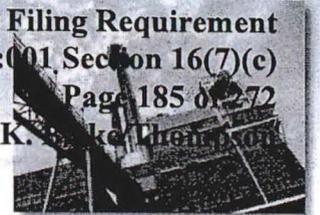


PPL companies

# Project Engineering

# 2015 Business Plan

*September 17, 2014*



## Capital Review – Trimble County CCR

### Accrual Basis, \$Millions

#### Authority/ECR Comparison

	Total Projection	Current Authority	ECR Filing	Variance to Authority	Variance to ECR Filing
BAP/GSP	\$28	\$30	\$25	\$2	(\$3)
Landfill Phase I/Treatment & Transport	\$322	\$76	\$73	(\$246)	(\$249)
Landfill Phase II, III, & IV	\$180	\$0	\$0	(\$180)	(\$180)
Holcim	\$9	\$9	\$8	\$0	(\$1)
Total	\$539	\$115	\$106	(\$424)	(\$433)

#### Business Plan Comparison

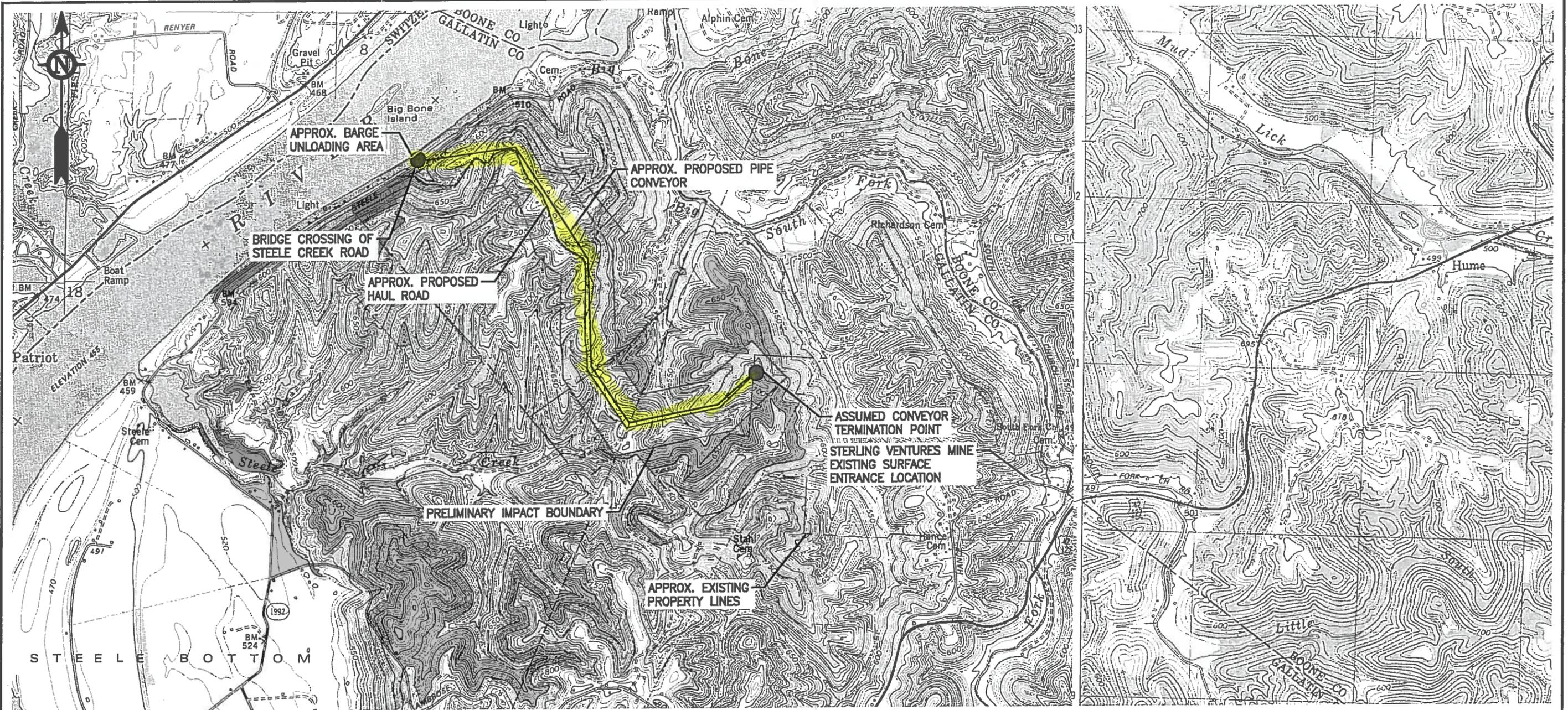
	Pre-2014	2014	2015	2016	2017	2018	2019	Post 2019	Total
<b>2014 BP</b>									
BAP/GSP	\$29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$29
Landfill Phase I	\$10	\$2	\$19	\$28	\$32	\$8	\$10	\$2	\$112
Treatment & Transport	\$8	\$1	\$29	\$86	\$42	\$0	\$0	\$0	\$165
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$148	\$148
Holcim	\$9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9
Total 2014 BP	\$57	\$3	\$48	\$113	\$74	\$9	\$10	\$150	\$463
<b>2015 BP</b>									
BAP/GSP	\$28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$28
Landfill Phase I	\$12	\$3	\$5	\$44	\$38	\$42	\$1	\$3	\$148
Treatment & Transport	\$7	\$0	\$20	\$80	\$44	\$23	\$0	\$0	\$174
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$180	\$180
Holcim	\$9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9
Total 2015 BP	\$57	\$3	\$25	\$124	\$81	\$65	\$1	\$183	\$539
<b>Variance to 2014 BP</b>									
BAP/GSP	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Landfill Phase I	(\$2)	(\$1)	\$14	(\$16)	(\$5)	(\$34)	\$9	(\$1)	(\$36)
Treatment & Transport	\$1	\$1	\$9	\$6	(\$2)	(\$23)	\$0	\$0	(\$9)
Landfill Phase II, III, Close & Cap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$31)	(\$31)
Holcim	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Variance to 2014 BP	(\$0)	(\$0)	\$23	(\$10)	(\$7)	(\$57)	\$9	(\$32)	(\$75)

#### Key Messages

- All numbers are net of IMPA/IMEA reimbursement.
- The increase over the ECR Filing is due to refined engineering on the Transport System, permit delays, new landfill layout, and project contingencies added.
- Permitting issues have delayed Phase I at least 2 years.



PPL companies



REFERENCE:  
 TOPOGRAPHIC MAPPING FROM USGS  
 7.5 MINUTE QUADRANGLES, BEDFORD  
 (1984), BETHLEHAM (1987), MADISON  
 EAST (1994), & MADISON WEST  
 (1980), KENTUCKY.

NOTE: IMPACT BOUNDARY INCLUDES AREA TO CONSTRUCT AND  
 OPERATE PIPE CONVEYOR AND HAUL ROAD.

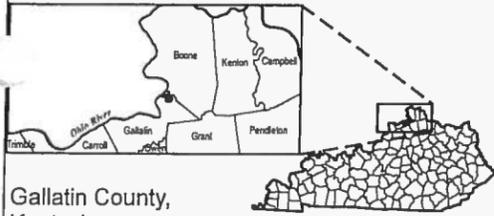
SCALE: 1" = 2000'



DRAWING TITLE: <b>FIGURE SV-2 - TOPOGRAPHIC MAP</b>		DRAWN BY: RJH		APPROVED BY: KCC	
TRIMBLE COUNTY GENERATING STATION LANDFILL SUPPLEMENT TO ALTERNATIVES ANALYSIS		LOUISVILLE GAS & ELECTRIC COMPANY (LG&E) TRIMBLE COUNTY GENERATING STATION TRIMBLE COUNTY, KENTUCKY		CHECKED BY: KPR	
PITTSBURGH OFFICE • 385 EAST WATERFRONT DRIVE, HOMESTEAD, PA 15120-5005		 		DATE: 11/26/2014	
		DRAWING NUMBER: SV-2		This drawing was produced with computer aided drafting technology and is supported by electronic drawing files. Do not revise this drawing via manual drafting methods.	
		SCALE: 1"=2000'		SHT. NO. ___ OF ___	
		GAI DRAWING FILE NO.		REVISION 	
				C100784-07-007-11-C-SV-2	



**PROJECT LOCATION**



**REFERENCE:**

Aerial imagery provided by Langair Mapping, World Imagery, 2012, obtained through ESRI World Imagery, Microsoft Corporation, accessed 09/20/14

Wetland and Surface Waters based on National Wetlands Inventory data obtained from U.S. Fish and Wildlife Service.

Topographic contours from National Elevation Dataset, provided by U.S. Geological Survey.

Perennial and intermittent streams are based on the National Hydrography Dataset produced by the U.S. Geological Survey and obtained through ESRI. Ephemeral streams interpolated from topographic data and aerial imagery.

Horizontal datum and projection is NAD 83, State Plane, Kentucky North, Feet Gnd System, Vertical datum is NGVD 88.

**LEGEND**

- Perennial Stream (based on Nat. Hydrography Data)
- Intermittent Stream (based on Nat. Hydrography Data)
- Ephemeral Stream (Estimated)
- Preliminary Impact Boundary
- Wetlands
- Surface Water



**FIGURE SV-1 - PLANIMETRIC MAP  
STERLING VENTURES SITE ALTERNATIVE**



**TRIMBLE COUNTY CCR  
LANDFILL PROJECT  
LG&E**



DRAWN BY: JGS  
CHECKED: KPR

DATE: 11/26/2014  
APPROVED: MAF



TABLE III.D-3  
Cost Comparison Summary of  
Sterling Ventures Mine Alternative<sup>1,2,3</sup>

CAPITAL COSTS	Unit Costs	Unit	Sterling Ventures Mine		
			Quantity	Cost	
<b>General Project / Permitting / Infrastructure Cost Impacts</b>					
1	Property Acquisition	\$ 12,000	Acre	307	\$ 3,684,000
2	Clearing, Grubbing, and Site Preparation	\$ 17,000	Acre	290	\$ 4,830,000
3	Large Utility Line Relocation (345 kV Single Circuit)	\$ 880	LF	0	\$ -
4	Fencing	\$ 50	LF	25,833	\$ 1,291,650
5	Environmental Wetland Mitigation (cost based on adjusted mitigation units)	\$ 72,000	Acre	0.67	\$ 48,240
6	Environmental Stream Mitigation (cost based on adjusted mitigation units)	Varies	LF	15,521	\$ 3,274,245
7	Cultural Resources	Varies	EA	1	\$ 1,131,000
8	Indiana Bat Mitigation <sup>4</sup>	\$ 5,338	Acre	290	\$ 1,548,020
9	Road Relocation (County Road)	\$ 350	LF	0	\$ -
10	Road Relocation (State Road)	\$ 400	LF	0	\$ -
	CCR Transportation			Subtotal	\$ 15,907,155
11	Pipe Conveyor Transport (North Ridge Top)	\$ 2,150	LF	10,667	\$ 22,877,050
12	Pipe Conveyor Transport (Opden Ridge Road Path)	\$ 2,425	LF	0	\$ -
13	Pipe Conveyor Transport (South Ridge Top)	\$ 3,125	LF	0	\$ -
14	Transfer Station	\$ 250,000	EA	2	\$ 500,000
15	Haul Road - Off Landfill	\$ 1,600	LF	12,700	\$ 20,320,000
16	Bridge - Large (36 FT High, 440 FT long, 60 FT wide)	\$ 4,900,000	EA	0	\$ -
17	Bridge - Medium (200 FT long, 60 FT wide)	\$ 1,750,000	EA	1	\$ 1,750,000
	Landfill Preparation			Subtotal	\$ 45,547,050
18	Perimeter Collection Channel - Fabric Form, 6-10' Bottom Width	\$ 75.00	LF	0	\$ -
19	Upslope Drainage Diversion Channel - Fabric Form, 1-5' Bottom Width	\$ 50.00	LF	0	\$ -
20	Subgrade Preparation - General Earthwork - Soil Inside Footprint (3000 ft R.T.)	\$ 5.65	CY	0	\$ -
21	Subgrade Preparation - General Earthwork - Rock Blasting (3000 ft R.T.)	\$ 21.72	CY	0	\$ -
22	Subgrade Preparation - Borrow or Spilling Excess Material - Soil - 1/2 Mile	\$ 5.65	CY	0	\$ -
23	Subgrade Preparation - Borrow or Spilling Excess Material - Soil - 1 Mile	\$ 5.94	CY	0	\$ -
24	Subgrade Preparation - Borrow or Spilling Excess Material - Soil - 2 Miles	\$ 6.64	CY	0	\$ -
25	Subgrade Preparation - Borrow or Spilling Excess Material - Soil - 4 Miles	\$ 8.36	CY	0	\$ -
26	Landfill Composite Liner System - 0.5 ml RT Protective Cover/4 ml RT Drainage Layer	\$ 91,000	Acre	0	\$ -
27	Landfill Composite Liner System - 1.5 ml RT Protective Cover/4 ml RT Drainage Layer	\$ 93,000	Acre	0	\$ -
28	Landfill Composite Liner System - 0.5 ml RT Protective Cover/2 ml RT Drainage Layer	\$ 88,000	Acre	0	\$ -
29	Groundwater Underdrain Drainage Pipes	\$ 5,000	Acre	0	\$ -
30	Leachate Collection System Drainage Pipes	\$ 15,000	Acre	0	\$ -
	ES/SWM Pond and Leachate Pond <sup>5</sup>			Subtotal	\$ -
31	Large ES/SWM Pond and Leachate Pond - Earthwork and Liner System (~35 acre-ft)	\$ 3,000,000	EA	0	\$ -
32	Medium ES/SWM Pond and Leachate Pond - Earthwork and Liner System (~20 acre-ft)	\$ 2,000,000	EA	0	\$ -
	Landfill Cap Cover System			Subtotal	\$ -
33	Final Cover System - 2 Mile RT (12 Inches Clay, 12 Inches Topsoil)	\$ 29,000	Acre	0	\$ -
34	Final Cover System - 4 Mile RT (12 Inches Clay, 12 Inches Topsoil)	\$ 33,000	Acre	0	\$ -
	Barge Transport			Subtotal	\$ -
35	Barge Loading Facility	\$ 14,200,000	EA	1	\$ 14,200,000
36	Barge Unloading Facility	\$ 16,100,000	EA	1	\$ 16,100,000
37	Ancillary Costs (Critical Spares and Office/Warehouse Space)	\$ 1,600,000	EA	1	\$ 1,600,000
	Additional Capital Costs			Subtotal	\$ 31,900,000
38	Additional Capital Costs <sup>6</sup>				
	LG&E Overheads and Engineering Support	\$ 6,880,000	LUMP	1	\$ 6,880,000
	Intermediate Cover and Benches	\$ -	LUMP	1	\$ -
	QA/QC (Subgrade, Liner, Final Cover System)	\$ -	LUMP	1	\$ -
	Borrow Area Roads and On-Landfill Haul Roads	\$ -	LUMP	1	\$ -
				Subtotal	\$ 6,880,000
	<b>Capital Total</b>				<b>\$ 100,234,205</b>
<b>OPERATION AND MAINTENANCE (O&amp;M) COSTS</b>					
<b>Landfill / Pipe Conveyor Operating Costs</b>					
39	Hauling - 1 Mile Round Trip (22 CY on landfill/private road)	\$ 2.56	CY	0	\$ -
40	Hauling - 2 Mile Round Trip (22 CY on landfill/private road)	\$ 3.46	CY	0	\$ -
41	Hauling - 3 Mile Round Trip (22 CY on landfill/private road)	\$ 4.18	CY	0	\$ -
42	Hauling - 30 Mile Round Trip (18 CY, 35 MPH avg)	\$ 11.55	CY	0	\$ -
43	Offsite CCR Disposal - Tipping Fee	\$ 10.15	TON	39,393,900	\$ 399,848,085
44	Pipe Conveyor Cost of Operation	\$ 0.20	CY	33,670,000	\$ 6,734,000
	Barge Transport			Subtotal	\$ 406,582,085
45	Barge Loading and Unloading Operations Cost	\$ 1,100,000	YR	37	\$ 40,700,000
46	Barge Transportation Costs	\$ 2.61	TON	39,393,900	\$ 102,818,079
	Additional O&M Costs			Subtotal	\$ 449,518,079
47	Additional O&M Costs <sup>6</sup>				
	CCR Placement, Compaction, Survey, and QA/QC	\$ -	LUMP	1	\$ -
	Cleanout / Maintenance (Haul Roads, Ponds, LCS, Underdrain, and Landfill)	\$ 7,680,000	LUMP	1	\$ 7,680,000
	Dust Control	\$ 5,750,000	LUMP	1	\$ 5,750,000
				Subtotal	\$ 13,430,000
	<b>O&amp;M Total</b>				<b>\$ 462,948,079</b>

CASE STUDY:	Sterling Ventures Mine
STORAGE CAPACITY (MCY):	33.7
CAPITAL COST (\$1 MILLION):	\$100
O&M COST (\$1 MILLION):	\$564
TOTAL CAPITAL AND O&M COST (\$1 MILLION):	\$664
(\$/CY):	\$19.71

NOTES:

- Costs are for comparison of case studies only as described in Section III of report. Contingencies were not applied except as noted in Appendix III.D-1.
- Costs were developed including only line items which are anticipated to be significantly different between case studies. "Common Cost" items anticipated to be similar in cost for all case studies are not included (e.g. project management, or the conditioning and treatment of CCR prior to transit from TC Station). Minor construction and operations costs are not included due to the conceptual nature of the design. Examples of these cost items include: minor utility line relocations, minor erosion and sedimentation/stormwater management controls, surface and groundwater testing, mowing.
- Costs are calculated on 2012 dollar basis except as noted in Appendix III.D-1. No inflation or discount rates included.
- Assumes average cost (\$5,338 per acre) for Indiana Bat Mitigation as described in Support Document III.D-1-4.
- Does not include costs for leachate treatment or transport system. See Appendix III.D-1 for more information.
- Additional Capital and O&M costs include costs previously omitted from (GAI 2014) cost analysis but added to the Case Study analysis due to comparison of landfill vs. non-landfill (e.g. mine) Site Alternatives. See Appendix III.D-1 for more information.



Sterling – Exhibit 04



**Kentucky Bar Association**  
514 West Main Street  
Frankfort, Kentucky 40601-1812

**Ethics Hotline Committee**

**(502) 564-3795/(502) 564-3225 (FAX)**

September 10, 2015

Honorable John W. Walters, Jr.  
376 South Broadway  
Lexington, Kentucky 40508

Dear Mr. Walters,

This letter is in response to your recent phone call and correspondence received from you dated September 10, 2015, copy attached. This advice is provided to you based upon your representation that your request pertains to a "professional act contemplated by you" within the meaning of SCR 3.530(1), that you are a licensed attorney in Kentucky and that the conduct at issue does not pertain to the propriety of past conduct or that of another attorney.

You have requested advice regarding your professional responsibilities, as a member of the Kentucky Bar Association, relating to to whether you may act as both the attorney and a witness in a proceeding before the Kentucky Public Service Commission (the "Commission") consistent with SCR 3.130(3.7) **Lawyer as witness**.

As your letter indicates, you are both the Chief Financial Officer ("CFO") and General Counsel for Sterling Ventures, LLC. As General Counsel, you filed a Complaint with the Commission, have responded to data requests from opposing parties, propounded data requests to opposing parties and pre-filed testimony, in anticipation of a hearing before the Commission scheduled for September 14, 2015. As CFO, you have "reviewed multiple financial analyses of the proposed cost of the Trimble Landfill, and prepared financial comparisons to an alternative using an underground limestone mine owned by

Sterling versus the landfill." As CFO, you have also pre-filed your testimony relating to the financial analyses, and have responded to data requests from opposing parties. You further indicate that no objection has been raised by any party to the proceeding, including the Commission, which questions your dual participation as both counsel and witness.

Finally, you state that by reason of your extensive and significant involvement with the issues before the Commission, both as counsel and analyst/witness, it would be a hardship for your client if you could not perform both roles. In addition, you have added co-counsel to help when and as needed, and you intend to "confirm with the Commission that (you) will be serving as both advocate and witness at the hearing."

The purpose of SCR 3.130(3.7) **Lawyer as witness** is to guard against possible juror confusion about the lawyer's role, particularly when testifying. This concern does not exist in a hearing before the Commission where the triers of fact are lawyers or, at the least, are experienced, sophisticated and competent professionals who are assisted in their deliberations by an array of support staff including other lawyers. Nor would there appear to be any prejudice to opposing counsel, all of whom are equally sophisticated, competent and experienced practitioners before the Commission. More importantly, your practice of this case clearly indicates that you are participating as both counsel and witness without any objection from either the Commission or opposing parties.

In addition to the reasons above, the "hardship" exception at paragraph (a) (3) of the Rule seemingly applies because of your lengthy and substantial involvement in all aspects of the case. The fact of the matter is that you know the case better than anyone else. In my opinion, it would be unreasonably prejudicial to expect your client to "re-tool" its case so deep into its preparation.

For all of these reasons, it is my opinion that the dual participation is acceptable and does not offend the Rule.

I hope that this advice has been useful. Please note that this opinion is limited to the scope granted pursuant to SCR 3.530 that provides that "no attorney shall be disciplined for any professional act on his part performed in compliance with an opinion furnished to him on his petition, provided his petition clearly, fairly, accurately and complete states his contemplated professional act."

This opinion is not an expression of law; it is not binding on any court (or administrative tribunal); it is of limited use in that it is only directed to you and to your firm, and it does not reflect the opinion of the Kentucky Bar Association. Further, this opinion is

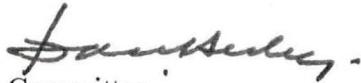
confidential and may not be used as authority for any purpose other than as provided by SCR 3.530.

A confidential copy of this opinion will be sent to the Chair of the KBA Ethics Committee for general information regarding the operation of the Hotline, and to determine if, in the future, it is appropriate for the KBA Ethics Committee to consider the subject of your inquiry for a formal opinion of the entire Committee. A confidential copy will also be sent to the KBA's Executive Director for statistical informational purposes. A copy will not be sent to the KBA's Office of Bar Counsel. The Office of Bar Counsel will not be aware of this opinion unless some form of complaint or other information arises within the scope of Bar Counsel's responsibilities. Therefore, it is important that you keep a copy of the opinion for your personal protection, if the need should arise.

Finally, members of the Hotline are granted immunity and are not subject to any action in their role as a member of the Hotline.

Please contact me if you have any questions about this opinion.

Sincerely,



KBA Ethics Committee  
Dale W. Henley  
3513 Castlegate Wynd  
Lexington, Kentucky 40502

Cc: KBA Executive Director  
KBA Ethics Committee Chair



**STERLING  
VENTURES**

September 10, 2015

Dale W. Henley, Esq.  
3513 Castlegate Wynd  
Lexington, KY 40502

*Hand Delivered*

Re: SCR 3.130 (3.7) Lawyer as Witness

Dear Mr. Henley:

I am writing to request an informal ethics opinion on my ability to act as both an advocate at a September 14, 2014 hearing before the Kentucky Public Service Commission (the "PSC"), and a witness on behalf of my employer/client in that hearing.

I am the General Counsel and Chief Financial Officer for Sterling Ventures, LLC ("Sterling"), a single member Kentucky limited liability company. As General Counsel, I provide legal advice and representation for the Company in legal matters. As Chief Financial Officer, I oversee the Company's financial, business and accounting matters.

On behalf of Sterling, I filed a Complaint with the PSC against Kentucky Utilities Company regarding a Certificate of Public Convenience and Necessity for the Trimble Landfill Project. In that Complaint, and in subsequent filing in this matter, I have consistently identified myself as Sterling's General Counsel and CFO. After filing the Complaint, I retained, on behalf of Sterling, Dennis Howard, II Esq. to assist me in this matter. In the notification of Mr. Howard's entry into the case, he was identified as co-counsel.

A key issue before the PSC involves whether the Trimble Landfill Project is the least cost alternative to deal with coal combustion residuals. In connection with that question, in my role as CFO for Sterling, I have prepared and reviewed multiple financial analyses of the proposed cost of the Trimble Landfill, and prepared financial comparisons to an alternative using an underground limestone mine owned by Sterling versus the landfill.

I have entered pre-filed testimony in the matter with regard to Sterling's position, as well as responded to data requests from both the PSC Staff and KU/LG&E. I have also propounded data requests to KU/LG&E on behalf of Sterling. As of the date of this letter, KU/LG&E has not expressed any opposition to my dual roles in the matter.

Another key issue in the case is whether new regulations recently issued by the EPA regarding beneficial use of coal combustion residuals allow Sterling's proposed alternative. My

September 15, 2015

Page 2

pre-filed testimony and responses to data requests have addressed Sterling's legal position on this issue.

At the upcoming hearing before the PSC on this matter, I am planning to question witnesses offered by KU/LG&E as Sterling's legal counsel, and serve as a witness on behalf of Sterling with respect to my analysis of the economic and legal issues raised in the matter.

I do not believe my dual role in this matter will mislead the PSC as the tribunal. I also believe that KU/LG&E understand my dual role in this matter, and will not be prejudiced at the upcoming hearing, given the sophistication, experience and expertise of KU/LG&E and their counsel in practice and dealings before the PSC. Finally, my inability to act in a dual role at the hearing would have a significant adverse impact on Sterling.

Prior to the hearing, I plan to confirm with the Commission that I will be serving as both advocate and witness at the hearing.

I am requesting your informal opinion with respect to my dual role as advocate and witness in the above matter, in light of SCR 3.130.

Thank you for your consideration and advice on this issue. Should you need any additional information, please do not hesitate to call me at (859) 621-3990.

Sincerely,

John W Walters, Jr  
KY Bar #81801



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

JUL 11 2014

Colonel Luke T. Leonard  
District Engineer  
Louisville District Corps of Engineers  
Attn: Kimberley J. Simpson  
CELRL-OP-FS, Room 752  
P.O. Box 59  
Louisville, Kentucky 40201-0059

Subject: Louisville Gas & Electric Company  
Coal Combustion Residuals Landfill, Trimble County, Kentucky LRL-2010-711

Dear Colonel Leonard:

The U.S. Environmental Protection Agency, Region 4, has conducted a review of the public notice and the additional materials submitted by the Louisville Gas & Electric Company (LG&E) in support of its application for a Clean Water Act (CWA), Section 404 permit. The public notice from the U.S. Army Corps of Engineers (Corps), Louisville District announcing this project was dated May 23, 2014. The EPA received an advance copy of the public notice approximately one week prior to that date and on May 19, 2014, Ms. Lee Anne Devine of your staff approved the EPA's request to extend the comment period for this project to July 14, 2014. We are grateful for the additional time to review the voluminous materials provided by LG&E and hope that the following comments are useful to the Louisville District during its own review of this project.

The LG&E proposes to construct a coal combustion residuals (CCR) landfill in waters of the United States to accommodate the CCR produced at its existing Trimble County Generating Station on the Ohio River in Trimble County, Kentucky. According to project documents, the LG&E generates approximately 910,000 cubic yards of CCR annually at this facility, and design plans for the proposed landfill are based on providing enough storage capacity to accommodate 33.4 million cubic yards of CCR over a 37 year timeframe. The proposed project, which includes a 189-acre landfill and an additional 651 acres of support facilities and operations areas, will directly impact approximately 87,254 linear feet of stream, 2.6 acres of wetland and 0.5 acres of ponds. These stream impacts are a 60 percent increase over the linear length of stream impacts associated with this project as it was formerly proposed in 2011-2012.

The comments provided herein identify the EPA's views regarding compliance with the CWA Section 404(b)(1) Guidelines (40 C.F.R. Part 230) (Guidelines). The Guidelines provide the substantive environmental criteria against which Section 404 permit applications are evaluated. For reasons outlined below, the EPA has concerns that the project, as currently proposed, may not comply with the Guidelines.

**Alternatives Analysis – 40 C.F.R. Part 230.10(a)**

The Guidelines state that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." The permit issued by the Corps should reflect the least environmentally damaging practicable alternative. Furthermore, the Guidelines

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*Sterling – Exhibit 06  
Accepted into Record as Exhibit 11*

recognize that the rigor of analysis should be commensurate with the severity of potential adverse impacts on the aquatic ecosystem. Based on our review of available monitoring data from the project area, the EPA believes that the aquatic resources proposed to be impacted as a result of this project may be among the highest quality headwater stream resources in this region of the Commonwealth.

We do not believe that the applicant has adequately demonstrated that the proposed alternative to fill nearly 17 miles of headwater stream represents the least environmentally practicable alternative, consistent with the Guidelines. The alternatives analysis should more clearly and completely describe the process by which the least environmentally damaging practicable alternative was identified. The information provided to date appears to rely considerably on undocumented or undefined cost information and with very little to no comparative analysis of the range of environmental impacts associated with different alternatives that were considered or estimated compensatory mitigation costs.

"Unreasonable expense" is frequently cited as reason for removing sites from further analysis without thorough documentation and often without even a defined threshold for this criterion. "Unreasonable expense" is cited as partial or primary cause for elimination of 17 site alternatives in the first phase (i.e. Cut I) of the multi-phased alternatives analysis. Furthermore, factors related to "Cost Impacts" comprise 40 percent of the criteria evaluated in the second phase (i.e. Cut II), yet the Cut II analysis is entirely hypothetical and fails to quantify thresholds or otherwise include any objective rationale for elimination of alternatives evaluated therein. It is not until the third phase of the alternatives analysis (i.e. Cut III) that cost is objectively addressed. "Excessive cost" is defined in Cut III as "*any cost per cubic yard greater than twenty percent of the lowest cost Alternative's cost per cubic yard.*" (pg. 20, Alternatives Analysis Report). However, it is unclear whether "excessive cost" in Cut III is synonymous with "unreasonable cost" in Cut I and Cut II, but this is somewhat implausible given that the former is defined on a Cut III economic analysis and no costs at all are discussed in Cut I and Cut II.

We note that 13 of the 15 alternatives evaluated in Cut III of the alternative analysis are eliminated "based on cost and logistical analysis." However, even the cost threshold defined here in Cut III is confounding, because it is based on a landfill site alternative that is dismissed for logistical and scheduling concerns. If this site is dismissed due to such concerns, should it viably be used to establish the cost threshold upon which other sites are evaluated in the same phase of the analysis? The fact that numerous alternative sites were eliminated during Cuts I and II without provision of pertinent economic data, defined cost thresholds, or consideration of associated environmental impacts is of additional concern to the EPA.

The EPA believes that potentially feasible alternatives may have been eliminated in the alternatives analysis based on incompletely vetted economic considerations and that these sites warrant closer scrutiny. For example, the degree of impacts to jurisdictional waters of the United States is not a criterion used in the alternatives analysis until the final phase of the evaluation (Cut IV) when only landfills cited in Ravine B remain under consideration. The alternatives evaluated in Cut IV are materially equivalent in location, costs, and impacts. Both lie in Ravine B, both have nearly identical project costs (i.e. \$7.47 vs \$7.48 per cubic yard of ash stored) and both have the same anticipated impacts to waters of the United States. Considering that anticipated aquatic resources impacts in Ravine B are significant and the resources of high quality (further addressed below), mitigation costs for such impacts to waters of the United States will likely be significant. The EPA believes it is necessary to include compensatory mitigation costs throughout the alternatives analysis where project cost is a criterion for evaluation of practicable alternatives.

The permit application announces the LG&E's proposal to pay an in-lieu-fee (ILF) to the Kentucky Department of Fish and Wildlife Resources ILF Program to satisfy compensatory mitigation needs for the proposed project. Although no specific monetary amount was specified for this ILF payment, the EPA estimates that, based on the LG&E's own assessment of stream conditions in Ravine B and the ILF calculator on the Corps' web site, the project as presently proposed could require an ILF payment of approximately \$18 million. This would equate to \$0.54 per cubic yard of ash over the proposed life of the

landfill. As noted previously in this letter, environmental impacts to waters of the United States were not used as an evaluation criterion until Cut IV of the analysis and project cost estimates (excluding mitigation costs) were not provided until Cut III. If compensatory mitigation costs were included throughout the tiered evaluation of alternatives instead of only the final stage thereof, alternatives with fewer adverse impacts on jurisdictional waters of the United States and commensurately less mitigation cost may be more attractive from an economical perspective and thereby exert some influence on the company's determination of "unreasonable expense" during the initial phases of its alternatives analysis.

**Alternative 5B (Lee Bottom) is one example where additional economic analysis may be warranted.** This alternative is dismissed as a practicable alternative in Cut I of the alternatives evaluation based solely on undefined expenses related to barge transport, loading and off-loading facilities. According to project documentation, Alternative 5B (Lee Bottom) can accommodate the entire landfill design volume of 33.7 million cubic yards of CCR for long-term storage. A typical barge can hold approximately 2,400 cubic yards of material, which is the approximate daily volume of CCR produced at the Trimble County Generating Station. Considering that even the company's preferred alternative will require considerable construction costs for arguably similar infrastructure as that necessary at any CCR landfill (e.g. conveyors, haul roads, other equipment), it is uncertain whether infrastructure needs unique to a site such as Lee Bottom (e.g. barge unloading facilities) grossly exceed other costs unique to the preferred alternative in Ravine B (e.g. compensatory mitigation costs).

While the EPA concurs with the position, taken in the LG&E's alternatives analysis, that sites located within the 100-year floodplain of the Ohio River are impracticable alternatives, the EPA believes that all potentially feasible alternatives that avoid or minimize impacts to high quality jurisdictional waters should be vetted in detail, including consideration of compensatory mitigation costs and the impacts thereof on the economic evaluation of alternatives. In addition, criterion used during Cut II of the alternatives analysis should be more objectively defined. Alternative 5B (Lee Bottom) is one specific example where a more objective and complete economic analysis is needed, but there may be others.

#### **Baseline Aquatic Resource Characterization**

The present CWA 404 permit application fails to acknowledge the March 2013 field sampling effort in Ravine B where the proposed landfill would be located. That sampling was conducted by biologists from the Kentucky Division of Water (KDOW) and consultants for the LG&E. Based on KDOW's analysis, the Ravine B stream biological community was dominated by sensitive taxa, included numerous rare or uncommon taxa and scored "Excellent" on the Kentucky Macroinvertebrate Bioassessment Index (KMBI). This assessment was consistent with the conclusion reached by the LG&E's former consultant who sampled the stream six years earlier (Mactec, 2007).

However, neither the KDOW, nor the EPA, has any record that the LG&E's consultants ever provided a data summary or interpretive report based on their collection of biological samples concurrent with the KDOW's own sampling effort in March 2013. Instead, the present permit application evaluates stream quality based solely on physical stream habitat subjectively evaluated "over the course of a two-year period from June 2011 through November 2013." While the present permit application includes the Mactec (2007) report as Attachment K in Volume III of the permit application, the text of the alternatives analysis downplays the significance of the Mactec conclusions by referring to a subsequent 2012 water quality assessment compiled by Civil & Environmental Consultants, Inc. (CEC). The latter report however, provides little relevant biological information on the Ravine B stream(s), because biological sampling was conducted outside of the KDOW's required sample index period. In fact, the 2012 report itself notes, "*In consideration of the biological sampling being conducted outside of the index period for this study, CEC determined that computing MBI scores, in accordance with the biological metrics and scoring criteria outlined in the KMBI manual (KDOW 2003), was impractical.*" (CEC, 2012).

In spite of the relative paucity of biological data provided in the present permit application, the LG&E considers slightly over one-half of the total 16.5 miles of streams proposed to be impacted as "excellent" condition. Approximately 88 percent of intermittent streams in the Ravine B watershed are reported as "excellent" and 12 percent is considered in "average" condition. Furthermore, 82 percent of ephemeral channels in the Ravine B watershed are reported to be in "average" or "poor" condition, with the remainder rated as "excellent."

In light of the quantitative evidence provided by Mactec in 2007, and the KDOW in 2013, the EPA believes that the quality of the unnamed mainstem tributary stream in Ravine B is equivalent to reference stream conditions, as defined in the Commonwealth's categorization criteria for "Exceptional Waters" in its antidegradation regulations at 401 KAR 10:030 Section 1(2)(a):

*(a) Categorization criteria. A surface water shall be categorized as an exceptional water if any of the following criteria are met:*

*1. Surface water is designated as a Kentucky Wild River and is not categorized as an outstanding national resource water;*

*2. Surface water is designated as an outstanding state resource water as established in 401 KAR 10:031, Section 8(1)(a)1, 2, and 3 and Section 8(1)(b);*

*3. Surface water contains either of the following:*

*a. A fish community that is rated "excellent" by the use of the Index of Biotic Integrity included in Development and Application of the Kentucky Index of Biotic Integrity (KIBI), 2003; or*

*b. A macroinvertebrate community that is rated "excellent" by the Macroinvertebrate Bioassessment Index included in "The Kentucky Macroinvertebrate Bioassessment Index," 2003; or*

*4. Surface water in the cabinet's reference reach network.*

According to the KDOW, there are only 13 "reference" quality stream segments recognized in the Outer Bluegrass ecoregion of Kentucky (Ecoregion 71d) where the proposed project lies (C.Brantley, *pers. comm.*, July 7, 2014). Of those 13, only seven are headwater streams, like Ravine B, that drain a watershed of five square miles or less. The rarity of high quality reference streams in this ecoregion heightens the importance of pursuing all possible measures to avoid impacting such streams and requires regulatory diligence to ensure that such efforts are objective, quantifiable and thorough.

## **Conclusion**

In conclusion, the EPA believes that the project, as proposed, may not comply with Guidelines. The EPA finds this project may result in substantial and unacceptable adverse impacts on aquatic resources of national importance. Therefore, we recommend denial of this project as currently proposed. As summarized above, a significantly expanded alternatives analysis is necessary to more thoroughly and objectively evaluate all alternatives to the proposed CCR landfill in the unnamed tributary of Corn Creek, with particular emphasis on those alternatives previously dismissed due to undefined and undocumented economic considerations. This letter follows the field level procedures outlined in the August 1992 Memorandum of Agreement between the EPA and the Department of the Army, Part IV, paragraph 3(a) regarding § 404(q) of the CWA.

I want to thank you and your staff for your cooperation and willingness to address our concerns. We look forward to working closely with you and the applicant to resolve the concerns outlined above. If you have any questions, please call me at (404) 562-9345 or Mr. Eric Somerville at (706) 355-8514 of my staff.

Sincerely,



James D. Giattina  
Director  
Water Protection Division

cc: Ms. Lee Anne Devine, U.S. Army Corps of Engineers Louisville District

Mr. Lee Andrews, U.S. Fish and Wildlife Service

Mr. Peter Goodman, Kentucky Division of Water

# Practical techniques to improve the air quality in underground stone mines

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**ABSTRACT:** Researchers working for the National Institute for Occupational Safety and Health (NIOSH) at the Pittsburgh Research Laboratory are developing ways to protect the health of miners. Part of that effort is devoted to improving the air quality in underground stone mines by developing ventilation techniques that can be used in these types of operations. The air quality in these large opening nonmetal mines can be significantly improved by using diesel particulate matter (DPM) controls along with sufficient ventilation quantities to remove contaminants. Practical methods of ventilating these underground stone mines can be accomplished by using mine layouts that course and separate ventilation air through the use of stoppings. The design, construction, and maintenance of effective stoppings in large openings have been a real challenge to mine operators. Several different types of stoppings have and can be used for this application. The choice of stopping design, material used, and construction techniques should be dependent upon a number of factors such as the intended life and effectiveness desired.

## 1 INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH) conducts research into various mining health and safety issues to provide the basis for improvements to U.S. miners' health and safety. As part of this role, researchers at the NIOSH Pittsburgh Research Laboratory (PRL) are developing methods and technologies to improve the air quality for large opening underground metal/nonmetal mines. This paper discusses NIOSH/PRL research dealing with ventilation techniques that will be applicable to large opening mining operations. Furthermore, the paper describes concepts that can be incorporated into the overall ventilation design of these mines. The most common underground large opening mines are underground stone mines followed by underground rock salt mines. Surveillance data from the Mine Safety and Health Administration (MSHA) for the year 2000 shows that there were 162 active nonmetal underground mines in the United States, of which, 117 were stone mines and 13 were rock salt mines.

The continuing and emerging air quality issues in metal/nonmetal mines include silica dust, diesel particulate, fog and fumes. The concentration of these contaminants can be effectively reduced by utilizing various control technologies along with adequate air quantities and proper ventilation methods. A growing concern by various health agencies is the health risks

associated with exposure to diesel particulate matter (DPM). It is generally accepted by various regulatory agencies, ACGIH (2001), NIOSH (1988), EPA (2000), and confirmed by the United States Congress, as to the health hazards of exposure to diesel particulate matter. As this concern grows, the mining community is confronted with new DPM regulatory exposure limits. MSHA recently addressed these health concerns by promulgating underground diesel regulations for coal and metal/nonmetal mines, MSHA (2001). The standard was developed to reduce the health risks associated with exposure to DPM. Our view is that the metal/nonmetal DPM exposure limits proposed by the regulations of  $400 \mu\text{g}/\text{m}^3$  on July 19, 2002 and a more stringent limit on January 12, 2006 to  $160 \mu\text{g}/\text{m}^3$  will impel the use of diesel emissions control technology, and in many cases, some form of ventilation improvement to meet these new air quality standards. The most common ventilation knowledge and techniques that are utilized in coal and some metal mines are not readily adaptable to large opening mines. The large openings in many mines offer little ventilation resistance to air flow. However, this low resistance permits large air quantities to move through the large opening mines at extremely small mine (fan) pressures. From an engineering design perspective, this large air quantity, small pressure scenario should play an integral part in the overall mine ventilation design scheme.

## 2 FUNDAMENTALS OF IMPROVING VENTILATION IN LARGE OPENING MINES

Previous literature (Head 2001; Grau 2002) has documented the necessity for the large air volumes that are required to effectively dilute DPM concentrations to meet the proposed regulatory standards established by MSHA. In addition to the large air requirements, effective planning for the placement of ventilation equipment and control devices, such as fans and stoppings are necessary to effectively ventilate the large opening mines. Determining the required air quantity throughout the mine is the first and most important elements for planning effective underground mine ventilation. Although many mining activities produce contaminants that enter the mine air, the greatest concern is with the DPM created from the diesel engines used to power the equipment operating in these U.S. mines. Most likely, if the DPM concentrations are reduced or diluted to concentrations that comply with the proposed regulatory standards, the other contaminant concentrations will also be in compliance. The research at NIOSH indicates that there is no single fix or approach to reduce DPM concentrations within these large opening mines, however, providing at least the minimum ventilation quantities to areas with operating diesel equipment plays a crucial role in diluting DPM concentrations. Therefore, we believe, that for the foreseeable future, the eventual DPM regulatory exposure limits will be the dominant parameter driving ventilation requirements for these mines.

## 3 DESIGNING EFFICIENT VENTILATION SYSTEMS

The fundamental principle of mine ventilation is that air movement is caused by differences in air pressure. The pressure difference results from either natural ventilation pressures or a mechanical fan(s) or a combination of both. There are currently large variations in the methods used by U.S. underground large opening mine operators to develop air movement. The methods vary from reliance on natural ventilation forces to the use of main mine fan(s) or combinations of both. In addition, auxiliary jet fans (free standing) are often used in most of these systems for local areas or to assist and direct the main mine currents. Since natural ventilation is a product of the differences in densities of air columns in and around mine openings, natural ventilation is largely variable and uncontrolled. The direction and magnitude of natural ventilation will change frequently, often several times in a day and certainly seasonally in temperate climates. Therefore, mines that rely solely on natural ventilation as the primary source of

ventilation have a highly uncontrolled ventilation system. It should be noted that natural ventilation is better than no ventilation and natural ventilation may provide satisfactory air exchanges in some circumstances or in some parts of the mine. Natural ventilation has been helpful in some large opening drift stone mines with multiple entries and in parts of mines that have been extensively benched. Even with small differences in elevation, natural ventilation alone can promote large volume air movement and mine air exchanges, although in an uncontrolled manner. In areas that have become extensively benched, the large void created may actually create an "air reserve." Although this air reserve can become gradually contaminated with DPM, the natural ventilation does provide some ventilation relief during working hours and clean out the system during off shift times. Jet fans positioned in proper locations may enhance this exchange process. However, jet fans in other portions of the mine are often positioned working against the natural ventilation flow direction. This results in inadequate air flow and uncontrolled recirculation. In most cases, using natural ventilation as a primary ventilation source is a haphazard affair usually with unknown results.

To effectively improve the air quality in these underground mines, sound ventilation planning needs to be incorporated into the overall mine planning process. For instance, mechanical main mine fans, auxiliary fans, stoppings, and a general ventilation concept should to be integrated into mine layouts and mining sequences. Also, special ventilation considerations, such as production faces, shops, benching areas, and haulage routes should be considered in this mine planning process. Criteria for proper fan selection, installation and operation for both main mine fans and auxiliary fans should be considered. Fan characteristics of pressure and quantity should be matched for the operation. Fan effectiveness is increased dramatically when used in conjunction with stoppings. Utilizing stoppings to build air walls helps control the mine ventilation flow, i.e., efficiently directing the air to where it's needed the most. The air walls also separate the intake and return airways. **Stoppings can be made from man-made materials, leaving areas of intact rock to act as stoppings, or by filling an opening with waste material.**

Fan and stopping locations need to be an integral part of the mine layout. Stopping and air wall locations will often need to be built, taken down or moved with changes in mining areas and/or in concert with a predetermined sequence of a mining and accompanying ventilation scheme. This would include methods to ventilate the active faces, while providing adequate ventilation to any special needs area noted above. The overall ventilation concepts for these types ventilation concepts are discussed more fully in Grau (2002). Other important factors that reduce DPM at

the face area are selecting cleaner burning diesel engines and planning the truck haulage routes. Effective planning of haulage routes will reduce DPM from truck haulage which is the single largest source of DPM in many underground stone mines.

#### 4 DETERMINING SUFFICIENT AIR REQUIREMENTS

The first step to designing an effective ventilation system in underground stone mines is to determine the total air quantity that is needed for effective dilution of DPM and other contaminants. As previously noted, although many different mining activities emit noxious contaminants and require dilution, the result of the new DPM regulations will be that the overriding ventilation design parameter is for the dilution of DPM. In addition, even though the total theoretical air quantity needed to dilute these contaminants can be estimated for adequate dilution, sufficient quantities of air must be distributed to areas where contaminants are being generated. Therefore, certain mining operations may require auxiliary fans to adequately dilute the DPM at the source. Methods to determine the mine air requirements for DPM dilution are described by both Haney (1998); Grau (2002). Grau (2002) reported that the estimated air quantity required for the equipment currently operating in an underground stone mine producing 113 million metric tons (1.25 million tons) is 401 m<sup>3</sup>/s (850,000 cfm) to dilute to a 400 µg/m<sup>3</sup> concentration and 990 m<sup>3</sup>/s (2,100,000 cfm) to dilute to a 160 µg/m<sup>3</sup> concentration. These conclusions were based on the current equipment, controls, etc being used. The air quantities may be too high for practical mine ventilation, however the required air quantity is highly dependent upon the engines in use and as previously described, the extremely large volume of the bench area may reduce the air flow required. It should be noted that engines of an older vintage are less efficient. As an engine ages, the combustion process degrades, which lowers the fuel economy and promotes higher emissions. Mine operators can dramatically decrease air requirements by selectively replacing the engines with a lower DPM emissions or by adding control measures to engines that emit the most DPM. This significant difference defines why additional research is needed to define more accurate estimates of air requirements.

The goal for many mine operators in the near future will be to have their mine be in compliance with the DPM regulations. We expect that, over time, this will be a process of implementing both DPM control measures and ventilation techniques. Operators are looking at different scenarios in both areas to determine where the most DPM reduction can be achieved in the best practical way. As they move

through this iterative process, they will likely make ventilation changes to their mine and also gradually replace the older high DPM emitting engines with new cleaner burning engines. The operators should factor these scenarios into their mine planning process.

#### 5 FAN SELECTION

Many underground limestone mines are drift mines developed from previous quarry operations. Typically, these room and pillar mines have entries that are 6.1 m (20 feet) or higher and at least 12.2 m (40 feet) wide. These large dimensions lead to a very small pressure loss, even when significant air quantities move through the mine. This is especially true of the drift mine operations where our observations found that pressure differences of less than a 24.9 Pa (0.1 in of water gauge, (w.g.)) are not uncommon, no matter whether these mine are ventilated by natural ventilation, a mechanical fan(s) or combinations of both. Our observations also indicate that the underground stone mines with slope/decline and shaft operations that are less than 70 m (200 ft) in depth, have small mine pressure differences, usually less than 746 Pa (3 in w.g). These differences are or could be much lower if the proper consideration was given to the contribution that the slope/decline and shaft provide to the overall mine resistance.

The low pressure loss present in these large opening mines is actually an advantage compared to other type mines and should be treated as such. The ventilation principles, concepts and techniques used to ventilate these mines are different from the techniques used in mines with larger pressure losses. For example, axial vane fans have predominately been used where higher pressures are required. However, in large opening mines with low pressure requirements, propeller fans offer an alternative. The propeller fans can develop large air volumes under low pressure conditions. Propeller fans can be used as either main mine fans or as free standing auxiliary (jet) fans. Free-standing fans are commonly used to promote air movement as shown in Figure 1.

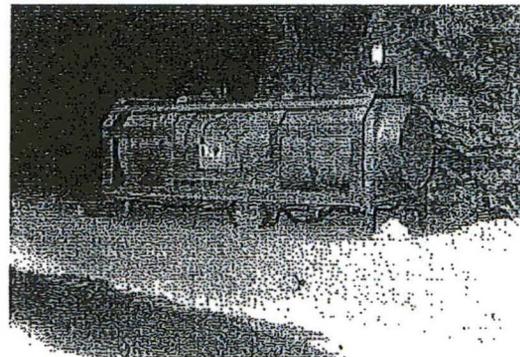


Figure 1. Jet fan.

Ventilation studies by Matt et al. (1978), Agaipito (1985), Goodman (1992) and Foster-Miller (1980) have measured the performance of jet fans (usually axial vane free standing) either in single headings or ventilating portions of the main airways. The research found that the most important aspect for jet fan performance is that the jet fan should be positioned in the intake incoming main air stream so that there is sufficient intake air for the fan. Other important results from these tests showed that the performance of these fans was enhanced by adding a nozzle to the fan. Results were also significantly improved by angling the fan upward and located against a rib when ventilating a dead-ended opening.

## 6 VENTILATION CONTROLS (STOPPINGS)

In order to adequately deliver proper air flows to the face areas, good air controls in the form of stoppings are necessary. Stoppings are physical barriers that separate the intake air from the return air. Since air flows through a mine due to differential pressure between travel points, a pressure difference always exists between the intake and return airways. The stoppings act as a barrier allowing for this pressure differential to exist and circumvent short circuiting of intake air to return air. Currently, in most U.S. large opening mines, stoppings and fans are the only control measures used. Most of these operations are currently using or strive to produce a primary, single mine air current to the active mining faces. However, there are a number of variations, especially for drift operations where natural ventilation and sometimes a number of openings, yields secondary air currents. This single split concept currently eliminates the need for other control measures such as overcasts, regulators and air doors. In many underground mines with large openings, the auxiliary fans are the only control devices used to distribute the air to the face working area.

Stoppings have not been widely used in large opening stone mines. Unfortunately, capital expense, construction, and maintenance problems have impeded this segment of the mining industry from building stoppings. This is particularly problematic in the larger, more established mines. In those mines, stoppings were never incorporated into the mining plan. Retrofitting the mines with stoppings to course the air requires building many stoppings with a corresponding investment in time and construction cost.

Design criteria for stoppings include minimizing the leakage between the intake and return air, withstanding the fan pressure differentials and withstanding or relieving the pressure from face production blasting. Table 1 shows the criteria that are

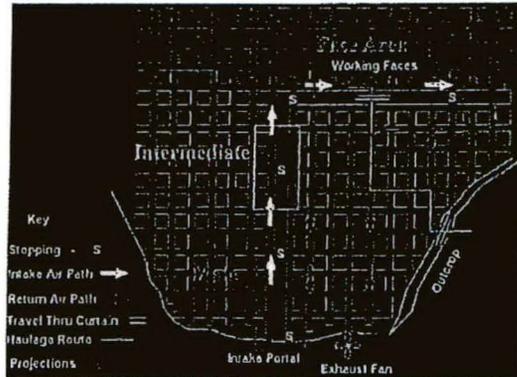


Figure 2. Stopping locations in a typical room and pillar stone mine.

the most important in different parts of the mine. There are three main areas of the mine to consider in determining the type or quality of stopping, the main, intermediate, and the face areas. These areas are shown in Figure 2 for a typical underground stone mine. The stoppings in the main airways will typically have less blast pressure, but since they are usually located near the main mine fan, they are subject to the highest constant pressure differential and thus have the potential for the highest leakage. The stoppings in the main entry will also need to survive the life of the mine, hopefully requiring little maintenance. Minimizing leakage in the main airways prevents a direct short circuit of air to or from the fan. For these reasons, the stoppings located in the main areas of the mine should be substantially constructed. For these stoppings, some form of pressure relief may be needed from production face shots, especially early in their life. This need will often diminish as the active mining advances further away, causing the blast pressures to dissipate with ventilation relief (other openings) and distance.

Table 1 - Stopping criteria for locations in an underground stone mine.

Location in the mine	Fan pressure difference	Blast pressure	Acceptable leakage
Main	Greatest	Little	Low
Intermediate	Significant	Some	Intermediate
Face Area	Lowest	Greatest	Moderate

For underground large opening stone drift mines with multiple entries, the pressure across intake and return air is generally less than 62 Pa (0.25 inch w.g.) as found by Grau (2002). From theoretical ventilation calculations, this pressure differential is greatest near the fan.

Pressures from face production blasts far exceed the ventilation pressure. Tests performed by NIOSH, (Mucho, 2001) found pressures from two different

production face shot, ranged from 8.2738 kPA (1.20 psi) to 9.3769 kPA (1.36 psi) at distances of 200-500 ft from the face shot as shown in Figure 3. The face shots were generated with 400 lbs of ANFO, 169 lb of dynamite and 50 lb of Datagel. Research is continuing at NIOSH to further bracket expected blasting pressures that stoppings could be expected to experience in these types of mines and to define the controlling parameters such as distance and the impact of venting to adjacent openings.

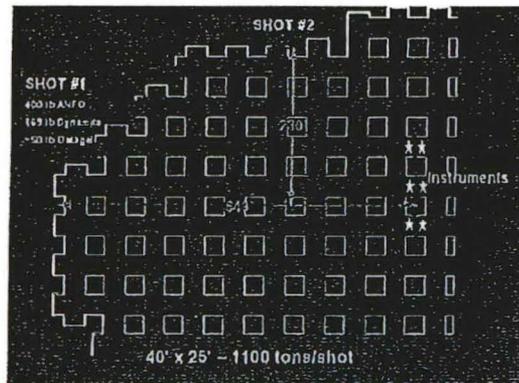


Figure 3. Schematics of tests for measure pressure from face production shots.

Some mines have had success in developing stoppings designed to provide relief from blast pressure. Techniques such as leaving the brattice loose at the floor (and sometimes ribs), using tear away VELCRO strips (Timko 1987), creating openings in the stoppings prior to blasting, and using a combination of used mine belt and brattice have been used. The brattice left loose at the floor simply allows the brattice to fly up when the face shot pressure passes by and returns to the floor when the pressure is through. This technique has been used in some mines near face areas where leakage is not as critical and pressure differentials are lower. Brattice stoppings sealed with VELCRO strips have been developed and used on brattice stoppings in oil shale mines (Timko 1987) and in the NIOSH Lake Lynn Laboratory (Mayercheck 2002). The VELCRO strips separate during the impact of the face shot but they immediately reseal. If sealing is not immediately accomplished, the VELCRO strip seals are manually reconnected after the mine blast. Although they exhibited good success in the Lake Lynn conditions, at least one mine has discontinued their use because of mud and dirt filling the VELCRO and reducing the sealing effectiveness.

## 7 TYPES OF LARGE OPENING STOPPINGS

Stoppings are built from a variety of construction materials. The construction materials are chosen based upon the desired performance, construction time and

ease, and material cost. Construction materials that have typically been used in these mines for stoppings include steel sheeting, cementious-covered fiber matting, mine brattice cloth, used mine belting and piled waste stone.

Used conveyor belting that is no longer useful for material transport can be used to make stoppings. The combination of used belting and brattice have been used effectively in stoppings for both sealing, production face shot relief, and flyrock or other physical damage protection. It has been successfully used as blast relief in a main mine fan bulkhead. Prior to utilizing the mine belt as shown in Figure 4, the mine had several stoppings blown over during production face shots. The mine belt weight and strength allow it to be strong enough to withstand the pressure wave from the face shot but flexible enough to give and act as a pressure relief. Belting hung in this manner should be hung in an overlapping concave pattern to promote interlocking of belting. This technique will minimize air leakage. Figure 5 shows used mine conveyor belt supplementing conventional mine brattice in a stopping. This combination minimizes leakage while providing protection, blast relief, and a more substantial stopping. Conveyor belts could also be used to shield conventional brattice stoppings from the fly rock damage shown in Figure 6.

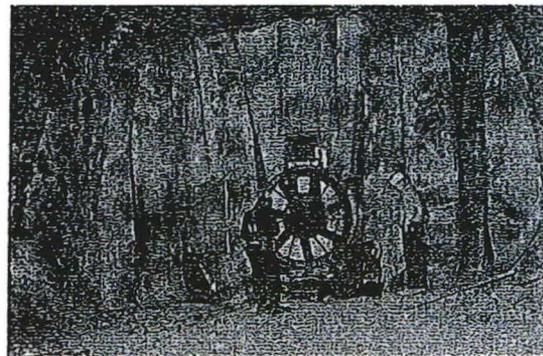


Figure 4. Used mine belt used pressure relief.

Certainly one of the most durable, but also the most costly, for both construction and materials are the corrugated steel panels reinforced with a steel frame as shown in Figure 7. This is the most durable stopping and can be effectively sealed on roof and rib by making a template of the rib and cutting the corrugated sheet to match. The remaining spaces can be filled with expanding foam. One advantage of this stopping is that a swing door can be incorporated into it. This allows for personnel and equipment passage, as well as for blast relief. Besides the cost and time required to install, a disadvantage of this door is that leakage can occur at the door bottom. This might be corrected by adding some type of door sweep.

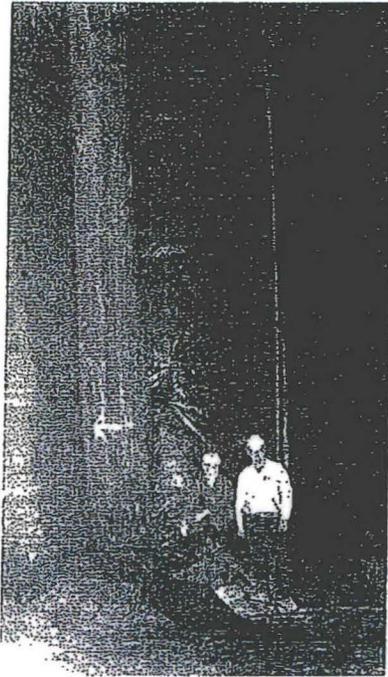


Figure 5. Used mine conveyor belt supplementing conventional mine brattice in a stopping.

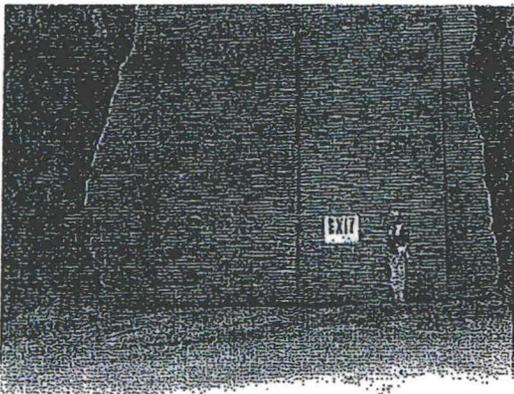


Figure 7. Stopping made for corrugated steel panels reinforced with a steel frame.

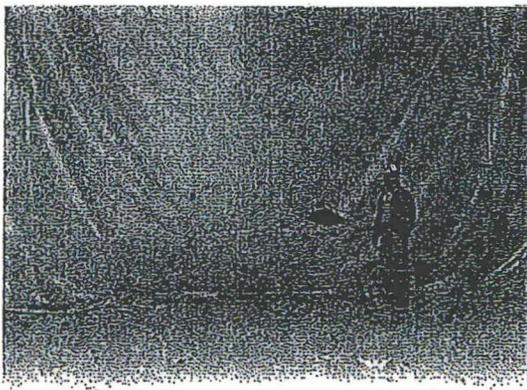


Figure 6. Fly rock damage in brattice cloth.

A less elaborate, but still rigid, stopping is a fiber/mesh covered with cementitious grout as shown in Figure 8. This type of stopping is currently being evaluated in an operating underground limestone mine. This stopping is installed by hanging fabric backed by grid and then sealed by spraying with a water-based cementitious grout on both sides using high pressure grout pumps. Stoppings of this type are still being evaluated for effectiveness by NIOSH researchers.

A prototype stopping being researched by NIOSH is a tension brattice stopping. The stopping is similar to the tension membrane construction methods used to create various fabric covered, large dome stadiums throughout the country. In this stopping, currently being installed and tested at NIOSH's Lake Lynn Laboratory, a brattice material is tensioned and attached to the various steel framework supports, thereby increasing the strength of the structure.

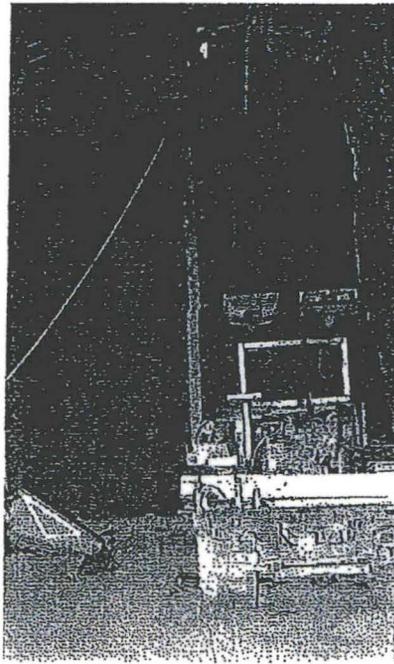


Figure 8. Fabric-grid material sprayed with cementitious material.

## 8 NATURAL ROCK STOPPINGS

Leaving rock in place to form natural rock stoppings has several advantages. By using the natural rock stopping, leakage, construction, and maintenance costs are eliminated. The rock stoppings are created by leaving at least the last face shot that would normally break through two adjoining openings. This keeps a natural rock integrity between the two adjoining pillars. Similar to constructed stoppings, natural rock stoppings between future independent pillars can be strategically oriented to direct the ventilation air. In

order to direct the air, the rock stoppings are oriented parallel to the ventilation flow. Stone production may be temporarily compromised because the stone in the rock stopping is not immediately mined. However, the rock stoppings can be pre-drilled and mined through at a later time for stone recovery, or for other reasons when the particular stopping line is no longer required to course the air.

When using lines of rock stoppings to separate and course the air, openings need to be created every few crosscuts to meet practical mining needs. However, often the natural rock can be left in place along the ribs and back of the final cut that creates these long pillars to serve as a natural framework for the stoppings and to minimize the size of the stoppings. These too can be pre-drilled for future enlargement to normal opening size when the stopping line is no longer needed and/or the area is to be benched. A caution when using this method is the mining horizon for the top or back rock must be carefully chosen so that a ground control problem is not created.

#### 9 CONCLUSIONS

NIOSH is researching various ways to improve ventilation in large opening mines in an effort to assist with methods and techniques to improve the air quality in these mines and therefore the health of miners. NIOSH is currently focusing on fan applications, air coursing, intake and return airway separation using stoppings, and implementing mine ventilation techniques and concepts into the mine planning to accomplish this goal.

Many U.S. underground stone mines are large opening mines that generally feature small ventilation head losses compared to other types of underground mining. Propeller fans are generally well suited to efficiently produce large air quantities under low pressure requirements. Stoppings are necessary to direct and control the mine air. A variety of stopping choices exist for these types of applications and depend upon the quality of the stopping needed. Different portions of the mine may be better suited to different types of stoppings. The use of stone stoppings is being investigated, especially as it relates to their deployment in various stages of the mine

layout. Operators of all underground stone mines should find that this information will improve their ventilation in the underground workings.

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## ABOUT US



DRA is an international, multi-disciplinary organisation specialising in the project management of mining, infrastructure and mineral process plant design and construction. One of the largest project management enterprises in Africa, our South African-founded group of companies has constructed plants on five continents, and has offices in more than 10 countries around the world.

Building on our strong foundation in South Africa, DRA has launched into markets across the globe. In 2005 DRA established offices in North America, now called DRA Taggart. With four offices in North America including Toronto and Pittsburgh, DRA Taggart provides full service engineering solutions to clients in both North and South America. Offering engineering services across all minerals and metals, DRA Taggart also provides specialist services in large-scale coal preparation plants and materials handling systems. In the last six years, we have provide 50% of the new Greenfield coal plant capacity worldwide.

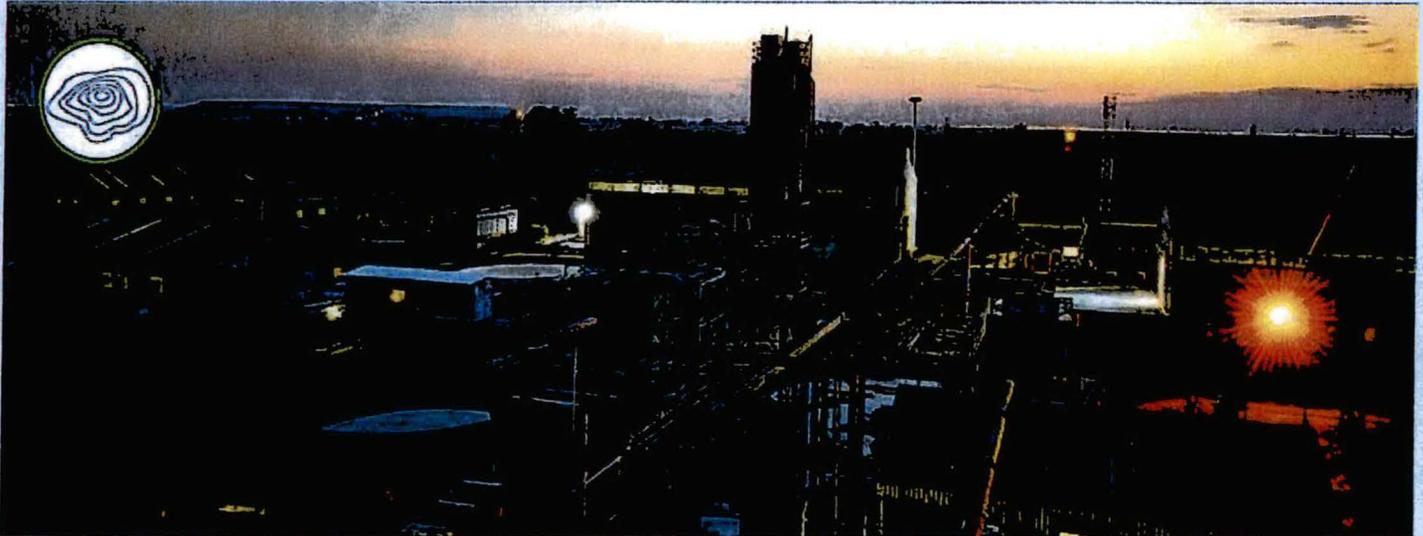
Our highly regarded complement of professional engineers of all disciplines – in conjunction with our draughting, support-service and safety-management teams – manages, designs and constructs mines for our clients in mining areas around the world.

We offer engineering expertise in process, electrical and instrumentation, mechanical, civil and structural, infrastructure, materials handling, winder, mining, process plant operations and maintenance management. We also offer services in pre-feasibility and feasibility studies, procurement of equipment and supplies, fabrication and erection, commissioning and training.

DRA manages projects with a "zero-harm" focus evident in our excellent safety record. We utilise world-class quality standards, systems, and procedures based on ISO standards. Currently, we are ISO certified.

A key element of our success is having the expertise to offer the entire spectrum of mining services. To mineral rights owners wishing to convert their resources into wealth, we are effectively a one-stop-shop.

## BACKFILL



Underground mining becomes more costly the deeper a mine progresses. Carefully engineered and efficiently run backfill systems can significantly enhance mining operations. The underground disposal of mine tailings not only reduces the environmental impact, provides a material to improve ground conditions, but is also economically beneficial to the mining operation.

Backfill reduces the relaxation of the rock mass, so the rock itself retains a load carrying capacity and becomes self-supporting. Placement of mine tailings in underground backfill support directly reduces the quantity of tailings to be disposed on the surface. This not only reduces operating and capital costs, but also future rehabilitation costs.

DRA has an extensive understanding of tailings material characteristics including, sizing, mineralogical composition, rheology and reactivity, which are vital to the design of reliable underground distribution pipeline systems.

Gravity assisted delivery methods are utilized for backfill transportation with the dense tailings slurry being delivered by pipelines to the disposal point in the mined out stopes. The selection of a backfill system for a mine is part of the overall plan for the mining of the ore body. This plan takes the full life cycle of the operation into consideration, including mine closure and rehabilitation.

### BACKFILL TYPES:

Each orebody and mine is unique, requiring a tailored backfill solution based on extensive test-work. DRA has the capability to implement all variations of backfill, including:

**Slurry fill, hydraulic fill, or cyclone classified tailings backfill** - these processes utilize cyclone technology to reduce fines content and de-water plant tailings. This solution uses cost effective and well understood hydro-cyclone technology, making it the most commonly used form of backfill.

**Full plant tailings fill or paste fill** – these processes require the use of vacuum filter technology, or state of the art high density thickeners to produce materials for the fill.

**Rock Fill** – the process involves placing rocks in voids and pouring cemented fluid between the rocks to cover the voids, creating roof support.

#### Backfill Benefits:

- Environmental:

Backfill utilizes plant waste that would have been transported to the dumps for water recovery. It also diverts waste underground, reducing the costs of managing dumps, and reduces the required volume of the dump, reducing the dump footprint. This decreases both the costs of managing dumps and the capital outlay of dumps design.

- Refrigeration:

Backfilling the mined out stopes underground reduces the area of the mine, and in turn, the need for extensive refrigeration load.

- Ventilation:

Backfill improves underground ventilation by preventing air losses in mined out areas.

- Logistics:

Backfill reduces the logistics required in the transport of support packs.

- Time Efficiency:

Backfill completely eliminates the need for wooden shaft support, ensuring shaft time can be maximized and properly allocated.

- Improved Ore Extraction:

Backfilling allows for pillar mining, which increases the reef tons to be mined, improving the ore extraction percentage. This results in increased life of mine and all related benefits, including increased revenue.

- Support:

Backfill provides regional support in mined areas by reducing the relaxation of the rock mass, thus the rock itself retains the load carrying capacity and becomes self-supporting.

- Safety:

Backfill helps to mitigate underground hazards such as falls of ground (FOG), and underground fires associated with the use of wooden support packs.



TRIMBLE COUNTY LANDFILL (PHASE I)

Capital Expenditures (\$ million)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Geomembrane Liner	-	-	-	0.49	0.52	-	-	-	-	-	-
Clay Liner	-	-	-	0.38	0.40	-	-	-	-	-	0.78
Leachate Collection System and Underdrain in flat areas	-	-	-	0.68	0.72	-	-	-	-	-	1.40
Geocomposite Leachate Collection System	-	-	-	0.24	0.26	-	-	-	-	-	0.50
Ridgetop timber clearing	-	-	-	0.09	0.10	-	-	-	-	-	0.19
Ravine timber clearing	0.20	-	-	0.15	0.16	-	-	-	-	-	0.50
Shot-rock fill/blasted excavation	-	-	-	0.71	0.75	-	-	-	-	-	1.47
Security fencing	-	-	-	0.11	0.12	-	-	-	-	-	0.23
Diversiory storm sewer around perimeter	-	-	-	0.58	0.62	-	-	-	-	-	1.20
Excavation for perimeter road	-	-	-	0.61	0.64	-	-	-	-	-	1.25
Loose soil fill	-	-	-	0.41	0.43	-	-	-	-	-	0.84
Engineering, permitting, surveying, CQA	-	-	-	0.05	0.05	-	-	-	-	-	0.10
Relocation of 345 kV transmission line	-	-	-	1.38	1.46	-	-	-	-	-	2.84
Leachate treatment wetland	-	-	-	0.14	0.15	-	-	-	-	-	0.30
Channel on ravine floor	-	-	-	0.55	0.58	-	-	-	-	-	1.13
Sediment basin	-	-	-	0.10	0.10	-	-	-	-	-	0.20
Stream mitigation	-	-	-	1.53	1.63	-	-	-	-	-	3.16
Pipe conveyor to combo landfill in Upper B	-	-	-	8.91	9.44	-	-	-	-	-	18.35
<b>Total</b>	<b>0.20</b>	<b>-</b>	<b>-</b>	<b>17.11</b>	<b>18.13</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>35.44</b>
E.ON-US Overheads	0.01	-	-	0.60	0.63	-	-	-	-	-	1.24
<b>Total with Overheads</b>	<b>0.21</b>	<b>-</b>	<b>-</b>	<b>17.70</b>	<b>18.77</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>36.68</b>

Operating & Maintenance Costs (\$)	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Hauling and Placing	-	-	-	893,725.56	947,349.09	1,004,190.04	1,064,441.44	1,128,307.92	1,196,006.40	6,234,020
Material Handling Replacement Cost	-	-	-	243,850.18	258,481.19	273,990.06	290,429.46	307,855.23	326,326.54	1,700,933
<b>TOTAL</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1,137,576</b>	<b>1,205,830</b>	<b>1,278,180</b>	<b>1,354,871</b>	<b>1,436,163</b>	<b>1,522,333</b>	<b>7,934,953</b>

## GHENT LANDFILL (PHASE I)

Capital Expenditures (\$ million)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
<b>Property Acquisition</b>											
Disposal Site(s)	-	-	4.66	-	-	-	-	-	-	-	4.66
Overhead Electric Line(s)	-	-	0.03	-	-	-	-	-	-	-	0.03
Buffer Zones	-	-	-	-	2.37	-	-	-	-	-	2.37
<b>Higher End House Acquisition</b>											
Engineering, Permits and Fees, and Construction Documents	0.46	2.00	-	-	-	-	-	-	-	-	2.46
Stream and Wetland Mitigation	-	-	4.14	-	-	-	-	-	-	-	4.14
Ground Water Monitoring System	-	0.27	-	-	-	-	-	-	-	-	0.27
Transmission Line Relocation Design, Engineering, and Construction	-	-	-	-	0.82	-	-	-	-	-	0.82
CCWD Relocation	-	-	0.12	-	-	-	-	-	-	-	0.12
Pump House Fly Ash and Bottom Ash Segregation	-	0.72	-	-	-	-	-	-	-	-	0.72
Dry Ash/Pyrites Handling System - Conveyor	-	-	16.29	27.08	38.93	-	-	-	-	-	82.31
Dry Gypsum Handling System	-	-	7.79	15.96	13.05	-	-	-	-	-	36.80
Gypsum Fines Project	-	0.74	6.30	6.30	-	-	-	-	-	-	13.34
<b>Initial Site Preparation</b>											
Clearing, Grubbing, and Site Preparation	-	-	-	0.62	0.65	0.69	-	-	-	-	1.96
Stripping and Stockpiling Soil	-	-	-	0.50	0.53	0.56	-	-	-	-	1.58
Hauling Topsoil - Phase 1 - 1.0 Mile Round Trip	-	-	-	0.19	0.20	0.21	-	-	-	-	0.59
Erosion and Sedimentation Controls	-	-	-	0.06	0.06	0.06	-	-	-	-	0.18
Sedimentation Pond	-	-	-	0.33	-	-	-	-	-	-	0.33
Collection Channels (Fabricform)	-	-	-	0.36	0.38	0.40	-	-	-	-	1.15
Diversion Channels (Riprap)	-	-	-	0.11	0.12	0.12	-	-	-	-	0.35
<b>Liner Subgrade Preparation</b>											
Scraping and Hauling - 0.25 Mile Round Trip	-	-	-	0.32	0.33	0.35	-	-	-	-	1.01
Excavating	-	-	-	0.15	0.16	0.17	-	-	-	-	0.49
Hauling Subgrade - Phase 1 - 1.0 Mile Round Trip	-	-	-	0.31	0.33	0.35	-	-	-	-	0.99
Spreading and Compacting Subgrade	-	-	-	0.49	0.52	0.55	-	-	-	-	1.57
Subgrade QA/QC	-	-	-	0.24	0.25	0.27	-	-	-	-	0.76
<b>Gypsum Dewatering Facility Earthwork</b>											
Excavating	-	-	-	0.73	-	-	-	-	-	-	0.73
Hauling Earth - 1.0 Mile Round Trip	-	-	-	1.53	-	-	-	-	-	-	1.53
Spreading and Compacting	-	-	-	1.21	-	-	-	-	-	-	1.21
Earthwork QA/QC	-	-	-	0.24	-	-	-	-	-	-	0.24

## GHENT LANDFILL (PHASE I)

Capital Expenditures (\$ million)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
<b>Haul Roads</b>											
CCP Disposal On-Landfill Haul Road (60 Feet Wide)	-	-	-	-	0.61	0.05	0.05	0.05	0.05	0.06	0.87
CCP Disposal Off-Landfill Haul Road (60 Feet Wide)	-	-	-	0.30	1.03	-	-	-	-	-	1.33
<b>Liner</b>											
Landfill - Single Liner System	-	-	-	-	7.00	7.43	7.87	-	-	-	22.30
Liner System QA/QC	-	-	-	-	1.23	1.30	1.38	-	-	-	3.90
Leachate Collector Line	-	-	-	-	0.19	0.20	0.21	-	-	-	0.60
On-Landfill Leachate Trunk Line	-	-	-	-	0.08	0.08	0.09	-	-	-	0.25
Off-Landfill Leachate Trunk Line	-	-	-	-	0.07	-	-	-	-	-	0.07
Leachate Storage Pond	-	-	-	-	0.29	-	-	-	-	-	0.29
Leachate Pump House	-	-	-	-	0.09	-	-	-	-	-	0.09
Leachate Pipe Line	-	-	-	-	0.08	-	-	-	-	-	0.08
Underdrains - Trunk	-	-	-	-	0.17	0.18	0.19	-	-	-	0.54
Underdrains - Collector	-	-	-	-	0.11	0.12	0.12	-	-	-	0.35
<b>Cap</b>											
Intermediate Soil Cover	-	-	-	-	-	-	0.28	0.30	0.32	0.34	1.24
Cap System	-	-	-	-	-	-	0.22	0.23	0.25	0.26	0.96
Cap System QA/QC	-	-	-	-	-	-	0.03	0.03	0.03	0.03	0.12
<b>Total</b>	<b>0.46</b>	<b>3.72</b>	<b>40.73</b>	<b>57.01</b>	<b>69.65</b>	<b>13.10</b>	<b>10.44</b>	<b>0.62</b>	<b>0.65</b>	<b>0.69</b>	<b>197.07</b>
<b>E.ON-US Overheads</b>	<b>0.02</b>	<b>0.13</b>	<b>1.43</b>	<b>2.00</b>	<b>2.44</b>	<b>0.46</b>	<b>0.37</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<b>6.90</b>
<b>Total with Overheads</b>	<b>0.47</b>	<b>3.85</b>	<b>42.16</b>	<b>59.01</b>	<b>72.09</b>	<b>13.56</b>	<b>10.81</b>	<b>0.64</b>	<b>0.68</b>	<b>0.72</b>	<b>203.97</b>

## GHENT LANDFILL (PHASE I)

Operating & Maintenance Costs (\$)	2010	2011	2012	2013	2014	2015	2016	2017
Ground Water Sampling and Testing	14,045	14,888	15,781	16,728	17,731	18,795	19,923	21,118
Leachate Management	-	-	-	83,639	88,657	93,977	99,616	105,592
Surveying (As-builts)	16,292	17,270	18,306	19,404	20,569	21,803	23,111	24,497
Pump House Fly Ash and Bottom Ash Segregation	75,843	80,394	85,217	-	-	-	-	-
Dry Ash/Pyrites Handling System - Conveyor	-	-	-	2,161,234	2,290,908	2,428,363	2,574,065	2,728,509
Dry Gypsum Handling System	-	-	-	682,495	723,445	766,851	812,863	861,634
Leachate Pump House	15,169	16,079	17,043	18,066	19,150	20,299	21,517	22,808
<b>Hauling Fly Ash and Bottom Ash to Landfill</b>								
Loading	-	-	-	1,338,226	1,418,519	1,503,630	1,593,848	1,689,479
Phase 1 - 2.25 Mile Round Trip	-	-	-	2,822,723	2,992,087	3,171,612	3,361,909	3,563,623
<b>Hauling Gypsum to Landfill</b>								
Loading	-	-	-	1,746,384	1,851,167	1,962,237	2,079,972	2,204,770
Phase 1 - 2.25 Mile Round Trip	-	-	-	3,997,156	4,236,986	4,491,205	4,760,677	5,046,318
Landfilling Fly Ash and Bottom Ash	-	-	-	2,408,806	2,553,334	2,706,534	2,868,927	3,041,062
Landfilling Gypsum	-	-	-	3,143,492	3,332,101	3,532,027	3,743,949	3,968,586
Ash/Gypsum Placement QA/QC	-	-	-	54,198	57,450	60,897	64,551	68,424
<b>Maintenance</b>								
Landfills	-	-	-	301,101	319,167	338,317	358,616	380,133
Haul Roads	-	-	-	53,529	56,741	60,145	63,754	67,579
Dust Control	-	-	-	156,126	165,494	175,424	185,949	197,106
<b>TOTAL</b>	<b>121,349</b>	<b>128,630</b>	<b>136,348</b>	<b>19,003,308</b>	<b>20,143,507</b>	<b>21,352,117</b>	<b>22,633,244</b>	<b>23,991,239</b>

**Louisville Gas and Electric Company**  
**Environmental Cost Recovery Surcharge Summary**

	2010	2011	2012	2013	2014
<b>Total E(m) - (\$000)</b>	\$10,455	\$10,896	\$13,426	\$16,341	\$16,901
<b>12 Month Average Jurisdictional Ratio</b>	76.68%	76.68%	76.68%	76.68%	76.68%
<b>Jurisdictional E(m) - (\$000)</b>	\$8,017	\$8,356	\$10,295	\$12,530	\$12,960
<b>Forecasted Jurisdictional R(m) - (million)</b>	852	946	1,009	1,101	1,131
<b>Incremental MESF</b>	0.94%	0.88%	1.02%	1.14%	1.15%
<b>Residential Customer Impact</b>					
<b>Monthly bill (1,000 kWh per month)</b>	\$0.71	\$0.67	\$0.77	\$0.86	\$0.87

**Kentucky Utilities Company**  
**Environmental Cost Recovery Surcharge Summary**

	2010	2011	2012	2013	2014
<b>Total E(m) - (\$000)</b>	\$21,573	\$43,140	\$61,826	\$95,090	\$96,261
<b>12 Month Average Jurisdictional Ratio</b>	81.91%	81.91%	81.91%	81.91%	81.91%
<b>Jurisdictional E(m) - (\$000)</b>	\$17,670	\$35,334	\$50,639	\$77,884	\$78,843
<b>Forecasted Jurisdictional R(m) - (million)</b>	1,237	1,314	1,379	1,450	1,515
<b>Incremental MESF</b>	1.43%	2.69%	3.67%	5.37%	5.21%
<b>Residential Customer Impact</b>					
<b>Monthly bill (1,000 kWh per month)</b>	\$0.99	\$1.87	\$2.55	\$3.73	\$3.61

State	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Tax Rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
	LG&E	KU								
Tax Rate-Retirements	40.3625%	40.3625% Not applicable in this filing - no retirements								
Property Tax Rate	0.15%	0.15%								

**LG&E Rate of Return Calculation  
August 31, 2008**

Total Company	Elec Rate Base %	Electric Capitaliz Post 1995 Plan ( Adjusted Electric Capitalization	Annual Cost Rate	2009 Weighted Cost of Capital	2010 Weighted Cost of Capital	2011 Weighted Cost of Capital	2012 Weighted Cost of Capital	2013 Weighted Cost of Capital	2014 Weighted Cost of Capital	2015 Weighted Cost of Capital	2016 Weighted Cost of Capital	2017 Weighted Cost of Capital	2018 Weighted Cost of Capital
Long-Term Debt		603,008,606	32.80%	5.31%	1.74%	1.74%	1.74%	1.74%	1.74%	1.74%	1.74%	1.74%	1.74%
Short-Term Debt		282,005,869	15.34%	2.44%	0.37%	0.37%	0.37%	0.37%	0.37%	0.37%	0.37%	0.37%	0.37%
Preferred Stock		0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Common Equity		953,280,364	51.86%	10.63%	5.51%	5.51%	5.51%	5.51%	5.51%	5.51%	5.51%	5.51%	5.51%
Total		1,838,294,839			7.63%	7.63%	7.63%	7.63%	7.63%	7.63%	7.63%	7.63%	7.63%
Composite Debt Rate				2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%
Composite Tax Rate				36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Overall Rate of Return Grossed Up				10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%

**KU Rate of Return Calculation  
August 31, 2008**

Total Company	Elec Rate Base %	Electric Capitaliz 1994 ECR Roll-In Post 1994 Plan C Adjusted Electric Capitalization	Annual Cost Rate	2009 Weighted Cost of Capital	2010 Weighted Cost of Capital	2011 Weighted Cost of Capital	2012 Weighted Cost of Capital	2013 Weighted Cost of Capital	2014 Weighted Cost of Capital	2015 Weighted Cost of Capital	2016 Weighted Cost of Capital	2017 Weighted Cost of Capital	2018 Weighted Cost of Capital
Long-Term Debt		781,961,523	44.20%	5.32%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%
Short-Term Debt		74,381,446	4.20%	2.44%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%
Preferred Stock		0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Common Equity		912,829,361	51.60%	10.63%	5.48%	5.48%	5.48%	5.48%	5.48%	5.48%	5.48%	5.48%	5.48%
Total		1,769,172,330			7.94%	7.94%	7.94%	7.94%	7.94%	7.94%	7.94%	7.94%	7.94%
Composite Debt Rate					2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%	2.45%
Composite Tax Rate				36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Overall Rate of Return Grossed Up					11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%

**Jurisdictional Ratios from ECR Filings**

Billimg Month	LG&E	KU
May-08	76.23%	81.31%
Jun-08	81.60%	84.71%
Jul-08	72.11%	81.63%
Aug-08	79.71%	83.46%
Sep-08	83.09%	81.02%
Oct-08	87.41%	85.16%
Nov-08	78.92%	82.47%
Dec-08	67.10%	77.38%
Jan-09	61.82%	75.52%
Feb-09	70.27%	79.97%
Mar-09	79.27%	83.81%
Apr-09	82.64%	86.43%
Average	76.68%	81.91%
4/1/2009 Expense Month Avg Mth Juris Rev	778,413,576	1,104,927,144

**Billing Factors as of  
4/1/2009 Expense Month**

	LG&E	KU
Customer Charge	5.00	5.00
Energy	0.06303	0.05716
FAC	0.00574	0.00584
DSM	0.00193	0.00144
ECR Factor	0.02170	0.09890
	39904	

**Portional Share TC Facilities Ash Pond & Lar**

Utility	75%	
LG&E	52%	39.000%
KU	48%	36.000%

## Revenue Calculations Percentage Change

LG&E	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Non-Fuel Base Revenues	537,142,760	560,659,090	626,769,670	652,292,880	721,751,820	741,069,180	793,579,590	808,966,250	841,716,280	855,948,250
Base Fuel Revenues	233,640,900	257,031,690	306,591,680	352,502,600	354,600,140	356,627,730	359,277,770	363,691,240	368,813,220	374,668,080
FAC Revenues	29,321,470	16,531,110	(6,208,780)	(14,738,030)	5,956,480	13,511,510	26,205,650	47,956,630	61,173,590	70,852,330
Environmental Cost Recovery	12,054,040	15,179,090	17,078,760	24,779,540	27,978,040	29,457,600	29,556,390	31,364,760	28,886,360	26,545,220
Energy Efficient Operations Cost Recovery	12,588,360	17,836,920	18,361,680	18,728,880	19,103,520	19,485,600	19,875,240	20,272,800	20,678,280	21,091,800
Total (less ECR)	812,693,490	852,058,810	945,514,250	1,008,786,330	1,101,411,960	1,130,694,020	1,198,938,250	1,240,886,920	1,292,381,370	1,322,560,460
% Change		0.04844	0.10968	0.06692	0.09182	0.02659	0.06036	0.03499	0.04150	0.02335
			0.1634	0.2413	0.3553	0.3913	0.4753	0.5269	0.5902	0.6274
<b>KU</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Non-Fuel Base Revenues	578,834,881	608,061,511	685,963,441	707,215,550	726,283,900	748,834,830	806,868,640	835,167,060	902,939,220	925,229,610
Base Fuel Revenues	534,096,081	587,968,403	596,646,880	624,977,200	641,436,250	646,741,820	653,337,210	662,393,520	670,722,000	680,819,780
FAC Revenues	91,372,190	21,505,710	10,411,790	25,931,180	60,536,470	97,172,770	116,647,390	129,630,020	152,299,380	174,961,330
Environmental Cost Recovery	124,290,806	155,130,640	175,893,910	187,576,440	201,072,490	210,273,240	203,317,410	197,113,970	195,691,220	189,331,840
Energy Efficient Operations Cost Recovery	13,784,400	19,584,120	20,534,280	20,944,920	21,363,840	21,791,160	22,226,880	22,671,480	23,124,840	23,587,440
Total (less ECR)	1,218,087,552	1,237,119,744	1,313,556,392	1,379,068,850	1,449,620,460	1,514,540,580	1,599,080,120	1,649,862,080	1,749,085,440	1,804,598,160
% Change		0.01562	0.06179	0.04987	0.05116	0.04478	0.05582	0.03176	0.06014	0.03174
			0.0784	0.1322	0.1901	0.2434	0.3128	0.3545	0.4359	0.4815

**Incremental O&M**

**LG&E**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 18</b>										
TC2 AQS O&M	0	1,328,398	2,078,421	2,457,617	2,631,751	2,702,173	2,767,171	2,834,519	2,917,621	2,972,968
<b>Project 22</b>										
Cane Run Landfill - Phase I	20,352	21,573	22,868	24,240	25,694	27,236	28,870	30,602	32,438	34,384
<b>Project 23</b>										
TC Ash Treatment Basin (BAP/Gypsum)	0	0	0	0	0	0	0	0	0	0
<b>Project 24</b>										
TC CCP Storage (Landfill)	0	0	0	0	967,296	1,025,334	1,086,854	1,152,065	1,221,189	1,294,460
<b>Project 25</b>										
Beneficial Reuse	0	6,781,867	4,044,649	4,243,433	4,769,138	5,428,541	5,610,358	6,106,637	6,456,655	6,768,993
<b>Total-LGE</b>	<b>20,352</b>	<b>1,349,971</b>	<b>2,101,288</b>	<b>2,481,857</b>	<b>3,624,741</b>	<b>3,754,743</b>	<b>3,882,894</b>	<b>4,017,185</b>	<b>4,171,247</b>	<b>4,301,812</b>

**KU**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 23</b>										
TC2 AQS O&M	0	5,663,169	8,860,636	10,477,210	11,219,570	11,519,791	11,796,886	12,084,001	12,438,277	12,674,231
<b>Project 28</b>										
Brown 3	0	0	0	649,267	3,122,809	3,193,154	3,239,641	3,335,614	3,463,706	3,572,886
<b>Project 29</b>										
Brown Ash Treatment Basin - Phase II	0	0	0	0	0	0	0	0	0	0
<b>Project 30</b>										
Ghent Landfill - Phase I	84,800	121,349	128,630	136,348	19,003,308	20,143,507	21,352,117	22,633,244	23,991,239	25,430,713
<b>Project 31</b>										
TC Ash Treatment Basin (BAP/Gypsum)	0	0	0	0	0	0	0	0	0	0
<b>Project 32</b>										
TC CCP Storage (Landfill)	0	0	0	0	892,889	946,462	1,003,249	1,063,444	1,127,251	1,194,886
<b>Project 33</b>										
Beneficial Reuse	50,000	4,181,968	4,423,023	1,788,885	592,869	613,321	635,000	657,980	682,339	708,159
<b>Total-KU</b>	<b>84,800</b>	<b>5,784,518</b>	<b>8,989,266</b>	<b>11,262,825</b>	<b>34,238,576</b>	<b>35,802,914</b>	<b>37,391,894</b>	<b>39,116,304</b>	<b>41,020,473</b>	<b>42,872,716</b>

## Incremental O&M Estimates for Projects in the 2009 ECR Plan

		Area below used as inputs into Project tabs									
		<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
1 Beneficial Reuse											
<b><u>Louisville Gas and Electric Company</u></b>											
Project 18	<b><u>TC2 AQS O&amp;M (1)</u></b>	\$ -	\$ 1,328,398	\$ 2,078,421	\$ 2,457,617	\$ 2,631,751	\$ 2,702,173	\$ 2,767,171	\$ 2,834,519	\$ 2,917,621	\$ 2,972,968
Proposed Project 22	<b><u>CR Landfill - Phase I</u></b>	\$ 20,352	\$ 21,573	\$ 22,868	\$ 24,240	\$ 25,694	\$ 27,236	\$ 28,870	\$ 30,602	\$ 32,438	\$ 34,384
Proposed Project 23	<b><u>TC Ash Pond (BAP/Gypsum) (2)</u></b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Proposed Project 24	<b><u>TC CCP Storage (Landfill) (2)</u></b>	\$ -	\$ -	\$ -	\$ -	\$ 967,296	\$ 1,025,334	\$ 1,086,854	\$ 1,152,065	\$ 1,221,189	\$ 1,294,460
Proposed Project 25	<b><u>Beneficial Reuse</u></b>	\$ -	\$ 6,781,867	\$ 4,044,649	\$ 4,243,433	\$ 4,769,138	\$ 5,428,541	\$ 5,610,358	\$ 6,106,637	\$ 6,456,655	\$ 6,768,993
<b><u>Kentucky Utilities Company</u></b>											
Project 23	<b><u>TC2 AQS O&amp;M (1)</u></b>	\$ -	\$ 5,663,169	\$ 8,860,636	\$ 10,477,210	\$ 11,219,570	\$ 11,519,791	\$ 11,796,886	\$ 12,084,001	\$ 12,438,277	\$ 12,674,231
Proposed Project 28	<b><u>BR3 SCR</u></b>	\$ -	\$ -	\$ -	\$ 649,267	\$ 3,122,809	\$ 3,193,154	\$ 3,239,641	\$ 3,335,614	\$ 3,463,706	\$ 3,572,886
Proposed Project 29	<b><u>BR Ash Pond - Phase II</u></b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Proposed Project 30	<b><u>GH Landfill - Phase I</u></b>	\$ 84,800	\$ 121,349	\$ 128,630	\$ 136,348	\$ 19,003,308	\$ 20,143,507	\$ 21,352,117	\$ 22,633,244	\$ 23,991,239	\$ 25,430,713
Proposed Project 31	<b><u>TC Ash Pond (BAP/Gypsum) (2)</u></b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Proposed Project 32	<b><u>TC CCP Storage (Landfill) (2)</u></b>	\$ -	\$ -	\$ -	\$ -	\$ 892,889	\$ 946,462	\$ 1,003,249	\$ 1,063,444	\$ 1,127,251	\$ 1,194,886
Proposed Project 33	<b><u>Beneficial Reuse</u></b>	\$ 50,000	\$ 4,181,968	\$ 4,423,023	\$ 1,788,885	\$ 592,869	\$ 613,321	\$ 635,000	\$ 657,980	\$ 682,339	\$ 708,159

**Notes:**

- (1) Combined, the KU/LG&E costs account for 75% of the total TC2 costs. KU and LG&E's costs split 81% / 19% respectively.
- (2) Combined, the KU/LG&E costs account for 75% of the total TC CCP project costs. KU and LG&E's costs split 48% / 52% respectively.

NOT USED IN CALCULATIONS

	TC 2 Split LG&E 19%	KU 81%										
<b><u>TC2 AQS O&amp;M</u></b>			0	6,991,567	10,939,056	12,934,827	13,851,321	14,221,965	14,564,057	14,918,520	15,355,897	15,647,199

## Revenue Requirements Summary 2009 Amended Plan - LG&E

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 18 TC2 AQS O&amp;M</b>										
<b>Revenue Requirement</b>										
Eligible Plant	-	-	-	-	-	-	-	-	-	-
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	-	-	-	-	-	-
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	-	-	-	-	-	-
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	-	-	-	-	-	-	-	-	-	-
Rate of return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Operating expenses	-	1,328,398	2,078,421	2,457,617	2,631,751	2,702,173	2,767,171	2,834,519	2,917,621	2,972,968
Annual Depreciation expense	-	-	-	-	-	-	-	-	-	-
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	-	-	-	-	-	-	-	-	-
<b>Total OE</b>	<b>\$ -</b>	<b>\$ 1,328,398</b>	<b>\$ 2,078,421</b>	<b>\$ 2,457,617</b>	<b>\$ 2,631,751</b>	<b>\$ 2,702,173</b>	<b>\$ 2,767,171</b>	<b>\$ 2,834,519</b>	<b>\$ 2,917,621</b>	<b>\$ 2,972,968</b>
<b>Total E(m)</b>	<b>-</b>	<b>1,328,398</b>	<b>2,078,421</b>	<b>2,457,617</b>	<b>2,631,751</b>	<b>2,702,173</b>	<b>2,767,171</b>	<b>2,834,519</b>	<b>2,917,621</b>	<b>2,972,968</b>

## Revenue Requirements Summary 2009 Amended Plan - LG&E

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 22 Cane Run Landfill (Phase I)</b>										
<b>Revenue Requirement</b>										
Eligible Plant	3,439,366	4,067,346	4,156,101	4,250,181	4,300,043	4,352,897	4,408,922	4,468,309	4,531,259	4,597,986
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	(183,791)	(377,930)	(574,568)	(773,855)	(975,949)	(1,181,019)
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	8,022	(34,721)	(69,508)	(96,813)	(117,020)	(130,521)
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	3,439,366	4,067,346	4,156,101	4,250,181	4,124,274	3,940,246	3,764,846	3,597,641	3,438,290	3,286,446
Rate of return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
	<u>\$ 372,293</u>	<u>\$ 434,164</u>	<u>\$ 443,638</u>	<u>\$ 453,681</u>	<u>\$ 440,241</u>	<u>\$ 420,597</u>	<u>\$ 401,874</u>	<u>\$ 384,026</u>	<u>\$ 367,016</u>	<u>\$ 350,808</u>
Operating expenses	20,352	21,573	22,868	24,240	25,694	27,236	28,870	30,602	32,438	34,384
Annual Depreciation expense	-	-	-	-	183,791	194,139	196,638	199,287	202,094	205,070
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	5,159	6,101	6,234	6,375	6,174	5,962	5,752	5,542	5,333
<b>Total OE</b>	<u>\$ 20,352</u>	<u>\$ 26,732</u>	<u>\$ 28,969</u>	<u>\$ 30,474</u>	<u>\$ 215,860</u>	<u>\$ 227,549</u>	<u>\$ 231,470</u>	<u>\$ 235,640</u>	<u>\$ 240,074</u>	<u>\$ 244,787</u>
<b>Total E(m)</b>	392,645	460,896	472,607	484,155	656,101	648,146	633,344	619,666	607,090	595,595

## Revenue Requirements Summary 2009 Amended Plan - LG&E

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 23 TC Ash Treatment Basin (BAP/GSP)</b>										
<b>Revenue Requirement</b>										
Eligible Plant	5,122,532	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	(19,340)	(483,505)	(947,669)	(1,411,834)	(1,875,998)	(2,340,163)	(2,804,327)	(3,268,492)	(3,732,656)
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	(164,245)	(328,483)	(467,987)	(584,674)	(680,187)	(756,168)	(814,032)	(855,194)	(893,618)
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	5,122,532	12,638,638	12,010,236	11,406,567	10,825,716	10,266,039	9,725,893	9,203,865	8,698,538	8,195,949
Rate of return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
	<u>\$ 554,487</u>	<u>\$ 1,349,097</u>	<u>\$ 1,282,019</u>	<u>\$ 1,217,581</u>	<u>\$ 1,155,579</u>	<u>\$ 1,095,837</u>	<u>\$ 1,038,180</u>	<u>\$ 982,456</u>	<u>\$ 928,516</u>	<u>\$ 874,868</u>
Operating expenses	-	-	-	-	-	-	-	-	-	-
Annual Depreciation expense	-	19,340	464,165	464,165	464,165	464,165	464,165	464,165	464,165	464,165
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	7,684	19,204	18,508	17,812	17,116	16,419	15,723	15,027	14,331
<b>Total OE</b>	<u>\$ -</u>	<u>\$ 27,024</u>	<u>\$ 483,369</u>	<u>\$ 482,673</u>	<u>\$ 481,976</u>	<u>\$ 481,280</u>	<u>\$ 480,584</u>	<u>\$ 479,888</u>	<u>\$ 479,191</u>	<u>\$ 478,495</u>
<b>Total E(m)</b>	554,487	1,376,121	1,765,388	1,700,254	1,637,555	1,577,117	1,518,764	1,462,344	1,407,707	1,353,363

## Revenue Requirements Summary 2009 Amended Plan - LG&E

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 24 TC CCP Storage (Landfill)</b>										
<b>Revenue Requirement</b>										
Eligible Plant	222,988	222,988	17,927,561	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	(1,272,361)	(2,600,042)	(3,927,724)	(5,255,405)	(6,583,086)	(7,910,767)
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	(36,657)	(506,438)	(905,471)	(1,239,238)	(1,512,439)	(1,729,773)
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	222,988	222,988	17,927,561	36,676,276	35,367,257	33,569,796	31,843,081	30,181,633	28,580,751	27,035,736
Rate of return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
	<u>\$ 24,137</u>	<u>\$ 23,803</u>	<u>\$ 1,913,658</u>	<u>\$ 3,914,968</u>	<u>\$ 3,775,239</u>	<u>\$ 3,583,371</u>	<u>\$ 3,399,054</u>	<u>\$ 3,221,705</u>	<u>\$ 3,050,820</u>	<u>\$ 2,885,900</u>
Operating expenses	-	-	-	-	967,296	1,025,334	1,086,854	1,152,065	1,221,189	1,294,460
Annual Depreciation expense	-	-	-	-	1,272,361	1,327,681	1,327,681	1,327,681	1,327,681	1,327,681
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	334	334	26,891	55,014	53,106	51,114	49,123	47,131	45,140
<b>Total OE</b>	<u>\$ -</u>	<u>\$ 334</u>	<u>\$ 334</u>	<u>\$ 26,891</u>	<u>\$ 2,294,671</u>	<u>\$ 2,406,121</u>	<u>\$ 2,465,649</u>	<u>\$ 2,528,869</u>	<u>\$ 2,596,001</u>	<u>\$ 2,667,281</u>
<b>Total E(m)</b>	24,137	24,137	1,913,992	3,941,860	6,069,910	5,989,491	5,864,703	5,750,574	5,646,822	5,553,180

## Revenue Requirements Summary 2009 Amended Plan - LG&E

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 25 Beneficial Reuse</b>										
<b>Revenue Requirement</b>										
Eligible Plant	1,079,764	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	(6,808)	(170,193)	(333,579)	(496,964)	(660,350)	(823,735)	(987,121)	(1,150,507)	(1,313,892)
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	(57,814)	(115,626)	(164,731)	(205,805)	(239,425)	(266,170)	(286,539)	(301,028)	(314,553)
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	1,079,764	4,448,791	4,227,594	4,015,103	3,810,643	3,613,638	3,423,507	3,239,753	3,061,878	2,884,968
Rate of return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
	<u>\$ 116,879</u>	<u>\$ 474,881</u>	<u>\$ 451,270</u>	<u>\$ 428,588</u>	<u>\$ 406,763</u>	<u>\$ 385,734</u>	<u>\$ 365,438</u>	<u>\$ 345,824</u>	<u>\$ 326,837</u>	<u>\$ 307,953</u>
Operating expenses	-	6,781,867	4,044,649	4,243,433	4,769,138	5,428,541	5,610,358	6,106,637	6,456,655	6,768,993
Annual Depreciation expense	-	6,808	163,386	163,386	163,386	163,386	163,386	163,386	163,386	163,386
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	1,620	6,760	6,515	6,270	6,025	5,780	5,535	5,289	5,044
<b>Total OE</b>	<u>\$ -</u>	<u>\$ 6,790,294</u>	<u>\$ 4,214,794</u>	<u>\$ 4,413,333</u>	<u>\$ 4,938,793</u>	<u>\$ 5,597,951</u>	<u>\$ 5,779,524</u>	<u>\$ 6,275,557</u>	<u>\$ 6,625,330</u>	<u>\$ 6,937,423</u>
<b>Total E(m)</b>	116,879	7,265,175	4,666,064	4,841,921	5,345,556	5,983,685	6,144,962	6,621,381	6,952,167	7,245,375

## Revenue Requirements Summary 2009 Amended Plan - LG&E

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Total E(m) - All LG&amp;E Projects</b>	1,088,147	10,454,728	10,896,472	13,425,806	16,340,874	16,900,613	16,928,944	17,288,483	17,531,407	17,720,482
	1,088,147	10,454,728	10,896,472	13,425,806	16,340,874	16,900,613	16,928,944	17,288,483	17,531,407	17,720,482
<b>Total Revenue Requirements</b>										
Project 18	-	1,328,398	2,078,421	2,457,617	2,631,751	2,702,173	2,767,171	2,834,519	2,917,621	2,972,968
Project 22	392,645	460,896	472,607	484,155	656,101	648,146	633,344	619,666	607,090	595,595
Project 23	554,487	1,376,121	1,765,388	1,700,254	1,637,555	1,577,117	1,518,764	1,462,344	1,407,707	1,353,363
Project 24	24,137	24,137	1,913,992	3,941,860	6,069,910	5,989,491	5,864,703	5,750,574	5,646,822	5,553,180
Project 25	116,879	7,265,175	4,666,064	4,841,921	5,345,556	5,983,685	6,144,962	6,621,381	6,952,167	7,245,375
Total	1,088,147	10,454,728	10,896,472	13,425,806	16,340,874	16,900,613	16,928,944	17,288,483	17,531,407	17,720,482
	-	-	-	-	-	-	-	-	-	-
<b>12 Month Average Jurisdictional Ratio</b>	76.68%	76.68%	76.68%	76.68%	76.68%	76.68%	76.68%	76.68%	76.68%	76.68%
<b>Jurisdictional Allocation</b>	834,400	8,016,773	8,355,505	10,295,020	12,530,318	12,959,531	12,981,255	13,256,953	13,443,229	13,588,213
<b>Forecasted 12-Month Retail Revenue</b>	778,413,576	852,058,810	945,514,250	1,008,786,330	1,101,411,960	1,130,694,020	1,198,938,250	1,240,886,920	1,292,381,370	1,322,560,460
<b>Billing Factor</b>	0.11%	0.94%	0.88%	1.02%	1.14%	1.15%	1.08%	1.07%	1.04%	1.03%
<b>LGE Residential Bill Impact</b>										
Customer Charge	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00
Energy - 1,000 Kwh @ \$0.06303	\$63.03	\$63.03	\$63.03	\$63.03	\$63.03	\$63.03	\$63.03	\$63.03	\$63.03	\$63.03
FAC billings (Apr 09 factor - \$0.00574/kWh)	\$5.74	\$5.74	\$5.74	\$5.74	\$5.74	\$5.74	\$5.74	\$5.74	\$5.74	\$5.74
DSM billings (Apr 09 factor - \$0.00193/kWh)	\$1.93	\$1.93	\$1.93	\$1.93	\$1.93	\$1.93	\$1.93	\$1.93	\$1.93	\$1.93
ECR billings (Apr 09 factor: 2.17%)	\$1.64	\$1.64	\$1.64	\$1.64	\$1.64	\$1.64	\$1.64	\$1.64	\$1.64	\$1.64
Additional ECR factor	\$0.08	\$0.71	\$0.67	\$0.77	\$0.86	\$0.87	\$0.82	\$0.81	\$0.79	\$0.78

**Revenue Requirements  
Project 18 - LG&E**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
					1	2	3	4	5	6
In-Service										
TrimbleNPC										
Project 18 - TC2 AQS O&M (Proportional Ownership)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Accumulated Expenditures	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Book Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%
Tax Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	-	-	-	-	-	-	-	-	-
Book Accumulated Depreciation Balance	-	-	-	-	-	-	-	-	-	-
Unrecovered Investment -- Book	-	-	-	-	-	-	-	-	-	-
Book Depreciation	-	-	-	-	-	-	-	-	-	-
Unrecovered Investment -- Tax total	-	-	-	-	-	-	-	-	-	-
Tax Depreciation	-	-	-	-	-	-	-	-	-	-
Allowed Rate of Return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
Book Depreciation expense total	-	-	-	-	-	-	-	-	-	-
Tax Depreciation expense total	-	-	-	-	-	-	-	-	-	-
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	-	-	-	-	-	-	-	-	-
<b>Revenue Recovery on Capital Expenditure to date</b>										
Eligible Plant, cumulative capital expenditures	-	-	-	-	-	-	-	-	-	-
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	-	-	-	-	-	-
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	-	-	-	-	-	-
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	-	-	-	-	-	-	-	-	-	-
Rate of return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
Return on Environmental Compliance Rate Base	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Operating Expenses</b>										
Annual Depreciation expense	-	1,328,398	2,078,421	2,457,617	2,631,751	2,702,173	2,767,171	2,834,519	2,917,621	2,972,968
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	-	-	-	-	-	-	-	-	-
<b>Total OE</b>	\$ -	\$ 1,328,398	\$ 2,078,421	\$ 2,457,617	\$ 2,631,751	\$ 2,702,173	\$ 2,767,171	\$ 2,834,519	\$ 2,917,621	\$ 2,972,968
<b>Total E(m) - Project</b>	-	1,328,398	2,078,421	2,457,617	2,631,751	2,702,173	2,767,171	2,834,519	2,917,621	2,972,968

**Revenue Requirements  
Project 22 - LG&E**

	2009	2010	2011	2012	January					
					2013	2014	2015	2016	2017	2018
					1	2	3	4	5	6
<b>In-Service</b>										
<b>Cane Run 6</b>										
Capital Expenditures - Project 22 - Cane Run Landfill (Phase I)	\$ 3,439,366	\$ 627,980	\$ 88,755	\$ 94,080	\$ 49,862	\$ 52,854	\$ 56,025	\$ 59,387	\$ 62,950	\$ 66,727
Accumulated Expenditures	\$ 3,439,366	\$ 4,067,346	\$ 4,156,101	\$ 4,250,181	\$ 4,300,043	\$ 4,352,897	\$ 4,408,922	\$ 4,468,309	\$ 4,531,259	\$ 4,597,986
Book Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	4.460%	4.460%	4.460%	4.460%	4.460%	4.460%
Tax Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	-	-	-	(8,022)	34,721	69,508	96,813	117,020	130,521
Book Accumulated Depreciation Balance	-	-	-	-	183,791	377,930	574,568	773,855	975,949	1,181,019
Unrecovered Investment -- Book	3,439,366	4,067,346	4,156,101	4,250,181	4,300,043	4,352,897	4,408,922	4,468,309	4,531,259	4,597,986
Book Depreciation	-	-	-	-	183,791	194,139	196,638	199,287	202,094	205,070
Unrecovered Investment -- Tax total	3,439,366	4,067,346	4,156,101	4,250,181	4,300,043	4,352,897	4,408,922	4,468,309	4,531,259	4,597,986
Tax Depreciation	-	-	-	-	161,252	314,236	294,384	276,007	258,871	243,004
Allowed Rate of Return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
Book Depreciation expense total	-	-	-	-	183,791	194,139	196,638	199,287	202,094	205,070
Tax Depreciation expense total	-	-	-	-	161,252	314,236	294,384	276,007	258,871	243,004
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	-	-	-	(8,022)	42,742	34,788	27,305	20,207	13,500
<b>Revenue Recovery on Capital Expenditure to date</b>										
Eligible Plant, cumulative capital expenditures	3,439,366	4,067,346	4,156,101	4,250,181	4,300,043	4,352,897	4,408,922	4,468,309	4,531,259	4,597,986
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	(183,791)	(377,930)	(574,568)	(773,855)	(975,949)	(1,181,019)
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	8,022	(34,721)	(69,508)	(96,813)	(117,020)	(130,521)
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	3,439,366	4,067,346	4,156,101	4,250,181	4,124,274	3,940,246	3,764,846	3,597,641	3,438,290	3,286,446
Rate of return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
	\$ 372,293	\$ 434,164	\$ 443,638	\$ 453,681	\$ 440,241	\$ 420,597	\$ 401,874	\$ 384,026	\$ 367,016	\$ 350,808
<b>Operating Expenses</b>										
Annual Depreciation expense	-	-	-	-	183,791	194,139	196,638	199,287	202,094	205,070
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	5,159	6,101	6,234	6,375	6,174	5,962	5,752	5,542	5,333
Total OE	\$ 20,352	\$ 26,732	\$ 28,969	\$ 30,474	\$ 215,860	\$ 227,549	\$ 231,470	\$ 235,640	\$ 240,074	\$ 244,787
<b>Total E(m) - Project</b>	392,645	460,896	472,607	484,155	656,101	648,146	633,344	619,666	607,090	595,595

### Revenue Requirements Project 23 - LG&E

	December									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
In-Service		1	2	3	4	5	6	7	8	9
<b>TrimbleNPC</b>										
Capital Expenditures - Project 23 - TC Ash Treatment Basin (BAP/Gypsum) (Proportional Ownership)	\$ 5,122,532	\$ 7,699,692	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Accumulated Expenditures</b>	\$ 5,122,532	\$ 12,822,224	\$ 12,822,224	\$ 12,822,224	\$ 12,822,224	\$ 12,822,224	\$ 12,822,224	\$ 12,822,224	\$ 12,822,224	\$ 12,822,224
Book Depreciation rate, per year	0.000%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%
Tax Depreciation rate, per year	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%	4.888%	4.522%	4.462%
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	164,245	328,483	467,987	584,674	680,187	756,168	814,032	855,194	893,618
Book Accumulated Depreciation Balance	-	19,340	483,505	947,669	1,411,834	1,875,998	2,340,163	2,804,327	3,268,492	3,732,656
Unrecovered Investment -- Book	5,122,532	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224
Book Depreciation	-	19,340	464,165	464,165	464,165	464,165	464,165	464,165	464,165	464,165
Unrecovered Investment -- Tax total	5,122,532	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224
Tax Depreciation	-	480,833	925,636	856,140	792,029	732,534	677,655	626,750	579,821	572,128
Allowed Rate of Return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
Book Depreciation expense total	-	19,340	464,165	464,165	464,165	464,165	464,165	464,165	464,165	464,165
Tax Depreciation expense total	-	480,833	925,636	856,140	792,029	732,534	677,655	626,750	579,821	572,128
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	164,245	164,238	139,504	116,687	95,513	75,981	57,864	41,162	38,424
<b>Revenue Recovery on Capital Expenditure to date</b>										
Eligible Plant, cumulative capital expenditures	5,122,532	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224	12,822,224
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	(19,340)	(483,505)	(947,669)	(1,411,834)	(1,875,998)	(2,340,163)	(2,804,327)	(3,268,492)	(3,732,656)
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	(164,245)	(328,483)	(467,987)	(584,674)	(680,187)	(756,168)	(814,032)	(855,194)	(893,618)
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	5,122,532	12,638,638	12,010,236	11,406,567	10,825,716	10,266,039	9,725,893	9,203,865	8,698,538	8,195,949
Rate of return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
	\$ 554,487	\$ 1,349,097	\$ 1,282,019	\$ 1,217,581	\$ 1,155,579	\$ 1,095,837	\$ 1,038,180	\$ 982,456	\$ 928,516	\$ 874,868
<b>Operating Expenses</b>										
Annual Depreciation expense	-	19,340	464,165	464,165	464,165	464,165	464,165	464,165	464,165	464,165
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	7,684	19,204	18,508	17,812	17,116	16,419	15,723	15,027	14,331
<b>Total OE</b>	\$ -	\$ 27,024	\$ 483,369	\$ 482,673	\$ 481,976	\$ 481,280	\$ 480,584	\$ 479,888	\$ 479,191	\$ 478,495
<b>Total E(m) - Project</b>	554,487	1,376,121	1,765,388	1,700,254	1,637,555	1,577,117	1,518,764	1,462,344	1,407,707	1,353,363

### Revenue Requirements Project 24 - LG&E

	January									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
					1	2	3	4	5	6
In-Service										
TrimbleNPC										
Capital Expenditures - Project 24 - TC CCP Storage (Landfill) (Proportional Ownership)	\$ 222,988	\$ -	\$ 17,704,573	\$ 18,748,715	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Accumulated Expenditures	\$ 222,988	\$ 222,988	\$ 17,927,561	\$ 36,676,276	\$ 36,676,276	\$ 36,676,276	\$ 36,676,276	\$ 36,676,276	\$ 36,676,276	\$ 36,676,276
Book Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%
Tax Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	-	-	-	36,657	506,438	905,471	1,239,238	1,512,439	1,729,773
Book Accumulated Depreciation Balance	-	-	-	-	1,272,361	2,600,042	3,927,724	5,255,405	6,583,086	7,910,767
Unrecovered Investment -- Book	222,988	222,988	17,927,561	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276
Book Depreciation	-	-	-	-	1,272,361	1,327,681	1,327,681	1,327,681	1,327,681	1,327,681
Unrecovered Investment -- Tax total	222,988	222,988	17,927,561	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276
Tax Depreciation	-	-	-	-	1,375,360	2,647,660	2,448,875	2,265,494	2,095,316	1,938,341
Allowed Rate of Return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
Book Depreciation expense total	-	-	-	-	1,272,361	1,327,681	1,327,681	1,327,681	1,327,681	1,327,681
Tax Depreciation expense total	-	-	-	-	1,375,360	2,647,660	2,448,875	2,265,494	2,095,316	1,938,341
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	-	-	-	36,657	469,781	399,033	333,767	273,201	217,334
<b>Revenue Recovery on Capital Expenditure to date</b>										
Eligible Plant, cumulative capital expenditures	222,988	222,988	17,927,561	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276	36,676,276
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	(1,272,361)	(2,600,042)	(3,927,724)	(5,255,405)	(6,583,086)	(7,910,767)
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	(36,657)	(506,438)	(905,471)	(1,239,238)	(1,512,439)	(1,729,773)
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	222,988	222,988	17,927,561	36,676,276	35,367,257	33,589,796	31,843,081	30,181,633	28,580,751	27,035,736
Rate of return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
	<b>\$ 24,137</b>	<b>\$ 23,803</b>	<b>\$ 1,913,658</b>	<b>\$ 3,914,968</b>	<b>\$ 3,775,239</b>	<b>\$ 3,583,371</b>	<b>\$ 3,399,054</b>	<b>\$ 3,221,705</b>	<b>\$ 3,050,820</b>	<b>\$ 2,885,900</b>
Operating Expenses	-	-	-	-	967,296	1,025,334	1,086,854	1,152,065	1,221,189	1,294,460
Annual Depreciation expense	-	-	-	-	1,272,361	1,327,681	1,327,681	1,327,681	1,327,681	1,327,681
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	334	334	26,891	55,014	53,106	51,114	49,123	47,131	45,140
<b>Total OE</b>	<b>\$ -</b>	<b>\$ 334</b>	<b>\$ 334</b>	<b>\$ 26,891</b>	<b>\$ 2,294,671</b>	<b>\$ 2,406,121</b>	<b>\$ 2,465,649</b>	<b>\$ 2,528,869</b>	<b>\$ 2,596,001</b>	<b>\$ 2,667,281</b>
<b>Total E(m) - Project</b>	<b>24,137</b>	<b>24,137</b>	<b>1,913,992</b>	<b>3,941,860</b>	<b>6,069,910</b>	<b>5,989,491</b>	<b>5,864,703</b>	<b>5,750,574</b>	<b>5,646,822</b>	<b>5,553,180</b>

**Revenue Requirements  
Project 25 - LG&E**

	December									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
		1	2	3	4	5	6	7	8	9
In-Service										
TrimbleNPC										
<b>Project 25 - Beneficial Reuse</b>	\$ 1,079,764	\$ 3,433,649	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Accumulated Expenditures</b>	\$ 1,079,764	\$ 4,513,413	\$ 4,513,413	\$ 4,513,413	\$ 4,513,413	\$ 4,513,413	\$ 4,513,413	\$ 4,513,413	\$ 4,513,413	\$ 4,513,413
Book Depreciation rate, per year	0.000%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%
Tax Depreciation rate, per year	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%	4.888%	4.522%	4.462%
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	57,814	115,626	164,731	205,805	239,425	266,170	286,539	301,028	314,553
Book Accumulated Depreciation Balance	-	6,808	170,193	333,579	496,964	660,350	823,735	987,121	1,150,507	1,313,892
Unrecovered Investment – Book	1,079,764	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413
Book Depreciation	-	6,808	163,386	163,386	163,386	163,386	163,386	163,386	163,386	163,386
Unrecovered Investment – Tax total	1,079,764	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413
Tax Depreciation	-	169,253	325,823	301,361	278,794	257,851	238,534	220,616	204,097	201,388
Allowed Rate of Return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
Book Depreciation expense total	-	6,808	163,386	163,386	163,386	163,386	163,386	163,386	163,386	163,386
Tax Depreciation expense total	-	169,253	325,823	301,361	278,794	257,851	238,534	220,616	204,097	201,388
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	57,814	57,812	49,105	41,074	33,620	26,745	20,368	14,489	13,525
<b>Revenue Recovery on Capital Expenditure to date</b>										
Eligible Plant, cumulative capital expenditures	1,079,764	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413	4,513,413
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	(6,808)	(170,193)	(333,579)	(496,964)	(660,350)	(823,735)	(987,121)	(1,150,507)	(1,313,892)
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	(57,814)	(115,626)	(164,731)	(205,805)	(239,425)	(266,170)	(286,539)	(301,028)	(314,553)
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	1,079,764	4,448,791	4,227,594	4,015,103	3,810,643	3,613,638	3,423,507	3,239,753	3,061,878	2,884,968
Rate of return	10.82%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%	10.67%
	\$ 116,879	\$ 474,881	\$ 451,270	\$ 428,588	\$ 406,763	\$ 385,734	\$ 365,438	\$ 345,824	\$ 326,837	\$ 307,953
<b>Operating Expenses</b>	-	6,781,867	4,044,649	4,243,433	4,769,138	5,428,541	5,610,358	6,106,637	6,456,655	6,768,993
Annual Depreciation expense	-	6,808	163,386	163,386	163,386	163,386	163,386	163,386	163,386	163,386
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	1,620	6,760	6,515	6,270	6,025	5,780	5,535	5,289	5,044
<b>Total OE</b>	\$ -	\$ 6,790,294	\$ 4,214,794	\$ 4,413,333	\$ 4,938,793	\$ 5,597,951	\$ 5,779,524	\$ 6,275,557	\$ 6,625,330	\$ 6,937,423
<b>Total E(m) - Project</b>	116,879	7,265,175	4,666,064	4,841,921	5,345,556	5,983,685	6,144,962	6,621,381	6,952,167	7,245,375

**Summary Cash Flow**  
**Cash Flow for 2009 thru 2018**  
**2009 LG&E Amended ECR Plan**

1 Top section used for calculation

Date	TC2 AQS		TC BAP/	TC CCP	Beneficial Reuse	Total
	O&M (Project 18)	CR Landfill (Project 22)	Gypsum Storage (Project 23)	Storage (Landfill) (Project 24)		
2009	\$ -	\$ 3,439,366	\$ 5,122,532	\$ 222,988	\$ 1,079,764	\$ 9,864,649
2010	\$ -	\$ 627,980	\$ 7,899,692	\$ -	\$ 3,433,649	\$ 11,761,321
2011	\$ -	\$ 88,755	\$ -	\$ 17,704,573	\$ -	\$ 17,793,328
2012	\$ -	\$ 94,080	\$ -	\$ 18,748,715	\$ -	\$ 18,842,795
2013	\$ -	\$ 49,862	\$ -	\$ -	\$ -	\$ 49,862
2014	\$ -	\$ 52,854	\$ -	\$ -	\$ -	\$ 52,854
2015	\$ -	\$ 56,025	\$ -	\$ -	\$ -	\$ 56,025
2016	\$ -	\$ 59,387	\$ -	\$ -	\$ -	\$ 59,387
2017	\$ -	\$ 62,950	\$ -	\$ -	\$ -	\$ 62,950
2018	\$ -	\$ 66,727	\$ -	\$ -	\$ -	\$ 66,727
	\$ -	\$ 4,597,966	\$ 12,822,224	\$ 36,676,276	\$ 4,513,413	\$ 58,609,899

2008	\$ -	\$ 324,374	\$ 191,000	\$ 571,764	\$ -	\$ -
2009	\$ -	\$ -	\$ 12,943,697	\$ -	\$ 2,768,625	\$ -
2010	\$ -	\$ -	\$ 19,742,801	\$ -	\$ 8,804,228	\$ -
2011	\$ -	\$ -	\$ -	\$ 45,396,341	\$ -	\$ -
2012	\$ -	\$ -	\$ -	\$ 48,073,628	\$ -	\$ -
2013	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2014	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2015	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2016	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

LG&E Proportional Share - TC Shared Facilities  
 LG&E 52%  
 KU 48%

Assumes no beneficial reuse

Date	TC2 AQS		TC BAP/	TC CCP	Beneficial Reuse	Total
	O&M (Project 18)	CR Landfill (Project 22)	Gypsum Storage (Project 23)	Storage (Landfill) (Project 24)		
2009	\$ -	\$ 3,636,844	\$ 5,122,532	\$ 222,988	\$ -	\$ 8,982,364
2010	\$ -	\$ 1,440,377	\$ 7,899,692	\$ -	\$ -	\$ 9,140,069
2011	\$ -	\$ 7,801,078	\$ -	\$ 17,704,573	\$ -	\$ 25,505,651
2012	\$ -	\$ 5,005,037	\$ -	\$ 18,748,715	\$ -	\$ 23,753,752
2013	\$ -	\$ 307,310	\$ -	\$ -	\$ -	\$ 307,310
2014	\$ -	\$ 325,748	\$ -	\$ -	\$ -	\$ 325,748
2015	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2016	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	\$ -	\$ 18,516,394	\$ 12,822,224	\$ 36,676,276	\$ -	\$ 68,014,894

2008	\$ -	\$ 324,374	\$ 191,000	\$ 571,764	\$ -	\$ -
2009	\$ -	\$ -	\$ 12,943,697	\$ -	\$ -	\$ -
2010	\$ -	\$ -	\$ 19,742,801	\$ -	\$ -	\$ -
2011	\$ -	\$ -	\$ -	\$ 45,396,341	\$ -	\$ -
2012	\$ -	\$ -	\$ -	\$ 48,073,628	\$ -	\$ -
2013	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2014	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2015	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2016	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

LG&E Proportional Share - TC Shared Facilities  
 LG&E 52%  
 KU 48%

Assumes beneficial reuse

Date	TC2 AQS O&M		TC BAP/ Gypsum	TC CCP Storage	Beneficial Reuse	Total
	(Project 18)	CR Landfill (Project 22)	Storage (Project 23)	(Landfill) (Project 24)		
2009	\$ -	\$ 3,439,366	\$ 5,122,532	\$ 222,988	\$ 1,079,764	\$ 9,864,649
2010	\$ -	\$ 627,980	\$ 7,699,692	\$ -	\$ 3,433,649	\$ 11,761,321
2011	\$ -	\$ 88,755	\$ -	\$ 17,704,573	\$ -	\$ 17,793,328
2012	\$ -	\$ 94,080	\$ -	\$ 18,748,715	\$ -	\$ 18,842,795
2013	\$ -	\$ 49,862	\$ -	\$ -	\$ -	\$ 49,862
2014	\$ -	\$ 52,854	\$ -	\$ -	\$ -	\$ 52,854
2015	\$ -	\$ 56,025	\$ -	\$ -	\$ -	\$ 56,025
2016	\$ -	\$ 59,387	\$ -	\$ -	\$ -	\$ 59,387
2017	\$ -	\$ 62,950	\$ -	\$ -	\$ -	\$ 62,950
2018	\$ -	\$ 66,727	\$ -	\$ -	\$ -	\$ 66,727
	\$ -	\$ 4,597,986	\$ 12,822,224	\$ 36,676,276	\$ 4,613,413	\$ 58,609,899

2008	\$ 324,374	\$ 191,000	\$ 571,764	\$ -	\$ -	\$ -
2009	\$ -	\$ 12,943,697	\$ -	\$ -	\$ 2,768,625	\$ -
2010	\$ -	\$ 19,742,801	\$ -	\$ -	\$ 8,804,228	\$ -
2011	\$ -	\$ -	\$ 45,396,341	\$ -	\$ -	\$ -
2012	\$ -	\$ -	\$ 48,073,628	\$ -	\$ -	\$ -
2013	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2014	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2015	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2016	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

LG&E Proportional Share - TC Shared Facilities  
 LG&E 75%  
 KU 52%  
 48%

Maximizes capital – assumes Holcim with no BR landfill spending

Date	TC2 AQS O&M		TC BAP/ Gypsum	TC CCP Storage	Beneficial Reuse	Total
	(Project 18)	CR Landfill (Project 22)	Storage (Project 23)	(Landfill) (Project 24)		
2009	\$ -	\$ 3,636,844	\$ 5,122,532	\$ 222,988	\$ 1,079,764	\$ 10,062,127
2010	\$ -	\$ 1,440,377	\$ 7,699,692	\$ -	\$ 3,433,649	\$ 12,573,718
2011	\$ -	\$ 7,801,078	\$ -	\$ 17,704,573	\$ -	\$ 25,505,651
2012	\$ -	\$ 5,005,037	\$ -	\$ 18,748,715	\$ -	\$ 23,753,752
2013	\$ -	\$ 307,310	\$ -	\$ -	\$ -	\$ 307,310
2014	\$ -	\$ 325,748	\$ -	\$ -	\$ -	\$ 325,748
2015	\$ -	\$ 56,025	\$ -	\$ -	\$ -	\$ 56,025
2016	\$ -	\$ 59,387	\$ -	\$ -	\$ -	\$ 59,387
2017	\$ -	\$ 62,950	\$ -	\$ -	\$ -	\$ 62,950
2018	\$ -	\$ 66,727	\$ -	\$ -	\$ -	\$ 66,727
	\$ -	\$ 18,761,483	\$ 12,822,224	\$ 36,676,276	\$ 4,513,413	\$ 72,773,395

2008	\$ 324,374	\$ 191,000	\$ 571,764	\$ -	\$ -	\$ -
2009	\$ -	\$ 12,943,697	\$ -	\$ -	\$ 2,768,625	\$ -
2010	\$ -	\$ 19,742,801	\$ -	\$ -	\$ 8,804,228	\$ -
2011	\$ -	\$ -	\$ 45,396,341	\$ -	\$ -	\$ -
2012	\$ -	\$ -	\$ 48,073,628	\$ -	\$ -	\$ -
2013	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2014	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2015	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2016	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

LG&E Proportional Share - TC Shared Facilities  
 LG&E 75%  
 KU 52%  
 48%

## Revenue Requirements Summary 2009 Amended Plan - KU

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 23 TC2 AQS O&amp;M</b>										
<b>Revenue Requirement</b>										
Eligible Plant	-	-	-	-	-	-	-	-	-	-
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	-	-	-	-	-	-
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	-	-	-	-	-	-
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	-	-	-	-	-	-	-	-	-	-
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
Operating expenses	-	5,663,169	8,860,636	10,477,210	11,219,570	11,519,791	11,796,886	12,084,001	12,438,277	12,674,231
Annual Depreciation expense	-	-	-	-	-	-	-	-	-	-
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	-	-	-	-	-	-	-	-	-
<b>Total OE</b>	<u>\$ -</u>	<u>\$ 5,663,169</u>	<u>\$ 8,860,636</u>	<u>\$ 10,477,210</u>	<u>\$ 11,219,570</u>	<u>\$ 11,519,791</u>	<u>\$ 11,796,886</u>	<u>\$ 12,084,001</u>	<u>\$ 12,438,277</u>	<u>\$ 12,674,231</u>
<b>Total E(m)</b>	-	5,663,169	8,860,636	10,477,210	11,219,570	11,519,791	11,796,886	12,084,001	12,438,277	12,674,231

## Revenue Requirements Summary 2009 Amended Plan - KU

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 28 BR3 SCR</b>										
<b>Revenue Requirement</b>										
Eligible Plant	348,805	34,848,805	108,948,805	178,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	(1,043,285)	(6,191,051)	(11,338,818)	(16,486,584)	(21,634,351)	(26,782,117)	(31,929,884)
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	(2,015,656)	(4,907,087)	(7,443,877)	(9,653,509)	(11,559,537)	(13,185,517)	(14,551,732)
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	348,805	34,848,805	108,948,805	175,789,864	172,750,667	165,066,110	157,708,712	150,654,917	143,881,171	137,367,189
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
	<u>\$ 38,782</u>	<u>\$ 3,822,662</u>	<u>\$ 11,950,896</u>	<u>\$ 19,282,877</u>	<u>\$ 18,949,499</u>	<u>\$ 18,106,558</u>	<u>\$ 17,299,505</u>	<u>\$ 16,525,755</u>	<u>\$ 15,782,724</u>	<u>\$ 15,068,187</u>
Operating expenses	-	-	-	649,267	3,122,809	3,193,154	3,239,641	3,335,614	3,463,706	3,572,886
Annual Depreciation expense	-	-	-	1,043,285	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	523	52,273	163,423	266,708	266,487	258,765	251,043	243,322	235,600
<b>Total OE</b>	<u>\$ -</u>	<u>\$ 523</u>	<u>\$ 52,273</u>	<u>\$ 1,855,975</u>	<u>\$ 8,537,284</u>	<u>\$ 8,607,407</u>	<u>\$ 8,646,173</u>	<u>\$ 8,734,424</u>	<u>\$ 8,854,794</u>	<u>\$ 8,956,253</u>
<b>Total E(m)</b>	38,782	3,823,185	12,003,169	21,138,852	27,486,783	26,713,966	25,945,678	25,260,179	24,637,518	24,024,440

## Revenue Requirements Summary 2009 Amended Plan - KU

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 29</b>										
<b>Brown Ash Pond - Phase II</b>										
<b>Revenue Requirement</b>										
Eligible Plant	120,681	8,140,291	18,308,495	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	(29,001)	(725,035)	(1,421,069)	(2,117,103)	(2,813,136)	(3,509,170)	(4,205,204)
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	(321,444)	(712,397)	(1,055,398)	(1,354,164)	(1,611,880)	(1,831,730)	(2,016,457)
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	120,681	8,140,291	18,308,495	24,507,901	23,420,915	22,381,880	21,387,080	20,433,331	19,517,447	18,636,686
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
	<u>\$ 13,418</u>	<u>\$ 892,931</u>	<u>\$ 2,008,309</u>	<u>\$ 2,688,340</u>	<u>\$ 2,569,105</u>	<u>\$ 2,455,130</u>	<u>\$ 2,346,008</u>	<u>\$ 2,241,389</u>	<u>\$ 2,140,923</u>	<u>\$ 2,044,310</u>
Operating expenses	-	-	-	-	-	-	-	-	-	-
Annual Depreciation expense	-	-	-	29,001	696,034	696,034	696,034	696,034	696,034	696,034
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	181	12,210	27,463	37,244	36,200	35,156	34,112	33,068	32,024
<b>Total OE</b>	<u>\$ -</u>	<u>\$ 181</u>	<u>\$ 12,210</u>	<u>\$ 56,464</u>	<u>\$ 733,278</u>	<u>\$ 732,234</u>	<u>\$ 731,190</u>	<u>\$ 730,146</u>	<u>\$ 729,102</u>	<u>\$ 728,057</u>
<b>Total E(m)</b>	13,418	893,112	2,020,520	2,744,804	3,302,383	3,187,364	3,077,198	2,971,534	2,870,024	2,772,367

## Revenue Requirements Summary 2009 Amended Plan - KU

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 30 Ghent Landfill - Phase I</b>										
<b>Revenue Requirement</b>										
Eligible Plant	4,321,671	46,478,848	105,485,803	177,577,356	191,133,918	201,941,953	202,578,976	203,254,220	203,969,979	203,969,979
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	(5,110,443)	(10,744,624)	(16,396,577)	(22,067,370)	(27,758,132)	(33,448,895)
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	(732,114)	(3,915,287)	(6,717,731)	(9,167,825)	(11,289,716)	(13,100,909)
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	4,321,671	46,478,848	105,485,803	177,577,356	185,291,361	187,282,042	179,464,668	172,019,025	164,922,131	157,420,175
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
	<u>\$ 480,509</u>	<u>\$ 5,098,393</u>	<u>\$ 11,571,030</u>	<u>\$ 19,478,952</u>	<u>\$ 20,325,122</u>	<u>\$ 20,543,486</u>	<u>\$ 19,685,976</u>	<u>\$ 18,869,243</u>	<u>\$ 18,090,765</u>	<u>\$ 17,267,855</u>
Operating expenses	84,800	121,349	128,630	136,348	19,003,308	20,143,507	21,352,117	22,633,244	23,991,239	25,430,713
Annual Depreciation expense	-	-	-	-	5,110,443	5,634,180	5,651,953	5,670,793	5,690,762	5,690,762
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	6,483	69,718	158,229	266,366	279,035	286,796	279,274	271,780	264,318
<b>Total OE</b>	<u>\$ 84,800</u>	<u>\$ 127,832</u>	<u>\$ 198,348</u>	<u>\$ 294,577</u>	<u>\$ 24,380,117</u>	<u>\$ 26,056,723</u>	<u>\$ 27,290,866</u>	<u>\$ 28,583,310</u>	<u>\$ 29,953,782</u>	<u>\$ 31,385,793</u>
<b>Total E(m)</b>	565,309	5,226,225	11,769,378	19,773,528	44,705,239	46,600,208	46,976,843	47,452,553	48,044,547	48,653,648

## Revenue Requirements Summary 2009 Amended Plan - KU

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 31 TC Ash Treatment Basin (BAP/GSP)</b>										
<b>Revenue Requirement</b>										
Eligible Plant	4,728,491	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	(17,852)	(446,312)	(874,772)	(1,303,231)	(1,731,691)	(2,160,150)	(2,588,610)	(3,017,069)	(3,445,529)
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	(151,611)	(303,215)	(431,988)	(539,699)	(627,865)	(698,001)	(751,414)	(789,410)	(824,878)
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	4,728,491	11,666,435	11,086,372	10,529,139	9,992,969	9,476,344	8,977,748	8,495,875	8,029,420	7,565,492
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
	<u>\$ 525,742</u>	<u>\$ 1,279,724</u>	<u>\$ 1,216,095</u>	<u>\$ 1,154,970</u>	<u>\$ 1,096,156</u>	<u>\$ 1,039,486</u>	<u>\$ 984,794</u>	<u>\$ 931,936</u>	<u>\$ 880,769</u>	<u>\$ 829,880</u>
Operating expenses	-	-	-	-	-	-	-	-	-	-
Annual Depreciation expense	-	17,852	428,460	428,460	428,460	428,460	428,460	428,460	428,460	428,460
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	7,093	17,727	17,084	16,442	15,799	15,156	14,514	13,871	13,228
<b>Total OE</b>	<u>\$ -</u>	<u>\$ 24,945</u>	<u>\$ 446,187</u>	<u>\$ 445,544</u>	<u>\$ 444,901</u>	<u>\$ 444,259</u>	<u>\$ 443,616</u>	<u>\$ 442,973</u>	<u>\$ 442,330</u>	<u>\$ 441,688</u>
<b>Total E(m)</b>	525,742	1,304,669	1,662,281	1,600,514	1,541,058	1,483,745	1,428,410	1,374,909	1,323,100	1,271,568

## Revenue Requirements Summary 2009 Amended Plan - KU

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 32 TC CCP Storage (Landfill)</b>										
<b>Revenue Requirement</b>										
Eligible Plant	205,835	205,835	16,548,518	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	(1,174,487)	(2,400,039)	(3,625,591)	(4,851,143)	(6,076,695)	(7,302,247)
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	(33,838)	(467,481)	(835,819)	(1,143,912)	(1,396,098)	(1,596,714)
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	205,835	205,835	16,548,518	33,855,024	32,646,699	30,987,504	29,393,614	27,859,969	26,382,231	24,956,064
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
	<u>\$ 22,886</u>	<u>\$ 22,579</u>	<u>\$ 1,815,253</u>	<u>\$ 3,713,651</u>	<u>\$ 3,581,107</u>	<u>\$ 3,399,105</u>	<u>\$ 3,224,267</u>	<u>\$ 3,056,037</u>	<u>\$ 2,893,940</u>	<u>\$ 2,737,500</u>
Operating expenses	-	-	-	-	892,889	946,462	1,003,249	1,063,444	1,127,251	1,194,886
Annual Depreciation expense	-	-	-	-	1,174,487	1,225,552	1,225,552	1,225,552	1,225,552	1,225,552
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	309	309	24,823	50,783	49,021	47,182	45,344	43,506	41,667
<b>Total OE</b>	<u>\$ -</u>	<u>\$ 309</u>	<u>\$ 309</u>	<u>\$ 24,823</u>	<u>\$ 2,118,158</u>	<u>\$ 2,221,035</u>	<u>\$ 2,275,984</u>	<u>\$ 2,334,340</u>	<u>\$ 2,396,309</u>	<u>\$ 2,462,105</u>
<b>Total E(m)</b>	22,886	22,887	1,815,561	3,738,474	5,699,265	5,620,140	5,500,251	5,390,377	5,290,249	5,199,605

## Revenue Requirements Summary 2009 Amended Plan - KU

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Project 33 Beneficial Reuse</b>										
<b>Revenue Requirement</b>										
Eligible Plant	996,705	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	(6,284)	(157,101)	(307,919)	(458,736)	(609,554)	(760,371)	(911,189)	(1,062,006)	(1,212,823)
Plus: Accumulated Depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	(53,367)	(106,732)	(152,060)	(189,974)	(221,008)	(245,696)	(264,497)	(277,872)	(290,357)
Plus: Deferred Tax Balance on retired plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	996,705	4,106,576	3,902,394	3,706,249	3,517,517	3,335,665	3,160,160	2,990,541	2,826,349	2,663,047
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
	<u>\$ 110,820</u>	<u>\$ 450,462</u>	<u>\$ 428,064</u>	<u>\$ 406,549</u>	<u>\$ 385,846</u>	<u>\$ 365,898</u>	<u>\$ 346,647</u>	<u>\$ 328,041</u>	<u>\$ 310,030</u>	<u>\$ 292,117</u>
Operating expenses	50,000	4,181,968	4,423,023	1,788,885	592,869	613,321	635,000	657,980	682,339	708,159
Annual Depreciation expense	-	6,284	150,817	150,817	150,817	150,817	150,817	150,817	150,817	150,817
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	1,495	6,240	6,014	5,787	5,561	5,335	5,109	4,883	4,656
<b>Total OE</b>	<u>\$ 50,000</u>	<u>\$ 4,189,747</u>	<u>\$ 4,580,080</u>	<u>\$ 1,945,716</u>	<u>\$ 749,474</u>	<u>\$ 769,700</u>	<u>\$ 791,153</u>	<u>\$ 813,906</u>	<u>\$ 838,039</u>	<u>\$ 863,633</u>
<b>Total E(m)</b>	160,820	4,640,209	5,008,145	2,352,265	1,135,320	1,135,598	1,137,799	1,141,947	1,148,069	1,155,750

## Revenue Requirements Summary 2009 Amended Plan - KU

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Total E(m) - All KU Projects</b>	1,326,957	21,573,456	43,139,690	61,825,647	95,089,617	96,260,812	95,863,064	95,675,501	95,751,784	95,751,608
	1,326,957	21,573,456	43,139,690	61,825,647	95,089,617	96,260,812	95,863,064	95,675,501	95,751,784	95,751,608
<b>Total Revenue Requirements</b>										
Project 23	-	5,663,169	8,860,636	10,477,210	11,219,570	11,519,791	11,796,886	12,084,001	12,438,277	12,674,231
Project 28	38,782	3,823,185	12,003,169	21,138,852	27,486,783	26,713,966	25,945,678	25,260,179	24,637,518	24,024,440
Project 29	13,418	893,112	2,020,520	2,744,804	3,302,383	3,187,364	3,077,198	2,971,534	2,870,024	2,772,367
Project 30	565,309	5,226,225	11,769,378	19,773,528	44,705,239	46,600,208	46,976,843	47,452,553	48,044,547	48,653,648
Project 31	525,742	1,304,669	1,662,281	1,600,514	1,541,058	1,483,745	1,428,410	1,374,909	1,323,100	1,271,568
Project 32	22,886	22,887	1,815,561	3,738,474	5,699,265	5,620,140	5,500,251	5,390,377	5,290,249	5,199,605
Project 33	160,820	4,640,209	5,008,145	2,352,265	1,135,320	1,135,598	1,137,799	1,141,947	1,148,069	1,155,750
<b>Total</b>	1,326,957	21,573,456	43,139,690	61,825,647	95,089,617	96,260,812	95,863,064	95,675,501	95,751,784	95,751,608
	-	-	-	-	-	-	-	-	-	-
<b>12 Month Average Jurisdictional Ratio</b>	81.91%	81.91%	81.91%	81.91%	81.91%	81.91%	81.91%	81.91%	81.91%	81.91%
<b>Jurisdictional Allocation</b>	1,086,855	17,669,919	35,333,923	50,638,811	77,883,944	78,843,220	78,517,441	78,363,817	78,426,296	78,426,153
<b>Forecasted 12-Month Retail Revenue</b>	1,104,927,144	1,237,119,744	1,313,556,392	1,379,068,850	1,449,620,460	1,514,540,580	1,599,080,120	1,649,862,080	1,749,085,440	1,804,598,160
<b>Billing Factor</b>	0.10%	1.43%	2.69%	3.67%	5.37%	5.21%	4.91%	4.75%	4.48%	4.35%
<b>KU Residential Bill Impact</b>										
Customer Charge	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00	\$5.00
Energy - 1,000 Kwh @ \$0.05716	\$57.16	\$57.16	\$57.16	\$57.16	\$57.16	\$57.16	\$57.16	\$57.16	\$57.16	\$57.16
FAC billings (Apr 09 factor - \$0.00584/kWh)	\$5.84	\$5.84	\$5.84	\$5.84	\$5.84	\$5.84	\$5.84	\$5.84	\$5.84	\$5.84
DSM billings (Apr 09 factor - \$0.00144/kWh)	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44
ECR billings (Apr 09 factor: 9.89%)	\$6.87	\$6.87	\$6.87	\$6.87	\$6.87	\$6.87	\$6.87	\$6.87	\$6.87	\$6.87
Additional ECR factor	\$0.07	\$0.99	\$1.87	\$2.55	\$3.73	\$3.61	\$3.41	\$3.30	\$3.11	\$3.02

### Revenue Requirements Project 23 - KU

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
					1	2	3	4	5	6
In-Service										
TrimbleNPC										
Capital Expenditures - Project 23 - TC2 AQS O&M (Proportional Ownership) \$	-	-	-	-	-	-	-	-	-	-
Accumulated Expenditures	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Book Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%
Tax Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	-	-	-	-	-	-	-	-	-
Book Accumulated Depreciation Balance	-	-	-	-	-	-	-	-	-	-
Unrecovered Investment – Book	-	-	-	-	-	-	-	-	-	-
Book Depreciation	-	-	-	-	-	-	-	-	-	-
Unrecovered Investment – Tax total	-	-	-	-	-	-	-	-	-	-
Tax Depreciation	-	-	-	-	-	-	-	-	-	-
Allowed Rate of Return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Book Depreciation expense total	-	-	-	-	-	-	-	-	-	-
Tax Depreciation expense total	-	-	-	-	-	-	-	-	-	-
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	-	-	-	-	-	-	-	-	-
<b>Revenue Recovery on Capital Expenditure to date</b>										
Eligible Plant, cumulative capital expenditures	-	-	-	-	-	-	-	-	-	-
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	-	-	-	-	-	-
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	-	-	-	-	-	-
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	-	-	-	-	-	-	-	-	-	-
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Return on Environmental Compliance Rate Base	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Operating Expenses</b>										
Annual Depreciation expense	-	-	-	-	-	-	-	-	-	-
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	-	-	-	-	-	-	-	-	-
<b>Total OE</b>	\$ -	\$ 5,663,169	\$ 8,860,636	\$ 10,477,210	\$ 11,219,570	\$ 11,519,791	\$ 11,796,886	\$ 12,084,001	\$ 12,438,277	\$ 12,674,231
<b>Total E(m) - Project</b>	-	5,663,169	8,860,636	10,477,210	11,219,570	11,519,791	11,796,886	12,084,001	12,438,277	12,674,231

### Revenue Requirements Project 28 - KU

	2009	2010	2011	October		2013	2014	2015	2016	2017	2018
				1	2	3	4	5	6	7	
In-Service											
<b>Brown 3</b>											
<b>Capital Expenditures - Project 28 - BR3 SCR</b>	\$ 348,805	\$ 34,500,000	\$ 74,100,000	\$ 69,900,000	\$ 5,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Accumulated Expenditures</b>	\$ 348,805	\$ 34,848,805	\$ 108,948,805	\$ 178,848,805	\$ 183,848,805	\$ 183,848,805	\$ 183,848,805	\$ 183,848,805	\$ 183,848,805	\$ 183,848,805	\$ 183,848,805
Book Depreciation rate, per year	0.000%	0.000%	0.000%	2.800%	2.800%	2.800%	2.800%	2.800%	2.800%	2.800%	2.800%
Tax Depreciation rate, per year	0.000%	0.000%	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%	4.888%	
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	-	-	2,015,656	4,907,087	7,443,877	9,653,509	11,559,537	13,185,517	14,551,732	
Book Accumulated Depreciation Balance	-	-	-	1,043,285	6,191,051	11,338,818	16,486,584	21,634,351	26,782,117	31,929,884	
Unrecovered Investment -- Book	348,805	34,848,805	108,948,805	178,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805
Book Depreciation	-	-	-	1,043,285	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767
Unrecovered Investment -- Tax total	348,805	34,848,805	108,948,805	178,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805
Tax Depreciation	-	-	-	6,706,830	13,272,045	12,275,585	11,356,341	10,503,282	9,716,409	8,986,530	
Allowed Rate of Return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Book Depreciation expense total	-	-	-	1,043,285	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767
Tax Depreciation expense total	-	-	-	6,706,830	13,272,045	12,275,585	11,356,341	10,503,282	9,716,409	8,986,530	
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	-	-	2,015,656	2,891,431	2,536,790	2,209,632	1,906,028	1,625,980	1,366,216	
<b>Revenue Recovery on Capital Expenditure to date</b>											
Eligible Plant, cumulative capital expenditures	348,805	34,848,805	108,948,805	178,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805	183,848,805
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	(1,043,285)	(6,191,051)	(11,338,818)	(16,486,584)	(21,634,351)	(26,782,117)	(31,929,884)	
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	(2,015,656)	(4,907,087)	(7,443,877)	(9,653,509)	(11,559,537)	(13,185,517)	(14,551,732)	
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	348,805	34,848,805	108,948,805	175,789,864	172,750,667	165,066,110	157,708,712	150,654,917	143,881,171	137,367,189	
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Return on Environmental Compliance Rate Base	\$ 38,782	\$ 3,822,662	\$ 11,950,896	\$ 19,282,877	\$ 18,949,499	\$ 18,106,558	\$ 17,299,505	\$ 16,525,755	\$ 15,782,724	\$ 15,068,187	
<b>Operating Expenses</b>	-	-	-	649,267	3,122,809	3,193,154	3,239,641	3,335,614	3,463,706	3,572,886	
Annual Depreciation expense	-	-	-	1,043,285	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767	5,147,767
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	523	52,273	163,423	266,708	266,487	258,765	251,043	243,322	235,600	
<b>Total OE</b>	\$ -	\$ 523	\$ 52,273	\$ 1,855,975	\$ 8,537,284	\$ 8,607,407	\$ 8,646,173	\$ 8,734,424	\$ 8,854,794	\$ 8,956,253	
<b>Total E(m) - Project</b>	38,782	3,823,185	12,003,169	21,138,852	27,486,783	26,713,966	25,945,678	25,260,179	24,637,518	24,024,440	

**Revenue Requirements  
Project 29 - KU**

	2009	2010	2011	December		2013	2014	2015	2016	2017	2018
				2012	2012	2013	2014	2015	2016	2017	2018
				1	2	3	4	5	6	7	
In-Service											
<b>Brown 3</b>											
Capital Expenditures - Project 29 - Brown Ash Pond - Phase II	\$ 120,681	\$ 8,019,610	\$ 10,168,204	\$ 6,549,852	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Accumulated Expenditures	\$ 120,681	\$ 8,140,291	\$ 18,308,495	\$ 24,858,347	\$ 24,858,347	\$ 24,858,347	\$ 24,858,347	\$ 24,858,347	\$ 24,858,347	\$ 24,858,347	\$ 24,858,347
Book Depreciation rate, per year	0.000%	0.000%	0.000%	2.800%	2.800%	2.800%	2.800%	2.800%	2.800%	2.800%	2.800%
Tax Depreciation rate, per year	0.000%	0.000%	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%	4.888%	
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	-	-	321,444	712,397	1,055,398	1,354,164	1,611,880	1,831,730	2,016,457	
Book Accumulated Depreciation Balance	-	-	-	29,001	725,035	1,421,069	2,117,103	2,813,136	3,509,170	4,205,204	
Unrecovered Investment -- Book	120,681	8,140,291	18,308,495	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347
Book Depreciation	-	-	-	29,001	696,034	696,034	696,034	696,034	696,034	696,034	696,034
Unrecovered Investment -- Tax total	120,681	8,140,291	18,308,495	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347
Tax Depreciation	-	-	-	932,188	1,794,524	1,659,792	1,535,500	1,420,157	1,313,764	1,215,076	
Allowed Rate of Return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Book Depreciation expense total	-	-	-	29,001	696,034	696,034	696,034	696,034	696,034	696,034	696,034
Tax Depreciation expense total	-	-	-	932,188	1,794,524	1,659,792	1,535,500	1,420,157	1,313,764	1,215,076	
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	-	-	321,444	390,953	343,002	298,766	257,716	219,850	184,727	
<b>Revenue Recovery on Capital Expenditure to date</b>											
Eligible Plant, cumulative capital expenditures	120,681	8,140,291	18,308,495	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347	24,858,347
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	(29,001)	(725,035)	(1,421,069)	(2,117,103)	(2,813,136)	(3,509,170)	(4,205,204)	
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	(321,444)	(712,397)	(1,055,398)	(1,354,164)	(1,611,880)	(1,831,730)	(2,016,457)	
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	120,681	8,140,291	18,308,495	24,507,901	23,420,915	22,381,880	21,387,080	20,433,331	19,517,447	18,636,686	
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Return on Environmental Compliance Rate Base	\$ 13,418	\$ 892,931	\$ 2,008,309	\$ 2,688,340	\$ 2,569,105	\$ 2,455,130	\$ 2,346,008	\$ 2,241,389	\$ 2,140,923	\$ 2,044,310	
<b>Operating Expenses</b>											
Annual Depreciation expense	-	-	-	29,001	696,034	696,034	696,034	696,034	696,034	696,034	696,034
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	181	12,210	27,463	37,244	36,200	35,156	34,112	33,068	32,024	
<b>Total OE</b>	\$ -	\$ 181	\$ 12,210	\$ 56,464	\$ 733,278	\$ 732,234	\$ 731,190	\$ 730,146	\$ 729,102	\$ 728,057	
<b>Total E(m) - Project</b>	13,418	893,112	2,020,520	2,744,804	3,302,383	3,187,364	3,077,198	2,971,534	2,870,024	2,772,367	

**Revenue Requirements  
Project 30 - KU**

	2009	2010	2011	2012	January 2013	2014	2015	2016	2017	2018
					1	2	3	4	5	6
In-Service										
<b>Ghent 4</b>										
Capital Expenditures - Project 30 - Ghent Landfill - Phase I	\$ 4,321,671	\$ 42,157,177	\$ 59,006,955	\$ 72,091,553	\$ 13,556,562	\$ 10,808,035	\$ 637,023	\$ 675,244	\$ 715,759	\$ -
Accumulated Expenditures	\$ 4,321,671	\$ 46,478,848	\$ 105,485,803	\$ 177,577,356	\$ 191,133,918	\$ 201,941,953	\$ 202,578,976	\$ 203,254,220	\$ 203,969,979	\$ 203,969,979
Book Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	2.790%	2.790%	2.790%	2.790%	2.790%	2.790%
Tax Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	-	-	-	732,114	3,915,287	6,717,731	9,167,825	11,289,716	13,100,909
Book Accumulated Depreciation Balance	-	-	-	-	5,110,443	10,744,624	16,396,577	22,067,370	27,758,132	33,448,895
Unrecovered Investment -- Book	4,321,671	46,478,848	105,485,803	177,577,356	191,133,918	201,941,953	202,578,976	203,254,220	203,969,979	203,969,979
Book Depreciation	-	-	-	-	5,110,443	5,634,180	5,651,953	5,670,793	5,690,762	5,690,762
Unrecovered Investment -- Tax total	4,321,671	46,478,848	105,485,803	177,577,356	191,133,918	201,941,953	202,578,976	203,254,220	203,969,979	203,969,979
Tax Depreciation	-	-	-	-	7,167,522	14,578,190	13,526,198	12,555,013	11,652,805	10,779,813
Allowed Rate of Return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Book Depreciation expense total	-	-	-	-	5,110,443	5,634,180	5,651,953	5,670,793	5,690,762	5,690,762
Tax Depreciation expense total	-	-	-	-	7,167,522	14,578,190	13,526,198	12,555,013	11,652,805	10,779,813
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	-	-	-	732,114	3,183,173	2,802,444	2,450,094	2,121,891	1,811,193
<b>Revenue Recovery on Capital Expenditure to date</b>										
Eligible Plant, cumulative capital expenditures	4,321,671	46,478,848	105,485,803	177,577,356	191,133,918	201,941,953	202,578,976	203,254,220	203,969,979	203,969,979
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	(5,110,443)	(10,744,624)	(16,396,577)	(22,067,370)	(27,758,132)	(33,448,895)
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	(732,114)	(3,915,287)	(6,717,731)	(9,167,825)	(11,289,716)	(13,100,909)
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	4,321,671	46,478,848	105,485,803	177,577,356	185,291,361	187,282,042	179,464,668	172,019,025	164,922,131	157,420,175
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Return on Environmental Compliance Rate Base	\$ 480,509	\$ 5,098,393	\$ 11,571,030	\$ 19,478,952	\$ 20,325,122	\$ 20,543,486	\$ 19,685,976	\$ 18,869,243	\$ 18,090,765	\$ 17,267,855
<b>Operating Expenses</b>										
Operating Expenses	84,800	121,349	128,630	136,348	19,003,308	20,143,507	21,352,117	22,633,244	23,991,239	25,430,713
Annual Depreciation expense	-	-	-	-	5,110,443	5,634,180	5,651,953	5,670,793	5,690,762	5,690,762
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	6,483	69,718	158,229	266,366	279,035	286,796	279,274	271,780	264,318
Total OE	\$ 84,800	\$ 127,832	\$ 198,348	\$ 294,577	\$ 24,380,117	\$ 26,056,723	\$ 27,290,866	\$ 28,583,310	\$ 29,953,782	\$ 31,385,793
<b>Total E(m) - Project</b>	565,309	5,226,225	11,769,378	19,773,528	44,705,239	46,600,208	46,976,843	47,452,553	48,044,547	48,653,648

**Revenue Requirements  
Project 31 - KU**

	December									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
		1	2	3	4	5	6	7	8	9
In-Service										
<b>TrimbleNPC</b>										
<b>Capital Expenditures - Project 31 - TC Ash Treatment Basin (BAP/Gypsum) (Proportional Ownership)</b>	\$ 4,728,491	\$ 7,107,408	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Accumulated Expenditures</b>	\$ 4,728,491	\$ 11,835,899	\$ 11,835,899	\$ 11,835,899	\$ 11,835,899	\$ 11,835,899	\$ 11,835,899	\$ 11,835,899	\$ 11,835,899	\$ 11,835,899
Book Depreciation rate, per year	0.000%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%
Tax Depreciation rate, per year	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%	4.888%	4.522%	4.462%
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	151,611	303,215	431,988	539,699	627,865	698,001	751,414	789,410	824,878
Book Accumulated Depreciation Balance	-	17,852	446,312	874,772	1,303,231	1,731,691	2,160,150	2,588,610	3,017,069	3,445,529
Unrecovered Investment -- Book	4,728,491	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899
Book Depreciation	-	17,852	428,460	428,460	428,460	428,460	428,460	428,460	428,460	428,460
Unrecovered Investment -- Tax total	4,728,491	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899
Tax Depreciation	-	443,846	854,434	790,283	731,103	676,185	625,527	578,539	535,219	528,118
Allowed Rate of Return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Book Depreciation expense total	-	17,852	428,460	428,460	428,460	428,460	428,460	428,460	428,460	428,460
Tax Depreciation expense total	-	443,846	854,434	790,283	731,103	676,185	625,527	578,539	535,219	528,118
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	151,611	151,604	128,773	107,711	88,165	70,136	53,413	37,996	35,468
<b>Revenue Recovery on Capital Expenditure to date</b>										
Eligible Plant, cumulative capital expenditures	4,728,491	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899	11,835,899
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	(17,852)	(446,312)	(874,772)	(1,303,231)	(1,731,691)	(2,160,150)	(2,588,610)	(3,017,069)	(3,445,529)
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	(151,611)	(303,215)	(431,988)	(539,699)	(627,865)	(698,001)	(751,414)	(789,410)	(824,878)
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	4,728,491	11,666,435	11,086,372	10,529,139	9,992,969	9,476,344	8,977,748	8,495,875	8,029,420	7,565,492
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Return on Environmental Compliance Rate Base	\$ 525,742	\$ 1,279,724	\$ 1,216,095	\$ 1,154,970	\$ 1,096,156	\$ 1,039,486	\$ 984,794	\$ 931,936	\$ 880,769	\$ 829,880
<b>Operating Expenses</b>										
Annual Depreciation expense	-	17,852	428,460	428,460	428,460	428,460	428,460	428,460	428,460	428,460
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	7,093	17,727	17,084	16,442	15,799	15,156	14,514	13,871	13,228
<b>Total OE</b>	\$ -	\$ 24,945	\$ 446,187	\$ 445,544	\$ 444,901	\$ 444,259	\$ 443,616	\$ 442,973	\$ 442,330	\$ 441,688
<b>Total E(m) - Project</b>	525,742	1,304,669	1,662,281	1,600,514	1,541,058	1,483,745	1,428,410	1,374,909	1,323,100	1,271,568

**Revenue Requirements  
Project 32 - KU**

	2009	2010	2011	2012	January					
					2013	2014	2015	2016	2017	2018
					1	2	3	4	5	6
In-Service										
TrimbleNPC										
Capital Expenditures - Project 32 - TC CCP Storage (Landfill) (Proportional Ownership)	\$ 205,835	\$ -	\$ 16,342,683	\$ 17,306,506	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Accumulated Expenditures	\$ 205,835	\$ 205,835	\$ 16,548,518	\$ 33,855,024	\$ 33,855,024	\$ 33,855,024	\$ 33,855,024	\$ 33,855,024	\$ 33,855,024	\$ 33,855,024
Book Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%
Tax Depreciation rate, per year	0.000%	0.000%	0.000%	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	-	-	-	33,838	467,481	835,819	1,143,912	1,396,098	1,596,714
Book Accumulated Depreciation Balance	-	-	-	-	1,174,487	2,400,039	3,625,591	4,851,143	6,076,695	7,302,247
Unrecovered Investment -- Book	205,835	205,835	16,548,518	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024
Book Depreciation	-	-	-	-	1,174,487	1,225,552	1,225,552	1,225,552	1,225,552	1,225,552
Unrecovered Investment -- Tax total	205,835	205,835	16,548,518	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024
Tax Depreciation	-	-	-	-	1,269,563	2,443,994	2,260,500	2,091,225	1,934,138	1,789,238
Allowed Rate of Return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Book Depreciation expense total	-	-	-	-	1,174,487	1,225,552	1,225,552	1,225,552	1,225,552	1,225,552
Tax Depreciation expense total	-	-	-	-	1,269,563	2,443,994	2,260,500	2,091,225	1,934,138	1,789,238
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	-	-	-	33,838	433,644	368,338	308,093	252,186	200,616
<b>Revenue Recovery on Capital Expenditure to date</b>										
Eligible Plant, cumulative capital expenditures	205,835	205,835	16,548,518	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024	33,855,024
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	-	-	-	(1,174,487)	(2,400,039)	(3,625,591)	(4,851,143)	(6,076,695)	(7,302,247)
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	-	-	-	(33,838)	(467,481)	(835,819)	(1,143,912)	(1,396,098)	(1,596,714)
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	205,835	205,835	16,548,518	33,855,024	32,646,699	30,987,504	29,393,614	27,859,969	26,382,231	24,956,064
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Return on Environmental Compliance Rate Base	\$ 22,886	\$ 22,579	\$ 1,815,253	\$ 3,713,651	\$ 3,581,107	\$ 3,399,105	\$ 3,224,267	\$ 3,056,037	\$ 2,893,940	\$ 2,737,500
<b>Operating Expenses</b>										
Operating Expenses	-	-	-	-	892,889	946,462	1,003,249	1,063,444	1,127,251	1,194,886
Annual Depreciation expense	-	-	-	-	1,174,487	1,225,552	1,225,552	1,225,552	1,225,552	1,225,552
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	309	309	24,823	50,783	49,021	47,182	45,344	43,506	41,667
<b>Total OE</b>	\$ -	\$ 309	\$ 309	\$ 24,823	\$ 2,118,158	\$ 2,221,035	\$ 2,275,984	\$ 2,334,340	\$ 2,396,309	\$ 2,462,105
<b>Total E(m) - Project</b>	22,886	22,887	1,815,561	3,738,474	5,699,265	5,620,140	5,500,251	5,390,377	5,290,249	5,199,605

**Revenue Requirements  
Project 33 - KU**

	December									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
		1	2	3	4	5	6	7	8	9
In-Service										
TrimbleNPC										
<b>Project 33 - Beneficial Reuse</b>	\$ 996,705	\$ 3,169,522	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Accumulated Expenditures</b>	\$ 996,705	\$ 4,166,227	\$ 4,166,227	\$ 4,166,227	\$ 4,166,227	\$ 4,166,227	\$ 4,166,227	\$ 4,166,227	\$ 4,166,227	\$ 4,166,227
Book Depreciation rate, per year	0.000%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%	3.620%
Tax Depreciation rate, per year	0.000%	3.750%	7.219%	6.677%	6.177%	5.713%	5.285%	4.888%	4.522%	4.462%
Income tax rate	36.70%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%	35.59%
Deferred Tax Balance	-	53,367	106,732	152,060	189,974	221,008	245,696	264,497	277,872	290,357
Book Accumulated Depreciation Balance	-	6,284	157,101	307,919	458,736	609,554	760,371	911,189	1,062,006	1,212,823
Unrecovered Investment – Book	996,705	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227
Book Depreciation	-	6,284	150,817	150,817	150,817	150,817	150,817	150,817	150,817	150,817
Unrecovered Investment – Tax total	996,705	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227
Tax Depreciation	-	156,234	300,760	278,179	257,348	238,017	220,185	203,645	188,397	185,897
Allowed Rate of Return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
Book Depreciation expense total	-	6,284	150,817	150,817	150,817	150,817	150,817	150,817	150,817	150,817
Tax Depreciation expense total	-	156,234	300,760	278,179	257,348	238,017	220,185	203,645	188,397	185,897
Annual Property Tax Rate	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%	0.1500%
Deferred Tax Balance	-	53,367	53,365	45,328	37,914	31,034	24,688	18,801	13,374	12,485
<b>Revenue Recovery on Capital Expenditure to date</b>										
Eligible Plant, cumulative capital expenditures	996,705	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227	4,166,227
Less: Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Accumulated Depreciation	-	(6,284)	(157,101)	(307,919)	(458,736)	(609,554)	(760,371)	(911,189)	(1,062,006)	(1,212,823)
Plus: Accumulated Depreciation on Retired Plant	-	-	-	-	-	-	-	-	-	-
Less: Deferred Tax Balance	-	(53,367)	(106,732)	(152,060)	(189,974)	(221,008)	(245,696)	(264,497)	(277,872)	(290,357)
Plus: Deferred Tax Balance on Retired Plant	-	-	-	-	-	-	-	-	-	-
Environmental Compliance Rate Base	996,705	4,106,576	3,902,394	3,706,249	3,517,517	3,335,665	3,160,160	2,990,541	2,826,349	2,663,047
Rate of return	11.12%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%	10.97%
<b>Return on Environmental Compliance Rate Base</b>	<b>\$ 110,820</b>	<b>\$ 450,462</b>	<b>\$ 428,064</b>	<b>\$ 406,549</b>	<b>\$ 385,846</b>	<b>\$ 365,898</b>	<b>\$ 346,647</b>	<b>\$ 328,041</b>	<b>\$ 310,030</b>	<b>\$ 292,117</b>
<b>Operating Expenses</b>	<b>50,000</b>	<b>4,181,968</b>	<b>4,423,023</b>	<b>1,788,885</b>	<b>592,869</b>	<b>613,321</b>	<b>635,000</b>	<b>657,980</b>	<b>682,339</b>	<b>708,159</b>
Annual Depreciation expense	-	6,284	150,817	150,817	150,817	150,817	150,817	150,817	150,817	150,817
Less depreciation on retired plant	-	-	-	-	-	-	-	-	-	-
Annual Property Tax expense	-	1,495	6,240	6,014	5,787	5,561	5,335	5,109	4,883	4,656
<b>Total OE</b>	<b>\$ 50,000</b>	<b>\$ 4,189,747</b>	<b>\$ 4,580,080</b>	<b>\$ 1,945,716</b>	<b>\$ 749,474</b>	<b>\$ 769,700</b>	<b>\$ 791,153</b>	<b>\$ 813,906</b>	<b>\$ 838,039</b>	<b>\$ 863,633</b>
<b>Total E(m) - Project</b>	<b>160,820</b>	<b>4,640,209</b>	<b>5,008,145</b>	<b>2,352,265</b>	<b>1,135,320</b>	<b>1,135,598</b>	<b>1,137,799</b>	<b>1,141,947</b>	<b>1,148,069</b>	<b>1,155,750</b>

**Summary Cash Flow**  
**Cash Flow for 2009 thru 2018**  
**2009 KU Amended ECR Plan**

1

Date	TC2 AQS O&M (Project 23)	BR3 SCR (Project 28)	BR Ash Pond Phase II (Project 29)	Ghent Landfill Phase I (Project 30)	TC	TC CCP	Beneficial Reuse (Project 33)	Total
					BAP/Gypsum Storage (Project 31)	Storage (Landfill) (Project 32)		
2009	\$ -	\$ 348,805	\$ 120,681	\$ 4,321,671	\$ 4,728,491	\$ 205,835	\$ 996,705	\$ 10,722,188
2010	\$ -	\$ 34,500,000	\$ 8,019,610	\$ 42,157,177	\$ 7,107,408	\$ -	\$ 3,169,522	\$ 94,953,717
2011	\$ -	\$ 74,100,000	\$ 10,168,204	\$ 59,006,955	\$ -	\$ 16,342,683	\$ -	\$ 159,617,842
2012	\$ -	\$ 69,900,000	\$ 6,549,852	\$ 72,091,553	\$ -	\$ 17,306,506	\$ -	\$ 165,847,911
2013	\$ -	\$ 5,000,000	\$ -	\$ 13,556,562	\$ -	\$ -	\$ -	\$ 18,556,562
2014	\$ -	\$ -	\$ -	\$ 10,808,035	\$ -	\$ -	\$ -	\$ 10,808,035
2015	\$ -	\$ -	\$ -	\$ 637,023	\$ -	\$ -	\$ -	\$ 637,023
2016	\$ -	\$ -	\$ -	\$ 675,244	\$ -	\$ -	\$ -	\$ 675,244
2017	\$ -	\$ -	\$ -	\$ 715,759	\$ -	\$ -	\$ -	\$ 715,759
2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	\$ -	\$ 183,848,805	\$ 24,858,347	\$ 203,969,979	\$ 11,835,899	\$ 33,855,024	\$ 4,166,227	\$ 462,534,281

2008		\$ 348,805		\$ 472,583	\$ 191,000	\$ 571,764	\$ -	
2009					\$ 12,943,697	\$ -	\$ 2,768,625	
2010					\$ 19,742,801	\$ -	\$ 8,804,228	
2011					\$ -	\$ 45,396,341	\$ -	
2012					\$ -	\$ 48,073,628	\$ -	
2013					\$ -	\$ -	\$ -	
2014					\$ -	\$ -	\$ -	
2015					\$ -	\$ -	\$ -	
2016					\$ -	\$ -	\$ -	
2017					\$ -	\$ -	\$ -	
2018					\$ -	\$ -	\$ -	

LG&E Proportional Share - TC Shared Facilities  
 LG&E 75%  
 KU 52%  
 48%

Year in Service	Tax Depreciation, 20 yr HL		Book Depreciation
1	3.75%	Ghent 1PC	3.87%
2	7.22%	Ghent 1	3.84%
3	6.68%	Ghent 2	2.33%
4	6.18%	Ghent 3	2.63%
5	5.71%	Ghent 4	2.79%
6	5.29%	Brown 1	2.98%
7	4.89%	Brown 2	3.01%
8	4.52%	Brown 3	2.80%
9	4.46%	Ghent 1,3,&4	3.09%
10	4.46%	Mill Creek 1PC	4.50%
11	4.46%	Mill Creek 1NPC	4.24%
12	4.46%	Mill Creek 2PC	4.28%
13	4.46%	Mill Creek 2NPC	4.70%
14	4.46%	Mill Creek 3PC	3.85%
15	4.46%	Mill Creek 3NPC	3.87%
16	4.46%	Mill Creek 4NPC	3.85%
17	4.46%	Mill Creek 4PC	3.71%
18	4.46%	TrimblePC	3.62%
19	4.46%	TrimbleNPC	3.62%
20	4.46%	All Plants-LGE	4.59%
21	2.23%	All Plants-KU	3.07%
22	0.00%		
23	0.00%		
24	0.00%		
25	0.00%		
26	0.00%	Cane Run 4	5.88%
27	0.00%	Cane Run 5	6.11%
28	0.00%	Cane Run 6	4.46%
29	0.00%	Green River 3	3.08%
30	0.00%	Green River 4	4.20%
31	0.00%		
32	0.00%		
33	0.00%		
34	0.00%		
35	0.00%		
36	0.00%		
37	0.00%		
38	0.00%		
39	0.00%		
40	0.00%		
41	0.00%		
42	0.00%		
43	0.00%		
44	0.00%		
45	0.00%		
46	0.00%		
47	0.00%		
48	0.00%		
49	0.00%		
50	0.00%		
51	0.00%		
52	0.00%		
53	0.00%		
54	0.00%		
55	0.00%		
56	0.00%		
57	0.00%		

Assumes all investments to plant account 312  
 Updated using Depreciation Rates in effect as of 2/6/09

Unit	12/31/1995 Rate	1/1/2005 Rate	2/6/2009
BR1N.1311	2.90%	2.90%	0.60%
BR1N.1312	2.88%	2.88%	2.98%
BR1N.1314	2.88%	2.88%	1.12%
BR1N.1315	2.88%	2.88%	2.10%
BR1N.1316	2.88%	2.88%	2.26%
BR2N.1311	2.88%	2.88%	0.08%
BR2N.1312	2.88%	2.88%	3.01%
BR2N.1314	2.88%	2.88%	2.91%
BR2N.1315	2.88%	2.88%	0.48%
BR2N.1316	2.88%	2.88%	0.71%
BR3N.1311	3.91%	3.91%	0.54%
BR3N.1312	3.91%	3.91%	2.80%
BR3N.1314	3.91%	3.91%	3.17%
BR3N.1315	3.91%	3.91%	0.54%
BR3N.1316	3.91%	3.91%	2.33%
BR3S.1311	3.91%	3.91%	2.65%
BR3S.1312	3.91%	3.91%	3.87%
BR3S.1314	3.91%	3.91%	0.00%
BR3S.1315	3.91%	3.91%	2.70%
GH1N.1311	3.12%	3.12%	0.39%
GH1N.1312	3.12%	3.12%	3.84%
GH1N.1314	3.12%	3.12%	2.23%
GH1N.1315	3.12%	3.12%	0.55%
GH1N.1316	3.12%	3.12%	1.38%
GH1S.1311	3.12%	3.12%	2.65%
GH1S.1312	3.12%	3.12%	3.87%
GH1S.1314	3.12%	3.12%	0.00%
GH1S.1315	3.12%	3.12%	2.70%
GH1S.1316	3.12%	3.12%	2.87%
GH2N.1311	1.84%	1.84%	0.50%
GH2N.1312	1.84%	1.84%	2.33%
GH2N.1314	1.84%	1.84%	2.08%
GH2N.1315	1.84%	1.84%	0.60%
GH2N.1316	1.84%	1.84%	1.07%
GH2S.1311	1.84%	1.84%	2.65%
GH2S.1312	1.84%	1.84%	3.87%
GH2S.1314	1.84%	1.84%	0.00%
GH2S.1315	1.84%	1.84%	2.70%
GH2S.1316	1.84%	1.84%	2.87%
GH3N.1311	2.22%	2.22%	1.19%
GH3N.1312	2.22%	2.22%	2.63%
GH3N.1314	2.22%	2.22%	2.03%
GH3N.1315	2.22%	2.22%	1.03%
GH3N.1316	2.22%	2.22%	1.40%
GH3N.1392	2.22%	2.22%	0.00%
GH3S.1311	5.67%	5.67%	2.65%
GH3S.1312	5.67%	5.67%	3.87%
GH3S.1314	5.67%	5.67%	0.00%
GH3S.1315	5.67%	5.67%	2.70%
GH3S.1316	5.67%	5.67%	0.00%
GH4N.1311	2.16%	2.16%	1.41%
GH4N.1312	2.16%	2.16%	2.79%
GH4N.1314	2.16%	2.16%	2.20%
GH4N.1315	2.16%	2.16%	1.22%
GH4N.1316	2.16%	2.16%	2.03%
GH4S.1311	2.16%	5.67%	2.65%
GH4S.1312	2.16%	5.67%	3.87%
GH4S.1314	2.16%	5.67%	0.00%
GH4S.1315	2.16%	5.67%	2.70%
GH4S.1316	2.16%	5.67%	0.00%
GR2N.1311	0.00%	1.94%	0.00%
GR2N.1312	0.00%	1.94%	2.18%
GR2N.1314	0.00%	1.94%	0.00%
GR2N.1315	0.00%	1.94%	0.00%
GR2N.1316	0.00%	1.94%	0.00%
GR3N.1311	0.00%	1.94%	0.00%
GR3N.1312	0.00%	1.94%	3.08%
GR3N.1314	0.00%	1.94%	2.90%
GR3N.1315	0.00%	1.94%	0.00%
GR3N.1316	0.00%	1.94%	3.97%
GR4N.1311	3.10%	3.10%	0.00%
GR4N.1312	3.10%	3.10%	4.20%
GR4N.1314	3.10%	3.10%	3.79%
GR4N.1315	3.10%	3.10%	1.46%
GR4N.1316	3.10%	3.10%	2.71%
KUTR.1392	2.22%	5.67%	20.00%
SW00.1391	20%	20%	10.14%
TY3N.1311	2.13%	2.13%	0.00%
TY3N.1312	2.13%	2.13%	3.99%
TY3N.1314	2.13%	2.13%	3.44%
TY3N.1315	2.13%	2.13%	0.00%
TY3N.1316	2.13%	2.13%	3.12%

Unit	12/31/1995 Rate	1/1/2005 Rate	2/6/2009
CR4N.131100	2.94%	2.94%	1.14%
CR4N.131200	2.94%	2.94%	5.88%
CR4N.131500	2.94%	2.94%	3.18%
CR4S.131100	3.47%	3.47%	0.95%
CR4S.131200	3.47%	3.47%	4.93%
CR4S.131500	3.47%	3.47%	0.82%
CR5N.131100	2.87%	2.87%	1.92%
CR5N.131200	2.87%	2.87%	6.11%
CR5N.131500	2.87%	2.87%	2.97%
CR5S.131100	3.47%	3.47%	1.56%
CR5S.131200	3.47%	3.47%	4.07%
CR5S.131500	3.47%	3.47%	1.49%
CR6N.131100	3.06%	3.06%	2.13%
CR6N.131200	3.06%	3.06%	5.19%
CR6N.131500	3.06%	3.06%	2.80%
CR6S.131100	2.18%	2.18%	2.04%
CR6S.131200	2.18%	2.18%	4.46%
CR6S.131500	2.18%	2.18%	1.44%
CRLF.131200	2.82%	2.82%	2.13%
MC1N.131100	2.39%	2.39%	1.64%
MC1N.131200	2.39%	2.39%	4.24%
MC1N.131500	2.39%	2.39%	2.75%
MC1S.131100	3.90%	3.90%	1.65%
MC1S.131200	3.90%	3.90%	4.50%
MC1S.131500	3.90%	3.90%	1.67%
MC2N.131100	2.29%	2.29%	1.42%
MC2N.131200	2.29%	2.29%	4.70%
MC2N.131500	2.29%	2.29%	2.03%
MC2S.131100	3.99%	3.99%	1.81%
MC2S.131200	3.99%	3.99%	4.28%
MC2S.131500	3.99%	3.99%	1.69%
MC3N.131100	3.03%	3.03%	1.51%
MC3N.131200	3.03%	3.03%	3.87%
MC3N.131500	2.29%	2.29%	1.58%
MC3S.131100	4.54%	4.54%	1.47%
MC3S.131200	4.54%	4.54%	3.85%
MC3S.131500	3.99%	3.99%	1.56%
MC4N.131020	2.82%	2.82%	0.00%
MC4N.131100	2.82%	2.82%	1.85%
MC4N.131200	2.82%	2.82%	3.85%
MC4N.131500	2.29%	2.29%	1.75%
MC4S.131100	5.38%	5.38%	1.76%
MC4S.131200	5.38%	5.38%	3.71%
MC4S.131500	3.99%	3.99%	1.71%
MSUB.135310	2.10%	2.10%	1.32%
SW00.339130	20.00%	20.00%	21.96%
TC1N.131100	2.41%	2.41%	2.08%
TC1N.131200	2.41%	2.41%	3.62%
TC1N.131500	2.41%	2.41%	2.13%
TC1S.131100	3.47%	3.47%	2.28%
TC1S.131200	3.47%	3.47%	3.62%
TC1S.131500	3.47%	3.47%	2.12%
TC2N.131100	2.41%	2.41%	2.08%
TC2N.131200	2.41%	2.41%	3.62%
TC2N.131500	2.41%	2.41%	2.13%
TC2S.131100	3.47%	3.47%	2.28%
TC2S.131200	3.47%	3.47%	3.62%
TC2S.131500	3.47%	3.47%	2.12%



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

AUG - 7 2014

Colonel Christopher G. Beck  
District Engineer  
Louisville District Corps of Engineers  
Attn: Kimberly J. Simpson  
CELRL-OP-FS, Room 752  
P.O. Box 59  
Louisville, Kentucky 40201-0059

Subject: Louisville Gas & Electric Company  
Coal Combustion Residuals Landfill, Trimble County, Kentucky  
LRL-2010-711

Dear Colonel Beck:

The enclosed July 11, 2014, letter from the U. S. Environmental Protection Agency provides comments in response to a Clean Water Act (CWA) Section 404 permit application submitted by the Louisville Gas & Electric Company (LG&E) proposing to construct a 189-acre landfill in jurisdictional waters of the U.S. located in Trimble County, Kentucky. The proposed landfill is designed to accommodate Coal Combustion Residuals (CCR) from the existing LG&E Trimble County Generating Station for the next 37-38 years, and together with its appurtenant structures and operations plan, will affect approximately 840 acres of land and result in direct impacts to 87,254 linear feet of streams, 2.6 acres of wetlands and 0.5 acres of open water ponds.

The EPA's July 11, 2014, letter was sent pursuant to Part IV, paragraph 3(a) of the 1992 CWA Section 404(q) Memorandum of Agreement (MOA) between the EPA and the Department of the Army. As noted below, this letter is being sent pursuant to Part IV, paragraph 3(b) of the 1992 CWA Section 404(q) MOA. The proposed LG&E project would have direct impacts, as stated above, on a watershed drained by an unnamed tributary to Corn Creek that has been documented as having high water quality and a diverse biological community, as evidenced by an "excellent" Macroinvertebrate Bioassessment Index (MBI) rating. An additional indication of the quality of this stream system can be found by comparing the system that is proposed to be impacted to a nearby stream. Sampling conducted by LG&E's consultants in 2007, documented that conditions in the streams proposed to be impacted by construction and operation of the CCR landfill were in fact better (i.e. higher scoring on the MBI) than conditions documented in a stream lying immediately to the north. That northern stream is designated by the Commonwealth of Kentucky as an Exceptional Water of the Commonwealth, an Outstanding State Resource Water and is also included in the Commonwealth's biological reference reach network. The Kentucky Division of Water resampled the streams proposed to be impacted in March 2013 and again found that the stream's biological community ranked as "excellent" according to the MBI.

Internet Address (URL) • <http://www.epa.gov>

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Sterling – Exhibit 11

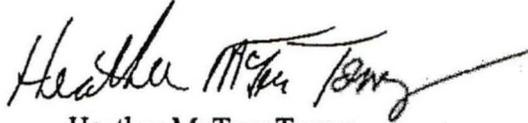
The EPA's July 11, 2014 comments were based on information contained in the CWA 404 permit application dated January 2014 and provided the EPA's views regarding compliance with the CWA Section 404(b)(1) Guidelines - 40 C.F.R. § 230 (Guidelines). The EPA expressed concerns that the permit applicant had not undertaken a proper alternatives analysis required under the Guidelines in order to justify the proposed alternative as the least environmentally damaging practicable alternative (LEDPA), consistent with 40 C.F.R. § 230.10(a). Specifically, the EPA commented that the applicant dismissed numerous potentially feasible alternatives based on economic considerations that were neither defined, nor documented. Further, the applicant's alternative analysis included little to no comparative analysis of the range of environmental impacts associated with different alternatives or their comparative estimated compensatory mitigation costs.

In addition, since providing the July 11, 2014, comment letter, the EPA has learned of a potentially feasible alternative not considered by the applicant. Sterling Ventures, LLC owns and operates an underground limestone mine in Gallatin County, Kentucky that holds a Special Waste Facility permit from the Kentucky Division of Waste Management (KDWM) to accept synthetic gypsum produced during the flue gas desulfurization (FGD) process at the Kentucky Utilities Ghent Power Station to fill mine voids in the mined out sections of the underground mine. It is the EPA's understanding that subsequent to KDWM's issuance of the Special Waste Facility permit for Sterling Ventures which had originally identified the Ghent Power Station as a source of FGD, Kentucky Utilities elected to dispose of this material on-site of the Ghent Power Station instead of utilizing the Sterling Ventures mine. Based on information contained in the Sterling Ventures permit application approved by KDWM (summarized in enclosure 1), the mine may have the storage capacity necessary to accommodate all of the CCR material generated by the LG&E Trimble County Generating Station. Use of the existing Gallatin County site would likely significantly reduce impacts to wetlands, surface waters, floodplains and groundwater resources in comparison to those impacts associated with construction and operation of the proposed new landfill. In addition, according to KDWM, it would require only a permit modification to the Sterling Ventures Special Waste Facility permit in order to allow for storage of CCR generated at the Trimble County Generating Station. Pursuant to 40 C.F.R. § 230.10(a), it is the applicant's responsibility to consider all practicable alternatives and to select a practicable alternative that does not involve a special aquatic site unless it can be clearly demonstrated that one is not available. The EPA believes that opportunities to utilize the underground limestone mine to store CCR from the Trimble County Generating Station warrant careful consideration as a potentially feasible alternative.

The EPA continues to be concerned that the proposed discharge of dredged or fill material into waters of the U.S. would eliminate 16.5 miles of streams that have been documented to be among the highest quality in this region of Kentucky. In addition, potential opportunities to avoid and minimize impacts to these resources have either not yet been considered, or have been dismissed for reasons that are not clearly defined or documented. The EPA recommends that the applicant undertake a thorough and transparent analysis of alternatives and associated environmental impacts to ensure that the LEDPA can be selected. Without this analysis, we do not believe there is sufficient information to make a determination that the proposed alternative represents the LEDPA, as required by the Guidelines. Given the potential elimination of high quality streams as described above, and consistent with Part IV, paragraph 3(b) of the 1992 CWA Section 404(q) MOA between the EPA and the Department of the Army, the EPA believes that the discharge, as proposed, will have a substantial and unacceptable impact on aquatic resources of national importance.

The EPA believes that there are opportunities to address these concerns. We look forward to working with your staff and the applicant to discuss and resolve these issues. If you have any questions, please call Mr. James D. Giattina, Director, Water Protection Division, at (404) 562-9345.

Sincerely,

A handwritten signature in black ink, appearing to read "Heather McTeer Toney", with a long horizontal flourish extending to the right.

Heather McTeer Toney  
Regional Administrator

Enclosures

cc: Ms. Lee Anne Devine, U.S. Army Corps of Engineers, Louisville District  
Mr. Lee Andrews, U.S. Fish and Wildlife Service  
Mr. Peter Goodman, Kentucky Division of Water

Louisville Gas & Electric Company  
Proposed Combustion Residuals Landfill, Trimble County, Kentucky

Attachment 1

Summary of Existing Special Waste Facility Permit Held by Sterling Ventures, LLC  
Gallatin County, Kentucky

Permit I.D.: Kentucky Division of Waste Management, Registered Permit-By-Rule for  
Beneficial Reuse, ARP20100001

Authorization Date: November 19, 2010

Authorized Special Waste: FGD Gypsum generated by the Kentucky Utilities Ghent Power Station

Authorized Volume/Weight: 800,000 tons per year<sup>1</sup>

Total Capacity: 1,000,000 tons per year

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<sup>1</sup> The existing Special Waste Facility permit held by Sterling Ventures, LLC identifies a weight of FGD gypsum to be deposited in the limestone mine per annum (800,000 tons/year). LG&E's CWA 404 permit application for its proposed CCR landfill in Trimble County identifies a volume of waste ash per annum (910,000 cubic yards/year). Based on LG&E's anticipated waste stream and published weights of the primary components of that waste stream (i.e. 53% gypsum and 38% fly ash), a cubic yard of Trimble County CCR may weigh approximately 1,300 pounds ~ 0.65 tons/cubic yard.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

JUL 11 2014

Colonel Luke T. Leonard  
District Engineer  
Louisville District Corps of Engineers  
Attn: Kimberley J. Simpson  
CELRL-OP-FS, Room 752  
P.O. Box 59  
Louisville, Kentucky 40201-0059

Subject: Louisville Gas & Electric Company  
Coal Combustion Residuals Landfill, Trimble County, Kentucky LRL-2010-711

Dear Colonel Leonard:

The U.S. Environmental Protection Agency, Region 4, has conducted a review of the public notice and the additional materials submitted by the Louisville Gas & Electric Company (LG&E) in support of its application for a Clean Water Act (CWA), Section 404 permit. The public notice from the U.S. Army Corps of Engineers (Corps), Louisville District announcing this project was dated May 23, 2014. The EPA received an advance copy of the public notice approximately one week prior to that date and on May 19, 2014, Ms. Lee Anne Devine of your staff approved the EPA's request to extend the comment period for this project to July 14, 2014. We are grateful for the additional time to review the voluminous materials provided by LG&E and hope that the following comments are useful to the Louisville District during its own review of this project.

The LG&E proposes to construct a coal combustion residuals (CCR) landfill in waters of the United States to accommodate the CCR produced at its existing Trimble County Generating Station on the Ohio River in Trimble County, Kentucky. According to project documents, the LG&E generates approximately 910,000 cubic yards of CCR annually at this facility, and design plans for the proposed landfill are based on providing enough storage capacity to accommodate 33.4 million cubic yards of CCR over a 37 year timeframe. The proposed project, which includes a 189-acre landfill and an additional 651 acres of support facilities and operations areas, will directly impact approximately 87,254 linear feet of stream, 2.6 acres of wetland and 0.5 acres of ponds. These stream impacts are a 60 percent increase over the linear length of stream impacts associated with this project as it was formerly proposed in 2011-2012.

The comments provided herein identify the EPA's views regarding compliance with the CWA Section 404(b)(1) Guidelines (40 C.F.R. Part 230) (Guidelines). The Guidelines provide the substantive environmental criteria against which Section 404 permit applications are evaluated. For reasons outlined below, the EPA has concerns that the project, as currently proposed, may not comply with the Guidelines.

**Alternatives Analysis – 40 C.F.R. Part 230.10(a)**

The Guidelines state that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." The permit issued by the Corps should reflect the least environmentally damaging practicable alternative. Furthermore, the Guidelines

recognize that the rigor of analysis should be commensurate with the severity of potential adverse impacts on the aquatic ecosystem. Based on our review of available monitoring data from the project area, the EPA believes that the aquatic resources proposed to be impacted as a result of this project may be among the highest quality headwater stream resources in this region of the Commonwealth.

We do not believe that the applicant has adequately demonstrated that the proposed alternative to fill nearly 17 miles of headwater stream represents the least environmentally practicable alternative, consistent with the Guidelines. The alternatives analysis should more clearly and completely describe the process by which the least environmentally damaging practicable alternative was identified. The information provided to date appears to rely considerably on undocumented or undefined cost information and with very little to no comparative analysis of the range of environmental impacts associated with different alternatives that were considered or estimated compensatory mitigation costs.

"Unreasonable expense" is frequently cited as reason for removing sites from further analysis without thorough documentation and often without even a defined threshold for this criterion. "Unreasonable expense" is cited as partial or primary cause for elimination of 17 site alternatives in the first phase (i.e. Cut I) of the multi-phased alternatives analysis. Furthermore, factors related to "Cost Impacts" comprise 40 percent of the criteria evaluated in the second phase (i.e. Cut II), yet the Cut II analysis is entirely hypothetical and fails to quantify thresholds or otherwise include any objective rationale for elimination of alternatives evaluated therein. It is not until the third phase of the alternatives analysis (i.e. Cut III) that cost is objectively addressed. "Excessive cost" is defined in Cut III as "any cost per cubic yard greater than twenty percent of the lowest cost Alternative's cost per cubic yard." (pg. 20, Alternatives Analysis Report). However, it is unclear whether "excessive cost" in Cut III is synonymous with "unreasonable cost" in Cut I and Cut II, but this is somewhat implausible given that the former is defined on a Cut III economic analysis and no costs at all are discussed in Cut I and Cut II.

We note that 13 of the 15 alternatives evaluated in Cut III of the alternative analysis are eliminated "based on cost and logistical analysis." However, even the cost threshold defined here in Cut III is confounding, because it is based on a landfill site alternative that is dismissed for logistical and scheduling concerns. If this site is dismissed due to such concerns, should it viably be used to establish the cost threshold upon which other sites are evaluated in the same phase of the analysis? The fact that numerous alternative sites were eliminated during Cuts I and II without provision of pertinent economic data, defined cost thresholds, or consideration of associated environmental impacts is of additional concern to the EPA.

The EPA believes that potentially feasible alternatives may have been eliminated in the alternatives analysis based on incompletely vetted economic considerations and that these sites warrant closer scrutiny. For example, the degree of impacts to jurisdictional waters of the United States is not a criterion used in the alternatives analysis until the final phase of the evaluation (Cut IV) when only landfills cited in Ravine B remain under consideration. The alternatives evaluated in Cut IV are materially equivalent in location, costs, and impacts. Both lie in Ravine B, both have nearly identical project costs (i.e. \$7.47 vs \$7.48 per cubic yard of ash stored) and both have the same anticipated impacts to waters of the United States. Considering that anticipated aquatic resources impacts in Ravine B are significant and the resources of high quality (further addressed below), mitigation costs for such impacts to waters of the United States will likely be significant. The EPA believes it is necessary to include compensatory mitigation costs throughout the alternatives analysis where project cost is a criterion for evaluation of practicable alternatives.

The permit application announces the LG&E's proposal to pay an in-lieu-fee (ILF) to the Kentucky Department of Fish and Wildlife Resources ILF Program to satisfy compensatory mitigation needs for the proposed project. Although no specific monetary amount was specified for this ILF payment, the EPA estimates that, based on the LG&E's own assessment of stream conditions in Ravine B and the ILF calculator on the Corps' web site, the project as presently proposed could require an ILF payment of approximately \$18 million. This would equate to \$0.54 per cubic yard of ash over the proposed life of the

landfill. As noted previously in this letter, environmental impacts to waters of the United States were not used as an evaluation criterion until Cut IV of the analysis and project cost estimates (excluding mitigation costs) were not provided until Cut III. If compensatory mitigation costs were included throughout the tiered evaluation of alternatives instead of only the final stage thereof, alternatives with fewer adverse impacts on jurisdictional waters of the United States and commensurately less mitigation cost may be more attractive from an economical perspective and thereby exert some influence on the company's determination of "unreasonable expense" during the initial phases of its alternatives analysis.

**Alternative 5B (Lee Bottom) is one example where additional economic analysis may be warranted, This alternative is dismissed as a practicable alternative in Cut I of the alternatives evaluation based solely on undefined expenses related to barge transport, loading and off-loading facilities. According to project documentation, Alternative 5B (Lee Bottom) can accommodate the entire landfill design volume of 33.7 million cubic yards of CCR for long-term storage. A typical barge can hold approximately 2,400 cubic yards of material, which is the approximate daily volume of CCR produced at the Trimble County Generating Station. Considering that even the company's preferred alternative will require considerable construction costs for arguably similar infrastructure as that necessary at any CCR landfill (e.g. conveyors, haul roads, other equipment), it is uncertain whether infrastructure needs unique to a site such as Lee Bottom (e.g. barge unloading facilities) grossly exceed other costs unique to the preferred alternative in Ravine B (e.g. compensatory mitigation costs).**

While the EPA concurs with the position, taken in the LG&E's alternatives analysis, that sites located within the 100-year floodplain of the Ohio River are impracticable alternatives, the EPA believes that all potentially feasible alternatives that avoid or minimize impacts to high quality jurisdictional waters should be vetted in detail, including consideration of compensatory mitigation costs and the impacts thereof on the economic evaluation of alternatives. In addition, criterion used during Cut II of the alternatives analysis should be more objectively defined. Alternative 5B (Lee Bottom) is one specific example where a more objective and complete economic analysis is needed, but there may be others.

#### **Baseline Aquatic Resource Characterization**

The present CWA 404 permit application fails to acknowledge the March 2013 field sampling effort in Ravine B where the proposed landfill would be located. That sampling was conducted by biologists from the Kentucky Division of Water (KDOW) and consultants for the LG&E. Based on KDOW's analysis, the Ravine B stream biological community was dominated by sensitive taxa, included numerous rare or uncommon taxa and scored "Excellent" on the Kentucky Macroinvertebrate Bioassessment Index (KMBI). This assessment was consistent with the conclusion reached by the LG&E's former consultant who sampled the stream six years earlier (Mactec, 2007).

However, neither the KDOW, nor the EPA, has any record that the LG&E's consultants ever provided a data summary or interpretive report based on their collection of biological samples concurrent with the KDOW's own sampling effort in March 2013. Instead, the present permit application evaluates stream quality based solely on physical stream habitat subjectively evaluated "over the course of a two-year period from June 2011 through November 2013." While the present permit application includes the Mactec (2007) report as Attachment K in Volume III of the permit application, the text of the alternatives analysis downplays the significance of the Mactec conclusions by referring to a subsequent 2012 water quality assessment compiled by Civil & Environmental Consultants, Inc. (CEC). The latter report however, provides little relevant biological information on the Ravine B stream(s), because biological sampling was conducted outside of the KDOW's required sample index period. In fact, the 2012 report itself notes, "*In consideration of the biological sampling being conducted outside of the index period for this study, CEC determined that computing MBI scores, in accordance with the biological metrics and scoring criteria outlined in the KMBI manual (KDOW 2003), was impractical,*" (CEC, 2012).

In spite of the relative paucity of biological data provided in the present permit application, the LG&E considers slightly over one-half of the total 16.5 miles of streams proposed to be impacted as "excellent" condition. Approximately 88 percent of intermittent streams in the Ravine B watershed are reported as "excellent" and 12 percent is considered in "average" condition. Furthermore, 82 percent of ephemeral channels in the Ravine B watershed are reported to be in "average" or "poor" condition, with the remainder rated as "excellent."

In light of the quantitative evidence provided by Mactec in 2007, and the KDOW in 2013, the EPA believes that the quality of the unnamed mainstem tributary stream in Ravine B is equivalent to reference stream conditions, as defined in the Commonwealth's categorization criteria for "Exceptional Waters" in its antidegradation regulations at 401 KAR 10:030 Section 1(2)(a):

*(a) Categorization criteria. A surface water shall be categorized as an exceptional water if any of the following criteria are met:*

*1. Surface water is designated as a Kentucky Wild River and is not categorized as an outstanding national resource water;*

*2. Surface water is designated as an outstanding state resource water as established in 401 KAR 10:031, Section 8(1)(a)1, 2, and 3 and Section 8(1)(b);*

*3. Surface water contains either of the following:*

*a. A fish community that is rated "excellent" by the use of the Index of Biotic Integrity included in Development and Application of the Kentucky Index of Biotic Integrity (KIBI), 2003; or*

*b. A macroinvertebrate community that is rated "excellent" by the Macroinvertebrate Bioassessment Index included in "The Kentucky Macroinvertebrate Bioassessment Index," 2003; or*

*4. Surface water in the cabinet's reference reach network.*

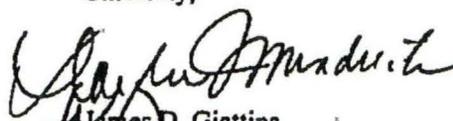
According to the KDOW, there are only 13 "reference" quality stream segments recognized in the Outer Bluegrass ecoregion of Kentucky (Ecoregion 71d) where the proposed project lies (C.Brantley, *pers. comm.*, July 7, 2014). Of those 13, only seven are headwater streams, like Ravine B, that drain a watershed of five square miles or less. The rarity of high quality reference streams in this ecoregion heightens the importance of pursuing all possible measures to avoid impacting such streams and requires regulatory diligence to ensure that such efforts are objective, quantifiable and thorough.

## **Conclusion**

In conclusion, the EPA believes that the project, as proposed, may not comply with Guidelines. The EPA finds this project may result in substantial and unacceptable adverse impacts on aquatic resources of national importance. Therefore, we recommend denial of this project as currently proposed. As summarized above, a significantly expanded alternatives analysis is necessary to more thoroughly and objectively evaluate all alternatives to the proposed CCR landfill in the unnamed tributary of Corn Creek, with particular emphasis on those alternatives previously dismissed due to undefined and undocumented economic considerations. This letter follows the field level procedures outlined in the August 1992 Memorandum of Agreement between the EPA and the Department of the Army, Part IV, paragraph 3(a) regarding § 404(q) of the CWA.

I want to thank you and your staff for your cooperation and willingness to address our concerns. We look forward to working closely with you and the applicant to resolve the concerns outlined above. If you have any questions, please call me at (404) 562-9345 or Mr. Eric Somerville at (706) 355-8514 of my staff.

Sincerely,



James D. Giattina  
Director  
Water Protection Division

cc: Ms. Lee Anne Devine, U.S. Army Corps of Engineers Louisville District

Mr. Lee Andrews, U.S. Fish and Wildlife Service

Mr. Peter Goodman, Kentucky Division of Water



6560-50-P

**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Parts 257 and 261**

**[EPA-HQ-RCRA-2009-0640; FRL-9919-44-OSWER]**

**RIN-2050-AE81**

**Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities**

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Final rule.

**SUMMARY:** The Environmental Protection Agency (EPA or the Agency) is publishing a final rule to regulate the disposal of coal combustion residuals (CCR) as solid waste under subtitle D of the Resource Conservation and Recovery Act (RCRA). The available information demonstrates that the risks posed to human health and the environment by certain CCR management units warrant regulatory controls. EPA is finalizing national minimum criteria for existing and new CCR landfills and existing and new CCR surface impoundments and all lateral expansions consisting of location restrictions, design and operating criteria, groundwater monitoring and corrective action, closure requirements and post closure care, and recordkeeping, notification, and internet posting requirements. The rule requires any existing unlined CCR surface impoundment that is contaminating groundwater above a regulated constituent's groundwater protection standard to stop receiving CCR and either retrofit or close, except in limited circumstances. It also requires the closure of any CCR landfill or CCR surface

impoundment that cannot meet the applicable performance criteria for location restrictions or structural integrity. Finally, those CCR surface impoundments that do not receive CCR after the effective date of the rule, but still contain water and CCR will be subject to all applicable regulatory requirements, unless the owner or operator of the facility dewateres and installs a final cover system on these inactive units no later than three years from publication of the rule. EPA is deferring its final decision on the Beville Regulatory Determination because of regulatory and technical uncertainties that cannot be resolved at this time.

**DATES:** This final rule is effective on **[INSERT DATE 180 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

**ADDRESSES:** EPA has established three dockets for this regulatory action under Docket ID No. **EPA-HQ-RCRA-2009-0640**, Docket ID No. **EPA-HQ-RCRA-2011-0392**, and Docket ID No. **EPA-HQ-RCRA-2012-0028**. All documents in these dockets are available at <http://www.regulations.gov>. Although listed in the index, some information is not publicly available, e.g., Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically in <http://www.regulations.gov> or in hard copy at the OSWER Docket, EPA/DC, WJC West Building, Room 3334, 1301 Constitution Ave., NW, Washington, DC 20460. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the OSWER Docket is 202-566-0276.

**FOR FURTHER INFORMATION CONTACT:** For questions on technical issues: Alexander Livnat, Office of Resource Conservation and Recovery, Environmental Protection Agency,

5304P; telephone number: (703) 308-7251; fax number: (703) 605-0595; email address: livnat.alexander@epa.gov, or Steve Souders, Office of Resource Conservation and Recovery, Environmental Protection Agency, 5304P; telephone number: (703) 308-8431; fax number: (703) 605-0595; email address: souders.steve@epa.gov. For questions on the regulatory impact analysis: Richard Benware, Office of Resource Conservation and Recovery, Environmental Protection Agency, 5305P; telephone number: (703) 308-0436; fax number: (703) 308-7904; email address: [benware.richard@epa.gov](mailto:benware.richard@epa.gov). For questions on the risk assessment: Jason Mills, Office of Resource Conservation and Recovery, Environmental Protection Agency, 5305P; telephone number: (703) 305-9091; fax number: (703) 308-7904; email address: mills.jason@epa.gov.

For more information on this rulemaking please visit

<http://www.epa.gov/epawaste/nonhaz/industrial/special/fossil/index.htm>.

#### **SUPPLEMENTARY INFORMATION:**

##### **A. Does this Action Apply to Me?**

This rule applies to all coal combustion residuals (CCR) generated by electric utilities and independent power producers that fall within the North American Industry Classification System (NAICS) code 221112 and may affect the following entities: electric utility facilities and independent power producers that fall under the NAICS code 221112. The industry sector(s) identified above may not be exhaustive; other types of entities not listed could also be affected. The Agency's aim is to provide a guide for readers regarding those entities that potentially could be affected by this action. To determine whether your facility, company, business, organization, etc., is affected by this action, you should refer to the applicability criteria discussed in Unit VI.A. of this document. If you have any questions regarding the applicability of this action to a

subject to regulation as disposal, and so were not directly on point. However, because these damage cases involved the placement of unencapsulated CCR on the land, they raised questions regarding the safety of other uses of unencapsulated CCR that involved direct placement on the land. In addition, previous risk analyses do not address many of the use applications currently being implemented, and have not addressed the improved leachate characterization methods. EPA also noted that some scientific literature indicates that the uncontrolled (i.e., excessive) application of CCR can lead to the potentially toxic accumulation of metals.<sup>43</sup>

As noted, several commenters raised concern that EPA's beneficial use criteria did not include any standard that ensured protection of human health and the environment. EPA agrees that a criterion that accounted for the potential risks of the land placement of unencapsulated CCR would be an appropriate element to include in differentiating between disposal and beneficial use. RCRA's definition of disposal includes some elements related to risk: specifically, the definition includes as a relevant concept that the waste or any constituent of concern "may enter the environment." In this regard it is also relevant that not all disposal activities are regulated by EPA under subtitle D; rather, EPA only regulates those that present risks that exceed the Agency's acceptable risk levels.

Building off of these concepts, the Agency has developed an additional criterion to address both the question of whether the activity is appropriately considered to be "disposal," and the question of whether that "disposal" warrants regulation. Because uses that fail to meet

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<sup>43</sup> See, for example, "Effects of coal fly ash amended soils on trace element uptake in plant," S.S. Brake, R.R. Jensen, and J. M. Mattox, *Environmental Geology*, November 7, 2003 available at <http://www.springerlink.com/content/3c5gaq2qrkr5unvp/fulltext.pdf>; See information regarding the Town of Pines Groundwater Plume at [http://www.epa.gov/region5superfund/npl/sas\\_sites/INN000508071.htm](http://www.epa.gov/region5superfund/npl/sas_sites/INN000508071.htm). Also see additional information for this site at <http://www.epa.gov/region5/sites/pines/#updates>.

the beneficial use criteria will be considered disposal and would therefore be considered disposal subject to the final regulation, this fourth criterion was designed to exclude uses likely to present the same risks as the management practices regulated under other sections of the final rule. Thus, the final criterion directly correlates to the practices and the risks that the disposal regulations are designed to address: the risks associated with the placement of large quantities of CCR in a single concentrated location, such as a CCR landfill, as documented in the 2014 risk assessment and the damage cases.

As discussed in more detail below, to be considered a “beneficial use,” prior to initiating an activity that involves placing unencapsulated CCR on the land in amounts greater than 12,400 tons, in non-roadway applications, the user must demonstrate that environmental releases to groundwater, surface water, soil and air are comparable to or lower than those from analogous products made without CCR, or that environmental releases to groundwater, surface water, soil and air will be at or below relevant regulatory and health-based benchmarks for human and ecological receptors during use.

EPA acknowledges that there may be risks associated with uses that are below this threshold, depending on the characteristics of the CCR, the amount of material and the manner in which it is placed, and (perhaps most important) the site conditions. Consequently, all unencapsulated uses, including use in road construction and agriculture, should be conducted with care, according to appropriate management practices, and with appropriate characterization of the material and the site where the material will be placed. However, as discussed in the previous section, because the amounts and, in some cases, the manner in which the CCR are used are very different from the land disposal modeled in the risk assessment, EPA cannot extrapolate

from the risk assessment to reach conclusions regarding the risks these uses may pose. And in the absence of such information, EPA cannot establish criteria to regulate these uses.

a. *Final Definition of the Term “Beneficial Use of CCR”*

The final beneficial use criteria are as follows: (1) the CCR must provide a functional benefit; (2) The CCR must substitute for the use of a virgin material, conserving natural resources that would otherwise need to be obtained through practices such as extraction; (3) the use of CCR must meet relevant product specifications, regulatory standards, or design standards when available, and when such standards are not available, CCR are not used in excess quantities; and (4) when unencapsulated use of CCR involves placement on the land of 12,400 tons or more in non-roadway applications, the user must demonstrate and keep records, and provide such documentation upon request, that environmental releases to groundwater, surface water, soil and air are comparable to or lower than those from analogous products made without CCR, or that environmental releases to groundwater, surface water, soil and air will be at or below relevant regulatory and health-based benchmarks for human and ecological receptors during use. Any use that fails to comply with all of the relevant criteria will be considered to be disposal of CCR, subject to all of the requirements in the disposal regulations, and the user will be considered to be the owner or operator of a CCR disposal unit. Encapsulated uses need only comply with the first three criteria. Unencapsulated uses involving placement on the land of 12,400 tons or more in non-roadway applications that fail to meet all of the beneficial use criteria are considered a CCR unit. As previously noted, the first three criteria were discussed in the proposal and commenters generally supported these criteria, which establish flexible performance standards. As discussed above, the Agency has developed an additional criterion in response to comments, which generally reflects the issues discussed in the proposal. This

*Criteria 1: CCR must provide a functional benefit.* This criterion is designed to ensure that the material performs a genuine function in the product or use; while it need not improve product performance when compared to the material for which it is substituting, CCR must genuinely be a necessary component of the product. In other words, there must be a legitimate reason for using CCR in the product other than the fact that it is an alternative to disposal of the material, e.g., the material fulfills material specifications. For example, CCR provides a functional benefit when used as a replacement for cement in concrete because the CCR increases the durability of the concrete and is also more effective against degradation from salt water. FGD gypsum serves the same function in the production of wallboard as mined gypsum, and meets all product specification. Additionally, CCR can be used to adjust the pH of soils thereby increasing and promoting plant growth.

One commenter noted that many states already consider whether the material provides a functional benefit when making beneficial use determinations under their regulatory programs. The Agency agrees that this is an important criterion in determining whether a use is a “beneficial use.” To the extent that a state regulatory program has determined that a particular use provides a functional benefit, this may serve as evidence that this criterion has been met.

*Criteria 2: CCR must substitute for the use of a virgin material, conserving natural resources that would otherwise need to be obtained through practices, such as extraction.* This criterion is intended to ensure that the use is truly “beneficial” from an environmental perspective. Examples of CCR used as a substitute for a virgin material include FGD gypsum for mined gypsum and the use of fly ash in lieu of Portland cement thereby reducing the need for cement. The use of FGD gypsum in the manufacture of wallboard reduces the need to use virgin gypsum, thereby conserving natural resources (virgin gypsum) while conserving valuable energy

and health related standards have been met. The criterion is a general performance standard that is equally applicable to all sites and uses and will account for a wide variety of potential exposures. By contrast, in order to establish toxicant “threshold levels,” EPA would need to develop risk assessments that account for the wide variety of potential uses and exposures. This is neither practical nor feasible, given the site specific nature of the potential risks and the myriad of potential uses. In addition, EPA disagrees that this is necessary, as the performance standard laid out in the fourth criterion will appropriately address the risks documented in the current record for these uses. Furthermore, as the Agency has previously stated in the May 2000 Regulatory Determination and the 2010 proposal, leaving the Bevill determination in place for beneficial use does not conflict with EPA’s view that certain beneficial uses, e.g., use in road construction and agriculture, should be conducted with care, according to appropriate management practices, and with appropriate characterization of the material and the site where the materials will be placed. EPA has concluded that the potential risks of these uses do not warrant federal regulation, but can be addressed, if necessary, in other ways.

**State programs exist and have the expertise to address beneficial use applications.** In addition, the Agency is currently developing a framework to address the risks associated with the beneficial use of unencapsulated materials. This framework is expected to be finalized in 2015; the framework will be available to assist in the implementation of issues associated with the unencapsulated uses of CCR. The Agency has also been working with the U.S. Department of Agriculture to address the risks associated with the agricultural use of CCR. In conclusion, the Agency believes that sufficient tools are available (or will soon be available) to address the site-specific risks associated with the beneficial use of CCR.

# **Evaluation of Trimble County Coal Combustion Residual Storage Options**



**PPL companies**

**Generation Planning & Analysis  
2015**

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## 1 Executive Summary

The existing coal combustion residual (“CCR”) storage facilities at the Trimble County Generating Station (“Trimble County Station”) are nearing capacity. As a result, additional CCR storage capacity will be needed as early as 2018. To meet this need, the LG&E and KU (the “Companies”) requested a permit to construct a new landfill in 2010. However, in 2013 the Kentucky Division of Waste Management denied the permit for the new landfill citing the Cave Protection Act and the existence of the “Wentworth Cave” within the footprint of the new landfill as the reason. In July and August 2014, the Companies received comments from the EPA regarding the alternatives analysis submitted to the U. S. Army Corps to support a Clean Water Act permit application for the redesigned landfill. Based on these comments, as an alternative to building the on-site landfill, the Companies evaluated an alternative to store CCRs produced by the Trimble County Station in depleted sections of an active underground limestone quarry owned by Sterling Ventures (“Sterling”).

Based on information provided by Sterling, their quarry appears to have only about 5 million cubic yards of available capacity that can be used to store CCRs which is significantly less than the CCR production from the Trimble County Station over the next several decades. For purposes of this analysis, the Companies assumed that additional capacity would be created at the quarry (from mining limestone) at a rate that would exceed Trimble County Station’s need for CCR storage capacity. As a result of this assumption, the Sterling alternative is assumed to completely eliminate the need for an onsite landfill for the purposes of this analysis.

It should also be noted that the Sterling site, as understood by the Companies, is an unlined quarry. Based on the Companies’ understanding of EPA’s CCR Rule, the Sterling site is not likely to be a permitted alternative for storing CCRs. However, for purposes of this analysis, the Companies’ assumed that the Sterling site could be permitted to store all forms of CCRs produced by the Trimble County Station.

In reality, both the assumption that additional space will be created and that the site will be a legal long-term repository for CCRs would create significant risk for the Companies and their customers. While this analysis does not explicitly address either of these risks, a prudent long-term CCR storage plan would require some amount of on-site storage capability in order to avoid the potential for the need to curtail generation from the Trimble County Station.

The costs of the onsite and Sterling CCR storage alternatives are summarized in Table 1.<sup>1</sup> The total capital cost for the onsite alternative is \$99.4 million higher than the Sterling alternative, but \$53.8 million more capital is required by 2018 for the Sterling alternative than the onsite alternative. All capital (\$391.2 million) for the Sterling alternative is required by 2018; for the onsite alternative, only the capital for the CCR treatment and transport system (“CCRT”), pipe conveyor, and first landfill phase (\$337.4 million) is required by 2018. Compared to the onsite storage alternative, the material handling costs in the Sterling storage alternative are much higher. As a result, fixed and variable operating and maintenance costs (“O&M”) are much higher for the Sterling alternative.

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<sup>1</sup> Typically, the Companies present cost data based on its 75 percent ownership share of the Trimble County coal units, but this project is applicable to 100 percent of the Trimble County CCRs. **Unless otherwise stated, all of the data in this analysis is for 100 percent of the project.**

**Table 1 – CCR Storage Costs (\$2014)**

	<b>Onsite Alternative</b>	<b>Sterling Alternative</b>	<b>Difference (Onsite less Sterling)</b>
Capital Costs (\$M)			
Spent by 2018	337.4	391.2	(53.8)
Spent after 2018	153.4	-	153.4
Total	490.8	391.2	99.4
Fixed O&M (\$/Year)	1,210,000	2,525,000	(1,315,000)
Variable O&M (\$/Ton)	1.59 – 1.98	15.42	(13.83) – (13.44)

The Companies evaluated the onsite and Sterling alternatives over six scenarios with annual CCR storage requirements ranging from 350 thousand cubic yards per year to 900 thousand cubic yards per year. In all six scenarios, the onsite storage alternative was lower cost than the Sterling alternative. The difference in present value of revenue requirements (“PVRR”) between the onsite and Sterling alternatives ranged from \$156 million to \$217 million. This result is driven by several factors:

1. In all scenarios (and particularly in scenarios with higher CCR storage requirements), variable O&M costs for the Sterling alternative are significantly higher.
2. Due to the need to operate barge loading and unloading facilities, fixed O&M costs for the Sterling alternative are also higher.
3. The onsite alternative has higher capital costs overall, but more capital is required by 2018 in the Sterling alternative. This fact minimizes the Sterling alternative’s capital cost advantage.

Without the ability to operate Trimble County Station units 1 and 2 beyond 2018, the Companies would need to replace 932 MW of their baseload capacity and associated energy from two of the lowest cost generating units in the Companies’ system.

Based on the Companies’ analysis, continuing with the onsite CCR storage alternative remains the least-cost alternative for the Trimble County Station compared to the Sterling alternative. In all scenarios considered, continuing with the onsite alternative is the least-cost alternative. Furthermore, these results do not address the risks associated with having no onsite CCR storage as well as the site specific risks inherent in the Sterling alternative. A prudent CCR plan for the Trimble County Station would address those risks which further supports continuing with the onsite storage project. Finally, regardless of which alternative is selected, the Companies will need to construct a CCRT system in order to dry and prepare the CCR’s for storage.

## 2 Background

The Trimble County Station has two coal-fired generating units with a combined generating capacity of 1,260 megawatts. The station produces around 8 million MWh of energy annually (including IMPA and IMEA's share) and provides about 17 percent of the energy needs of the Companies' customers. The station consumes around 3.5 million tons of coal annually and produces approximately 700,000 to 900,000 cubic yards ("CY") of CCRs.<sup>2</sup> Approximately 27 percent of the station's CCRs were beneficially reused by the concrete, cement, and wallboard industries. Any CCRs not delivered to beneficial reuse markets are currently stored in onsite ponds.

In 2010, the Companies requested a permit to construct a new landfill. However, in 2013 the Kentucky Division of Waste Management denied the permit for the new landfill citing the Cave Protection Act and the existence of one karst feature known as the "Wentworth Cave" within the footprint of the new landfill as the reason. The Companies worked with GAI Consultants ("GAI") to redesign the landfill to exclude the karst feature. The initial siting study identified several potential alternatives based on combinations of a number of variables, including storage, transport methods, and site locations. The alternative that was chosen is more expensive than the 2009 design due in part to the modified footprint but also to increased cost estimates for the CCR treatment and transport system ("CCRT").<sup>3</sup>

In July and August 2014, the Companies received comments from the EPA regarding the alternatives analysis submitted to the U. S. Army Corps of Engineers to support a Clean Water Act permit application for the redesigned landfill. Based on these comments, as an alternative to building the on-site landfill, the Companies evaluated an alternative to store CCRs produced by the Trimble County Station in depleted sections of an active underground limestone quarry owned by Sterling. The Sterling quarry is located in Gallatin County Kentucky near the Ohio River. This analysis compares the costs of the redesigned onsite landfill alternative to the cost of the Sterling alternative. The Sterling alternative consists of a tipping fee associated with disposing of CCRs at Sterling's facility plus the necessary capital and O&M costs to move CCRs from the Trimble County Station to the Sterling site. The Companies developed estimates for the infrastructure needed for handling and transporting the CCRs to the Sterling site.

## 3 Summary of Alternatives

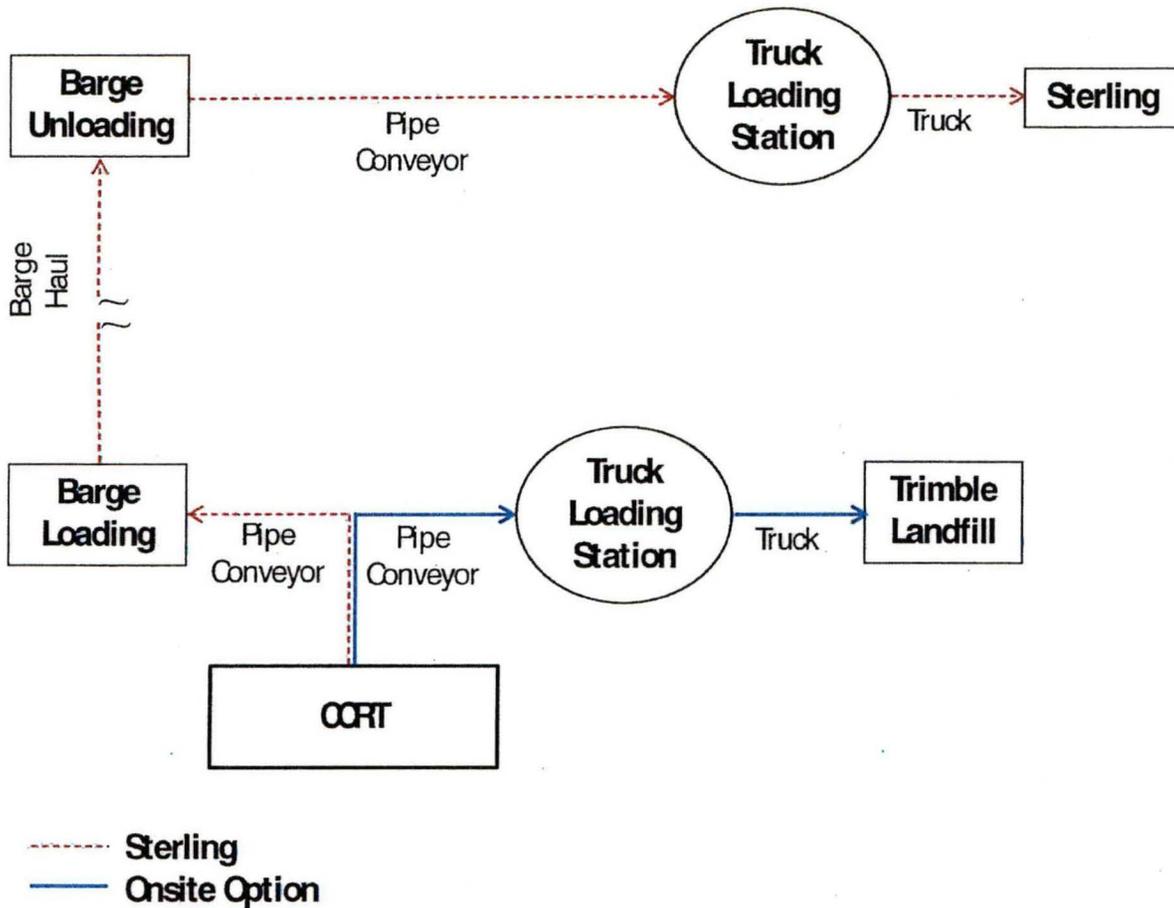
Figure 1 contains a diagram of the CCR storage alternatives considered in this analysis. The least-cost onsite alternative consists of a CCRT, a pipe conveyor, a truck loading station, and a landfill. The CCRT conditions and prepares the CCRs to be transported by the pipe conveyor to the truck loading station where the CCRs are loaded into trucks. Then, trucks haul and place the CCRs in the landfill. The landfill will be constructed in four phases; the total storage capacity for all four phases is 33.4 million CY. The truck hauling distance from the truck loading station to the working face of the landfill varies between 0.5 and 1.25 miles depending on the landfill phase.

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<sup>2</sup> CCRs are comprised of approximately 8% bottom ash, 30% fly ash, and 62% gypsum. The weighted average of CCR production results in a 1.2 tons per cubic yard average conversion factor for dry material.

<sup>3</sup> The increased cost estimates for the CCRT are based on actual costs for the CCRT that was recently installed at the Companies' Ghent Generating Station.

Figure 1 – Onsite and Sterling CCR Storage Alternatives



The Sterling alternative consists of the same CCRT, two pipe conveyors, barge loading and unloading facilities, a truck loading station, and the Sterling quarry. The first pipe conveyor transports the CCRs to the barge loading facility where the CCRs are loaded onto dedicated barges.<sup>4</sup> From there, the CCRs are barged approximately 47 miles up the Ohio River to a barge unloading facility located near the Sterling quarry. After the barges are unloaded, a second pipe conveyor, which is approximately three times longer than the first, transports the CCRs to a truck loading station where the CCRs are loaded onto trucks. Then, the trucks haul the CCRs to the quarry. The truck hauling distance is assumed to be 0.5 miles. Alternatives to the Companies' design for a least cost method of delivering the CCRs to the Sterling site that do not include the pipe conveyor systems would result in higher O&M costs associated with transporting the CCRs.

Based on information provided by Sterling, their quarry appears to have only about 5 million cubic yards of available capacity that can be used to store CCRs which is significantly less than the CCR production from the Trimble County Station over the next several decades. For purposes of this analysis, the Companies assumed that additional capacity would be created at the quarry (from mining limestone) at

<sup>4</sup> The length of the first pipe conveyor in the offsite option is assumed to be the same as the length of the pipe conveyor in the onsite option.

a rate that would exceed Trimble County Station's need for CCR storage capacity. As a result of this assumption, the Sterling alternative is assumed to completely eliminate the need for an onsite landfill for the purposes of this analysis.

It should also be noted that the Sterling site, as understood by the Companies, is an unlined quarry. Based on the Companies' understanding of EPA's CCR Rule, the Sterling site is not likely to be a permitted alternative for storing CCRs. However, for purposes of this analysis, the Companies' assumed that the Sterling site could be permitted to store all forms of CCRs produced by the Trimble County Station.

In reality, both the assumption that additional space will be created and that the site will be a legal long-term repository for CCRs would create significant risk for the Companies and their customers. While this analysis does not explicitly address either of these risks, a prudent long-term CCR storage plan would require some amount of on-site storage capability in order to avoid the potential for the need to curtail generation from the Trimble County Station.

### **3.1 Capital Costs**

Table 2 summarizes the capital costs for the onsite and Sterling alternatives. The total capital cost for the onsite alternative is \$99.4 million higher than the Sterling alternative, but \$53.8 million more capital is required by 2018 for the Sterling alternative than the onsite alternative. All capital (\$391.2 million) for the Sterling alternative is required by 2018; for the onsite alternative, only the capital for the CCRT, pipe conveyor, and first landfill phase (\$337.4 million) is required by 2018. The capital cost for the CCRT and first pipe conveyor is the same for both alternatives. Based on its length, the second pipe conveyor in the Sterling alternative costs three times more than the pipe conveyor in the onsite alternative; this cost estimate is conservative since it does not account for the more rugged terrain through which the Sterling conveyor must pass. In addition, the Sterling alternative requires ten dedicated barges. **With the exception of the cost of the barges, all capital cost estimates for both alternatives were developed by GAI.** Not included in the Sterling alternative is the cost of a contingency plan for storing CCRs in the event that Sterling is unable to accept the material. **A potential contingency plan would involve constructing Phase 1 of the landfill for the Sterling alternative (\$135.3 million in the onsite alternative in Table 2).**

**Table 2 – Capital Cost (\$2014, \$M)**

Onsite Alternative		Sterling Alternative	
CCRT	172.1	CCRT	172.1
Pipe Conveyor <sup>5</sup>	30.0	First Pipe Conveyor <sup>5</sup>	30.0
Landfill Phase 1 <sup>6</sup>	135.3	Barge Loading/Unloading Facilities	43.0
Landfill Phase 2	79.5	Second Pipe Conveyor to Truck Loading	89.8
Landfill Phase 3	38.9	Site Preparation and Permitting	21.8
Landfill Phase 4	12.1	Haul Road	26.0
Intermediate & Final Soil Cover <sup>7</sup>	22.9	Barge Purchase	8.5
<b>Total</b>	<b>490.8</b>	<b>Total</b>	<b>391.2</b>

### 3.2 Fixed Operating and Maintenance Costs

Table 3 summarizes the annual fixed operating and maintenance costs (“O&M”) for the onsite and Sterling alternatives. Compared to the onsite alternative, the annual fixed O&M for the Sterling alternative is more than \$1 million higher. The fixed O&M estimates for the onsite alternative were developed by GAI. For the Sterling alternative, GAI developed the estimated road maintenance and dust control costs; the Companies developed the fleeting and barge operating costs based on existing contracts for similar services. The barge fleeting cost, which is the cost to secure and position the barges while loading and unloading, is the majority of the annual fixed O&M for the Sterling alternative. In addition to these costs, fixed O&M for the onsite alternative includes the cost of covering and closing landfill phases. Over the life of the project, these costs are less than \$2 million in 2014 dollars.

**Table 3 – Annual Fixed Operating and Maintenance Costs (\$2014, \$/year)**

Onsite Alternative		Sterling Alternative	
Road Maintenance and Dust Control	420,000	Road Maintenance and Dust Control	390,000
Leachate System O&M	330,000	Fleeting for Barge Loading	485,000
Landfill Maintenance	460,000	Fleeting for Barge Unloading	970,000
		Barge Operating Cost	680,000
<b>Total</b>	<b>1,210,000</b>	<b>Total</b>	<b>2,525,000</b>

### 3.3 Variable Operating and Maintenance Costs

Table 4 summarizes the variable O&M for the onsite and Sterling alternatives. Compared to the onsite alternative, variable O&M for the Sterling alternative is approximately \$14/ton higher. The variable O&M for the pipe conveyor and truck hauling is the same for both alternatives. The barge loading and unloading cost estimates are based on the Companies’ experience operating their existing barge loading facility at the Trimble County Station. The CCRs are in a paste-like form that result in more difficult handling than other solids. Due to this consistency of the CCRs, unloading barges is assumed to be 50% more costly than loading barges. The truck hauling cost estimates are based on KU’s contract for similar services at the Ghent Generating Station. Sterling Ventures provided the estimate for the tipping fee, which includes the cost of transporting the CCR by off-road trucks into the quarry.

<sup>5</sup> The capital cost for the CCRT includes the cost for a haul road which is needed in case the pipe conveyor is out of service.

<sup>6</sup> The Landfill Phase 1 cost includes site preparation and permitting costs as well as the cost of the haul road from the truck loading station to the landfill.

<sup>7</sup> The capital for intermediate and final soil cover are incurred as the phases are filled.

**Table 4 – Variable Operating and Maintenance Cost (\$2014, \$/Ton)<sup>8</sup>**

Onsite Alternative		Sterling Alternative	
Pipe Conveyor (“PC”) Operating Costs	0.04	First Pipe Conveyor	0.04
Truck Hauling to Landfill (0.5 Miles)	0.99	Barge Loading	0.68
Truck Hauling to Landfill (0.75 Miles)	1.13	Barge Transport	2.50
Truck Hauling to Landfill (1.25 Miles)	1.38	Barge Unloading	1.02
CCR Placement & Compaction at Landfill	0.56	Second Pipe Conveyor	0.04
		Truck Hauling to Mineshaft (0.5 Miles)	0.99
		Sterling Tipping Fee	10.15
Total	1.59 – 1.98	Total	15.42

### 3.4 Other Inputs

Table 5 lists the other input assumptions for this analysis.

**Table 5 – Other Inputs**

Input	Value
Analysis Period	2015-2044
Return on Equity	10.25%
Cost of Debt	3.53%
Capital Structure	
Debt	47.4%
Equity	52.6%
Tax Rate	38.9%
Revenue Requirement Discount Rate	6.41%
O&M Cost Escalation Rate	3%
Capital Cost Escalation Rate	4%

## 4 Analysis of Alternatives

The need for additional CCR storage capacity varies with the level of coal generation at the Trimble County Station and the amount of CCRs that are beneficially reused. As coal generation increases or as beneficial reuse volumes decrease, the need for additional storage capacity increases. To capture the full range of possible CCR storage needs, three coal generation cases were considered: base, high, and low. The base generation case is taken from the Companies’ 2015 Business Plan. The average annual capacity factor for the Trimble County coal units in the base generation scenario is 73%. In the high generation case, the average capacity factor is 80%. In the low generation case, the average capacity factor is 50%. The low generation case is an extreme scenario. The Trimble County coal units are two of the Companies’ most efficient coal units; a 50% capacity factor for the Trimble County coal units implies that other coal units in the Companies’ generating portfolio are operating at even lower capacity factors.

Because the Companies cannot reasonably assume a continuous and constant level of beneficial reuse moving forward, the analysis considered two beneficial reuse cases in addition to the generation cases. In the first case, no CCR volumes are beneficially reused. In the second case, beneficial reuse continues

<sup>8</sup> On average, to convert a \$/ton of CCR to \$/CY, divide by 1.2.

at current levels (approximately 250,000 CY/year). In total, the analysis considered six CCR storage scenarios (three generation cases times two beneficial reuse cases; see Table 6). With these scenarios, the analysis considers a wide range of annual CCR storage requirements. This is important for properly evaluating the onsite and Sterling storage alternatives.

**Table 6 – CCR Generation and Beneficial Reuse Scenarios**

Scenarios	Avg. Capacity Factor: Trimble County Coal Units	Beneficial Reuse (000s CY)	Annual CCR Storage (000s CY)
High Generation; No Beneficial Reuse	80%	0	900
High Generation; Beneficial Reuse	80%	250	650
Base Generation; No Beneficial Reuse	73%	0	725
Base Generation; Beneficial Reuse	73%	250	475
Low Generation; No Beneficial Reuse	50%	0	600
Low Generation; Beneficial Reuse	50%	250	350

Annual revenue requirements were computed for the onsite and Sterling storage alternatives over a 30-year analysis period for each of the six generation-beneficial reuse scenarios. For the onsite storage alternative, the annual CCR storage requirement impacts the timing of second, third, and fourth landfill phases. For each of the scenarios considered, Table 7 lists the in-service year for each landfill phase, the total nominal capital cost for the project, and the life of the landfill.

**Table 7 – Timing of Onsite Landfill Phases**

Scenarios	No Beneficial Reuse			With Beneficial Reuse		
	High Generation	Base Generation	Low Generation	High Generation	Base Generation	Low Generation
Phase 1	2018	2018	2018	2018	2018	2018
Phase 2	2024	2026	2028	2027	2029	2033
Phase 3	2032	2036	2039	2035	2040	2045
Phase 4	2044	2050	2057	2047	2055	2063
Final Cover	2055	2064	2074	2058	2068	2078
Total Project Nominal Capital Cost (\$M) <sup>9</sup>	663	689	782	701	773	879
Landfill Life (years)	37	46	56	40	50	60

The results of the analysis are summarized in Table 8. Over all scenarios, the onsite storage alternative is lower cost than the Sterling alternative. The difference in present value of revenue requirements ("PVRR") between the onsite and Sterling alternatives ranges from \$156 million to \$217 million. The difference in levelized cost between the two options ranges from \$14/ton to \$22/ton.

<sup>9</sup> The total nominal capital cost excludes \$26.4 million that has been spent on the project through 2/28/2014.

**Table 8 – Analysis Results, All Scenarios (30-year study period)<sup>10</sup>**

Scenarios	CCRs Stored (MCY)	Present Value Revenue Requirement (\$2014, 2015-2044, \$M)			Levelized Cost (\$/Ton Stored)		
		Onsite	Sterling	Diff (Onsite less Sterling)	Onsite	Sterling	Diff (Onsite less Sterling)
High Generation; No Beneficial Reuse	32.7	637	854	(217)	42	57	(14)
High Generation; Beneficial Reuse	28.2	614	811	(197)	50	66	(16)
Base Generation; No Beneficial Reuse	26.0	614	795	(181)	51	66	(15)
Base Generation; Beneficial Reuse	21.5	589	752	(164)	64	82	(18)
Low Generation; No Beneficial Reuse	21.3	595	754	(159)	61	77	(16)
Low Generation; Beneficial Reuse	16.8	556	711	(156)	79	101	(22)

Table 9 lists the PVRR for the onsite and Sterling alternatives by cost item. Several factors drive the results of this analysis:

1. In all scenarios (and particularly in scenarios with higher CCR storage requirements), variable O&M costs for the Sterling alternative are significantly higher.
2. Due to the need to operate barge loading and unloading facilities, fixed O&M costs for the Sterling alternative are also higher.
3. The onsite alternative has higher capital costs overall on a PVRR basis, but this is more than offset by the lower fixed and variable O&M costs. Furthermore, inclusion of the capital (\$135 million in 2014 dollars) associated with a potential contingency storage plan for the Sterling alternative would result in the Sterling alternative's capital costs exceeding those of the onsite alternative.

<sup>10</sup> To highlight the cost differences between the onsite and offsite alternatives, the cost of beneficial reuse projects are not reflected in these results. Beneficial reuse costs are the same for both alternatives.

**Table 9 – PVRR by Cost Item<sup>11</sup>**

Scenarios	Present Value Revenue Requirement (\$2014, 2015-2044, \$M)			
	Capital Cost	Fixed O&M	Variable O&M	Total Cost
<b>Onsite Alternative</b>				
High Generation; No Beneficial Reuse	580	23	34	637
High Generation; Beneficial Reuse	563	23	29	614
Base Generation; No Beneficial Reuse	564	23	27	614
Base Generation; Beneficial Reuse	544	23	22	589
Low Generation; No Beneficial Reuse	550	23	22	595
Low Generation; Beneficial Reuse	516	23	17	556
<b>Sterling Alternative</b>				
High Generation; No Beneficial Reuse	523	44	287	854
High Generation; Beneficial Reuse	523	44	244	811
Base Generation; No Beneficial Reuse	523	44	228	795
Base Generation; Beneficial Reuse	523	44	185	752
Low Generation; No Beneficial Reuse	523	44	187	754
Low Generation; Beneficial Reuse	523	44	144	711
<b>Difference (Onsite Less Sterling)</b>				
High Generation; No Beneficial Reuse	57	(21)	(253)	(217)
High Generation; Beneficial Reuse	40	(21)	(215)	(197)
Base Generation; No Beneficial Reuse	41	(21)	(201)	(181)
Base Generation; Beneficial Reuse	21	(21)	(163)	(164)
Low Generation; No Beneficial Reuse	24	(21)	(165)	(159)
Low Generation; Beneficial Reuse	(7)	(21)	(127)	(156)

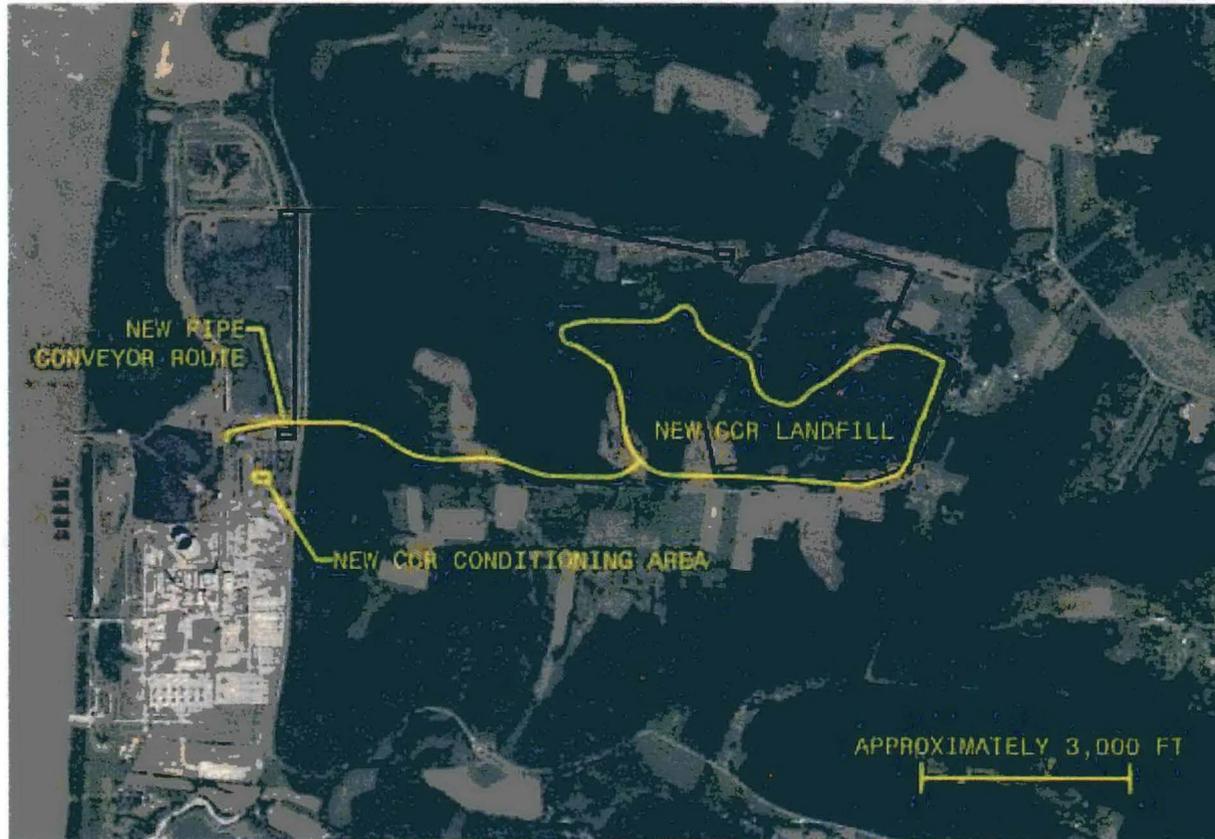
## 5 Conclusion

Based on the Companies' analysis, continuing with the onsite CCR storage alternative remains the least-cost alternative for the Trimble County Station compared to the Sterling alternative. In all scenarios considered, continuing with the onsite alternative is the least-cost alternative. Furthermore, these results do not address the risks associated with having no onsite CCR storage as well as the site specific risks inherent in the Sterling alternative. A prudent CCR plan for the Trimble County Station would address those risks which further supports continuing with the onsite storage project. Finally, regardless of which alternative is selected, the Companies will need to construct a CCRT system in order to dry and prepare the CCR's for storage.

<sup>11</sup> To highlight the cost differences between the onsite and offsite alternatives, the cost of beneficial reuse projects are not reflected in these results. Beneficial reuse costs are the same for both alternatives.

## II. Companies Continue to Exercise CPCN/ECR Project Authority

### *CCRT/Landfill Layout Comparison (Current vs. 2009)*



**NOTE: Black Outline: Original Design (2009) ; Yellow Outline: Current 2014 Layout**

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TRIMBLE COUNTY GENERATING STATION LANDFILL PROJECT  
 SUPPLEMENT TO ALTERNATIVES ANALYSIS  
 TABLE APPENDIX III.D-1 - UNIT COST DEVELOPMENT<sup>1,2,3</sup>

BY:RJH 12/05/14  
 CHECKED:KPR 12/05/14

	Unit Cost (\$)	Unit	Source	Source Support Document	RS Means Item Number	Original Cost (\$)	Original Unit	Trimble, KY Adjusted Cost (\$)	Adjusted Unit	Adjustment Equation
<b>CAPITAL COSTS</b>										
<b>General Project / Permitting / Infrastructure Cost Impacts</b>										
1	\$ 12,000	Acre	LG&E Supplied Estimate	N/A	N/A	-	-	-	-	N/A
2	\$ 17,000	Acre	See Below	See Below	See Below	-	-	16,837	Acre	Sum of Sub-Items
	\$ 11,111	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.11.10.10.0300	14,600	Acre	11,111	Acre	N/A
	\$ 5,727	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.11.10.10.0350	7,525	Acre	5,727	Acre	N/A
3	\$ 880	LF	Inflated LG&E Supplied Estimate - Scaled from 90% TC Construction Estimate	Support Document III.D-1-2	N/A	5,954,000	Lump Sum	872	LF	\$5,954,000 / 6,825 LF
4	\$ 50	LF	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-3	See Support Document III.D-1-3	-	-	-	-	N/A
5	Varies	Acre	Kentucky Department of Fish and Wildlife Resources Fee In-Lieu Of Program	Support Document III.D-1-4	N/A	-	-	-	-	N/A
6	Varies	LF	Kentucky Department of Fish and Wildlife Resources Fee In-Lieu Of Program	Support Document III.D-1-4	N/A	-	-	-	-	N/A
7	Varies	EA	GAI Cost Estimate	Support Document III.D-1-5	N/A	-	-	-	-	N/A
8	\$ 5,338	Acre	GAI Cost Estimate	Support Document III.D-1-4	N/A	5,338	Acre	5,338	Acre	(\$4,575 + \$6,100) / 2
9	\$ 350	LF	GAI Cost Estimate	Support Document III.D-1-6	N/A	303	LF	350	LF	Round up
10	\$ 400	LF	GAI Cost Estimate	Support Document III.D-1-6	N/A	350	LF	400	LF	Round up
<b>CCR Transportation</b>										
11	\$ 2,150	LF	Recent Vendor/Contractor Supplied Estimate	Support Document III.D-1-7	N/A	-	-	-	-	N/A
12	\$ 2,425	LF	Recent Vendor/Contractor Supplied Estimate	Support Document III.D-1-7	N/A	-	-	-	-	N/A
13	\$ 3,125	LF	Recent Vendor/Contractor Supplied Estimate	Support Document III.D-1-7	N/A	-	-	-	-	N/A
14	\$ 250,000	EA	Recent Vendor/Contractor Supplied Estimate	Support Document III.D-1-8	N/A	-	-	-	-	N/A
15	\$ 1,600	LF	Scaled from Recent Haul Road Construction Package Cost Estimate	Support Document III.D-1-9	N/A	10,487,982	Lump Sum	1,565	LF	\$10,487,982 / 6,700 LF
16	\$ 4,000,000	EA	Scaled from Recent Haul Road Construction Package Cost Estimate	Support Document III.D-1-10	N/A	3,965,000	EA	4,000,000	EA	Round up
17	\$ 1,750,000	EA	Scaled from Recent Haul Road Construction Package Cost Estimate	Support Document III.D-1-11	N/A	145	SF	1740000	EA	\$/SF * SF
<b>Landfill Preparation</b>										
18	\$ 75.00	LF	Recent Construction Bid Price or Supplier Quote on Similar Project	N/A	N/A	-	-	-	-	N/A
19	\$ 50.00	LF	Recent Construction Bid Price or Supplier Quote on Similar Project	N/A	N/A	-	-	-	-	N/A
20	\$ 5.65	CY	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-12	See Support Document III.D-1-12	7.42	CY	5.65	CY	N/A
21	\$ 21.72	CY	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-12	See Support Document III.D-1-12	28.54	CY	21.72	CY	N/A
22	\$ 5.65	CY	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-12	See Support Document III.D-1-12	7.42	CY	5.65	CY	N/A
23	\$ 5.94	CY	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-12	See Support Document III.D-1-12	7.81	CY	5.94	CY	N/A
24	\$ 6.84	CY	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-12	See Support Document III.D-1-12	8.99	CY	6.84	CY	N/A
25	\$ 8.36	CY	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-12	See Support Document III.D-1-12	10.99	CY	8.36	CY	N/A
26	\$ 91,000	Acre	See Below	See Below	See Below	-	-	90,682	Acre	Sum of Sub-Items-rounded to \$91,000
	\$ 17,139	Acre	See Below	See Below	See Below	-	-	17,139	Acre	Sum of Sub-Items
	\$ 4,543	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.16.42.1350	1.85	CY	4,543	Acre	\$/CY * 2FT/3FT * 43560CF/9SF
	\$ 7,317	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.20.5090	2.98	CY	7,317	Acre	\$/CY * 2FT/3FT * 43560CF/9SF
	\$ 5,279	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.17.0020	2.15	CY	5,279	Acre	\$/CY * 2FT/3FT * 43560CF/9SF
	\$ 12,830	Acre	See Below	See Below	See Below	-	-	12,830	Acre	Sum of Sub-Items
	\$ 2,271	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.16.42.1350	1.85	CY	2,271	Acre	\$/CY * 1FT/3FT * 43560CF/9SF
	\$ 7,919	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.20.5120	6.45	CY	7,919	Acre	\$/CY * 1FT/3FT * 43560CF/9SF
	\$ 2,640	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.17.0020	2.15	CY	2,640	Acre	\$/CY * 1FT/3FT * 43560CF/9SF
	\$ 4,985	Acre	GAI Cost Estimate from Past Project	Support Document III.D-1-13	N/A	1.03	SY	4,985	Acre	\$/SY * 1SY/9SF * 43560SF/Acre
	\$ 32,670	Acre	GAI Cost Estimate from Past Project	Support Document III.D-1-13	N/A	6.75	SY	32,670	Acre	\$/SY * 1SY/9SF * 43560SF/Acre
	\$ 23,057	Acre	See Below	See Below	See Below	-	-	23,057	Acre	Sum of Sub-Items
	\$ 4,076	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.16.42.0300	1.66	CY	4,076	Acre	\$/CY * 2FT/3FT * 43560CF/9SF
	\$ 11,172	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.20.5110	4.55	CY	11,172	Acre	\$/CY * 2FT/3FT * 43560CF/9SF
	\$ 5,279	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.17.0020	2.15	CY	5,279	Acre	\$/CY * 2FT/3FT * 43560CF/9SF
	\$ 1,891	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.23.5720	0.77	CY	1,891	Acre	\$/CY * 2FT/3FT * 43560CF/9SF
	\$ 638	Acre	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.23.5060	0.26	CY	638	Acre	\$/CY * 2FT/3FT * 43560CF/9SF
27	\$ 93,000	Acre	See Below	See Below	See Below	-	-	93,088	Acre	Sum of Sub-Items-rounded to \$93,000

Sterling - Exhibit 17



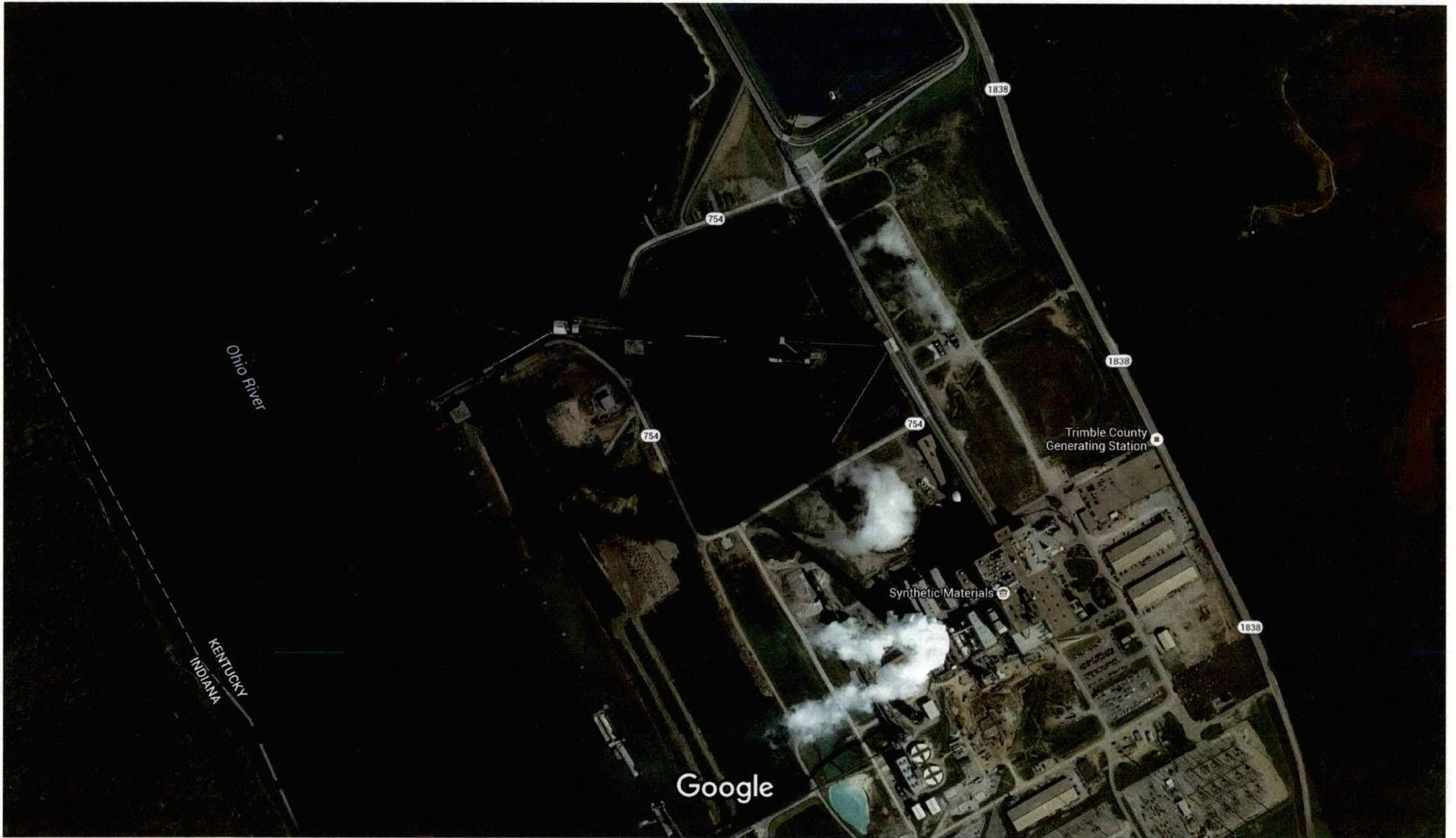
TRIMBLE COUNTY GENERATING STATION LANDFILL PROJECT  
 SUPPLEMENT TO ALTERNATIVES ANALYSIS  
 TABLE APPENDIX III.D-1 - UNIT COST DEVELOPMENT<sup>1,2,3</sup>

BY:RJH 12/05/14  
 CHECKED:KPR 12/05/14

	Unit Cost (\$)	Unit	Source	Source Support Document	RS Means Item Number	Original Cost (\$)	Original Unit	Trimble, KY Adjusted Cost (\$)	Adjusted Unit	Adjustment Equation	
<b>CAPITAL COSTS</b>											
35	Barge Loading Facility	\$ 14,200,000	EA	Recent Vendor/Contractor Supplied Estimate	Support Document III.D-1-16	N/A	-	-	-	N/A	
36	Barge Unloading Facility	\$ 16,100,000	EA	Recent Vendor/Contractor Supplied Estimate	Support Document III.D-1-16	N/A	-	-	-	N/A	
37	Ancillary Costs (Critical Spares and Office/Warehouse Space)	\$ 1,600,000	EA	Recent Vendor/Contractor Supplied Estimate	Support Document III.D-1-16	N/A	-	-	-	N/A	
	<b>Additional Capital Costs</b>										
38	Additional Capital Costs <sup>6</sup>	Varies	LUMP	See Below	Support Document III.D-1-17	-	-	-	-	Sum of Sub-Items	
	LG&E Overheads and Engineering Support	Varies	LUMP	LG&E Supplied Estimate	Support Document III.D-1-17	-	-	-	-	N/A	
	Intermediate Cover and Benches	Varies	LUMP	GAI Cost Estimate	Support Document III.D-1-17	-	-	-	-	N/A	
	QA/QC (Subgrade, Liner, Final Cover System)	Varies	LUMP	GAI Cost Estimate	Support Document III.D-1-17	-	-	-	-	N/A	
	Borrow Area Haul Roads and On-Landfill Haul Roads	Varies	LUMP	GAI Cost Estimate	Support Document III.D-1-17	-	-	-	-	N/A	
<b>OPERATION AND MAINTENANCE (O&amp;M) COSTS</b>											
	<b>Landfill / Pipe Conveyor Operating Costs</b>										
39	Hauling - 1 Mile Round Trip (22 CY on landfill/private road)	\$ 2.56	CY	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.20.5100	3.37	CY	2.56	CY	N/A
40	Hauling - 2 Mile Round Trip (22 CY on landfill/private road)	\$ 3.46	CY	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.20.5110	4.55	CY	3.46	CY	N/A
41	Hauling - 3 Mile Round Trip (22 CY on landfill/private road)	\$ 4.19	CY	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.20.5110/5120	5.50	CY	4.19	CY	N/A
42	Hauling - 30 Mile Round Trip (18 CY, 35 MPH avg)	\$ 11.55	CY	2012 RS Means Heavy Construction Cost Data	Support Document III.D-1-1	31.23.23.20.9670/9704	11.55	CY	11.55	CY	N/A
43	Offsite CCR Disposal - Tipping Fee <sup>7</sup>	Varies	TON	Recent Vendor/Contractor Supplied Estimate	Support Document III.D-1-18	N/A	-	-	-	N/A	
44	Pipe Conveyor Cost of Operation	\$ 0.20	CY	Recent Vendor/Contractor Supplied Estimate	Support Document III.D-1-19	N/A	-	-	-	N/A	
	<b>Barge Transport</b>										
45	Barge Loading and Unloading Operations Costs	\$ 1,100,000	YR	Recent Vendor/Contractor Supplied Estimate	Support Document III.D-1-16	N/A	-	-	-	N/A	
46	Barge Transportation Costs	Varies	TON	Confidential Source	N/A	N/A	-	-	-	N/A	
	<b>Additional O&amp;M Costs</b>										
47	Additional O&M Costs <sup>6</sup>	Varies	LUMP	See Below	Support Document III.D-1-17	-	-	-	-	Sum of Sub-Items	
	CCR Placement, Compaction, Survey, and QA/QC	Varies	LUMP	GAI Cost Estimate	Support Document III.D-1-17	-	-	-	-	N/A	
	Cleanout / Maintenance (Haul Roads, Ponds, LCS, Underdrain, and Landfill)	Varies	LUMP	GAI Cost Estimate	Support Document III.D-1-17	-	-	-	-	N/A	
	Dust Control	Varies	LUMP	GAI Cost Estimate	Support Document III.D-1-17	-	-	-	-	N/A	

NOTES:

- Costs are for comparison of Site Alternatives only as described in Section III of the report. Contingencies were not applied except as noted in Appendix III.D-1.
- Costs were developed including only line items which are anticipated to be significantly different between Site Alternatives. "Common Cost" items anticipated to be similar in cost for all Site Alternatives are not included (i.e. project management or the conditioning and treatment of CCR prior to transit from TC Station). Minor construction and operations costs are not included due to the conceptual nature of the design. Examples of these minor cost items include: minor utility line relocations, minor erosion and sedimentation/stormwater management controls, surface and groundwater testing, mowing.
- Costs are calculated on 2012 dollar basis (except as noted in Appendix III.D-1). No inflation or discount rates included.
- Assumes average cost (\$5,338 per acre) for Indiana Bat Mitigation as described in Support Document III.D-1-4.
- Does not include costs for leachate treatment or transport system. See Appendix III.D-1 for more information.
- Additional Capital and O&M costs include costs previously omitted from (GAI 2014) Cost Analysis but added to the Case Study Analysis due to comparison of landfill vs. non-landfill (e.g. mine) alternatives. See Appendix III.D-1 for more information.
- Cost varies with location of disposal. At Valley View, tipping fee is \$21.20/ton. At Sterling Ventures Mine, tipping fee is \$10.15/ton.



Imagery ©2015 Google, Map data ©2015 Google 500 ft

Sterling – Exhibit 18

**SUPPORT DOCUMENT III.D-1-16**  
**Fenner Dunlop Project Cost Report Dated October 24, 2014**  
**– River Loading/Transport/Unloading Operations**

Support Document III.D-1-16:

All costs are taken from the Fenner Dunlop Project Cost Report (October 24, 2014) regarding river loading, transport, and unloading operations costs. Listed below is a summary of the line items and their assumptions, followed by the full report.

**Line Item 46 – Barge Loading Facility:** A continuous drive conveyor system to transfer materials from a load out hopper to an open hopper barge. The facility would cost approximately \$8,300,000 and does not include construction costs. It also assumes existing infrastructure is sufficient.

**Line Item 47 – Barge Unloading Facility:** A bridge style continuous unloader to remove material from barges. The facility would cost approximately \$16,100,000 and includes facility and construction costs of ~\$9.97 million and ~\$6.15 million, respectively.

**Line Item 48 – Barge Transportation Capital Costs:** Material will be transported using four barges at once along with a push boat. Utilizing two sets of four barges and a push boat, the approximate cost is \$3,100,000.

**Line Item 49 – Ancillary Costs:** Factors in support facilities for employees consisting of office space, warehouse space, and/or maintenance supplies storage space, as well as spares for critical components in case of failures. Approximate cost is \$1,600,000.

**Line Item 50 – Barge Loading and Unloading Operations Cost:** The total of labor, utilities, and maintenance and supplies costs for barge loading operation, barge unloading, and barge transport operations. Will cost approximately \$2,100,000 per year.

GAI Consultants  
385 East Waterfront Drive  
Homestead, Pa 15120

Project Cost Report  
October 24, 2014

Attn: Kevin P. Resnik

From: John Harvey

## River Loading/Transport/Unloading Operations

This report has been developed in order to provide an order of magnitude cost estimation to load coal combustible residuals (CCRs) from a processing point along the river, transport, and unload to an offsite landfill area elsewhere along the river. This report is not intended to be used as a quote for services or a proposal to perform such activity. Rather, it is intended solely as a frame of reference to be used in assisting with capital expenditure decisions.

### Conceptual Design

Design would incorporate a conveyor and truss loading structure with the capability to transport 800 tons of material per hour at 75% efficiency for 8 hours per day and 250 days per year. The loading structure would disperse material into one of eight open hopper barges with a minimum capacity of 1200 ton. A tug or push boat is utilized to transport four loaded barges to the offsite unloading facility. The unloading facility consists of a bridge style continuous unloader with the capability to remove 800 tons per hour at 75% efficiency for 8 hours per day and 250 days per year. This design does not consider material processing/transport **to** the loading facility or material processing /transport **from** the unloading facility. This design does consider support facilities, construction, operating costs, and critical spares.

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- H. Sources
  
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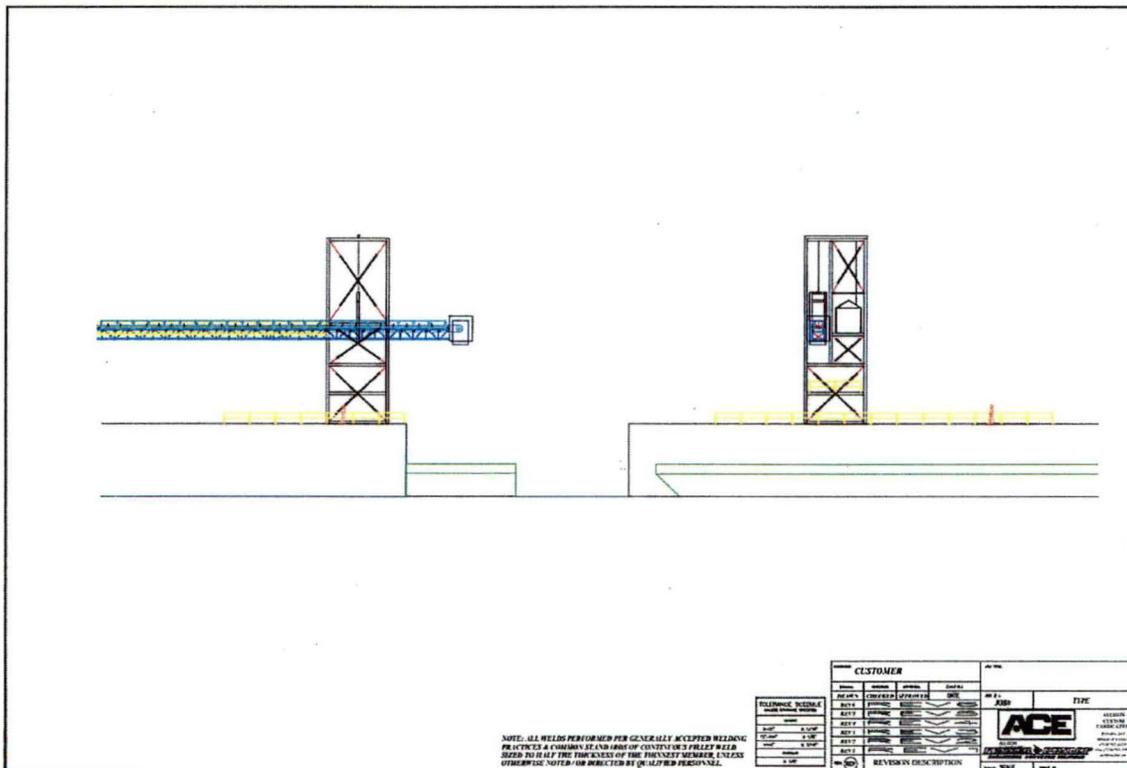
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## A. Barge Loading Facility

### Description

A minimum 100ft continuous drive transfer conveyor system would be utilized to transfer material at up to 1400TPH from an integrated materials load out hopper to a minimum 1200ton open hopper barge. The 36" wide transfer conveyor would consist of a 600HP continuous drive motor with drive frame and pulley, gravity take up with frame and pulleys, tail pulley and frame, CEMA C flat/trough/return idlers, hinged conveyor covers, and walkways with handrail and estops. The conveyor support superstructure would incorporate a reinforced, seamlessly welded truss and bend design and be fabricated from heavy structural angles, tubes, and beams. Articulation would be designed into the load out chute and superstructure in order to compensate for varying river water levels.

### Schematic



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Cost Breakdown

<b>Barge Load Out</b>						
Item	Description	Quantity	Unit	Unit Cost	Total Cost	
1	Truss and Bent Structure	32589	LB	\$3.00	\$97,767.00	
2	Shipping - EX Works	6	Loads	\$3,300.00	\$19,800.00	
3	Drive Pulley	1	Ea	\$93,742.00	\$93,742.00	
4	Take-up Pulley	2	Ea	\$12,538.00	\$25,076.00	
5	Tail Pulley	1	Ea	\$12,538.00	\$12,538.00	
6	Drive Frame	1	EA	\$172,000.00	\$172,000.00	
7	Motor 600 HP	1	EA	\$153,000.00	\$153,000.00	
8	Gearboxes (Falk 585A3-C-39.900:1) - Inquiry 15797	2	EA	\$398,636.41	\$797,272.82	
9	Backstop (Falk 1185 nrt) - Inquiry 15797	2	EA	\$186,778.31	\$373,556.62	
10	Tail A-Frame	1	EA	\$16,054.00	\$16,054.00	
11	Take-up	22000	LB	\$3.00	\$66,000.00	
12	Feeder Hopper	12000	LB	\$3.00	\$36,000.00	
13	Drive frame	20000	LB	\$3.00	\$60,000.00	
14	Overland Frame Section A-a	100	LF	\$75.00	\$7,500.00	
15	Hinged Conveyor Covers	100	LF	\$116.95	\$11,695.00	
16	Walkway (30 sheets @ 12 ft @ \$564.36) + 25% hardware	1	LS	\$21,163.50	\$21,163.50	
17	Stair Treads (\$25.00 + 25% hardware)	10	EA	\$35.00	\$350.00	
18	Hand Rail	100	LF	\$60.00	\$6,000.00	
19	E-stops (conveyor components company)	1	EA	\$27,972.00	\$27,972.00	
20	Motor Controls	1	EA	\$990,000.00	\$990,000.00	
21	Guarding (take-up, Drive, Tail)	1	EA	\$24,000.00	\$24,000.00	
22	Manuals and Signage	80	HRS	\$75.00	\$6,000.00	
23	Structural Engineering	270	HRS	\$85.00	\$22,950.00	
24	Design and Documentation Services	222	HRS	\$75.00	\$16,650.00	
25	Engineering - PE Stamp	120	HRS	\$73.00	\$8,760.00	
27	Installation	1	LS	\$450,000.00	\$450,000.00	
28	Classic Idlers	0.295	LF	\$3,117,979.00	\$919,803.81	
29	DynaFlight ST3150 CSA-FF Type	1	LS	\$984,524.00	\$984,524.00	
					\$5,420,174.75	
					25% Margin	\$1,806,724.92
<b>Total Items 1 Through 29</b>						\$7,226,899.66
					15% Contingency	\$1,084,034.95
						\$8,310,934.61

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## B. Barge Transport

### Description

Material would be loaded into Jumbo Open Hopper Barges with a minimum capacity of 1200ton. Four barges at once would be transported via a tug or push boat from the loading facility to the unloading facility.

Time to load one barge = 2 hours (1200ton /600TPH)

Time to load four barges = 8 hours

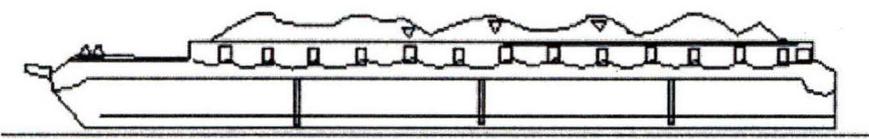
Time to unload one barge = 2 hours (1200ton/600TPH)

Time to unload four barges = 8 hours

### Continuous operations example:

Day shift loads and unloads four barges (8 hours).

Full barges are taken to unload and empty barges returned during night shift. (8 hours)

<b>Common Barge Types</b>				
				
<b>OPEN HOPPER BARGES</b>				
	LENGTH	BREADTH	DRAFT	CAPACITY
TYPE	FEET	FEET	FEET	TONS
Standard	175	26	9	1000
Jumbo	195-200	35	9	1600
Super Jumbo	250-290	40-52	9	2100-3300

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Cost

Open Hopper Barge = \$301,000 (average of 5 bids) X 8 = **\$2,408,000**  
Tug/Push Boat = **\$725,000** (average of 2 bids)

Supporting Information

**HB 140 Inland River Hopper Barges (14 Rakes)** **\$265,000**

**Type:** Inland River Hopper Barge  
**Dimensions (LxWxD):** 195'x35'x12'  
**Year Built:** 1998  
**Hull Type:** Steel  
**Flag:** US  
**Listed:** January 14 2014 4 28 pm

**HB 209 Inland Open Hopper Barge (Rake)** **\$265,000**

[Hopper Barges](#) [Damco Marine](#)  
**Dimensions (LxWxD):** 195'x35'x12'  
**Year Built:** 1991  
**Location:** Gulf of Mexico  
**Listed:** January 14 2014 3 23 pm  
4 Main Compartments 1 Bow Rake Compartment 1 Stern Transom Compartment 6 Manhole Covers



**Hopper Barge**

US \$25000-45000 / 195'x35'x12'  
**2 Units** / 195'x35'x12'  
**20 Unit/Units per Month** / 195'x35'x12'

Barge Floating Barge Platform Barge

View 2+ similar products

**Brownsville Marine Products - New Open Hopper Barge \$275,000**

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Price: U.S. \$ 685,000.00 **FIRM**

DIMENSIONS		
	Feet	Meters
Length	52	15.8
Width	20	6.1
Depth	7'6"	2.28
Draft	5'3"	1.6
Eye Height	Feet	
Speed	7.5 Knots	
Consumption	20 GPH	



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Price: U.S. \$ 765,000.00 **FIRM**

DIMENSIONS		
	Feet	Meters
Length	114.5	34.9
Width	30	9.15
Depth	11	3.35
Draft	7.5	2.29
Eye Level of Bridge	27 Feet	
Speed		
Consumption		



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**Cost Breakdown**

Item	Description	Barge Unload		Unit Cost	Total Cost	
		Quantity	Unit			
1	Structure	127898	LB	\$3.00	\$383,694.00	
2	Shipping	8	Loads	\$3,300.00	\$26,400.00	
3	Drive Pulley	1	Ea	\$93,742.00	\$93,742.00	
4	Take-up Pulley	2	Ea	\$12,538.00	\$25,076.00	
5	Tail Pulley	1	Ea	\$12,538.00	\$12,538.00	
6	Drive Frame	1	EA	\$172,000.00	\$172,000.00	
7	Motor 600 HP	1	EA	\$153,000.00	\$153,000.00	
8	Gearboxes (Falk 585A3-C-39.900:1) - Inquiry 15797	2	EA	\$398,636.41	\$797,272.82	
9	Tail A-Frame	1	EA	\$16,054.00	\$16,054.00	
10	Take-up	15000	LB	\$3.00	\$45,000.00	
11	Drive frame	20000	LB	\$3.00	\$60,000.00	
12	Conveyor Frame Section A-a	100	LF	\$75.00	\$7,500.00	
13	Hinged Conveyor Covers	100	LF	\$116.95	\$11,695.00	
14	Walkway (30 sheets @ 12 ft @ \$564.36) + 25% hardware	1	LS	\$21,163.50	\$21,163.50	
15	Stair Treads (\$25.00 + 25% hardware)	100	EA	\$35.00	\$3,500.00	
16	Hand Rail	1000	LF	\$60.00	\$60,000.00	
17	E-stops (conveyor components company)	1	EA	\$27,972.00	\$27,972.00	
18	Motor Controls	1	EA	\$990,000.00	\$990,000.00	
19	Electronics	1	LS	\$350,000.00	\$350,000.00	
20	Guarding (take-up, Drive, Tail)	1	EA	\$24,000.00	\$24,000.00	
21	Manuals and Signage	80	HRS	\$75.00	\$6,000.00	
22	Structural Engineering	270	HRS	\$85.00	\$22,950.00	
23	Design and Documentation Services	222	HRS	\$75.00	\$16,650.00	
24	Engineering - PE Stamp	120	HRS	\$73.00	\$8,760.00	
25	Bucket conveyor	1	LS	\$389,660.00	\$389,660.00	
26	Barge haul system	1	LS	\$222,000.00	\$222,000.00	
27	Installation	1	LS	\$650,000.00	\$650,000.00	
28	Classic Idlers	0.295	LF	\$3,117,979.00	\$919,803.81	
29	DynaFlight ST3150 CSA-FF Type	1	LS	\$984,524.00	\$984,524.00	
					\$6,500,955.13	
					25% Margin	\$2,166,985.04
<b>Total Items 1 Through 29</b>						\$8,667,940.17
					15% Contingency	\$1,300,191.03
						<b>\$9,968,131.19</b>

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## D. Support Facilities

### Description

It is anticipated that a minimum of four employees working 8 hours shifts for 250 days per year will be necessary at both the load and unload facility to properly operate each facility. This does not include operators needed for transport operations (tugboat captain, engineer, and two deck hands). Sufficient support facilities will be required for these employees consisting of office space, warehouse space and/or maintenance/supplies storage space.

### Cost Breakdown

Min 12'X40' office space - \$23,909 (avg of 3 bids) X 2 (1 at each site) = **\$47,818**

Min 24'X30 warehouse/maint space - \$12,317 (avg of 3 bids) X 2 (1 at each site) = **\$26,634**

### Supporting information



New Mobile Modular Office Trailer 12'X 56'

**\$27,895.00**  
0 bids



12x56 Modular Building General/Sales/Bus.Office Trailer

**\$26,536.00**  
Buy It Now  
or Best Offer



New Mobile Modular Office Trailer 12'X 40'

**\$17,295.00**  
0 bids

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**36' X 40' GARAGE SHOP STEEL BUILDING METAL KIT**

**\$16,800.00**

or Best Offer

**Free shipping**

 **FAST 'N FREE**

Get it on or before **Thu, Oct. 30**



**Metal Building 24x30x10 Garage Shop, all galvanized steel**

**\$10,173.00**

or Best Offer

**Free shipping**



**NEW LISTING DuroSPAN Steel 30x70x14 Metal Building Kits Factory  
DiRECT Garage Shop Structure**

**\$9,979.00**

Buy It Now

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## E. Construction

It is anticipated that certain site preparation construction activities will be required prior to installation of both the barge load and unload facilities. These preparations include, but may not be limited to, river walls, abutments, pilings, fill, and utilities. An estimated cost of each of these items is listed as follows and is based on historical data from previous projects and consultation with construction firms.

Barge Load Out - Construction						
Item	Description	Quantity	Unit	Unit Cost	Total Cost	
1	<b>River Wall (600'X20')</b>					
1.1	Backfill (crushed stone - 2700lbs per CY - 3 CY required)	8100	lb	\$42.80		\$346,680.00
1.2	Concrete (600'X20'X24" = 890CY)	890	CY	\$80.00		\$71,200.00
1.3	Lining (600'X40')	24000	SF	\$6.50		\$156,000.00
1.4	Hand Rail	660	LF	\$60.00		\$39,600.00
2	<b>Pilings</b>					
2.1	Material (PZ27)	800	Ton	\$950.00		\$760,000.00
2.2	Pile driver	1000	LF	\$1,500.00		\$1,500,000.00
3	<b>Misc Fill (access roads, foundations, berms, etc)</b>					
3.1	Backfill (crushed stone - 2700lbs per CY - 3 CY required)	12000	lb	\$42.80		\$513,600.00
4	<b>Utilities</b>					
4.1	Lighting (8 poles)	8	EA	\$6,200.00		\$49,600.00
4.2	Stormwater (channels and collection pond)	5500	CY	\$15.00		\$82,500.00
4.3	Plumbing	1	EA	\$21,163.50		\$21,163.50
4.4	Electrical	1	EA	\$27,455.00		\$27,455.00
5	Engineering	400	HRS	\$85.00		\$34,000.00
6	Construction manager	280	HRS	\$120.00		\$33,600.00
7	Labor	2400	HRS	\$100.00		\$240,000.00
						\$3,875,398.50
			25%	Margin		\$1,291,799.50
	<b>Total Items 1 Through 8</b>					\$5,167,198.00
						\$5,167,198.00
			15%	Contingency		\$775,079.70
						\$5,942,277.70

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Barge UnLoad - Construction					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
<b>1</b>	<b>River Wall (600'X20')</b>				
1.1	Backfill (crushed stone - 2700lbs per CY - 3 CY required)	8100	lb	\$42.80	\$346,680.00
1.2	Concrete (600'X20'X24" = 890CY)	890	CY	\$80.00	\$71,200.00
1.3	Lining (600'X40')	24000	SF	\$6.50	\$156,000.00
1.4	Hand Rail	660	LF	\$60.00	\$39,600.00
<b>2</b>	<b>Abutments</b>				
2.1	Concrete	550	CY	\$80.00	\$44,000.00
2.2	Lining	14000	SF	\$6.50	\$91,000.00
<b>3</b>	<b>Pilings</b>				
3.1	Material (PZ27)	800	Ton	\$950.00	\$760,000.00
3.2	Pile driver	1000	LF	\$1,500.00	\$1,500,000.00
<b>4</b>	<b>Misc Fill (access roads, foundations, berms, etc)</b>				
4.1	Backfill (crushed stone - 2700lbs per CY - 3 CY required)	12000	lb	\$42.80	\$513,600.00
<b>5</b>	<b>Utilities</b>				
5.1	Lighting (8 poles)	8	EA	\$6,200.00	\$49,600.00
5.2	Stormwater (channels and collection pond)	5500	CY	\$15.00	\$82,500.00
5.3	Plumbing	1	EA	\$21,163.50	\$21,163.50
5.3	Electrical	1	EA	\$27,455.00	\$27,455.00
6	Engineering	400	HRS	\$85.00	\$34,000.00
7	Construction manager	280	HRS	\$120.00	\$33,600.00
8	Labor	2400	HRS	\$100.00	\$240,000.00
					\$4,010,398.50
			25%	Margin	\$1,336,799.50
	<b>Total Items 1 Through 8</b>				\$5,347,198.00
					\$5,347,198.00
			15%	Contingency	\$802,079.70
					<b>\$6,149,277.70</b>

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## F. Operating Costs

Operating costs for the Load facility, Transport operations, and Unload facility have been conservatively calculated by adding labor rates with utility consumption with consumable maintenance and supply items for one year. An estimated cost of each of these items is listed as follows and is based on historical data from previous projects, internet research, and consultation with facility operators.

<b>Barge Unload - Operating</b>					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	Labor (4 laborers @\$40/hr X 2080hr)	8320	HRS	\$40.00	\$332,800.00
2	Utilities (Avg Yearly Consumption)	1	EA	\$67,200.00	\$67,200.00
3	Maintenance and supplies	1	EA	\$7,200.00	\$7,200.00
<b>Barge Load - Operating</b>					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	Labor (4 laborers @\$40/hr X 2080hr)	8320	HRS	\$40.00	\$332,800.00
2	Utilities (Avg Yearly Consumption)	1	EA	\$67,200.00	\$67,200.00
3	Maintenance and supplies	1	EA	\$7,200.00	\$7,200.00
<b>Barge Transport - Operating</b>					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	Labor (4 personnel @Avg \$70/hr X 2080hr)	8320	HRS	\$70.00	\$582,400.00
2	Tug Boat (\$85.18X 2400HP) *See source D	85.18	HP	\$2,400.00	\$204,432.00
3	Maintenance and supplies	1	EA	\$5,600.00	\$5,600.00
					\$1,606,832.00
			25%	Contingency	\$535,610.67
					\$2,142,442.67
					\$2,142,442.67

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## G. Critical Spares

In order to maintain continuous operation, it is anticipated that certain components be deemed critical in maintaining on site for expedited replacement in the case of failure. A list of these critical spares and associated cost is as follows.

Critical Spares						
Item	Description	Quantity	Unit	Unit Cost	Total Cost	
1	Drive Pulley	1	Ea	\$93,742.00	\$93,742.00	
2	Take-up Pulley	1	Ea	\$12,538.00	\$12,538.00	
3	Tail Pulley	1	Ea	\$12,538.00	\$12,538.00	
4	Barge	1	Ea	\$301,000.00	\$301,000.00	
5	Motor 600 HP	1	EA	\$153,000.00	\$153,000.00	
6	Hydraulic hoses and fittings	1	LS	\$5,500.00	\$5,500.00	
7	Conveyor rollers and idlers	1	LS	\$9,750.00	\$9,750.00	
8	Conveyor belting	1	LS	\$17,000.00	\$17,000.00	
9	Gearbox (Falk 585A3-C-39.900:1)	1	EA	\$398,636.41	\$398,636.41	
10	Electrical switches, relays, breakers	1	LS	\$1,500.00	\$1,500.00	
						\$1,005,204.41
					25% Margin	\$335,068.14
<b>Total Items 1 Through 10</b>						<b>\$1,340,272.55</b>
						\$1,340,272.55
					15% Contingency	\$201,040.88
						<b>\$1,541,313.43</b>

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**H. Sources**

- a) ACE Project 17475 (Kinder Morgan River T Barge Unload facility project)
- b) ACE Project 15797 (Kiewit Mining Coal Spur Project)
- c) [REDACTED]
- d) US Army Corp of Engineers
- e) Federal Interagency Vessel and Shipping Costs Workshop
- f) IWR – Institute for Water Resources
- g) [REDACTED]
- h) Heyl&Patterson Inc
- i) Coosa-Alabama River Improvement Association
- j) Miscellaneous internet research

**I. Summary**

It is anticipated that full scope cost, including operations for one year, to load coal combustible residuals (CCRs) from a processing point along the river, transport, and unload to an offsite landfill area elsewhere along the river to be **\$37,261,829.30**. It is reiterated that this report is not intended to be used as a quote for services or a proposal to perform such activity. Rather, it is intended solely as a frame of reference to be used in assisting with capital expenditure decisions. A list of summary costs is as follows.

Summary					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	Load facility	1	LS	\$8,310,934.61	\$8,310,934.61
2	Load facility construction	1	LS	\$5,942,277.70	\$5,942,277.70
3	Unload Facility	1	LS	\$9,968,131.19	\$9,968,131.19
4	Unload facility construction	1	LS	\$6,149,277.70	\$6,149,277.70
5	Barges	8	EA	\$301,000.00	\$2,408,000.00
6	Push Boat	1	EA	\$725,000.00	\$725,000.00
7	Operating cost	1	LS	\$2,142,442.67	\$2,142,442.67
8	Critical spares	1	LS	\$1,541,313.43	\$1,541,313.43
9	Office/Warehouse space	1	LS	\$74,452.00	\$74,452.00
					<b>\$37,261,829.30</b>

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