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Pond vs Peninsula

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Older

- **Baugh, James S.** 03/10/2005 — Gypsum Disposal — Gary, Just wanted to be sure that budgeting for a couple of gypsum disposal projects aren't falling through the
- **Lundy, Dennis L.** 02/28/2005 — FW: Kingston By-Product Disposal - Meeting Results — fyi Dennis -----Original Message----- From: Baugh, James S.
- **Baugh, James S.** 02/17/2005 — Draft KIF Presentation — This may change again.... Let me know if you have any questions. Steve Baugh Fuel By-Products and Properties LP 5G-C
- **Purkey, Ronald E.** 02/09/2005 — RE: Draft Sensitivity Analysis - KIF pond vs Peninsula — Steve, We have reviewed the subject spread sheets and have the following comments(most of which I discussed earlier
- **Renfroe, Bret** 02/08/2005 — KIF Dry Fly Ash Estimate — Attached is the latest estimate, It came out to be $25MM. It includes the $16MM quote, $3MM for deluge slurry system, $3MM in escalation, $0.7MM in
- **Harless, J. Larry** 02/08/2005 — RE: KIF530: KIF dry fly ash estimate — Will do. When and if this meeting is scheduled I will let you know. -----Original Message-----
- **Kimsey, Barry A.** 02/07/2005 — FW: KIF dry fly ash estimate — Is this a FY05 or FY06 approved project? I don't have

Gypsum Disposal

Baugh, James S.

To: Nuyt, Gary M.
Cc: Purkey, Ronald E.; Haber, Stanley M.

Gary,

Just wanted to be sure that budgeting for a couple of gypsum disposal projects aren't falling through the crack.....

1. Is the design and construction of gypsum disposal facilities for Bull Run in your scrubber project budget?
2. I am assuming (a dangerous thing) that following the decision to pursue the development of the peninsula for Kingston gypsum disposal, you will be picking up the peninsula design and construction costs in your scrubber project budget (Ron Purkey - will you provide the funding needs to Gary, Stan, and myself). Are you planning to cover these costs?

Let me know if we need to discuss this.

Thanks.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

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Pond vs Peninsula

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Kimsey, Barry A. 02/07/2005
FW: KIF dry fly ash estimate
Is this a FY05 or FY06 approved project? I don't have anything loaded in the schedule to support this current effort. If we need to do a full study we can.

Latitude 02/07/2005
FW: Meeting: Petty (Meeting ID: 6705)
When: Tuesday, February 08, 2005 2:30 PM-4:00 PM (GMT-05:00) Eastern Time (US & Canada).
~~*~*~*~*~*~*~*~*

Baugh, James S. 02/07/2005
Draft Sensitivity Analysis - KIF pond vs Peninsula
The attached excel spread sheet entitled "Summary Matrix R1" shows the draft results of the series of sensitivity analyses performed as we discussed in our

Purkey, Ronald E. 02/07/2005
RE: KIF Dry Fly Ash Estimate
Tom, The $2M was the electrical estimate of not having to provide a transformer and associated equipment. The electrical feeds and controls and other electrical work

Myers, Thomas J. 02/07/2005
RE: KIF Dry Fly Ash Estimate
Ron, In looking at the attached, there are two line items that would be picked up by the KIF Scrubber Project IF the Scrubber Project was implemented before the Dry

Renfroe, Bret 02/07/2005
RE: KIF Dry Fly Ash Estimate
Ron,
Based on Victor's response of no Mechanical contract admin.and review or mechanical BOP, the basis of the

Purkey, Ronald E. 02/07/2005
FW: KIF Dry Fly Ash Estimate
Please respond to Victor and myself. Thanks.
Ron
-----Original Message-----

FW: KIF dry fly ash estimate

Kimsey, Barry A.

You forwarded this message on 02/08/2005 2:47 AM.
Please treat this as Private.

To: Haber, Stanley M.

Is this a FY05 or FY06 approved project? I don't have anything loaded in the schedule to support this current effort. If we need to do a full study we can.

-----Original Message-----
From: Harless, J. Larry
Sent: Monday, February 07, 2005 4:33 PM
To: Purkey, Ronald E.; Davis, Victor W.; Kimsey, Barry A.
Cc: Peterson, Leonard J.; Renfroe, Bret; Hedgecoth, Melissa A.
Subject: KIF dry fly ash estimate
Sensitivity: Private

Minutes from the meeting dated 2/7/05 on the subject project. For the estimating section to complete the estimate on this project we will need some information on the following:

- Electrical - Electrical power feeds, TVA FPG responsibility/scrubber responsibility

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Pond vs Peninsula

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Purkey, Ronald E. 02/07/2005
FW: KIF Dry Fly Ash Estimate
Please respond to Victor and myself. Thanks.
Ron
-----Original Message-----

Baugh, James S. 02/07/2005
RE: KIF update
We will schedule the conference call for a time that you can attend.
-----Original Message-----

Purkey, Ronald E. 02/07/2005
RE: KIF update
i have meeetings from 7-10am and at 3 pm
-----Original Message-----
From: Baugh, James S.

Purkey, Ronald E. 02/07/2005
FW: KIF - Drainage Blanket - Need for Stability Dec...
fyi
-----Original Message-----
From: Purkey, Ronald E.

Purkey, Ronald E. 02/07/2005
FW: Matrix on KIF
fyi
-----Original Message-----
From: Purkey, Ronald E.

Purkey, Ronald E. 02/07/2005
FW: KIF - Drainage Blanket - Need for Stability De...
fyi
-----Original Message-----
From: Purkey, Ronald E.

Baugh, James S. 02/04/2005
KIF update
We have completed the sensitivity analyses on pond vs peninsula at KIF that we discussed earlier this week. I would like to review the analysis summary on Monday

FW: KIF Dry Fly Ash Estimate

Purkey, Ronald E.

To: Renfroe, Bret
Cc: Haber, Stanley M.

Please respond to Victor and myself. Thanks.

Ron

-----Original Message-----
From: Davis, Victor W.
Sent: Monday, February 07, 2005 7:36 AM
To: Purkey, Ronald E.
Subject: RE: KIF Dry Fly Ash Estimate

I don't see anything in this for Mechanical contract admin.and review or mechanical BOP

-----Original Message-----
From: Purkey, Ronald E.
Sent: Thursday, February 03, 2005 3:05 PM
To: Haber, Stanley M.; Davis, Victor W.
Subject: RE: KIF Dry Fly Ash Estimate

Stan - it's all right - I will send one

Victor - for your viewing pleasure

Ron

-----Original Message-----

33 Items

Pond vs Peninsula - Microsoft Outlook

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Pond vs Peninsula

Arranged By: Date — Newest on top

	Date	
Baugh, James S.	02/04/2005	KIF update — We have completed the sensitivity analyses on pond vs peninsula at KIF that we discussed earlier this week. I would like to review the analysis summary on Monday
Hedgecoth, Melissa A.	02/04/2005	RE: KIF Dry fly ash — For those that need to call in to the meeting, the number is 423-751-2428, and the I.D. # is 6426. Again, the meeting is at 3:00 EST.
Purkey, Ronald E.	02/03/2005	RE: KIF Dry Fly Ash Estimate — Stan - it's all right - I will send one Victor - for your viewing pleasure Ron
Haber, Stanley M.	02/03/2005	RE: KIF Dry Fly Ash Estimate — Don't you think that he should get a copy? -----Original Message----- From: Purkey, Ronald E.
Purkey, Ronald E.	02/03/2005	RE: KIF Dry Fly Ash Estimate — no, Bret used the vendor's info as he had gotten the ash from TVA facilities to silo turnkey. -----Original Message-----
Haber, Stanley M.	02/03/2005	RE: KIF Dry Fly Ash Estimate — Ron, Did the Mechanical section review this to ensure that it was complete from their perspective?
Haber, Stanley M.	02/03/2005	RE: UCC meeting — yes. -----Original Message----- From: Baugh, James S.

KIF update

Baugh, James S.

To: Purkey, Ronald E.; Haber, Stanley M.

Cc: Lundy, Dennis L.

We have completed the sensitivity analyses on pond vs peninsula at KIF that we discussed earlier this week. I would like to review the analysis summary on Monday morning, then send it to you for comments.

The conference call with UCC to resolve issues on the estimate for dry ash collection is scheduled for Monday.

Let me know if you have any questions.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

33 Items

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- KIF SCR U9 (KIF538)

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Pond vs Peninsula

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Haber, Stanley M. — 02/03/2005
RE: UCC meeting
yes.
-----Original Message-----
From: Baugh, James S.

Baugh, James S. — 02/03/2005
RE: UCC meeting
I have a copy on my desk - do have time to come by to pick it up?
-----Original Message-----

Haber, Stanley M. — 02/03/2005
FW: UCC meeting
Steve,
I believe that we were going to distribute a copy of the original UCC estimate for review by 2/2. I didn't get a

Purkey, Ronald E. — 02/03/2005
FW: UCC meeting
-----Original Message-----
From: Baugh, James S.
Sent: Wednesday, February 02, 2005 4:03 PM

Haber, Stanley M. — 02/02/2005
RE: KIF Pond vs Peninsula Action Plan
Steve,
It looks accurate to me.
Stan

Purkey, Ronald E. — 02/01/2005
KIF Dry Fly Ash Estimate
Per my action item in the Meeting last Thursday, I have attached the Dry Ash estimate for Kingston. Bret Renfroe did the estimate and will be glad to discuss any

Baugh, James S. — 02/01/2005
KIF Pond vs Peninsula Action Plan
Please review the attached and let me know if I missed anything from our meeting this morning.
Thanks,

RE: UCC meeting

Haber, Stanley M.

To: Baugh, James S.

yes.

-----Original Message-----
From: Baugh, James S.
Sent: Thursday, February 03, 2005 9:06 AM
To: Haber, Stanley M.
Subject: RE: UCC meeting

I have a copy on my desk - do have time to come by to pick it up?

-----Original Message-----
From: Haber, Stanley M.
Sent: Thursday, February 03, 2005 8:22 AM
To: Baugh, James S.
Subject: FW: UCC meeting
Importance: Low

Steve,

I believe that we were going to distribute a copy of the original UCC estimate for review by 2/2. I didn't get a copy. Can I have one please? I also would like to be part of the phone call on Friday.

33 Items

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- KIF SCR UO (KIF538)

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Pond vs Peninsula

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Haber, Stanley M. 02/03/2005
FW: UCC meeting
Steve,
I believe that we were going to distribute a copy of the original UCC estimate for review by 2/2. I didn't get a

Purkey, Ronald E. 02/03/2005
FW: UCC meeting
-----Original Message-----
From: Baugh, James S.
Sent: Wednesday, February 02, 2005 4:03 PM

Haber, Stanley M. 02/02/2005
RE: KIF Pond vs Peninsula Action Plan
Steve,
It looks accurate to me.
Stan

Purkey, Ronald E. 02/01/2005
KIF Dry Fly Ash Estimate
Per my action item in the Meeting last Thursday, I have attached the Dry Ash estimate for Kingston. Bret Renfroe did the estimate and will be glad to discuss any

Baugh, James S. 02/01/2005
KIF Pond vs Peninsula Action Plan
Please review the attached and let me know if I missed anything from our meeting this morning.
Thanks,

Petty, Harold L. 01/26/2005
FW: KIF Pond or Peninsula decision
-----Original Message-----
From: Watts, Janet K
Sent: Wednesday, January 26, 2005 4:19 PM

Petty, Harold L. 01/26/2005
KINGSTONMATRIXPRESENTATION 2 saved on the ...

KIF Pond vs Peninsula Action Plan

Baugh, James S.

You replied on 02/02/2005 7:45 AM

To: Lundy, Dennis L.; Purkey, Ronald E.; Haber, Stanley M.

Attachments: KIF action plan FEb 1 2005.xls (25 KB)

Please review the attached and let me know if I missed anything from our meeting this morning.

Thanks.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

33 Items

Haber, Stanley M

From: Baugh, James S.

Sent: Thursday, March 10, 2005 9:26 AM

To: Nuyt, Gary M.

Cc: Purkey, Ronald E.; Haber, Stanley M.

Subject: Gypsum Disposal

Gary,

Just wanted to be sure that budgeting for a couple of gypsum disposal projects aren't falling through the crack.....

1. Is the design and construction of gypsum disposal facilities for Bull Run in your scrubber project budget?
2. I am assuming (a dangerous thing) that following the decision to pursue the development of the peninsula for Kingston gypsum disposal, you will be picking up the peninsula design and construction costs in your scrubber project budget (Ron Purkey - will you provide the funding needs to Gary, Stan, and myself). Are you planning to cover these costs?

Let me know if we need to discuss this.

Thanks.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Haber, Stanley M

From: Lundy, Dennis L.
Sent: Monday, February 28, 2005 10:58 AM
To: Haber, Stanley M.
Subject: FW: Kingston By-Product Disposal - Meeting Results

fyi
Dennis

-----Original Message-----
From: Baugh, James S.
Sent: Monday, February 28, 2005 7:51 AM
To: Deskins, Earl L
Cc: Preslar, Jacky D.; Watts, Janet K; Lundy, Dennis L.
Subject: Kingston By-Product Disposal - Meeting Results

This is to confirm the results of and action items from our meeting at Kingston on February 23, 2005.

As a result of the meeting, we collectively agreed to pursue the Peninsula as the site for disposal of scrubber gypsum, and to dispose of ash only in the existing ash pond complex. We also agreed that the following project keydates will be achieved.

Permanent Dredge Cells
Complete detailed design for dredge cell repair – 5/30/05
Complete dredge cell repairs – 9/30/05
Peninsula Development
Complete HydroGeo studies – 8/15/05
Submit Part II Solid Waste Permit application – 10/15/05
Complete design, receive all required permits – 12/15/07
Complete construction – 11/30/08
Action items from the meeting are as follows:

1. Provide Earl Deskins with projected yearly O&M costs for both Peninsula and In-Pond disposal options - Baugh by March 7.
2. Provide Earl Deskins with a quarterly report on project status, cost, and schedule - Baugh to lead effort, support from Lundy
and Watts organizations - first quarterly report by June 3.
3. Provide Earl Deskins with a write up for the TWRA that discusses TVA's plans for the peninsula and the reason for these
plans - Watts to lead effort, support from Baugh and Lundy organizations - by March 18.

Let me know if you have any questions or if there are action items I did not include.

Thanks.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Haber, Stanley M

From: Baugh, James S.
Sent: Thursday, February 17, 2005 1:56 PM
To: Haber, Stanley M.
Subject: Draft KIF Presentation
Attachments: kINGSTON Pond vs Peninsula r4.ppt

This may change again....

Let me know if you have any questions.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

TVA

Kingston Coal Combustion By-Product Disposal

Pond vs. Peninsula

February 23, 2005

TVA

Actions since Jan. 27 meeting

- Cost Estimate for dry ash collection has been revisited
- Potential for reduction of drainage layer design and cost has been explored
  - Engineering perspective
  - Environmental perspective
- Sensitivity Analysis of options has been performed – results are in this presentation
- Recommendation has been developed

TVA

Dry Ash Collection

- Original UCC turnkey estimate was $16M in 2003 (TVA provides electrical service at the powerhouse wall)
- Due to 60% increase in steel prices, UCC estimate has increased to $19M
- Additional upgrade to dense slurry system will add an additional $3M
- Additional TVA cost is approximately $3M
- Total cost of dry ash conversion is $25M in 2005 dollars ($24.2 currently used)

TVA

Drainage Layer

Engineering Perspective

- GeoSyntec believes that the cost of the drainage layer can be reduced by 25 to 40% via design changes.
- Parsons position is that the current design is the minimum requirement.
- TVA Fossil Engineering concurs with Parsons.

Environmental Perspective

- Environmental Affairs feels that the current design cannot be reduced for regulatory reasons:
  - A lesser design will be difficult or impossible to permit
  - Design changes at this point in the process will likely:
    - Adversely impact schedules for providing required gypsum disposal capacity for new scrubbers
    - Damage TVA's credibility with TDEC and impact TDEC's level of cooperation with TVA

TVA

Sensitivity Analyses

Sensitivities run for Peninsula Option include:

- Impact of gypsum marketing
- Impact of potential development cost escalation:
  - Sinkhole repair
  - Potential need for off site clay
- Impact of 5# coal (rather than 2.8# coal) with and without gypsum marketing

TVA Sensitivity Analyses Conclusions

- PVs for the most likely scenarios (2.8# or 5# coal with marketing with adjustments to the base case cost estimates) are between $23.7M and $25.7M
- Due to inherent cost uncertainties (dense slurry installation/operation and cost of sinkhole remediation), the most likely scenarios for pond and peninsula are essentially financially equal.

TVA

Peninsula – Other Considerations

Positives

- Best for gypsum marketing:
  - Adequate space for dewatering facilities
  - Keeps marketer out of ash pond complex
- Simplifies disposal operations by keeping ash and gypsum completely separate
- Land available for future expansion

Negatives

- Potential community opposition to peninsula development
- Permitting and development cost risk due to Karst geology

TVA

In Pond – Other Considerations

Positives

- Avoids potential community opposition to peninsula development
- Potential reduction in manpower due to all waste disposal operations in a single consolidated facility

Negatives

- Reduced in-pond operational flexibility
- More complex disposal operations; increased risk of problems if facility is not intensively managed
- Will not be possible to reclaim gypsum for marketing
- Dewatering facilities for marketer may have to be located near or on the ball fields
- Will have to truck or convey gypsum for marketing across plant site
- Free Water Volume requirements will increase due to increase in volume of wastewater discharges

TVA

Recommendations

- Develop the peninsula for long term gypsum disposal
- Leave the current permit application submitted to TDEC as is pending the outcome of additional site investigation on the peninsula.

TVA

Key Project Milestones

Complete detailed design for dredge cell repair – 5/30/05

Complete HydroGeo studies for Peninsula – 8/15/05

Complete dredge cell repairs – 9/30/05

Submit Part II Solid Waste Permit application – 10/15/05

Complete design, receive all required permits – 12/15/07

Complete construction – 11/30/08

TVA

Appendix
Additional Sensitivity Analysis Details

TVA

Sensitivity Analyses Summary

Option	Description	25 year Present Worth	10 year Present Worth	5 year Present Worth	2008 Cash Flow
1	Peninsula, Base Case	$ 23,751,838	$ 19,574,386	$ 15,779,328	$ 11,812,515
1-1	Peninsula with marketing	$ 19,623,264	$ 15,920,486	$ 12,436,566	$ 6,728,591
1-2	Peninsula with cost escalation	$ 26,079,479	$ 21,902,027	$ 18,106,969	$ 15,352,565
1-3	5# coal, no marketing, peninsula	$ 25,220,129	$ 20,079,171	$ 15,961,471	$ 11,812,515
1-4	5# coal with marketing, peninsula	$ 23,751,838	$ 19,574,386	$ 15,779,328	$ 11,812,515
1-5	5# coal, marketing, cost escalation	$ 25,744,394	$ 21,709,344	$ 18,037,443	$ 15,352,565
1-6	2.8# coal, marketing, cost escalation	$ 25,293,667	$ 21,590,889	$ 18,106,969	$ 15,352,565
3	In pond, Base Case	$ 30,166,737	$ 16,510,466	$ 13,485,506	$ 8,156,619
3-1	In pond, reduced drainage layer, marketing and other considerations	$ 21,279,352	$ 13,231,093	$ 10,892,184	$ 4,904,225
3-2	In pond, marketing and other considerations	$ 23,707,462	$ 15,303,564	$ 12,964,656	$ 8,056,195
3-3	5# coal, no marketing, in pond	$ 31,925,701	$ 25,330,610	$ 13,485,506	$ 8,156,619
3-4	5# coal with marketing, in pond	$ 28,962,461	$ 16,510,466	$ 13,485,506	$ 8,156,619
3-5	5# coal, marketing, cost savings	$ 24,663,976	$ 15,614,702	$ 12,964,656	$ 8,056,195

TVA

Sensitivity Analyses Interpretation

Peninsula:

- Sensitivity PVs range from $19.6 to 26M.
- Peninsula with marketing (2.8# coal) has the best 25, 10, and 5 year PVs as well as lowest 2008 cash flow of all options (if 50% drainage layer option is not included).
- Likely scenarios, 2.8# or 5# coal with marketing and some cost increase yield 25 year PVs of $25.2 to $25.7M.
- Sinkhole remediation and the effect on permitting could have a major impact on project economics. Engineering feels that the remediation costs assumed in the sensitivity analyses are high.

Sensitivity Analyses Interpretation

In Pond:

- **Sensitivity PVs range from $21.3M to $31.9M.**
- **Lowest 25 year PV for in Pond Options is $23.7M (if 50% drainage layer option is not included).**
- **Likely scenarios, 2.8# or 5# coal with marketing and some cost improvements yield 25 year PVs of $23.7M to $24.7M. The cost of installing and operating of a dense slurry system as assumed in this sensitivity has not been investigated in detail.**

Haber, Stanley M

From: Purkey, Ronald E.
Sent: Wednesday, February 09, 2005 2:13 PM
To: Baugh, James S.
Cc: Petty, Harold L.; Haber, Stanley M.
Subject: RE: Draft Sensitivity Analysis - KIF pond vs Peninsula

Steve,
We have reviewed the subject spread sheets and have the following comments(most of which I discussed earlier with you):

Option 1-1
$10 million Gypsum pond cost for the marketing case is unrealistic. Should be $3 million max

Option 1-2
Too much escalation - most of which is Karst Mitigation - the $1/2 million we used in 1-1 is twice what we expected plus we added 10% contingency to that. This doesn't approach the size and geology of COF. Suggest $1M.

Option 1-3
No comments

Option 1-4
Gypsum pond on peninsula cost too high because of the marketing.

Option 3
No comment

Option 3-1
Eliminate case due to drainage blanket errors

Option 3-2
Geho pump costs and O&M/station service - great deal - 53 cents/cy is a gooood deal also. If we go that way later, we would want to look into this much deeper.

Option 3-3
No comments

Option 3-4
No coments

Still appears the answer earlier is still the answer with or without marketing.

Ron

-----Original Message-----
From: Baugh, James S.
Sent: Monday, February 07, 2005 1:23 PM

To: Purkey, Ronald E.; Haber, Stanley M.
Cc: Lundy, Dennis L.; Hedgecoth, Melissa A.; Park, Gordon G
Subject: Draft Sensitivity Analysis - KIF pond vs Peninsula

The attached excel spread sheet entitled "Summary Matrix R1" shows the draft results of the series of sensitivity analyses performed as we discussed in our meeting last week. The actual analyses with assumptions are also attached.

Please look over the analyses/results and let me know if you have suggested changes or additions. If I haven't heard back from you by mid day on Wednesday of this week, I'll follow up with you.

Let me know if you have any questions and thanks for your help.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Haber, Stanley M

From: Renfroe, Bret
Sent: Tuesday, February 08, 2005 2:52 PM
To: Purkey, Ronald E.; Davis, Victor W.; Haber, Stanley M.; Kimsey, Barry A.
Cc: Harless, J. Larry; Peterson, Leonard J.
Subject: KIF Dry Fly Ash Estimate
Attachments: KIF Fly Ash Estimate R1.pdf

Attached is the latest estimate, It came out to be $25MM. It includes the $16MM quote, $3MM for deluge slurry system, $3MM in escalation, $0.7MM in engineering and roughly 10% contingency @ $2.3MM. Assumptions include The Scrubber project will install a new 161kV Substation and will be designed to handle the additional load required by this project. Additional electrical & mechanical items are assumed minimal considering the magnitude of the project and would be captured in contigency.

If you have any questions, let me know.

Bret Renfroe
Cost Estimating
Ph: 423-751-7684
Fx: 423-751-4295

Kingston Fossil Plant
Dry Fly Ash Collection
Design & Install New Fly Ash Handling System

Project name	Dry Fly Ash
Estimator	B. L. Renfroe
Labor rate table	KIF 60 2004
Equipment rate table	TVA Equipment
Plant	KIF
Estimate #	05212
Requesting Engr	R. E. Purkey
Option	0
Revision	1
Phase	1
Estimate Type	Conceptual
Estimate Accuracy	+/- 30%
Est. Issue Date	02/08/2005
Funding Type	Capital
Notes	Based on UC Service Corporation proposal (Q03381), it includes Fly Ash Handling design & equipment, which is coming from United Conveyor. Assumptions: The Scrubber project will install a new 161kV Substation and will be designed to handle the additional load required by this project. Additional electrical & mechanical items are assumed minimal considering the magnitude of the project and would be captured in contigency. Roughly 10% contingency has been used.
Report format	Sorted by 'Location/Activity' 'Detail' summary

Spreadsheet Report

Dry Fly Ash

Location	Activity	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
KIF									
	Fly Ash Collection								
		UC Service Corporation	1.00 ls	0	0	16,000,000	-	-	16,000,000
		Deluge Slurry System	1.00 ls			3,000,000	-	-	3,000,000

Estimate Totals

Labor	0		0.000	hrs	
Subcontract	19,000,000				
	19,000,000	19,000,000			
Engineered Materials - Ph 2			100.000 %		C
Adjustment - Engr Materials			(100.000) %		C
		19,000,000			
Escalation - Subcontract	3,040,000		16.000 %		C
	3,040,000	22,040,000			
Elect. Engineering Design	380,000				L
Elect. Site Meeting / Travel	45,000				L
Mech Engineering - Phase 2	120,800				L
Civil Engineering - Phase 2	20,000				L
Elect. Field Commissioning	75,000				L
Project Controls & Estimating	14,547		2.526 %		O
	655,347	22,695,347			
Contingency	2,304,653				L
	2,304,653	25,000,000			
	Total	***25,000,000***			

Haber, Stanley M

From: Harless, J. Larry
Sent: Tuesday, February 08, 2005 8:29 AM
To: Haber, Stanley M.
Subject: RE: KIF530: KIF dry fly ash estimate
Sensitivity: Private

Will do. When and if this meeting is scheduled I will let you know.

-----Original Message-----
From: Haber, Stanley M.
Sent: Tuesday, February 08, 2005 7:48 AM
To: Harless, J. Larry
Cc: Waldrep, Roger T.
Subject: KIF530: KIF dry fly ash estimate
Sensitivity: Private

Larry,

Please keep me copied on your future notes.

Stan
-----Original Message-----
From: Kimsey, Barry A.
Sent: Monday, February 07, 2005 4:46 PM
To: Haber, Stanley M.
Subject: FW: KIF dry fly ash estimate
Sensitivity: Private

Is this a FY05 or FY06 approved project? I don't have anything loaded in the schedule to support this current effort. If we need to do a full study we can.

-----Original Message-----
From: Harless, J. Larry
Sent: Monday, February 07, 2005 4:33 PM
To: Purkey, Ronald E.; Davis, Victor W.; Kimsey, Barry A.
Cc: Peterson, Leonard J.; Renfroe, Bret; Hedgecoth, Melissa A.
Subject: KIF dry fly ash estimate
Sensitivity: Private

Minutes from the meeting dated 2/7/05 on the subject project. For the estimating section to complete the estimate on this project we will need some information on the following:

- Electrical - Electrical power feeds, TVA FPG responsibility/scrubber responsibility
- Mechanical - BOP for water supply to the silo, drains from the existing water exhausters, if they move from their present location.
- Mechanical - Add an elevator wash down, sump and scale for the silo.

I would suggest a meeting with all the represented staffs, electrical, mechanical, scrubber group rep. (Tom Myers), estimating (Bret Renfroe & Larry Harless) and Ron Purkey to define the BOP for electrical and mechanical. Melissa Hedgecoth can provide the details for the "UCC" bid package.

Ron can we all meet when you and Tom get together to resolve these issues?

J. Larry Harless
Supervisor
Cost Estimating and Project Controls Cost
Phone: (423) 751-3413

Haber, Stanley M

From: Kimsey, Barry A.
Sent: Monday, February 07, 2005 4:46 PM
To: Haber, Stanley M.
Subject: FW: KIF dry fly ash estimate
Sensitivity: Private

Is this a FY05 or FY06 approved project? I don't have anything loaded in the schedule to support this current effort. If we need to do a full study we can.

-----Original Message-----
From: Harless, J. Larry
Sent: Monday, February 07, 2005 4:33 PM
To: Purkey, Ronald E.; Davis, Victor W.; Kimsey, Barry A.
Cc: Peterson, Leonard J.; Renfroe, Bret; Hedgecoth, Melissa A.
Subject: KIF dry fly ash estimate
Sensitivity: Private

Minutes from the meeting dated 2/7/05 on the subject project. For the estimating section to complete the estimate on this project we will need some information on the following:

- Electrical - Electrical power feeds, TVA FPG responsibility/scrubber responsibility
- Mechanical - BOP for water supply to the silo, drains from the existing water exhausters, if they move from their present location.
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I would suggest a meeting with all the represented staffs, electrical, mechanical, scrubber group rep. (Tom Myers), estimating (Bret Renfroe & Larry Harless) and Ron Purkey to define the BOP for electrical and mechanical. Melissa Hedgecoth can provide the details for the "UCC" bid package.

Ron can we all meet when you and Tom get together to resolve these issues?

J. Larry Harless
Supervisor
Cost Estimating and Project Controls Cost
Phone: (423) 751-3413

FW: Meeting: Petty {Meeting ID: 6705} - Meeting

File Edit View Insert Format Tools Actions Help

Accept | Tentative | Decline | Propose New Time | Calendar...

Accepted by Haber, Stanley M. on 02/07/2005 2:28 PM.
This appointment occurs in the past.

From: Petty, Harold L. on behalf of Latitude Sent: Mon 02/07/2005 2:26 PM
Required: Petty, Harold L.; Daniel.R.Smith@worleyparsons.com; eGreg.McNulty@parsons.com; Boggs, J. Markus; Smith, Amos L; Bowers, Larry C; GEOSYNTEC CONSULTANTS INC Attn: R NEIL DAVIES; TElkady@GeoSyntec.com; Purkey, Ronald E.
Optional: Haber, Stanley M.
Subject: FW: Meeting: Petty {Meeting ID: 6705}

Location:
When: Tuesday, February 08, 2005 2:30 PM-4:00 PM (GMT-05:00) Eastern Time (US & Canada).

Here is the revised phone call meeting information.

NOTE THE REVISED MEETING ID NUMBER OF 6705

I appreciate everyone's adjusting their schedule to 2:30 pm for tomorrow's telecon due to our conflict.

Thanks,
Lynn

-----Original Appointment-----
From: Latitude
Sent: Monday, February 07, 2005 2:22 PM
To: Latitude; Petty, Harold L.
Subject: Meeting: Petty {Meeting ID: 6705}
When: Tuesday, February 08, 2005 2:30 PM-4:00 PM (GMT-05:00) Eastern Time (US & Canada).
Where:

Harold Petty has invited you to a MeetingPlace e-Conference (Mtg ID 6705) on MeetingPlace, February 08, 2005 at 02:30 PM America/New_York. If provided, use the following password:

To attend from your PC:

1) Launch the attached "Click to Attend" web link, or browse to http://latitude.cha.tva.gov & enter Mtg ID 6705
A MeetingPlace web page appears.

2) Click Join Voice & enter your phone number

3) Click Join Data

Haber, Stanley M

From: Baugh, James S.
Sent: Monday, February 07, 2005 1:23 PM
To: Purkey, Ronald E.; Haber, Stanley M.
Cc: Lundy, Dennis L.; Hedgecoth, Melissa A.; Park, Gordon G
Subject: Draft Sensitivity Analysis - KIF pond vs Peninsula
Attachments: KIF Base Case Peninsula.xls; KIF Peninsula with marketing.xls; KIF Peninsula Cost escalation.xls; KIF 5 Pound coal to Peninsula no marketing.xls; KIF Base Case In Pond.xls; KIF In Pond with marketing and other considerations.xls; KIF In Pond 5 pound coal.xls; Summary Matrix r1.xls; KIF 5 Pound coal to Peninsula with marketing.xls; KIF In Pond 5 pound coal with marketing.xls; KIF In Pond Reduced drainage layer.xls

The attached excel spread sheet entitled "Summary Matrix R1" shows the draft results of the series of sensitivity analyses performed as we discussed in our meeting last week. The actual analyses with assumptions are also attached.

Please look over the analyses/results and let me know if you have suggested changes or additions. If I haven't heard back from you by mid day on Wednesday of this week, I'll follow up with you.

Let me know if you have any questions and thanks for your help.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Case:	Base
Location:	Peninsula
Governing Assumptions:	
Coal Supply	2.8 #
Drainage Layer	Current Parsons design
Marketing	No marketing

ESTIMATE NUMBER 0509301R1

KINGSTON FOSSIL PLANT OPTION 1 - WET ASH IN POND GYPSUM ON PENINSULA

(WITHOUT POND BUFFER)

PRESENT WORTH

ITEM No.	DESCRIPTION	UNITS	Total Cost 2005 Dollars	Number of Cycles	2005 Dollars per Cycle	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Escalated SubTotal	PRESENT WORTH of using Capital Dollars
	Escalation Factor					1.00	1.04	1.08	1.13	1.17	1.21	1.26	1.31	1.36	1.42	1.48	1.54	1.60	1.66	1.73	1.80	1.87	1.94	2.02	2.10	2.18	2.27	2.36	2.46	2.56		
	CAPITAL COSTS																															
1	Install Drains For Swan Pond Road	Lump Sum	$1,967,628	1	$1,967,628	$1,967,628																									$1,967,628	$1,967,628
2	Ash In Pond	Lump Sum	$582,456	1	$582,456	$582,456																									$582,456	$582,456
2A	Phase 2 Base Construction (Base Layers)	Lump Sum	$5,431,967	2	$2,715,984											$4,008,707	$4,169,055														$8,177,763	$1,887,001
3	Gypsum On Peninsula	Lump Sum	$9,015,269	1	$9,015,269				$10,150,656																						$10,150,656	$6,674,221
5	Miscellaneous	Lump Sum	$1,974,007	4	$493,502	$493,502			$565,654							$728,393	$757,529														$2,535,078	$1,201,726
6	Engineering / Geotech	Lump Sum	$808,829	1	$808,829	$808,829																									$808,829	$808,829
	Total Capital Costs		$ 19,780,166			$ 3,862,415	$ -	$ -	$ 10,706,309	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,737,100	$ 4,926,584	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 24,222,409	$ 13,121,862
	OPERATING COSTS																															
6	Dredge Cell Phase 1	Lump Sum	$11,564,547	12	$962,879	$962,879	$1,004,283	$1,043,450	$1,084,144	$1,125,342	$1,169,230	$1,214,830	$1,263,423	$1,313,960	$1,366,519	$1,421,179	$1,478,027	$1,537,148													$15,984,413	$7,337,188
14	Gypsum On Peninsula Disposal Cost	Lump Sum	$3,644,075	20	$182,204					$212,946	$221,261	$229,880	$239,075	$248,638	$258,584	$268,927	$279,684	$290,872	$302,506	$314,607	$327,191	$340,279	$353,890	$368,045	$382,767	$398,078	$414,001	$430,561	$447,783	$465,695	$6,795,259	$1,116,949
20,22,23&24	Phase 2 Wet Ash (Initial Thru Stage 3)	Lump Sum	$10,483,975	12	$873,665													$1,394,725	$1,450,514	$1,508,535	$1,568,876	$1,631,631	$1,696,896	$1,764,772	$1,835,363	$1,908,778	$1,985,129	$2,064,534	$2,147,115	$2,233,000	$23,189,868	$1,987,801
	QA/QC For Construction Of Disposal	Lump Sum	$470,247	24	$19,594	$19,594	$20,436	$21,233	$22,061	$22,900	$23,793	$24,721	$25,709	$26,738	$27,807	$28,920	$30,076	$31,279	$32,531	$33,832	$35,185	$36,592	$38,056	$39,578	$41,162	$42,808	$44,520	$46,301	$48,153	$50,079	$814,065	$188,038
	Total Operating Costs		$ 26,152,844			$ 982,473	$ 1,024,719	$ 1,064,683	$ 1,106,206	$ 1,361,188	$ 1,414,274	$ 1,469,431	$ 1,528,208	$ 1,589,336	$ 1,652,910	$ 1,719,026	$ 1,787,787	$ 3,254,024	$ 1,785,551	$ 1,856,973	$ 1,931,252	$ 2,008,602	$ 2,088,842	$ 2,172,396	$ 2,259,292	$ 2,349,663	$ 2,443,650	$ 2,541,398	$ 2,643,052	$ 2,748,774	$ 46,783,606	$ 10,629,977
	Total Costs		$ 45,933,000			$ 4,834,997	$ 1,024,719	$ 1,064,683	$ 11,812,515	$ 1,361,188	$ 1,414,274	$ 1,469,431	$ 1,528,208	$ 1,589,336	$ 1,652,910	$ 6,456,126	$ 6,714,371	$ 3,254,024	$ 1,785,551	$ 1,856,973	$ 1,931,252	$ 2,008,602	$ 2,088,842	$ 2,172,396	$ 2,259,292	$ 2,349,663	$ 2,443,650	$ 2,541,398	$ 2,643,052	$ 2,748,774	$ 71,006,014	$ 23,751,838

Present Worth of this Option $ 23,751,838

03/14/2009

ESCALATION TABLE: Contract Labor - T&L

TO

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
	1.045	1.043	1.039	1.039	1.038	1.039	1.039	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040
2005	1.000	1.043	1.084	1.126	1.169	1.214	1.262	1.312	1.365	1.419	1.476	1.535	1.596	1.660	1.727	1.796	1.868	1.942	2.020	2.101	2.185	2.272	2.363	2.458	2.556
2006		1.000	1.039	1.080	1.121	1.164	1.210	1.258	1.308	1.361	1.415	1.472	1.531	1.592	1.655	1.722	1.791	1.862	1.937	2.014	2.095	2.179	2.266	2.356	2.451
2007			1.000	1.039	1.078	1.121	1.164	1.211	1.259	1.310	1.362	1.416	1.473	1.532	1.593	1.657	1.723	1.792	1.864	1.939	2.016	2.097	2.181	2.268	2.359
2008				1.000	1.038	1.078	1.121	1.165	1.212	1.260	1.311	1.363	1.418	1.475	1.534	1.595	1.659	1.725	1.794	1.866	1.940	2.018	2.099	2.183	2.270
2009					1.000	1.039	1.080	1.123	1.168	1.214	1.263	1.313	1.366	1.421	1.477	1.536	1.598	1.662	1.728	1.797	1.869	1.944	2.022	2.103	2.187
2010						1.000	1.039	1.081	1.124	1.169	1.215	1.264	1.315	1.367	1.422	1.479	1.538	1.599	1.663	1.730	1.799	1.871	1.946	2.024	2.105
2011							1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948	2.026
2012								1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948
2013									1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873
2014										1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801
2015											1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732
2016												1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665
2017													1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601
2018														1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539
2019															1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480
2020																1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423
2021																	1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369
2022																		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316
2023																			1.000	1.040	1.082	1.125	1.170	1.217	1.265
2024																				1.000	1.040	1.082	1.125	1.170	1.217
2025																					1.000	1.040	1.082	1.125	1.170
2026																						1.000	1.040	1.082	1.125
2027																							1.000	1.040	1.082
2028																								1.000	1.040
2029																									1.000

	Cash Flows		NPV
2005	4,834,887		
2006	1,024,719		
2007	1,064,683		
2008	11,812,515		
2009	1,361,188		
2010	1,414,274	$	15,779,328
2011	1,469,431		
2012	1,528,208		
2013	1,589,336		
2014	1,652,910		
2015	6,456,126	$	19,574,386
2016	6,714,371		
2017	3,254,024		
2018	1,785,551		
2019	1,856,973		
2020	1,931,252		
2021	2,008,502		
2022	2,088,842		
2023	2,172,396		
2024	2,259,292		
2025	2,349,663		
2026	2,443,650		
2027	2,541,396		
2028	2,643,052		
2029	2,748,774	$	23,751,838

Case:	Peninsula with marketing
Location:	Peninsula
Governing Assumptions:	
Coal Supply	2.8 #
Marketing	Assume SynMat markets 100% after 2011

No gypsum disposal cost after 2011
No change in footprint development

ESTIMATE NUMBER 050930 1R1

KINGSTON FOSSIL PLANT OPTION 1 - WET ASH IN POND GYPSUM ON PENINSULA

(WITHOUT POND BUFFER)

PRESENT WORTH

ITEM No.	DESCRIPTION	UNITS	Total Cost 2005 Dollars	Number of Cycles	2005 Dollars per Cycle	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	Escalation Factor					1.00	1.04	1.08	1.13	1.17	1.21	1.26	1.31	1.36	1.42	1.48	1.54
	CAPITAL COSTS																
1	Install Drains For Swan Pond Road	Lump Sum	$1,967,628	1	$1,967,628	$1,967,628											
2	Ash In Pond	Lump Sum	$582,456	1	$582,456	$582,456											
2A	Phase 2 Base Construction (Base Layers)	Lump Sum	$5,431,967	2	$2,715,984											$4,008,707	$4,169,055
3	Gypsum On Peninsula	Lump Sum	$9,015,269	1	$9,015,269				$10,150,656								
5	Miscellaneous	Lump Sum	$1,974,007	4	$493,502	$493,502			$555,654							$728,393	$757,529
6	Engineering / Geotech	Lump Sum	$808,829	1	$808,829	$808,829											
	Total Capital Costs		$ 19,780,156			$ 3,852,415	$ -	$ -	$ 10,706,309	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,737,100	$ 4,926,584
	OPERATING COSTS																
8	Dredge Cell Phase 1	Lump Sum	$11,554,547	12	$962,879	$962,879	$1,004,283	$1,043,450	$1,084,144	$1,125,342	$1,169,230	$1,214,830	$1,263,423	$1,313,960	$1,366,519	$1,421,179	$1,478,027
14	Gypsum On Peninsula Disposal Cost	Lump Sum	$3,644,075	20	$182,204					$212,946	$221,251	$229,880	$0	$0	$0	$0	$0
20,22,23&24	Phase 2 Wet Ash (Initial Thru Stage 3)	Lump Sum	$10,483,975	12	$873,665												
	QA/QC For Construction Of Disposal	Lump Sum	$470,247	24	$19,594	$19,594	$20,436	$21,233	$22,061	$22,900	$23,793	$24,721	$25,709	$26,738	$27,807	$28,920	$30,076
	Total Operating Costs		$ 26,152,844			$ 982,473	$ 1,024,719	$ 1,064,683	$ 1,106,206	$ 1,361,188	$ 1,414,274	$ 1,469,431	$ 1,289,133	$ 1,340,698	$ 1,394,326	$ 1,450,099	$ 1,508,103
	Total Costs		$ 45,933,000			$ 4,834,887	$ 1,024,719	$ 1,064,683	$ 11,812,515	$ 1,361,188	$ 1,414,274	$ 1,469,431	$ 1,289,133	$ 1,340,698	$ 1,394,326	$ 6,187,199	$ 6,434,687

ITEM No.	DESCRIPTION	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Escalated SubTotal	PRESENT WORTH of using Capital Dollars
	Escalation Factor	1.60	1.66	1.73	1.80	1.87	1.94	2.02	2.10	2.18	2.27	2.36	2.46	2.56		
	CAPITAL COSTS															
1	Install Drains For Swan Pond Road														$1,967,628	$1,967,628
2	Ash In Pond														$582,456	$582,456
2A	Phase 2 Base Construction (Base Layers)														$8,177,763	$1,887,001
3	Gypsum On Peninsula														$10,150,656	$6,674,221
5	Miscellaneous														$2,535,078	$1,201,726
6	Engineering / Geotech														$808,829	$808,829
	Total Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 24,222,409	$ 13,121,862
	OPERATING COSTS															
8	Dredge Cell Phase 1	$1,537,148													$15,984,413	$7,337,188
14	Gypsum On Peninsula Disposal Cost	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$664,077	$331,137
20,22,23&24	Phase 2 Wet Ash (Initial Thru Stage 3)	$1,394,725	$1,450,514	$1,508,535	$1,568,876	$1,631,631	$1,696,896	$1,764,772	$1,835,363	$1,908,778	$1,985,129	$2,064,534	$2,147,115	$2,233,000	$23,189,868	$1,987,801
	QA/QC For Construction Of Disposal	$31,279	$32,531	$33,832	$35,185	$36,592	$38,056	$39,578	$41,162	$42,808	$44,520	$46,301	$48,153	$50,079	$814,065	$188,038
	Total Operating Costs	$ 2,963,152	$ 1,483,045	$ 1,542,366	$ 1,604,061	$ 1,668,224	$ 1,734,953	$ 1,804,351	$ 1,876,525	$ 1,951,586	$ 2,029,649	$ 2,110,835	$ 2,195,269	$ 2,283,079	$ 40,652,424	$ 9,844,165
	Total Costs	$ 2,963,152	$ 1,483,045	$ 1,542,366	$ 1,604,061	$ 1,668,224	$ 1,734,953	$ 1,804,351	$ 1,876,525	$ 1,951,586	$ 2,029,649	$ 2,110,835	$ 2,195,269	$ 2,283,079	$ 64,874,833	$ 22,966,026

Present Worth of this Option $ 22,966,026

03/14/2009

ESCALATION TABLE: Contract Labor - T&L

TO

	1.045 2005	1.043 2006	1.039 2007	1.039 2008	1.038 2009	1.039 2010	1.039 2011	1.040 2012	1.040 2013	1.040 2014	1.040 2015	1.040 2016	1.040 2017	1.040 2018	1.040 2019	1.040 2020	1.040 2021	1.040 2022	1.040 2023	1.040 2024	1.040 2025	1.040 2026	1.040 2027	1.040 2028	1.040 2029
2005	1.000	1.043	1.084	1.126	1.169	1.214	1.262	1.312	1.365	1.419	1.476	1.535	1.596	1.660	1.727	1.796	1.868	1.942	2.020	2.101	2.185	2.272	2.363	2.458	2.556
2006		1.000	1.039	1.080	1.121	1.164	1.210	1.258	1.308	1.361	1.415	1.472	1.531	1.592	1.655	1.722	1.791	1.862	1.937	2.014	2.095	2.179	2.266	2.356	2.451
2007			1.000	1.039	1.078	1.121	1.164	1.211	1.259	1.310	1.362	1.416	1.473	1.532	1.593	1.657	1.723	1.792	1.864	1.939	2.016	2.097	2.181	2.268	2.359
2008				1.000	1.038	1.078	1.121	1.165	1.212	1.260	1.311	1.363	1.418	1.475	1.534	1.595	1.659	1.725	1.794	1.866	1.940	2.018	2.099	2.183	2.270
2009					1.000	1.039	1.080	1.123	1.168	1.214	1.263	1.313	1.366	1.421	1.477	1.536	1.598	1.662	1.728	1.797	1.869	1.944	2.022	2.103	2.187
2010						1.000	1.039	1.081	1.124	1.169	1.215	1.264	1.315	1.367	1.422	1.479	1.538	1.599	1.663	1.730	1.799	1.871	1.946	2.024	2.105
2011							1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948	2.026
2012								1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948
2013									1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873
2014										1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801
2015											1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732
2016												1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665
2017													1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601
2018														1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539
2019															1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480
2020																1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423
2021																	1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369
2022																		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316
2023																			1.000	1.040	1.082	1.125	1.170	1.217	1.265
2024																				1.000	1.040	1.082	1.125	1.170	1.217
2025																					1.000	1.040	1.082	1.125	1.170
2026																						1.000	1.040	1.082	1.125
2027																							1.000	1.040	1.082
2028																								1.000	1.040
2029																									1.000

	Cash Flows		NPV
2005	4,834,887		
2006	1,024,719		
2007	1,064,683		
2008	11,812,515		
2009	1,361,188		
2010	1,414,274	$	15,779,328
2011	1,469,431		
2012	1,289,133		
2013	1,340,698		
2014	1,394,326		
2015	6,187,199	$	19,263,248
2016	6,434,687		
2017	2,963,152		
2018	1,483,045		
2019	1,542,366		
2020	1,604,061		
2021	1,668,224		
2022	1,734,953		
2023	1,804,351		
2024	1,876,525		
2025	1,951,586		
2026	2,029,649		
2027	2,110,835		
2028	2,195,268		
2029	2,283,079	$	22,966,026

Case:
Location:
Governing Assumptions:
Coal Supply
Marketing
Increased cost for sinkhole mitigation:
  Base cost in estimate for 6 sinkholes
  Parsons estimated cost for repair of 1 sinkhole in pond at Gallatin
  Assume 12 sinkholes repaired at GAF cost
  Removal of rock pinnacles (2 acres, 2' out of ground, 3' depth in ground, $25/yd)
  Addition to estimate

Increase cost - off site clay (lack of comprehensive soil investigation on peninsula)
  Base cost for on site clay
  Base volume of clay
  Assume 25% of clay must come from on site source not on the peninsula
    Add $2.50 per yard cost to load and haul to peninsula

Peninsula with escalation
Peninsula

2.8 #
No marketing

513,500
250,000
3,000,000
403,333
2,889,833

2,128,285
406,800

254,250

ESTIMATE NUMBER 050930IR1

KINGSTON FOSSIL PLANT OPTION 1 - WET ASH IN POND GYPSUM ON PENINSULA

(WITHOUT POND BUFFER)

PRESENT WORTH

ITEM No.	DESCRIPTION	UNITS	Total Cost 2005 Dollars	Number of Cycles	2005 Dollars per Cycle	2005	2006	2007	2008	2009	2010	2011	2012
	Escalation Factor					1.00	1.04	1.08	1.13	1.17	1.21	1.26	1.31
	CAPITAL COSTS												
1	Install Drains For Swan Pond Road	Lump Sum	$1,967,628	1	$1,967,628	$1,967,628							
2	Ash In Pond	Lump Sum	$582,456	1	$582,456	$582,456							
2A	Phase 2 Base Construction (Base Layers)	Lump Sum	$5,431,967	2	$2,715,984								
3	Gypsum On Peninsula	Lump Sum	$12,159,352	1	$12,159,352				$13,690,706				
5	Miscellaneous	Lump Sum	$1,974,007	4	$493,502	$493,502			$555,654				
6	Engineering / Geotech	Lump Sum	$808,829	1	$808,829	$808,829							
	Total Capital Costs		$ 22,924,239			$ 3,852,415	$ -	$ -	$ 14,246,360	$ -	$ -	$ -	$ -
	OPERATING COSTS												
8	Dredge Cell Phase 1	Lump Sum	$11,554,547	12	$962,879	$962,879	$1,004,283	$1,043,450	$1,084,144	$1,125,342	$1,169,230	$1,214,830	$1,263,423
14	Gypsum On Peninsula Disposal Cost	Lump Sum	$3,644,075	20	$182,204					$212,946	$221,251	$229,880	$239,075
20,22,23&24	Phase 2 Wet Ash (Initial Thru Stage 3)	Lump Sum	$10,483,975	12	$873,665								
	QA/QC For Construction Of Disposal	Lump Sum	$470,247	24	$19,594	$19,594	$20,436	$21,233	$22,061	$22,900	$23,793	$24,721	$25,709
	Total Operating Costs		$ 26,152,844			$ 982,473	$ 1,024,719	$ 1,064,683	$ 1,106,206	$ 1,361,188	$ 1,414,274	$ 1,469,431	$ 1,528,208
	Total Costs		$ 49,077,083			$ 4,834,887	$ 1,024,719	$ 1,064,683	$ 15,352,565	$ 1,361,188	$ 1,414,274	$ 1,469,431	$ 1,528,208

ITEM No.	DESCRIPTION	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Escalation Factor	1.36	1.42	1.48	1.54	1.60	1.66	1.73	1.80	1.87
	CAPITAL COSTS									
1	Install Drains For Swan Pond Road									
2	Ash In Pond									
2A	Phase 2 Base Construction (Base Layers)			$4,008,707	$4,169,055					
3	Gypsum On Peninsula									
5	Miscellaneous			$728,393	$757,529					
6	Engineering / Geotech									
	Total Capital Costs	$ -	$ -	$ 4,737,100	$ 4,926,584	$ -	$ -	$ -	$ -	$ -
	OPERATING COSTS									
8	Dredge Cell Phase 1	$1,313,960	$1,356,519	$1,421,179	$1,478,027	$1,537,148				
14	Gypsum On Peninsula Disposal Cost	$248,638	$258,584	$268,927	$279,684	$290,872	$302,506	$314,607	$327,191	$340,279
20,22,23&24	Phase 2 Wet Ash (Initial Thru Stage 3)					$1,394,725	$1,450,514	$1,508,535	$1,568,876	$1,631,631
	QA/QC For Construction Of Disposal	$26,738	$27,807	$28,920	$30,076	$31,279	$32,531	$33,832	$35,185	$36,592
	Total Operating Costs	$ 1,589,336	$ 1,652,910	$ 1,719,026	$ 1,787,787	$ 3,254,024	$ 1,785,551	$ 1,856,973	$ 1,931,262	$ 2,008,502
	Total Costs	$ 1,589,336	$ 1,652,910	$ 6,456,126	$ 6,714,371	$ 3,254,024	$ 1,785,551	$ 1,856,973	$ 1,931,262	$ 2,008,502

ITEM No.	DESCRIPTION	2022	2023	2024	2025	2026	2027	2028	2029	Escalated SubTotal	PRESENT WORTH of using Capital Dollars
	Escalation Factor	1.94	2.02	2.10	2.19	2.27	2.36	2.46	2.56		
	CAPITAL COSTS										
1	Install Drains For Swan Pond Road									$1,967,628	$1,967,628
2	Ash In Pond									$582,456	$582,456
2A	Phase 2 Base Construction (Base Layers)									$8,177,763	$1,887,001
3	Gypsum On Peninsula									$13,690,706	$9,001,861
5	Miscellaneous									$2,535,078	$1,201,726
6	Engineering / Geotech									$808,829	$808,829
	Total Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,762,459	$ 15,449,502
	OPERATING COSTS										
8	Dredge Cell Phase 1									$15,984,413	$7,337,188
14	Gypsum On Peninsula Disposal Cost	$353,890	$368,045	$382,767	$398,078	$414,001	$430,561	$447,783	$465,695	$6,795,259	$1,116,949
20,22,23&24	Phase 2 Wet Ash (Initial Thru Stage 3)	$1,696,896	$1,764,772	$1,835,363	$1,908,778	$1,985,129	$2,064,534	$2,147,115	$2,233,000	$23,189,868	$1,987,801
	QA/QC For Construction Of Disposal	$38,056	$39,578	$41,162	$42,808	$44,520	$46,301	$48,153	$50,079	$814,065	$188,038
	Total Operating Costs	$ 2,088,842	$ 2,172,396	$ 2,259,292	$ 2,349,663	$ 2,443,650	$ 2,541,396	$ 2,643,052	$ 2,748,774	$ 46,783,606	$ 10,629,977
	Total Costs	$ 2,088,842	$ 2,172,396	$ 2,259,292	$ 2,349,663	$ 2,443,650	$ 2,541,396	$ 2,643,052	$ 2,748,774	$ 74,546,065	$ 26,079,479

Present Worth of this Option $ 26,079,479

03/14/2009

ESCALATION TABLE: Contract Labor - T&L

TO

	1.045 2005	1.043 2006	1.039 2007	1.039 2008	1.038 2009	1.039 2010	1.039 2011	1.040 2012	1.040 2013	1.040 2014	1.040 2015	1.040 2016	1.040 2017	1.040 2018	1.040 2019	1.040 2020	1.040 2021	1.040 2022	1.040 2023	1.040 2024	1.040 2025	1.040 2026	1.040 2027	1.040 2028	1.040 2029
2005	1.000	1.043	1.084	1.126	1.169	1.214	1.262	1.312	1.365	1.419	1.476	1.535	1.596	1.660	1.727	1.796	1.868	1.942	2.020	2.101	2.185	2.272	2.363	2.458	2.556
2006		1.000	1.039	1.080	1.121	1.164	1.210	1.258	1.308	1.361	1.415	1.472	1.531	1.592	1.655	1.722	1.791	1.862	1.937	2.014	2.095	2.179	2.266	2.356	2.451
2007			1.000	1.039	1.078	1.121	1.164	1.211	1.259	1.310	1.362	1.416	1.473	1.532	1.593	1.657	1.723	1.792	1.864	1.939	2.016	2.097	2.181	2.268	2.359
2008				1.000	1.038	1.078	1.121	1.165	1.212	1.260	1.311	1.363	1.418	1.475	1.534	1.595	1.659	1.725	1.794	1.866	1.940	2.018	2.099	2.183	2.270
2009					1.000	1.039	1.080	1.123	1.168	1.214	1.263	1.313	1.366	1.421	1.477	1.536	1.598	1.662	1.728	1.797	1.869	1.944	2.022	2.103	2.187
2010						1.000	1.039	1.081	1.124	1.169	1.215	1.264	1.315	1.367	1.422	1.479	1.538	1.599	1.663	1.730	1.799	1.871	1.946	2.024	2.105
2011							1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948	2.026
2012								1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948
2013									1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873
2014										1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801
2015											1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732
2016												1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665
2017													1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601
2018														1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539
2019															1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480
2020																1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423
2021																	1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369
2022																		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316
2023																			1.000	1.040	1.082	1.125	1.170	1.217	1.265
2024																				1.000	1.040	1.082	1.125	1.170	1.217
2025																					1.000	1.040	1.082	1.125	1.170
2026																						1.000	1.040	1.082	1.125
2027																							1.000	1.040	1.082
2028																								1.000	1.040
2029																									1.000

	Cash Flows		NPV
2005	4,834,887		
2006	1,024,719		
2007	1,064,683		
2008	15,352,565		
2009	1,361,188		
2010	1,414,274	$	18,106,969
2011	1,469,431		
2012	1,528,208		
2013	1,589,336		
2014	1,652,910		
2015	6,456,126	$	21,902,027
2016	6,714,371		
2017	3,254,024		
2018	1,785,551		
2019	1,856,973		
2020	1,931,252		
2021	2,008,502		
2022	2,088,842		
2023	2,172,396		
2024	2,259,292		
2025	2,349,663		
2026	2,443,650		
2027	2,541,396		
2028	2,643,052		
2029	2,748,774	$	26,079,479

Case:	Sensitivity	
Location:	Peninsula	
Governing Assumptions:		
Coal Supply	5 #	
Gypsum Marketing	No marketing	
Annual Gypsum Production		583,929
Net Gypsum to Peninsula		583,929
Annual Ash production		475,600
Capacity of peninsula		9,300,000
Years of peninsula capacity	16	
Year peninsula capacity expires	2025	
Assume construct a new 40 acre area on the peninsula ($100,000 acre in 2005 $) in 2024	$	4,000,000

327000 x
2.8 5

583928.5714

1176610
2101090

0.55999981 583928.8

ESTIMATE NUMBER 050803O1R1

KINGSTON FOSSIL PLANT OPTION 1 - WET ASH IN POND GYPSUM ON PENINSULA

(WITHOUT POND BUFFER)

PRESENT WORTH

ITEM No.	DESCRIPTION	UNITS	Total Cost 2005 Dollars	Number of Cycles	2005 Dollars per Cycle	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	Escalation Factor					1.00	1.04	1.08	1.13	1.17	1.21	1.26	1.31	1.36	1.42	1.48	1.54
	CAPITAL COSTS																
1	Install Drains For Swan Pond Road	Lump Sum	$1,967,628	1	$1,967,628	$1,967,628											
2	Ash in Pond	Lump Sum	$582,456	1	$582,456	$582,456											
2A	Phase 2 Base Construction (Base Layers)	Lump Sum	$5,431,967	2	$2,715,984											$4,008,707	$4,169,055
3	Gypsum On Peninsula	Lump Sum	$9,015,269	1	$9,015,269				$10,150,656								
5	Miscellaneous	Lump Sum	$1,974,007	4	$493,502	$493,502			$555,654							$728,393	$757,529
6	Engineering / Geotech	Lump Sum	$808,829	1	$808,829	$808,829											
	Total Capital Costs		$ 19,780,156			$ 3,952,415	$ -	$ -	$ 10,706,309	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,737,100	$ 4,926,584
	OPERATING COSTS																
8	Dredge Cell Phase 1	Lump Sum	$11,554,547	12	$962,879	$962,879	$1,004,283	$1,043,450	$1,084,144	$1,125,342	$1,169,230	$1,214,830	$1,263,423	$1,313,960	$1,366,519	$1,421,179	$1,478,027
14	Gypsum On Peninsula Disposal Cost	Lump Sum	$3,644,075	20	$182,204					$212,946	$221,251	$229,880	$239,075	$248,638	$258,584	$268,927	$279,684
20,22,23&24	Phase 2 Wet Ash (Initial Thru Stage 3)	Lump Sum	$10,483,975	12	$873,665												
	QA/QC For Construction Of Disposal	Lump Sum	$470,247	24	$19,594	$19,594	$20,436	$21,233	$22,061	$22,900	$23,793	$24,721	$25,709	$26,738	$27,807	$28,920	$30,076
	Total Operating Costs		$ 26,152,844			$ 982,473	$ 1,024,719	$ 1,064,683	$ 1,106,206	$ 1,381,188	$ 1,414,274	$ 1,469,431	$ 1,528,208	$ 1,589,336	$ 1,652,910	$ 1,718,026	$ 1,787,787
	Total Costs		$ 45,933,000			$ 4,934,887	$ 1,024,719	$ 1,064,683	$ 11,812,615	$ 1,381,188	$ 1,414,274	$ 1,469,431	$ 1,528,208	$ 1,589,336	$ 1,652,910	$ 6,456,126	$ 6,714,371

ITEM No.	DESCRIPTION	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Escalated SubTotal	PRESENT WORTH of using Capital Dollars
	Escalation Factor	1.60	1.66	1.73	1.80	1.87	1.94	2.02	2.10	2.19	2.27	2.36	2.46	2.56		
	CAPITAL COSTS															
1	Install Drains For Swan Pond Road														$1,967,628	$1,967,628
2	Ash in Pond														$582,456	$582,456
2A	Phase 2 Base Construction (Base Layers)														$8,177,763	$1,887,001
3	Gypsum On Peninsula								8403055.934						$18,553,712	$7,264,664
5	Miscellaneous														$2,535,078	$1,201,726
6	Engineering / Geotech														$808,829	$808,829
	Total Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,403,056	$ -	$ -	$ -	$ -	$ -	$ 32,625,465	$ 13,712,305
	OPERATING COSTS															
8	Dredge Cell Phase 1	$1,537,148													$15,984,413	$7,337,188
14	Gypsum On Peninsula Disposal Cost	$290,872	$302,506	$314,607	$327,191	$340,279	$353,890	$368,045	$382,767	$398,078	$414,001	$430,561	$447,783	$465,695	$6,795,259	$1,116,949
20,22,23&24	Phase 2 Wet Ash (Initial Thru Stage 3)	$1,394,725	$1,450,514	$1,508,535	$1,568,876	$1,631,631	$1,696,896	$1,764,772	$1,835,363	$1,908,778	$1,985,129	$2,064,534	$2,147,115	$2,233,000	$23,189,868	$1,987,801
	QA/QC For Construction Of Disposal	$31,279	$32,531	$33,832	$35,185	$36,592	$38,056	$39,578	$41,162	$42,808	$44,520	$46,301	$48,153	$50,079	$814,065	$188,038
	Total Operating Costs	$ 3,254,024	$ 1,785,551	$ 1,856,973	$ 1,931,252	$ 2,008,502	$ 2,088,842	$ 2,172,396	$ 2,259,292	$ 2,349,663	$ 2,443,650	$ 2,541,396	$ 2,643,052	$ 2,748,774	$ 46,783,606	$ 10,629,977
	Total Costs	$ 3,254,024	$ 1,785,551	$ 1,856,973	$ 1,931,252	$ 2,008,502	$ 2,088,842	$ 2,172,396	$ 10,662,348	$ 2,349,663	$ 2,443,650	$ 2,541,396	$ 2,643,052	$ 2,748,774	$ 79,409,070	$ 24,342,282

Present Worth of this Option $ 24,342,282

03/14/2009

ESCALATION TABLE: Contract Labor - T&L

TO

	1.045	1.043	1.039	1.039	1.038	1.039	1.039	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
2005	1.000	1.043	1.084	1.126	1.169	1.214	1.262	1.312	1.365	1.419	1.476	1.535	1.596	1.660	1.727	1.796	1.868	1.942	2.020	2.101	2.185	2.272	2.363	2.458	2.556
2006		1.000	1.039	1.080	1.121	1.164	1.210	1.258	1.308	1.361	1.415	1.472	1.531	1.592	1.655	1.722	1.791	1.862	1.937	2.014	2.095	2.179	2.266	2.356	2.451
2007			1.000	1.039	1.078	1.121	1.164	1.211	1.259	1.310	1.362	1.416	1.473	1.532	1.593	1.657	1.723	1.792	1.864	1.939	2.016	2.097	2.181	2.268	2.359
2008				1.000	1.038	1.078	1.121	1.165	1.212	1.260	1.311	1.363	1.418	1.475	1.534	1.595	1.659	1.725	1.794	1.866	1.940	2.018	2.099	2.183	2.270
2009					1.000	1.039	1.080	1.123	1.168	1.214	1.263	1.313	1.366	1.421	1.477	1.536	1.598	1.662	1.728	1.797	1.869	1.944	2.022	2.103	2.187
2010						1.000	1.039	1.081	1.124	1.169	1.215	1.264	1.315	1.367	1.422	1.479	1.538	1.599	1.663	1.730	1.799	1.871	1.946	2.024	2.105
2011							1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948	2.026
2012								1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948
2013									1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873
2014										1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801
2015											1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732
2016												1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665
2017													1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601
2018														1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539
2019															1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480
2020																1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423
2021																	1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369
2022																		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316
2023																			1.000	1.040	1.082	1.125	1.170	1.217	1.265
2024																				1.000	1.040	1.082	1.125	1.170	1.217
2025																					1.000	1.040	1.082	1.125	1.170
2026																						1.000	1.040	1.082	1.125
2027																							1.000	1.040	1.082
2028																								1.000	1.040
2029																									1.000

	Cash Flows		NPV
2005	4,834,887		
2006	1,024,719		
2007	1,064,683		
2008	11,812,515		
2009	1,361,188		
2010	1,414,274	$	15,779,328
2011	1,469,431		
2012	1,528,208		
2013	1,589,336		
2014	1,652,910		
2015	6,456,126	$	19,574,386
2016	6,714,371		
2017	3,254,024		
2018	1,785,551		
2019	1,856,973		
2020	1,931,252		
2021	2,008,502		
2022	2,088,842		
2023	2,172,396		
2024	10,662,348		
2025	2,349,663		
2026	2,443,650		
2027	2,541,396		
2028	2,643,052		
2029	2,748,774	$	24,342,282

Case:	Base
Location:	In Pond
Governing Assumptions:	
Coal Supply	2.8 #
Drainage Layer	Current Parsons design
Marketing	No marketing

ESTIMATE NUMBER 05093O1R1

KINGSTON FOSSIL PLANT OPTION 1 - WET ASH IN POND GYPSUM ON PENINSULA

(WITHOUT POND BUFFER)

PRESENT WORTH

ITEM No.	DESCRIPTION	UNITS	Total Cost 2005 Dollars	Number of Cycles	2005 Dollars per Cycle	2005	2006	2007	2008	2009	2010	2011	2012
	Escalation Factor					1.00	1.04	1.08	1.13	1.17	1.21	1.26	1.31
	CAPITAL COSTS												
1	Install Drains For Swan Pond Road	Lump Sum	$1,967,628	1	$1,967,628	$1,967,628							
4	Ash And Gypsum In Pond	Lump Sum	$582,456	1	$582,456	$582,456							
4A	Phase 2 Base Construction	Lump Sum	$5,598,822	1	$5,598,822				$6,303,940				
4B	Phase 3 Base Construction	Lump Sum	$2,155,779	1	$2,155,779								
5	Miscellaneous	Lump Sum	$1,686,838	3	$562,279	$562,279			$633,093				
5A	Dry Fly Ash Conversion	Lump Sum	$24,175,580	1	$24,175,580								
zz	Engineering	Lump Sum	$349,210	1	$349,210	$349,210							
	Total Capital Costs		$ 36,516,313			$ 3,461,573	$ -	$ -	$ 6,937,033	$ -	$ -	$ -	$ -
	OPERATING COSTS												
6	Dredge Cell Phase 1	Lump Sum	$12,624,840	12	$1,052,070	$1,052,070	$1,097,309	$1,140,104	$1,184,588	$1,229,582	$1,277,535	$1,327,359	$1,380,454
10,11,12,13,18&19	Phase 2 Wet Gypsum (initial Thru Stage 4)	Lump Sum	$5,188,249	20	$259,412					$303,182	$315,006	$327,291	$340,383
14,15,16,17&20	Phase 3 Dry Ash (initial Thru Stage 4)	Lump Sum	$17,748,174	12	$1,479,015								
	QA/QC For Construction Of Disposal Facility	Lump Sum	$746,424	24	$31,101	$31,101	$32,438	$33,703	$35,018	$36,349	$37,766	$39,239	$40,809
	Total Operating Costs		$ 36,307,687			$ 1,083,171	$ 1,129,747	$ 1,173,807	$ 1,219,586	$ 1,569,112	$ 1,630,308	$ 1,693,890	$ 1,761,645
	Total Costs		$ 72,824,000			$ 4,544,744	$ 1,129,747	$ 1,173,807	$ 8,156,619	$ 1,569,112	$ 1,630,308	$ 1,693,890	$ 1,761,645

ITEM No.	DESCRIPTION	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Escalation Factor	1.36	1.42	1.48	1.54	1.60	1.66	1.73	1.80	1.87
	CAPITAL COSTS									
1	Install Drains For Swan Pond Road									
4	Ash And Gypsum In Pond									
4A	Phase 2 Base Construction									
4B	Phase 3 Base Construction				$3,309,137					
5	Miscellaneous				$663,103					
5A	Dry Fly Ash Conversion				$37,109,701					
zz	Engineering									
	Total Capital Costs	$ -	$ -	$ -	$ 41,281,941	$ -	$ -	$ -	$ -	$ -
	OPERATING COSTS									
6	Dredge Cell Phase 1	$1,435,672	$1,493,099	$1,552,823	$1,614,936	$1,679,533				
10,11,12,13,18&19	Phase 2 Wet Gypsum (initial Thru Stage 4)	$353,998	$368,158	$382,885	$398,200	$414,128	$430,693	$447,921	$465,838	$484,471
14,15,16,17&20	Phase 3 Dry Ash (initial Thru Stage 4)					$2,361,111	$2,455,555	$2,553,777	$2,655,928	$2,762,165
	QA/QC For Construction Of Disposal Facility	$42,441	$44,139	$45,904	$47,740	$49,650	$51,636	$53,701	$55,849	$58,083
	Total Operating Costs	$ 1,832,111	$ 1,905,396	$ 1,981,611	$ 2,060,876	$ 4,504,421	$ 2,937,884	$ 3,055,399	$ 3,177,615	$ 3,304,720
	Total Costs	$ 1,832,111	$ 1,905,396	$ 1,981,611	$ 43,342,817	$ 4,504,421	$ 2,937,884	$ 3,055,399	$ 3,177,615	$ 3,304,720

ITEM No.	DESCRIPTION	2022	2023	2024	2025	2026	2027	2028	2029	Escalated SubTotal	PRESENT WORTH of using Capital Dollars
	Escalation Factor	1.94	2.02	2.10	2.18	2.27	2.36	2.41	2.56		
	CAPITAL COSTS										
1	Install Drains For Swan Pond Road									$1,967,628	$1,967,628
4	Ash And Gypsum In Pond									$582,456	$582,456
4A	Phase 2 Base Construction									$6,303,940	$4,144,943
4B	Phase 3 Base Construction									$3,309,137	$711,277
5	Miscellaneous									$2,058,475	$1,164,066
5A	Dry Fly Ash Conversion									$37,109,701	$7,975,479
zz	Engineering									$349,210	$349,210
	Total Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 51,680,547	$ 16,896,058
	OPERATING COSTS										
6	Dredge Cell Phase 1									$17,465,043	$8,016,829
10,11,12,13,18&19	Phase 2 Wet Gypsum (initial Thru Stage 4)	$503,850	$524,004	$544,964	$566,763	$589,433	$613,011	$637,531	$663,032	$9,674,745	$1,590,256
14,15,16,17&20	Phase 3 Dry Ash (initial Thru Stage 4)	$2,872,652	$2,987,558	$3,107,060	$3,231,343	$3,360,597	$3,495,020	$3,634,821	$3,780,214	$39,257,802	$3,365,121
	QA/QC For Construction Of Disposal Facility	$60,407	$62,823	$65,336	$67,949	$70,667	$73,494	$76,434	$79,491	$1,292,187	$298,474
	Total Operating Costs	$ 3,436,909	$ 3,574,385	$ 3,717,361	$ 3,866,055	$ 4,020,697	$ 4,181,525	$ 4,348,786	$ 4,522,738	$ 67,689,757	$ 13,270,679
	Total Costs	$ 3,436,909	$ 3,574,385	$ 3,717,361	$ 3,866,055	$ 4,020,697	$ 4,181,525	$ 4,348,786	$ 4,522,738	$ 119,370,304	$ 30,166,737

Present Worth of this Option $ 30,166,737

03/14/2009

ESCALATION TABLE: Contract Labor - T&L

TO

	1.045 2005	1.043 2006	1.039 2007	1.039 2008	1.038 2009	1.039 2010	1.039 2011	1.040 2012	1.040 2013	1.040 2014	1.040 2015	1.040 2016	1.040 2017	1.040 2018	1.040 2019	1.040 2020	1.040 2021	1.040 2022	1.040 2023	1.040 2024	1.040 2025	1.040 2026	1.040 2027	1.040 2028	1.040 2029
2005	1.000	1.043	1.084	1.126	1.169	1.214	1.262	1.312	1.365	1.419	1.476	1.535	1.596	1.660	1.727	1.798	1.868	1.942	2.020	2.101	2.185	2.272	2.363	2.458	2.556
2006		1.000	1.039	1.080	1.121	1.164	1.210	1.258	1.308	1.361	1.415	1.472	1.531	1.592	1.655	1.722	1.791	1.862	1.937	2.014	2.095	2.179	2.266	2.356	2.451
2007			1.000	1.039	1.078	1.121	1.164	1.211	1.259	1.310	1.362	1.416	1.473	1.532	1.593	1.657	1.723	1.792	1.864	1.939	2.016	2.097	2.181	2.268	2.359
2008				1.000	1.038	1.078	1.121	1.165	1.212	1.260	1.311	1.363	1.418	1.475	1.534	1.595	1.659	1.725	1.794	1.866	1.940	2.018	2.099	2.183	2.270
2009					1.000	1.039	1.080	1.123	1.168	1.214	1.263	1.313	1.366	1.421	1.477	1.538	1.598	1.662	1.728	1.797	1.869	1.944	2.022	2.103	2.187
2010						1.000	1.039	1.081	1.124	1.169	1.215	1.264	1.315	1.367	1.422	1.479	1.538	1.599	1.663	1.730	1.799	1.871	1.946	2.024	2.105
2011							1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948	2.026
2012								1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948
2013									1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873
2014										1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801
2015											1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732
2016												1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665
2017													1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601
2018														1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539
2019															1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480
2020																1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423
2021																	1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369
2022																		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316
2023																			1.000	1.040	1.082	1.125	1.170	1.217	1.265
2024																				1.000	1.040	1.082	1.125	1.170	1.217
2025																					1.000	1.040	1.082	1.125	1.170
2026																						1.000	1.040	1.082	1.125
2027																							1.000	1.040	1.082
2028																								1.000	1.040
2029																									1.000

	Cash Flows		NPV
2005	4,544,744		
2006	1,129,747		
2007	1,173,807		
2008	8,156,619		
2009	1,569,112		
2010	1,630,308	$	13,485,506
2011	1,693,890		
2012	1,761,645		
2013	1,832,111		
2014	1,905,396		
2015	1,981,611	$	16,510,466
2016	43,342,817		
2017	4,504,421		
2018	2,937,884		
2019	3,055,399		
2020	3,177,615		
2021	3,304,720		
2022	3,436,909		
2023	3,574,385		
2024	3,717,361		
2025	3,866,055		
2026	4,020,697		
2027	4,181,525		
2028	4,348,786		
2029	4,522,738	$	30,166,737

Case:	Reduced drainage layer	
Location:	In Pond	
Governing Assumptions:		
Coal Supply	2.8 #	
Drainage Layer (no change)		
Present cost in 2005 dollars -Phase 2		5,598,822
Present cost in 2005 dollars -Phase 3		2,155,779
Gypsum Marketing	**100% marketing after 2011**	
No gypsum disposal cost after 2011		
In Pond gypsum handling cost:		
Present cost over 20 years		5,188,249
Assume same cost as for peninsula - no increased cost through 2014		**3,644,075**
Fly Ash handling cost		
Present cost over 20 years		12,624,840
Assume same cost as for peninsula - no increased cost through 2014		**11,554,547**
Delay Dry Ash conversion		
Present year for dry ash conversion	2016	
Gypsum marketing - 2012-2016		1,309,440
Years of fly ash storage gained		2.75
Revised year for dry ash conversion	**2019**	
Reduced Fly Ash Handling cost		
Present cost/yr for dry ash handling		1,479,015
Revised cost for handling dense slurry based on conversation with JEA and Calvin Toney (1 dozer and 1 operator)		**250,000**

ESTIMATE NUMBER 05093O1R1

KINGSTON FOSSIL PLANT OPTION 1 - WET ASH IN POND GYPSUM ON PENINSULA

(WITHOUT POND BUFFER)

PRESENT WORTH

ITEM No.	DESCRIPTION	UNITS	Total Cost 2005 Dollars	Number of Cycles	2005 Dollars per Cycle	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Escalated SubTotal	PRESENT WORTH of using Capital Dollars
	Escalation Factor					1.00	1.04	1.08	1.13	1.17	1.21	1.26	1.31	1.36	1.42	1.48	1.54	1.60	1.66	1.73	1.80	1.87	1.94	2.02	2.10	2.18	2.27	2.36	2.46	2.56		
	CAPITAL COSTS																															
1	Install Drains For Swan Pond Road	Lump Sum	$1,967,628	1	$1,967,628	$1,967,628																									$1,967,628	$1,967,628
4	Ash And Gypsum In Pond	Lump Sum	$582,456	1	$582,456	$582,456																									$582,456	$582,456
4A	Phase 2 Base Construction	Lump Sum	$5,598,822	1	$5,598,822				$6,303,940																						$6,303,940	$4,144,943
4B	Phase 3 Base Construction	Lump Sum	$2,155,779	1	$2,155,779												$3,309,137														$3,309,137	$711,277
5	Miscellaneous	Lump Sum	$1,686,838	3	$562,279	$562,279			$633,083								$863,103														$2,058,475	$1,164,066
5A	Dry Fly Ash Conversion	Lump Sum	$24,175,580	1	$24,175,580															$41,743,366											$41,743,366	$5,899,534
zz	Engineering	Lump Sum	$349,210	1	$349,210	$349,210																									$349,210	$349,210
	Total Capital Costs		$ 36,516,313			$ 3,461,573	$ -	$ -	$ 6,937,033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,172,240	$ -	$ -	$ 41,743,366	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 56,314,213	$ 14,819,114
	OPERATING COSTS																															
6	Dredge Cell Phase 1	Lump Sum	$11,554,547	12	$962,879	$962,879	$1,004,283	$1,043,450	$1,084,144	$1,125,342	$1,169,230	$1,214,830	$1,263,423	$1,313,960	$1,366,519	$1,421,179	$1,478,027	$1,537,148	$1,598,633	$1,662,579											$19,245,625	$7,831,980
10,11,12,13,18&19	Phase 2 Wet Gypsum (Initial Thru Stage 4)	Lump Sum	$3,644,075	20	$182,204					$212,946	$221,251	$229,880	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$664,077	$331,137
14,15,16,17&20	Phase 3 Dry Ash (Initial Thru Stage 4)	Lump Sum	$3,000,000	12	$250,000													$0	$0	$431,669	$448,935	$466,893	$485,569	$504,991	$525,191	$546,199	$568,047	$590,768	$614,399	$638,975	$5,821,636	$426,756
	QA/QC For Construction Of Disposal Facility	Lump Sum	$746,424	24	$31,101	$31,101	$32,438	$33,703	$35,018	$36,349	$37,766	$39,239	$40,809	$42,441	$44,139	$45,904	$47,740	$49,650	$51,636	$53,701	$55,849	$58,083	$60,407	$62,823	$65,330	$67,949	$70,667	$73,494	$76,434	$79,491	$1,292,167	$298,474
	Total Operating Costs		$ 18,945,046			$ 993,980	$ 1,036,721	$ 1,077,153	$ 1,119,162	$ 1,374,637	$ 1,428,247	$ 1,483,949	$ 1,304,232	$ 1,356,401	$ 1,410,657	$ 1,467,083	$ 1,525,767	$ 1,586,797	$ 1,650,269	$ 2,147,949	$ 504,785	$ 524,976	$ 545,975	$ 567,814	$ 590,527	$ 614,148	$ 638,714	$ 664,262	$ 690,833	$ 718,466	$ 27,023,506	$ 8,888,348
	Total Costs		$ 55,461,359			$ 4,455,553	$ 1,036,721	$ 1,077,153	$ 8,056,195	$ 1,374,637	$ 1,428,247	$ 1,483,949	$ 1,304,232	$ 1,356,401	$ 1,410,657	$ 1,467,083	$ 5,698,007	$ 1,586,797	$ 1,650,269	$ 43,891,315	$ 504,785	$ 524,976	$ 545,975	$ 587,814	$ 590,527	$ 614,148	$ 638,714	$ 664,262	$ 690,833	$ 718,466	$ 83,337,719	$ 23,707,462

Present Worth of this Option $ 23,707,462

03/14/2005

ESCALATION TABLE: Contract Labor - T&L

TO

	1.045 2005	1.043 2006	1.039 2007	1.039 2008	1.038 2009	1.039 2010	1.039 2011	1.040 2012	1.040 2013	1.040 2014	1.040 2015	1.040 2016	1.040 2017	1.040 2018	1.040 2019	1.040 2020	1.040 2021	1.040 2022	1.040 2023	1.040 2024	1.040 2025	1.040 2026	1.040 2027	1.040 2028	1.040 2029
2005	1.000	1.043	1.084	1.126	1.169	1.214	1.262	1.312	1.365	1.419	1.476	1.535	1.596	1.660	1.727	1.796	1.868	1.942	2.020	2.101	2.185	2.272	2.363	2.458	2.556
2006		1.000	1.039	1.080	1.121	1.164	1.210	1.258	1.308	1.361	1.415	1.472	1.531	1.592	1.655	1.722	1.791	1.862	1.937	2.014	2.095	2.179	2.266	2.356	2.451
2007			1.000	1.039	1.078	1.121	1.164	1.211	1.259	1.310	1.362	1.416	1.473	1.532	1.593	1.657	1.723	1.792	1.864	1.939	2.016	2.097	2.181	2.268	2.359
2008				1.000	1.038	1.078	1.121	1.165	1.212	1.260	1.311	1.363	1.418	1.475	1.534	1.595	1.659	1.725	1.794	1.866	1.940	2.018	2.099	2.183	2.270
2009					1.000	1.039	1.080	1.123	1.168	1.214	1.263	1.313	1.366	1.421	1.477	1.538	1.598	1.662	1.728	1.797	1.869	1.944	2.022	2.103	2.187
2010						1.000	1.039	1.081	1.124	1.169	1.215	1.264	1.315	1.367	1.422	1.479	1.538	1.599	1.663	1.730	1.799	1.871	1.946	2.024	2.105
2011							1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948	2.026
2012								1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948
2013									1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.318	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873
2014										1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801
2015											1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732
2016												1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665
2017													1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601
2018														1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539
2019															1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480
2020																1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423
2021																	1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369
2022																		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316
2023																			1.000	1.040	1.082	1.125	1.170	1.217	1.265
2024																				1.000	1.040	1.082	1.125	1.170	1.217
2025																					1.000	1.040	1.082	1.125	1.170
2026																						1.000	1.040	1.082	1.125
2027																							1.000	1.040	1.082
2028																								1.000	1.040
2029																									1.000

	Cash Flows		NPV
2005	4,455,553		
2006	1,036,721		
2007	1,077,153		
2008	8,056,195		
2009	1,374,637		
2010	1,428,247	$	12,964,656
2011	1,483,949		
2012	1,304,232		
2013	1,356,401		
2014	1,410,657		
2015	1,467,083	$	15,303,564
2016	5,698,007		
2017	1,586,797		
2018	1,650,269		
2019	43,891,315		
2020	504,785		
2021	524,976		
2022	545,975		
2023	567,814		
2024	590,527		
2025	614,148		
2026	638,714		
2027	664,262		
2028	690,833		
2029	718,466	$	23,707,462

Case:	Sensitivity		
Location:	In Pond		
Governing Assumptions:			
Coal Supply	5 #		
Drainage Layer	Current Parsons design		
Marketing	No Marketing		
Annual Gypsum Production		583,929	
Annual Ash production		475,600	20074000
Ash production - 2005 to 2009		1,902,400	20300000
Available storage for wet ash and gypsum as of 2010			
		6,423,680	226000
Years of pond capacity as of 2010		6	
Year when dry collection required	2016		
Years of remaining pond capacity		17	
Year pond capacity expires (develop the peninsula)	2026		

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2.8		5
583928.5714		
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0.55999981	583928.8	

ESTIMATE NUMBER 0508301R1

KINGSTON FOSSIL PLANT OPTION 1 - WET ASH IN POND GYPSUM ON PENINSULA

(WITHOUT POND BUFFER)

PRESENT WORTH

ITEM No.	DESCRIPTION	UNITS	Total Cost 2005 Dollars	Number of Cycles	2005 Dollars per Cycle	2005	2006	2007	2008	2009	2010	2011
	Escalation Factor					1.00	1.04	1.08	1.13	1.17	1.21	1.26
	CAPITAL COSTS											
1	Install Drains For Swan Pond Road	Lump Sum	$1,967,628	1	$1,967,628	$1,967,628						
4	Ash And Gypsum In Pond	Lump Sum	$582,456	1	$582,456	$582,456						
4A	Phase 2 Base Construction	Lump Sum	$5,598,822	1	$5,598,822				$6,303,940			
4B	Phase 3 Base Construction	Lump Sum	$2,155,779	1	$2,155,779							
5	Miscellaneous (& construct peninsula)	Lump Sum	$1,686,838	3	$562,279	$562,279			$633,093			
5A	Dry Fly Ash Conversion	Lump Sum	$24,175,580	1	$24,175,580							
zz	Engineering	Lump Sum	$349,210	1	$349,210	$349,210						
	Total Capital Costs		$ 36,516,313			$ 3,461,573	$ -	$ -	$ 6,937,033	$ -	$ -	$ -
	OPERATING COSTS											
6	Dredge Cell Phase 1	Lump Sum	$12,624,840	12	$1,052,070	$1,052,070	$1,097,309	$1,140,104	$1,184,568	$1,229,582	$1,277,535	$1,327,359
10,11,12,13,18&19	Phase 2 Wet Gypsum (Initial Thru Stage 4)	Lump Sum	$5,188,249	20	$259,412					$303,182	$315,006	$327,291
14,15,16,17&20	Phase 3 Dry Ash (Initial Thru Stage 4)	Lump Sum	$17,748,174	12	$1,479,015							
	QA/QC For Construction Of Disposal Facility	Lump Sum	$746,424	24	$31,101	$31,101	$32,438	$33,703	$35,018	$36,349	$37,766	$39,239
	Total Operating Costs		$ 36,307,687			$ 1,083,171	$ 1,129,747	$ 1,173,807	$ 1,219,586	$ 1,569,112	$ 1,630,308	$ 1,693,890
	Total Costs		$ 72,824,000			$ 4,544,744	$ 1,129,747	$ 1,173,807	$ 8,156,619	$ 1,569,112	$ 1,630,308	$ 1,693,890

ITEM No.	DESCRIPTION	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Escalation Factor	1.31	1.36	1.42	1.48	1.54	1.60	1.66	1.73	1.80	1.87
	CAPITAL COSTS										
1	Install Drains For Swan Pond Road										
4	Ash And Gypsum In Pond										
4A	Phase 2 Base Construction										
4B	Phase 3 Base Construction					$3,309,137					
5	Miscellaneous (& construct peninsula)					$883,103					
5A	Dry Fly Ash Conversion				$35,682,404						
zz	Engineering										
	Total Capital Costs	$ -	$ -	$ -	$ 35,682,404	$ 4,172,240	$ -	$ -	$ -	$ -	$ -
	OPERATING COSTS										
6	Dredge Cell Phase 1	$1,380,454	$1,435,672	$1,493,099	$1,552,823	$0	$0				
10,11,12,13,18&19	Phase 2 Wet Gypsum (Initial Thru Stage 4)	$340,383	$353,998	$368,158	$382,885	$398,200	$414,128	$430,693	$447,921	$465,838	$484,471
14,15,16,17&20	Phase 3 Dry Ash (Initial Thru Stage 4)					$2,270,299	$2,361,111	$2,455,555	$2,553,777	$2,655,928	$2,762,165
	QA/QC For Construction Of Disposal Facility	$40,809	$42,441	$44,139	$45,904	$47,740	$49,650	$51,636	$53,701	$55,849	$58,063
	Total Operating Costs	$ 1,761,645	$ 1,832,111	$ 1,905,396	$ 1,981,611	$ 2,716,239	$ 2,824,889	$ 2,937,884	$ 3,055,399	$ 3,177,615	$ 3,304,720
	Total Costs	$ 1,761,645	$ 1,832,111	$ 1,905,396	$ 37,664,016	$ 6,888,479	$ 2,824,889	$ 2,937,884	$ 3,055,399	$ 3,177,615	$ 3,304,720

ITEM No.	DESCRIPTION	2022	2023	2024	2025	2026	2027	2028	2029	Escalated Sub Total	PRESENT WORTH of using Capital Dollars
	Escalation Factor	1.94	2.02	2.10	2.18	2.27	2.36	2.46	2.56		
	CAPITAL COSTS										
1	Install Drains For Swan Pond Road									$1,967,628	$1,967,628
4	Ash And Gypsum In Pond									$582,456	$582,456
4A	Phase 2 Base Construction									$6,303,940	$4,144,943
4B	Phase 3 Base Construction									$3,309,137	$711,277
5	Miscellaneous (& construct peninsula)					20484370.93				$22,542,846	$2,252,415
5A	Dry Fly Ash Conversion									$35,682,404	$8,820,145
zz	Engineering									$349,210	$349,210
	Total Capital Costs	$ -	$ -	$ -	$ -	$ 20,484,371	$ -	$ -	$ -	$ 70,737,622	$ 18,828,073
	OPERATING COSTS										
6	Dredge Cell Phase 1									$14,170,574	$7,355,792
10,11,12,13,18&19	Phase 2 Wet Gypsum (Initial Thru Stage 4)	$503,850	$524,004	$544,964	$566,763	$589,433	$613,011	$637,531	$663,032	$9,674,745	$1,590,256
14,15,16,17&20	Phase 3 Dry Ash (Initial Thru Stage 4)	$2,872,652	$2,987,558	$3,107,060	$3,231,343	$3,360,597	$3,495,020	$3,634,821	$3,780,214	$41,528,100	$3,853,106
	QA/QC For Construction Of Disposal Facility	$60,407	$62,823	$65,336	$67,949	$70,667	$73,494	$76,434	$79,491	$1,282,167	$298,474
	Total Operating Costs	$ 3,436,909	$ 3,574,385	$ 3,717,361	$ 3,866,055	$ 4,020,697	$ 4,181,525	$ 4,348,786	$ 4,522,738	$ 66,665,587	$ 13,097,628
	Total Costs	$ 3,436,909	$ 3,574,385	$ 3,717,361	$ 3,866,055	$ 24,505,068	$ 4,181,525	$ 4,348,786	$ 4,522,738	$ 137,403,209	$ 31,925,701

Present Worth of this Option $ 31,925,701

03/14/2009

ESCALATION TABLE: Contract Labor - T&L

TO

	1.045 2005	1.043 2006	1.039 2007	1.039 2008	1.038 2009	1.039 2010	1.039 2011	1.040 2012	1.040 2013	1.040 2014	1.040 2015	1.040 2016	1.040 2017	1.040 2018	1.040 2019	1.040 2020	1.040 2021	1.040 2022	1.040 2023	1.040 2024	1.040 2025	1.040 2026	1.040 2027	1.040 2028	1.040 2029
2005	1.000	1.043	1.084	1.126	1.169	1.214	1.262	1.312	1.365	1.419	1.476	1.535	1.596	1.660	1.727	1.796	1.868	1.942	2.020	2.101	2.185	2.272	2.363	2.458	2.556
2006		1.000	1.039	1.080	1.121	1.164	1.210	1.258	1.308	1.361	1.415	1.472	1.531	1.592	1.655	1.722	1.791	1.862	1.937	2.014	2.095	2.179	2.266	2.356	2.451
2007			1.000	1.039	1.078	1.121	1.164	1.211	1.259	1.310	1.362	1.416	1.473	1.532	1.593	1.657	1.723	1.792	1.864	1.939	2.016	2.097	2.181	2.268	2.359
2008				1.000	1.038	1.078	1.121	1.165	1.212	1.260	1.311	1.363	1.418	1.475	1.534	1.595	1.659	1.725	1.794	1.866	1.940	2.018	2.099	2.183	2.270
2009					1.000	1.039	1.080	1.123	1.168	1.214	1.263	1.313	1.366	1.421	1.477	1.536	1.598	1.662	1.728	1.797	1.869	1.944	2.022	2.103	2.187
2010						1.000	1.039	1.081	1.124	1.169	1.215	1.264	1.315	1.367	1.422	1.479	1.538	1.599	1.663	1.730	1.799	1.871	1.946	2.024	2.105
2011							1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948	2.026
2012								1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.946
2013									1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873
2014										1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801
2015											1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732
2016												1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665
2017													1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601
2018														1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539
2019															1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480
2020																1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423
2021																	1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369
2022																		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316
2023																			1.000	1.040	1.082	1.125	1.170	1.217	1.265
2024																				1.000	1.040	1.082	1.125	1.170	1.217
2025																					1.000	1.040	1.082	1.125	1.170
2026																						1.000	1.040	1.082	1.125
2027																							1.000	1.040	1.082
2028																								1.000	1.040
2029																									1.000

	Cash Flows	NPV
2005	4,544,744	
2006	1,129,747	
2007	1,173,807	
2008	8,156,619	
2009	1,569,112	
2010	1,630,308	$ 13,485,506
2011	1,693,890	
2012	1,761,645	
2013	1,832,111	
2014	1,905,396	
2015	37,664,016	$ 25,330,610
2016	6,888,479	
2017	2,824,889	
2018	2,937,884	
2019	3,055,399	
2020	3,177,615	
2021	3,304,720	
2022	3,436,909	
2023	3,574,385	
2024	3,717,361	
2025	3,866,055	
2026	24,505,068	
2027	4,181,525	
2028	4,348,786	
2029	4,522,738	$ 31,925,701

KIF Pond vs Peninsula - Sensitivity Analysis Summary

Option	Description	25 year Present Worth	10 year Present Worth	5 year Present Worth	2008 Cash Flow	Gypsum Marketing	Dry Ash Conversion	Drainage Layer	Coal	Other considerations
1	Peninsula, Base Case	$ 23,751,838	$ 19,574,386	$ 15,779,328	$ 11,812,515	No	N/A	N/A	2.8 #	
1-1	Peninsula with marketing	$ 22,966,026	$ 19,263,248	$ 15,779,328	$ 11,812,515	Yes	N/A	N/A	2.8 #	100% marketing after 2011
1-2	Peninsula with cost escalation	$ 26,079,479	$ 21,902,027	$ 18,106,969	$ 15,352,565	No	N/A	N/A	2.8 #	
1-3	5# coal, no marketing, peninsula	$ 24,342,282	$ 19,574,386	$ 15,779,328	$ 11,812,515	No	N/A	N/A	5 #	
1-4	5# coal with marketing, peninsula	$ 23,751,838	$ 19,574,386	$ 15,779,328	$ 11,812,515	No	N/A	N/A	5 #	
3	In pond, Base Case	$ 30,166,737	$ 16,510,466	$ 13,485,506	$ 8,156,619	No	2016	Parsons	2.8 #	
3-1	In pond, reduced drainage layer, marketing and other considerations	$ 21,279,352	$ 13,231,093	$ 10,892,184	$ 4,904,225	Yes	2019	50% Cost of Parsons	2.8 #	Reduced fly ash handling cost per JEA; reduced gypsum handling cost (same as Option 1)
3-2	In pond, marketing and other considerations	$ 23,707,462	$ 15,303,564	$ 12,964,656	$ 8,056,195	Yes	2019	Parsons	2.8 #	Reduced fly ash handling cost per JEA; reduced gypsum handling cost (same as Option 1)
3-3	5# coal, no marketing, in pond	$ 31,925,701	$ 25,330,610	$ 13,485,506	$ 8,156,619	No	2015	Parsons	5 #	
3-4	5# coal with marketing, in pond	$ 28,962,461	$ 16,510,466	$ 13,485,506	$ 8,156,619	Yes	2017	Parsons	5 #	

Case:	Sensitivity	
Location:	Peninsula	
Governing Assumptions:		
Coal Supply	5 #	
Gypsum Marketing	Marketing	
Annual Gypsum Production		583,929
Net Gypsum to Peninsula		211,929
Annual Ash production		475,600
Capacity of peninsula		9,300,000
Years of peninsula capacity	44	
Year peninsula capacity expires	2053	

327000 x

2.8 5

583928.5714

1176610	
2101090	
0.55999981	583928.8

ESTIMATE NUMBER 050930 1R1

KINGSTON FOSSIL PLANT OPTION 1 - WET ASH IN POND GYPSUM ON PENINSULA

(WITHOUT POND BUFFER)

PRESENT WORTH

ITEM No.	DESCRIPTION	UNITS	Total Cost 2005 Dollars	Number of Cycles	2005 Dollars per Cycle	2005	2006	2007	2008	2009	2010	2011	2012
	Escalation Factor					1.00	1.04	1.08	1.13	1.17	1.21	1.26	1.31
	CAPITAL COSTS												
1	Install Drains For Swan Pond Road	Lump Sum	$1,967,628	1	$1,967,628	$1,967,628							
2	Ash In Pond	Lump Sum	$582,456	1	$582,456	$582,456							
2A	Phase 2 Base Construction (Base Layers)	Lump Sum	$5,431,967	2	$2,715,984								
3	Gypsum On Peninsula	Lump Sum	$9,015,269	1	$9,015,269				$10,150,656				
5	Miscellaneous	Lump Sum	$1,974,007	4	$493,502	$493,502			$556,654				
8	Engineering / Geotech	Lump Sum	$808,829	1	$808,829	$808,829							
	Total Capital Costs		$ 19,780,156			$ 3,852,415	$ -	$ -	$ 10,706,309	$ -	$ -	$ -	$ -
	OPERATING COSTS												
6	Dredge Cell Phase I	Lump Sum	$11,554,547	12	$962,879	$962,879	$1,004,283	$1,043,450	$1,084,144	$1,125,342	$1,169,230	$1,214,830	$1,263,423
14	Gypsum On Peninsula Disposal Cost	Lump Sum	$3,644,075	20	$182,204					$212,946	$221,251	$229,880	$239,075
20,22,23&24	Phase 2 Wet Ash (Initial Thru Stage 3)	Lump Sum	$10,483,975	12	$873,665								
	QA/QC For Construction Of Disposal	Lump Sum	$470,247	24	$19,594	$19,594	$20,436	$21,233	$22,061	$22,900	$23,793	$24,721	$25,709
	Total Operating Costs		$ 26,152,844			$ 982,473	$ 1,024,719	$ 1,064,683	$ 1,106,206	$ 1,361,188	$ 1,414,274	$ 1,469,431	$ 1,528,208
	Total Costs		$ 45,933,000			$ 4,834,887	$ 1,024,719	$ 1,064,683	$ 11,812,515	$ 1,361,188	$ 1,414,274	$ 1,469,431	$ 1,528,208

DESCRIPTION	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Escalation Factor	1.36	1.42	1.49	1.54	1.60	1.66	1.73	1.80	1.87	1.94
CAPITAL COSTS										
Install Drains For Swan Pond Road										
Ash In Pond										
Phase 2 Base Construction (Base Layers)			$4,008,707	$4,169,055						
Gypsum On Peninsula										
Miscellaneous			$728,393	$757,529						
Engineering / Geotech										
Total Capital Costs	$ -	$ -	$ 4,737,100	$ 4,926,584	$ -	$ -	$ -	$ -	$ -	$ -
OPERATING COSTS										
Dredge Cell Phase I	$1,313,960	$1,366,519	$1,421,179	$1,478,027	$1,537,148					
Gypsum On Peninsula Disposal Cost	$248,638	$258,584	$268,927	$279,684	$290,872	$302,506	$314,607	$327,191	$340,279	$353,890
Phase 2 Wet Ash (Initial Thru Stage 3)					$1,394,725	$1,450,514	$1,508,535	$1,568,876	$1,631,631	$1,696,896
QA/QC For Construction Of Disposal	$26,738	$27,807	$28,920	$30,076	$31,279	$32,531	$33,832	$35,185	$36,592	$38,056
Total Operating Costs	$ 1,589,336	$ 1,652,910	$ 1,719,026	$ 1,787,787	$ 3,254,024	$ 1,785,551	$ 1,856,973	$ 1,931,252	$ 2,008,502	$ 2,088,842
Total Costs	$ 1,589,336	$ 1,652,910	$ 6,456,126	$ 6,714,371	$ 3,254,024	$ 1,785,551	$ 1,856,973	$ 1,931,252	$ 2,008,502	$ 2,088,842

DESCRIPTION	2023	2024	2025	2026	2027	2028	2029	Escalated SubTotal	PRESENT WORTH of using Capital Dollars
Escalation Factor	2.02	2.10	2.18	2.27	2.36	2.46	2.56		
CAPITAL COSTS									
Install Drains For Swan Pond Road								$1,967,628	$1,967,628
Ash In Pond								$582,456	$582,456
Phase 2 Base Construction (Base Layers)								$8,177,763	$1,887,001
Gypsum On Peninsula								$10,150,656	$6,674,221
Miscellaneous								$2,535,078	$1,201,726
Engineering / Geotech								$808,829	$808,829
Total Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 24,222,409	$ 13,121,862
OPERATING COSTS									
Dredge Cell Phase I								$15,984,413	$7,337,188
Gypsum On Peninsula Disposal Cost	$368,045	$382,767	$398,078	$414,001	$430,561	$447,783	$465,695	$6,795,259	$1,116,949
Phase 2 Wet Ash (Initial Thru Stage 3)	$1,764,772	$1,835,363	$1,909,778	$1,985,129	$2,064,534	$2,147,116	$2,233,000	$23,189,868	$1,987,801
QA/QC For Construction Of Disposal	$39,578	$41,162	$42,808	$44,520	$46,301	$48,153	$50,079	$814,065	$188,038
Total Operating Costs	$ 2,172,396	$ 2,259,292	$ 2,349,663	$ 2,443,650	$ 2,541,396	$ 2,643,052	$ 2,748,774	$ 46,783,606	$ 10,629,977
Total Costs	$ 2,172,396	$ 2,259,292	$ 2,349,663	$ 2,443,650	$ 2,541,396	$ 2,643,052	$ 2,748,774	$ 71,006,014	$ 23,751,838

Present Worth of this Option $ 23,751,838

03/14/2009

ESCALATION TABLE: Contract Labor - T&L

TO

	1.045 2005	1.043 2006	1.039 2007	1.039 2008	1.038 2009	1.039 2010	1.039 2011	1.040 2012	1.040 2013	1.040 2014	1.040 2015	1.040 2016	1.040 2017	1.040 2018	1.040 2019	1.040 2020	1.040 2021	1.040 2022	1.040 2023	1.040 2024	1.040 2025	1.040 2026	1.040 2027	1.040 2028	1.040 2029
2005	1.000	1.043	1.084	1.126	1.169	1.214	1.262	1.312	1.365	1.419	1.476	1.535	1.596	1.660	1.727	1.796	1.868	1.942	2.020	2.101	2.185	2.272	2.363	2.458	2.556
2006		1.000	1.039	1.080	1.121	1.164	1.210	1.258	1.308	1.361	1.415	1.472	1.531	1.592	1.655	1.722	1.791	1.862	1.937	2.014	2.095	2.179	2.266	2.356	2.451
2007			1.000	1.039	1.078	1.121	1.164	1.211	1.259	1.310	1.362	1.416	1.473	1.532	1.593	1.657	1.723	1.792	1.864	1.939	2.016	2.097	2.181	2.268	2.359
2008				1.000	1.038	1.078	1.121	1.165	1.212	1.260	1.311	1.363	1.418	1.475	1.534	1.595	1.659	1.725	1.794	1.866	1.940	2.018	2.099	2.183	2.270
2009					1.000	1.039	1.080	1.123	1.168	1.214	1.263	1.313	1.366	1.421	1.477	1.536	1.598	1.662	1.728	1.797	1.869	1.944	2.022	2.103	2.187
2010						1.000	1.039	1.081	1.124	1.169	1.215	1.264	1.315	1.367	1.422	1.479	1.538	1.599	1.663	1.730	1.799	1.871	1.946	2.024	2.105
2011							1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948	2.026
2012								1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948
2013									1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873
2014										1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801
2015											1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732
2016												1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665
2017													1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601
2018														1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539
2019															1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480
2020																1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423
2021																	1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369
2022																		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316
2023																			1.000	1.040	1.082	1.125	1.170	1.217	1.265
2024																				1.000	1.040	1.082	1.125	1.170	1.217
2025																					1.000	1.040	1.082	1.125	1.170
2026																						1.000	1.040	1.082	1.125
2027																							1.000	1.040	1.082
2028																								1.000	1.040
2029																									1.000

	Cash Flows		NPV
2005	4,834,887		
2006	1,024,719		
2007	1,064,683		
2008	11,812,515		
2009	1,361,188		
2010	1,414,274	$	15,779,328
2011	1,469,431		
2012	1,528,208		
2013	1,589,336		
2014	1,652,910		
2015	6,456,126	$	19,574,386
2016	6,714,371		
2017	3,254,024		
2018	1,785,551		
2019	1,856,973		
2020	1,931,252		
2021	2,008,502		
2022	2,088,842		
2023	2,172,396		
2024	2,259,292		
2025	2,349,663		
2026	2,443,650		
2027	2,541,396		
2028	2,643,052		
2029	2,748,774	$	23,751,838

Case:	Base	
Location:	In Pond	
Governing Assumptions:		
Coal Supply	5 #	
Drainage Layer	Current Parsons design	
Gypsum Marketing	100% marketing after 2011	
Annual Gypsum Production		583,929
Net Gypsum to Pond		211,929
Annual Ash production		475,600
Ash production - 2005 to 2009		1,902,400
Available storage for wet ash and gypsum as of 2010		6,423,680
Years of pond capacity as of 2010		8
Year when dry collection required	2018	
Years of remaining pond capacity		23
Year pond capacity expires	2032	

327000	x	
2.8		5
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1176610		
2101090		
0.55999981	583928.8	

ESTIMATE NUMBER 05653O1R1

KINGSTON FOSSIL PLANT OPTION 1 - WET ASH IN POND GYPSUM ON PENINSULA

(WITHOUT POND BUFFER)

PRESENT WORTH

ITEM No.	DESCRIPTION	UNITS	Total Cost 2005 Dollars	Number of Cycles	2005 Dollars per Cycle	2005	2006	2007	2008	2009	2010	2011
	Escalation Factor					1.00	1.04	1.08	1.13	1.17	1.21	1.26
	CAPITAL COSTS											
1	Install Drains For Swan Pond Road	Lump Sum	$1,967,628	1	$1,967,628	$1,967,628						
4	Ash And Gypsum in Pond	Lump Sum	$582,456	1	$582,456	$582,456						
4A	Phase 2 Base Construction	Lump Sum	$5,598,822	1	$5,598,822				$6,303,940			
4B	Phase 3 Base Construction	Lump Sum	$2,155,779	1	$2,155,779							
5	Miscellaneous	Lump Sum	$1,686,836	3	$562,279	$562,279			$633,093			
5A	Dry Fly Ash Conversion	Lump Sum	$24,175,580	1	$24,175,580							
zz	Engineering	Lump Sum	$349,210	1	$349,210	$349,210						
	Total Capital Costs		$ 36,516,313			$ 3,481,573	$ -	$ -	$ 6,837,033	$ -	$ -	$ -
	OPERATING COSTS											
6	Dredge Cell Phase 1	Lump Sum	$12,624,840	12	$1,052,070	$1,052,070	$1,097,309	$1,140,104	$1,184,568	$1,229,582	$1,277,535	$1,327,359
10,11,12,13,18&19	Phase 2 Wet Gypsum (Initial Thru Stage 4)	Lump Sum	$5,188,249	20	$259,412					$303,182	$315,006	$327,291
14,15,16,17&20	Phase 3 Dry Ash (Initial Thru Stage 4)	Lump Sum	$17,748,174	12	$1,479,015							
	QA/QC For Construction Of Disposal Facility	Lump Sum	$746,424	24	$31,101	$31,101	$32,438	$33,703	$35,018	$36,349	$37,766	$39,239
	Total Operating Costs		$ 36,307,687			$ 1,083,171	$ 1,129,747	$ 1,173,807	$ 1,219,586	$ 1,569,112	$ 1,630,308	$ 1,693,890
	Total Costs		$ 72,824,000			$ 4,544,744	$ 1,129,747	$ 1,173,807	$ 8,156,619	$ 1,569,112	$ 1,630,308	$ 1,693,890

ITEM No.	DESCRIPTION	2012	2013	2014	2015	2016	2017	2018	2019	2020
	Escalation Factor	1.31	1.36	1.42	1.48	1.54	1.60	1.66	1.73	1.80
	CAPITAL COSTS									
1	Install Drains For Swan Pond Road									
4	Ash And Gypsum in Pond									
4A	Phase 2 Base Construction									
4B	Phase 3 Base Construction					$3,309,137				
5	Miscellaneous					$863,103				
5A	Dry Fly Ash Conversion					$0	$38,594,089			
zz	Engineering									
	Total Capital Costs	$ -	$ -	$ -	$ -	$ 4,172,240	$ 38,594,089	$ -	$ -	$ -
	OPERATING COSTS									
6	Dredge Cell Phase 1	$1,380,454	$1,435,672	$1,493,099	$1,552,823	$1,614,936	$1,679,533			
10,11,12,13,18&19	Phase 2 Wet Gypsum (Initial Thru Stage 4)	$340,383	$353,998	$368,158	$382,885	$398,200	$414,128	$430,893	$447,921	$465,838
14,15,16,17&20	Phase 3 Dry Ash (Initial Thru Stage 4)							$2,456,555	$2,553,777	$2,656,928
	QA/QC For Construction Of Disposal Facility	$40,809	$42,441	$44,139	$45,904	$47,740	$49,650	$51,636	$53,701	$55,849
	Total Operating Costs	$ 1,761,645	$ 1,832,111	$ 1,905,396	$ 1,981,611	$ 2,060,876	$ 2,143,311	$ 2,937,884	$ 3,055,399	$ 3,177,615
	Total Costs	$ 1,761,645	$ 1,832,111	$ 1,905,396	$ 1,981,611	$ 5,233,116	$ 40,737,400	$ 2,937,884	$ 3,055,399	$ 3,177,615

ITEM No.	DESCRIPTION	2021	2022	2023	2024	2025	2026	2027	2028	2029	Escalated SubTotal	PRESENT WORTH of using Capital Dollars
	Escalation Factor	1.87	1.94	2.02	2.10	2.18	2.27	2.36	2.46	2.56		
	CAPITAL COSTS											
1	Install Drains For Swan Pond Road										$1,967,628	$1,967,628
4	Ash And Gypsum in Pond										$582,456	$582,456
4A	Phase 2 Base Construction										$6,303,940	$4,144,943
4B	Phase 3 Base Construction										$3,309,137	$711,277
5	Miscellaneous										$2,058,475	$1,184,066
5A	Dry Fly Ash Conversion										$38,594,089	$7,213,511
zz	Engineering										$349,210	$349,210
	Total Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 53,164,935	$ 16,133,091
	OPERATING COSTS											
6	Dredge Cell Phase 1										$17,465,043	$8,016,829
10,11,12,13,18&19	Phase 2 Wet Gypsum (Initial Thru Stage 4)	$484,471	$503,850	$524,004	$544,964	$566,763	$589,433	$613,011	$637,531	$663,032	$9,674,745	$1,590,258
14,15,16,17&20	Phase 3 Dry Ash (Initial Thru Stage 4)	$2,762,165	$2,872,652	$2,987,558	$3,107,060	$3,231,343	$3,360,597	$3,495,020	$3,634,821	$3,780,214	$36,896,691	$2,923,812
	QA/QC For Construction Of Disposal Facility	$58,083	$60,407	$62,823	$65,336	$67,949	$70,667	$73,494	$76,434	$79,491	$1,292,167	$298,474
	Total Operating Costs	$ 3,304,720	$ 3,436,909	$ 3,574,385	$ 3,717,361	$ 3,866,055	$ 4,020,697	$ 4,181,525	$ 4,348,786	$ 4,522,738	$ 65,328,647	$ 12,829,370
	Total Costs	$ 3,304,720	$ 3,436,909	$ 3,574,385	$ 3,717,361	$ 3,866,055	$ 4,020,697	$ 4,181,525	$ 4,348,786	$ 4,522,738	$ 118,493,582	$ 28,962,461

Present Worth of this Option $ 28,962,461

ESCALATION TABLE: Contract Labor - T&L

TO

	1.045 2005	1.043 2006	1.039 2007	1.039 2008	1.038 2009	1.039 2010	1.039 2011	1.040 2012	1.040 2013	1.040 2014	1.040 2015	1.040 2016	1.040 2017
2005	1.000	1.043	1.084	1.126	1.169	1.214	1.262	1.312	1.365	1.419	1.476	1.535	1.596
2006		1.000	1.039	1.080	1.121	1.164	1.210	1.258	1.308	1.361	1.415	1.472	1.531
2007			1.000	1.039	1.078	1.121	1.164	1.211	1.259	1.310	1.362	1.416	1.473
2008				1.000	1.038	1.078	1.121	1.165	1.212	1.260	1.311	1.363	1.418
2009					1.000	1.039	1.080	1.123	1.168	1.214	1.263	1.313	1.366
2010						1.000	1.039	1.081	1.124	1.169	1.215	1.264	1.315
2011							1.000	1.040	1.082	1.125	1.170	1.217	1.265
2012								1.000	1.040	1.082	1.125	1.170	1.217
2013									1.000	1.040	1.082	1.125	1.170
2014										1.000	1.040	1.082	1.125
2015											1.000	1.040	1.082
2016												1.000	1.040
2017													1.000
2018													
2019													
2020													
2021													
2022													
2023													
2024													
2025													
2026													
2027													
2028													
2029													

	1.040 2018	1.040 2019	1.040 2020	1.040 2021	1.040 2022	1.040 2023	1.040 2024	1.040 2025	1.040 2026	1.040 2027	1.040 2028	1.040 2029
2005	1.660	1.727	1.796	1.868	1.942	2.020	2.101	2.185	2.272	2.363	2.458	2.556
2006	1.592	1.655	1.722	1.791	1.862	1.937	2.014	2.095	2.179	2.266	2.356	2.451
2007	1.532	1.593	1.657	1.723	1.792	1.864	1.939	2.016	2.097	2.181	2.268	2.359
2008	1.475	1.534	1.595	1.659	1.725	1.794	1.866	1.940	2.018	2.099	2.183	2.270
2009	1.421	1.477	1.536	1.598	1.662	1.728	1.797	1.869	1.944	2.022	2.103	2.187
2010	1.367	1.422	1.479	1.538	1.599	1.663	1.730	1.799	1.871	1.946	2.024	2.105
2011	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948	2.026
2012	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948
2013	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873
2014	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801
2015	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732
2016	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665
2017	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601
2018	1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539
2019		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480
2020			1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423
2021				1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369
2022					1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316
2023						1.000	1.040	1.082	1.125	1.170	1.217	1.265
2024							1.000	1.040	1.082	1.125	1.170	1.217
2025								1.000	1.040	1.082	1.125	1.170
2026									1.000	1.040	1.082	1.125
2027										1.000	1.040	1.082
2028											1.000	1.040
2029												1.000

	Cash Flows		NPV
2005	4,544,744		
2006	1,129,747		
2007	1,173,807		
2008	8,156,619		
2009	1,569,112		
2010	1,630,308	$	13,485,506
2011	1,693,890		
2012	1,761,645		
2013	1,832,111		
2014	1,905,396		
2015	1,981,611	$	16,510,466
2016	6,233,116		
2017	40,737,400		
2018	2,937,884		
2019	3,055,399		
2020	3,177,615		
2021	3,304,720		
2022	3,436,909		
2023	3,574,385		
2024	3,717,361		
2025	3,866,055		
2026	4,020,697		
2027	4,181,525		
2028	4,348,786		
2029	4,522,738	$	28,962,461

Case:	Reduced drainage layer	
Location:	In Pond	
Governing Assumptions:		
Coal Supply	2.8 #	
Drainage Layer		
Present cost in 2005 dollars -Phase 2		5,598,822
Present cost in 2005 dollars -Phase 3		2,155,779
Phase 2 cost with 50% reduction		**2,799,411**
Phase 3 cost with 50% reduction		**1,077,890**
Gypsum Marketing	**100% marketing after 2011**	
No gypsum disposal cost after 2011		
In Pond gypsum handling cost:		
Present cost over 20 years		5,188,249
Assume same cost as for peninsula - no increased cost through 2014		**3,644,075**
Fly Ash handling cost		
Present cost over 20 years		12,624,840
Assume same cost as for peninsula - no increased cost through 2014		**11,554,547**
Delay Dry Ash conversion		
Present year for dry ash conversion	2016	
Gypsum marketing - 2012-2016		1,309,440
Years of fly ash storage gained		2.75
Revised year for dry ash conversion	**2019**	
Reduced Fly Ash Handling cost		
Present cost/yr for dry ash handling		1,479,015
Revised cost for handling dense slurry based on conversation with JEA and Calvin Toney (1 dozer and 1 operator)		**250,000**

ESTIMATE NUMBER 05893O1R1

KINGSTON FOSSIL PLANT OPTION 1 - WET ASH IN POND GYPSUM ON PENINSULA

(WITHOUT POND BUFFER)

PRESENT WORTH

ITEM No.	DESCRIPTION	UNITS	Total Cost 2005 Dollars	Number of Cycles	2005 Dollars per Cycle	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Escalated SubTotal	PRESENT WORTH of using Capital Dollars
	Escalation Factor					1.00	1.04	1.08	1.13	1.17	1.21	1.26	1.31	1.36	1.42	1.48	1.54	1.60	1.66	1.73	1.80	1.87	1.94	2.02	2.10	2.18	2.27	2.36	2.46	2.56		
	CAPITAL COSTS																															
1	Install Drains For Swan Pond Road	Lump Sum	$1,967,628	1	$1,967,628	$1,967,628																									$1,967,628	$1,967,628
4	Ash And Gypsum In Pond	Lump Sum	$582,456	1	$582,456	$582,456																									$582,456	$582,456
4A	Phase 2 Base Construction	Lump Sum	$2,799,411	1	$2,799,411				$3,151,970																						$3,151,970	$2,072,471
4B	Phase 3 Base Construction	Lump Sum	$1,077,890	1	$1,077,890												$1,654,569														$1,654,569	$355,638
5	Miscellaneous	Lump Sum	$1,686,838	3	$562,279	$562,279			$633,093								$863,103														$2,058,475	$1,164,066
5A	Dry Fly Ash Conversion	Lump Sum	$24,175,580	1	$24,175,580															$41,743,366											$41,743,366	$5,899,534
zz	Engineering	Lump Sum	$349,210	1	$349,210	$349,210																									$349,210	$349,210
	Total Capital Costs		$ 32,639,013			$ 3,461,573	$ -	$ -	$ 3,785,063	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,517,672	$ -	$ -	$ 41,743,366	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 51,507,674	$ 12,391,804
	OPERATING COSTS																															
6	Dredge Cell Phase 1	Lump Sum	$11,554,547	12	$962,879	$962,879	$1,004,283	$1,043,450	$1,084,144	$1,125,342	$1,169,230	$1,214,830	$1,263,423	$1,313,960	$1,366,519	$1,421,179	$1,478,027	$1,537,148	$1,598,633	$1,662,579											$19,245,625	$7,831,980
10,11,12,13,18&19	Phase 2 Wet Gypsum (Initial Thru Stage 4)	Lump Sum	$3,644,075	20	$182,204					$212,946	$221,251	$229,880	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$664,077	$331,137
14,15,16,17&20	Phase 3 Dry Ash (Initial Thru Stage 4)	Lump Sum	$3,000,000	12	$250,000													$0	$0	$431,669	$448,935	$466,893	$485,569	$504,991	$525,191	$546,199	$568,047	$590,768	$614,399	$638,975	$5,821,636	$426,756
	QA/QC For Construction Of Disposal Facility	Lump Sum	$746,424	24	$31,101	$31,101	$32,436	$33,703	$35,018	$36,349	$37,766	$39,239	$40,809	$42,441	$44,139	$45,904	$47,740	$49,650	$51,636	$53,701	$55,849	$58,083	$60,407	$62,823	$65,336	$67,949	$70,667	$73,494	$76,434	$79,491	$1,292,167	$298,474
	Total Operating Costs		$ 18,945,046			$ 993,880	$ 1,036,721	$ 1,077,153	$ 1,119,162	$ 1,374,637	$ 1,428,247	$ 1,483,949	$ 1,304,232	$ 1,356,401	$ 1,410,657	$ 1,467,083	$ 1,525,767	$ 1,586,797	$ 1,650,269	$ 2,147,949	$ 504,785	$ 524,976	$ 545,975	$ 567,814	$ 590,527	$ 614,149	$ 638,714	$ 664,262	$ 690,833	$ 718,466	$ 27,023,506	$ 8,888,348
	Total Costs		$ 51,584,059			$ 4,455,553	$ 1,036,721	$ 1,077,153	$ 4,904,225	$ 1,374,637	$ 1,428,247	$ 1,483,949	$ 1,304,232	$ 1,356,401	$ 1,410,657	$ 1,467,083	$ 4,043,439	$ 1,586,797	$ 1,650,269	$ 43,891,315	$ 504,785	$ 524,976	$ 545,975	$ 567,814	$ 590,527	$ 614,149	$ 638,714	$ 664,262	$ 690,833	$ 718,466	$ 78,531,181	$ 21,279,352

Present Worth of this Option $ 21,279,352

03/14/2009

ESCALATION TABLE: Contract Labor - T&L

TO

	1.045 2005	1.043 2006	1.039 2007	1.039 2008	1.038 2009	1.039 2010	1.039 2011	1.040 2012	1.040 2013	1.040 2014	1.040 2015	1.040 2016
2005	1.000	1.043	1.084	1.126	1.169	1.214	1.262	1.312	1.365	1.419	1.476	1.535
2006		1.000	1.039	1.080	1.121	1.164	1.210	1.258	1.308	1.361	1.415	1.472
2007			1.000	1.039	1.078	1.121	1.164	1.211	1.259	1.310	1.362	1.416
2008				1.000	1.038	1.078	1.121	1.165	1.212	1.260	1.311	1.363
2009					1.000	1.039	1.080	1.123	1.168	1.214	1.263	1.313
2010						1.000	1.039	1.081	1.124	1.169	1.215	1.264
2011							1.000	1.040	1.082	1.125	1.170	1.217
2012								1.000	1.040	1.082	1.125	1.170
2013									1.000	1.040	1.082	1.125
2014										1.000	1.040	1.082
2015											1.000	1.040
2016												1.000
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												
2026												
2027												
2028												
2029												

	1.040 2017	1.040 2018	1.040 2019	1.040 2020	1.040 2021	1.040 2022	1.040 2023	1.040 2024	1.040 2025	1.040 2026	1.040 2027	1.040 2028	1.040 2029
2005	1.596	1.660	1.727	1.796	1.868	1.942	2.020	2.101	2.185	2.272	2.363	2.458	2.556
2006	1.531	1.592	1.655	1.722	1.791	1.862	1.937	2.014	2.095	2.179	2.266	2.356	2.451
2007	1.473	1.532	1.593	1.657	1.723	1.792	1.864	1.939	2.016	2.097	2.181	2.268	2.359
2008	1.418	1.475	1.534	1.595	1.659	1.725	1.794	1.866	1.940	2.018	2.099	2.183	2.270
2009	1.366	1.421	1.477	1.536	1.598	1.662	1.728	1.797	1.869	1.944	2.022	2.103	2.187
2010	1.315	1.367	1.422	1.479	1.538	1.599	1.663	1.730	1.799	1.871	1.946	2.024	2.105
2011	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948	2.026
2012	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873	1.948
2013	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801	1.873
2014	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732	1.801
2015	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665	1.732
2016	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601	1.665
2017	1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539	1.601
2018		1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480	1.539
2019			1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423	1.480
2020				1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369	1.423
2021					1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316	1.369
2022						1.000	1.040	1.082	1.125	1.170	1.217	1.265	1.316
2023							1.000	1.040	1.082	1.125	1.170	1.217	1.265
2024								1.000	1.040	1.082	1.125	1.170	1.217
2025									1.000	1.040	1.082	1.125	1.170
2026										1.000	1.040	1.082	1.125
2027											1.000	1.040	1.082
2028												1.000	1.040
2029													1.000

	Cash Flows		NPV
2005	4,455,553		
2006	1,036,721		
2007	1,077,153		
2008	4,904,225		
2009	1,374,637		
2010	1,428,247	$	10,892,184
2011	1,483,949		
2012	1,304,232		
2013	1,356,401		
2014	1,410,657		
2015	1,467,083	$	13,231,093
2016	4,043,439		
2017	1,586,797		
2018	1,650,269		
2019	43,891,315		
2020	504,785		
2021	524,976		
2022	545,975		
2023	567,814		
2024	590,527		
2025	614,148		
2026	638,714		
2027	664,262		
2028	690,833		
2029	718,466	$	21,279,352

Haber, Stanley M

From: Purkey, Ronald E.
Sent: Monday, February 07, 2005 10:14 AM
To: Myers, Thomas J.; Kimsey, Barry A.
Cc: Renfroe, Bret; Haber, Stanley M.; Miller, Evelyn C.; Baugh, James S.; Radford, Larry D.; Latsch, Mitchell D.; Hedgecoth, Melissa A.; Deskins, Earl L; Campbell, Linda F.; Preslar, Jacky D.; Rehberg, Robert L.; Bowers, Larry C; Petty, Harold L.; Nuyt, Gary M.; Petty, Harold L.
Subject: RE: KIF Dry Fly Ash Estimate

Tom,
The $2M was the electrical estimate of not having to provide a transformer and associated equipment. The electrical feeds and controls and other electrical work outside the power sources would still be outside the scope of the scrubber and to DFA's account. This has been discussed on other occasions and maybe you were not present.

Barry,
Do you have anything to add to my coment?
Ron

-----Original Message-----
From: Myers, Thomas J.
Sent: Monday, February 07, 2005 10:07 AM
To: Purkey, Ronald E.
Cc: Renfroe, Bret; Haber, Stanley M.; Miller, Evelyn C.; Baugh, James S.; Radford, Larry D.; Latsch, Mitchell D.; Hedgecoth, Melissa A.; Deskins, Earl L; Campbell, Linda F.; Preslar, Jacky D.; Rehberg, Robert L.; Bowers, Larry C; Petty, Harold L.; Nuyt, Gary M.; Petty, Harold L.
Subject: RE: KIF Dry Fly Ash Estimate

Ron,
In looking at the attached, there are two line items that would be picked up by the KIF Scrubber Project **IF** the Scrubber Project was implemented before the Dry Fly Ash Project. Those items are the 161-kV feed (shown in your estimate at $5.6MM) and the 161-kV Transformer (shown in your estimate at $619k). The Scrubber Project would provide space as necessary for items such as additional switchgear in the Scrubber electrical room and provide a feeder off of the 161-kV transformer, but would expect the Dry Fly Ash Project to pick up the cost of all of the remaining additional medium and low voltage switchgear and connections.

That having been said, we are not sure how you arrived at the $2MM credit mentioned for the fly ash project in one of the options discussed at KIF on January 27. It would appear based on these numbers that the credit would be $6.2MM (the estimated value of the two line items mentioned above) which could sway the resulting NPV's in your option cost comparisons.

Please let me know if we have missed something or if you have any questions or comments.

Tom
Thomas J. Myers, PMP
FGD Turnkey Project Manager
TVA Fossil Projects

LP 2T - C
Phone: 423-751-3415
Fax: 423-751-6116
E-Mail: tjmyers@tva.gov

-----Original Message-----
From: Purkey, Ronald E.
Sent: Tuesday, February 01, 2005 2:44 PM
To: Haber, Stanley M.; Miller, Evelyn C.; Baugh, James S.; Radford, Larry D.; Latsch, Mitchell D.; Hedgecoth, Melissa A.; Deskins, Earl L; Campbell, Linda F.; Preslar, Jacky D.; Rehberg, Robert L.; Bowers, Larry C; Petty, Harold L.; Nuyt, Gary M.; Myers, Thomas J.; Petty, Harold L.
Cc: Renfroe, Bret
Subject: KIF Dry Fly Ash Estimate

Per my action item in the Meeting last Thursday, I have attached the Dry Ash estimate for Kingston. Bret Renfroe did the estimate and will be glad to discuss any item with you.
Thanks.

Ron Purkey

Haber, Stanley M

From: Myers, Thomas J.

Sent: Monday, February 07, 2005 10:07 AM

To: Purkey, Ronald E.

Cc: Renfroe, Bret; Haber, Stanley M.; Miller, Evelyn C.; Baugh, James S.; Radford, Larry D.; Latsch, Mitchell D.; Hedgecoth, Melissa A.; Deskins, Earl L; Campbell, Linda F.; Preslar, Jacky D.; Rehberg, Robert L.; Bowers, Larry C; Petty, Harold L.; Nuyt, Gary M.; Petty, Harold L.

Subject: RE: KIF Dry Fly Ash Estimate

Attachments: KIF Fly Ash Estimate.pdf

Ron,
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Tom

Thomas J. Myers, PMP
FGD Turnkey Project Manager
TVA Fossil Projects
LP 2T - C
Phone: 423-751-3415
Fax: 423-751-6116
E-Mail: tjmyers@tva.gov

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From: Purkey, Ronald E.
Sent: Tuesday, February 01, 2005 2:44 PM
To: Haber, Stanley M.; Miller, Evelyn C.; Baugh, James S.; Radford, Larry D.; Latsch, Mitchell D.; Hedgecoth, Melissa A.; Deskins, Earl L; Campbell, Linda F.; Preslar, Jacky D.; Rehberg, Robert L.; Bowers, Larry C; Petty, Harold L.; Nuyt, Gary M.; Myers, Thomas J.; Petty, Harold L.
Cc: Renfroe, Bret
Subject: KIF Dry Fly Ash Estimate

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Thanks.

Ron Purkey

Haber, Stanley M

From: Renfroe, Bret
Sent: Monday, February 07, 2005 10:02 AM
To: Purkey, Ronald E.; Davis, Victor W.
Cc: Haber, Stanley M.; Harless, J. Larry; Peterson, Leonard J.; Hedgecoth, Melissa A.; Murray, David B.
Subject: RE: KIF Dry Fly Ash Estimate

Ron,

Based on Victor's response of no Mechanical contract admin.and review or mechanical BOP, the basis of the estimate is the quote from UCC and Electrical feeds to power the system proposed by UCC.

Bret Renfroe
Cost Estimating
Ph: 423-751-7684
Fx: 423-751-4295

-----Original Message-----
From: Purkey, Ronald E.
Sent: Monday, February 07, 2005 9:44 AM
To: Renfroe, Bret
Cc: Haber, Stanley M.
Subject: FW: KIF Dry Fly Ash Estimate

Please respond to Victor and myself. Thanks.

Ron

-----Original Message-----
From: Davis, Victor W.
Sent: Monday, February 07, 2005 7:36 AM
To: Purkey, Ronald E.
Subject: RE: KIF Dry Fly Ash Estimate

I don't see anything in this for Mechanical contract admin.and review or mechanical BOP

-----Original Message-----
From: Purkey, Ronald E.
Sent: Thursday, February 03, 2005 3:05 PM
To: Haber, Stanley M.; Davis, Victor W.
Subject: RE: KIF Dry Fly Ash Estimate

Stan - it's all right - I will send one

Victor - for your viewing pleasure

Ron

-----Original Message-----
From: Haber, Stanley M.

Sent: Thursday, February 03, 2005 3:03 PM
To: Purkey, Ronald E.
Subject: RE: KIF Dry Fly Ash Estimate

Don't you think that he should get a copy?

-----Original Message-----
From: Purkey, Ronald E.
Sent: Thursday, February 03, 2005 3:00 PM
To: Haber, Stanley M.
Subject: RE: KIF Dry Fly Ash Estimate

no, Bret used the vendor's info as he had gotten the ash from TVA facilities to silo turnkey.

-----Original Message-----
From: Haber, Stanley M.
Sent: Thursday, February 03, 2005 10:24 AM
To: Purkey, Ronald E.
Cc: Petty, Harold L.
Subject: RE: KIF Dry Fly Ash Estimate

Ron,

Did the Mechanical section review this to ensure that it was complete from their perspective?

Stan

-----Original Message-----
From: Purkey, Ronald E.
Sent: Tuesday, February 01, 2005 2:44 PM
To: Haber, Stanley M.; Miller, Evelyn C.; Baugh, James S.; Radford, Larry D.; Latsch, Mitchell D.; Hedgecoth, Melissa A.; Deskins, Earl L; Campbell, Linda F.; Preslar, Jacky D.; Rehberg, Robert L.; Bowers, Larry C; Petty, Harold L.; Nuyt, Gary M.; Myers, Thomas J.; Petty, Harold L.
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Ron Purkey

Haber, Stanley M

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Cc: Haber, Stanley M.
Subject: FW: KIF Dry Fly Ash Estimate

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Subject: RE: KIF Dry Fly Ash Estimate

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Sent: Thursday, February 03, 2005 3:05 PM
To: Haber, Stanley M.; Davis, Victor W.
Subject: RE: KIF Dry Fly Ash Estimate

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Victor - for your viewing pleasure

Ron

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From: Haber, Stanley M.
Sent: Thursday, February 03, 2005 3:03 PM
To: Purkey, Ronald E.
Subject: RE: KIF Dry Fly Ash Estimate

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From: Purkey, Ronald E.
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To: Haber, Stanley M.
Subject: RE: KIF Dry Fly Ash Estimate

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Cc: Renfroe, Bret
Subject: KIF Dry Fly Ash Estimate

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Thanks.

Ron Purkey

Haber, Stanley M

From: Baugh, James S.

Sent: Monday, February 07, 2005 7:48 AM

To: Purkey, Ronald E.

Cc: Hedgecoth, Melissa A.; Haber, Stanley M.

Subject: RE: KIF update

We will schedule the conference call for a time that you can attend.

-----Original Message-----
From: Purkey, Ronald E.
Sent: Monday, February 07, 2005 7:04 AM
To: Baugh, James S.; Haber, Stanley M.
Subject: RE: KIF update

i have meeetings from 7-10am and at 3 pm

-----Original Message-----
From: Baugh, James S.
Sent: Friday, February 04, 2005 3:57 PM
To: Purkey, Ronald E.; Haber, Stanley M.
Cc: Lundy, Dennis L.
Subject: KIF update

We have completed the sensitivity analyses on pond vs peninsula at KIF that we discussed earlier this week. I would like to review the analysis summary on Monday morning, then send it to you for comments.

The conference call with UCC to resolve issues on the estimate for dry ash collection is scheduled for Monday.

Let me know if you have any questions.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Haber, Stanley M

From: Purkey, Ronald E.

Sent: Monday, February 07, 2005 7:04 AM

To: Baugh, James S.; Haber, Stanley M.

Subject: RE: KIF update

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To: Purkey, Ronald E.; Haber, Stanley M.
Cc: Lundy, Dennis L.
Subject: KIF update

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Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Haber, Stanley M

From: Purkey, Ronald E.
Sent: Monday, February 07, 2005 6:59 AM
To: Haber, Stanley M.
Subject: FW: KIF - Drainage Blanket - Need for Stability Decision
Attachments: Bottom Drainage Memo.doc; KIF Blanket drain paper.doc

fyi
-----Original Message-----
From: Purkey, Ronald E.
Sent: Friday, February 04, 2005 2:51 PM
To: Lundy, Dennis L.
Subject: KIF - Drainage Blanket - Need for Stability Decision

Dennis,

I have put our position on the blanket drain below.

Here is the history of the blanket drain:

TVA had a precedence for a blanket drain with the TDEC at CUF. The requirement for a geologic buffer and liner is in the TDEC regulations. We are using the blanket drain to intercept water and minimize effects to groundwater.

In both the 10% and 50% design review (in May 04) meetings, the blanket drain below the ash stack for the in pond option was presented. The blanket drain had 2 distinct purposes:

1. It was required for stability based upon Parson's design - i.e. something less would be technically unacceptable

2. The Hydro/Geo model used the blanket drain and Environmental Affairs will use it effectively in their "in lieu of a liner" requests to the TDEC (draft position paper from EA attached).

In November 04, the cost of the blanket drain vs. something less came up for the first time. We estimated at that time the differential cost was $1.5 Million - we didn't do a formal estimate. Based on GeoSyntec's estimate the cost is more like 25-40% of $6,000,000, with the savings potential (if we could ever get a design and it permitted) of $1.5 to 2.4 million.

Geosyntec has stated that they think something less may be used (Bottom Drain Memo from Geosyntec attached). There is some degree of uncertainty attached to it.

Parsons will not accept something less than a full drainage blanket because of their assumptions (see discussion below)

Re-doing the design (estimate $150,000) and revising the hydrogeo and permit application ($25,000) will be required.

Here is our position taking all factors in-hand:

We have carefully reviewed each design/proposal and support Parsons claim that the drainage layer is required for stability reasons. I do believe we have adequate input to make an informed decision.

Parsons arguments as follows supports this decision:

1. The water table is high within the ash stack demonstrated by an exploratory boring (Location B4) 0 blow counts (soup not soil) and the seemingly unlimited outflow of water in the Swan Pond Road seep.

2. The potential of the pond to collapse from within for seismic conditions

3. The difficulty in predicting the state of dredged ash at any one time

4. The new cells being 100+ feet higher than the ones we now have

5. Hydraulic conductivity of water in the ash is significantly aided by a full, continuous drainage layer. This results in quicker consolidation and more space to place more ash.

6. Future raisings of the ash storage may hinge on the blanket drain at the bottom being present.

7. A quick drainage period is essential for long term stability

Geosyntec Proposal (attached) Comments:

1. Figure 3's results are optimistic and data blow counts indicate saturation lives much longer - i.e. the effective saturation layers are apparently much longer lasting than we can predict

2. Savings potentials predicted were 25-40% with an open ended array of potential alternatives which would add to the complexity of pond construction.

3. Their points are well intended, but a more conservative approach in light of recent events at KIF are preferred. The faster the stack drains the more stable it will be.

GEOSYNTEC CONSULTANTS
1255 Roberts Blvd., Suite 200
Kennesaw, Georgia 30144
Tel (678) 202-9500 Fax (678) 202-9501

Memorandum

To: Mr. Ron Purkey, P.E. – TVA
From: Neil Davies and Bob Bachus – GeoSyntec
Date: 4 February 2005
Subject: **Bottom Drainage Layer Alternatives, Proposed Dredge Cell Lateral Expansion, Kinston Fossil Plant**

Background

This memorandum relates to recent discussions held between representatives of TVA, Parsons and GeoSyntec related to the bottom drainage layer of the proposed Dredge Cell Lateral Expansion at TVA's Kingston Fossil Plant, located in Kingston , TN. Representatives of GeoSyntec Consultants, (GeoSyntec) participated in a conference call on February 2, 2005 to discuss potential alternative approaches to the currently proposed design as represented on drawings prepared by Parsons. At the conclusion of the conference call, Mr. Ron Purkey (TVA) asked if GeoSyntec considered that other more cost effective alternatives to the currently designed system would be feasible in terms of addressing stability of the disposal facility. Mr. Purkey further requested that GeoSyntec provide an opinion of the magnitude of potential savings and provide this information to TVA by February 4, 2005.

Summary of the Issue

Based on information discussed during the above referenced telephone conference, it is our understanding that Parsons believes that a continuous drainage blanket is required across the entire base of the proposed lateral expansion. This is illustrated on the project drawings (specifically, Drawing no. 10W435-64). During the conference call, Parsons stated that the drainage layer is needed to address both seismic stability and environmental concerns. Further, in Section 9.2.6 of Parsons' responses to GeoSyntec's review comment s on the Kingston Dredge Cell Lateral Expansion, it is stated that,

> *"The upper two layers are provided to keep the phreatic surface from rising above the top drainage layer and not to drain the entire ash or gypsum stack column between two layers. It should be noted that the effective stress stability evaluation for the wet stack operation assumes that the phreatic surface is at the top bottom ash drainage layer (Elev. 930 feet) for the end of construction case. Thus the entire gypsum column is assumed to be submerged in water below Elev. 930 feet, except near the outer slope where the water is drained by the perimeter drain system and more pervious perimeter dikes. Therefore, it is actually not necessary to calculate the required vertical spacing of the drainage layers"*

Based on this statement, it would appear that Parsons did not specifically rely upon the presence of the bottom drainage layer in their stability evaluations. It is not completely clear to us what specific water pressure conditions were and were not considered in the Parsons analysis. Regardless of the specific assumed design conditions, GeoSyntec concurs with other statements made by Parsons in this document that the presence of a continuous bottom ash layer will facilitate drainage of the bottom ash column drains and consolidation of interior ash and/or gypsum. The primary questions relate to: (i) the lateral extent of the drainage features; and (ii) whether there are alternative and less expensive designs for the bottom drainage layer that will provide comparable performance to the proposed design.

Potential Alternative Bottom Drainage Layer Designs

GeoSyntec believes that other more cost-effective methods are available to TVA for the purpose of providing drainage at the base of the stack. During the conference call, we suggested that a drainage blanket that extends over a part of the lateral expansion footprint might be equally effective in terms of providing adequate drainage to address static and seismic stability concerns. To illustrate this point, GeoSyntec performed some simplistic seepage analyses using SEEP/W. Graphical output is provided below to facilitate discussion. Note that these analyses are intentionally simplistic are provided for comparison purposes only, and are not intended for design purposes. The effects of perimeter drains above the bottom drainage layer are intentionally not included in these simplified analyses to better illustrate the action of the bottom drainage layer.

In both cases, we modeled the lateral expansion as a simple trapezoid with dimensions of 1,000 ft x 2,000 ft x 165 ft high (representative of raising the stack from elevation 765 to elevation 930 feet). In addition, we simplified the problem to a two-dimensional problem, as illustrated in the figures below. Note that this simplification will likely result in a conservative estimate of drainage rates since the problem is clearly three-dimensional.

In Case 1 (Figure 1), we modeled the effect of a highly permeable base drain across the entire footprint of the stack. The material was assumed to be saturated at year 0. As illustrated in Figure 1(below), the phreatic surface at the center of the impoundment is lowered to an elevation within the lower third of the height within a five year period, while the water level at the edges lowers more rapidly.

In Case 2, we modeled the effect of a highly permeable drainage blanket that would extend 300 feet inwards from the toe of the slope on three sides (Figure 2). As in Case 1, the material was assumed to be saturated at year 0. Using the dimensions indicated, the area of the drainage blanket used in Case 2 is approximately 50 percent of the total footprint of the base. Figure 3 indicates that under this configuration, a 300-foot wide base drain located around the perimeter is very effective at lowering the phreatic surface

1255 Roberts Blvd., Suite 200
Kennesaw, Georgia 30144
Tel (678) 202-9500 Fax (678) 202-9501

within 200 feet of the face of the slopes. The rate that the water level lowers at the edges is comparable to the rate for the complete bottom drainage layer shown in Figure 1. The phreatic surface within the interior of the fill is lowered to an elevation within the lower third of the height within a ten to fifteen year period. While this is slower dissipation than the full coverage drain, the partial drainage blanket is shown to be effective at lowering the level within the entire impoundment. If the blanket drain is extended further towards the center of the fill, the phreatic surface moves farther from the face of the slope and the rate at which the phreatic surface is lowered within the interior of the fill increases. The actual design extent of the partial drain would be determined during the final design, but this simple model demonstrates that a partial blanket drain can be highly effective at lowering the phreatic surface, while providing significant potential cost savings..

The simple analysis models presented in the previous figures were re-run utilizing different values for hydraulic conductivity for the bottom drain material. While these results are not specifically shown, it is interesting to note that in each of the models that we ran, the hydraulic conductivity of the drainage layer significantly influenced the rate of drainage (i.e., the effective hydraulic conductivity of the drainage layer may control the drainage rate). This indicates the importance of the hydraulic conductivity of the bottom drainage material. In the event that a highly permeable bottom drain cannot be provided, it will be necessary to compensate for the lower hydraulic conductivity by using relatively closely spaced perforated pipes within the drainage media to assure the effectiveness of the bottom drain.

Based on the results of the simple modeling performed for presentation in this memorandum, GeoSyntec believes that that there are a number of potential alternative approaches available to TVA to address base drainage of the proposed lateral expansion at Kingston. These include, but are not limited to:

- modifying the extent of the proposed bottom drainage layer; our very preliminary and simplistic evaluations indicate that it may be feasible to reduce the size of this layer by up to 50 percent without compromising static or seismic stability;
- use of geotextile-wrapped bottom ash "fingers" or "tubes" constructed on a geocomposite drainage layer and compacted low permeability fly ash; and
- various combinations of a bottom drainage layer covering a partial area of the footprint supplemented by geosynthetic drainage strips.

GeoSyntec also understands that the bottom drainage layer, as designed, is also intended to serve as a hydrogeologic buffer. If the drainage layer is modified, then it will be necessary to evaluate the performance of alternative proposals in terms of their ability to

1255 Roberts Blvd., Suite 200
Kennesaw, Georgia 30144
Tel (678) 202-9500 Fax (678) 202-9501

satisfy permit requirements. This would typically be done using one of the following methods:

- perform an "equivalency demonstration" with the objective of demonstrating that the flux moving through the base is equivalent (or close) to the "as designed" system; or

- perform a fate and transport analysis of the specific constituents of concern (COCs) to demonstrate that environmental impacts are within acceptable ranges.

Utilizing the properties of compacted fly ash and by incorporating elements of drainage system design (e.g., slope and hydraulic conductivity of the drainage blanket), we are confident that an equivalency demonstration can be made. This demonstration would be a component of the bottom layer drainage design modification described above.

Seismic Stability Considerations

We also believe that the specific design details for the drainage layer at the bottom of the cell and around the perimeter of the facility may have a profound impact of the calculated seismic slope stability. GeoSyntec recommends that the assessment of the optimized drainage include a detailed re-evaluation of the seismic slope stability. This recommendation is made for two reasons: (i) significant changes to drainage features will have a direct influence on stability; and (ii) there is a chance that the Tennessee Division of Solid Waste (TDSW) may request consideration (or at least a comment regarding) larger ground motions than reflected in the current permit documents. A discussion related to this recommendation follows.

The current seismic analysis of global slope stability has been conducted utilizing a pseudo-static analysis methodology. This is the most common analysis method for assessing global slope stability due to a seismic event and the methodology is appropriate for the proposed lateral expansion at Kingston. In this analysis method, the ground motions from a seismic event are simulated by applying an external horizontal force to the analyzed slope and then proceeding with a conventional static global slope stability analysis. The biggest challenge facing the designer/engineer is the selection of the external horizontal force that is representative of the ground motions from the design earthquake. The horizontal force is simulated by selecting an appropriate seismic coefficient. In simplified seismic analyses where relatively small ground accelerations are realized, the seismic coefficient is commonly assumed to be a fraction of the peak ground acceleration (PGA) in bedrock for the earthquake that has been found to have a two percent chance of exceedance in 50 years. This is the approach taken by Parsons for

1255 Roberts Blvd., Suite 200
Kennesaw, Georgia 30144
Tel (678) 202-9500 Fax (678) 202-9501

Kingston and presented in Attachment 5 titled "Peak Ground Acceleration Evaluation". For global slope stability, the design appears to consider a bedrock PGA of 0.22g and a pseudo-static seismic coefficient of 0.11g (i.e., a 50 percent reduction in the bedrock PGA) in the subsequent global pseudo-static slope stability analyses. This approach follows traditionally accepted geotechnical practice, but is recognized as having the potential to be overly conservative because it does not account for the attenuation of the ground motion as it interacts with the materials through which the seismic motions propagate.

It is GeoSyntec's experience that for projects where the PGA is greater than approximately 0.20g, it is common for the seismic global slope stability analysis to govern the design. This appears to, in fact, be the case for Kingston , where the calculated global static factor of safety reduced from approximately 1.6 to 1.1 when seismic loading was considered.

In cases where a pseudo-static seismic analysis is demonstrated to have a significant impact on the calculated slope stability analysis results, GeoSyntec typically recommends that a site-specific seismic response analysis be conducted to more realistically assess the ground motions within the impacted earth structure. The objective of this assessment is to develop ground motion signatures that consider the geometry of the slope, the engineering properties of the foundation soils, and the physical properties of materials used to construct the analyzed earth structure, and (in the case of Kingston) the impounded materials. In this way, a more realistic estimate to the ground motions can be recognized. During the site-specific assessment, the actual geometry and physical properties of the earth structure (in this case the dredged ash basins and the compacted ash/gypsum perimeter berms) are considered and a numerical simulation is performed to model the propagation of the PGA applied at the bedrock surface upward through the dredged ash. In this way, the actual damping/acceleration of the bedrock PGA by the impounded ash can be simulated and assessed. Depending on the frequency content of the design earthquake and the properties of the impounded ash, it may be shown that the impounded ash is effective at damping (or accelerating) the ground motions. The analysis results are then assessed to quantify the average ground motion and an appropriate pseudo-static seismic coefficient can be calculated and used in subsequent slope stability calculations. Again, the goal of this procedure is to develop a more realistic representation of the anticipated ground motions that can be used in future slope stability calculations.

As mentioned, GeoSyntec has utilized the approach of conducting seismic response analyses and in some cases seismic deformation analyses for slopes across the U.S. when PGA values greater than approximately 0.20g are considered. This is the most common case in the western U.S. where bedrock PGA values greater than 0.60g are common. This approach seems to be appropriate for Kingston facility because of the indicated sensitivity of the calculated factor of safety to the selected design ground motion and because of the somewhat unique properties of the impounded ash/gypsum. It may even

GEOSYNTEC CONSULTANTS
1255 Roberts Blvd., Suite 200
Kennesaw, Georgia 30144
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be more important for the Kingston facility, where the bedrock PGA considered by the designers appears to be 0.22g in accordance with guidance documents prepared by TDSW (1993) and U.S. Environmental Protection Agency (USEPA, 1995).

It is important to note that the above referenced documents relied on assessments of bedrock PGA values presented in documents prepared by the United States Geological Survey (USGS) dated 1991. More recent USGS publications (i.e., 2002) present revised bedrock PGA values that have recently been required by regulatory agencies, although not explicitly incorporated into the TDSW guidance documents. Considerations of these revised ground motions were required by TDSW in a permit application for a facility in Memphis prepared by GeoSyntec in 2003, primarily due to the close proximity of the Memphis site to the New Madrid Fault zone. In the case of Kingston, Tennessee, the revised bedrock PGA shown in the more recent USGS publication is approximately 0.27g, representing an increase in ground motion of more than 20 percent compared to the previously considered ground motions. GeoSyntec is not aware of any actions by TDSW that will require that seismic slope stability analyses be conducted using the revised ground motions, but we believe that if supplemental analyses are to be conducted, it would be to TVA's best interest to at least be aware of the impacts of the revised ground motions. In the extreme case (and one which we feel is not likely), if revised calculations are required, then the design presented in the current permit package may be deemed deficient, necessitating a re-evaluation of the seismic stability. Because of the potential consequence of this, we believe that at a minimum, analyses utilizing the revised ground motions should be performed.

While the consideration of a more representative site seismic response and (potentially) increased design ground motions may adversely impact the seismic stability of the current design, GeoSyntec believes that refined seismic analyses are warranted and that they will ultimately benefit TVA. These analyses may include seismic response analyses as well as seismic deformation analyses. These analyses will be coupled with design considerations regarding the selected drainage features around the perimeter and along a portion of the bottom of the facility. Based on experience on a range of similar projects, GeoSyntec believes that a cost-effective and stable design can be demonstrated for the Kingston facility. We note that in a recent project for a large earth dam in North Georgia, GeoSyntec demonstrated that the use of more robust seismic analyses resulted in a much more efficient and less expensive design than the design developed (by others) utilizing the simplified seismic slope stability analysis procedures. Of equal importance, however, GeoSyntec recognizes that any modification of the analysis methods recommended in the TDSW guidance documents must be thoroughly supported and presented to the agency. GeoSyntec has utilized site-specific analysis results and seismic response techniques for the previously referenced Memphis project that was impacted by its proximity to the New Madrid Fault zone. For the Memphis project, GeoSyntec developed supporting documentation and presented analysis results that were accepted and approved by TDSW. GeoSyntec enjoys a tremendous professional relationship with the TDSW technical staff and is confident that a technically compelling demonstration to TDSW can be developed and approved, if the revised analysis results for Kingston differ from those presented in the dated TDSW and USEPA guidance documents.

Summary and Recommendations

In summary, GeoSyntec recommends that TVA perform an evaluation of bottom drainage alternatives. The evaluation would address the following items, at a minimum:

- cost benefit analysis of various drainage configurations;
- re-evaluation of the hydrogeologic buffer requirements together with an equivalency demonstration or fate and transport analysis to address permit requirements; and
- re-evaluation of global static and seismic stability following selection of any revisions to the bottom drainage.

Based on the very preliminary analyses presented herein, we believe that potential savings of the order of 25 to more than 40 percent of the cost to construct the currently proposed bottom drainage layer may be achievable. However, additional analysis and evaluation will be required to confirm this preliminary opinion. We are confident that significant savings can be realized.

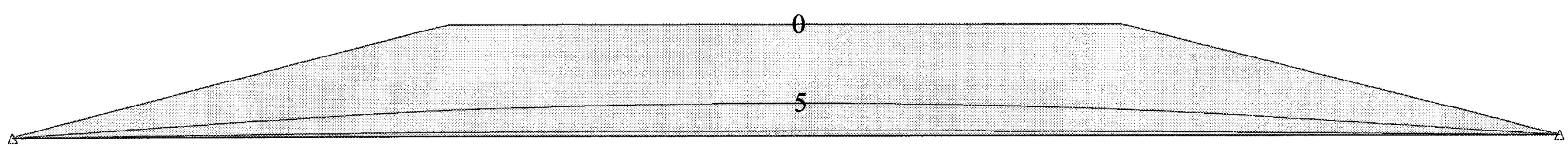
GeoSyntec believes that the evaluations and analyses described herein could be completed within approximately three to four weeks. Depending upon the level of analyses needed and interaction with other team members, the estimated cost to perform this work is likely in the range $40,000 to $55,000. Note this is a quick “guesstimate” to aid TVA in decision making.

Should you have any questions regarding any of the information provided in this memorandum, please do not hesitate to contact either of us. We appreciate the opportunity to work with your team on the Kingston project.

1255 Roberts Blvd., Suite 200
Kennesaw, Georgia 30144
Tel (678) 202-9500 Fax (678) 202-9501

Figure 1

Case I: Drainage layer constructed along the entire base of the dredged ash stack.



Note: Estimated water levels in the dredged fly ash are shown for 5 years time increment (i.e., 0, 5, 10,…etc.) up to 50 years.

Figure 2
Schematic Diagram Showing the Layout of the Proposed Bottom Drainage Layer (Case 2)

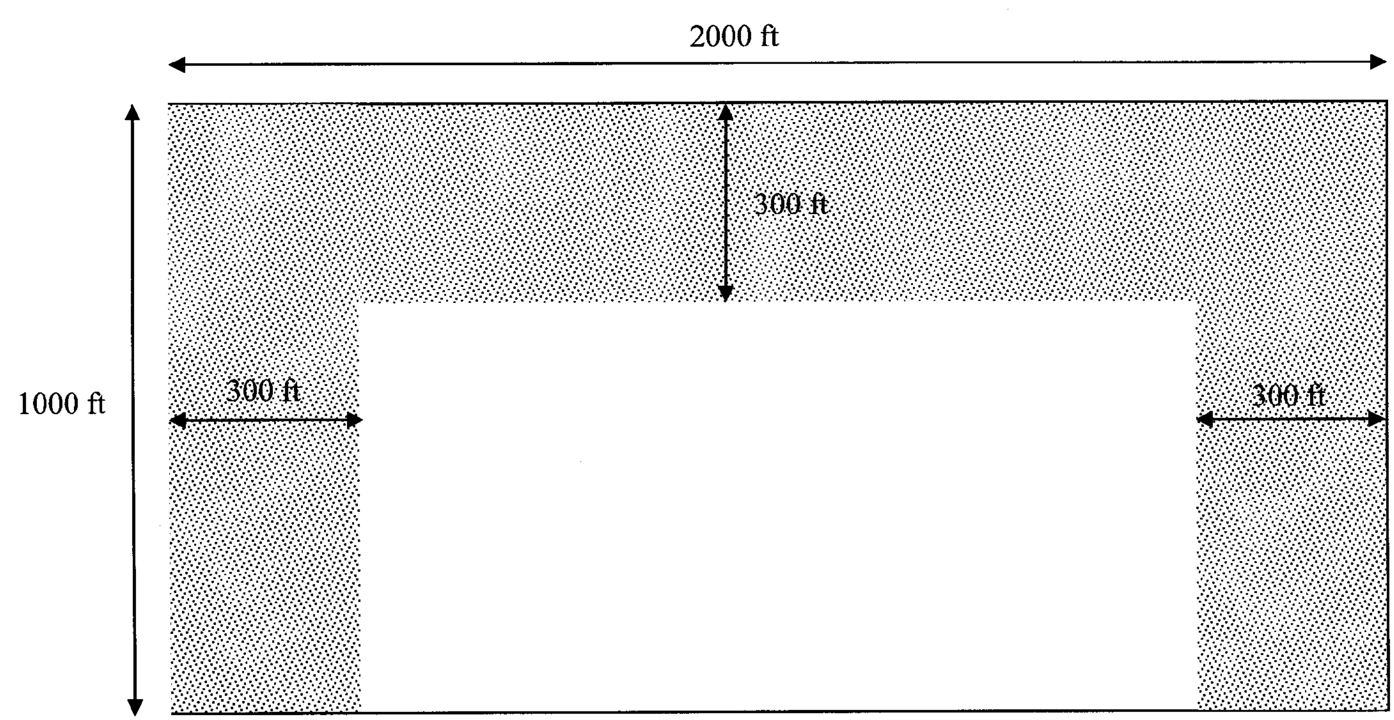


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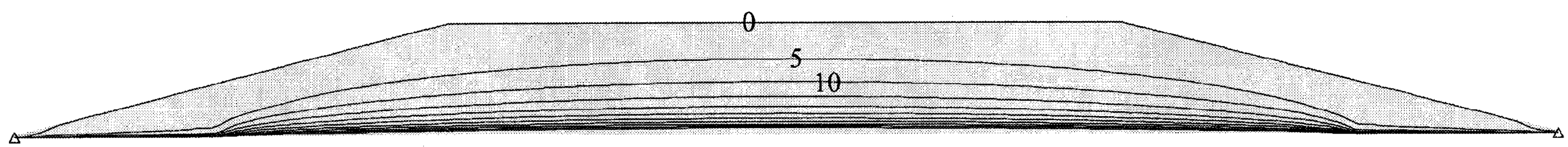
Figure 3

Case 2: Drainage layer of 300 feet in length from the edge of the fly ash stack.



Note: Estimated water levels in the dredged fly ash are shown for 5 years time increment (i.e., 0, 5, 10,…etc.) up to 50 years.

Position Paper on the Whether the Drainage Blankets Can be Removed from TVA's Pending Solid Waste Disposal Applications for Bull Run and Kingston Fossil Plants

Background

The permit applications for the BRF and KIF FGD disposal facilities contain blanket drains similar to the one used for the FGD stack at CUF. However, these drains use bottom ash in lieu of gravel as the drainage layer to save money. These drains are an integral part of the landfill design from a stack dewatering, material consolidation, and stability standpoint. Since these drains also act as an intercept drain that reduces leachate flux to groundwater, they were also included in the groundwater impact modeling that is included in the HydroGeologic Reports for both facilities. The blanket drains have been included in every plan developed by EDS beginning with the plans included in the Phase I Study and the plans presented at the 10% and 50% Design Review Meetings. These review meetings were held prior to the submission of the permit packages for both facilities and omission of the blanket drains was never discussed at any these meetings. After the permit packages were submitted, EDS had a peer review of the KIF landfill design preformed by an independent consulting company, and as part of that review the need for the blanket drains was questioned. However, the decision was made to proceed with design as is with minor changes to add operational flexibility. Now TVA's Byproducts Management (BPM) staff has again questioned the need for these drains. It should be noted that at no time prior to the submission of the applications, did BPM raise this issue.

Environmental Affairs Position

It is Environmental Affairs position that the permit applications for BRF and KIF **not be withdrawn** and that TVA continues with the applications as is. Our rationale for that position is as follows:

1. **The removal of the drains at this stage of the permit process will likely result in a design that cannot be permitted.**

The TN Solid Waste regulations, Rule 1200-1-7, require that a Class II landfill, the classification of these facilities, have both a 5 foot geologic buffer and a composite liner. However, TVA has negotiated a TVA specific Design Memorandum (DM 93) that allows a three foot buffer of 10-6 clay in lieu of the buffer and liner required of other Class II facilities. At both BRF and KIF, we have asked TDEC for a further variance from DM 93 to allow no buffer based on site specific geologic information and ground water modeling. This modeling utilized the blanket drains as an intercept drain which reduced contaminant flux to groundwater. We have received verbal indication that this approach will be acceptable to TDEC. It should be noted that the CUF permit application had an under drain and the same approach was used at BRF and KIF. BPM has stated that a 1993 memo from Glen Pugh to Tom Tiesler granted a variance for all construction in TVA's ash ponds. However that memo specifically states that it only applies to "ash disposed on existing ash"

It should also be noted that TDEC is hyper sensitive to the long term stability of elevated wet stacking. This concern existed prior to the blowout at KIF and has only been reinforced by that event. Given that the drains were included at CUF and in our initial plans for BRF and KIF removing them at this time for obvious cost reasons will raise numerous red flags with TDEC on stability and ground water impact issues.

Given the above issues and the fact that TDEC has already completed review of the BRF HydroGeo Report, Environmental affairs strongly feels that changing direction at this late date will likely result in an application that will not be permitted.

2. The withdrawal and subsequent redesign of the landfill at BRF will seriously jeopardize the availability of the landfill at scrubber startup.

Since the under drains are integral to the HydroGeo, stability calculations, seismic analysis, and flow routing, removing them would require a major redesign that could delay the resubmission of plans as much as 6 months. Also how motivated will TDEC be to restart their review would be a valid concern. If TDEC is very cooperative, we could meet our schedule. If they are not we would not meet it.

3. Environmental Affairs shares EDS's concerns about the long term stability of the stacks without these drains.

While these issues are outside our expertise, we share EDS, Parson's, and TDEC concerns about the long term stability of a poorly drained wet stack.

4. Withdrawal of the permits at this stage has a high potential to seriously damage Environmental Affairs and TVA's credibility with TDEC.

Given the number of times we have gone to TDEC with emergency requests due to our lack of adequate solid waste planning, they will not view this change of direction in a good light. We simply can not meet our waste disposal needs in the next 5 years without their active cooperation. To endanger that cooperation for this issue is not a decision EA can support.

5. Since these issues were not raised in the 10% and 50% review meeting to revisit them at this late date is in direct conflict with TVA's Projects Process.

In the next 5 years we will have designed, permitted and built more waste disposal facilities than TVA has in its history. We have very tight timeframes for many of these facilities, and if we are to bring these facilities on line in time, we must adhere to our projects process.

Haber, Stanley M

From: Purkey, Ronald E.

Sent: Monday, February 07, 2005 6:59 AM

To: Haber, Stanley M.

Subject: FW: Matrix on KIF

fyi

-----Original Message-----
From: Purkey, Ronald E.
Sent: Friday, February 04, 2005 3:30 PM
To: Baugh, James S.; Hedgecoth, Melissa A.
Cc: Petty, Harold L.
Subject: Matrix on KIF

2d - answered earlier

4a - distributed earlier in week

5d - Based upon our later discussion regarding 2 years of gypsum in the next 25 years, this gypsum can be sluiced to the pond just like fly ash and this gypsum dredged to the dredge cells just like fly ash is now. I have cleared this with Larry Bowers.

1b - I know of nothing that would make the comparisons inconsistent - estimates for Karst mitigation on the Peninsula have been as low as $250,000 vs the $500,000 used. The worst possible is felt to be $1,000,000, but borings we have would not support that assumption. We can fix approximately 20 - 50' diameter karst areas with the $500,000 which is about twice what is expected.

Other assumptions appear to be in line.

1a - Calvin and Robert Knox are documenting the O&M assumptions

call if you have comments

Ron

Haber, Stanley M

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Sent: Monday, February 07, 2005 6:58 AM
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Based on this statement, it would appear that Parsons did not specifically rely upon the presence of the bottom drainage layer in their stability evaluations. It is not completely clear to us what specific water pressure conditions were and were not considered in the Parsons analysis. Regardless of the specific assumed design conditions, GeoSyntec concurs with other statements made by Parsons in this document that the presence of a continuous bottom ash layer will facilitate drainage of the bottom ash column drains and consolidation of interior ash and/or gypsum. The primary questions relate to: (i) the lateral extent of the drainage features; and (ii) whether there are alternative and less expensive designs for the bottom drainage layer that will provide comparable performance to the proposed design.

Potential Alternative Bottom Drainage Layer Designs

GeoSyntec believes that other more cost-effective methods are available to TVA for the purpose of providing drainage at the base of the stack. During the conference call, we suggested that a drainage blanket that extends over a part of the lateral expansion footprint might be equally effective in terms of providing adequate drainage to address static and seismic stability concerns. To illustrate this point, GeoSyntec performed some simplistic seepage analyses using SEEP/W. Graphical output is provided below to facilitate discussion. Note that these analyses are intentionally simplistic are provided for comparison purposes only, and are not intended for design purposes. The effects of perimeter drains above the bottom drainage layer are intentionally not included in these simplified analyses to better illustrate the action of the bottom drainage layer.

In both cases, we modeled the lateral expansion as a simple trapezoid with dimensions of 1,000 ft x 2,000 ft x 165 ft high (representative of raising the stack from elevation 765 to elevation 930 feet). In addition, we simplified the problem to a two-dimensional problem, as illustrated in the figures below. Note that this simplification will likely result in a conservative estimate of drainage rates since the problem is clearly three-dimensional.

In Case 1 (Figure 1), we modeled the effect of a highly permeable base drain across the entire footprint of the stack. The material was assumed to be saturated at year 0. As illustrated in Figure 1(below), the phreatic surface at the center of the impoundment is lowered to an elevation within the lower third of the height within a five year period, while the water level at the edges lowers more rapidly.

In Case 2, we modeled the effect of a highly permeable drainage blanket that would extend 300 feet inwards from the toe of the slope on three sides (Figure 2). As in Case 1, the material was assumed to be saturated at year 0. Using the dimensions indicated, the area of the drainage blanket used in Case 2 is approximately 50 percent of the total footprint of the base. Figure 3 indicates that under this configuration, a 300-foot wide base drain located around the perimeter is very effective at lowering the phreatic surface within 200 feet of the face of the slopes. The rate that the water level lowers at the edges is comparable to the rate for the complete bottom drainage layer shown in Figure 1. The phreatic surface within the interior of the fill is lowered to an elevation within the lower third of the height within a ten to fifteen year period. While this is slower dissipation than the full coverage drain, the partial drainage blanket is shown to be effective at lowering the level within the entire impoundment. If the blanket drain is extended further towards the center of the fill, the phreatic surface moves farther from the face of the slope and the rate at which the phreatic surface is lowered within the interior of the fill increases. The actual design extent of the partial drain would be determined during the final design, but this simple model demonstrates that a partial blanket drain can be highly effective at lowering the phreatic surface, while providing significant potential cost savings..

The simple analysis models presented in the previous figures were re-run utilizing different values for hydraulic conductivity for the bottom drain material. While these results are not specifically shown, it is interesting to note that in each of the models that we ran, the hydraulic conductivity of the drainage layer significantly influenced the rate of drainage (i.e., the effective hydraulic conductivity of the drainage layer may control the drainage rate). This indicates the importance of the hydraulic conductivity of the bottom drainage material. In the event that a highly permeable bottom drain cannot be provided, it will be necessary to compensate for the lower hydraulic conductivity by using relatively closely spaced perforated pipes within the drainage media to assure the effectiveness of the bottom drain.

Based on the results of the simple modeling performed for presentation in this memorandum, GeoSyntec believes that that there are a number of potential alternative approaches available to TVA to address base drainage of the proposed lateral expansion at Kingston. These include, but are not limited to:

- modifying the extent of the proposed bottom drainage layer; our very preliminary and simplistic evaluations indicate that it may be feasible to reduce the size of this layer by up to 50 percent without compromising static or seismic stability;
- use of geotextile-wrapped bottom ash "fingers" or "tubes" constructed on a geocomposite drainage layer and compacted low permeability fly ash; and
- various combinations of a bottom drainage layer covering a partial area of the footprint supplemented by geosynthetic drainage strips.

GeoSyntec also understands that the bottom drainage layer, as designed, is also intended to serve as a hydrogeologic buffer. If the drainage layer is modified, then it will be necessary to evaluate the performance of alternative proposals in terms of their ability to satisfy permit requirements. This would typically be done using one of the following methods:

- perform an "equivalency demonstration" with the objective of demonstrating that the flux moving through the base is equivalent (or close) to the "as designed" system; or

- perform a fate and transport analysis of the specific constituents of concern (COCs) to demonstrate that environmental impacts are within acceptable ranges.

Utilizing the properties of compacted fly ash and by incorporating elements of drainage system design (e.g., slope and hydraulic conductivity of the drainage blanket), we are confident that an equivalency demonstration can be made. This demonstration would be a component of the bottom layer drainage design modification described above.

Seismic Stability Considerations

We also believe that the specific design details for the drainage layer at the bottom of the cell and around the perimeter of the facility may have a profound impact of the calculated seismic slope stability. GeoSyntec recommends that the assessment of the optimized drainage include a detailed re-evaluation of the seismic slope stability. This recommendation is made for two reasons: (i) significant changes to drainage features will have a direct influence on stability; and (ii) there is a chance that the Tennessee Division of Solid Waste (TDSW) may request consideration (or at least a comment regarding) larger ground motions than reflected in the current permit documents. A discussion related to this recommendation follows.

The current seismic analysis of global slope stability has been conducted utilizing a pseudo-static analysis methodology. This is the most common analysis method for assessing global slope stability due to a seismic event and the methodology is appropriate for the proposed lateral expansion at Kingston. In this analysis method, the ground motions from a seismic event are simulated by applying an external horizontal force to the analyzed slope and then proceeding with a conventional static global slope stability analysis. The biggest challenge facing the designer/engineer is the selection of the external horizontal force that is representative of the ground motions from the design earthquake. The horizontal force is simulated by selecting an appropriate seismic coefficient. In simplified seismic analyses where relatively small ground accelerations are realized, the seismic coefficient is commonly assumed to be a fraction of the peak ground acceleration (PGA) in bedrock for the earthquake that has been found to have a two percent chance of exceedance in 50 years. This is the approach taken by Parsons for

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Kingston and presented in Attachment 5 titled "Peak Ground Acceleration Evaluation". For global slope stability, the design appears to consider a bedrock PGA of 0.22g and a pseudo-static seismic coefficient of 0.11g (i.e., a 50 percent reduction in the bedrock PGA) in the subsequent global pseudo-static slope stability analyses. This approach follows traditionally accepted geotechnical practice, but is recognized as having the potential to be overly conservative because it does not account for the attenuation of the ground motion as it interacts with the materials through which the seismic motions propagate.

It is GeoSyntec's experience that for projects where the PGA is greater than approximately 0.20g, it is common for the seismic global slope stability analysis to govern the design. This appears to, in fact, be the case for Kingston , where the calculated global static factor of safety reduced from approximately 1.6 to 1.1 when seismic loading was considered.

In cases where a pseudo-static seismic analysis is demonstrated to have a significant impact on the calculated slope stability analysis results, GeoSyntec typically recommends that a site-specific seismic response analysis be conducted to more realistically assess the ground motions within the impacted earth structure. The objective of this assessment is to develop ground motion signatures that consider the geometry of the slope, the engineering properties of the foundation soils, and the physical properties of materials used to construct the analyzed earth structure, and (in the case of Kingston) the impounded materials. In this way, a more realistic estimate to the ground motions can be recognized. During the site-specific assessment, the actual geometry and physical properties of the earth structure (in this case the dredged ash basins and the compacted ash/gypsum perimeter berms) are considered and a numerical simulation is performed to model the propagation of the PGA applied at the bedrock surface upward through the dredged ash. In this way, the actual damping/acceleration of the bedrock PGA by the impounded ash can be simulated and assessed. Depending on the frequency content of the design earthquake and the properties of the impounded ash, it may be shown that the impounded ash is effective at damping (or accelerating) the ground motions. The analysis results are then assessed to quantify the average ground motion and an appropriate pseudo-static seismic coefficient can be calculated and used in subsequent slope stability calculations. Again, the goal of this procedure is to develop a more realistic representation of the anticipated ground motions that can be used in future slope stability calculations.

As mentioned, GeoSyntec has utilized the approach of conducting seismic response analyses and in some cases seismic deformation analyses for slopes across the U.S. when PGA values greater than approximately 0.20g are considered. This is the most common case in the western U.S. where bedrock PGA values greater than 0.60g are common. This approach seems to be appropriate for Kingston facility because of the indicated sensitivity of the calculated factor of safety to the selected design ground motion and because of the somewhat unique properties of the impounded ash/gypsum. It may even

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be more important for the Kingston facility, where the bedrock PGA considered by the designers appears to be 0.22g in accordance with guidance documents prepared by TDSW (1993) and U.S. Environmental Protection Agency (USEPA, 1995).

It is important to note that the above referenced documents relied on assessments of bedrock PGA values presented in documents prepared by the United States Geological Survey (USGS) dated 1991. More recent USGS publications (i.e., 2002) present revised bedrock PGA values that have recently been required by regulatory agencies, although not explicitly incorporated into the TDSW guidance documents. Considerations of these revised ground motions were required by TDSW in a permit application for a facility in Memphis prepared by GeoSyntec in 2003, primarily due to the close proximity of the Memphis site to the New Madrid Fault zone. In the case of Kingston, Tennessee, the revised bedrock PGA shown in the more recent USGS publication is approximately 0.27g, representing an increase in ground motion of more than 20 percent compared to the previously considered ground motions. GeoSyntec is not aware of any actions by TDSW that will require that seismic slope stability analyses be conducted using the revised ground motions, but we believe that if supplemental analyses are to be conducted, it would be to TVA's best interest to at least be aware of the impacts of the revised ground motions. In the extreme case (and one which we feel is not likely), if revised calculations are required, then the design presented in the current permit package may be deemed deficient, necessitating a re-evaluation of the seismic stability. Because of the potential consequence of this, we believe that at a minimum, analyses utilizing the revised ground motions should be performed.

While the consideration of a more representative site seismic response and (potentially) increased design ground motions may adversely impact the seismic stability of the current design, GeoSyntec believes that refined seismic analyses are warranted and that they will ultimately benefit TVA. These analyses may include seismic response analyses as well as seismic deformation analyses. These analyses will be coupled with design considerations regarding the selected drainage features around the perimeter and along a portion of the bottom of the facility. Based on experience on a range of similar projects, GeoSyntec believes that a cost-effective and stable design can be demonstrated for the Kingston facility. We note that in a recent project for a large earth dam in North Georgia, GeoSyntec demonstrated that the use of more robust seismic analyses resulted in a much more efficient and less expensive design than the design developed (by others) utilizing the simplified seismic slope stability analysis procedures. Of equal importance, however, GeoSyntec recognizes that any modification of the analysis methods recommended in the TDSW guidance documents must be thoroughly supported and presented to the agency. GeoSyntec has utilized site-specific analysis results and seismic response techniques for the previously referenced Memphis project that was impacted by its proximity to the New Madrid Fault zone. For the Memphis project, GeoSyntec developed supporting documentation and presented analysis results that were accepted and approved by TDSW. GeoSyntec enjoys a tremendous professional relationship with the TDSW technical staff and is confident that a technically compelling demonstration to TDSW can be developed

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and approved, if the revised analysis results for Kingston differ from those presented in the dated TDSW and USEPA guidance documents.

Summary and Recommendations

In summary, GeoSyntec recommends that TVA perform an evaluation of bottom drainage alternatives. The evaluation would address the following items, at a minimum:

- cost benefit analysis of various drainage configurations;
- re-evaluation of the hydrogeologic buffer requirements together with an equivalency demonstration or fate and transport analysis to address permit requirements; and
- re-evaluation of global static and seismic stability following selection of any revisions to the bottom drainage.

Based on the very preliminary analyses presented herein, we believe that potential savings of the order of 25 to more than 40 percent of the cost to construct the currently proposed bottom drainage layer may be achievable. However, additional analysis and evaluation will be required to confirm this preliminary opinion. We are confident that significant savings can be realized.

GeoSyntec believes that the evaluations and analyses described herein could be completed within approximately three to four weeks. Depending upon the level of analyses needed and interaction with other team members, the estimated cost to perform this work is likely in the range $40,000 to $55,000. Note this is a quick "guesstimate" to aid TVA in decision making.

Should you have any questions regarding any of the information provided in this memorandum, please do not hesitate to contact either of us. We appreciate the opportunity to work with your team on the Kingston project.

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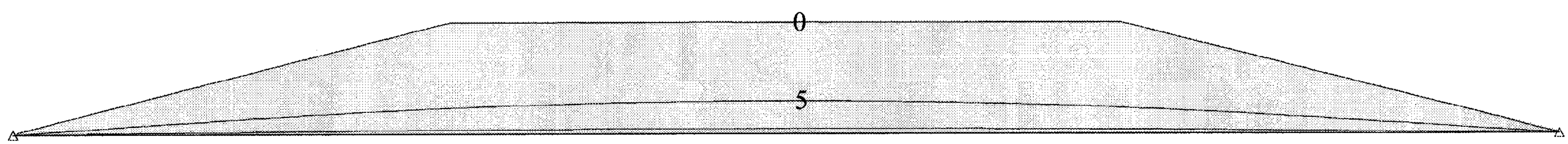
Figure 1

Case I: Drainage layer constructed along the entire base of the dredged ash stack.



Note: Estimated water levels in the dredged fly ash are shown for 5 years time increment (i.e., 0, 5, 10,…etc.) up to 50 years.

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Figure 2
Schematic Diagram Showing the Layout of the Proposed Bottom Drainage Layer (Case 2)

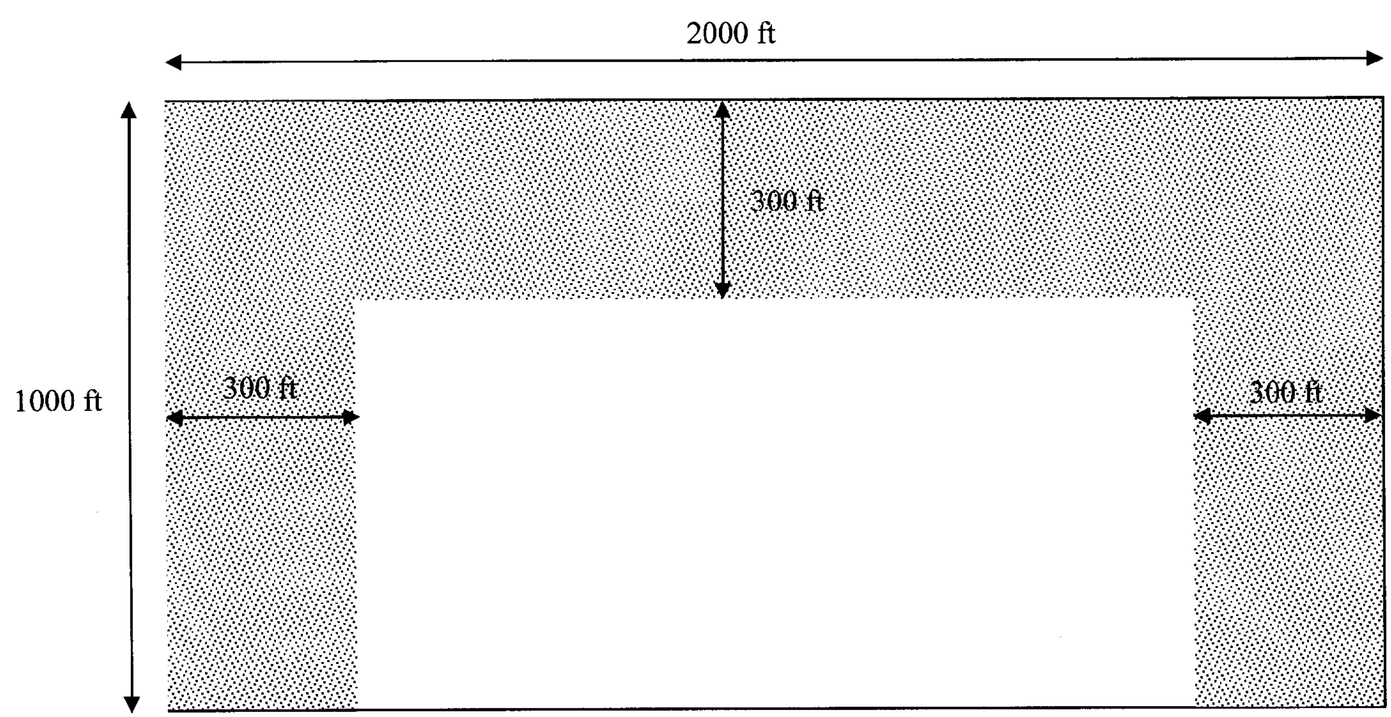

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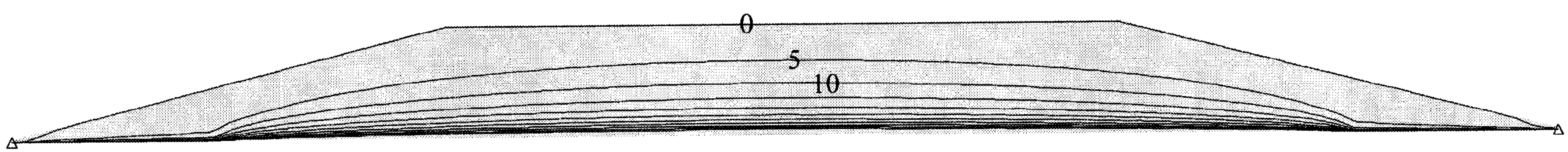
Figure 3

Case 2: Drainage layer of 300 feet in length from the edge of the fly ash stack.



Note: Estimated water levels in the dredged fly ash are shown for 5 years time increment (i.e., 0, 5, 10,…etc.) up to 50 years.

Haber, Stanley M

From: Baugh, James S.

Sent: Friday, February 04, 2005 3:57 PM

To: Purkey, Ronald E.; Haber, Stanley M.

Cc: Lundy, Dennis L.

Subject: KIF update

We have completed the sensitivity analyses on pond vs peninsula at KIF that we discussed earlier this week. I would like to review the analysis summary on Monday morning, then send it to you for comments.

The conference call with UCC to resolve issues on the estimate for dry ash collection is scheduled for Monday.

Let me know if you have any questions.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Haber, Stanley M

From: Hedgecoth, Melissa A.
Sent: Friday, February 04, 2005 3:42 PM
To: Hedgecoth, Melissa A.; Baugh, James S.; Purkey, Ronald E.; Haber, Stanley M.; Renfroe, Bret; Murray, David B.; Myers, Thomas J.
Cc: Nuyt, Gary M.
Subject: RE: KIF Dry fly ash

For those that need to call in to the meeting, the number is 423-751-2428, and the I.D. # is 6426. Again, the meeting is at 3:00 EST.
Thanks,
Missy

-----Original Appointment-----
From: Hedgecoth, Melissa A.
Sent: Friday, February 04, 2005 1:42 PM
To: Baugh, James S.; Purkey, Ronald E.; Haber, Stanley M.; Renfroe, Bret; Murray, David B.; Myers, Thomas J.
Cc: Nuyt, Gary M.
Subject: KIF Dry fly ash
When: Monday, February 07, 2005 3:00 PM-4:00 PM (GMT-05:00) Eastern Time (US & Canada).
Where: LP 5N A03 (Mill Creek)

This meeting is to discuss the current Dry Fly Ash Conversion cost estimate with United Conveyor Corporation.

Tom Myers, could you please see if the person that has been looking at electrical costs for Kingston is available? We would like to get a better idea on the additional costs to meet the electrical needs for the dry fly ash conversion.

Thanks,
Missy

Haber, Stanley M

From: Purkey, Ronald E.
Sent: Thursday, February 03, 2005 3:05 PM
To: Haber, Stanley M.; Davis, Victor W.
Subject: RE: KIF Dry Fly Ash Estimate
Attachments: KIF Fly Ash Estimate.pdf

Stan - it's all right - I will send one

Victor - for your viewing pleasure

Ron

-----Original Message-----
From: Haber, Stanley M.
Sent: Thursday, February 03, 2005 3:03 PM
To: Purkey, Ronald E.
Subject: RE: KIF Dry Fly Ash Estimate

Don't you think that he should get a copy?

-----Original Message-----
From: Purkey, Ronald E.
Sent: Thursday, February 03, 2005 3:00 PM
To: Haber, Stanley M.
Subject: RE: KIF Dry Fly Ash Estimate

no, Bret used the vendor's info as he had gotten the ash from TVA facilities to silo turnkey.

-----Original Message-----
From: Haber, Stanley M.
Sent: Thursday, February 03, 2005 10:24 AM
To: Purkey, Ronald E.
Cc: Petty, Harold L.
Subject: RE: KIF Dry Fly Ash Estimate

Ron,

Did the Mechanical section review this to ensure that it was complete from their perspective?

Stan

-----Original Message-----
From: Purkey, Ronald E.
Sent: Tuesday, February 01, 2005 2:44 PM
To: Haber, Stanley M.; Miller, Evelyn C.; Baugh, James S.; Radford, Larry D.; Latsch, Mitchell D.; Hedgecoth, Melissa A.; Deskins, Earl L; Campbell, Linda F.; Preslar, Jacky D.; Rehberg, Robert L.; Bowers, Larry C; Petty, Harold L.; Nuyt, Gary M.; Myers, Thomas J.; Petty, Harold L.
Cc: Renfroe, Bret
Subject: KIF Dry Fly Ash Estimate

Per my action item in the Meeting last Thursday, I have attached the Dry Ash estimate for Kingston. Bret Renfroe did the estimate and will be glad to discuss any item with you.
Thanks.

Ron Purkey

Kingston Fossil Plant
Dry Fly Ash Collection
Design & Install New Fly Ash Handling System

Project name	Dry Fly Ash
Estimator	B. L. Renfroe
Labor rate table	KIF 60 2003
Plant	KIF
Estimate #	04096
Requesting Engr	R. E. Purkey
Option	0
Revision	0
Phase	1
Estimate Type	Conceptual
Estimate Accuracy	+/- 30%
Est. Issue Date	12/10/2003
Funding Type	Capital
Notes	Electrical Engineered Material Costs based on ABB quote. (1043-03-1633) UC Service Corporation proposal (Q03381) included Flly Ash Handling design & equipment, which is coming from United Conveyor Corporation. 161kV Power Feed is based off of an FY01 TPS estimate that has been escalated. Estimate is in FY04 Dollars.
Report format	Sorted by 'Location/Activity' 'Detail' summary

Spreadsheet Report

Dry Fly Ash

Location	Activity	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
KIF									
	Fly Ash Collection								
		480V indoor switchgear	1.00 ls	73,360	150,000	-	-	-	223,360
		1500 KVA, 4.16kV/480V Transformer	2.00 ls	44,016	100,000	15,000	-	-	159,016
		4.16kV Indoor Switchgear	1.00 ls	73,360	150,000	-	-	-	223,360
		4.16kV Outdoor Switchgear	3.00 ls	104,538	210,000	-	-	-	314,538
		10MVA, 161kv/4.16kv liq filled Transformer	2.00 ls	44,016	500,000	75,000	-	-	619,016
		750 KVA, 4.16kV/480V Transformer	1.00 ls	11,004	25,000	3,750	-	-	39,754
		480V Outdoor MCC	1.00 ls	22,925	50,000	-	-	-	72,925
		CU 5KV 4/0-3C Shielded EPR/CSPE	3,500.00 lf	17,460	29,295	-	-	-	46,755
		UC Service Corporation	1.00 ls	0	0	16,000,000	-	-	16,000,000
		161kV Power Feed	1.00 ls			5,600,000	0	-	5,600,000
		CU 600V 2/0-3C XLPE/CSPE	2,250.00 lf	9,903	14,726	-	-	-	24,630
		Mis. Equipment & Unforeseen Items	1.00 ls	7,336	7,500	-	5,000	-	19,836

Estimate Totals

Labor	407,918		11,121.000	hrs	
Material	1,236,521				
Subcontract	21,693,750				
Equipment	5,000				
	23,343,189	23,343,189			
Engineered Materials - Ph 2	1,185,000		100.000	%	C
Adjustment - Engr Materials	(1,185,000)		(100.000)	%	C
		23,343,189			
Small Tools Expense	5,004		0.450	$/hr	H
Consumables & Expendables	16,317		4.000	%	C
	21,321	23,364,510			
Escalation - Craft Labor	20,396		5.000	%	C
Escalation - Subcontract	759,281		3.500	%	C
Escalation - Perm Materials	24,730		2.000	%	C
Escalation - Small Tools	378		0.034	$/hr	H
Escalation - Consumables	816		0.200	%	C
	805,601	24,170,111			
Partner Insurance (FY 04)	12,238		3.000	%	C
Partner Award Fee (FY04)	20,396		5.000	%	C
	32,634	24,202,745			
Elect. Engineering Design	380,000				L
Elect. Site Meeting / Travel	45,000				L
Mech Engineering - Phase 2	20,000				L
Civil Engineering - Phase 2	20,000				L
Elect. Field Commissioning	75,000				L
Project Controls & Estimating	12,000		2.526	%	O
	552,000	24,754,745			
Rounding	245,255				L
	245,255	25,000,000			
	Total	***25,000,000***			

Haber, Stanley M

From: Haber, Stanley M.
Sent: Thursday, February 03, 2005 3:03 PM
To: Purkey, Ronald E.
Subject: RE: KIF Dry Fly Ash Estimate

Tracking: Recipient	Delivery	Read
Purkey, Ronald E.	Delivered: 02/03/2005 3:03 PM	Read: 02/03/2005 3:03 PM

Don't you think that he should get a copy?

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From: Purkey, Ronald E.
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To: Haber, Stanley M.
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Cc: Petty, Harold L.
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Cc: Renfroe, Bret
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Haber, Stanley M

From: Haber, Stanley M.
Sent: Thursday, February 03, 2005 9:08 AM
To: Baugh, James S.
Subject: RE: UCC meeting

Tracking: **Recipient** **Delivery** **Read**
Baugh, James S. Delivered: 02/03/2005 9:08 AM Read: 02/03/2005 9:48 AM

yes.

-----Original Message-----
From: Baugh, James S.
Sent: Thursday, February 03, 2005 9:06 AM
To: Haber, Stanley M.
Subject: RE: UCC meeting

I have a copy on my desk - do have time to come by to pick it up?

-----Original Message-----
From: Haber, Stanley M.
Sent: Thursday, February 03, 2005 8:22 AM
To: Baugh, James S.
Subject: FW: UCC meeting
Importance: Low

Steve,

I believe that we were going to distribute a copy of the original UCC estimate for review by 2/2. I didn't get a copy. Can I have one please? I also would like to be part of the phone call on Friday.

Stan
-----Original Message-----
From: Purkey, Ronald E.
Sent: Thursday, February 03, 2005 7:47 AM
To: Haber, Stanley M.
Subject: FW: UCC meeting

-----Original Message-----
From: Baugh, James S.
Sent: Wednesday, February 02, 2005 4:03 PM
To: Purkey, Ronald E.
Subject: UCC meeting

FYI, Kent Shever (the guy who we need to talk to with UCC) is not available until Friday. We will schedule a conference call with him on Friday of this week.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Haber, Stanley M

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To: Purkey, Ronald E.
Subject: UCC meeting

FYI, Kent Shever (the guy who we need to talk to with UCC) is not available until Friday. We will schedule a conference call with him on Friday of this week.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Haber, Stanley M

From: Haber, Stanley M.
Sent: Thursday, February 03, 2005 8:22 AM
To: Baugh, James S.
Subject: FW: UCC meeting
Importance: Low

Tracking:

Recipient	Delivery
Baugh, James S.	Delivered: 02/03/2005 8:22 AM

Steve,

I believe that we were going to distribute a copy of the original UCC estimate for review by 2/2. I didn't get a copy. Can I have one please? I also would like to be part of the phone call on Friday.

Stan
-----Original Message-----
From: Purkey, Ronald E.
Sent: Thursday, February 03, 2005 7:47 AM
To: Haber, Stanley M.
Subject: FW: UCC meeting

-----Original Message-----
From: Baugh, James S.
Sent: Wednesday, February 02, 2005 4:03 PM
To: Purkey, Ronald E.
Subject: UCC meeting

FYI, Kent Shever (the guy who we need to talk to with UCC) is not available until Friday. We will schedule a conference call with him on Friday of this week.

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Haber, Stanley M

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Sent: Thursday, February 03, 2005 7:47 AM
To: Haber, Stanley M.
Subject: FW: UCC meeting

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To: Purkey, Ronald E.
Subject: UCC meeting

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Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Haber, Stanley M

From: Haber, Stanley M.
Sent: Wednesday, February 02, 2005 7:46 AM
To: Baugh, James S.
Subject: RE: KIF Pond vs Peninsula Action Plan

Tracking: **Recipient** **Delivery** **Read**
Baugh, James S. Delivered: 02/02/2005 7:46 AM Read: 02/02/2005 7:46 AM

Steve,

It looks accurate to me.

Stan

-----Original Message-----
From: Baugh, James S.
Sent: Tuesday, February 01, 2005 12:29 PM
To: Lundy, Dennis L.; Purkey, Ronald E.; Haber, Stanley M.
Subject: KIF Pond vs Peninsula Action Plan

Please review the attached and let me know if I missed anything from our meeting this morning.

Thanks.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Haber, Stanley M

From: Purkey, Ronald E.

Sent: Tuesday, February 01, 2005 2:44 PM

To: Haber, Stanley M.; Miller, Evelyn C.; Baugh, James S.; Radford, Larry D.; Latsch, Mitchell D.; Hedgecoth, Melissa A.; Deskins, Earl L; Campbell, Linda F.; Preslar, Jacky D.; Rehberg, Robert L.; Bowers, Larry C; Petty, Harold L.; Nuyt, Gary M.; Myers, Thomas J.; Petty, Harold L.

Cc: Renfroe, Bret

Subject: KIF Dry Fly Ash Estimate

Attachments: KIF Fly Ash Estimate.pdf

Per my action item in the Meeting last Thursday, I have attached the Dry Ash estimate for Kingston. Bret Renfroe did the estimate and will be glad to discuss any item with you.
Thanks.

Ron Purkey

Spreadsheet Report

Dry Fly Ash

Kingston Fossil Plant
Dry Fly Ash Collection
Design & Install New Fly Ash Handling System

Project name	Dry Fly Ash
Estimator	B. L. Renfroe
Labor rate table	KIF 60 2003
Plant	KIF
Estimate #	04096
Requesting Engr	R. E. Purkey
Option	0
Revision	0
Phase	1
Estimate Type	Conceptual
Estimate Accuracy	+/- 30%
Est. Issue Date	12/10/2003
Funding Type	Capital
Notes	Electrical Engineered Material Costs based on ABB quote. (1043-03-1633) UC Service Corporation proposal (Q03381) included Flly Ash Handling design & equipment, which is coming from United Conveyor Corporation. 161kV Power Feed is based off of an FY01 TPS estimate that has been escalated. Estimate is in FY04 Dollars.
Report format	Sorted by 'Location/Activity' 'Detail' summary

Spreadsheet Report

Dry Fly Ash

Location	Activity	Description	Takeoff Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
KIF									
	Fly Ash Collection								
		480V indoor switchgear	1.00 ls	73,360	150,000	-	-	-	223,360
		1500 KVA, 4.16kV/480V Transformer	2.00 ls	44,016	100,000	15,000	-	-	159,016
		4.16kV Indoor Switchgear	1.00 ls	73,360	150,000	-	-	-	223,360
		4.16kV Outdoor Switchgear	3.00 ls	104,538	210,000	-	-	-	314,538
		10MVA, 161kv/4.16kv liq filled Transformer	2.00 ls	44,016	500,000	75,000	-	-	619,016
		750 KVA, 4.16kV/480V Transformer	1.00 ls	11,004	25,000	3,750	-	-	39,754
		480V Outdoor MCC	1.00 ls	22,925	50,000	-	-	-	72,925
		CU 5KV 4/0-3C Shielded EPR/CSPE	3,500.00 lf	17,460	29,295	-	-	-	46,755
		UC Service Corporation	1.00 ls	0	0	16,000,000	-	-	16,000,000
		161kV Power Feed	1.00 ls			5,600,000	0	-	5,600,000
		CU 600V 2/0-3C XLPE/CSPE	2,250.00 lf	9,903	14,726	-	-	-	24,630
		Mis. Equipment & Unforeseen Items	1.00 ls	7,336	7,500	-	5,000	-	19,836

Estimate Totals

Labor	407,918		11,121.000	hrs	
Material	1,236,521				
Subcontract	21,693,750				
Equipment	5,000				
	23,343,189	23,343,189			
Engineered Materials - Ph 2	1,185,000		100.000	%	C
Adjustment - Engr Materials	(1,185,000)		(100.000)	%	C
		23,343,189			
Small Tools Expense	5,004		0.450	$/hr	H
Consumables & Expendables	16,317		4.000	%	C
	21,321	23,364,510			
Escalation - Craft Labor	20,396		5.000	%	C
Escalation - Subcontract	759,281		3.500	%	C
Escalation - Perm Materials	24,730		2.000	%	C
Escalation - Small Tools	378		0.034	$/hr	H
Escalation - Consumables	816		0.200	%	C
	805,601	24,170,111			
Partner Insurance (FY 04)	12,238		3.000	%	C
Partner Award Fee (FY04)	20,396		5.000	%	C
	32,634	24,202,745			
Elect. Engineering Design	380,000				L
Elect. Site Meeting / Travel	45,000				L
Mech Engineering - Phase 2	20,000				L
Civil Engineering - Phase 2	20,000				L
Elect. Field Commissioning	75,000				L
Project Controls & Estimating	12,000		2.526	%	O
	552,000	24,754,745			
Rounding	245,255				L
	245,255	25,000,000			
	Total	***25,000,000***			

Haber, Stanley M

From: Baugh, James S.
Sent: Tuesday, February 01, 2005 12:29 PM
To: Lundy, Dennis L.; Purkey, Ronald E.; Haber, Stanley M.
Subject: KIF Pond vs Peninsula Action Plan
Attachments: KIF action plan FEb 1 2005.xls

Please review the attached and let me know if I missed anything from our meeting this morning.

Thanks.

Steve Baugh
Fuel By-Products and Properties
LP 5G-C
(423) 751-6137

Kingston - Pond vs Peninsula - Additional Analysis Tasks

Item			Responsible	Complete
1	Project assumptions for cost estimating			
	a	Document governing assumptions used in cost estimating	Purkey/Toney	03-Feb-05
	b	Verify that assumptions are consistent for in-pond and peninsula options	Purkey/Toney	04-Feb-05
	c	Adjust economics as needed for consistency of assumptions	Baugh/ Hedgecoth/ Toney	05-Feb-05
2	Drainage layer			
	a	Prepare a position paper on why drainage layer is a TDEC requirement	J. Watts	05-Feb-05
	b	Run sensitivity analyses with varying cost assumptions for drainage layer	Baugh/ Hedgecoth	05-Feb-05
	c	Adjust cost of drainage layer in base case analysis if appropriate	Baugh/ Hedgecoth/ Toney	05-Feb-05
	d	Establish the TVA Engineering position on minimum requirements for the drainage layer	Purkey	05-Feb-05
3	Impact of 5# coal on analysis			
	a	Determine source of assumptions for use of 2.8# coal	Baugh	02-Feb-05
	b	Provide pond/peninsula storage capacity data for sensititivy analysis	Purkey	02-Feb-05
	c	Run sensitivity analysis with 5# coal	Baugh/ Hedgecoth	05-Feb-05
4	Dry Fly Ash conversion			
	a	Distribute copies of cost estimate for review	Purkey	02-Feb-05
	b	Provide a copy of the original UCC turnkey estimate	Hedgecoth	02-Feb-05
	c	Review cost estimate with UCC to indentify potential issues	Toney/ Hedgecoth/ Fossil Engr	03-Feb-05
	d	Revise project economics as appropriate	Baugh/ Hedgecoth/ Toney	05-Feb-05
5	Gypsum marketing			
	a	Determine how marketing would affect pond/peninsula options	Hedgecoth/ Radford/ Catlett	03-Feb-05
	b	Revise project economics to consider marketing	Baugh/ Hedgecoth/ Toney	05-Feb-05
	c	Run sensitivity analyses - marketer fails to meet guarantees	Baugh/ Hedgecoth	05-Feb-05
	d	Determine if it is feasible to stack gypsum in the active pond with marketing and a 2.8# coal (based on quantities to be disposed of)	Purkey	03-Feb-05
6	Complexity of Operations - In Pond option			
	a	Review and adjust ongoing construction costs in economic analysis	Hedgecoth/ Radford/ Toney	02-Feb-05
	b	Run sensitivity analyses - varying costs of ongoing construction	Baugh/ Hedgecoth/ Radford	05-Feb-05
7	Unknowns - Peninsula development costs			
	a	Run sensitivity analyses - varying costs of peninsual development, including sinkhole repair	Baugh/ Hedgecoth/ Radford	05-Feb-05
8	Summary of Analyses			
	a	Develop a summary of economic analyses, including cash flows and 5, 10, and 25 year NPVs	Baugh/ Hedgecoth/ Toney	05-Feb-05

Haber, Stanley M

From: Petty, Harold L.
Sent: Wednesday, January 26, 2005 4:36 PM
To: Purkey, Ronald E.; Haber, Stanley M.
Subject: FW: KIF Pond or Peninsula decision

-----Original Message-----
From: Watts, Janet K
Sent: Wednesday, January 26, 2005 4:19 PM
To: Preslar, Jacky D.
Cc: Lundy, Dennis L.; Cooper, Marcia A.; Baugh, James S.
Subject: KIF Pond or Peninsula decision

Jacky,
I've had discussion with staff today and want to let you know from a regulatory perspective we cannot revisit the blanket drain as part of the design for the wet ash in Pond - gypsum option. There are several reasons if you would like to discuss please give me a call.

I would also like to say I don't understand what the process is if we are revisiting a design that impacts a regulatory/permitting process well after the 10% review, after the 50% review, after the design is done and application has been submitted to state. Staff tells me there is a process. I will pursue finding it and then maybe those of us involved in these issues can agree that we are going to follow it or, we need to come up with a new improved process.

My concerns about this regulatory issue that is related to design include impacts to the BRF schedule since it had similar design/permict application elements.

And if I've misunderstood something please correct me.

Janet

Haber, Stanley M

From: Petty, Harold L.

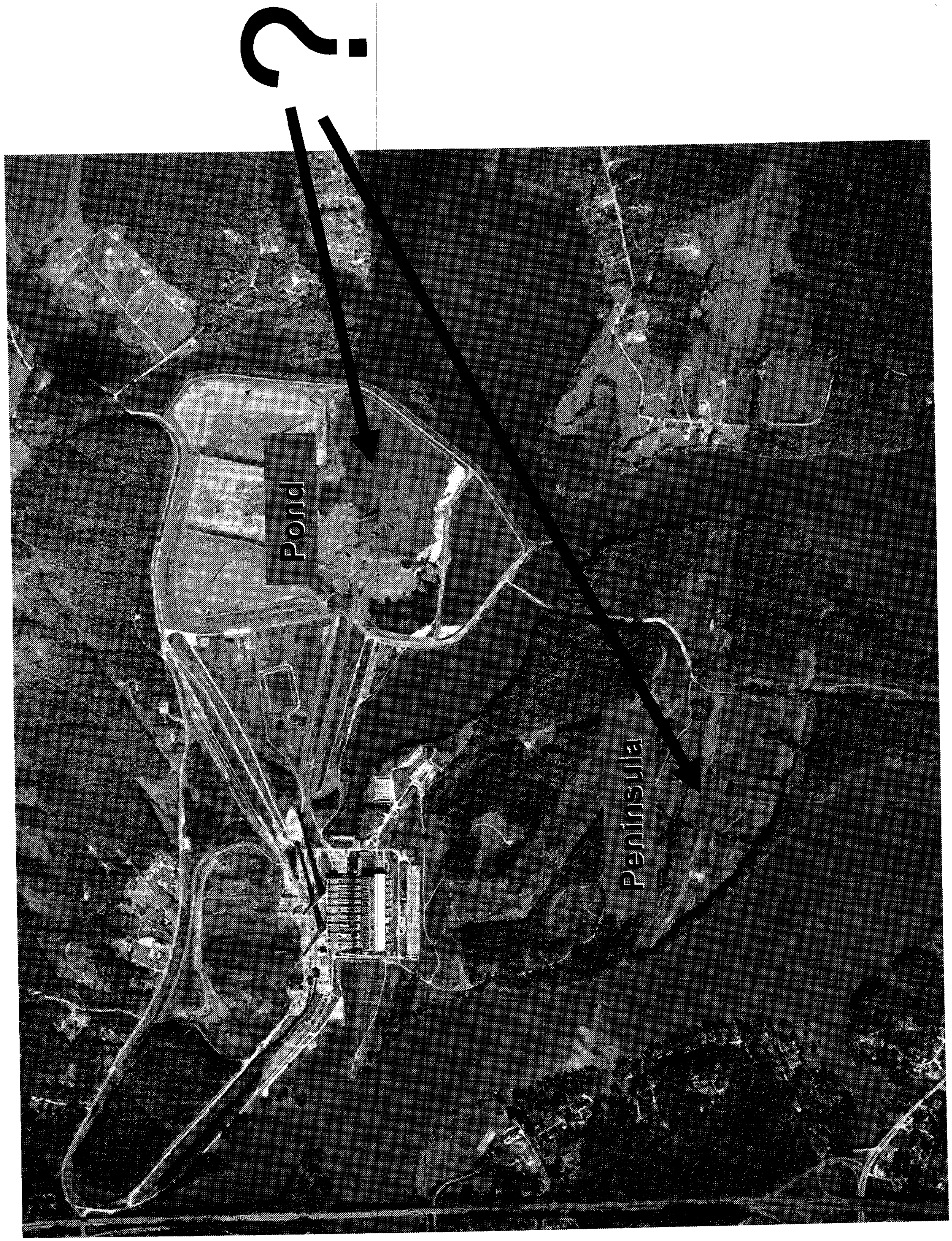
Sent: Wednesday, January 26, 2005 2:03 PM

To: Haber, Stanley M.

Cc: Bowers, Larry C; Purkey, Ronald E.

Subject: KINGSTONMATRIXPRESENTATION 2 saved on the z drive.ppt

Attachments: KINGSTONMATRIXPRESENTATION 2 saved on the z drive.ppt


Pond
Peninsula

Kingston Fossil Plant Decision Matrix

Pond or Peninsula?

January 27th, 2005

Plant Managers Conference Room

10 AM – 11:30 AM

Presentation of Decision Matrix
Agenda

- How We Got Here & Where We Are
- Basis for Matrix
- Presentation of Options
- Presentation of Option Costs
- Summary of Present Worth by Option
- Engineering Recommendation
- Path Forward

How We Got Here & Where We Are

- Initial Look at Peninsula for Gypsum Only
  - Plant Manager's Concerns for this Area
  - and Request to Revisit a Pond Only Option (JPT)
- Blowout – November 2003
  - Interim Cell Decision
  - Permit Package Required by DSWM
  - TVA took this opportunity to do the engineering and permitting required for a Lateral Expansion utilizing the remaining capacity in the pond complex. This expansion included all wastes in all forms.
- Part II Permit Package Submitted in June 2004

How We Got Here & Where We Are

- Peer Review
  - Questions Raised by Yard Regarding Complexity of Operation
- Results of Peer review
  - Continue Permit Application As Is
  - Even More Flexibility Added to Maintain Gypsum & Ash Separately in Pond Option
  - Strengthened our Argument for Not Having a Liner

Where We Are

IT'S DECISION TIME…….

Decision Needed for Gypsum Disposal

- ✓Gypsum Production Begins in 2009
- ✓Permit Process for Peninsula Option must begin now to have a facility in-place when Gypsum is produced

Basis for Matrix

This is the "Given and Assumed" Portion of the Problem

Ash Production Per Year (2003 numbers):

398,000 CY Fly Ash

77,600 CY Bottom Ash

Provided by Missy Hedgecoth:

Gypsum Production Per Year:

327,360 CY

Provided by FGD Team – Based on Calculation using a 2.8# Coal (Average) Burn – Assumes No Marketing Success

Basis for Matrix

Gypsum Production Begins in 2009

Twenty-Five Year Window – 2005 Present Worth Value (PWV)

Closure Cost are NOT included for any option since all options provide in excess of 25 years capacity

Dry Fly Ash Conversion Cost – Includes a $2,000,00 deduction that assumes the electrical power cost would be absorbed by the scrubber project.

Since the in pond option is at the 50% design stage and the peninsula option is at the Phase 1 stage, a 5% delta in contingencies has been added to the peninsula option to "level the playing field" between the pond and peninsula options.

Basis for Matrix

Operations Assumptions:

Gypsum Delivery Costs are assumed as equal between the Pond Option and the Peninsula Option – Evidenced by the similar distance and height pumped.

O&M cost for Gypsum in Pond Options are higher to account for more complex operation

- **Greater effort in maintaining rim ditches, additional engineering support and surveying costs, etc.**
- **O&M Costs have been reviewed and confirmed by HED (Larry Radford)**

Basis for Matrix

Peninsula Options Include:

Assumed cost of $ 500,000 (2005 dollars) for Karst Mitigation

Must be an Assumption – Exact Cost will not be known until construction is completed

Assumed cost of $250,000 (2005 dollars) for Stream Mitigation

Based on 1300 linear feet of impact and a "in lieu of" fee of $200/ft of impact per TDEC guidance

Presentation of Options

- There are Four Major Options included in this Matrix. For the purpose of comparison of options the cost for a liner in the pond (if required by TDEC) is omitted since it may be required for the lateral expansion of the dredge cell even if no gypsum is placed there. This decision is outside TVA's control. Gypsum disposal on the peninsula assumes a clay liner.
- As stated earlier, all options provide in excess of the required 25 years capacity.

Option 1

Wet Ash in Pond – Gypsum on Peninsula

- Includes Fix for Swan Pond Road
- Dredge Cells are Operational for the Next 25 Years
- Dry Fly Ash Conversion is Not Required During the 25 year Evaluation Period (Beyond 2029)

Option 2

Dry Ash in Pond – Gypsum on Peninsula

For Study Purposes

- No Fix for Dredge Cells on Swan Pond Required
- Gypsum Rim Ditching on Peninsula
- Dry Fly Ash Conversion Assumed to Occur in 2005

Option 3

Wet Ash in Pond – Gypsum in Pond

- Includes Fix for Swan Pond Road
- Assumes Combined Dredge Cell/Gypsum Rim Ditch Operation in Pond
- Dry Fly Ash Conversion is Required in 2016

Option 4

Dry Ash in Pond – Gypsum in Pond

For Study Purposes

- No Fix for Dredge Cells on Swan Pond Required
- Dry Fly Ash Conversion Assumed to occur in 2005

Presentation of Option 1 Costs

Wet Ash in Pond – Gypsum on Peninsula

Capital Costs (PWV)	$ 13,121,862
O&M Cost (PWV)	$ 10,629,977
Total Present Worth	$ 23,751,838

Details are in the Appendixes

Presentation of Option 2 Costs

Dry Ash in Pond – Gypsum on Peninsula

Capital Costs (PWV)	$ 38,447,448
O&M Cost (PWV)	$ 17,512,694
Total Present Worth	$ 55,960,142

Details are in the Appendixes

Presentation of Option 3 Costs

Wet Ash in Pond – Gypsum in Pond

Capital Costs (PWV)	$ 16,896,059
O&M Cost (PWV)	$ 13,270,679
Total Present Worth	$ 30,166,737

Details are in the Appendixes

Presentation of Option 4 Costs

Dry Ash in Pond – Gypsum in Pond

Capital Costs (PWV)	$ 33,952,770
O&M Cost (PWV)	$ 19,096,939
Total Present Worth	$ 53,049,709

Details are in the Appendixes

Summary of Present Worth by Option

Option 1	Option 2	Option 3	Option 4
Wet Ash in Pond – Gypsum on Peninsula	**Dry Ash in Pond – Gypsum on Peninsula**	**Wet Ash in Pond – Gypsum in Pond**	**Dry Ash in Pond – Gypsum in Pond**
Present Worth **$23,751,838**	Present Worth **$55,960,142**	Present Worth **$30,166,737**	Present Worth **$53,049,709**

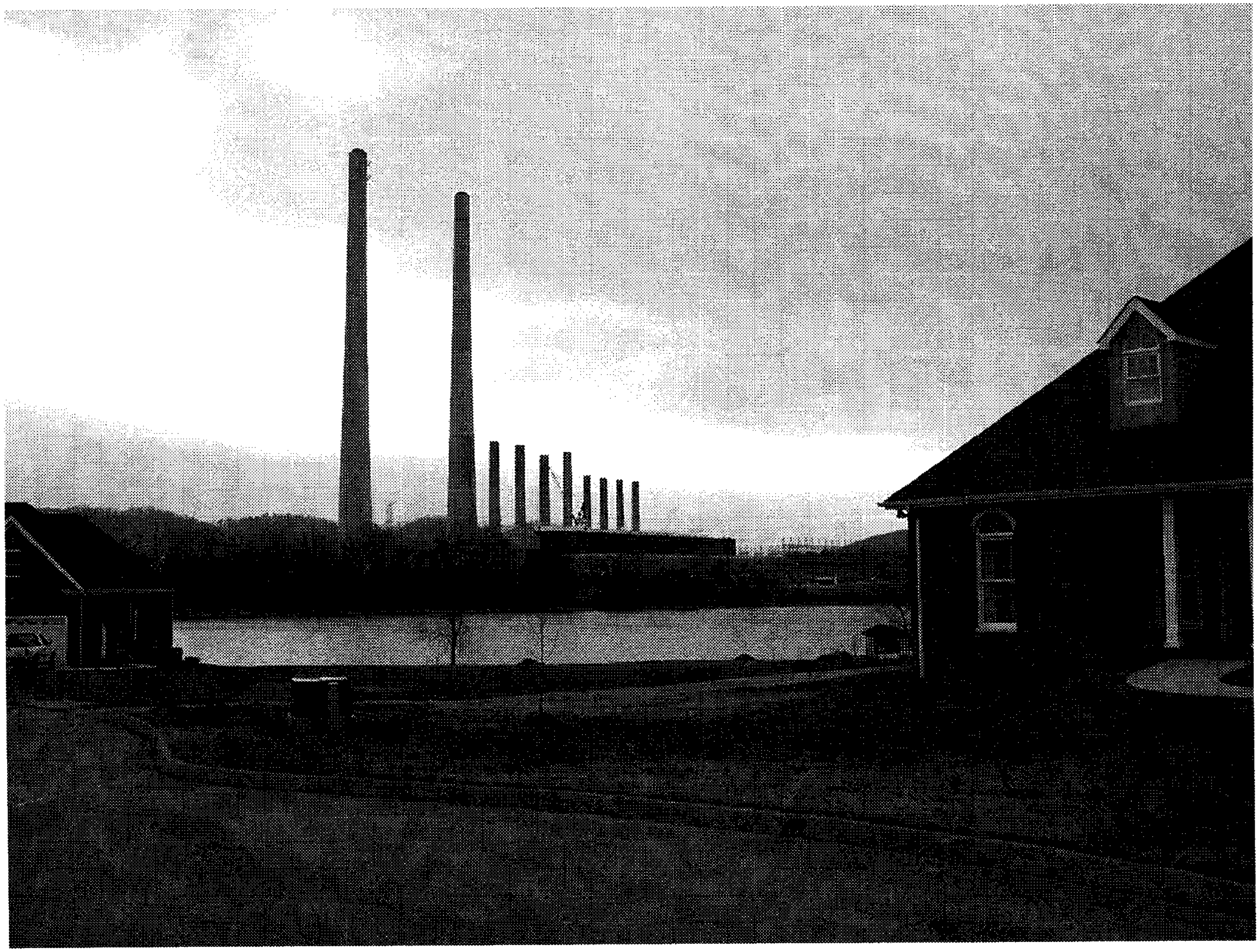
Summary of Non-Economic Factors by Option

Option 1 Wet Ash in Pond – Gypsum on Peninsula

- Straight forward design and operation
- Potential opposition of neighbors across the lake
- Involves ARAP & 404 Permitting
- Takes a State Wildlife Management Area
- Involves karst mitigation
- Adds a New NPDES Outfall

Option 3 Wet Ash in Pond – Gypsum in Pond

- Permit is already in process
- Less potential for public opposition
- Does not involve any greenfield impacts
- More operationally complex
- Utilizes potential ash disposal capacity for gypsum



There are two significant non-economic issues

- Proximity of neighbors across the lake
- Operational complexity of in-pond option

Engineering Recommendation

Recommended Option
Wet Ash in Pond – Gypsum
on Peninsula (Option 1)

HOWEVER, WE ALSO RECOMMEND THAT PERMITTING FOR OPTION 3 CONTINUE TO BE PURSUED.

- **Already in Permit Process**
- **No Additional Expense**
- **Lateral Expansion Permit Required for Ash Regardless of Gypsum Decision**
- **This Option Can Be a Fall Back Position If Public Opposition Delays Permitting Peninsula**

Path Forward

Begin Development of Permit Package for Peninsula

Collection of groundwater information has been ongoing

ARAP & 404 permits will be required

Milestone Dates are included in Appendix A

NPDES Outfall permitting will be pursued

Appendix A – Permitting Milestones

Appendix B – Cost Spreadsheets

Appendix C – Detailed Cost Sheets