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November 2, 2020

VIA ELECTRONIC FILING

Ms. Kimberley A. Campbell, Chief Clerk
North Carolina Utilities Commission
Dobbs Building
430 North Salisbury Street
Raleigh, North Carolina 27603

Re: DEC Late-Filed Exhibit Nos. 8, 9, 16, 17, 19, and 21
Docket No. E-7, Sub 1214

Dear Ms. Campbell:

Per the request of the North Carolina Utilities Commission during the Duke Energy Carolinas, LLC ("DEC") evidentiary hearing, enclosed for filing on behalf of DEC is Late-Filed Exhibit Nos. 8, 9, 16, 17, 19 and 21.

Please do not hesitate to contact me should you have any questions. Thank you for your assistance with this matter.

Very truly yours,

/s/Mary Lynne Grigg

MLG:kma

Enclosure

Duke Energy Carolinas, LLC's
Late-Filed Exhibit No. 8

Docket No. E-7, Sub 1214

Duke Energy Carolinas
Docket E-7, Sub 1214
Late-Filed Exhibit No. 8
October 23, 2020

Narrative Response for DEC LFE 8 – Request for 10- year plans

No versions of the CCR 10-year plan were found earlier than 2003.

Reports prior to 2003 that contain information similar to the 10-Year Plans, such as graphs showing expected ash production and potential projects to manage storage capacity in the basins, have also been provided.

Larry Morris
6/24/98

EXECUTIVE SUMMARY

Fuels Procurement Services
Ash Management
Five Year Business Plan

The attached Business Plan was prepared for Duke Energy's Fossil System. Factors such as the projected coal ash generation, basin and landfill capacities, environmental, legal and regulatory issues were considered to present an economic justification of the options available.

From a system basis, the main target stations for action in the immediate future include Marshall, Riverbend and Dan River. Riverbend and Dan River will require removal of material from their ash basins within the next few years. The plan has focused attention on addressing these stations in 1999. Marshall is the largest generating station with the least capacity in the ash basin and landfill, therefore, more attention has been devoted to this facility, based on the economic impacts to the entire system. Marshall's strategy is ongoing, with projected work being performed for the remainder of 1998. Of the remaining stations, Belews Creek is structured to maintain large volume ash sales into the concrete market, with Allen, Buck, Lee and Cliffside continuing to sluice to their basins, due to sufficient capacity. Cliffside will have the additional benefit of ash sales to concrete from the Unit #5 facility.

One key aspect of the Business Plan is the current and future commitment of contractors and marketers secured by Agreements. Bottom ash will continue to be sold by JTM from Marshall and Belews Creek, while Boral Technologies has marketing opportunities for fly ash till 2003 at these same facilities. Boral involvement at Marshall has the greatest impact financially due to an Agreement structured toward disposal as well as sales. The Business Plan and budget has attempted to minimize these expenses and create some flexibility in future direction of Ash Management. It may be possible to re-negotiate the Marshall Agreement based on past performance of Boral in sales volumes and revision of their involvement relating to off site fill projects, on site fill projects and disposal to the landfill.

In order to reduce the costs to Fossil Generation, Ash Management supports a competitive environment to get the best rates for services. Current activities are presently being discussed with Legal Counsel and Environmental Representatives in an effort to support this position, and decrease the amount of risk to Duke financially and legally. Ash Management also supports increased implementation of product into diversified markets, capable of generating more revenue to Duke, thus offsetting the costs. With this in mind, it is critical to provide funding to convince and secure end users of the value of using our product.

As we proceed into the 21st century, the emphasis should not only be on internal customers who provide funding, but also external customers who desire to use these products. Reduction of current costs cannot continue to decline without increasing revenue from all possible sources. Duke's management and overall company support is essential to increased efficiency of the Ash Management Team, thus providing greater benefit to the Corporation.

PROPOSED 1999-2003 ASH MANAGEMENT BUDGET FUNDING BY STATION

ASSUMPTIONS:

- No change in NOx and SOx or regulatory requirements which could affect salable quality of ash.

- Forecast projects are based on 1998 pond capacity curves which are subject to change based on annual ash produced, deregulation, chemical cleaning and other factors.

ALLEN:

- No change in 1999 fund accrual to meet a 2005 project (with 2007 pond expiration). Start accrual funding in 2002 to meet 2005 project. Assume recovery of 1,000,000 tons at \$5.00/ton = \$5,000,000 to on-site storage to add 3 years of capacity until 2008. Continue funding accrual at same rate beyond 2005 for project every 3 years.

- Although market may exist for off-site beneficial use engineered ash fill projects in the Allen/Belmont area, the 1995-1997 public relations experience was unfavorable, therefore on-site dry ash stacking is recommended for 2005. No revenue from off-site engineered ash fill projects should currently be assumed for 2005.

BELEWS CREEK:

- No change in 1999 fund accrual.

- No ash recovery projects by Duke forecast.

- Continue with Boral contract to market concrete grade ash until Dec 31, 2002 expiration subject to extension through incentives until Dec 31, 2007.

- Continue with JTM contract to market bottom ash until Dec 31, 1999 expiration subject to extension through incentives until Dec 31, 2004.

BUCK:

- No change with 1999 fund accrual to meet a 2009 project (with 2011 pond expiration). Start accrual funding in 2006 to meet 2009 project. Assume recovery of 500,000 tons at \$5.00/ton = \$2,500,000 to on-site storage to add 4 years of pond capacity until 2012. Potential off-site beneficial use engineered ash fill customers currently exist in Buck area. No projected revenue from off-site engineered ash fill projects should currently be assumed for 2009.

- A 1998 business case may be prepared for potential acceptance of Fieldcrest Cannon ash starting in 1999 at 5,000 tons/year. This would move project to 2007 or 2008. If business case is approved, start accrual funding in 2004 to meet 2007 project assuming same cost as above. Preliminary projected revenue from Fieldcrest Cannon could pay for as much as 50% of pond recovery costs for a 2009 project.

CLIFFSIDE:

- No change with 1999 fund accrual to meet a 2008 project (with 2010 pond expiration). Start accrual funding in 2005 to meet 2008 project. Assume recovery of 500,000 tons at $5.00/ton = $2,500,000 to on-site storage to add 4 years of pond life until 2012. No revenue from off-site engineered ash fill projects should currently be assumed for 2008.

- Continue with Southeastern Flyash contract to market concrete grade ash until March 31, 2000 expiration.

DAN RIVER:

- 1998 budget forecasts a 2001 project which is the expiration date of the pond. This date does not account for lead time required to develop, permit, engineer, bid, construct and close a project. Waiting until 2000 puts Station at the pond capacity curve with chemical cleaning and beyond pond capacity curve with chemical cleaning under regulated and non-regulated scenarios thereby risking Station "constipation".

- Budget 1999 for $600,000 at $3.00/ton construction cost for 200,000 tons of primary pond ash removal to dredged ash storage area to add 4 years of pond life until 2003. This will require 1998 fund accrual for 2000-2002 to be re-allocated to support a 1999 project. No revenue from off-site engineered ash fill projects should currently be assumed for 1999.

- Budget 1999 for $50,000 for baseline survey of primary pond/dredge ash storage area, engineering, environmental and ash management support of project.

- Proposed project scope includes starting site preparations by Summer 1999 to be moving ash in Fall 1999 in conjunction with outage periods. Total suspended solids (TSS) to be handled by either torturous path through primary pond or by pumping through discharge tower located between dry ash storage area and dredge pond to allow extended settling time back to secondary pond. Haul ash from primary pond to dredged ash storage area by truck and dry stack to engineered specifications. Cover soil source to be determined.

LEE:

- Budget 1999 fund accrual to meet a 2002 project (with 2004 pond expiration). Assume recovery of 400,000 tons at $5.00/ton = $2,000,000 to on-site storage to add 4 years of pond life until 2006. Off-site beneficial use engineered ash fill projects are considered case-by-case by SCDHEC regulators, therefore sufficient lead time will be needed if this option is exercised. No revenue from off-site engineered ash fill projects should currently be assumed for 2002.

RIVERBEND:

- 1998 budget forecasts a 2001 project which is the expiration date of the pond. This date does not account for lead time required to develop, permit, engineer, bid, construct and close a project. Waiting until 2001 puts Station at the pond capacity curve with and without with chemical cleaning under regulated and non-regulated scenarios thereby risking Station "constipation".

- Budget 1999 for $250,000 for marketing of off-site engineered ash fill projects, baseline topographic survey of pond/on-site placement area, pond preparation, engineering, environmental and ash management support of project.

- Budget 2000 for $2,500,000 at $5.00/ton construction cost for 500,000 tons of pond ash removal to on- or off-site location to add 4 years of pond life until 2003. This will require 1998 fund accrual for 2001-2002 to be re-allocated to support a 2000 project. The 1998 budget assumes no revenue from off-site engineered projects. The 2000 budget should assume some revenue return (comparable to Marshall) from off-site engineered ash fill projects based on marketing efforts spent in 1999.

- Budget 2000 for $1,250,000 at $5.00/ton construction cost for 250,000 tons of pond ash removal to on- or off-site location. This spreads project over two years to add a total (after 2nd year) of to add 4 years of pond life until 2003. This will require 1998 fund accrual for 2001-2002 to be re-allocated to support a 2000 project. The 1998 budget assumes no revenue from off-site engineered projects. The 2000 budget should assume some revenue return (comparable to Marshall) from off-site engineered ash fill projects based on marketing efforts spent in 1999.

- Budget 2001 for $1,250,000 at $5.00/ton construction cost for 250,000 tons of pond ash removal to on- or off-site location. This spreads project over two years to add a total (after 2nd year) of 4 years of pond life until 2003. This will require 1998 fund accrual for 2001-2002 to be re-allocated to support a 2001 project. The 1998 budget assumes no revenue from off-site engineered projects. The 2001 budget should assume some revenue return (comparable to Marshall) from off-site engineered ash fill projects based on marketing efforts spent in 1999.

1999 Marshall Steam Station

Budget Information

Work to be performed

- Excavate and Load 150,000 tons of ash from the active pond.
- Maintain and perform dust control existing (as of 5/13/98) haul roads.
- Recover and Load 10,000 tons of Mill Rejects.
- Excavate and Load 50,000 tons of ash from pond system as produced by station operation.

Equipment to be used (2080 hours)

- Cat 350 excavator
- Cat 970 loader
- Cat D4H LGP bulldozer
- Motorgrader
- Road tractor and tank trailer
- Explorer
- Pickup truck

Labor

- Driver (contract)
- Operators (2)
- Engineer/Supervisor

Equipment Costs (assumes equipment from the pool)

Total = $110,116.00 (Using 1998 chargeback rates)

Labor Costs

- Excavate and Load 150,000 tons of ash - 1950 hours - $90,090.00
- Maintain and perform dust control - 2580 hours - $53,135.20
- Recover and Load 10,000 tons of mill rejects - 200 hours - $9240.00
- Excavate and Load 50,000 tons of ash - 1050 hours - $48,510.00
- Supervision - 2080 hours - $150,091.20

Total = $351,066.40 (Assumes 1998 labor rates)

Please note that the above costs are based on information provided on 5/07/98 and no other work assignments have been made. It should be assumed that, if other work assignments are made, then better use of equipment and labor could be possible to reduce the overall expense to the customer. Fuel costs have been assumed to be included in the chargeback rates that were used.

Thomas R Mitchell
06/08/98 11:20 AM

To: Joseph White Jr/Corp/DukePower@DukePower
cc: Larry D Evans/Gen/DukePower@DukePower
Subject: Re: EHS Support 1999 through 2003

Please budget for one EHS employee each year.

Joseph White Jr

Joseph White Jr

06/08/98 11:08 AM

To: Thomas R Mitchell/Corp/DukePower@DukePower
cc: Roy H Hall Jr/Corp/DukePower@DukePower, Larry D Evans/Gen/DukePower@DukePower
Subject: EHS Support 1999 through 2003

Tom , in my discussion last Thursday with our customer Larry Morris. Mr. Morris wanted to see more support data to our budget suggestions. I'm working on that portion this week. While discussing the budget Environmental Health and Safety Support was questioned as well. Larry Evans and I talked a little about our needs for the next five years as well, and Larry Evans needs to know what amount of support will they need to provide Ash Management over the next five year . Larry Evans also needs to know if we still need the one person equivalent as he has provided us with in the past. In addition to that he will need to know if we plan to use Ron Lewis to handle inspections on fill projects if so how many projects should be used for budgeting purposes.

Can you please send Larry Evans and I the Ash Management needs of EHS for the next five years.
My thoughts are that we will plan for off site projects as directed by our customer for Marshall and perform our own environmental inspections through internal resources.

Thanks

1999 Budget Projections 8969

Station Number		7200	7210	7220	7230	7250	7260	7280	7290		
Description	SourceCode	Marshall	Riverbend	Buck	Belews Creek	Dan River	Cliffside	Lee	Allen	Total	
Incentive Goals	1E	$9,235	$1,600	$215	$2,950	$2,150	$1,000	$215	$400	$17,765	5%
Labor	11	$184,700	$32,000	$4,300	$59,000	$43,000	$20,000	$4,300	$8,000	$355,300	TRM
Assoc Fees	3A	$675	$103	$103	$675	$238	$103	$0	$103	$2,000	TRM
Marketing	31	$7,720	$3,366	$412	$3,605	$2,987	$2,985	$0	$925	$22,000	TRM
Expenses	51	$1,000	$250		$500	$250				$2,000	TRM
Sub Total		$203,330	$37,319	$5,030	$68,730	$48,625	$24,088	$4,515	$9,428	$399,065	
WID		720050118	721050118	722050118	723050118	725050118	726050118	728050118	729050118		
Revenues											
Ash Fill Projects		($600,000)								($600,000)	
R&D		0	0	0	0	0	0	0	0	$0	
Bottom Ash (UTM)		($120,000)			($100,000)					($220,000)	
Southeastern Fly Ash							($100,000)			($100,000)	
Boral Technologies		($16,000)			($1,200,000)					($1,216,000)	
Sub Total		($736,000)	$0	$0	($1,300,000)	$0	($100,000)	$0	$0	($2,136,000)	
Grand Total Operating		($532,670)	$37,319	$6,030	($1,233,270)	$48,625	($75,912)	$4,515	$9,428	($2,136,000)	
Capital Expenditures											
		$0									
Grand Total Capital		$0								$0	

Notes:

Rev.1 6/8/98

2000 Budget Projections 8969

Station Number		7200	7210	7220	7230	7250	7260	7280	7290		
Description	**SourceCode**	**Marshall**	**Riverbend**	**Buck**	**Belews Creek**	**Dan River**	**Cliffside**	**Lee**	**Allen**	**Total**	
Incentive Goals	1E	$9,697	$1,680	$226	$3,098	$2,258	$1,050	$226	$420	$18,653	5%
Labor	11	$191,165	$33,120	$4,451	$61,065	$44,505	$20,700	$4,451	$8,280	$367,736	TRM
Assoc Fees	3A	$716	$109	$109	$716	$252	$109	$0	$109	$2,120	TRM
Marketing	31	$8,183	$3,568	$437	$3,821	$3,166	$3,164	$0	$981	$23,320	JW
Expenses	51	$1,060			$530					$1,590	JW
Sub Total		$210,820	$38,477	$5,222	$69,229	$50,181	$25,023	$4,678	$9,790	$413,419	
WID		720050118	721050118	722050118	723050118	725050118	726050118	728050118	729050118		
Revenues											
Ash Fill Projects		($600,000)								($600,000)	
R&D										$0	
Bottom Ash (UTM)		($140,000)			($100,000)					($240,000)	
Southeastern Fly Ash							($100,000)			($100,000)	
Boral Technologies		($16,000)			($1,200,000)					($1,216,000)	
Sub Total		($756,000)	$0	$0	($1,300,000)	$0	($100,000)	$0	$0	($2,156,000)	
Grand Total Operating		($545,180)	$38,477	$5,222	($1,230,771)	$50,181	($74,977)	$4,676	$9,790	($2,158,000)	
Capital Expenditures											
		$0									
Grand Total Capital		$0								$0	

Notes:

Rev.1 6/8/98

2001 Budget Projections 8969

Station Number		7200	7210	7220	7230	7250	7260	7280	7290		
Description	SourceCode	Marshall	Riverbend	Buck	Belews Creek	Dan River	Cliffside	Lee	Allen	Total	
Incentive Goals	1E	$10,182	$1,764	$237	$3,252	$2,370	$1,103	$237	$441	$19,586	5%
Labor	11	$197,855	$34,279	$4,606	$63,202	$46,063	$21,425	$4,606	$8,570	$380,606	TRM
Assoc Fees	3A	$500	$100	$100	$500	$100	$100	$0	$100	$1,500	TRM
Marketing	31	$7,500	$2,400	$400	$3,500	$2,900	$2,900	$0	$900	$20,500	JW
Expenses	51	$1,088			$544					$1,632	JW
Sub Total		$208,944	$36,779	$5,106	$67,746	$49,063	$24,425	$4,606	$9,570	$404,239	
WID		720050118	721050118	722050118	723050118	725050118	726050118	728050118	729050118		
Revenues											
Ash Fill Projects		($600,000)								($600,000)	
R&D										$0	
Bottom Ash (UTM)		($120,000)			($100,000)					($220,000)	
Southeastern Fly Ash							($100,000)			($100,000)	
Boral Technologies		($16,000)			($1,200,000)					($1,216,000)	
Sub Total		($736,000)	$0	$0	($1,300,000)	$0	($100,000)	$0	$0	($2,136,000)	
Grand Total Operating		($529,056)	$36,779	$5,106	($1,232,254)	$49,063	($75,576)	$4,606	$9,570	($2,136,000)	
Capital Expenditures											
		$0									
Grand Total Capital		$0								$0	

Notes:

Rev.1 6/8/98

2002 Budget Projections 8969

Station Number		7200	7210	7220	7230	7250	7260	7280	7290		
Description	SourceCode	Marshall	Riverbend	Buck	Belews Creek	Dan River	Cliffside	Lee	Allen	Total	
Incentive Goals	1E	$10,691	$1,852	$249	$3,415	$2,489	$1,158	$249	$463	$20,665	5%
Labor	11	$204,780	$35,479	$4,767	$65,414	$47,675	$22,174	$4,767	$8,870	$393,927	TRM
Assoc Fees	3A	$500	$100	$100	$500	$100	$100	$0	$100	$1,500	TRM
Marketing	31	$7,500	$2,400	$400	$3,500	$2,900	$2,900	$0	$900	$20,500	JW
Expenses	51	$1,117			$559					$1,676	JW
Sub Total		$213,898	$37,979	$5,267	$69,973	$50,676	$25,174	$4,767	$9,870	$417,604	
WID		720050118	721050118	722050118	723050118	725050118	726050118	728050118	729050118		
Revenues											
Ash Fill Projects		($600,000)								($600,000)	
R&D										$0	
Bottom Ash (JTM)		($120,000)			($100,000)					($220,000)	
Southeastern Fly Ash							($100,000)			($100,000)	
Boral Technologies		($16,000)			($1,200,000)					($1,216,000)	
Sub Total		($736,000)	$0	$0	($1,300,000)	$0	($100,000)	$0	$0	($2,136,000)	
Grand Total Operating		($522,102)	$37,979	$5,267	($1,230,027)	$50,676	($74,826)	$4,767	$9,870	($2,136,000)	
Capital Expenditures											
		$0									
Grand Total Capital		$0								$0	
Notes:											

2003 Budget Projections 8969

Station Number		7200	7210	7220	7230	7250	7260	7280	7290		
Description	**SourceCode**	**Marshall**	**Riverbend**	**Buck**	**Belews Creek**	**Dan River**	**Cliffside**	**Lee**	**Allen**	**Total**	
Incentive Goals	1E	$11,225	$1,945	$261	$3,586	$2,613	$1,216	$261	$486	[illegible]	5%
Labor	11	$211,947	$36,721	$4,934	$67,704	$49,343	$22,950	$4,934	$9,180	[illegible]	TRM
Assoc Fees	3A	$500	$100	$100	$500	$100	$100	$0	$100	[illegible]	TRM
Marketing	31	$7,500	$2,400	$400	$3,500	$2,900	$2,900	$0	$900	[illegible]	JW
Expenses	51	$1,147			$574					[illegible]	JW
Sub Total		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
WID		720050118	721050118	722050118	723050118	725050118	726050118	728050118	729050118		
Revenues											
Ash Fill Projects		($600,000)								[illegible]	
R&D										$0	
Bottom Ash ([illegible])		($120,000)			($100,000)					[illegible]	
Southeastern Fly Ash							($100,000)			[illegible]	
Boral Technologies		($16,000)			($1,200,000)					[illegible]	
Sub Total		[illegible]	$0	$0	[illegible]	$0	[illegible]	$0	$0	[illegible]	
Grand Total Operating		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Capital Expenditures

	$0	
Grand Total Capital	[illegible]	$0

Notes:

1999 Budget Projections COMBINED

Station Number	7200	7210	7220	7230	7250	7260	7280	7290	
Description	Marshall	Riverbend	Buck	Belews Creek	Dan River	Cliffside	Lee	Allen	Total
Pond Maint.									
* Labor	$351,000								$351,000
EHS Environmental									
* Labor	$38,700	$12,000	$500	$40,000	$500	$500	$500	$500	$93,200
* Expenses	$2,000	$1,680	$680	$1,800	$680	$680	$680	$600	$8,800
Corp/Properties									
* Labor									$0
Fossil/Allocations									
* Labor									$0
* Allocations	$1,700	$200	$200	$1,000	$400	$200	$50	$200	$3,950
Real Estate Allocation									
* Labor	$1,000	$2,500	$200		$5,000				$8,700
Disposal Contract									
* Boral	$750,000								$750,000
* JTM									$0
* Southeastern									$0
Transportation									
* Auto & Truck Expense	$100,000								$100,000
* Fuel	$20,000								$20,000
Ash Projects									$0
Park / Off site	$688,000								$688,000
Pond Prep / Maint.		$150,000							$150,000
On Site Project					$600,000				
Products / R&D	$100,000								$100,000
									$0
									$0
Sub Total	$2,052,400	$168,380	$1,680	$42,800	$606,680	$1,380	$1,230	$1,300	$2,873,650
Revenues	($736,000)	$0	$0	($1,300,000)	$0	($100,000)	$0	$0	($2,138,000)
Ash Mgmt	$203,330	$37,319	$5,030	$66,730	$48,625	$24,088	$4,515	$9,428	$399,065
Grand Total Operating	$1,519,730	$205,699	$6,610	($1,190,470)	$655,205	($74,632)	$5,745	$10,728	$1,136,715

Capital Expenditures

Potential Capital Project On Site @ Marshall a preliminary proposal attached as support to our request.

Grand Total Capital	$0								$0

Notes:

* The recommended dollars for Pond Maintenance, Auto, Truck and Fuel for Marshall were derived from the DE&S budget requirements for 1999and Inflated for years 2000 through 2003.See attached Pond Maint. document.

* Marshall expenses are based on 300,000 tons of ash provided as supply arrangement out of the pond and silo combined .
* The Boral contract dictates a minimum of $750,000 dollars minimum for disposal at Plant Marshall. Ash Management suggest that we budget for the total amount possible based on 500,000 tons of silo ash generated. Ash Management has projected off site projects with the remaining potential disposal dollars and move ash off site at an overall lower cost to Marshall with revenues. Projected cost to truck ash less than ten miles at a rate of $1.00 per ton to Boral for loading ash into carrier and $2.35 per ton for trucking.The projected revenues will be offered @ $2.35 per ton delivered if acceptable otherwise lower rates may be offered.

* Ash Management would offer ash without trucking @ $1.00 per ton.

* Riverbend requested dollars for projects in 2000 will require Mobilization, and maintenance in 1999. The current plan is to prepare the area designated for ash on site stacking with the intent to supply ash to customers and recover projected expense dollars.

* Dan River plans for the requested dollars would be used to dry stack ash on site at an estimated cost of $3.00 per ton of ash removed and placed.

* Included in the Park/ Off site dollars are labor dollars for a portion of Project Management cost through the Major Projects Group.

* Products / R&D requested dollars needed to fund potential product market with cost reduction capibilities in the future.

2000 Budget Projections COMBINED

Station Number	7200	7210	7220	7230	7250	7260	7280	7290	
Description	Marshall	Riverbend	Buck	Belews Creek	Dan River	Cliffside	Lee	Allen	Total
Pond Maint.									
* Labor	$363,285								$363,285
EHS Environmental									
* Labor	$40,055	$12,420	$518	$41,400	$518	$518	$518	$518	$96,462
* Expenses	$2,053	$1,725	$698	$1,848	$698	$698	$698	$616	$9,035
Corp. Properties									
* Labor									$0
Fossil Allocations									
* Labor									$0
* Allocations	$1,745	$205	$205	$1,027	$411	$205	$51	$205	$4,055
Real Estate Allocation									
* Labor	$1,027	$2,567	$205	$0	$5,134	$0	$0	$0	$8,932
Disposal Contract									
* Boral	$776,250								$778,250
* JTM									$0
* Southeastern									$0
Transportation									
* Auto & Truck Expense	$102,670								$102,670
* Fuel	$20,000								$20,000
Ash Projects									$0
Park / Off site	$688,888								$688,888
Pond Prep / Maint.		$2,550,000							$2,550,000
On Site Project									
Products / R&D									$0
									$0
									$0
Sub Total	$1,995,973	$2,566,917	$1,626	$44,275	$6,760	$1,421	$1,267	$1,339	$4,619,678
Revenues	($756,000)	$0	$0	($1,300,000)	$0	($100,000)	$0	$0	($2,156,000)
Ash Mgmt.	$210,820	$38,477	$5,222	$69,229	$50,181	$25,023	$4,676	$9,790	$413,419
Grand Total Operating	$1,450,793	$2,605,394	$6,848	($1,186,496)	$56,941	($73,556)	$5,943	$11,129	$2,876,996
Capital Expenditures									
Grand Total Capital	$0								$0

Notes:

Rev.1 6/8/98

2001 Budget Projections COMBINED

Station Number	7200	7210	7220	7230	7250	7260	7280	7290	
Description	Marshall	Riverbend	Buck	Belews Creek	Dan River	Cliffside	Lee	Allen	Total
Pond Maint.									
* Labor	$376,000								$376,000
EHS Environmental									
* Labor	$40,000	$800	$800	$40,000	$400	$400	$400	$400	$83,200
* Expenses	$2,000	$680	$680	$2,000	$680	$680	$680	$600	$8,000
Corp. Properties									
* Labor									$0
Fossil Allocations									
* Labor									$0
* Allocations	$1,700	$200	$200	$1,000	$400	$200	$50	$600	$4,350
Real Estate Allocation									
* Labor	$200	$100	$100	$100	$100	$100	$100	$100	$900
Disposal Contract									
* Boral	$803,419								$803,419
* JTM									$0
* Southeastern									$0
Transportation									
* Auto & Truck Expense	$100,000								$100,000
* Fuel	$20,000								$20,000
Ash Contractor							$175,000		$175,000
Ash Projects									$0
Park / Off site	$688,000								$688,000
Pond Prep / Maint.									
On Site Project									$0
Products / R&D									$0
									$0
Sub Total	$2,031,319	$1,780	$1,780	$43,100	$1,580	$1,380	$176,230	$1,700	$2,258,889
Revenues	($736,000)	$0	$0	($1,300,000)	$0	($100,000)	$0	$0	($2,136,000)
Ash Mgmt.	$208,944	$36,779	$5,106	$87,748	$49,063	$24,425	$4,606	$9,670	$404,239
Grand Total Operating	$1,602,262	$38,659	$6,886	($1,189,154)	$50,643	($74,196)	$180,836	$11,270	$527,107
Capital Expenditures									
Grand Total Capital	$0								$0

Notes:

Rev.1 6/8/98

2002 Budget Projections COMBINED

Station Number	7200	7210	7220	7230	7250	7260	7280	7290	
Description	Marshall	Riverbend	Buck	Belews Creek	Dan River	Cliffside	Lee	Allen	Total
DE&S Pond Maint.									
* Labor	$389,160								$389,160
EHS Environmental									
* Labor	$40,000	$800	$800	$40,000	$400	$400	$400	$400	$83,200
* Expenses	$2,000	$680	$680	$2,000	$680	$680	$680	$600	$8,000
Corp. Properties									
* Labor									$0
Fossil Allocations									
* Labor									$0
* Allocations	$1,700	$200	$200	$1,000	$400	$200	$50	$600	$4,350
Real Estate Allocation									
* Labor	$200	$100	$100	$100	$100	$100	$100	$100	$900
Disposal Contract									
* Boral	$831,538								$831,538
* JTM									$0
* Southeastern									$0
Transportation									
* Auto & Truck Expense	$100,000								$100,000
* Fuel	$20,000								$20,000
Ash Contractor									$0
Ash Projects									$0
Park / Off site	$688,000						$1,850,000		$2,538,000
Pond Prep / Maint.									$0
On Site Project									$0
Products / R&D									$0
Sub Total	$2,072,598	$1,780	$1,780	$43,100	$1,580	$1,380	$1,851,230	$1,700	$3,975,148
Revenues	($736,000)	$0	$0	($1,300,000)	$0	($100,000)	$0	$0	($2,138,000)
Ash Mgmt.	$213,898	$37,979	$5,287	$69,973	$50,675	$25,174	$4,767	$9,870	$417,604
Grand Total Operating	$1,550,496	$39,759	$7,047	($1,186,927)	$52,255	($73,446)	$1,855,997	$11,570	$2,256,752
Capital Expenditures									
Grand Total Capital	$0								$0

Notes:

2003 Budget Projections COMBINED

Station Number	7200	7210	7220	7230	7250	7260	7280	7290	
Description	Marshall	Riverbend	Buck	Belews Creek	Dan River	Cliffside	Lee	Allen	Total
DE&S Pond Maint.									
* Labor	$402,781								$402,781
EHS Environmental									
* Labor	$40,000	$800	$800	$40,000	$400	$400	$400	$400	$83,200
* Expenses	$2,000	$680	$680	$2,000	$680	$680	$680	$600	$8,000
Corp. Properties									
* Labor									$0
Fossil Allocations									
* Labor									$0
* Allocations	$1,700	$200	$200	$1,000	$400	$200	$50	$600	$4,350
Real Estate/Allocation									
* Labor	$200	$100	$100	$100	$100	$100	$100	$100	$900
Disposal Contract									
* Boral	$860,642								$860,642
* JTM									$0
* Southeastern									$0
Transportation									
* Auto & Truck Expense	$100,000								$100,000
* Fuel	$20,000								$20,000
Ash Contractor									$0
Ash Projects									$0
Park / Off site	$688,000								$688,000
Pond Prep / Maint.									$0
On Site Project									$0
Products / R&D									$0
Sub Total	$2,115,323	$1,780	$1,780	$43,100	$1,580	$1,380	$1,230	$1,700	$2,167,873
Revenues	($738,000)	$0	$0	($1,300,000)	$0	($100,000)	$0	$0	($2,138,000)
Ash Mgmt.	$221,095	$39,221	$5,434	$72,277	$52,343	$25,950	$4,934	$10,180	$431,436
Grand Total Operating	$1,600,418	$41,001	$7,214	($1,184,823)	$53,923	($72,670)	$6,164	$11,880	$463,309
Capital Expenditures									
Grand Total Capital	$0								$0

Notes:

ASH MANAGEMENT PLAN

FOR

DAN RIVER STEAM STATION

Duke Energy Corporation

February 1999

CONTENTS

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SUMMARY

EXECUTIVE SUMMARY AND RECOMMENDATIONS

Dan River Station ash is at full pond capacity in the third quarter of 2000, based on no chemical cleaning done until after 2000. Therefore a spring 2000 project is recommended with pre-project activities in 1999. Project schedules show choices between single and two-phased construction. 200,000 tons (240,000 cubic yards) is recommended for removed from the Primary Cell by methods described in this Plan. Removal of this volume allows for four (4) additional years of pond storage.

Concurrent efforts are ongoing to develop a potential off-site project with the City of Eden. The off-site project could substitute for all or part of the on-site project if economically feasible. Application of ash benefication technologies is not recommended for Dan River Steam Station.

If project budget accrual funding does not allow for scope recommended by this Plan, then the project can be executed with a reduced volume within the same proposed schedules. Removal method of ash pond ash would require adjusting. Future need to perform pond removal would be adjusted to a more frequent basis (1, 2,or 3 years) depending on actual volume removed in 2000.

TEXT

INTRODUCTION

Planning for storage and/or beneficial reuse of coal ash is an on-going process through the life of Dan River Steam Station (DRSS). The type of coal burned, the operational characteristics of DRSS units, and environmental requirements influence Dan River's ash management plans. The purpose of this plan is to review DRSS ash management plans and develop plans that include at least annual review of individual station ash management plans, focusing on cost-effective environmental management and beneficial use options.

Dan River has an ash sluice system and ash basin for co-management of high and low volume waste streams that are regulated per an NPDES (National Pollutant Discharge Elimination System) permit. This includes co-management of coal ash and pyrites with other inflows to the ash basin that includes storm water runoff (including runoff from the coal pile), powerhouse basement sump flow, sanitary waste effluent, and boiler chemical cleaning waste. Ash is periodically removed from the Dan River ash basin and stored within the drainage area of the basin to maintain the free water volume required per the station's NPDES permit and as permitted by the NCDENR Division of Water.

Group EH&S has initiated discussions with NCDENR about proposed ash management planning with a focus on beneficial use of ash (i.e. on-site structural fill projects for beneficial use of ash).

Objectives:

1. Develop process for station review / revision of ash management plans and interface with station business plan and station permits / management plans for air, land, groundwater and surface water.
2. Develop ash management plans that include ash reuse options (consider ash basins, landfills, off-site storage, ash enhancement, etc.).
3. Estimate costs for ash storage that include ash reuse options and ensure compliance with proposed/pending environmental regulations
4. Provide an annual report detailing projected ash production, ash basin storage capacity, ash landfill storage capacity, ash removed and/or landfilled quantities, etc.

Operational Planning Team:

Core team members are chosen from groups that need to interface in the planning process. These individuals are responsible for providing interface with their respective group to provide the necessary expertise and information to develop and implement ash management plans. The present core team consists of the following groups and members:

- Team Sponsor - Fuels Procurement Coal Ash Group Manager (Steve Immel)
- Team Coordinator - Fuels Procurement Coal Ash (Jeff Newell)
- Fossil EH&S (Randy Price)
- Fossil Maintenance/Nde (Gary Blevins)
- Water Protection-Group EH&S (Ron Lewis)

The following group and support members:
- Fossil Convert Energy (Henry Fort)
- Fossil Budget (Greg Roberts)
- Waste-Group EH&S (Larry Evans)
- Air-Group EH&S (Bill Horton)
- Environmental Engineering-Group EH&S (Bill Miller)
- Research and Development (Tim Shawver)
- Fossil Maintenance/Nde Manager (Danny Hardin)
- Fossil Group EH&S Manager (John Calhoun)
- Fossil Station Manager (Marc Susinno)

Operational Planning Schedule for Ash Management Plans

The following is a listing of suggested ash management planning activities for each quarter:

Last quarter of each year (October through December):
- Core team members meet to review ash management plan
- Identify tentative ash management needs for station and budget requirements for the next five years
- Review and identify potential ash enhancement options
- Review and identify research and development needs for life-of-station
- Plan and budget for physical survey of DRSS ash storage sites as needed

First quarter of each year (January through March):
- Designated team members meet with management to review tentative DRSS Ash Management Plan
- Update DRSS Ash Management Plan and communicate budget needs for operational planning

Second quarter of each year (April through June):
- Core team reviews operational plans and updates any changes

Third quarter of each year (July through September):
- Core team review final operation plan and updates any changes

SYSTEM DESCRIPTION

Process and Waste Stream

The flyash produced by Units 1 and 2 is collected in electrostatic precipitators, routed to a hydroveyor for mixing with water, and piped to an air separator tank. The air separator tank, which services Units 1 and 2, provides sufficient head to convey the ash slurry by gravity through a single pipeline approximately 1000 ft. in length. The pipeline discharges to the Primary Cell of the Ash Basin at elevation 540-ft. The bottom ash produced by Units 1 and 2 is collected at the bottom of the boilers, mixed with water, and pumped through a pipeline that joins the flyash pipeline of Units 1 and 2 in the Boiler Room. Pyrites generated by Units 1 and 2 are collected and pumped through a pipeline that also merges with the flyash pipeline of Units 1 and 2.

The flyash and bottom ash produced by Unit 3 is collected and conveyed in a similar manner to that produced by Units 1 and 2. The flyash is conveyed by gravity from the Unit 3 air separator tank through a single pipeline which generally parallels the Units 1 and 2 pipeline and discharges to the Primary Cell of the Ash Basin at elevation 540-ft. The bottom ash produced by Unit 3 is collected at the bottom of the boiler, mixed with water, and pumped through a pipeline that joins the Unit 3 flyash pipeline. In addition, pyrites generated by Unit 3 are collected and pumped with Unit 3 bottom ash.

In addition to coal ash and pyrites, there are other inflows to the Primary Cell which include stormwater runoff (including runoff from coal pile), miscellaneous equipment cooling water, powerhouse floor drains, sanitary waste effluent, a yard drainage sump, and boiler chemical cleaning wastes.

Ash Basin

The Ash Basin at Dan River Steam Station consists of the Primary Cell, Dredge Pond, Dry Ash Storage Area, Secondary Cell, and associated outlet works. An earthen divider dike separates the Primary Cell from the Secondary Cell. A reinforced concrete drainage tower with a 36-inch diameter reinforced concrete pipe drains the Primary Cell to the Secondary Cell. Through the addition or removal of stoplogs, the drainage tower provides a means to control the water surface elevation in the Primary Cell.

Primary Cell

The Primary Cell functions as an initial settling pond and has a total ash storage capacity of approximately 744 acre-ft. The natural drainage area of the Primary Cell is 28.2 acres. Coal ash produced at the Powerhouse is piped to the Ash Basin in slurry and discharged to the Primary Cell. The drainage from an additional 11 acres of plant roofs and yard area (including 4.2 acres of coal pile) are routed to the yard sump, which discharges to the Primary Cell, bringing the total Primary Cell drainage area to 39.2 acres. The nominal crest elevation of the dike, which forms the Primary Cell, is 540 ft. Per the physical survey of the Ash Basin that was performed in August 1993, the water surface area at elevation 535-ft. (nominal full pond elevation) is 15.9 acres.

Secondary Cell

The Secondary Cell functions primarily as a polishing pond that provides additional settling time before discharging to the Dan River. A reinforced concrete drainage tower with a 36-inch diameter reinforced concrete pipe drains the Secondary Cell to the Dan River. Similar to the Primary Cell, the water surface elevation of the Secondary Cell is controlled by the addition or removal of stoplogs from the drainage tower. The Ash Basin discharges water to the Dan River at outfall 002 regulated under the National Pollutant Discharge Elimination System (NPDES) by NPDES Permit No. NC0003468.

The total drainage area of the Secondary Cell is 142.6 acres and consists of the Primary Cell (39.2 acres), the Dredge Pond Area (24.5 acres), the Dry Ash Storage Area (52.1 acres), the Secondary Cell itself (13.4 acres), and an area upland of the Secondary Cell (13.4 acres). The nominal crest elevation of the dike that forms the Secondary Cell is 530 ft. Per the August 1993 survey, the water surface area at elevation 525-ft. (nominal full pond elevation) is 11.7 acres.

Dredge Pond

Earthen dikes having a nominal crest elevation of 560 ft form the Dredge Pond. The total ash storage capacity of the Dredge Pond is approximately 100,000 tons and is essentially full at present. The drainage area consists of the 7.3-acre pond and 17.2 acres upland of the pond. The dredge Pond conveys drainage from the Dry Ash Storage Area through two 24-inch diameter reinforced concrete pipes installed near the north abutment of the Dredge Pond Dike.

Dry Ash Storage Area

The Dry Ash Storage Ash is also formed by earthen dikes, which have a nominal crest elevation of 560-ft. An ash fill having a storage capacity of approximately 250,000 cubic yards was designed for this effort. The 250,000 cubic yard fill can be expanded in the future as necessary to accommodate several hundred thousand additional cubic yards of ash. The drainage area of the Dry Ash Storage Area consists of 52.1 acres plus the 24.5-acre Dredge Pond Area for a total of 76.6 acres. A reinforced concrete drainage tower with a 36-inch reinforced concrete pipe drains the Dry Ash Storage Area to the Secondary Cell.

1994 ASH RECOVERY PROJECT

In the summer of 1994, approximately 100,000 cubic yards (83,000 dry ash tons) of ash was removed from the Primary Pond and placed in the Dry Ash Storage Area. The ash was covered and vegetated in accordance with the Erosion Control Plan.

1997 ASH RECOVERY PROJECT

In the summer of 1997, the existing soil cover was removed and approximately 125,388 cubic yards (104,500 dry ash tons) were placed in the Dry Ash Storage Area. The 1997

project was stopped short of its 150,000 cubic yard goal due to the elevated total suspended solids in basin water samples. Ash was placed in a controlled manner with a compaction requirement of 90% standard Proctor density. Cover soil borrow was taken from an embankment west of the Dry Ash Storage Area. The ash was covered and vegetated in accordance with the Erosion Control Plan. An access road was built to the completed grassed "ash plateau" and post-use was leased to the Eden Family YMCA for a soccer field. A research and development project entitled "Investigation of Potential Increases of Aquatic Toxicity Associated with Ash Basin Sediment Reclamation Activities" was conducted at the Dan River pond outfall during the 1997 ash removal project.

REGULATORY STATUS AND COMPLIANCE

Water Quality

The Dan River Ash Basin System is utilized for the treatment and/or storage of the station's high volume wastes (flyash and bottom ash) and low volume wastes (chemical cleaning wastes, regeneration wastes, sump wastewaters, coal pile runoff, etc.). The discharge of the ash basin system is permitted as outfall 002 of the Dan River NPDES Permit (# NC0003468). There have been no significant non-compliances associated with the Dan River NPDES Permit.

In the past, coal ash has been removed from the ash basin system and stored in the ash basin drainage area. Once properly stored, the ash is covered with adequate cover soil and seeded. The "Dry Ash Storage Area" was approved by the North Carolina Division of Water Quality, and is considered part of the permitted ash basin system. The Division of Water Quality on an as needed basis approves the ash removal and storage process. To date, approximately 200,000 tons of ash has been removed and stored in the Dry Ash Storage area. Approximately 10 to 20 years of capacity remains in the Dry Ash Storage Area.

The Division of Water Quality of North Carolina has issued an Ash Reuse Permit (#WQ0003253) as a non-discharge permit for the utilization of coal ash (fly and bottom ash) removed from the Dan River Ash Basin. Coal ash removed from the basin must be utilized in applications specified in the ash reuse permit. The applications, including those for on-site utilizations, must meet all conditions of the permit including setback (buffer) and reporting requirements. These ash reuse applications are used to provide additional ash storage capacity in the basin system. There have been no non-compliances associated with the Dan River Ash Reuse Permit.

Solid Waste

Because all coal ash (fly and bottom ash) at Dan River is wet sluiced to the ash basin system and there is no means of dry management of the ash, coal ash must first be removed from the ash basin system (NPDES permitted system) prior to any disposition. Therefore, the disposition of all ash at Dan River is regulated by the Division of Water Quality of North Carolina under the ash reuse permit (discussed above) and not by the Division of Solid Waste of North Carolina. In the future, if dry management of coal ash is established at Dan River, the landfilling and/or utilization of dry managed coal ash must be regulated through the Division of Solid Waste of North Carolina.

Watershed Regulations

Currently, there are no NC Watershed Regulations that impact the utilization or storage of ash at Dan River Steam Station. Further, future Watershed Regulation is not expected to impact ash practices at Dan River Steam Station due to the absence of drinking water intakes downstream from the plant.

ASH PRODUCTION AND POND STORAGE CAPACITY

The System Planning and Operating Department's coal consumption forecasts (PROMOD) are used to estimate projected ash production. Referring to Figure 1, two rates of ash production are considered:

1. The base coal consumption scenario (which represents the best estimate for coal consumption based on projected energy demands, the Integrated Resource Plan, scheduled plant outages, etc.), and

2. The high coal consumption scenario (which is determined by increasing the base coal consumption by 75%). Based on historical differences between PROMOD's base coal consumption projections and actual coal consumption at Dan River Steam Station, a 75% increase over the base scenario is judged to be a reasonable scenario to consider for ash production.

Figure 2 illustrates the assumption that the Primary Cell will exceed projected capacity by the end of 1999 with chemical cleaning allowance which deducts 49.11 K tons from the basin storage capacity. Without chemical cleaning, the basin capacity is projected to be reached in the third quarter of 2000. Discussions with Station personnel indicate that chemical cleaning will not be conducted until after 2000, therefore the third quarter 2000 date is used as the "full capacity" or expiration date of the Primary Pond. Ash production rates increased in 1998 (20.32 K tons) and are projected to increase in 1999 (33.58 K tons). The most recent pond survey was conducted on 8/8/97.

A combination of the above factors concludes that a Spring 2000 project should be executed. Proposed project schedules are discussed in the **On-Site Option** section of this Plan.

ASH STORAGE AND UTILIZATION OPTIONS

Off-Site Options

Several off-site options have been explored in since the 1997 project. Some of these include site improvement of adjacent Fieldcrest Cannon property, supplier for Lehigh Portland Cement, I-40 DOT Project near Greensboro, road maintenance for the City of Eden and a proposed municipal park for the City of Eden. Most of these have not developed into viable options. Discussions with the City of Eden for the proposed municipal park are in progress, however details cannot be shared in this plan. This project requires business case justification compared to the proposed on-site option discussed in this plan. Positive (City of Eden) and negative (truck traffic impact) community relations factors will be considered. Development of the City of Eden off-site prospect will continue concurrent to the on-site project. If successful terms are reached, the off-site project could substitute for all or part of the proposed on-site project in 2000. However, since this is not a given, this plan assumes that the on-site project will be implemented in 2000.

Cognizant of the geographical location of Dan River and the coal combustion product market, opportunities for significant off-site ash utilization projects are expected to be limited. Dan River has significant long-term on–site storage space for dry ash storage projects. However, it is recommended that off-site options continue to be explored and compared to on-site options, especially where potential revenues to offset disposal costs are feasible.

On-Site Option

An option considered in 1997 was to remove the ash from the Dredge Pond for placement in the Dry Ash Storage area. Removing ash from the Dredge Pond would provide storage area in which to dredge ash at some point in the future. This option was not pursued for the 2000 project because removing ash directly from the Primary Cell using conventional excavating equipment for placement above the existing Dredge pond was determined to be a viable option. Double handling of ash of pond previously removed from the Primary Cell by any means is not cost-effective.

Excavation of pond ash from the Primary Cell using conventional equipment to the Dredge Pond Area was determined to be to best on-site option. The distance between these two areas is less than one half mile. Placement of Ash in the Dredge Pond area allows for future phasing of on-site ash placement is discussed further in the **FUTURE ON-SITE ASH PROJECTS** section of this Plan.

Several pre-project preparation activities will be implemented in 1999. These activities are shown on Figures 3 and 4 schedules. A two-phased project shown on Figure 3 is proposed in order to avoid the peak ash production months of the year (June – August). Project phases can be adjusted to one phase or have each phase adjusted to be longer or shorter by adjusting equipment and production requirements. Alternate Figure 4 schedule shows execution of the project in one period between November 1, 1999 and May 30, 2000 and which still avoids the peak ash production summer months. This alternate schedule would avoid two mobilizations and pond level changes during the summer months.

Excavation of 200,000 dry ash tons (or 240,000 cubic yards) is proposed to add four (4) years of pond life to the pond. This is an ambitious proposed volume considering "TSS sensitivity" of Dan River's small two-pond system. However, removal of this volume will extend pond capacity to about 4 years resulting in a less frequent need to return for removal.

Truck to the Dredge Pond Area on unimproved roads used for 1994 and 1997 ash removal projects will haul excavated ash. No additional soil containment will be required to place structural fill ash above the Dredge Pond area. A circular truck haul route with on-way traffic flow crossing relatively narrow dikes will be discussed with Station personnel. Ash spillage at rail crossings will be monitored and cleared as necessary. Ash will be placed in a controlled manner with a compaction requirement of 90% standard Proctor density. The testing contractor will be contracted by Ash Management to allow third party quality control. This assumes that no future buildings will be constructed above the fill. Slopes will be designed at 3:1.

Cover soil will be obtained from a borrow source to the north and west of the proposed project. Trees will need to be cleared from this new borrow source. The soil borrow source used in 1997 was essentially depleted down to rock. Soil borings will be performed in 1999 to determine the availability of borrow soil near the Dredge Pond area. Existing Dredge Pond area ash densities will determined during this investigation.

Phase 1 Pond Excavation (February 1 – May 30, 2000) will be sequenced as follows:

1. Time project start to follow monthly TSS compliance testing. Coordinate with on-site environmental representative (Randy Price).
2. Place silt fencing or filter fabric around Secondary Cell discharge tower.
3. Place floating boom around pipe entering Secondary Cell.
4. Excavate ditch on north side of Secondary Cell for settling and retention of solids.
5. Excavate ash surrounding Primary Cell discharge tower.
6. Install a temporary cofferdam to a 20-foot depth surrounding the Primary Cell discharge tower

7. Slowly Lower water in primary and secondary cell from El 532 to El 518 (14 feet) to facilitate ash removal.

8. Allow Primary Cell to drain and Secondary Cell to stabilize for one week.

9. Place silt fencing or filter fabric around Primary Cell discharge tower.

10. Excavate ditches with trackhoe as shown on excavation plan, Figure 4. Ditches are sloped 0.5% to tower. Portions of these ditches exist from 1997 project but require excavation. "Torturous path" of ditch crossing basin will help increase solids retention time. Add rock check dams to ditches at appropriate field-determined locations to slow solids flow.

11. Periodically excavate ditches as needed to prevent ash from reaching Primary Cell discharge tower.

12. Excavate in Primary Cell Area 1 of Figure 3 from El 532 to El 525 (7 feet of depth). Quantity removed is approximately 86,000 tons. Excavate with track loader from north and load trucks to south of Area 1. Ash within Area 1 is densely compacted and contains Fragmiti (reeds) vegetation.

13. Excavate balance of ash to reach 100,000 ton quantity from Area 3 of Figure 5. Excavate from El 528 to El 523 (5 feet of depth). Excavate with track loader from north and load trucks to south of Area 3. Ash within Area 3 should be less densely compacted and contains less Fragmiti (reeds) vegetation than Area 1.

14. Remove silt fence or filter fabric and replace stop logs at towers. Slowly raise water level in Primary and Secondary Cell to El 532. Optionally leave pond level down during June – August peak production period depending on environmental compliance needs if project is done two phases.

Phase 1 Structural Fill Placement (February 1 – May 30) scope and equipment are as follows:

Clearing	5.6	acres		
Silt Fence	500	ln ft		
Ash Excavation	100,000	tons	83,000	cy
Ash Placement	100,000	tons	83,000	cy
Soil Cover	6463	cy	1 ft on slopes, 6"on top as temporary cover	
Grassing	3.8	acres		
Ditching	2300	ln ft		
Haul Rd Gravel	109	tons		

Equipment:

5 cy track loader with 10 foot reach	1	ea
20 cy dump truck	5	ea
D7 dozer	1	ea
Vibratory steel wheel compactor	1	ea
Production/dump truck/day	384	tons
Work days required	52*	days

* 77 days shown on schedule to allow for weather contingency.

Phase 2 Pond Excavation (September 1 – November 15, 2000) will be sequenced as follows:

1. Slowly lower water in Primary and Secondary Cells from El 532 to El 518 (14 feet) to facilitate ash removal.

2. Allow Primary Cell to drain and Secondary Cell to stabilize for one week.

3. Place new silt fencing or filter fabric around both Primary and Secondary Cell discharge towers.

4. Excavate ditches with trackhoe as shown on excavation plan, Figure 5. Ditches are sloped 0.5% to tower. These ditches exist from Phase 1, but may require excavation. Add rock check dams to ditches at appropriate field-determined locations to slow solids flow.

5. Periodically excavate ditches to prevent ash from reaching Primary Cell discharge tower.

6. Excavate in Primary Cell Area 3 of Figure 5 from El 528 to El 523 (5 feet of depth). Quantity removed is approximately 66,000 tons. Excavate with track loader from north and load trucks to south of Area 3. Ash within Area 3 is less densely compacted and contains less Fragmiti (reeds) vegetation than Area 1.

7. Excavate balance of ash to reach 100,000 ton quantity from Area 2 of Figure 3. Excavate from El 532 to El 525 (7 feet of depth). Excavate with track loader from south and load trucks to north of Area 2. Alternately place temporary pipe in ditch and excavate with track loader from north to south of Area 2.

8. Remove temporary cofferdam, silt fence or filter fabric and replace stop logs at towers. Slowly raise water level in Primary and Secondary Cells to El 532.

Phase 2 Structural Fill Placement (September 1 – November 30) scope and equipment are as follows:

Clearing Cover/Grass	3.8	acres		
Ash Excavation	100,000	tons	83,000	cy
Ash Placement	100,000	tons	83,000	cy
Soil Cover	8858	cy	1 ft on slopes and top	
Grassing	3.8	acres		
Silt Fence	500	ln ft		

<u>Equipment</u>:

5 cy track loader with 10 foot reach	1	ea
20 cy dump truck	5	ea
D7 dozer	1	ea
Vibratory steel wheel compactor	1	ea
Production/dump truck/day	384	tons
Workdays required	52	days

FUTURE ON-SITE ASH PROJECTS

The following areas should be reserved for future ash placement to eventually create a contiguous on-site structural ash fill area. It is recommended that these areas be constructed in phases the order given. The total volume of these phases is estimated to be approximately 800,000 tons allowing for on-site storage of four more pond recovery projects (at 200,000 tons each 4 years) for the next 20 years or life of Station. This allows off-site projects to be optional yet allowable if economically feasible thereby extending storage on-site availability.

1. <u>North of Dredge Area Structural Ash Fill</u> (2000 Project): An estimated 200,000 tons ash volume could be added by extending this area to the north into the hillside.

2. <u>Low Area between Dry Ash Storage Area and Dredge Area Structural Fill Project</u>: An estimated 3-400,000 tons of ash volume storage is available in this area.

3. <u>Dry Ash Storage Area</u> (1994 and 1997 Projects): An estimated 100,000 tons of ash could be added to the top elevation of this area. Ash added to El. 595 would match the top of the Dredge Area Structural Fill (2000) Project. Additional storage is available above this elevation.

4. <u>North of Dry Ash Storage Area</u> (1994 and 1997 Projects): An estimated 100,000 tons of ash could be added to this area by extending it to the north into the hillside.

Ash benefication options continue to be studied for potential application at Duke fossil stations. These technologies are outlined in detail in the Marshall Ash Management Plan. Application of these technologies at Dan River Station Station is not recommended due to capital investment, concrete market proximity to Belews Creek and CP&L-Roxboro, size and age of station.

CONCLUSIONS AND RECOMMENDATIONS

Dan River Station ash is at full pond capacity in the third quarter of 2000, based on no chemical cleaning done until after 2000. Therefore a spring 2000 project is recommended with pre-project activities in 1999. Project schedules show choices between single and two-phased construction. 200,000 tons (240,000 cubic yards) is recommended for removed from the Primary Cell by methods described in this Plan. Removal of this volume allows for four (4) additional years of pond storage. Construction will be competitively bid to ash marketing and/or construction contractors.

Concurrent efforts are ongoing to develop a potential off-site project with the City of Eden. The off-site project could substitute for all or part of the on-site project if economically feasible. Application of ash benefication technologies is not recommended for Dan River Steam Station.

If project budget accrual funding does not allow for this scope, then the project can be executed with a reduced volume within the same proposed schedules. Removal method of ash pond ash would require adjusting. Future need to perform pond removal would be adjusted to a more frequent basis (1,2,or 3 years) depending on actual volume removed in 2000.

FIGURES

FIGURES

REFERENCE FILES

DRAWING

Duke Power Company
Fossil/Hydro Dept.
1998 Ash Storage Forecast

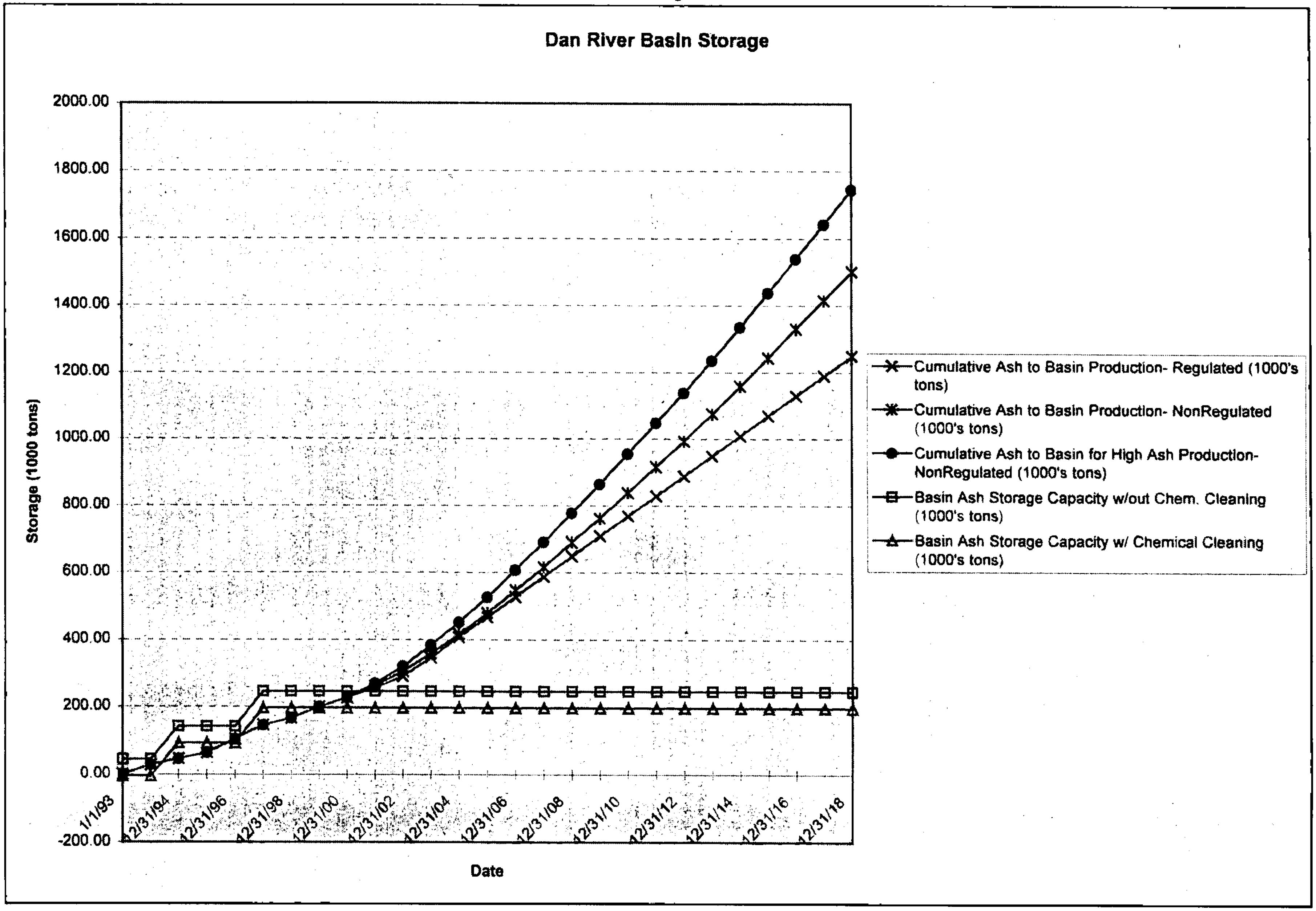

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FIGURE 1 **POND CAPACITY CURVE**

Duke/Fluor Daniel

Chart Chart 1

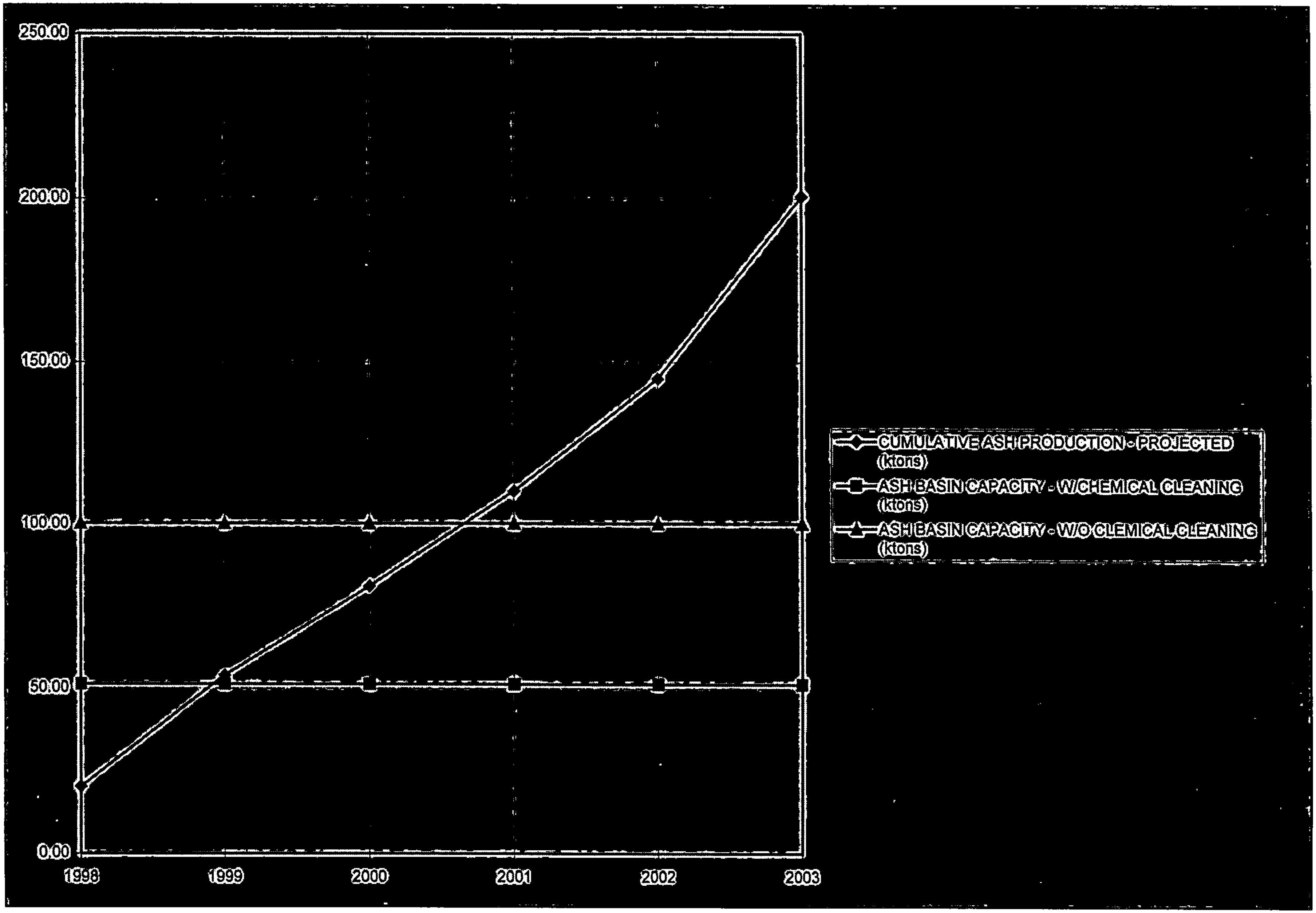
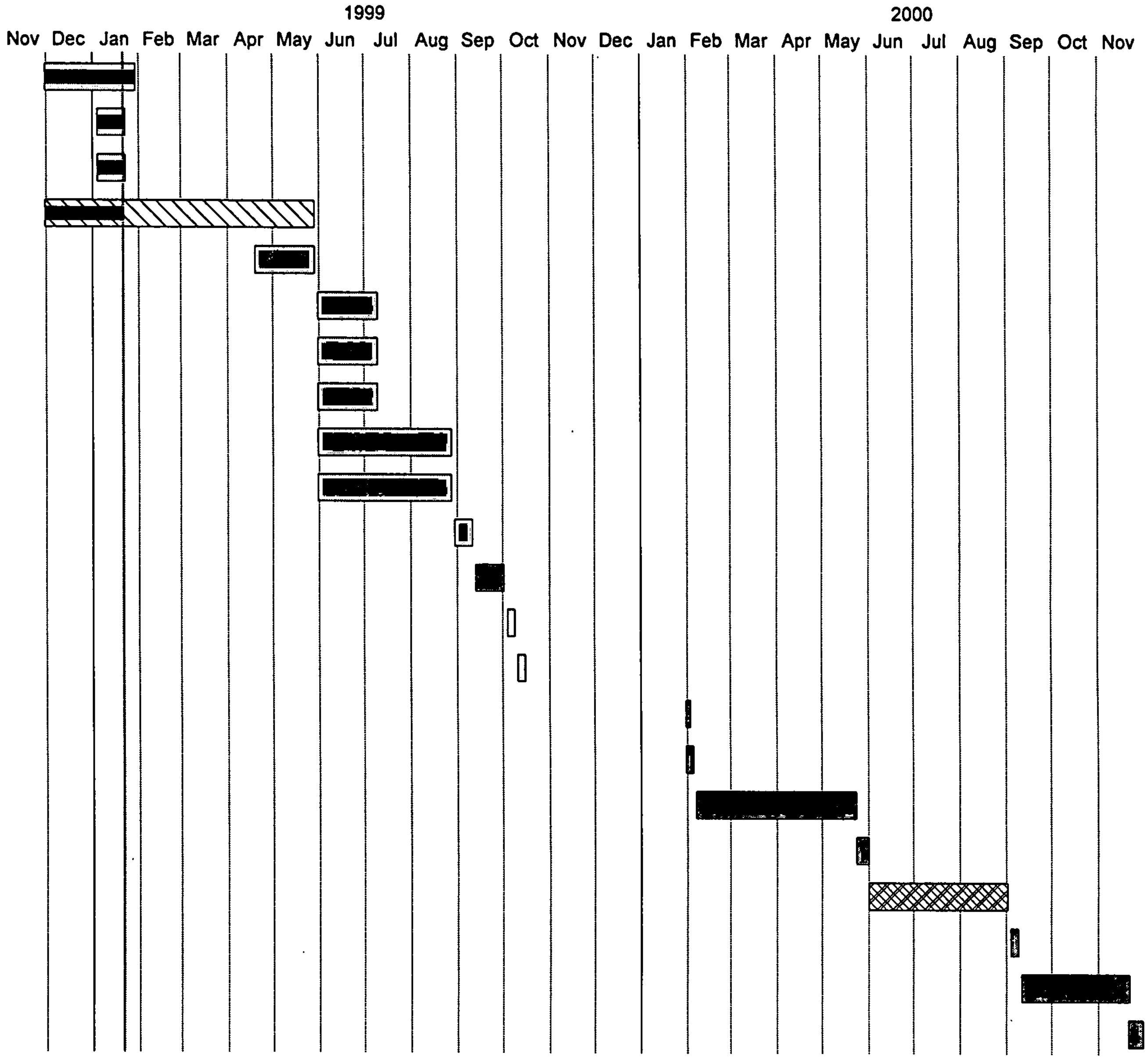


FIGURE 2 **POND CAPACITY DETAIL**

ID		Task Name	Duration
1	✓	Ash Mgt Plan Prep	45 days
2	✓	Prelim Engineering	15 days
3	✓	Pond Excavation Plan	15 days
4		Off-Site Project Development	130 days
5		Revise Budget	30 days
6		Permitting	30 days
7		Borrow Area Soil Borings	30 days
8		Baseline Pond Survey	30 days
9		Final Engineering	65 days
10		Final Spec/Excav Plan	65 days
11		Bid to Contractors	10 days
12		Bid Review	15 days
13		Award Bid	5 days
14		Clear/Grub Borrow Area	5 days
15		Mobilize Phase 1	3 days
16		Lower Pond & Site Prep	5 days
17		Ash Excavate, Haul & Place	77 days
18		Temp Clover Haul & Place	6 days
19		NO WORK at Peak Prod	67 days
20		Mobilize & Prep Phase 2	5 days
21		Ash Excvate, Haul & Place	52 days
22		Cover, Seed & Close	8 days



Project: Dan River Implement Schedu
Date: Thu 1/21/99

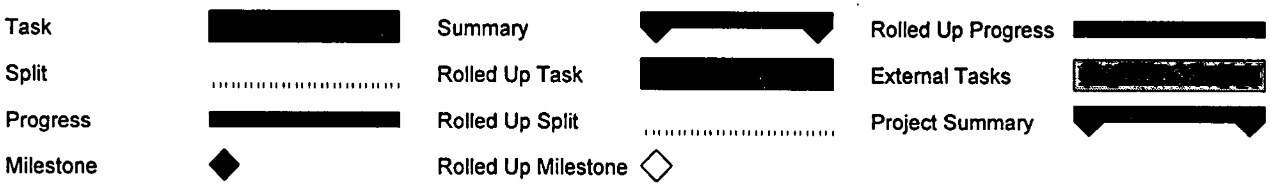


FIGURE 3 2-PHASE SCHEDULE

ID	Task Name	Duration
1	Ash Mgt Plan Prep	45 days
2	Prelim Engineering	15 days
3	Pond Excavation Plan	15 days
4	Off-Site Project Development	130 days
5	Revise Budget	30 days
6	Permitting	30 days
7	Borrow Area Soil Borings	30 days
8	Baseline Pond Survey	30 days
9	Final Engineering	65 days
10	Final Spec/Excav Plan	65 days
11	Bid to Contractors	10 days
12	Bid Review	15 days
13	Award Bid	5 days
14	Clear/Grub Borrow Area	5 days
15	Mobilize Phase 1	3 days
16	Lower Pond & Site Prep	5 days
17	Ash Excavate, Haul & Place	140 days
18	Cover, Seed & Close	8 days
19	NO WORK at Peak Prod	67 days

Project: Dan River Implement Schedu
Date: Fri 1/22/99

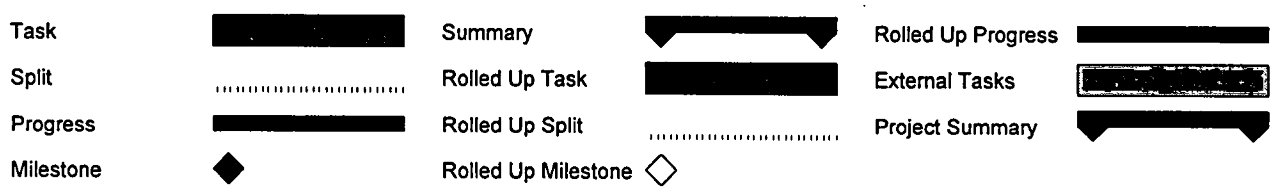
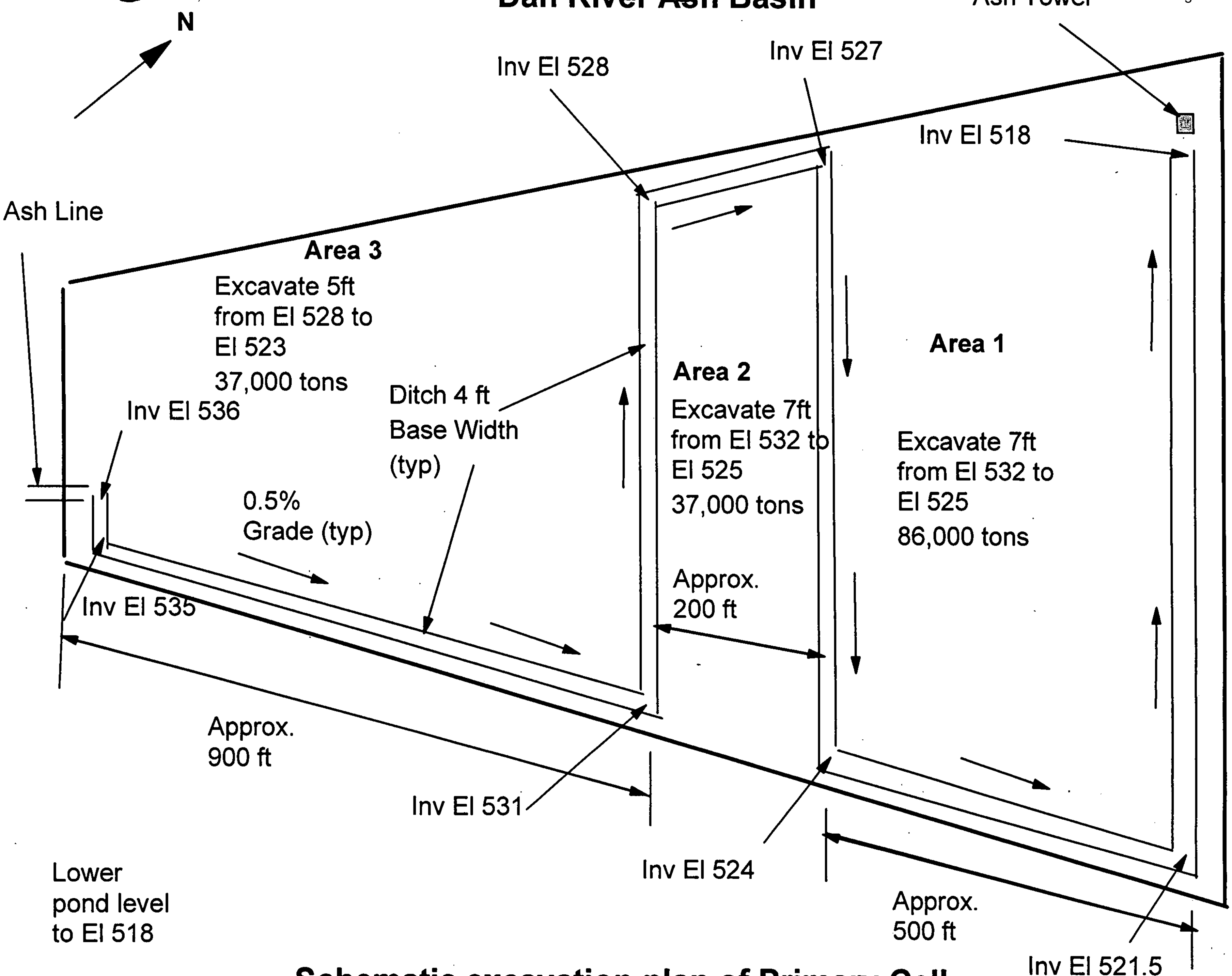


FIGURE 4 1-PHASE SCHEDULE

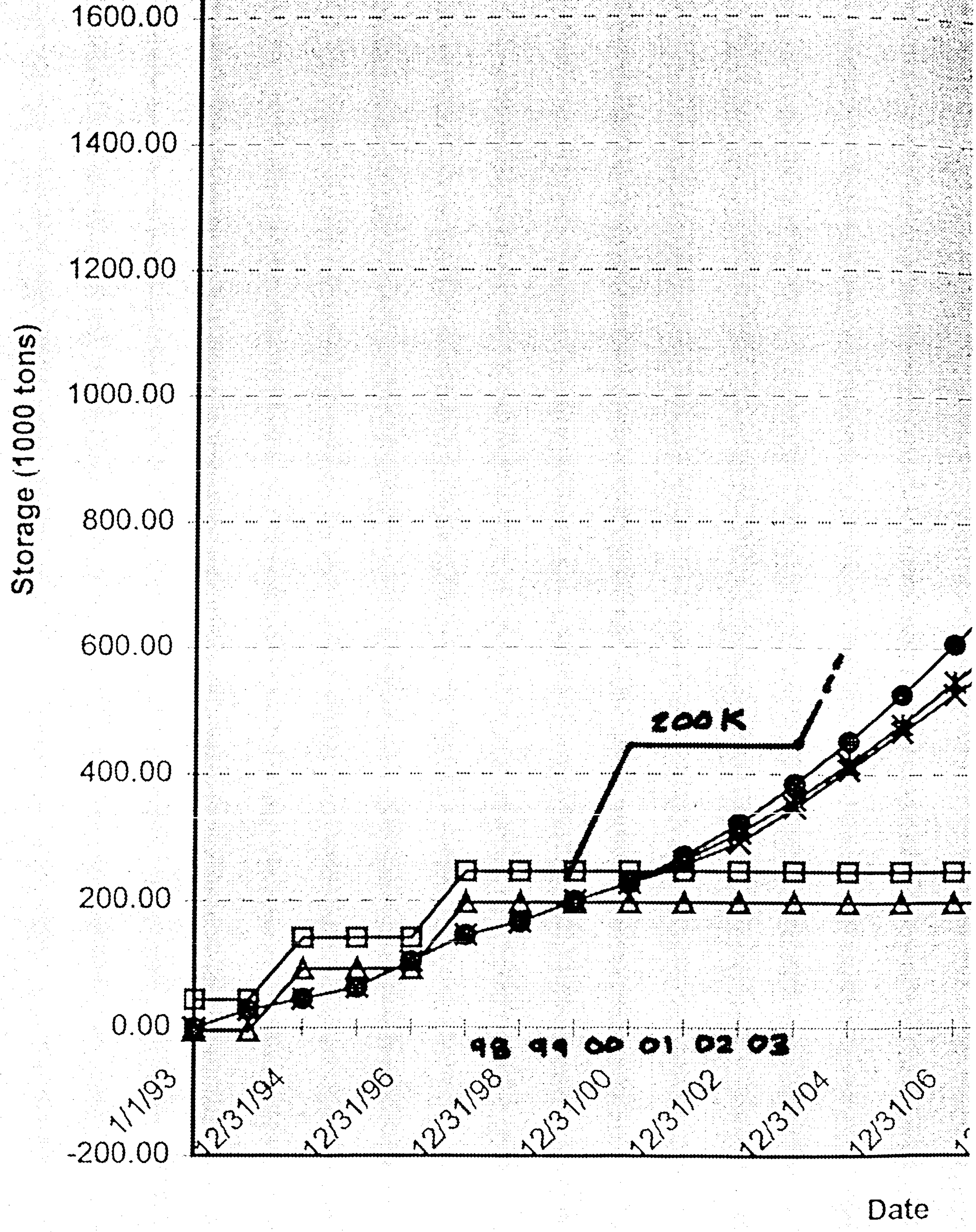
Dan River Ash Basin



Schematic excavation plan of Primary Cell

FIGURE 5 EXCAVATION PLAN

SUPPORT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1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
-200.00
Storage (1000 tons)
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98 99 00 01 02 03
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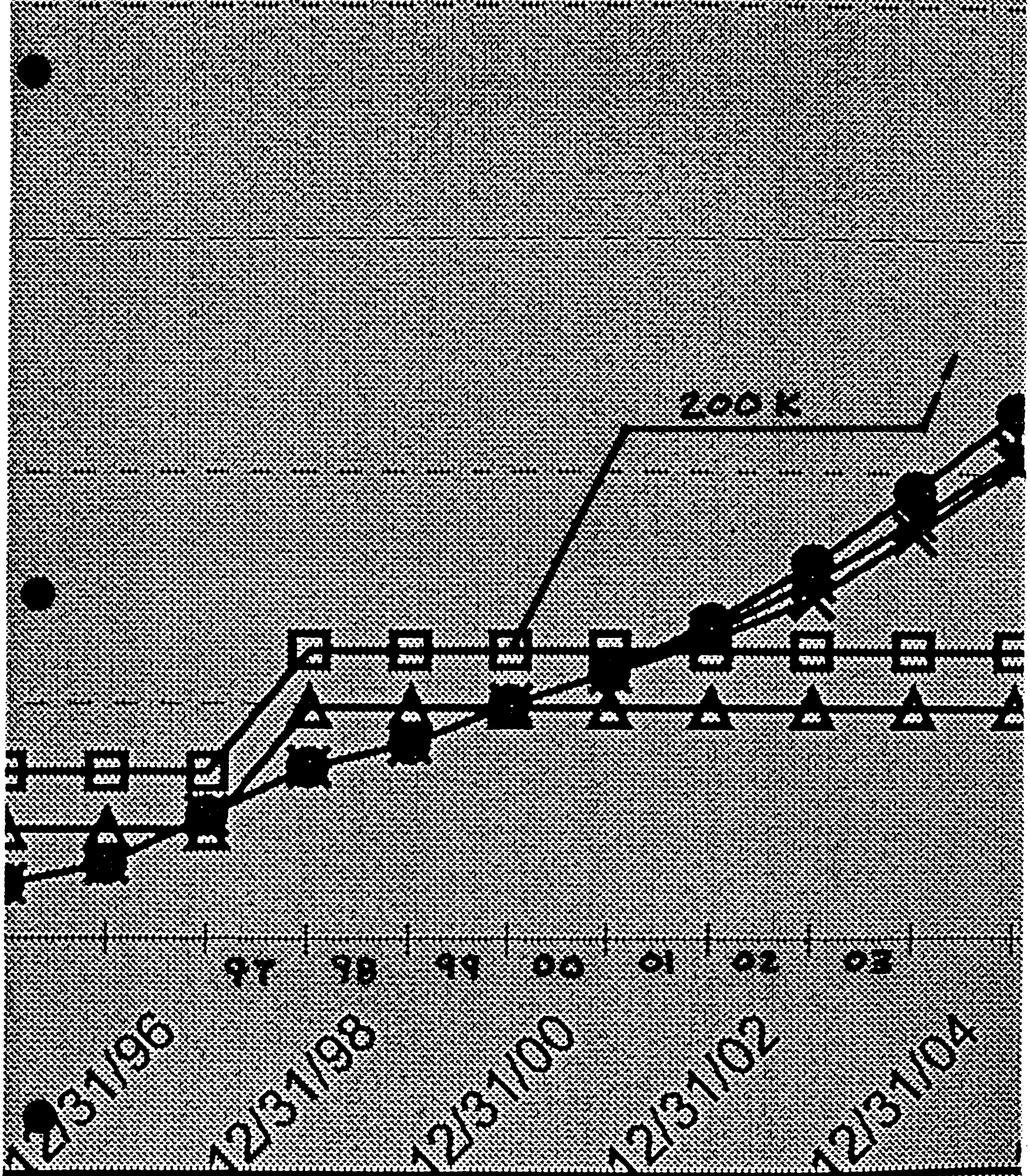
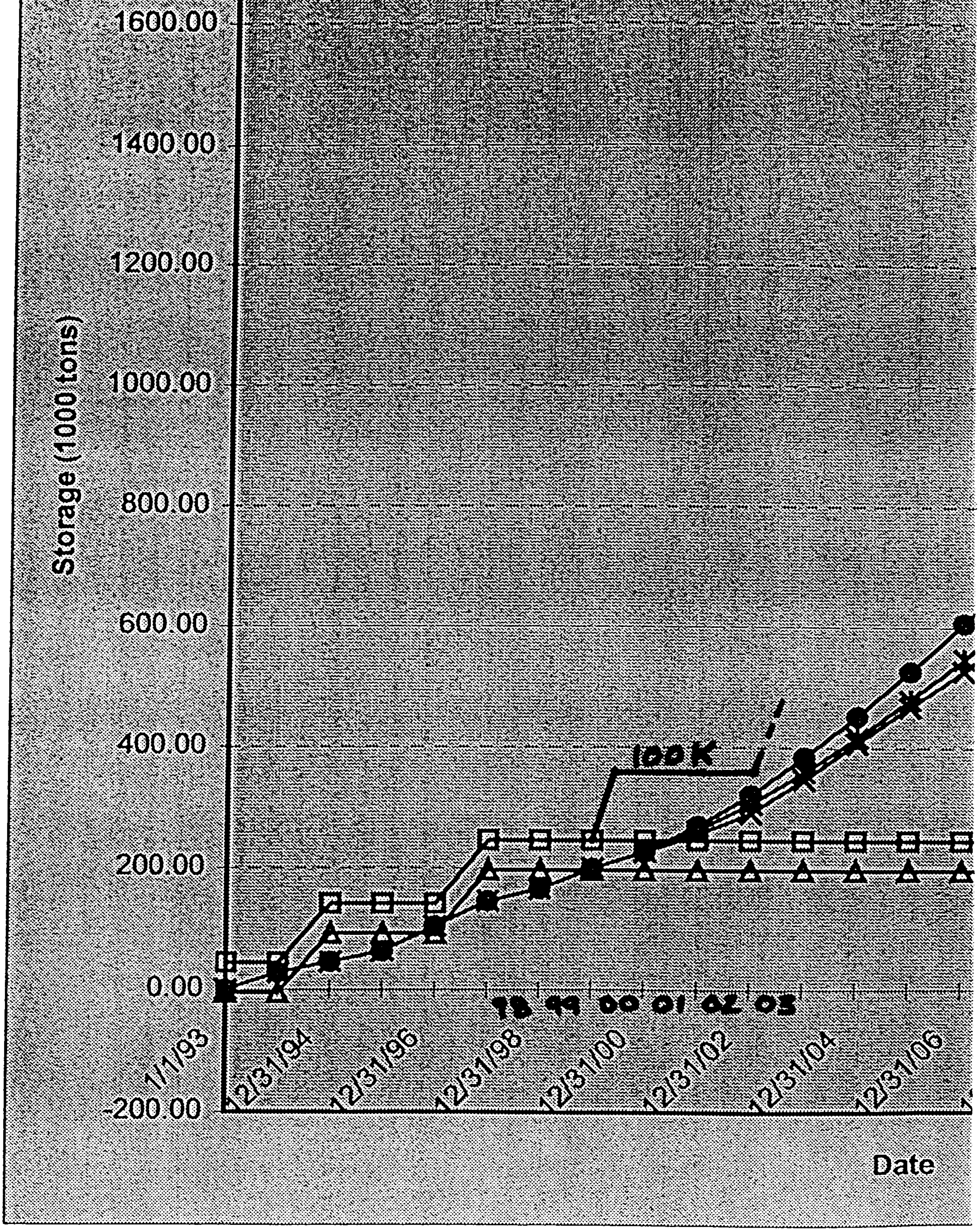
12/31/04
12/31/06
Date


200K
97
98
99
00
01
02
03
2/31/96
2/31/98
2/31/00
2/31/02
2/31/04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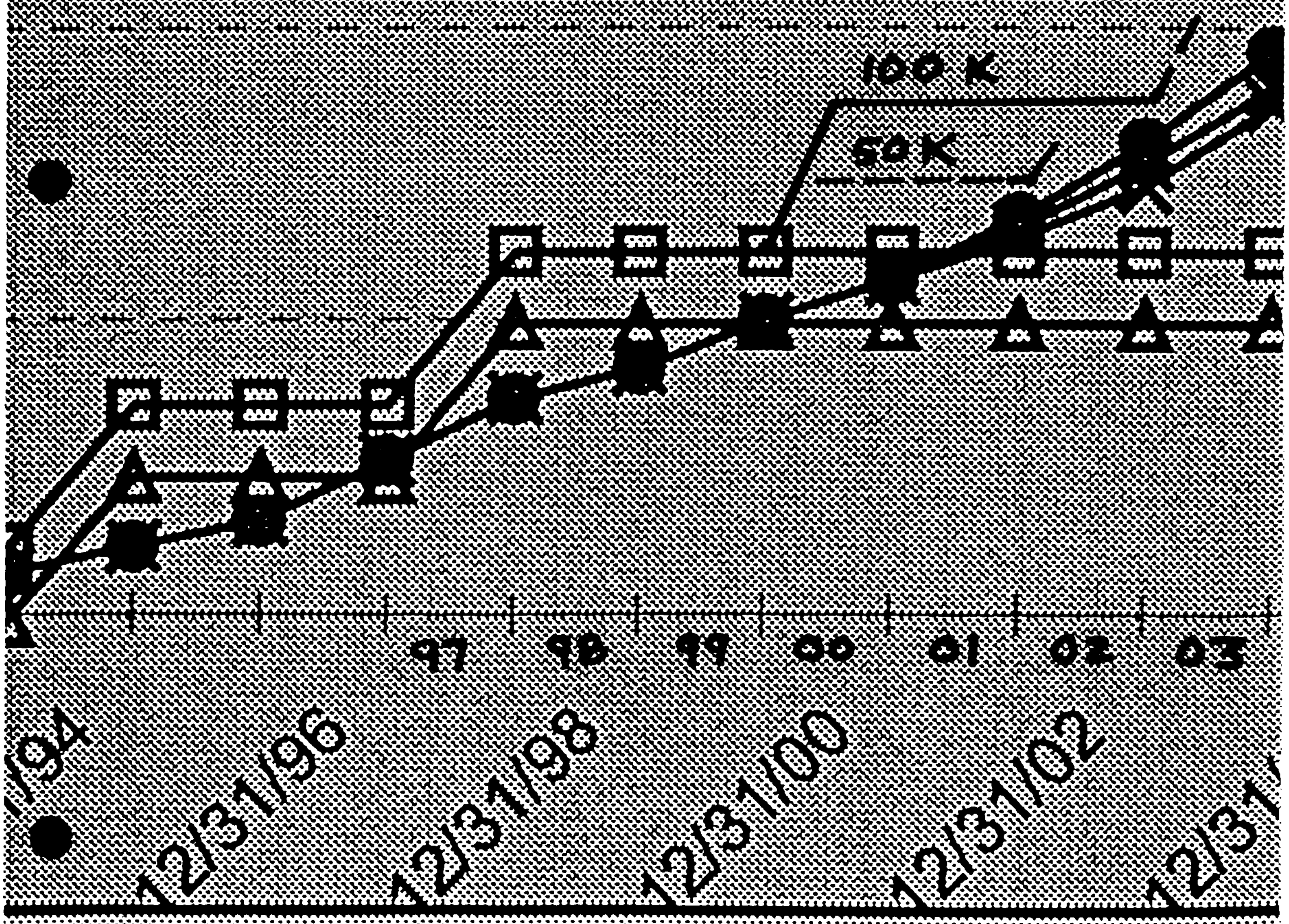
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
-200.00
Storage (1000 tons)
100 K
98 99 00 01 02 03
1/1/93
12/31/94
12/31/96
12/31/98
12/31/00
12/31/02
12/31/04
12/31/06
Date


100 K
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12/31

Duke Energy Corporation
1997 Ash Basin Landfill Forecast
Actual Ash Production and Utilization

1997 Monthly Ash Production & Utilization

Notes:
1. All coal consumption, ash production, and ash utilization quantities are in 1000's of dry tons.

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JAN Coal Consumption	263.12	496.37	80.27	151.56	53.01	62.53	490.04	83.68	1,680.582	1,680.582
JAN % Ash	10.69	9.00	10.75	8.21	9.78	10.39	9.32	8.57		
JAN Ash Produced	28.13	44.67	8.63	12.44	5.18	6.50	45.67	7.17	158.40	158.40
Utilization: Concrete		20.93					2.08		23.01	23.01
Mineral Filler							0.64		0.64	0.64
Structural Fill							36.73		36.73	36.73
JTM Bottom Ash		0.57					3.66		4.23	4.23
Duke Bottom Ash							6.10		6.10	6.10
Mill Rejects							0.00		0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	28.13	2.76	8.63	12.44	5.18	6.50	-5.00	7.17	65.82	65.82
Net Ash Placed in Landfills		20.41					1.47		21.88	21.88
JAN Total Ash Utilized	0.00	21.50	0.00	0.00	0.00	0.00	49.20	0.00	70.70	70.70
FEB Coal Consumption	163.89	468.05	28.00	68.45	7.35	5.03	425.20	18.52	1,184.490	2,865.072
FEB % Ash	10.91	9.03	11.46	8.00	10.84	9.00	9.80	7.29		
FEB Ash Produced	17.88	42.26	3.21	5.48	0.80	0.45	41.67	1.35	113.10	271.50
Utilization: Concrete		26.08					0.48		26.55	49.56
Mineral Filler							0.63		0.63	1.26
Structural Fill							34.59		34.59	71.32
JTM Bottom Ash		0.78					2.86		3.64	7.86
Duke Bottom Ash							6.98		6.98	13.08
Mill Rejects							0.00		0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	17.88	4.79	3.21	5.48	0.80	0.45	-3.86	1.35	30.09	95.91
Net Ash Placed in Landfills		10.62					0.00		10.62	32.50
FEB Total Ash Utilized	0.00	26.86	0.00	0.00	0.00	0.00	45.53	0.00	72.39	143.09
MAR Coal Consumption	87.03	483.20	19.67	77.29	3.66	5.49	436.41	17.37	1,130.102	3,995.174
MAR % Ash	11.04	9.14	12.55	7.27	11.58	8.72	9.65	8.28		
MAR Ash Produced	9.61	44.16	2.47	5.62	0.42	0.48	42.11	1.44	106.31	377.81
Utilization: Concrete		32.12							32.12	81.68
Mineral Filler							0.61		0.61	1.87
Structural Fill							31.69		31.69	103.01
JTM Bottom Ash		1.54					3.09		4.63	12.49
Duke Bottom Ash							10.57		10.57	23.65
Mill Rejects							0.00		0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	9.61	3.78	2.47	5.62	0.42	0.48	-3.85	1.44	19.96	115.87
Net Ash Placed in Landfills		6.73					0.00		6.73	39.23
MAR Total Ash Utilized	0.00	33.66	0.00	0.00	0.00	0.00	45.96	0.00	79.62	222.71
APR Coal Consumption	199.19	504.09	44.86	116.86	15.43	3.40	433.19	40.17	1,357.189	5,352.363
APR % Ash	11.35	9.35	11.69	8.21	11.29	8.43	10.15	8.14		
APR Ash Produced	22.61	47.13	5.24	9.59	1.74	0.29	43.97	3.27	133.85	511.66
Utilization: Concrete		33.91					0.00		33.91	115.59
Mineral Filler		0.00					0.68		0.68	2.56
Structural Fill							41.37		41.37	144.38
JTM Bottom Ash		3.08					3.17		6.25	18.74
Duke Bottom Ash							1.36		1.36	25.01
Mill Rejects							0.00		0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	22.61	1.49	5.24	9.59	1.74	0.29	-2.61	3.27	41.62	157.49
Net Ash Placed in Landfills		8.66					0.00		8.66	47.89
APR Total Ash Utilized	0.00	36.99	0.00	0.00	0.00	0.00	46.58	0.00	83.57	306.28
MAY Coal Consumption	216.75	392.07	64.27	51.99	33.50	16.05	393.97	75.95	1,244.535	6,596.898
MAY % Ash	10.32	9.40	11.58	8.68	10.67	8.53	9.83	8.44		
MAY Ash Produced	22.37	36.85	7.44	4.51	3.57	1.37	38.73	6.41	121.26	632.91
Utilization: Concrete		31.77					0.30		32.08	147.67
Mineral Filler							0.99		0.99	3.55
Structural Fill							40.72		40.72	185.10
JTM Bottom Ash		3.24					3.37		6.61	25.35
Duke Bottom Ash							15.82		15.82	40.83
Mill Rejects							2.46		2.46	2.46
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	22.37	1.84	7.44	4.51	3.57	1.37	-24.94	6.41	22.58	180.07
Net Ash Placed in Landfills		0.00					0.00		0.00	47.89
MAY Total Ash Utilized	0.00	35.01	0.00	0.00	0.00	0.00	63.67	0.00	98.68	404.96
JUN Coal Consumption	156.38	399.18	52.80	93.44	30.47	46.30	412.57	57.52	1,248.657	7,845.555
JUN % Ash	10.37	9.50	12.76	8.49	10.36	9.16	11.29	8.94		
JUN Ash Produced	16.22	37.92	6.74	7.93	3.16	4.24	46.58	5.14	127.93	760.84
Utilization: Concrete		32.38					0.58		32.96	180.62
Mineral Filler							0.78		0.78	4.33
Structural Fill					52.25		42.02		94.27	279.37
JTM Bottom Ash		3.48					3.67		7.15	32.51
Duke Bottom Ash							1.07		1.07	41.91
Mill Rejects							0.00		0.00	2.46
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	16.22	0.80	6.74	7.93	-49.09	4.24	-1.54	5.14	-9.56	170.51
Net Ash Placed in Landfills		1.26					0.00		1.26	49.15
JUN Total Ash Utilized	0.00	35.86	0.00	0.00	52.25	0.00	48.12	0.00	136.23	541.19

Duke Energy Corporation
1997 Ash Basin Landfill Forecast
Actual Ash Production and Utilization

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JUL Coal Consumption	218.20	519.69	94.01	151.94	61.86	71.14	478.22	101.49	1,696.555	9,542.110
JUL % Ash	9.46	9.26	10.99	8.71	10.55	9.27	10.73	8.86		
JUL Ash Produced	20.64	48.12	10.33	13.23	6.53	6.59	51.31	8.99	165.76	926.60
Utilization: Concrete		34.51					0.72		35.23	215.86
Mineral Filler		0.00					1.03		1.03	5.36
Structural Fill					52.25		41.52		93.77	373.14
JTM Bottom Ash		4.43					5.13		9.56	42.06
Duke Bottom Ash							0.00		0.00	41.91
Mill Rejects							0.00		0.00	2.46
Other: Ash Removal							9.15		9.15	9.15
Net Ash Sluiced to Basins	20.64	1.39	10.33	13.23	-45.72	6.59	3.16	8.99	18.62	189.13
Net Ash Placed in Landfills		7.79					0.00		7.79	56.94
JUL Total Ash Utilized	0.00	38.94	0.00	0.00	52.25	0.00	48.40	0.00	139.59	680.78
AUG Coal Consumption	189.54	551.69	65.04	120.69	29.98	35.86	448.04	55.73	1,496.569	11,038.679
AUG % Ash	9.06	9.56	12.05	9.17	10.62	10.45	11.27	9.33		
AUG Ash Produced	17.17	52.74	7.84	11.07	3.18	3.75	50.49	5.20	151.44	1078.04
Utilization: Concrete		39.85					0.19		40.05	255.90
Mineral Filler							0.85		0.85	6.21
Structural Fill							27.91		27.91	401.05
JTM Bottom Ash		2.51					4.79		7.31	49.37
Duke Bottom Ash									0.00	41.91
Mill Rejects							0.00		0.00	2.46
Other: Ash Removal							20.94		20.94	30.09
Net Ash Sluiced to Basins	17.17	2.53	7.84	11.07	3.18	3.75	5.72	5.20	56.46	245.59
Net Ash Placed in Landfills		7.84					0.00		7.84	64.78
AUG Total Ash Utilized	0.00	42.37	0.00	0.00	0.00	0.00	33.75	0.00	76.12	756.89
SEP Coal Consumption	215.15	336.11	75.69	119.44	36.26	36.06	460.98	44.98	1,324.673	12,363.352
SEP % Ash	9.16	9.77	11.12	8.90	11.52	9.50	10.62	9.42		
SEP Ash Produced	19.71	32.84	8.42	10.63	4.18	3.43	48.96	4.24	132.39	1,210.43
Utilization: Concrete		28.60		0.05			0.22		28.86	284.77
Mineral Filler							1.13		1.13	7.34
Structural Fill							7.35		7.35	408.40
JTM Bottom Ash		2.78					5.81		8.59	57.96
Duke Bottom Ash							2.81		2.81	44.71
Mill Rejects							1.21		1.21	3.67
Other: Ash Removal							25.72		25.72	55.81
Net Ash Sluiced to Basins	19.71	0.57	8.42	10.58	4.18	3.43	4.72	4.24	55.83	301.41
Net Ash Placed in Landfills		0.89							0.89	65.68
SEP Total Ash Utilized	0.00	31.38	0.00	0.05	0.00	0.00	18.52	0.00	49.95	806.84
OCT Coal Consumption	212.95	552.48	66.93	102.06	36.09	19.42	473.34	30.55	1,493.820	13,857.172
OCT % Ash	10.18	9.42	13.29	9.03	11.74	10.20	10.98	9.43		
OCT Ash Produced	21.68	52.04	8.89	9.22	4.24	1.98	51.97	2.88	152.90	1,363.33
Utilization: Concrete		38.78		0.12			0.25		39.14	323.91
Mineral Filler							2.29		2.29	9.63
Structural Fill							4.39		4.39	412.79
JTM Bottom Ash		2.69					6.10		8.79	66.75
Duke Bottom Ash							2.34		2.34	47.05
Mill Rejects							1.20		1.20	4.87
Other: Ash Removal							0.00		0.00	55.81
Net Ash Sluiced to Basins	21.68	4.28	8.89	9.10	4.24	1.98	35.40	2.88	88.46	389.87
Net Ash Placed in Landfills		6.29							6.29	71.97
OCT Total Ash Utilized	0.00	41.47	0.00	0.12	0.00	0.00	16.57	0.00	58.16	864.99
NOV Coal Consumption	235.89	547.64	75.81	135.07	23.55	39.66	350.96	74.57	1,483.150	15,340.322
NOV % Ash	10.24	9.36	12.95	8.62	11.36	9.32	10.39	9.80		
NOV Ash Produced	24.16	51.26	9.82	11.64	2.68	3.70	36.46	7.31	147.02	1,510.35
Utilization: Concrete		27.54		0.38					27.92	351.83
Mineral Filler							1.23		1.23	10.86
Structural Fill							1.90		1.90	414.69
JTM Bottom Ash		3.20					3.02		6.22	72.97
Duke Bottom Ash									0.00	47.05
Mill Rejects									0.00	4.87
Other: Ash Removal							0.00		0.00	55.81
Net Ash Sluiced to Basins	24.16	1.15	9.82	11.26	2.68	3.70	15.28	7.31	75.35	465.22
Net Ash Placed in Landfills		19.37					15.03		34.40	106.37
NOV Total Ash Utilized	0.00	30.74	0.00	0.38	0.00	0.00	6.15	0.00	37.27	902.26
DEC Coal Consumption	231.29	563.96	89.32	122.43	51.61	55.99	514.75	83.73	1,713.080	17,053.402
DEC % Ash	11.59	9.71	12.98	8.69	10.91	9.82	10.52	9.53		
DEC Ash Produced	26.81	54.76	11.59	10.64	5.63	5.50	54.15	7.98	177.06	1,687.41
Utilization: Concrete		22.92		0.23			0.79		23.95	375.77
Mineral Filler							0.72		0.72	11.58
Structural Fill									0.00	414.69
JTM Bottom Ash		2.55					3.44		5.99	78.96
Duke Bottom Ash							5.68		5.68	52.72
Mill Rejects							0.00		0.00	4.87
Other: Ash Removal							0.00		0.00	55.81
Net Ash Sluiced to Basins	26.81	10.84	11.59	10.41	5.63	5.50	-11.76	7.98	66.99	532.21
Net Ash Placed in Landfills		18.45					55.29		73.74	180.10
DEC Total Ash Utilized	0.00	25.47	0.00	0.23	0.00	0.00	10.63	0.00	36.33	938.59
Year to Date Coal Consumed	2,389.369	5,814.511	756.678	1,311.226	382.763	396.928	5,317.666	684.261		17,053.402
Year to Date Ash Produced	246.97	544.78	90.62	112.01	41.31	38.27	552.08	61.38		1,687.41
Utilization: Concrete	0.00	369.38	0.00	0.78	0.00	0.00	5.61	0.00		375.77
Mineral Filler	0.00	0.00	0.00	0.00	0.00	0.00	11.58	0.00		11.58
Structural Fill	0.00	0.00	0.00	0.00	104.50	0.00	310.19	0.00		414.69
JTM Bottom Ash	0.00	30.85	0.00	0.00	0.00	0.00	48.11	0.00		78.96
Duke Bottom Ash	0.00	0.00	0.00	0.00	0.00	0.00	52.72	0.00		52.72
Mill Rejects	0.00	0.00	0.00	0.00	0.00	0.00	4.87	0.00		4.87
Other: Ash Removal	0.00	0.00	0.00	0.00	0.00	0.00	55.81	0.00		55.81
Net Ash Sluiced to Basins	246.97	36.23	90.62	111.23	-63.19	38.27	10.71	61.38		532.21
Net Ash Placed in Landfills	0.00	108.32	0.00	0.00	0.00	0.00	112.05	0.00		220.36
YTD Total Ash Utilized	0.00	400.23	0.00	0.78	104.50	0.00	433.08	0.00		938.59
YTD Percent Ash Utilized	0.0%	73.5%	0.0%	0.7%	253.0%	0.0%	78.4%	0.0%		55.6%
YTD + Projected Ash Production	246.97	544.78	90.62	112.01	41.31	38.27	552.08	61.38		1687.41
YTD + Projected Ash Utilization	0.00	400.23	0.00	0.78	104.50	0.00	433.08	0.00		938.59
YTD + Projected % Ash Utilization	0.0%	73.5%	0.0%	0.7%	253.0%	0.0%	78.4%	0.0%		55.6%

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BC DisposalUpdated 1/26/99

Duke Energy Corporation
1998 Ash Basin Landfill Forecast
Actual Ash Production and Utilization

1998 Monthly Ash Production & Utilization

Notes:
1. All coal consumption, ash production, and ash utilization quantities are in 1000's of dry tons.

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JAN Coal Consumption	71.77	483.48	36.19	110.78	3.96	2.03	478.47	10.48	1,197.151	1,197.151
JAN % Ash	10.70	9.08	13.37	8.23	10.17	8.73	10.20	10.66		
JAN Ash Produced	7.68	43.90	4.84	9.12	0.40	0.18	48.80	1.12	116.04	116.04
Utilization: Concrete		16.43		0.20					16.64	16.64
Mineral Filler							0.49		0.49	0.49
Structural Fill									0.00	0.00
JTM Bottom Ash		1.96					3.50		5.46	5.46
Duke Bottom Ash							0.67		0.67	0.67
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	7.68	22.68	4.84	8.91	0.40	0.18	2.13	1.12	47.94	47.94
Net Ash Placed in Landfills		2.82					42.02		44.84	44.84
JAN Total Ash Utilized	0.00	18.40	0.00	0.20	0.00	0.00	4.65	0.00	23.25	23.25
FEB Coal Consumption	39.56	431.62	1.66	64.28	0.00	0.00	343.31	14.35	894.783	2,091.934
FEB % Ash	11.32	9.14	13.66	8.32	0.00	0.00	10.18	11.14		
FEB Ash Produced	4.48	39.45	0.23	5.35	0.00	0.00	34.95	1.60	86.05	202.09
Utilization: Concrete		20.33		0.20					20.53	37.17
Mineral Filler							0.61		0.61	1.10
Structural Fill									0.00	0.00
JTM Bottom Ash		2.57					4.28		6.85	12.31
Duke Bottom Ash							0.30		0.30	0.97
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	4.48	8.60	0.23	5.15	0.00	0.00	10.23	1.60	30.28	78.23
Net Ash Placed in Landfills		7.95					19.53		27.48	72.32
FEB Total Ash Utilized	0.00	22.89	0.00	0.20	0.00	0.00	5.19	0.00	28.29	51.54
MAR Coal Consumption	141.67	405.22	24.78	109.41	22.27	22.94	360.82	36.05	1,123.161	3,215.095
MAR % Ash	10.85	9.42	13.71	7.98	10.89	8.10	10.35	10.46		
MAR Ash Produced	15.37	38.17	3.40	8.73	2.43	1.86	37.34	3.77	111.07	313.16
Utilization: Concrete		26.47		1.71					28.19	65.35
Mineral Filler							0.63		0.63	1.73
Structural Fill									0.00	0.00
JTM Bottom Ash		2.67					4.99		7.66	19.97
Duke Bottom Ash							1.08		1.08	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	15.37	1.87	3.40	7.02	2.43	1.86	11.79	3.77	47.51	125.74
Net Ash Placed in Landfills		7.15					18.85		26.00	98.32
MAR Total Ash Utilized	0.00	29.15	0.00	1.71	0.00	0.00	6.70	0.00	37.56	89.10
APR Coal Consumption	81.49	458.93	8.53	48.38	1.95	5.53	417.24	12.52	1,034.581	4,249.676
APR % Ash	11.05	9.44	14.46	8.75	10.44	8.37	11.62	10.77		
APR Ash Produced	9.00	43.32	1.23	4.23	0.20	0.46	48.48	1.35	108.29	421.45
Utilization: Concrete		30.98		0.95					31.93	97.28
Mineral Filler							0.86		0.86	2.59
Structural Fill							22.99		22.99	22.99
JTM Bottom Ash		3.08					5.54		8.62	28.59
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	9.00	3.67	1.23	3.28	0.20	0.46	-8.05	1.35	11.15	136.89
Net Ash Placed in Landfills		5.60					27.14		32.74	131.06
APR Total Ash Utilized	0.00	34.06	0.00	0.95	0.00	0.00	29.39	0.00	64.40	153.50
MAY Coal Consumption	173.34	470.83	59.24	135.63	40.77	50.66	387.65	78.74	1,396.865	5,646.541
MAY % Ash	10.51	9.55	13.48	7.80	10.85	8.23	10.87	9.66		
MAY Ash Produced	18.22	44.96	7.99	10.58	4.42	4.17	42.14	7.61	140.08	561.53
Utilization: Concrete		33.42		1.51					34.93	132.21
Mineral Filler							0.60		0.60	3.19
Structural Fill							67.71		67.71	90.70
JTM Bottom Ash		2.00					5.05		7.05	35.64
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	18.22	2.42	7.99	9.07	4.42	4.17	-41.06	7.61	12.82	149.71
Net Ash Placed in Landfills		7.13					9.84		16.97	148.04
MAY Total Ash Utilized	0.00	35.42	0.00	1.51	0.00	0.00	73.36	0.00	110.29	263.78
JUN Coal Consumption	246.23	487.13	91.67	162.70	62.31	80.07	397.90	107.85	1,635.855	7,282.396
JUN % Ash	10.30	9.74	12.92	8.33	10.93	8.46	9.46	9.93		
JUN Ash Produced	25.36	47.45	11.84	13.55	6.81	6.77	37.64	10.71	160.14	721.67
Utilization: Concrete		38.74		1.12					39.87	172.08
Mineral Filler							0.65		0.65	3.84
Structural Fill							79.81		79.81	170.51
JTM Bottom Ash		1.86					4.79		6.65	42.29
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	25.36	2.34	11.84	12.43	6.81	6.77	-50.23	10.71	26.04	175.75
Net Ash Placed in Landfills		4.50					2.63		7.12	155.16
JUN Total Ash Utilized	0.00	40.61	0.00	1.12	0.00	0.00	85.25	0.00	126.98	390.76

Duke Energy Corporation
1998 Ash Basin Landfill Forecast
Actual Ash Production and Utilization

1998 Monthly Coal Ash Production and Utilization Tracking (as of 9/30/98): Sheet 2 of 2

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JUL Coal Consumption	221.45	545.57	84.11	168.82	53.87	63.85	483.70	100.64	1,721.997	9,004.393
JUL % Ash	10.55	9.98	13.74	8.22	11.15	8.33	10.09	9.97		
JUL Ash Produced	23.36	54.45	11.56	13.88	6.01	5.32	48.80	10.03	173.41	895.08
Utilization: Concrete		41.59		0.66					42.25	214.33
Mineral Filler							0.62		0.62	4.46
Structural Fill							20.23		20.23	190.74
JTM Bottom Ash		1.84					5.53		7.37	49.65
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	23.36	7.33	11.56	13.21	6.01	5.32	20.28	10.03	97.10	272.85
Net Ash Placed in Landfills		3.69					2.15		5.84	161.00
JUL Total Ash Utilized	0.00	43.42	0.00	0.66	0.00	0.00	26.38	0.00	70.47	461.23
AUG Coal Consumption	236.13	569.93	93.56	177.68	58.28	75.98	510.40	106.58	1,828.540	10,832.933
AUG % Ash	9.01	10.09	13.57	8.72	10.96	8.36	10.26	9.27		
AUG Ash Produced	21.28	57.51	12.70	15.49	6.39	6.35	52.37	9.88	181.96	1077.04
Utilization: Concrete		37.76		0.82					38.58	252.91
Mineral Filler							0.84		0.84	5.30
Structural Fill							38.94		38.94	229.69
JTM Bottom Ash		1.84					5.01		6.84	56.50
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	21.28	7.60	12.70	14.68	6.39	6.35	4.64	9.88	83.51	356.37
Net Ash Placed in Landfills		10.31					2.94		13.24	174.24
AUG Total Ash Utilized	0.00	39.60	0.00	0.82	0.00	0.00	44.79	0.00	85.20	546.44
SEP Coal Consumption	116.00	481.00	49.00	115.00	22.00	38.00	409.00	67.00	1,297.000	12,129.933
SEP % Ash	9.09	10.30	13.10	9.37	9.75	9.17	9.98	9.73		
SEP Ash Produced	10.54	49.54	6.42	10.78	2.15	3.48	40.82	6.52	130.25	1,207.29
Utilization: Concrete		38.25		2.74					40.99	293.90
Mineral Filler							0.84		0.84	6.14
Structural Fill							2.81		2.81	232.50
JTM Bottom Ash		2.65					4.48		7.13	63.63
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	10.54	-3.62	6.42	8.04	2.15	3.48	6.38	6.52	39.91	396.27
Net Ash Placed in Landfills		12.27					26.30		38.57	212.81
SEP Total Ash Utilized	0.00	40.90	0.00	2.74	0.00	0.00	8.14	0.00	51.77	598.21
OCT Coal Consumption	129.81	533.83	39.75	121.75	15.50	19.33	423.53	61.53	1,345.038	13,474.971
OCT % Ash	9.95	10.09	14.39	8.86	9.16	9.97	10.30	9.88		
OCT Ash Produced	12.92	53.86	5.72	10.79	1.42	1.93	43.62	6.08	136.34	1,343.63
Utilization: Concrete		40.63		3.09					43.72	337.61
Mineral Filler							0.82		0.82	6.96
Structural Fill									0.00	232.50
JTM Bottom Ash		0.92					5.04		5.96	69.59
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	12.92	1.00	5.72	7.70	1.42	1.93	13.33	6.08	50.09	446.37
Net Ash Placed in Landfills		11.32					24.43		35.75	248.56
OCT Total Ash Utilized	0.00	41.55	0.00	3.09	0.00	0.00	5.86	0.00	50.49	648.70
NOV Coal Consumption	69.84	427.29	43.22	111.44	0.46	2.82	393.66	18.83	1,067.570	14,542.541
NOV % Ash	10.21	10.58	14.22	9.01	10.41	11.06	10.39	11.13		
NOV Ash Produced	7.13	45.21	6.15	10.04	0.05	0.31	40.90	2.10	111.88	1,455.51
Utilization: Concrete		36.49		3.66					40.16	377.77
Mineral Filler							0.62		0.62	7.58
Structural Fill									0.00	232.50
JTM Bottom Ash		0.22					4.14		4.36	73.94
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	7.13	4.06	6.15	6.38	0.05	0.31	13.73	2.10	39.90	486.27
Net Ash Placed in Landfills		4.43					22.42		26.85	275.41
NOV Total Ash Utilized	0.00	36.71	0.00	3.66	0.00	0.00	4.76	0.00	45.13	693.83
DEC Coal Consumption	77.00	395.00	36.00	89.00	13.00	16.00	347.00	45.00	1,018.000	15,560.541
DEC % Ash	9.80	9.50	11.00	9.00	11.00	10.00	11.00	10.00		
DEC Ash Produced	7.55	37.53	3.96	8.01	1.43	1.60	38.17	4.50	102.74	1,558.25
Utilization: Concrete		32.32		2.18					34.50	412.27
Mineral Filler							0.62		0.62	8.20
Structural Fill									0.00	232.50
JTM Bottom Ash		0.49					3.45		3.93	77.87
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	7.55	-0.76	3.96	5.83	1.43	1.60	14.46	4.50	38.56	524.83
Net Ash Placed in Landfills		5.48					19.64		25.12	300.53
DEC Total Ash Utilized	0.00	32.81	0.00	2.18	0.00	0.00	4.07	0.00	39.05	732.88
Year to Date Coal Consumed	1,604.293	5,689.829	567.717	1,414.877	294.370	377.209	4,952.664	659.582		15,560.541
Year to Date Ash Produced	162.89	555.35	76.02	120.55	31.70	32.44	514.04	65.26		1,558.25
Utilization: Concrete	0.00	393.41	0.00	18.85	0.00	0.00	0.00	0.00		412.27
Mineral Filler	0.00	0.00	0.00	0.00	0.00	0.00	8.20	0.00		8.20
Structural Fill	0.00	0.00	0.00	0.00	0.00	0.00	232.50	0.00		232.50
JTM Bottom Ash	0.00	22.08	0.00	0.00	0.00	0.00	55.79	0.00		77.87
Duke Bottom Ash	0.00	0.00	0.00	0.00	0.00	0.00	2.05	0.00		2.05
Mill Rejects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Other: Ash Removal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Ash Sluiced to Basins	162.89	57.21	76.02	101.69	31.70	32.44	-2.38	65.26	524.83	524.83
Net Ash Placed in Landfills	0.00	82.65	0.00	0.00	0.00	0.00	217.88	0.00	300.53	300.53
YTD Total Ash Utilized	0.00	415.49	0.00	18.85	0.00	0.00	298.54	0.00	732.88	732.88
YTD Percent Ash Utilized	0.0%	74.8%	0.0%	15.6%	0.0%	0.0%	58.1%	0.0%	1.49	47.0%
YTD + Projected Ash Production	162.89	555.35	76.02	120.55	31.70	32.44	514.04	65.26		1558.25
YTD + Projected Ash Utilization	0.00	415.49	0.00	18.85	0.00	0.00	298.54	0.00		732.88
YTD + Projected % Ash Utilization	0.0%	74.8%	0.0%	15.6%	0.0%	0.0%	58.1%	0.0%		47.0%

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Updated BC moisture to landfill 11/98

Estimates of Monthly Fossil Fuel Consumption by Plant

1999	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
(Coal in Thousands of Tons Consumed)													
Allen	177	155	202	157	178	202	198	183	193	187	198	217	2246
Belews Creek	474	438	253	192	450	501	527	491	465	358	476	527	5152
Buck	79	57	74	71	82	70	60	57	56	73	77	62	817
Cliffside	151	137	154	64	131	123	125	116	121	154	143	145	1564
Dan River	54	33	44	47	60	29	32	36	18	39	25	31	449
Lee	73	66	71	64	77	70	54	57	53	61	73	62	782
Marshall	461	438	431	375	425	439	429	422	309	316	300	358	4701
Riverbend	74	67	88	41	77	80	67	64	75	80	78	62	853
System Total Coal	1543	1390	1317	1011	1480	1514	1491	1427	1289	1267	1371	1463	16563
(Gas in Thousands of KCF Consumed)													
Total CT Natural Gas Use	0	0	0	465	308	856	540	418	431	437	0	0	3454
(Oil in Thousands of Gallons Consumed)													
Total CT Fuel Oil Use	4798	1453	3248	0	0	0	0	0	0	0	2394	4598	16492

January 1999 Short Term Base Case - ps9901st

Estimates of Monthly Fossil Fuel Consumption by Unit

(Coal in Thousands of Tons Consumed)

1999	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Allen 1	32	26	34	22	31	29	27	26	26	31	22	33	339
Allen 2	23	0	0	0	8	31	28	26	29	31	31	31	237
Allen 3	49	43	57	36	51	48	49	42	46	35	50	48	555
Allen 4	23	43	55	47	55	50	46	45	45	47	41	52	549
Allen 5	51	42	56	52	33	45	48	43	48	42	54	53	567
Plant Total	177	155	202	157	178	202	198	183	193	187	198	217	2246
Belews Creek 1	248	228	253	192	253	263	268	273	226	133	264	267	2868
Belews Creek 2	227	210	0	0	197	237	259	218	239	225	212	259	2283
Plant Total	474	438	253	192	450	501	527	491	465	358	476	527	5152
Buck 3	13	4	12	15	14	10	4	5	8	15	13	10	126
Buck 4	8	2	8	10	9	5	5	2	2	8	8	8	75
Buck 5	29	26	31	18	29	27	26	26	19	30	26	13	300
Buck 6	29	25	24	28	29	27	25	24	27	20	29	30	316
Plant Total	79	57	74	71	82	70	60	57	56	73	77	62	817
Cliffside 1	6	6	5	7	5	3	5	3	4	5	5	6	59
Cliffside 2	7	5	2	4	4	3	4	4	3	6	8	5	55
Cliffside 3	11	8	13	9	10	11	9	8	9	6	7	9	109
Cliffside 4	12	10	13	13	13	11	8	8	10	12	6	10	126
Cliffside 5	115	108	120	32	100	95	99	93	94	125	118	115	1215
Plant Total	151	137	154	64	131	123	125	116	121	154	143	145	1564
Dan River 1	12	14	16	16	16	5	7	9	3	3	4	6	109
Dan River 2	16	13	6	1	14	4	11	9	3	5	1	11	94
Dan River 3	27	6	22	29	30	21	14	18	13	32	20	15	245
Plant Total	54	33	44	47	60	29	32	36	18	39	25	31	449
Lee 1	18	18	22	21	19	18	15	15	16	16	21	18	218
Lee 2	21	17	17	17	22	19	15	15	16	22	21	16	218
Lee 3	34	30	32	25	36	33	24	26	21	23	31	28	346
Plant Total	73	66	71	64	77	70	54	57	53	61	73	62	782
Marshall 1	78	80	57	80	76	82	78	79	73	85	86	37	892
Marshall 2	89	82	93	65	58	82	79	73	72	76	75	66	909
Marshall 3	154	136	129	127	146	136	136	138	43	0	48	142	1336
Marshall 4	139	141	152	103	145	139	136	131	121	155	91	113	1564
Plant Total	461	438	431	375	425	439	429	422	309	316	300	358	4701
Riverbend 4	18	18	18	4	17	19	15	16	17	21	21	17	201
Riverbend 5	2	12	21	10	20	19	15	15	17	18	15	13	177
Riverbend 6	26	25	30	13	22	19	20	15	22	21	17	13	243
Riverbend 7	27	13	20	14	17	22	18	18	19	21	25	18	233
Plant Total	74	67	88	41	77	80	67	64	75	80	78	62	853
System Total Coal	1543	1390	1317	1011	1480	1514	1491	1427	1289	1267	1371	1463	16563

January 1999 Short Term Base Case - ps9901st

Estimates of Monthly Fossil Fuel Consumption by Plant

2000	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
(Coal in Thousands of Tons Consumed)													
Allen	185	179	156	151	134	171	221	215	217	175	189	222	2217
Belews Creek	504	434	258	268	432	474	527	486	468	363	495	532	5242
Buck	63	54	60	53	67	86	84	76	80	73	73	76	846
Cliffside	125	116	130	65	107	156	148	138	138	158	157	129	1567
Dan River	39	52	42	18	35	40	41	51	8	32	62	48	469
Lee	71	31	52	41	63	79	80	76	69	73	83	60	778
Marshall	436	433	481	325	390	459	441	448	405	340	314	386	4859
Riverbend	89	64	69	72	71	93	87	92	89	70	85	75	957
System Total Coal	1513	1363	1249	994	1300	1557	1631	1582	1474	1284	1459	1529	16935
(Gas in Thousands of KCF Consumed)													
Total CT Natural Gas Use	0	0	0	363	218	1051	522	434	234	304	0	0	3127
(Oil in Thousands of Gallons Consumed)													
Total CT Fuel Oil Use	1809	1420	1924	0	0	0	0	0	0	0	1978	2920	10052

January 1999 Short Term Base Case - ps9901st

Estimates of Monthly Fossil Fuel Consumption by Unit

(Coal in Thousands of Tons Consumed)

1999	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Allen 1	30	28	28	17	26	29	32	31	30	29	36	34	351
Allen 2	29	27	27	30	21	33	34	32	30	36	23	34	357
Allen 3	39	45	52	53	40	55	56	47	54	42	53	52	589
Allen 4	42	47	48	52	48	53	54	53	48	8	21	52	527
Allen 5	46	31	0	0	0	0	44	52	54	60	56	50	394
Plant Total	185	179	156	151	134	171	221	215	217	175	189	222	2217
Belews Creek 1	255	200	0	0	193	260	278	244	245	258	249	267	2450
Belews Creek 2	249	233	258	268	239	214	249	242	223	105	246	265	2792
Plant Total	504	434	258	268	432	474	527	486	468	363	495	532	5242
Buck 3	5	4	6	9	9	17	15	11	13	18	12	8	126
Buck 4	3	1	3	4	5	9	9	6	8	11	11	8	77
Buck 5	28	27	29	11	27	30	30	30	29	22	19	30	311
Buck 6	28	23	23	29	27	30	30	30	29	22	32	30	332
Plant Total	63	54	60	53	67	86	84	76	80	73	73	76	846
Cliffside 1	5	6	5	2	1	8	6	6	6	5	7	6	62
Cliffside 2	5	3	0	3	3	8	6	6	6	7	9	6	60
Cliffside 3	4	0	7	6	2	10	8	9	7	6	10	7	78
Cliffside 4	10	3	8	8	10	14	11	11	11	13	14	7	121
Cliffside 5	101	104	110	46	90	117	117	106	107	126	116	104	1245
Plant Total	125	116	130	65	107	156	148	138	138	158	157	129	1567
Dan River 1	12	12	11	15	15	7	13	10	0	0	11	13	117
Dan River 2	9	14	6	4	4	3	12	9	0	8	16	3	89
Dan River 3	18	27	25	0	16	30	16	32	8	24	35	32	263
Plant Total	39	52	42	18	35	40	41	51	8	32	62	48	469
Lee 1	19	7	12	13	15	21	22	21	19	23	24	14	212
Lee 2	20	11	18	13	18	21	22	21	19	21	20	18	221
Lee 3	33	12	22	15	30	36	36	35	31	29	39	27	345
Plant Total	71	31	52	41	63	79	80	76	69	73	83	60	778
Marshall 1	81	80	79	58	72	88	83	83	56	89	89	85	943
Marshall 2	74	80	89	79	53	87	77	88	61	89	79	85	942
Marshall 3	148	137	156	91	131	143	135	143	149	162	146	96	1637
Marshall 4	133	137	157	96	135	141	146	133	139	0	0	120	1337
Plant Total	436	433	481	325	390	459	441	448	405	340	314	386	4859
Riverbend 4	19	14	15	18	18	20	19	20	19	20	22	19	222
Riverbend 5	19	15	11	11	13	21	19	21	20	18	22	18	208
Riverbend 6	25	23	23	19	23	28	24	26	24	18	15	24	273
Riverbend 7	25	12	20	24	18	24	25	25	26	14	27	14	254
Plant Total	89	64	69	72	71	93	87	92	89	70	85	75	957
System Total Coal	1513	1363	1249	994	1300	1557	1631	1582	1474	1284	1459	1529	16935

Duke Power Company
Fossil/Hydro Dept.
1998 Ash Storage Forecast

Dan River Steam Station

Ash Production Projections Based on: Coal Consumption with Utility Regulation Medium Ash Content (8.5% till 2002, 10% after 2002)
Coal Consumption with Utility Deregulation Medium Ash Content (8.5% till 2002, 10% after 2002)
Coal Consumption with Utility Deregulation High Ash Content (10% till 2002, 11.9% after 2002

Peak Ash Storage Elevation in Primary Cell = 538.0 ft.
Date of Most Recent Physical Survey: 08/08/97
1997 Removal = 140,700 pond cubic yards = 104,500 dry tons.

Date	Annual Production- Regulated (1000's tons)	Annual Production- NonRegulated (1000's tons)	Annual High Ash Production- NonRegulated (1000's tons)	Cumulative Ash to Basin Production- Regulated (1000's tons)	Cumulative Ash to Basin Production- NonRegulated (1000's tons)	Cumulative Ash to Basin for High Ash Production- NonRegulated (1000's tons)	Basin Ash Storage Capacity w/out Chem. Cleaning (1000's tons)	Basin Ash Storage Capacity w/ Chemical Cleaning (1000's tons)
1/1/93	0.00	0.00	0.00	0.00	0.00	0.00	44.50	-4.61
12/31/93	28.40	28.40	28.40	28.40	28.40	28.40	44.50	-4.61
12/31/94	17.50	17.50	17.50	45.90	45.90	45.90	141.32	92.21
12/31/95	16.90	16.90	16.90	62.80	62.80	62.80	141.32	92.21
12/31/96	41.32	41.32	41.32	104.12	104.12	104.12	141.32	92.21
12/31/97	41.31	41.31	41.31	145.43	145.43	145.43	245.82	196.71
12/31/98	20.32	20.32	20.32	165.75	165.75	165.75	245.82	196.71
12/31/99	33.58	33.58	33.58	199.32	199.32	199.32	245.82	196.71
12/31/00	27.20	27.20	27.20	226.52	226.52	226.52	245.82	196.71
12/31/01	29.33	36.20	43.08	255.85	262.72	269.60	245.82	196.71
12/31/02	34.51	43.00	51.17	290.36	305.72	320.77	245.82	196.71
12/31/03	55.80	52.70	62.71	346.16	358.42	383.48	245.82	196.71
12/31/04	60.20	57.20	68.07	406.36	415.62	451.55	245.82	196.71
12/31/05	60.20	63.10	75.09	466.56	478.72	526.64	245.82	196.71
12/31/06	60.20	67.60	80.44	526.76	546.32	607.08	245.82	196.71
12/31/07	60.20	69.00	82.11	586.96	615.32	689.19	245.82	196.71
12/31/08	60.20	73.90	87.94	647.16	689.22	777.13	245.82	196.71
12/31/09	60.20	72.40	86.16	707.36	761.62	863.29	245.82	196.71
12/31/10	60.20	76.50	91.04	767.56	838.12	954.32	245.82	196.71
12/31/11	60.20	77.80	92.58	827.76	915.92	1046.91	245.82	196.71
12/31/12	60.20	76.60	91.15	887.96	992.52	1138.06	245.82	196.71
12/31/13	60.20	81.40	96.87	948.16	1073.92	1234.93	245.82	196.71
12/31/14	60.20	84.10	100.08	1008.36	1158.02	1335.01	245.82	196.71
12/31/15	60.20	86.00	102.34	1068.56	1244.02	1437.35	245.82	196.71
12/31/16	60.20	86.00	102.34	1128.76	1330.02	1539.69	245.82	196.71
12/31/17	60.20	86.00	102.34	1188.96	1416.02	1642.03	245.82	196.71
12/31/18	60.20	86.00	102.34	1249.16	1502.02	1744.37	245.82	196.71
Totals:	1249.16	1502.02	1744.37					

Year To Date

1998 ASH PRODUCTION

	Coal Consumed - Projected (1000's lbs)	Coal Consumed - Actual (1000's lbs)	Ash Content (% by Weight)	Ash Production (1000's tons)
January		7,918.00	10.17%	0.40
February		0.00	0.00%	0.00
March		44,546.00	10.89%	2.43
April		3,892.00	10.44%	0.20
May		81,548.00	10.85%	4.42
June		124,618.00	10.93%	6.81
July		107,740.00	11.15%	6.01
August		116,560.00	10.96%	6.39
September		44,000.00	9.75%	2.15
October		31,000.00	9.16%	0.01
November		920.00	10.41%	0.05
December		26,000.00	11.00%	1.43
				30.31
YTD		588,740.00		

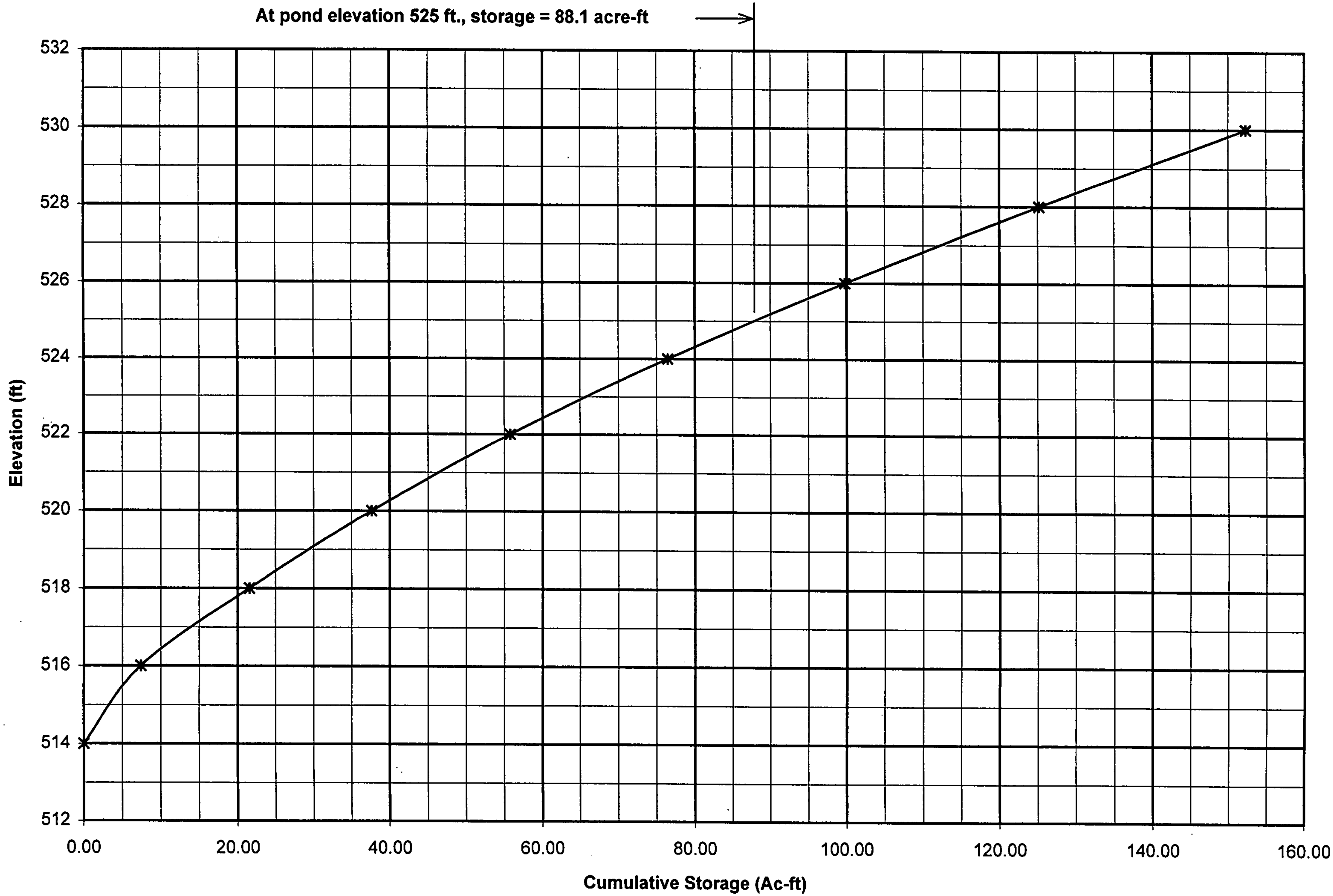
DAN RIVER - ASH BASIN CAPACITY

Reference file "DR Forecast.xls"

YEAR	ANNUAL ASH PRODUCTION - PROJECTED (ktons)	CUMULATIVE ASH PRODUCTION - PROJECTED (ktons)	ASH BASIN CAPACITY - W/CHEMICAL CLEANING (ktons)	ASH BASIN CAPACITY - W/O CLEMICAL CLEANING (ktons)
1998	20.32	20.32	51.28	100.39
1999	33.58	53.90	51.28	100.39
2000	27.20	81.10	51.28	100.39
2001	29.33	110.43	51.28	100.39
2002	34.51	144.94	51.28	100.39
2003	55.80	200.74	51.28	100.39

Dr2a.xls
8-04-93 Water Stage-Storage

Dan River Ash Basin: Secondary Cell Water Storage Capacity as of 8/04/93



Dr2a.xls

Dan River Steam Station
Ash Basin Secondary Cell
Water Storage Capacity Based on 08/04/93 Physical Survey

Elev. (ft)	Existing Water Storage Area (Acres)	Incremental Existing Water Storage Area (Ac-ft)	Cumulative Existing Water Storage Area (Ac-ft)
514	0.7	0.00	0.00
516	6.6	7.36	7.36
518	7.6	14.19	21.55
520	8.5	16.07	37.62
522	9.6	18.13	55.75
524	11.1	20.69	76.44
526	12.3	23.35	99.79
528	13.1	25.39	125.18
530	14.0	27.12	152.30

Dan River Station - Ash Basin Forecasting
Wet Weather Detention Volume

drwwdv.xls
1/27/99

Determination of Wet Weather Detention Volume: Wet Weather Detention Volume is the sum of the runoff accumulated in the ash basin which results from a 10-yr 24-hr storm (assuming 100% runoff) plus the maximum 24-hr dry weather waste stream which discharges to the Ash Basin (refer to NPDES Permit NC0003468)

I. Estimate Runoff to the Ash Basin from a 10-yr 24-hr storm:

1. Natural Drainage Area of Ash Basin = 131.6 Acres
   Station Yard Drainage Area Pumped to Ash Basin = 11.0 Acres
   Total = 142.6 Acres

2. Precipitation from 10-yr 24-hr storm = 5.2 Inches

3. Total Stormwater Runoff to Ash Basin = **61.79 Acre-feet**
   (Assuming 100% runoff)

II. Estimated Maximum 24-hr Dry Weather Waste Stream Discharging to Ash Basin:

1. Maximum recorded Ash Basin Discharge = 7,700,000 Gallons/day

2. Increase maximum daily disharge by 10% for conservatism and convert units to acre-feet = **25.99 Acre-feet**

III. Wet Weather Detention Volume:

Sum of Parts I. and II. = **87.79 Acre-feet**

IV. Estimated Quantity of Solids (Ash) to be discharged to Ash Basin During Life of Permit. (Refer to Coal Consumption Data and ENPRO EN9706F1 Output - Base Fuel Consumption Forecast.)
Note: NPDES Permit expiration date is 2/28/2002.

Time Period	Actual or Estimated Coal Consumption (1000's tons)	% Ash	Estimated Ash Production (1000's tons)	Estimated Ash Production (Ac-ft) *
8/1/97 - 10/31/97	102.33	11.33%	11.60	9.68
11/1/97 - 12/31/97	53	11.00%	5.83	4.87
1998	267	11.00%	29.37	24.52
1999	378	11.00%	41.58	34.71
2000	373	11.00%	41.03	34.25
2001	362	11.00%	39.82	33.24
1/1/2002 - 2/28/2002 **	104.25	11.00%	11.47	9.57
Total	1639.58		180.70	150.84

Dan River Station - Ash Basin Forecasting
Wet Weather Detention Volume

drwwdv.xls
1/27/99

* Calculation assumes an in-place ash density of 55 lbs. per cubic foot.
** Assumes 25% of yearly projection is consumed in January and February.

V. Estimated Total Storage Volume Required for Term of Permit:

Wet Weather Detention Volume =	87.8 Acre-feet
Estimated Solids to Ash Basin =	150.8 Acre-feet
Total =	238.6 Acre-feet

VI. Results:

Available Storage based on most recent basin survey dated 8/8/97 =	205.2 Acre-feet
Required Storage Volume:	
Thru 2/28/2002 (Term of Permit) =	238.6 Acre-feet
Thru 12/31/2001 =	229.1 Acre-feet
Thru 12/31/2000 =	195.8 Acre-feet

Based on these conservative calculations, there is sufficient capacity in the ash basin to provide the retention volume specified in the permit through the year 2000. Based on the current fuel consumption forecast, additional ash removal projects will be required to provide retention capacity through the term of the Permit.

Scratch Pad

Time Period	Actual or Estimated Coal Consumption (1000's tons)	% Ash	Estimated Ash Production (1000's tons)	Estimated Ash Production (Ac-ft)
10/1/95	3.80	10.50%	0.40	0.33
11/1/95	9.80	12.30%	1.21	1.01
12/1/95	15.70	12.00%	1.88	1.57
	29.30	11.91%	3.49	2.91
1/1/96	10.14	11.33%	1.15	0.96
2/1/96	21.88	10.60%	2.32	1.94
3/1/96	13.03	10.76%	1.40	1.17
4/1/96	7.50	10.59%	0.79	0.66
5/1/96	32.44	12.29%	3.99	3.33
6/1/96	46.96	10.39%	4.88	4.07
7/1/97	56.90	9.24%	5.26	4.39
8/1/96	48.99	11.50%	5.63	4.70
9/1/96	9.78	9.96%	0.97	0.81
10/1/96	30.61	9.94%	3.04	2.54
11/1/96	58.94	10.73%	6.32	5.28
12/1/96	56.32	9.89%	5.57	4.65
	393.49	10.50%	41.33	34.50
1/1/97	53.01	9.78%	5.18	4.33
2/1/97	7.35	10.84%	0.80	0.67
3/1/97	3.66	11.58%	0.42	0.35
4/1/97	15.43	11.29%	1.74	1.45
5/1/97	33.50	10.67%	3.57	2.98
6/1/97	30.47	10.36%	3.16	2.64
7/1/97	61.86	10.55%	6.53	5.45
	205.28	10.43%	21.40	17.87
8/1/97	29.98	10.62%	3.18	2.66
9/1/97	36.26	11.52%	4.18	3.49
10/1/97	36.09	11.74%	4.24	3.54
	102.33	11.33%	11.60	9.68
11/1/97	17.00	11.00%	1.87	1.56
12/1/97	36.00	11.00%	3.96	3.31
	53.00	11.00%	5.83	4.87

Dr1b.xls

Dan River Steam Station
Ash Basin Primary Cell Stage - Storage Data
Water Storage Capacity and Ash Storage Capacity Based on 08/08/97 Physical Survey
Note: Assumed Peak Ash Storage Elevation at Ash Sluice Discharge Piping = 538.0 ft.

Elev. (ft)	Existing Water Storage Area (Acres)	Remaining Ash Storage Area (Acres)	Net Water Storage Area (Acres)	Incremntl Existing Water Storage Capacity (Ac-ft)	Cumultv Existing Water Storage Capacity (Ac-ft)	Incremntl Remaining Ash Storage Capacity (Ac-ft)	Cumultv Remaining Ash Storage Capacity (Ac-ft)	Incremntl Net Water Storage Capacity (Ac-ft)	Cumultv Net Water Storage Capacity (Ac-ft)
522	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
524	0.24	0.24	0.00	0.32	0.32	0.32	0.32	0.00	0.00
526	0.88	0.88	0.00	1.12	1.44	1.12	1.44	0.00	0.00
528	9.08	9.08	0.00	9.96	11.40	9.96	11.40	0.00	0.00
530	11.57	11.57	0.00	20.65	32.05	20.65	32.05	0.00	0.00
532	12.51	12.51	0.00	24.08	56.13	24.08	56.13	0.00	0.00
534	19.25	11.65	7.60	31.76	87.89	24.16	80.29	7.60	7.60
536	22.98	4.37	18.61	42.23	130.12	16.02	96.31	26.21	33.81
538	23.76	0.00	23.76	46.74	176.86	4.37	100.68	42.37	76.18
540	26.78	0.00	26.78	50.54	227.40	0.00	100.68	50.54	126.72

Dan River Steam Station
1997 Ash Removal Project
Estimate Quantity placed at Fill

1. Based on PLAT Team Estimate:

Fill Height (ft.)	Area (acres)	Incremental Quantity (acre-ft)	Cumulative Quantity (acre-ft.)
0	10.14	0	0
2	9.19	19.33	19.33
4	7.58	16.77	36.1
6	5.35	12.93	49.03
8	4.66	10.01	59.04
10	4.14	8.8	67.84
12	2.67	6.81	74.65
14	0.99	3.66	**78.31**

78.31 acre-ft. = 78.31 X 43,560 / 27 = 126,340 cubic yards

2. Based on Overlay of 9/95 Topo Survey:

Elevation (ft.)	Area (acres)	Incremental Quantity (acre-ft)	Cumulative Quantity (acre-ft.)
560	0.09	0	0.00
562	0.37	0.46	0.46
564	1.39	1.76	2.22
566	2.79	4.18	6.40
568	3.83	6.62	13.02
570	4.37	8.2	21.22
572	4.98	9.35	30.57
574	5.52	10.5	41.07
576	6.2	11.72	52.79
578	5.46	11.66	64.45
580	2.41	7.87	72.32
582	0.83	3.24	75.56
584	0.61	1.44	77.00
586	0.32	0.93	77.93
588	0.05	0.37	78.30

78.30 acre-ft. = 78.31 X 43,560 / 27 = 126,324 cubic yards

Dr1b.xls
1997 Field Density Tests

Dan River Steam Station
1997 Fill in Dry Ash Storage Area
Summary of Compacted Fly Ash Field Density Tests

Proctor Test No.	1	2
max dry density	67.4 pcf	70.5 pcf
optimum w	35.8%	35.5%

Field Density Test No.	w, %	Dry Density, pcf	% Compaction
3	42.7	64.5	96
4	43.5	62.0	92
5	38.5	65.9	98
6	38.5	65.2	93
7	34.9	64.0	95
8	34.3	65.6	93
9	35.3	62.8	93
10	34.7	63.6	94
11	35.7	64.2	95
12	35.2	62.7	93
13	38.2	63.0	94
14	38.0	62.3	92
15	38.6	62.2	92
16	37.7	63.0	94
17	35.0	62.3	92
18	34.6	63.4	94
19	35.2	61.8	92
20	34.8	62.7	93
21	35.0	61.5	91
22	35.3	62.0	92
23	34.7	63.6	94
24	35.2	62.4	93
25	35.9	63.9	95
26	35.1	63.2	94
27	34.8	62.9	93
28	35.2	61.8	92
29	35.7	61.8	92
30	35.3	64.6	96
31	36.1	63.3	94
32	36.4	62.8	93
33	36.5	62.1	92
34	36.5	63.4	94
35	35.6	64.9	96
36	36.3	63.9	95
37	36.7	61.5	91
38	36.2	63.1	94
39	37.0	62.3	92
40	36.0	63.7	94
41	35.6	64.5	96
42	36.9	62.8	93
43	36.7	63.7	95
44	37.2	61.8	92
45	36.5	62.5	93
Average	36.4	63.1	93.5
Minimum	34.3	61.5	91.0
Maximum	43.5	65.9	98.0

Ash Management
Duke Power Co.
1999 Dan River Ash Storage Plan

Dan River Ash Fill Placement

Phase I Fill to El 577

Work Items				
Clearing	5.6	Acre		
Silt Fence	500	ln ft		
Ash Excavation	100,000	Tons	83,000	cy
Ash Placement	100,000	Tons	83,000	cy
Soil Cover	6463	cy	1 ft on slopes, 6 in on top	
Grassing	3.8	Acre		
Ditching	2300	ln ft		
Haul Road Gravel Surface	109	Tons		

Equipment		
5 cy track loader 10 ft reach	1	Ea
20 cy dump truck	5	Ea
D7 dozer	1	Ea
Vibratory steel wheel compactor	1	Ea
Production/dump truck/day	384	Tons
Work days required	52	Days

Phase II Fill to El 592

Clearing Grass	3.8	Acre		
Ash Excavation	100,000	Tons	83,000	cy
Ash Placement	100,000	Tons	83,000	cy
Soil Cover	8858	cy	1 ft on slopes, and on top	
Grassing	3.8	Acre		
Removal of silt fencing	500	ln ft		

5 cy track loader 10 ft reach	1	Ea
20 cy dump truck	5	Ea
D7 dozer	1	Ea
Vibratory steel wheel compactor	1	Ea
Production/dump truck/day	384	Tons
Work days required	52	Days

Ash Management
Duke Power Co.
1999 Dan River Ash Placement Plan

Dan River Ash Fill Placement

<u>Phase 1 Excavation</u>

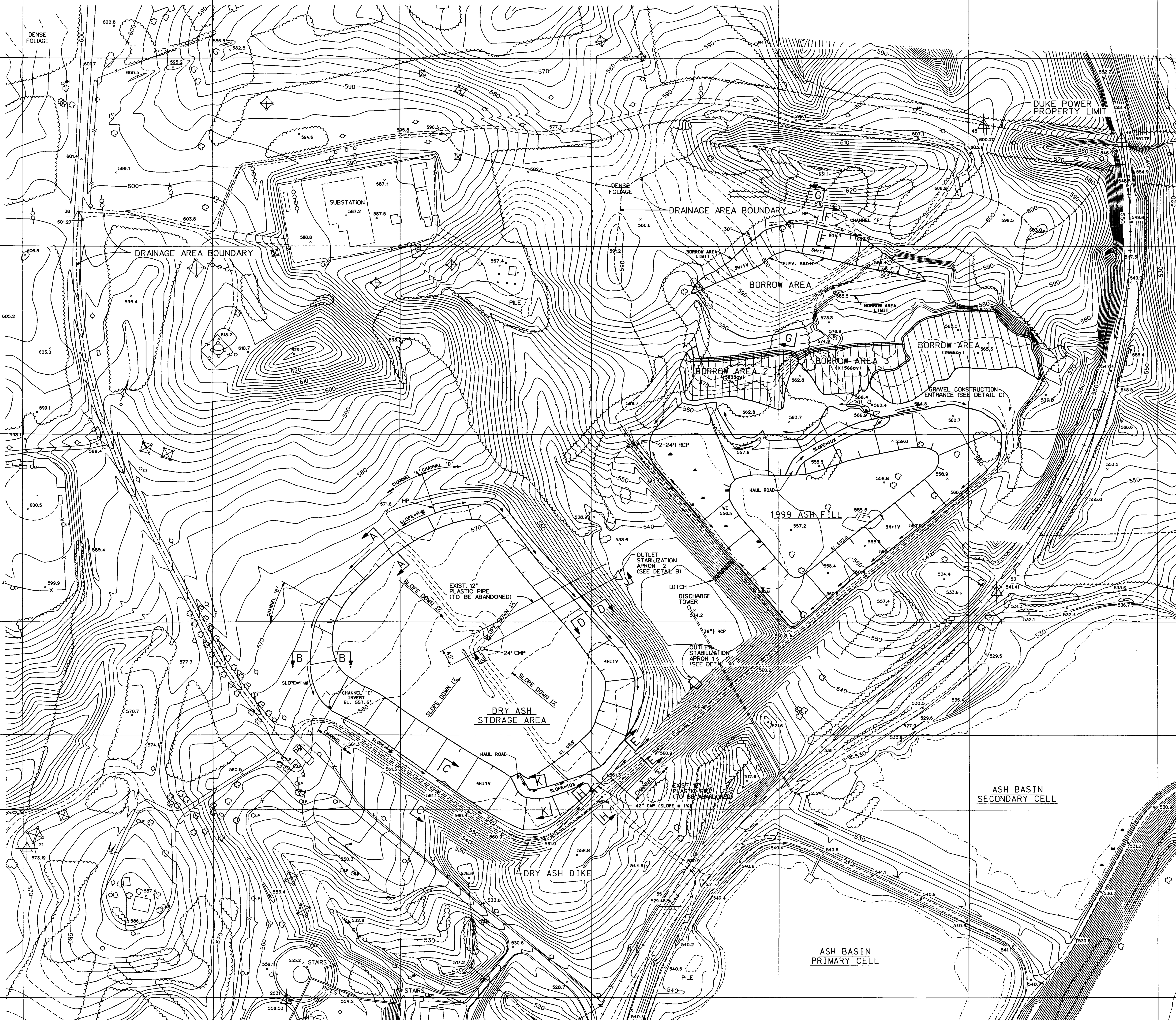
1. Lower water level in primary and secondary cell to El 518 slowly.
2. Allow basins to drain and stabilize for one week.
3. Place silt fencing around both the primary and secondary ash towers.
4. Excavate ditches with trackhoe as shown on the excavation plan. Ditch is sloped 0.5% to tower.
5. Periodically excavate ditches to prevent ash from reaching the tower.
6. Excavate in primary cell, Area 1 from El 532 to El 525 (7 ft depth). Quantity is approximately 86,000 tons.
7. Excavate balance of ash(to reach 100,000 ton quantity) from Area 3. Excavate from El 528 to El 523 (5 ft depth).
8. Remove silt fence at towers, replace stop logs at both towers.

<u>Phase 2 Excavation</u>

1. Lower water level in primary and secondary cell to El 518 slowly.
2. Allow basins to drain and stabilize for one week.
3. Place silt fencing around both the primary and secondary ash towers.
4. Excavate ditches with trackhoe as shown on the excavation plan. Ditch is sloped 0.5% to tower.
5. Periodically excavate ditches to prevent ash from reaching the tower.
6. Excavate in primary cell, Area 3 from El 528 to El 523 (5 ft depth). Quantity is approximately 66,000 tons.
7. Excavate balance of ash(to reach 100,000 ton quantity) from Area 2. Excavate from El 532 to El 525 (7 ft depth).
8. Remove silt fence at towers, replace stop logs at both towers.

DRAWING

DWG. NO. D-1039-M5 REV. 1



NOTES:

1. All work shall be performed in accordance with Duke Power Company's Erosion and Sediment Control Plan for Dan River Steam Station Ash Basin: Ash Fill in Dry Ash Storage Area, dated April 13, 1994.

2. The ash fill and Borrow Area shall be constructed to the elevations, lines, grades, and cross sections indicated on the drawings and in consideration of the final quantity of ash and soil cover material to be placed in the ash fill. The maximum storage capacity of the ash fill (including soil cover material) is approximately 265,000 cubic yards.

3. Ash fill material shall be obtained from the Ash Basin Primary Cell as directed by the Engineer. Ash shall be placed in the designated Dry Ash Storage Area in uniform and approximately horizontal lifts and in such a manner that provides positive drainage. Ash shall be compacted to a minimum 90% of Standard Proctor Density in accordance with ASTM D 698. To verify compactive effort, field density tests (Shelby Tube Method) shall be performed for every 5000 cubic yards placed.

4. Damage to existing haul roads due construction activities shall be repaired as directed by the Engineer in order to maintain the existing integrity of the roads.

5. Spillage of ash, soil cover material, stone aggregate, or other material en route to or from the ash fill shall be immediately removed and placed in an appropriate manner as directed by the Engineer.

6. Ash fill material and soil cover material shall be free from roots, logs, brush, and other objectionable material. This objectionable material shall be placed in small piles and burned in accordance with local and state ordinances. Materials not permissible to burn, materials remaining after burning, and loose stone shall be disposed of in an appropriate manner as directed by the Engineer.

7. All drainage and erosion and sediment control materials shall be furnished by the Contractor.

8. When the ash fill reaches approximately elevation 565 ft., the existing 12 inch diameter plastic pipe shall be abandoned by plugging the inlet as directed by the Engineer. Subsequently, the top surface of the ash fill shall be graded to drain to the 24 inch diameter corrugated metal pipe (CMP) at approximately 1%.

9. Unless otherwise directed by the Engineer, cover material for the ash fill shall be obtained from the designated Borrow Area. Soil cover material shall be placed over the ash fill and shall be 9 inches thick on gentle slopes (less than 5% slope) and 18 inches thick on slopes steeper than 5%.

10. All material designated as riprap shall be field stone or quarry stone and shall be hard, angular, and of such quality that it will not break down on exposure to water or weathering. The minimum specific gravity shall be 2.5. Gradation of riprap shall meet the following criteria:

Max stone size = 18 inches
d50 (50% finer by weight) = 12 inches
d20 (20% finer by weight) = 6 inches
d5 (5% finer by weight) = 3 inches

11. Bedding material for riprap shall be #467 stone in accordance with ASTM C 33.

12. Overlay material for gravel construction entrances and the haul road on the ash fill shall be washed stone 2 inches to 3 inches in size.

13. All CMP's shall be installed to the specified grades on a smooth uniform bedding of existing ash fill. Open trenches shall be backfilled and compacted to the density of the surrounding material. The 24 inch CMP shall be plain galvanized steel, 18 gauge (minimum) with 2 2/3 inch by 1/2 inch corrugations. The 42 inch CMP shall be plain galvanized steel, 16 gauge (minimum) with 2 2/3 inch by 1/2 inch corrugations. All CMP's shall be in accordance with ASTM A 444.

14. Storm grate cover over 24 inch diameter CMP shall be Model R-4040 with special setback lug arrangement for fitting to corrugated metal pipe as manufactured by Neenah Foundry Company, or approved equal.

15. HP designates high point; LP designates low point.

REFERENCE DRAWINGS:

D-1039-M	Ash Settling Basin - Layout
D-1039-M6	Dry Ash Storage Area - Sections and Details
D-1039-M7	Dry Ash Storage Area - Erosion and Sediment Control Plan

Conceptual Ash Storage Plan
For Review by Duke Ash Management
Not For Construction

ELEVATION CONTOUR INTERVAL = 2 FT.

DUKE POWER COMPANY
DAN RIVER STEAM STATION

DRY ASH STORAGE AREA

PLAN

NO.	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE	CIVIL (INSPECTED)	ELEC. (INSPECTED)	MECH. (INSPECTED)
1	RELEASED FOR CONSTRUCTION	LDI	5/11/94	MPM	5/11/94	RSB	5/13/94	---	---	---
ORIG.	RELEASED FOR PERMIT APPLICATION	LDI	4/11/94							

DESIGNER MP MARTIN DATE 3/30/94 INSP. ——— DATE
DRAWN LD ISAACS DATE 3/30/94 INSP. ——— DATE
CHECKED MP MARTIN DATE 4/11/94 APPR. RS BHATNAGAR DATE 5/13/94

SCALE 1"=100' DWG. NO. D-1039-M5 REV. 1

ERN:DR0000JM

ASH MANAGEMENT PLAN

FOR

MARSHALL STEAM STATION

Duke Energy Corporation

September 1998

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EXECUTIVE SUMMARY AND RECOMMENDATIONS

The purpose of this plan is to evaluate issues, strategies and options to determine optimum and cost-effective options for Marshall Steam Station ash management. Planning for disposal of coal ash is an on-going process through the life of the station. The type of coal burned, operational characteristics and environmental requirements influence the station ash management plans.

As of January 1, 1998, North Carolina solid waste regulations became effective that require all sanitary landfills to be lined and have a leachate collection system unless a design variance is granted. Group EH&S has submitted a demonstration for exemption of a liner and leachate collection system for Marshall's permitted sanitary landfill. Group EH&S has also initiated discussions with NCDENR about proposed life-of-station ash management planning with a focus on beneficial use of ash in lieu of expansion of the present landfill (i.e. on-site structural fill projects).

Evaluation of ash production and capacity of Marshall's landfill and ash basin indicates that in mid-year 2000 the landfill will be full and that removal of 100,000 tons of ash is needed annually to maintain the free water volume required by the NPDES permit. If expansion of the present landfill is required instead of an on-site structural fill, approximately two years will be needed to design, permit and begin construction. Submittal of a conceptual plan and request to construct an on-site structural fill at Marshall to NCDENR for review and approval is planned to coincide with their on-going review of the landfill demonstration in the fall of 1998. A conceptual plan for an on-site structural fill has been developed for management review and approval to request an authorization to construct permit from NCDENR for construction to begin in 1999.

Off-site structural fill projects have been the primary method used for ash reuse in the past several years. Although these projects beneficially utilize a waste at a disposal cost avoidance, they carry high risk potential with the area site development market, net revenue return and regulatory changes. Continuation of Off-site projects is planned, if the net cost per ton is less than the cost per ton of on-site disposal or beneficial ash fill placement. Off-site supply arrangements will be pursued with construction contracted by owners. A "Contractor's Day" is planned for the 4th quarter of 1998 to educate and encourage developers, contractors and engineers to beneficially use Duke-Marshall ash as a soil substitute for site development projects and other applications. Also, ash basin maintenance and product distribution will be competitively bid on an annual basis in the 4th quarter of 1998.

Many ash management options were considered by the Ash Management team and consultants. All options were economically evaluated based on the net present value (NPV) and the net cash flow determined using a business case analyses for a 20-year period. The following recommendations are proposed:

1. Upon acceptance of this Plan by Marshall Management, submit a written Conceptual Marshall Business Park Plan (without internal strategy and economics) to NCDENR to provide an alternative option to their current review of the Marshall Landfill Demonstration.

NCDENR has verbally expressed favor with the concept of an on-site beneficial use structural fill project (i.e. Marshall Business Park).

2. Begin developing Phase 1 of the proposed Marshall Business Park in 1999. The Business Park would be built in 4 phases on 200 acres of the northern pond area to hold 20 of the 30 required years of ash storage needs at Marshall. On-site beneficial use of ash offers the best long-term solution with least risk to Marshall's ash storage needs and the flexibility of pursuing other revenue generating options while still having a reliable location to place ash. By continuing off-site placement of ash in engineered fill projects, Duke can reduce Business Park annual costs. No potential revenue from lease or sale of property in the Business Park was assumed for comparison to other options. This option offers NCDENR a beneficial use alternative to more stringent landfill regulations.

3. Reconsider hiring Storm Engineering to evaluate Marshall operating characteristics and determine if optimizing combustion can enhance ash properties (lower LOI) without sacrificing megawatts. Evaluate this study against other ash enhancement options. Ash enhancement options that lower the carbon content of ash create concrete marketable ash for revenue generation (as done at Belews Creek Steam Station). The Combustion Optimization/Business Park combination offers the best NPV and net cash flow of all options.

4. Ash Management initiate a request for proposals (RFPs) with several financing options to the listed vendors to provide ash enhancement for 200,000 tons/year of Marshall ash:
   a. Separation Technologies for the electrostatic separation option.
   b. Progress Materials for the carbon reburn option.
   c. Mineral Resources Technology for the carbon flotation option.

5. Other recommendations include:
   a. Sell the dredge.
   b. Evaluate cases to accept third party ash for revenue.
   c. Harvest cenospheres, if market allows.
   d. Network with the Research and Development Department and other Duke Energy groups to investigate more "user friendly" ash product markets that are cost-effective and environmentally acceptable ash management options.

Other options considered with high NPV and not recommended include:
   a. Ash basin expansion by raising the main dike.
   b. Ash basin expansion by adding a second polishing cell.
   c. Landfill options adding wells, closure cap, liner and leachate collection system (depending on demonstration for exemption submitted to State).

INTRODUCTION

Planning for disposal and/or beneficial reuse of coal ash is an on-going process through the life of Marshall Steam Station (MSS). The type of coal burned, the operational characteristics of MSS units, and environmental requirements influence Marshall's ash management plans. The purpose of this plan is to review MSS ash management plans and develop life-of-station plans that include at least annual review of individual station ash management plans, focusing on cost-effective environmental management and beneficial use options.

Marshall has an ash sluice system and ash basin for co-management of high and low volume waste streams that are regulated per an NPDES (National Pollutant Discharge Elimination System) permit. This includes co-management of coal ash and pyrites with other inflows to the ash basin that includes storm water runoff (including runoff from the coal pile), powerhouse basement sump flow, sanitary waste effluent, and boiler chemical cleaning waste.

Marshall also has a dry-fly ash handling system and permitted sanitary landfill for disposal of conditioned fly ash (fly ash moistened to near optimum water content). North Carolina Regulations are currently in effect that require all sanitary landfills to have a liner and leachate collection system, unless other appropriate methods for ash disposal can be demonstrated. The following options are being pursued to avoid the costly installation of a liner/leachate collection system for ash landfills.

1. Group EH&S has submitted a demonstration for exemption of a liner and leachate collection system at the Marshall landfill and is working with the state regulators to draft a regulation for industrial landfills.
2. Group EH&S has initiated discussions with NCDENR about proposed life-of-station ash management planning with a focus on beneficial use of ash (i.e. on-site structural fill projects for beneficial use of ash).

Objectives:

1. Develop process for station review / revision of ash management plans and interface with station business plan and station permits / management plans for air, land, groundwater and surface water.
2. Develop ash management plans for life-of-station that include ash reuse options (consider ash basins, landfills, off-site disposal, ash enhancement, etc.).
3. Estimate costs for ash disposal that include ash reuse options and ensure compliance with proposed/pending environmental regulations
4. Provide an annual report detailing projected ash production, ash basin storage capacity, ash landfill storage capacity, ash removed and/or landfilled quantities, etc.

Operational Planning Team:

Core team members are chosen from groups that need to interface in the planning process. These individuals are responsible for providing interface with their respective group to provide the necessary expertise and information to develop and implement ash management plans. The present core team consists of the following groups and members:

- Team Sponsor - Fuels Procurement Coal Ash Group Manager (Steve Immel)
- Team Coordinator - Fuels Procurement Coal Ash (Jeff Newell)
- Fossil Maintenance/Nde (Gary Blevins)
- Fossil EH&S (Donna Burrell)
- Waste-Group EH&S (Larry Evans)
- Water Protection-Group EH&S (Ron Lewis)

The following group and support members:

- Environmental Engineering-Group EH&S (Bill Miller)
- Waste-Group EH&S (Grayling Vandervelde)
- Air-Group EH&S (Bill Horton)
- Research and Development (Tim Shawver)
- DE&S Contractor (John Loner)
- Fossil Budget (Gary Taylor)
- Fossil Maintenance/Nde Manager (Sonny Cook)
- Fossil Group EH&S Manager (John Calhoun)
- Fossil Station Manager (John Ellington)

Operational Planning Schedule for Ash Management Plans

A proposed operational planning schedule is presented in Table C. The following is listing of suggested ash management planning activities for each quarter.

Last quarter of each year (October through December)

- Core team members meet to review ash management plan
- Identify tentative ash management needs for station and budget requirements for the next five years
- Review and identify potential ash enhancement options for life-of-station
- Review and identify research and development needs for life-of-station
- Plan and budget for physical survey of MSS ash storage sites as needed

First quarter of each year (January through March)

- Designated team members meet with management to review tentative MSS ash management plan
- Update MSS ash management plan and communicate budget needs for operational planning

Second quarter of each year (April through June)

- Core team reviews operational plans and updates any changes

Third quarter of each year (July through September)

- Core team review final operation plan and updates any changes

MARSHALL ASH PRODUCTION AND STORAGE CAPACITY

The System Planning and Operating Department's coal consumption forecasts (PROMOD) are used to estimate projected ash production. Based on historical data, coal consists of 10% ash that is 10% bottom ash and 90% fly ash. Two rates of ash production are considered:

1. The base coal consumption scenario (which represents the best estimate for coal consumption based on projected energy demands, the Integrated Resource Plan, scheduled plant outages, etc.) and,

2. The high coal consumption scenario (which is determined by increasing the base coal consumption scenario by 5%). Based on historical differences between PROMOD's base coal consumption projections and actual coal consumption, a 5% increase over the base projection is a reasonable projection to consider for ash production.

Evaluation of ash production and capacity of Marshall's landfill and ash basin indicates that in mid-year 2000 the landfill will be full and that removal of 100,000 tons of ash is needed annually to maintain the free water volume required by the NPDES permit (Tables D and E; Figures 3 and 4). Actual ash production and capacity remaining in the landfill and ash basin is verified annually. A demonstration for expansion of Marshall's landfill, as presently designed, is being reviewed by NCDENR. Certification of the free water volume of Marshall's ash basin expires June 30, 2000, and recertification is planned in conjunction with submittal of the application for renewal of Marshall's NPDES permit by January 2, 2000. Discussion of ash storage and enhancement options for continued management of Marshall's ash will follow.

MARSHALL ASH STORAGE AND UTILIZATION OPTIONS

Marshall coal ash is currently segregated into bottom ash and fly ash. Pyrites and unburned coal are separated from the bottom ash, sluiced to a collection area in the ash basin, hauled to Buck Steam Station, and blended with coal for reuse. The pyrite free bottom ash is sluiced to one of two concrete settling basins where a vendor then moves the ash to a clay lined area of the ash basin drainage area and screens this ash for reuse. The remainder of the bottom ash settles in the ash basin. Ponded ash either remains in the ash basin or is reused for structural fill at off-site construction projects.

The fly ash is electrostatically separated and collected in hoppers where the ash can be transported with the sluice system or the dry-fly ash system. The fly ash is either utilized or stored in the Marshall ash basin or sanitary landfill. Although fly ash is the primary wastewater management concern, fly ash is utilized selectively for co-management of wastestreams and wastewater treatment to comply with ash basin discharge limits. Utilization of Marshall fly ash is currently limited to structural fill for off-site construction projects, due primarily to the high carbon content of the fly ash.

The following descriptions and economic assessments of current and potential ash management options for Marshall are presented:

1. OFF-SITE STRUCTURAL FILL PROJECTS

2. LANDFILL EXPANSION:
   - 2A. Truck Ash With No Liner or Leachate Collection System
   - 2B. Truck Ash and Cap With No Liner and Leachate Collection System
   - 2C. Truck Ash and Cap With Liner and Leachate Collection System

3. ON-SITE STRUCTURAL FILL FOR BUSINESS PARK:
   - 3A. Truck Ash to Business Park With No Revenues
   - 3B. Dense Phase Pump Ash to Business Park Without Revenues
   - 3C. Truck Ash to Business Park With $15-30K Revenues
   - 3D. Truck Ash to Business Park With $30-$60K Revenues

4. ASH ENHANCEMENTS:
   - 4A. Combustion Optimization at $3-5/ton Revenues and Truck Ash to Business Park
   - 4B. Electrostatic Separation at $3-5/ton Revenues and Truck Ash to Business Park
   - 4C. Ash Reburn at $3-5/ton Revenues and Truck Ash to Business Park
   - 4D. Carbon Flotation at $3-5/ton Revenues and Truck Ash to Business Park

5. ASH BASIN EXPANSION:

5A. Raise dike to El 820, upgrade sluice system, add secondary cell, and sluice ash to Basin
   - 5B. Raise dike to El 834, upgrade sluice system, and sluice ash to basin

Assumptions

Marshall Station produces 500,000 tons of ash per year.

Total ash consists of 450,000 tons fly ash, 50,000 tons bottom ash.

Ash content at Marshall Station is 10 percent.

Maximum market volume for concrete admixture applications for Marshall fly ash is 200,000 tons per year.

Cost for hauling distance to the fly-ash landfill area and first phase of structural fill is the same.

Cost for hauling and covering with one foot of soil on flat areas and two feet of soil on slopes for 500,000 tons of fly-ash from the silo each year at the present Boral contract rate is $1,271,000.00.

Cost for drainage and sedimentation control at the landfill is based on $2500 per acre.

Cost for drainage and sedimentation control at the structural fill is based on $3000 per acre.

Cost of grubbing is based on $2500.00 per acre.

Cost for removing and hauling 100,000 tons of ponded ash each year is $400,000

Net present value (NPV) and net cash flow are used to compare the economic value of ash management options (Table A; Figure 1; Appendix Tables 2A through 5B).

OPTION 1: OFF-SITE STRUCTURAL ASH FILL PROJECTS

Duke Ash Management has been contracting and building off-site structural fill projects since 1994. Structural fill projects serve to improve sites for development using an alternate to soil. Projects comply with all Federal, State and local permits and regulations. Projects are identified by either Duke, developers, or private land-owners. All prospective sites are pre-qualified for regulatory compliance and environmental compatibility. Prospective sites are considered on a case-by-case basis. Project costs are estimated and considered in a business case. Haul distance to sites is the most variable cost factor. Projects may be turnkey where Duke may engineer, permit, and build for a developer or owner. Projects may also be done as supply arrangements where Duke supplies material under contracted and regulated conditions. Recent engineered ash fill projects using Marshall pond and silo ash include Terry Smith, Marvin Phillips, Lake Norman Air Park, B.K. Barringer, Grigg/Greene, Port Village/Belk Investments, ROE LTD, Integrity Homes, Triangle Industrial Park, and Huntersville Ford.

Off-site placement of Marshall's fly ash is not a long-term solution to the ash storage problem at the station. Below is a table showing a record of fly ash used as structural fill on off site projects from Marshall Steam Station within the last five years.

Year	Quantity Placed
1993	2,860 tons
1994	43,660 tons
1995	159,480 tons
1996	100,150 tons
1997	310,190 tons
1998*	214,244 tons

*to date

Major risks for this option would be not finding potential clients needing fill within the economic haul distance (10 miles) from the plant. This option should be pursued as a revenue supplement in parallel with the Business Park Option.

Off-site structural fill projects have been the primary method used for ash recovery in the past several years. Although these project beneficially utilize a waste at a disposal cost avoidance, they carry high risk potential with the area site development market, net revenue return and regulatory changes. Off-site projects will continue if the net cost per ton is less than the cost per ton of on-site disposal or beneficial ash fill placement. Off-site supply arrangements will be pursued with construction contracted by owners. A "Contractor's Day" is planned for the 4th quarter of 1998 to educated and encourage developers, contractors and engineers to beneficially use Duke-Marshall ash as a soil substitute for site development projects.

There is a potential for use of ash as a structural fill on the Interstate 485 Highway Project. The point of contact within the local project in the NC DOT is Mr Alden Whitmore, telephone 704-982-0101. In the appendix is a portion of the project specification regarding use of Recycled Products or Solid Waste Materials that would favor structural fill use of fly ash in I-485 construction. Ash Management has copies of the NC DOT specifications for recycled products and the I-485 project bid list schedule. Any ash fill highway construction projects will require examination on a case-by-case basis to evaluate impact of haul distance on cost of supplying ash at specific sites.

Some extended liability (real or potential) exists for Duke Energy in terms of long-term responsibility for maintenance of the structural landfill in conformance with NC regulations and permit conditions and for later actions of business park tenants that could result in erosion, groundwater contamination, etc.

OPTION 2: LANDFILL EXPANSION

As of January 1, 1998, North Carolina solid waste regulations became effective that require all sanitary landfills to be lined and have a leachate collection system unless a design variance is granted. Group EH&S has submitted a demonstration for exemption of a liner and leachate collection system for Marshall's permitted sanitary landfill. Group EH&S has also initiated discussions with NCDENR about proposed life-of-station ash management planning with a focus on beneficial use of ash (i.e. on-site structural fill projects) in lieu of expansion of the present landfill.

The landfill design in use at Marshall and Belews Creek Steam Stations has consistently met the ground water standards established under 15A NCAC 2L. Since monitoring began in 1989, all measured parameters have met these standards except for iron and manganese, which are normally high in piedmont type soils. Duke in cooperation with several other companies in North Carolina is continuing to work with NCDENR to review and suggest changes to the landfill regulations based on sound science and cost-effective measures for environmental protection.

If expansion of the Marshall landfill is required, this would be done in two phases. The anticipated storage life of this area would be 15 years. The NPV and the net cash flow for this option is essentially the same as that of Option 3, Scenario 3A (On-Site Structural Fill For Business Park). Approximately two years will be needed to design, permit and begin construction of a landfill. Risks for this option would be additional costs imposed by the state authorities in requiring Duke Power to provide detailed hydrogeologic investigations with leachate fate analysis and to install a liner with leachate collection system. The Appendix contains two prints of the potential layout of the expanded landfill.

Scenario 2A: Truck Ash With No Liner or Leachate Collection System (Present Operation)

This scenario represents the "best case" landfill regulatory outcome assumming no change required in present landfill operation and no additional cost for the next five years (Figure 1; Table 2A). This scenario is also considered the "probable case" landfill regulatory outcome with the following operational changes: The landfill permit is modified to require additional monitoring wells, changes in constituents monitored, and/or changes to ash placement. The additional cost would be $4000 for installation of additional wells and $1000 per year for well monitoring per station.

Scenario 2B: Truck Ash and Cap With No Liner and Leachate Collection System

This scenario represents the "possible case" landfill regulatory outcome involving an enhanced closure cap system - A final cap system, exceeding the current design, would be required. There would be a cost of $26,000 per acre for a 18" clay cover. This would be incurred at final cover of the active landfill. These costs would also include the extra monitoring wells (Figure 1; Table 2B).

Scenario 2C: Truck Ash and Cap With Liner or Leachate Collection System

This scenario represents the "worst case" landfill regulatory outcome involving a liner and leachate collection system required for continued operation of the Marshall landfill. A liner system would most likely require an enhanced cover system at a cost of $35,000 to $50,000 / acre. This is the difference in cost between the current design and the cost of a lined landfill which would meet the NC solid waste requirements. The cost of a completely new landfill including design and construction would be about $150,000 to $500,000 / acre. A twenty five acre landfill would be required for five years of operation. Therefore a 25 acre landfill for five years of operation could cost from $3.95 million to $12.5 million (Figure 1; Table 2C).

OPTION 3: ON-SITE STRUCTURAL FILL FOR BUSINESS PARK

This option involves developing property on 200+ acres located on the north side of Duke-Marshall property bound by east of Steam Plant Road and south of Island Point Road (State Road 1838) into a Business Park. The property is a series of coves adjacent to the ash basin that will have the value improved by placing ash as a structural fill so that offices, warehouses, golf course or other planned end-use can be constructed on it. The property would be developed incrementally to lower capital costs and be constructed in four phases. The Business Park would have an ash storage life of 20 years. (Assuming 500,000 tons of silo ash and 100,000 tons of excavated basin ash is placed). If 200,000 tons of fly ash could be improved such that it becomes sales quality in concrete mixes, then the storage life would be increased to 30 years to 2018. Alternately, if additional land adjoining the Business Park were purchased by Duke, then the storage life would be increased to 30 years or year 2018. The project would be done in four phases consecutively:

- **Phase I** is 68.5 acres with a volume of 2,075,725 cy or 2,490,870 tons. It requires movement of a retail transmission line, installation of 400 lf of 60 inch culvert and 200 lf of 94 inch culvert.
- **Phase II** is 43 acres with a volume of 1,633,878 cy or 1,960,654 tons.
- **Phase III** is 50 acres with a volume of 2,130,005 cy or 2,556,006 tons.
- **Phase IV** is 43.8 acres with a volume of 375,538 cy or 450,646 tons.

Each phase would be developed, marketed and sold for business park use upon completion. Additional phases could be added through purchase of adjacent property tracts.

Periodic removal of coal ash from the ash basin is required to maintain the free water volume per the NPDES permit for wastewater treatment. Areas above and adjacent to the ash basin and considered part of the permitted ash basin system have been designated for on-site structural fill projects. In North Carolina, the design and plan for each engineered structural fill project is constructed per an Authorization to Construct permit and in accordance with conditions in the non-discharge ash reuse permit (#WQ0000452). Both permits are issued by the NCDENR Division of Water Quality and include set-back (buffer) and reporting requirements.

Completed on-site structural fill projects have been utilized for beneficial uses following construction at most of the fossil stations (i.e. ball fields, wildlife habitat enhancement and refuge). Plans are to also consider beneficial use of ash per the general ash reuse permit (#WQ0000452) and solid waste regulations that are expected to increase the market value of this property on-site. Focusing on beneficial use of ash per the general ash reuse permit (#WQ0000452) and solid waste regulations is expected to increase the market value of this property, as has been the case with off-site structural fill projects. Development in such a manner would also encourage development of businesses on-site that use ash to make other products, enhancing local economic growth and further beneficial uses of ash.

The structural fill application of fly ash is well demonstrated in the area, and NC permitting procedures and guidelines are well established. Some extended liability (real or potential) exists for Duke Energy in terms of long-term responsibility for maintenance of the structural fill in conformance with NC regulations and permit conditions and for later actions of business park tenants that could result in erosion, groundwater contamination, etc. Permitting requirements for the Marshall Business Park option will be minimal. Structural fill projects under current North Carolina solid waste regulations and the ash reuse permit only require notification once an approved authorization to construct permit and sedimentation/erosion control plan is received.

Generation of Revenue from Business Park

The following is a list of comments on generation of revenue from the Marshall Business Park based on discussions with land owners, realtors, developers, contractors, County agencies, engineering and others in and around the Terrell region:

- Catawba County can be a major player in the total scenario. Duke could donate the land they want for a waste treatment facility in exchange for a percentage of revenues or profits generated over a period of time, or Duke could structure a lease agreement with the County for use of the land. In any case Duke could have little or no involvement with the operation of such a facility.

- Developed land could be sold directly or leased.

- Crescent or some other developer could partner with Duke to develop the buildings and produce profits. These buildings could be leased or sold as well.

- A portion of the total park area could be developed for commercial business such as restaurant, gas station, etc. Would propose the portion of land bordering Island Point road, west of the Holdsclaw property.

- Maybe the railroads would pay a fee to have access to the park and customers. The ROW could be sold by Duke to them.

- Duke Energy would receive long term revenue from power sales for customers who located in the park.

- The developed land could be marketed to technologies which incorporate ash such as ceramics, agriculture (waste water sludge + ash), concrete and related concrete products (flowable fill, curbs, etc.), carbon separation or other processing so product could be tailored to different markets. Duke would reserve the right to limit the type of activity.

- A golf course could be built on the eastern side of Marshall property, outside the recreational area defined by Lake Management.

- Land Value Estimates:

Current state undeveloped	\$5k - \$20k/Ac.
Level site no water and sewer	\$15k - \$30k/Ac*
Level site with well and septic drain field possible	\$20k - \$40k/Ac.
Level site with water and sewer tap on available	\$30k - \$60k/Ac.*
Level site w/water, sewer and dual rail	\$75k - \$150k+/Ac.
Level site w/water, sewer, dual rail, recreation, retail etc.	\$100k - \$200k+/Ac.

* Assumed revenues used for NPV cash flows in this Plan.

- Comments: There are unlimited ways for various groups within Duke to receive benefit. Duke's participation in this endeavor could stimulate growth in the area, at a faster rate than today. Growth brings jobs and revenue to Catawba County. Amenities could be shared to benefit the community. Off site fill projects may lower costs to Duke, but the owners or developers receive the profit from using material and service supplied by Duke. There has been no success in getting Duke to purchase land for their own development and Crescent has not been receptive to using ash for their development projects. On site work reduces liability from regulations, satisfies the requirements of the station and is more flexible for the company.

Scenario 3A: Truck Ash to Business Park with No Revenues

This scenario assumes beneficial use of a structural fill on-site at Marshall with no revenues received. As noted in scenario 2A for landfill expansion, the NPV and net cash flow is similar for the two scenarios (Figure 1; Table 3A). Since ash is being handled similarly in both scenarios, the landfill demonstration being evaluated by NCDENR supports both options as an environmentally acceptable protocol for ash management.

Scenario 3B: Dense Phase Pumping Ash to Business Park with No Revenues

This scenario is similar to Scenario 3A - Truck Ash to Business Park with No Revenues, the only difference is the method of conveying the ash (Figure 1; Table 3B).

The dense phase pumping includes compressors with 1200 HP motors, conveyors, hoppers, 9000 ft of pipe line and a 150 tph pack machine. The ash is pumped to a cove within the ash basin, conditioned at the cove with the pack machine, spread and compacted with a bulldozer.

This system has been successfully used by Boral at other stations. Annual costs appear to be lower than trucking costs but need to be verified with a proposal from Boral. For this option to be a viable alternative renegotiation of the current haul agreement with Boral would be required. An additional item to be included in the contract negotiation with Boral is to give Duke Power the flexibility to haul ash off site to potential structural fill clients if the Company elected to do so.

Scenario 3C: Truck Ash to Business Park With $15-30K Revenues

This scenario assumes beneficial use of a structural fill on-site at Marshall and sale of property from $15,000.00 to $30,000.00 per acre over twenty years. The NPV and net cash flow indicates a cost savings compared to present ash management costs (Figure 1; Table 3C).

Scenario 3D: Truck Ash to Business Park With $30-60K Revenues

This scenario assumes beneficial use of a structural fill on-site at Marshall and sale of property from $30,000.00 to $60,000.00 per acre over twenty years. The NPV and net cash flow indicates a cost savings compared to present ash management costs (Figure 1; Table 3D).

OPTION 4: ASH ENHANCEMENT

Scenarios 4A through 4D are ash quality improvement technologies. Individually, none of these technologies considered will provide a complete solution to ash disposal at Marshall Steam Station. Based on discussions with ash marketers, a conservative level of marketability for Marshall ash is 200,000 tons/year. Since Marshall produces a total of about 500,000 tons of ash annually, about 300,000 tons/year will need to be placed in a structural fill, a landfill or otherwise utilized. The estimated retail value of low LOI ash in the Charlotte market is $20/ton. Plant operations costs must be deducted from this value. The remaining value would be split between Duke and the ash marketer. Technology suppliers would not give operation costs by telephone until the firm proposal stage occurs.

Ash quality improvement technologies are methods used to improve the quality of the fly ash to remove the impurities that interfere with beneficial uses. Combustion control technologies intended to reduce emissions, such as the low NOX burners used at Marshall, can increase the unburned carbon content of fly ash (LOI). This adversely affects potential for use of Marshall flyash in such products as concrete, blended cement, grouts, metal-matrix fillers and polymer fillers, which require low LOI fly ash. Some applications are relatively unaffected by LOI, including cement feedstock, highway subbase, asphalt filler, structural fill, mine backfill, agricultural amendments, or metals or cenosphere recovery. Other emission control technologies with potential for future application at Marshall, such as SCR, introduce ammonia into fly ash. Presence of the excess unreacted ammonia can also affect acceptability of fly ash in beneficial use applications. Ash improvement technologies considered in this study are combustion optimization, ash reburn, electrostatic separation and carbon flotation.

The combustion of coal produces the compounds NO and NO_2, collectively known as NOx. Nitrogen is present in the fuel and naturally in the atmosphere (the atmosphere is 70% N_2 gas). As coal-fired power plants burn the coal, the temperature and oxygen concentration rises, due to combustion. The N2 combined with the oxygen form NO and NO_2, also known as NOx.

The two general classes of NOx reduction measures are combustion modifications and post-combustion control technologies. Combustion modifications seek to reduce the creation of NOx by reducing the peak flame intensity-lowering the temperature, reducing the oxygen level, etc. These changes also impact important fly ash characteristics. Typically, the unburned carbon (UBC) level in the ash increases. Lower flame temperatures also cause less ash melting. As a consequence, the ash morphology is less spherical. These changes lead to greater variability in fly ash properties that are important to ash users. Post-combustion controls that use chemical reagents leave traces of them absorbed on the fly ash which can affect by-product markets. A common problem is the odor of ammonia when the ash is wetted.

Legislation requires many utilities with coal-fired boilers to reduce NOx emissions due to the 1990 Clean Air Act Amendments. The use of NOx reduction technologies on electric power plants has, in some cases, had a negative impact on the utilization of the coal ash in certain markets. This is largely a result of increased levels of unburned carbon and other chemical residuals that are left in the ash due to the lower temperatures. Currently, about 40% of US boilers have some form of NOx control. Low-NOx burners are the predominant technology.

Studies show that:

- Combustion control technologies (COM, LNB, OFA, etc.) can increase the unburned carbon content and relative coarseness of fly ash. Post-combustion controls (SCR, SNCR) can cause ammonia contamination of the fly ash.
- High unburned carbon levels can adversely affect the following current fly ash uses:
  Concrete and concrete products
  Blended cement
  Polymer fillers
  Grouts
  Metal-matrix fillers
- Ash with high unburned carbon levels can be used successfully in the following uses:
  Cement feedstock
  Highway construction (roadbase, subbase, asphalt filler)
  Structural fills
  Physical and chemical waste stabilization
  Controlled density fills
  Mine backfill
  Agricultural amendments (fertilizers, soil amendments, synthetic soils)
  Resource recovery (carbon, cenospheres, metals)
- Ash with high ammonia levels may not be acceptable as a cement feedstock. Concrete application is not suitable due to the release of ammonia at high pH. Construction and other bulk applications are impacted when personnel exposure occurs in enclosed spaces.
- With suitable mitigation measures, low-NOx ashes can still be used in existing pozzolan and concrete markets at a cost.
- Disposal costs for low-NOx ash can increase due to lower bulk density. The lower density requires more water for compaction and greater volumes; landfills will not last as long.
- Methods are available for beneficiating high unburned carbon and NH_3 contaminated fly ash.

Fly Ash Beneficial Use Technologies

Use of ash is an important component of ash management at many utilities. Some utilities are currently reporting lost ash sales due to off-specification ash (high LOI) or detectable ammonia contamination. Consequently, consideration to the prevention or mitigation of the impact of ash contamination on important and sensitive utilization markets needs to be given.

Four approaches to minimizing the impact of reduced ash quality on ash utilization are:

- Prevention of carbon accumulation in fly ash for use in sensitive markets
- Carbon removal
- Concentration of reactive ash fractions by removal of coarse fractions
- Ammonia removal

For many low value-added markets for ash, unburned carbon does not present a major concern. However, in the important cement and concrete market, user demand is for low-carbon ash. Use of fly ash in these applications is anticipated to grow as cement manufactures move to increase blended cement production as a means of meeting demands for reduced carbon dioxide emissions. The fly ash market faces strong competition from ground granulated blast-furnace slag. Overall, the pressures in this competitive marketplace suggest that any reduction in quality due to low-NOx combustion methods will exclude the ash from cement and concrete applications.

To meet these demands, reducing the carbon content of ash for cement and concrete applications will require either:

(1) optimizing combustion or ash collection conditions, or

(2) removing UBC from the ash by employing some form of post-collection materials processing.

Particle Size Control

An alternative approach to reduce carbon content is to separate it physically. Size-fractionation (using dry or wet methods) and electrostatic separation techniques have been used to remove the coarse carbon particles. More complex processes such as flotation are necessary to remove or concentrate the fine carbon materials. Some common separation techniques include:

Screening: In mineral processing, it is common to use screens to remove coarse particles from powdered products. Using 100 mesh screens is effective for the removal of most of the coarse particles, many of which comprise UBC. Screening may be effective as part of a general ash processing scheme to reduce coarse particle content, carbon content, variability, and improve concrete workability.

Grinding: Grinding reduces the particle size and is shown to improve pozzolanic activity, however it cannot be expected to contribute to removal of UBC. It will probably result in interference with concrete additive properties.

Air Classification: Mechanical (air) classification is a more efficient method of removing coarse particles. In some instances, the products differ not only in particle fineness but also in carbon content. Coarse unburned coal particles are removed by the air classification which is a feasible approach to reducing the carbon content of ash.

Scenario 4A: Combustion Optimization at $3-5/ton Revenues and Truck Ash to Business Park

Retrofitting combustion controls are the simplest and most cost-effective options available to utilities for NOx reductions therefore, they are the most frequently applied. To achieve optimal

NOx reductions with LNBs (low-NOx burners) demands that combustion equipment and all key associated systems are in good condition. Additionally, boiler design and coal properties should be suitable to staged combustion conditions. Even when all these issues are addressed in the integration of retrofit combustion NOx controls, adverse operational impacts can occur. Among the factors that may be impacted are boiler efficiency and ash quality, primarily unburned carbon (UBC).

Coal reactivity-expressed in terms of volatile matter (FC/VM) is the most important factor affecting the relationship between NOx emissions and UBC. Coals with high reactivity (many Western US coals) generally show no significant impact on UBC. However, Eastern bituminous coals may increase UBC by 3-5% higher. Also, excess oxygen at higher levels while ensuring good coal burnout (low UBC) increase the NOx emissions. This can usually be addressed by optimized primary air balancing. The coal fineness improves burnout whenever possible, and improved maintenance of pulverizers will support such reductions in most cases. Worn or damaged pulverizers, classifiers and coal distributors limit the options available to operators to optimize boiler conditions for minimum NOx and UBC. Operational optimization of boiler functions are the simplest and cheapest way of reducing UBC and hence maximizing its impact on ash quality.

A boiler optimization program at Marshall Steam Station would involve testing of existing flyash quality, HVT testing, pulverizer performance testing and airflow testing. Following initial testing, optimization of systems would be undertaken to achieve benefits including improved burner performance and more complete combustion, improved fuel distribution and air flow, optimized superheater spray flow, reduced flame impingement and increased waterwall life, lower fly ash LOI, and improved NOX control.

Optimization would require a systemwide evaluation at the station. Results could include changes to:

1. Improve PA flow measurement
2. Improve mill controls
3. Add O2 analyzers to improve combustion controls
4. Add waterwall sootblowers
5. Improve OFA measurement and control
6. Purchase boiler and pulverizer test equipment.
7. Improve burner register position indicators

A program of this type at the Duke Energy Mecklenburg Plant in Clarkesville, Va. was successful in decreasing LOI from 10% - 12% to 3% - 5%. However, Mecklenburg has a boiler that was designed for low NOx burners, i.e. a tall furnace with a modest heat release. Marshall may be more limited on improvements that can be expected due to the boiler and pulverizer design. Proper fineness of coal from the pulverizers is important, and Marshall may have to install extensive pulverizer modifications to get the fineness needed to produce good LOI with low NOx burners , since the existing mills are probably designed for much higher grindability index coal than what is currently burned. Marshall may benefit from pulverizer upgrades to produce better fineness and improved air flow measurement to allow better air flow management. A full optimization could require costly station modifications. A reasonable goal might be to achieve a fly ash with an LOI consistently less than 5%.

Modifications that could be anticipated as a result of this evaluation would include: new pulverizer control systems, installation of new airflow ducting on pulverizers, new oxygen analyzers for each boiler, installation of waterwall deslagging equipment, installation of windbox airflow controls and adjustment of windbox settings

The point of contact for this technology is Danny Storm of Storm Technologies, Inc., telephone 704-983-2040.

The NPV and net cash flow values are positive for the capital investment in this option to reduce the LOI of 200,000 tons of Marshall's ash to a level suitable for the concrete market, assuming a profit of $3.00 to $5.00 per ton (Figure 1; Tables 4A1, and 4A2)

Scenario 4B: Electrostatic Separation at $3-5/ton Revenues and Truck Ash to Business Park

Carbon may be removed from ash using a dry process based on induction of electric charges on ash particles. Ash particles of different composition (ash versus carbon) develop different charges, and an electric field can be used to separate the differently charged particles into fractions of high and low carbon content.

An electrostatic separation process marketed by Separation Technologies, Inc., of Needham, MA, can be used to separate the fine particulates of fly ash, removing excess carbon particulates and reducing LOI. The products of the process are an improved pozzolanic fly ash suitable for use in concrete and a high carbon particulate fraction that can be fed back to the power plant for combustion. The point of contact for this technology is Charlie Willauer (617-455-6600).

In the STI separation process, fly ash is fed into a separation apparatus consisting of electrodes and particle transporting, open-mesh belts. The ash enters a narrow gap between two parallel plate charged electrodes. Electrical charges are induced on particles due to contact between particles which results in charge transfer due to differences in electron affinity of materials that occur in varying proportions among the different particles that make up the fly ash mixture.

Small, induced particle movements caused by charge differences cause particles of varying composition to be transported to different ends of the separator apparatus. The open-mesh, moving belt system allows particles to move through the belts and between the electrodes, and conveys the fly ash particulates in left- and right-moving streams along the electrodes. The belt system provides a counter-current, multi-stage separation system that results in effective separation of particles composed of pozzolanic minerals from the residual carbon particles that remain in the fly ash after incomplete coal combustion.

The process is dry, requires no additional materials or reactants other than the fly ash itself, and produces no other waste material or combustion gas emissions. Commercial-sized machines can process between 30 and 45 tons of fly ash per hour. Machines installed and operating at the coal-fired New England Power Brayton Point power plant near Boston have capacities of 20 to 30 tons per hour. They achieve reduction of LOI from 8 percent in the input ash to 1 percent in the pozzolanic fly ash product fraction, while the high carbon fraction varies from about 15 to 60 percent LOI. The high carbon fraction has been successfully burned in the NEP Salem Harbor station. Overall production of low LOI ash (< 2.5% LOI) at Brayton Point was 61,000 tons in 1996 and 95,000 tons in 1997.

This process has been successfully installed at CP&L's Roxboro Plant.

The NPV and net cash flow values are positive for the capital investment in this option to reduce the LOI of 200,000 tons of Marshall's ash to a level suitable for the concrete, assuming a profit of $3.00 to $5.00 per ton (Figure 1; Tables 4B1 and 4B2).

Scenario 4C: Ash Reburn at $3-5/ton Revenues and Truck Ash to Business Park

Ash can be burned to remove excess carbon. Some heat recovery is possible to offset the cost of processing. Adverse impacts may include operational difficulties and the probability that the ash glass reactivity may be adversely affected. Power plant operating impacts may result, related to increased complexity of ash handling, ash processing and heat recovery. An advantage of carbon burnout is that all ash treated is potentially transformed into salable, low carbon material that will meet the LOI specifications for use in concrete. Ash reburn can also offer separation of ammonia from the process.

Feasibility of ash reburn (or burnout) ash improvement has been demonstrated using pilot scale facilities. Tests were judged successful in producing a product with average LOI < 3.0 percent using fly ashes from a variety of sources with widely varying carbon content.

SCE&G has installed this system as supplied by Progress Materials on its Wateree Plant. SCE&G financed the modification and had a lump sum contract with Progress Materials to design, build, construct and start up. Progress Materials will train SCE&G and Southeastern Fly Ash (SCE&G's ash marketer) to operate the ash reburn facility. Digital photographs of the system installed at the Wateree plant are included at the end of this section. Duke Ash Management visited SCE&G's carbon reburn facility on 8/27/98.

Duke has participated in the EPRI funding for demonstration of this technology and is therefore not required to pay any royalties.

The point of contact for this technology is Progress Materials (Pete Hay, 813-824-6693).

The NPV and net cash flow values are positive for the capital investment in this option to reduce the LOI of 200,000 tons of Marshall's ash to a level suitable for the concrete market, assuming a profit of $3.00 to $5.00 per ton (Figure 1; Tables 4C1, and 4C2).

Scenario 4D: Carbon Flotation at $3-5/ton Revenues and Truck Ash to Business Park

Carbon flotation systems use differing flotation properties of particles in water to separate high carbon particles from mineral fly ash fractions based on particle size, particle density and surface chemistry. Wet systems are considered to be more effective in separation of particles on these properties than dry systems.

Water can be used as the principal flotation medium. Use of water flotation methods may be feasible for plants such as Marshall that utilize wet lagoons for ash transport and collection and have adequate site area available to accommodate additional separation facilities.

However, separation using water alone is not sufficiently effective, due to the density properties of ash spheres and the carbon particles. Enhanced separation is achieved using other agents that will interact with hydrophobic carbon particle surfaces, such as fuel oil, kerosene, pine oil, polypropylene glycol ether or aliphatic alcohols, combined with introduction of air bubbles to form a "frothy" surface flotation phase that can be collected by skimming or overflow methods.

Carbon flotation technology offers separation of carbon, sulfur, metals for micronized fillers and extenders, cenospheres and ammonia from ash. Market uses include fillers and extenders in plastics, rubber compounding, colored and textured paints (domestic, marine, automotive), adhesives, sealants, carpet backing, colored paper and cardboard.

Although carbon flotation technology can achieve separation of the carbon-containing particles from the mineral fly ash, it has some significant disadvantages, including:

1) a requirement for large volumes of water,

2) water handling, treatment, settling and discharge systems,

3) requirement for treatment of process water to remove contaminants before it can be discharged,

4) drying of an ash filter-cake containing approximately 20% to 25% water is required before the solids can be handled for disposal,

5) energy input is required for drying the filter cake.

6) loss of flotation chemicals due to absorption by the residual ash particulate product

7) the lost flotation chemicals may themselves have detrimental effects on potential use of the low carbon ash product.

Permit-related requirements for use of the existing ash basin as a landfill site would include a requirement for an NPDES permit and appropriate flow and chemical monitoring and possible requirements to treat the flotation water prior to off-site discharge.

The point of contact for carbon separation technology is Bob Styron of Mineral Resource Technology (770-989-0089).

The NPV and net cash flow values are negative for the capital investment in this option to reduce the LOI of 200,000 tons of Marshall's ash to a level suitable for the concrete market, assuming a profit of $3.00 to $5.00 per ton (Figure 1; Tables 4D1, and 4D2).

OPTION 5: ASH BASIN EXPANSION

Option 5, Scenerios 5A and 5B involve abandoning the dry ash system and returning to the wet system in pumping all of the plant's ash into the expanded ash basin. Expansion of the ash basin does not provide a final long-term solution to Marshall's ash disposal problem. These scenerios have large associated capital costs with no revenue from ash to offset those costs, and there are permitting risks involved in expansion of the ash basin. These scenerios would require re-negotiations of the current Boral agreement and current contract that runs through 2001. Economic consideration of these Boral contract obligations were included in 20-year NPV runs (Figure 1; Tables 5A and 5B).

Projected coal consumption and ash production estimates are used to certify that the free water volume of the ash basin is maintained per the NPDES permit requirement for wastewater treatment. Actual ash production and remaining free water volume in the ash basin is verified annually. Certification to NCDENR of the free water volume for MSS expires June 30, 2000. Recertification will occur in conjunction with submittal of the application for renewal of the NPDES permit by January 2, 2000.

Scenario 5A: Raise Dike to El. 820, Add Secondary Cell and Sluice Ash to Basin

This scenario involves expanding the ash storage capacity at Marshall by raising the ash basin dike crest elevation from 804 feet to 820 feet msl to both increase the storage volume of the basin and develop a secondary "polishing" basin in an adjacent ravine and cove. This scenario was originally developed by Design Engineering in 1983, and was an alternative to the original Monex proposal. This scenario would expand the basin area by 108 acres, extending the existing ash dike to create a secondary basin, construct of saddle and intermediate dikes, construct new ash basin discharge towers in the primary and secondary basins and seal off the existing discharge tower in the primary basin.

The major permitting requirement related to expansion of the existing ash basin would be permits from the Corps of Engineers and the NCDENR for filling in portions of a small cove and wetland area at the edge of the lake within the larger Marshall intake cove. This process could be costly and could raise environmental permitting concerns. The additional area needed for the polishing pond is in the critical area of the Catawba River Watershed and would require a variance to permit this option.

Although the NPV and net cash flow values are negative for the capital investment in this option (Figure 1; Table 5A), this scenario could be used to extend the operating life of Marshall.

Scenario 5B: Raise Dike to El. 834 and Sluice Ash to Basin

A second scenario based on expansion of the existing Marshall ash basin involves raising the existing ash basin dike crest elevation from 804 feet msl to 834 feet msl. Details provided for this scenario are included in a report prepared for the Department of Energy (Engineering-Science 1982). This expansion would provide Marshall with 26 years of added capacity for disposal of fly ash. Restricting construction activity to within the present ash basin would be an acceptable permitting secnario.

Although the NPV and net cash flow values are negative for the capital investment in this option (Figure 1; Table 5B), this scenario could be used to extend the operating life of Marshall.

OTHER CONSIDERATIONS

Dredge

An evaluation of dredging operations was performed and documented by letter dated March 27, 1989 to W.F. Hall from C.E. Brown and L.S. Harper. This letter indicates that the need for dredging operations changed during the mid-1980's from costs by outside vendors averaging in the $2.00 per ton range to the $7.00 per ton range due to reduced sluicing and increased landfilling.

Major maintenance costs and labor-intensive operation would be required to re-establish use of the dredge. In 1998, sluicing and landfilling operations have stabilized with proposal (per this Plan) to send ash to the Business Park. No other long-term use of the dredge is forecast. Due to poor age, value and condition, Ash Management recommends that the dredge be sold after the landfill determination is returned by NCDENR (late 1998). Investment Recovery estimates the current salvage value to be in the $20,000 range.

Acceptance of Third Party Ash

Two outside parties (Colortex and Pillowtex) have approached Duke about acceptance of ash produced by their industrial facilities at a negotiated rate to the Buck Station. NCDENR has agreed to this practice upon submittal of TCLP data. Acceptance of this third party ash would increase Buck's pond capacity by 6 months of storage. Revenues and ability to incorporate third party ash into engineered fill projects make this practice feasible. Mention of this practice is included in the Marshall Ash Management Plan as potential industrial customers (Burlington) exist near the Marshall Station for which third party ash may be evaluated and negotiated for potential acceptance.

Cenosphere Harvesting

Harvesting of cenospheres is market-dependent on the quality and quantity of the material. This market will be investigated as market conditions allow.

Research and Product Development

Uses and markets that incorporate coal ash in products have been and are being developed. Many of the ash marketers currently have patented ash product lines. This is a low-volume but user-friendly market for Duke that will be explored through research and development avenues.

Utilization of coal ash continues to be a research objective of the Research and Development Department of Duke Energy. Plant operating conditions-such as use of fuel additives, boiler types, emission control technologies, and alternative or blended fuels-all influence the form and properties of coal combustion by-products (CCBs). Through tailored collaboration studies and continued support of research projects with the Electric Power Research Institute (EPRI), the influence these changes have on wastestreams and utilization of ash can be determined.

Wastestreams of Marshall have been characterized and evaluated as part of EPRI research projects. For a brief description of coal ash issues and a status of on-going and past EPRI supported research pertinent to coal ash utilization see the Appendix.

SUMMARY AND RECOMMENDATIONS

The purpose of this plan is to evaluate issues, strategies and options to determine optimum and cost-effective options for Marshall Steam Station ash management. Planning for disposal of coal ash is an on-going process through the life of the station. The type of coal burned, operational characteristics and environmental requirements influence the station ash management plans.

Marshall has an ash sluice system and ash basin for co-management of high and low volume waste streams that are regulated per an NPDES (National Pollutant Discharge Elimination System) permit. This includes co-management of coal ash and pyrites with other inflows to the ash basin that includes storm water runoff (including runoff from the coal pile), powerhouse basement sump flow, sanitary waste effluent, and boiler chemical cleaning waste.

Marshall also has a dry-fly ash handling system and permitted sanitary landfill for disposal of conditioned fly ash (fly ash moistened to near optimum water content). North Carolina Regulations are currently in effect that require all sanitary landfills to have a liner and leachate collection system, unless other appropriate methods for ash disposal can be demonstrated. The following options are being pursued to avoid the costly installation of a liner/leachate collection system for ash landfills.

As of January 1, 1998, North Carolina solid waste regulations became effective that require all sanitary landfills to be lined and have a leachate collection system unless a design variance is granted. Group EH&S has submitted a demonstration for exemption of a liner and leachate collection system for Marshall's permitted sanitary landfill. Group EH&S has also initiated discussions with NCDENR about proposed life-of-station ash management planning with a focus on beneficial use of ash in lieu of expansion of the present landfill (i.e. on-site structural fill projects).

Evaluation of ash production and capacity of Marshall's landfill and ash basin indicates that in mid-year 2000 the landfill will be full and that removal of 100,000 tons of ash is needed annually to maintain the free water volume required by the NPDES permit. If expansion of the present landfill is required instead of an on-site structural fill, approximately two years will be needed to design, permit and begin construction. Submittal of a conceptual plan and request to construct an on-site structural fill at Marshall to NCDENR for review and approval is planned to coincide with their on-going review of the landfill demonstration in the fall of 1998. A conceptual plan for an on-site structural fill has been developed for management review and approval to request an authorization to construct permit from NCDENR for construction to begin in 1999.

Off-site structural fill projects have been the primary method used for ash reuse in the past several years. Although these projects beneficially utilize a waste at a disposal cost avoidance, they carry high risk potential with the area site development market, net revenue return and regulatory changes. Continuation of off-site projects is planned, if the net cost per ton is less than the cost per ton of on-site disposal or beneficial ash fill placement. Off-site supply arrangements will be pursued with construction contracted by owners. A "Contractor's Day" is planned for the 4th quarter of 1998 to educate and encourage developers, contractors and engineers to beneficially use Duke-Marshall ash as a soil substitute for site development projects. Also, ash basin maintenance and product distribution will be competitively bid on an annual basis in the 4th quarter of 1998.

Many ash management options were considered by the Ash Management team and consultants. All options were economically evaluated based on the net present value (NPV) and the net cash flow determined using a business case analyses for a 20-year period. The following recommendations are proposed:

1. Upon acceptance of this Plan by Marshall Management, submit a written Conceptual Marshall Business Park Plan (without internal strategy and economics) to NCDENR to provide an alternative option to their current review of the Marshall Landfill Demonstration. NCDENR has verbally expressed favor with the concept of an on-site beneficial use structural fill project (i.e. Marshall Business Park).

2. Begin developing Phase 1 of the proposed Marshall Business Park in 1999. The Business Park would be built in 4 phases on 200 acres of the northern pond area to hold 20 of the 30 required years of ash storage needs at Marshall. On-site beneficial use of ash offers the best long-term solution with least risk to Marshall's ash storage needs and the flexibility of pursuing other revenue generating options while still having a reliable location to place ash. By continuing off-site placement of ash in engineered fill projects, Duke can reduce Business Park annual costs. No potential revenue from lease or sale of property in the Business Park was assumed for comparison to other options. This option offers NCDENR a beneficial use alternative to more stringent landfill regulations.

3. Reconsider hiring Storm Engineering to evaluate Marshall operating characteristics and determine if optimizing combustion can enhance ash properties (lower LOI) without sacrificing megawatts. Evaluate this study against other ash enhancement options. Ash enhancement options that lower the carbon content of ash create concrete marketable ash for revenue generation (as done at Belews Creek Steam Station). The Combustion Optimization/Business Park combination offers the best NPV and net cash flow of all options.

4. Ash Management initiate a request for proposals (RFPs) with several financing options to the listed vendors to provide ash enhancement for 200,000 tons/year of Marshall ash:
   a. Separation Technologies for the electrostatic separation option.
   b. Progress Materials for the carbon reburn option.
   c. Mineral Resources Technology for the carbon flotation option.

5. Other recommendations include:
   a. Sell the dredge.
   b. Evaluate cases to accept third party ash for revenue.
   c. Harvest cenospheres, if market allows.

d. Network with the Research and Development Department and other Duke Energy groups to investigate more "user friendly" ash product markets that are cost-effective and environmentally acceptable ash management options.

Other options considered with high NPV and not recommended include:

a. Ash basin expansion by raising the main dike.
b. Ash basin expansion by adding a second polishing cell.
c. Landfill options adding wells, closure cap, liner and leachate collection system (depending on demonstration for exemption submitted to State).

REFERENCES

1. EPRI TR-106747-V1, Assessment of Impacts of NOx Reduction Technologies on Coal Ssh Use, Volume 1: North American Perspective, November 1996.

2. Engineering-Science, 1982, RCRA Impact Case Study of Plant Marshall. Prepared for U.S. Department of Energy, Office of Coal Utilization, Advanced Conversion and Gasification, DOE Contract Number DE-AC-01-79 ET13543.

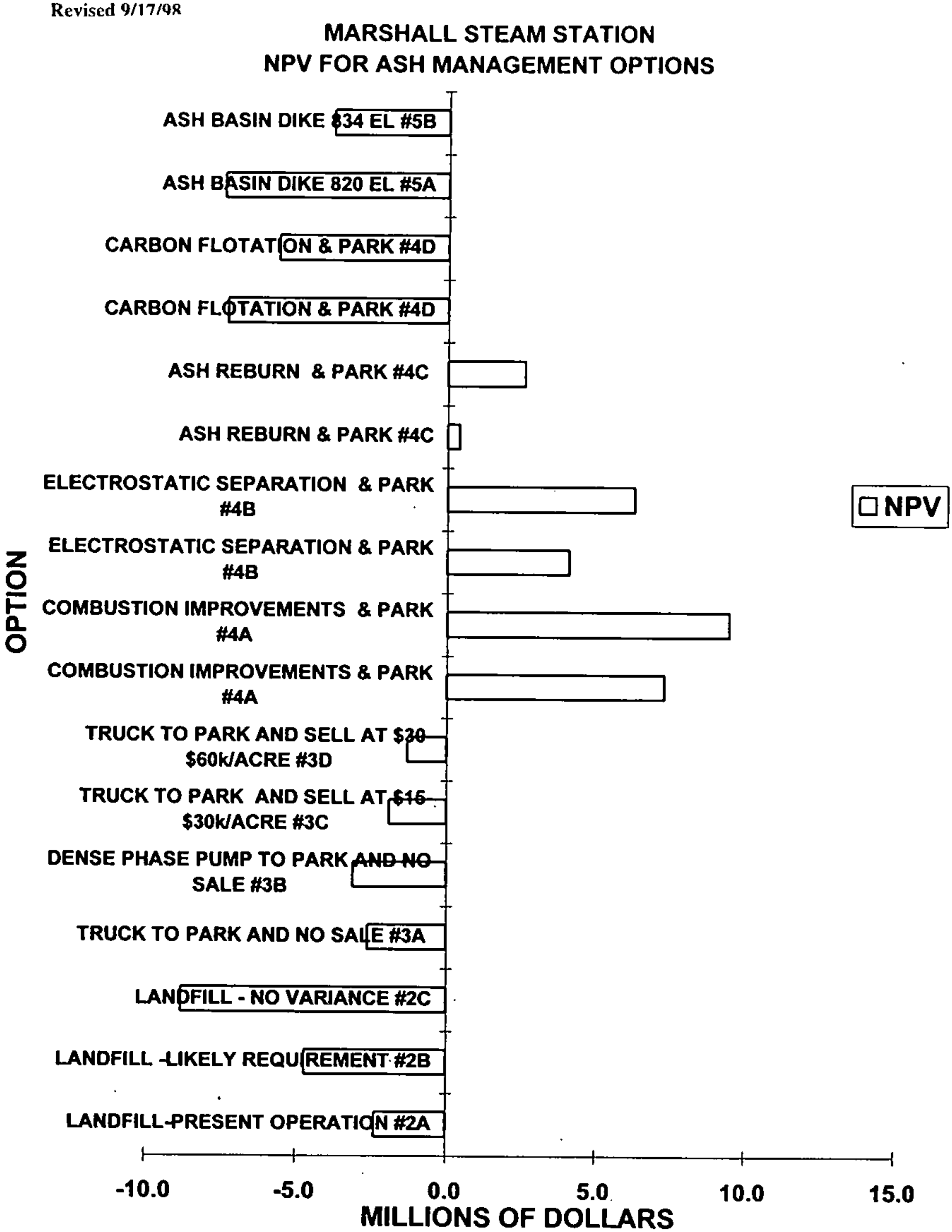


Figure 1. The net present value of ash management options considered for Marshall Steam Station

Figure 2: (page 1 of 2)
Marshall Ash Management Options Timeline

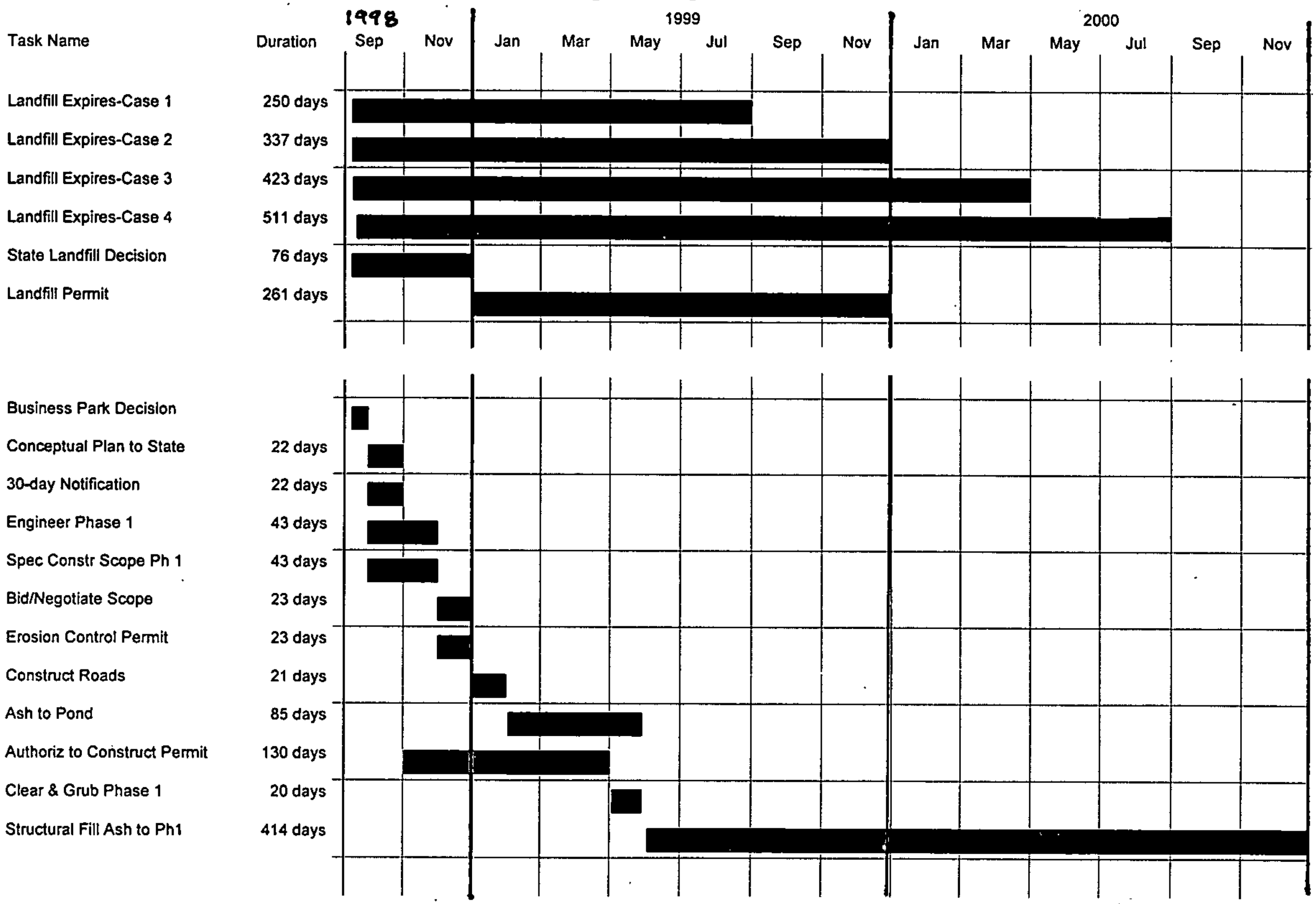
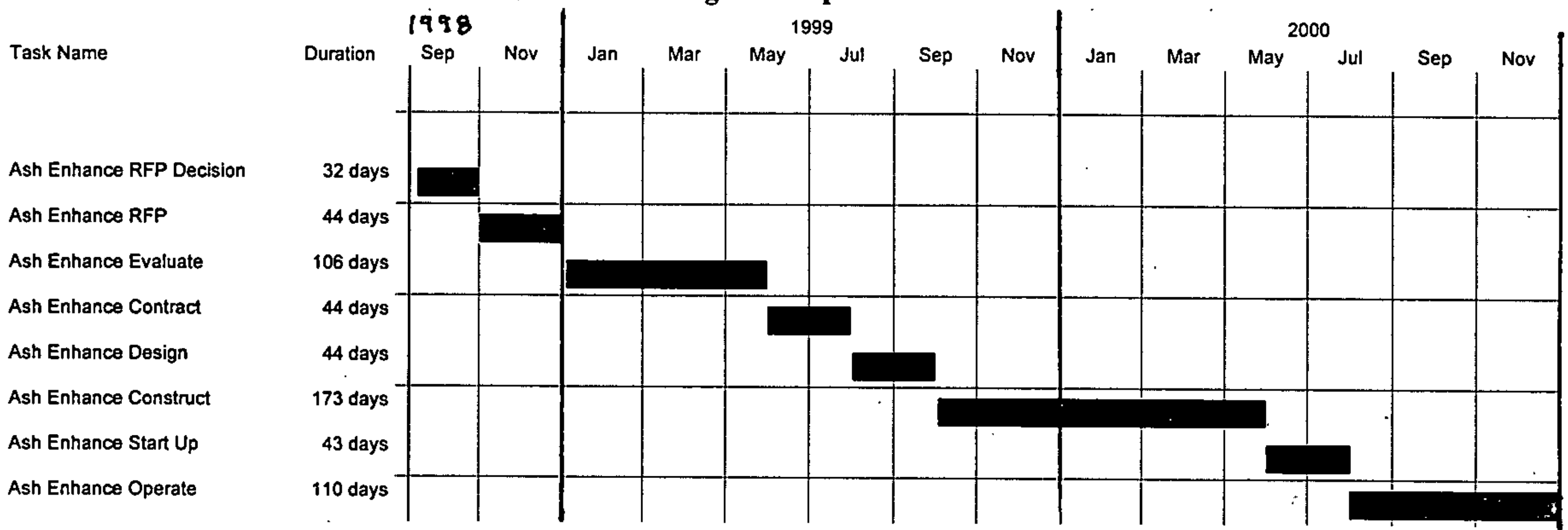


Figure 2 (page 2 of 2)
Marshall Ash Management Options Timeline



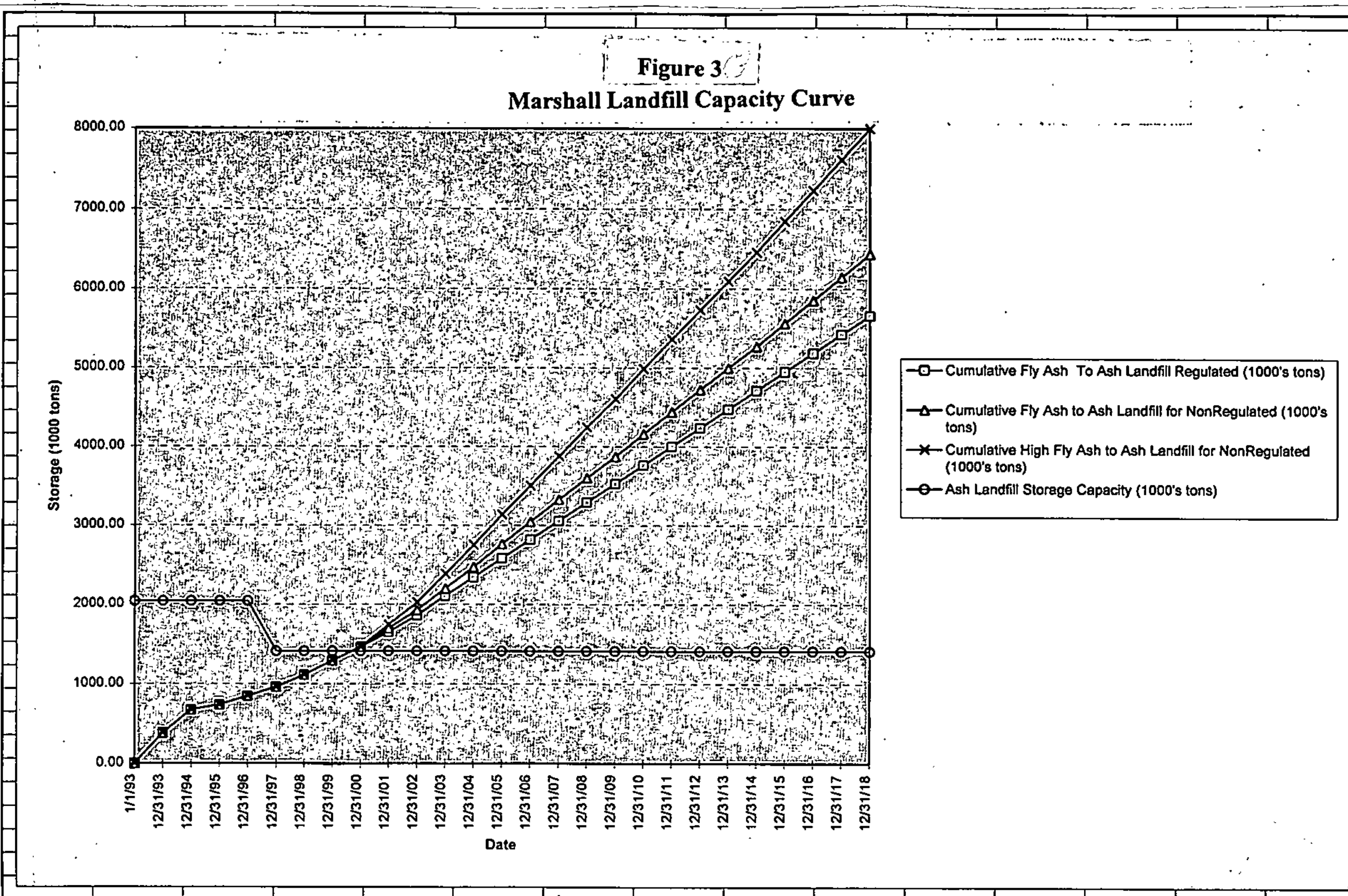


Figure 3. The capacity curve for the Marshall Steam Station ash landfill.

Figure 4: Marshall Pond Capacity Curve

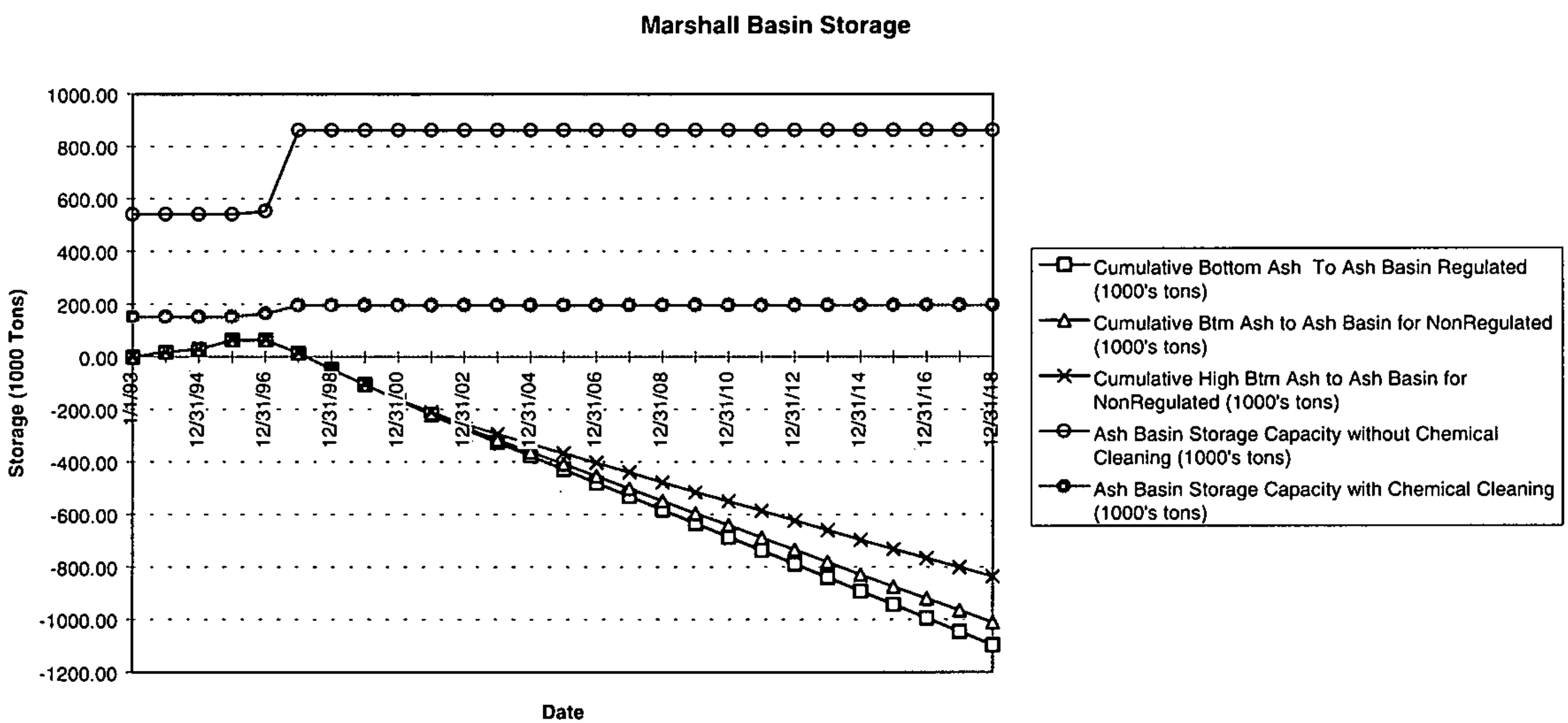
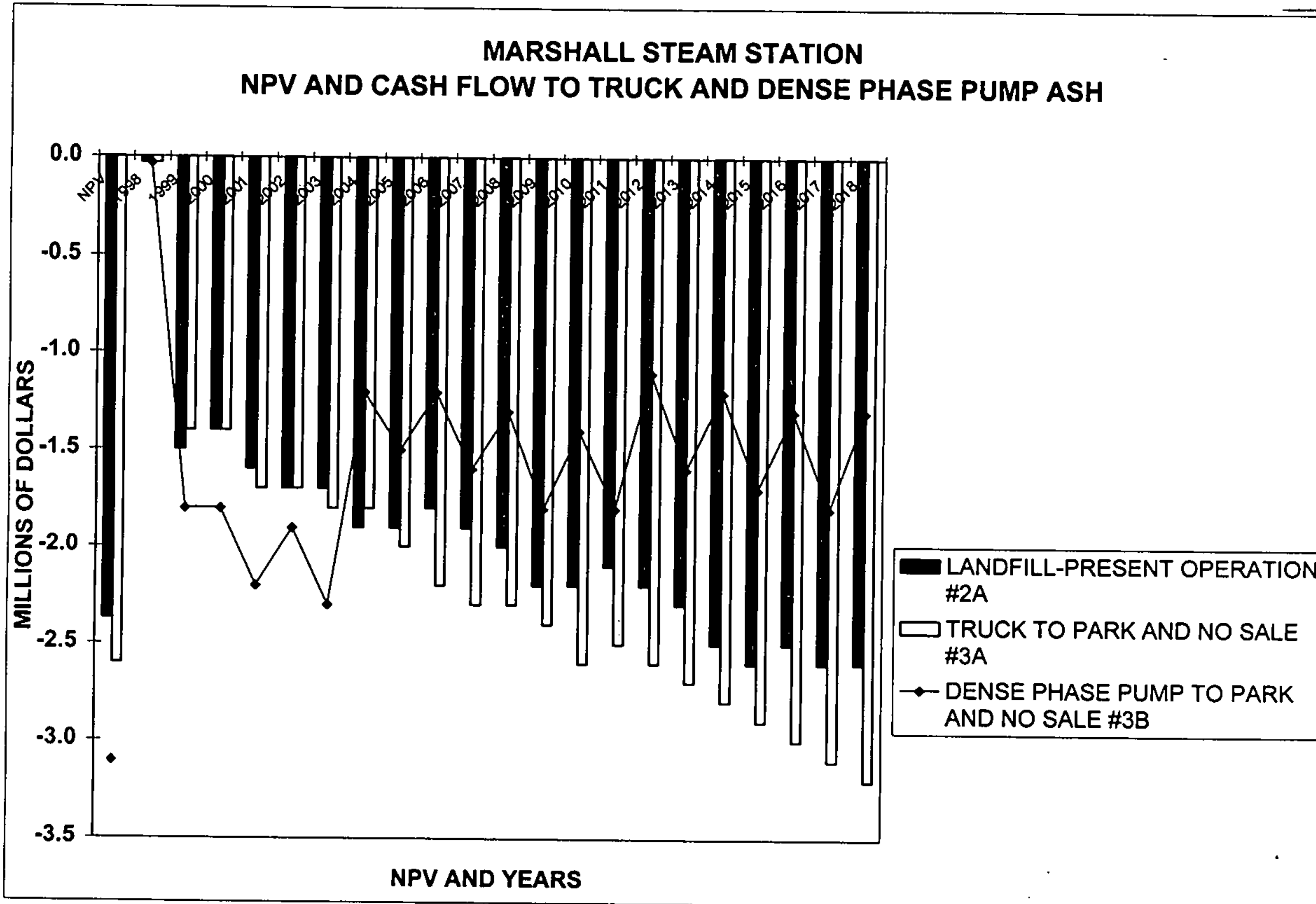


Figure 4. The capacity curve for the Marshall Steam Station ash basin.



phase pump ash to proposed on-site structural fill site at Marshall Steam Station.

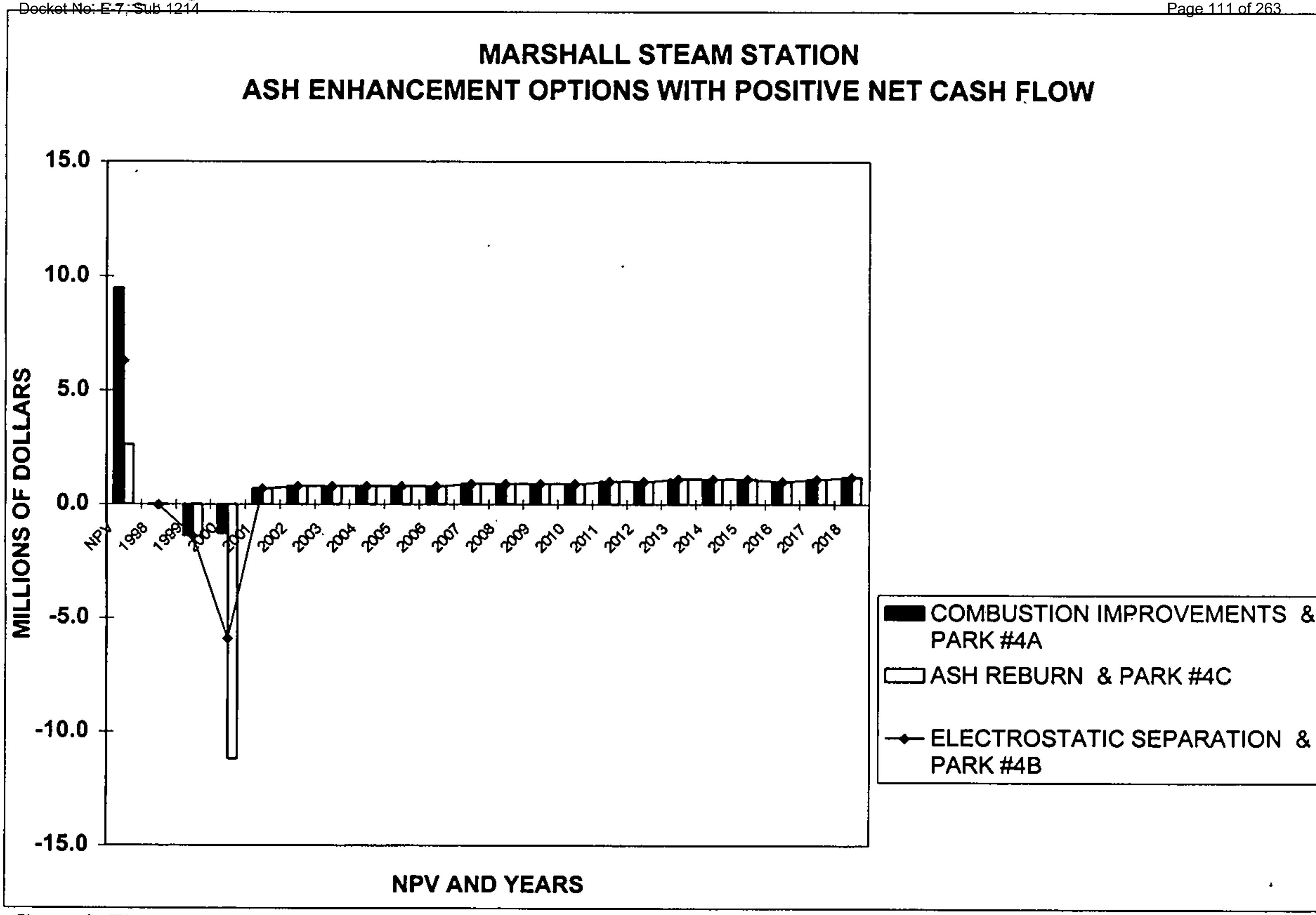


Figure 6. The net present value and net cash flow to truck ash to proposed on-site structural fill in addition to ash enhancements of combustion improvements, ash reburn, and electrostatic separation at Marshall Steam Station.

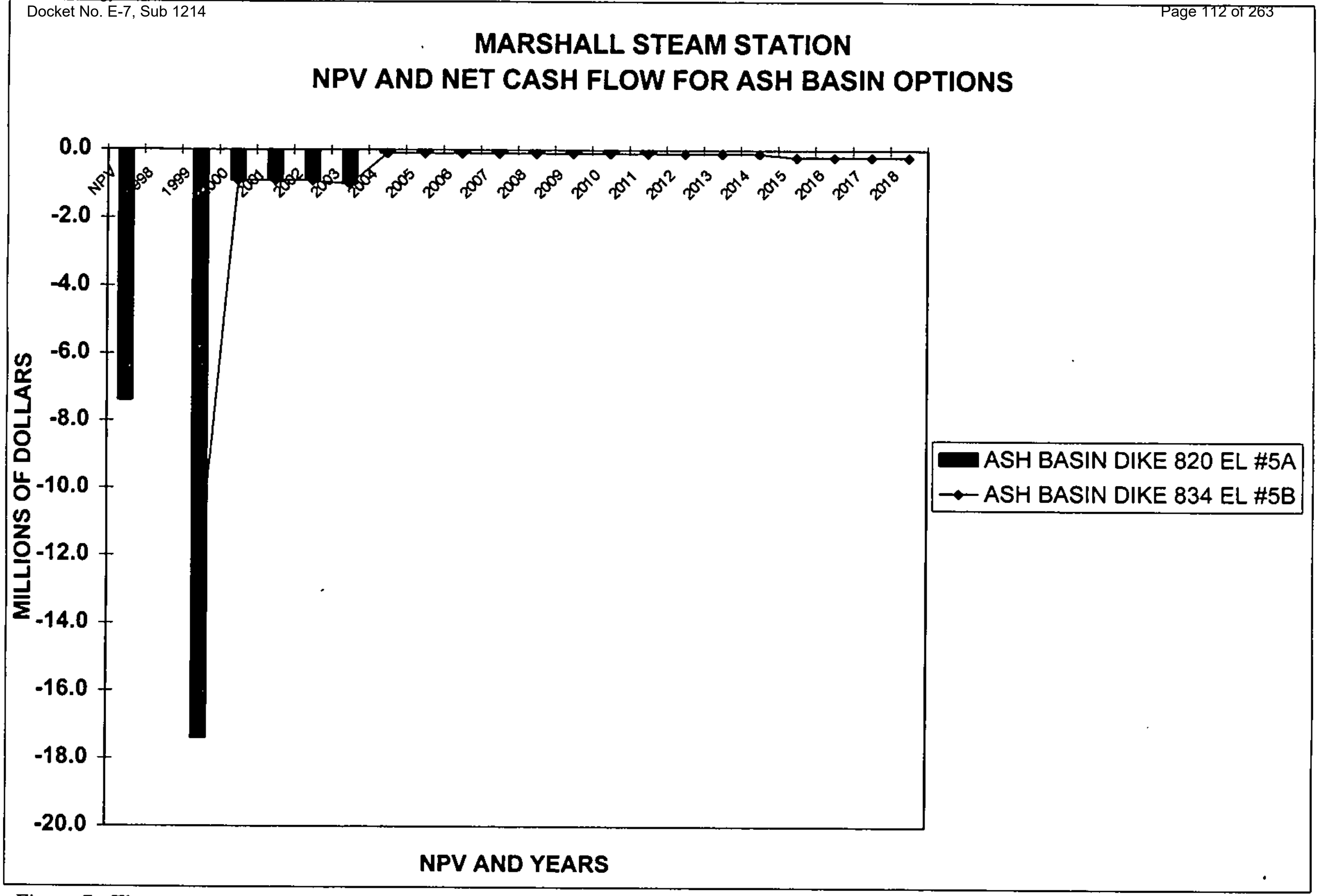
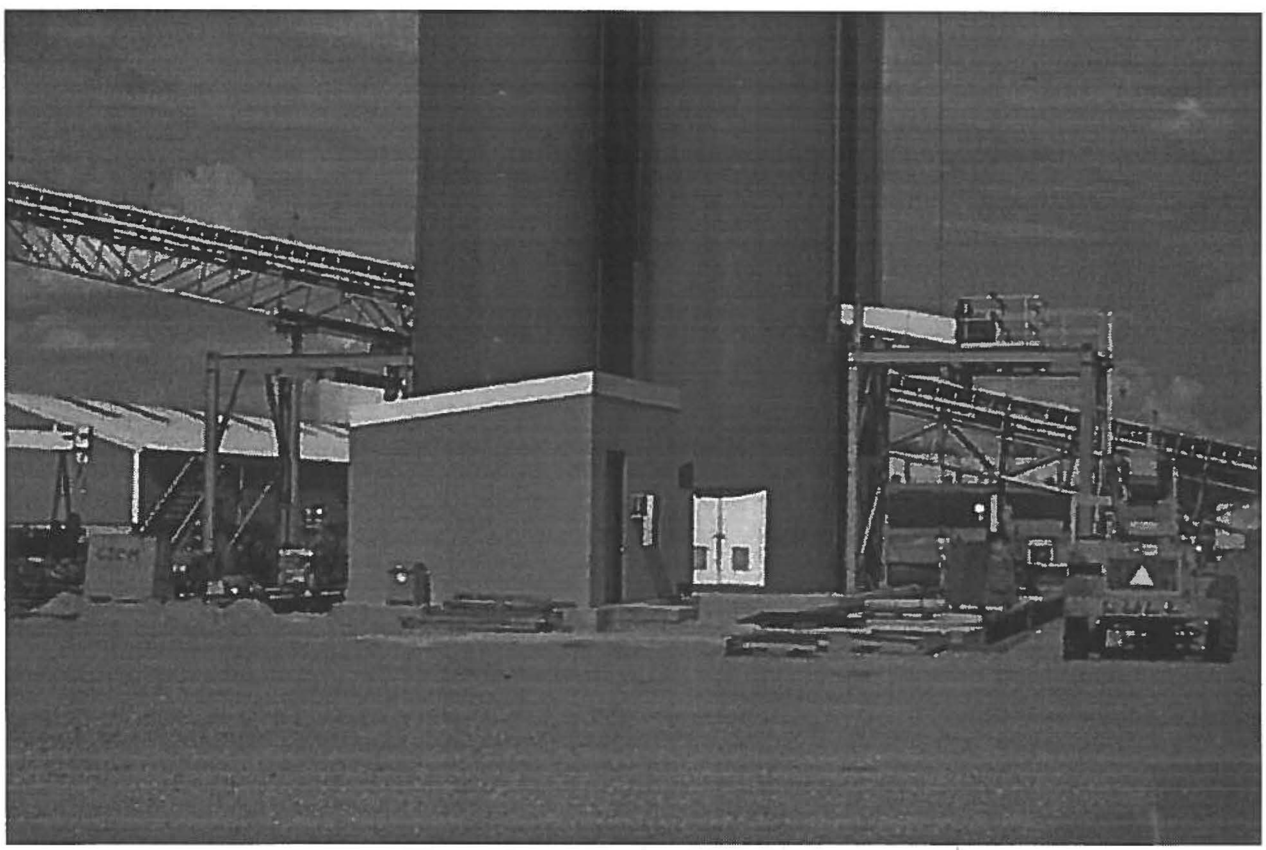


Figure 7. The net present value and net cash flow to upgrade the sluice system and raise the elevation of the ash basin dike under two scenarios at Marshall Steam Station.

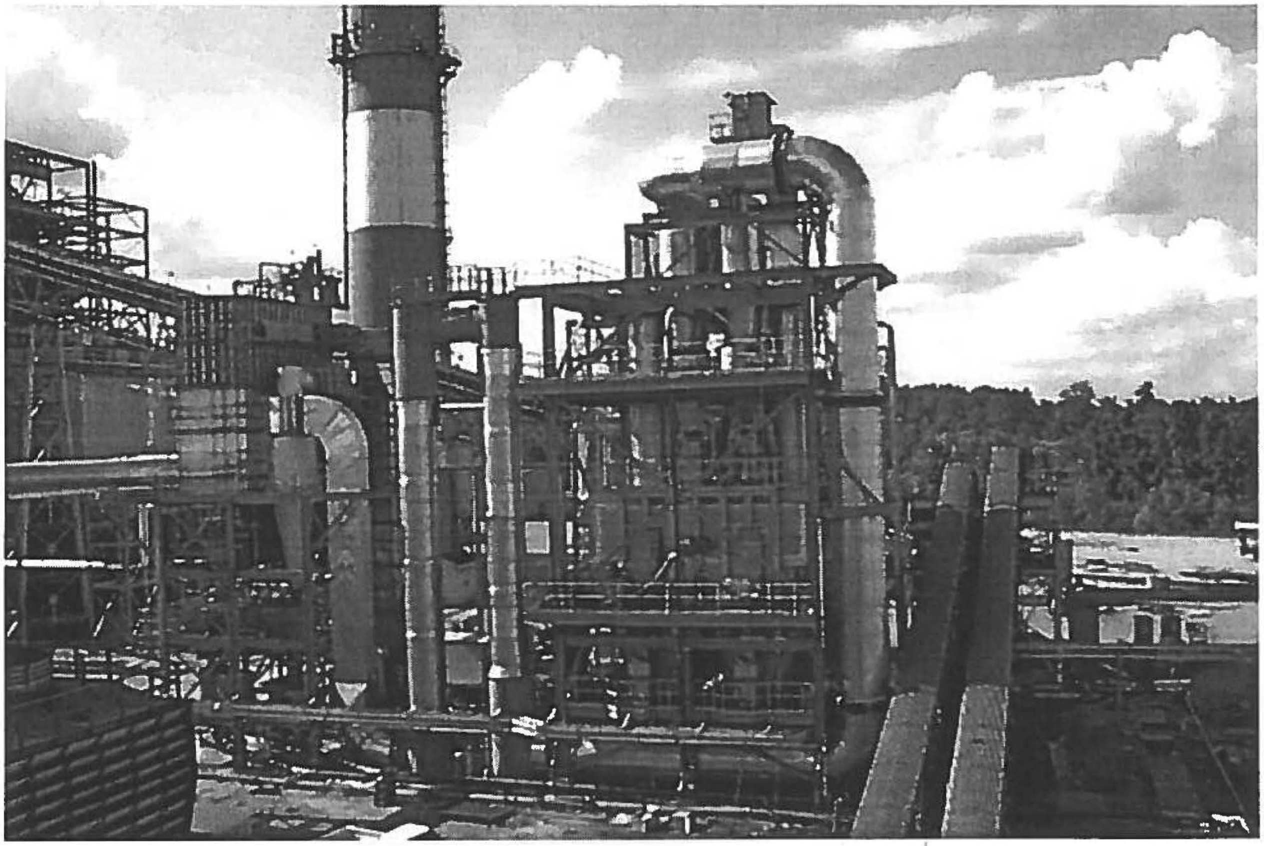
Figure 8 Ash Reburn Facility at SCE&G's Wateree Station (page 1 of 2)

Loadout Facility With Dual Scales

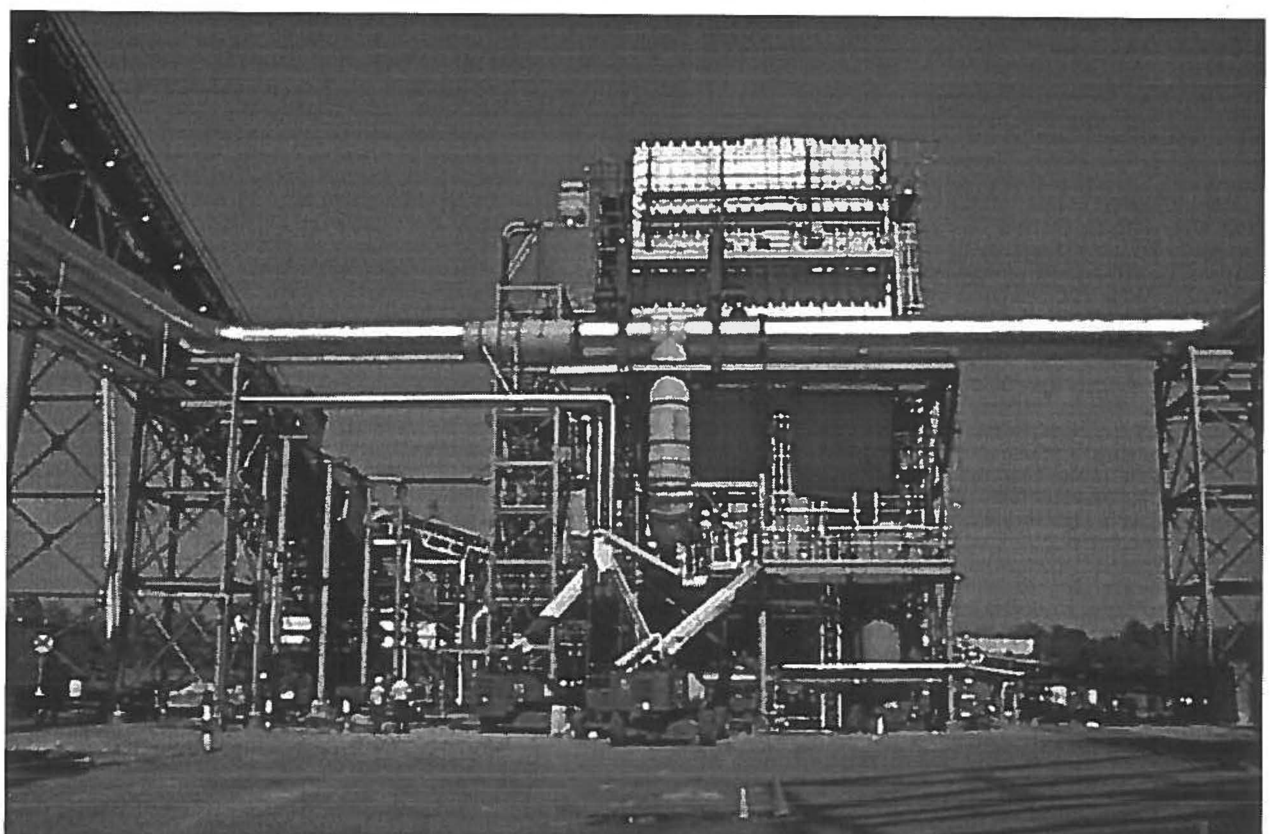


Loadout Facility With Dual Scales

Figure 8: Photos: Ash Reburn Facility at SCE&G's Wateree Station (page 2 of 2)



Reburn Facility - North View



Reburn Facility - East View

TABLE A: NET PRESENT VALUE AND RISKS OF ASH MANAGEMENT OPTIONS FOR MARSHALL STEAM STATION. **(page 1 of 4)**

OPTIONS	NET PRESENT VALUE (millions)	RISKS	
		ADVANTAGES	DISADVANTAGES
1. OFF-SITE STRUCTURAL FILL **Off-Site Structural Fill Scenario 1A:** Truck ash to off-site structural fill projects near Marshall Steam Station	Avoided Cost of Present Ash Management Option	• Avoid filling on-site storage at the same or less cost • Permitted per the solid waste reuse regulations for dry ash and the ash reuse permit for ponded ash	• Operational cost for station • Increased liability on non-Duke property • Short-term solution • Transportation costs versus on-site landfill costs limits projects within a 20 mile radius of Marshall • Placement of ponded ash in the 25 foot property buffer is an issue with the NCDENR Division of Solid Waste
2. LANDFILL EXPANSION: **Landfill Scenario 2A**: Truck Ash and No Liner or Leachate collection system **(Present Operation)** **Landfill Scenario 2B**: Truck Ash and Cap with No Liner and Leachate collection system **(Likely Requirement with approval of variance)** **Landfill Scenario 2C**: Truck Ash and Cap with Liner, and Leachate collection system (Req'd if variance not approved)	 ($2.37) ($4.69) ($8.80)	• Less liability on Duke property than on non-Duke property	• Operational cost for station will increase with stricter regulations • Only permitted for dry ash • Two years to permit and implement expansion of landfill • Compaction of ash limits reuse options

Table A continued.

TABLE A (page 2 of 4)
NET PRESENT VALUE AND RISKS OF ASH MANAGEMENT OPTIONS FOR MARSHALL STEAM STATION

OPTIONS	NET PRESENT VALUE (millions)	RISKS	
		ADVANTAGES	DISADVANTAGES
3. ON-SITE STRUCTURAL FILL FOR BUSINESS PARK:		• Permitted for dry ash per solid waste regulations and for ponded ash per ash reuse permit • Less liability on Duke property than non-Duke property • Focus on reuse and potential recoup of operational costs • Higher initial cost than Landfill Scenario 2A but net cost difference becomes closer in later years • May move regulators away from more stringent landfill regulations to beneficial use structural fill • Beneficial use for ash and land with revenue generation potential	• Operational cost for station • Three to six months for authorization to construct permit and begin implementation
Structural Fill Scenario 3A: Truck Ash to Business Park On-site with no revenues realized from beneficial use	($2.56)		
Structural Fill Scenario 3B: Dense Phase Pump Ash to Business Park On-site with no revenues realized from beneficial use	($3.10)		
Structural Fill Scenario 3C: Truck Ash to Business Park On-site w/o improvements sold from $15,000.00 to $30,000.00 per acre	($1.92)		
Structural Fill Scenario #3D: Truck Ash to Business Park On-site with improvements sold from $30,000.00 to $60,000.00 per acre	($1.28)		

Table A continued

TABLE A (page 3 of 4)
NET PRESENT VALUE AND RISKS OF ASH MANAGEMENT OPTIONS FOR MARSHALL STEAM STATION

OPTIONS	NET PRESENT VALUE (millions)	RISKS	
		ADVANTAGES	DISADVANTAGES
4. ASH ENHANCEMENT:		• Turns liability into an asset, except for scenario 4D. • Reduces the need for landfill and/or structural fills	• Initial capital cost • Further investigation needed to confirm option applicable to operating parameters of Marshall
Ash Enhancement Scenario 4A: **Combustion Optimization** and market a portion of ash at $3.00 to $5.00 per ton / Truck remaining ash to on-site Structural Fill	$7.29 to $9.48		
Ash Enhancement Scenario 4B: **Electrostatic Separation** and market a portion of ash at $3.00 to $5.00 per ton / Truck remaining ash to on-site Structural Fill	$4.12 to $6.31		
Ash Enhancement Scenario 4C: **Ash Reburn** and market a portion of ash at $3.00 to $5.00 per ton / Truck remaining ash to on-site Structural Fill	$0.45 to $2.63		
Ash Enhancement Scenario 4D: **Carbon Flotation** and market a portion of ash at $3.00 to $5.00 per ton / Truck remaining ash to on-site Structural Fill	($7.81) to ($5.62)		

Table A continued.

TABLE A (page 4 of 4)
NET PRESENT VALUE AND RISKS OF ASH MANAGEMENT OPTIONS FOR MARSHALL STEAM STATION

OPTIONS	NET PRESENT VALUE (millions)	RISKS	
		ADVANTAGES	DISADVANTAGES
5. ASH BASIN EXPANSION: **Ash Basin Scenario 5A**: Expansion Raising Dike to El. 820 & Secondary Cell (1983 est.) Sluicing ash to the basin **Ash Basin Scenario 5B**: Expansion Raising Dike to El. 834 (1980 est.) Sluicing ash to the basin	 ($7.36) ($3.83)	• Added capacity for ash storage of 15 to 26 years	• Higher operational cost than current option • Increases wastewater management concerns • Permitting of ash basin scenario 5A is unlikely due to proposed expansion in the critical area of the watershed

Table B.

20-Year NPV Options Summary (Without Risks)

OPTION	DESCRIPTION	PROPERTY SALES	STRUCTURAL FILL PLACEMENT METHOD	FLY ASH SALES TO CONCRETE MARKET	NPV
Businesss Park	On-Site Structural Fill	$15k to $30k	Truck	N/A	($1,921,548)
Businesss Park	On-Site Structural Fill	$30k to $60k	Truck	N/A	($1,277,232)
Businesss Park	On-Site Structural Fill	N/A	Truck	N/A	($2,563,431)
Businesss Park	On-Site Structural Fill	N/A	Dense Phase Pumping	N/A	($3,098,565)
Landfill	On-Site Landfill	N/A	Truck	N/A	($2,365,547)
Landfill	On-Site Landfill with cap	N/A	Truck	N/A	($4,692,857)
Landfill	On-Site Landfill with cap and liner	N/A	Truck	N/A	($8,795,235)
Ash Basin Expansion	Secondary Cell	N/A	N/A	N/A	($7,360,248)
Ash Basin Expansion	Raise Main Dike 30'	N/A	N/A	N/A	($3,826,737)
Ash Reburn/Business Park	Combine on-site structural fill project with ash improvement for ash sales to concrete market	N/A	Truck	$5/ton	$2,632,887
Ash Reburn/Business Park	Combine on-site structural fill project with ash improvement for ash sales to concrete market	N/A	Truck	$3/ton	$445,322
Combustion Improvements/Business Park	Combine on-site structural fill project with ash improvement for ash sales to concrete market	N/A	Truck	$5/ton	$9,482,087
Combustion Improvements/Business Park	Combine on-site structural fill project with ash improvement for ash sales to concrete market	N/A	Truck	$3/ton	$7,294,523
Carbon Flotation/Business Park	Combine on-site structural fill project with ash improvement for ash sales to concrete market	N/A	Truck	$5/ton	($5,622,245)
Carbon Flotation/Business Park	Combine on-site structural fill project with ash improvement for ash sales to concrete market	N/A	Truck	$3/ton	($7,809,810)
Electrostatic Separation/Business Park	Combine on-site structural fill project with ash improvement for ash sales to concrete market	N/A	Truck	$5/ton	$6,308,928
Electrostatic Separation/Business Park	Combine on-site structural fill project with ash improvement for ash sales to concrete market	N/A	Truck	$3/ton	$4,121,364

Table C. Propose schedule for operation planning of ash management plans for Marshal Steam Station.

SCHEDULE FOR DEVELOPMENT AND IMPLEMENTATION OF ASH MANAGEMENT PLANS FOR FOSSIL STATIONS

ASH MANAGEMENT PLAN TASKS	YEARS 1998												1999												2000												2001												2002												2003											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
MARSHALL: NCDENR Reviewing of Landfill Demonstration	X	X	X	X	X	X	X	X	X	X	X																																																													
Develop Conceptual Plan			X	X	X	X	X	X																																																																
Legal & Management Review Conceptual Plan, Marshall Options, and Approve Submittal of Plans to NCDENR								X	X																																																															
NCDENR Review of Conceptual Plan and Marshall ATC Request									X	X	X																																																													
Marshall: Off -site Structural Fills and Landfill	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																																				
Marshall: On-site/Off-site Structural Fill and/or Expand Landfill?													X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Marshall: Expanded Landfill Design?												?	?	?	?	?	?	?																																																						
Team Review/Update Fossil Station Ash Plans (ash storage forecasts, survey schedule, status of ash enhancement/R&D options, status of Environmental Regs.)				X	X	X	X	X	X	X	X	X									X	X	X										X	X	X										X	X	X										X	X	X										X	X	X	
Management Review Updated Plans As Appropriate													X	X	X																																																									
Team Review/Update Fossil Station Ash Plans and Finalize Operational Plan for the Next Year Budget																X	X	X																																																						
Team Finalize/Update Operation Plans																			X	X	X																																																		

ASH MANAGEMENT ON-SITE PLAN SCENARIOS	YEARS 1998												1999												2000												2001												2002												2003											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Marshall: On-site Survey (S),Structural Fill Design (D), Permitting (P), and Construction (C)	S		D	D	D	S			P	P	P	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	S C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	D C	D C	D C	P C	P C	P C	C	C	C	C	C	C

Table D. Ash storage capacity forecast for the Marshall Steam Station landfill.

Duke Power Company
Fossil/Hydro Dept.
1998 Ash Storage Forecast

Marshall Steam Station Landfill

sh Production Projections Based On:
Coal Consumption with Utility Regulation Medium Ash Content (9.0% till 2002, 10% after 2002)
Coal Consumption with Utility Deregulation Medium Ash Content (9.0% till 2002, 10% after 2002)
Coal Consumption with Utility Deregulation High Ash Content (10% till 2002, 11.9% after 2002

Assume that Coal is 10% Ash and that Ash is 10% Bottom Ash and 90% Flyash

Date of Most Recent Physical Survey: 12/25/97

Date	Annual Production of Regulated ash	Annual Production of Non Regulated ash	Annual Production of Non Regulated high ash	Annual Production of Regulated fly ash	Annual Production of Non Regulated fly ash	Annual Production of Non Regulated high fly ash	Annual Fly Ash Utilization	Annual Disposal of Regulated Fly Ash to Landfill	Annual Disposal of Non Regulated Fly Ash to Landfill	Annual Disposal of Non Regulated High Fly Ash to Landfill	Cumulative Disposal of Regulated Fly Ash to Landfill	Cumulative Disposal of Non Regulated Fly Ash to Landfill	Cumulative Disposal of Non Regulated High Fly Ash to Landfill	Ash Landfill Storage Capacity
	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	1000's tons
1/1/93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2042
12/31/93	420.90	420.90	420.90	387.98	387.98	387.98	7.23	380.75	380.75	380.75	380.75	380.75	380.75	2042
12/31/94	433.50	433.50	433.50	383.90	383.90	383.90	91.19	292.71	292.71	292.71	673.46	673.46	673.46	2042
12/31/95	476.60	476.60	476.60	390.67	390.67	81.74	327.82	62.85	62.85	62.85	736.31	736.31	736.31	2042
12/31/96	480.80	480.80	480.80	326.68	326.68	326.68	216.03	110.65	110.65	110.65	846.96	846.96	846.96	2042
12/31/97	552.08	552.08	552.08	496.87	496.87	496.87	327.38	112.05	112.05	112.05	959.01	959.01	959.01	1411
12/31/98	391.86	391.86	391.86	352.67	352.67	352.67	200.00	152.67	152.67	152.67	1111.68	1111.68	1111.68	1411
12/31/99	421.56	421.56	421.56	379.40	379.40	379.40	200.00	179.40	179.40	179.40	1291.09	1291.09	1291.09	1411
12/31/00	414.81	414.81	414.81	373.33	373.33	373.33	200.00	173.33	173.33	173.33	1464.42	1464.42	1464.42	1411
12/31/01	429.93	479.16	532.40	386.94	431.24	479.16	200.00	186.94	231.24	279.16	1651.35	1695.66	1743.58	1411
12/31/02	452.88	479.16	532.40	407.59	431.24	479.16	200.00	207.59	231.24	279.16	1858.95	1926.91	2022.74	1411
12/31/03	499.10	524.90	624.63	449.19	472.41	562.17	200.00	249.19	272.41	362.17	2108.14	2199.32	2384.90	1411
12/31/04	485.20	526.90	627.01	436.68	474.21	564.31	200.00	236.68	274.21	364.31	2344.82	2473.53	2749.21	1411
12/31/05	485.20	544.50	647.96	436.68	490.05	583.16	200.00	236.68	290.05	383.16	2581.50	2763.58	3132.37	1411
12/31/06	485.20	534.10	635.58	436.68	480.69	572.02	200.00	236.68	280.69	372.02	2818.18	3044.27	3504.40	1411
12/31/07	485.20	534.30	635.82	436.68	480.87	572.24	200.00	236.68	280.87	372.24	3054.86	3325.14	3876.63	1411
12/31/08	485.20	526.80	626.89	436.68	474.12	564.20	200.00	236.68	274.12	364.20	3291.54	3599.26	4240.83	1411
12/31/09	485.20	525.00	624.75	436.68	472.50	562.28	200.00	236.68	272.50	362.28	3528.22	3871.76	4603.11	1411
12/31/10	485.20	544.70	649.38	436.68	490.23	584.44	200.00	236.68	290.23	384.44	3764.90	4161.99	4987.55	1411
12/31/11	485.20	532.70	633.91	436.68	479.43	570.52	200.00	236.68	279.43	370.52	4001.58	4441.42	5358.07	1411
12/31/12	485.20	534.80	636.41	436.68	481.32	572.77	200.00	236.68	281.32	372.77	4238.26	4722.74	5730.85	1411
12/31/13	485.20	524.70	624.39	436.68	472.23	561.95	200.00	236.68	272.23	361.95	4474.94	4994.97	6092.80	1411
12/31/14	485.20	526.30	626.30	436.68	473.67	563.67	200.00	236.68	273.67	363.67	4711.62	5268.64	6456.47	1411
12/31/15	485.20	546.80	650.69	436.68	492.12	585.62	200.00	236.68	292.12	385.62	4948.30	5560.76	6842.09	1411
12/31/16	485.20	546.80	650.69	436.68	492.12	585.62	200.00	236.68	292.12	385.62	5184.98	5852.88	7227.71	1411
12/31/17	485.20	546.80	650.69	436.68	492.12	585.62	200.00	236.68	292.12	385.62	5421.66	6145.00	7613.34	1411
12/31/18	485.20	546.80	650.69	436.68	492.12	585.62	200.00	236.68	292.12	385.62	5658.34	6437.12	7998.96	1411
Totals:	12,252.02	13,117.33	14,852.71	10,885.43	11,664.21	12,917.12	5,169.65	5,658.34	6,437.12	7,998.96				

Table E. Ash storage capacity forecast for the Marshall Stream Station ash basin.

Duke Power Company
Fossil/Hydro Dept.
1998 Ash Storage Forecast

Marshall Steam Station Basin														
Ash Production Projections Based On:				Coal Consumption with Utility Regulation Medium Ash Content (9.0% till 2002, 10% after 2002)										
				Coal Consumption with Utility Deregulation Medium Ash Content (9.0% till 2002, 10% after 2002)										
				Coal Consumption with Utility Deregulation High Ash Content (10% till 2002, 11.9% after 2002										
Assume that Coal is 10% Ash and that Ash is 10% Bottom Ash and 90% Flyash														
Date of Most Recent Physical Survey: 12/25/97														
Date	Annual Production of Regulated ash	Annual Production of Non Regulated ash	Annual Production of Non Regulated high ash	Annual Production of Regulated bottom ash	Annual Production of Non Regulated bottom ash	Annual Production of Non Regulated high bottom ash	Annual Utilization of bottom ash	Annual Disposal of Regulated bottom ash	Annual Disposal of Non Regulated bottom ash	Annual Disposal of Non Regulated high bottom ash	Cumulative Disposal of Regulated bottom ash	Cumulative Disposal of Non Regulated bottom ash	Cumulative Disposal of Non Regulated high bottom ash	Ash Basin Storage Capactiy without chemical cleaning	Ash Basin Storage Capactiy with chemical cleaning
	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)	(1000's tons)
1/1/93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	541	152
12/31/93	420.90	420.90	420.90	29.16	29.16	29.16	5.85	19.65	19.65	19.65	19.65	19.65	19.65	541	152
12/31/94	433.50	433.50	433.50	45.73	45.73	45.73	22.97	9.89	9.89	9.89	29.54	29.54	29.54	541	152
12/31/95	476.60	476.60	476.60	81.74	81.74	81.74	42.69	35.24	35.24	35.24	64.78	64.78	64.78	541	152
12/31/96	480.80	480.80	480.80	74.49	74.49	74.49	86.77	0.00	0.00	0.00	64.78	64.78	64.78	554	165
12/31/97	552.08	552.08	552.08	55.21	55.21	55.21	105.70	-50.49	-50.49	-50.49	14.29	14.29	14.29	861	197
12/31/98	391.86	391.86	391.86	39.19	39.19	39.19	100.00	-60.81	-60.81	-60.81	-46.53	-46.53	-46.53	861	197
12/31/99	421.56	421.56	421.56	42.16	42.16	42.16	100.00	-57.84	-57.84	-57.84	-104.37	-104.37	-104.37	861	197
12/31/00	414.81	414.81	414.81	41.48	41.48	41.48	100.00	-58.52	-58.52	-58.52	-162.89	-162.89	-162.89	861	197
12/31/01	429.93	479.16	532.40	42.99	47.92	53.24	100.00	-57.01	-52.08	-46.76	-219.90	-214.97	-209.65	861	197
12/31/02	452.88	479.16	532.40	45.29	47.92	53.24	100.00	-54.71	-52.08	-46.76	-274.61	-267.06	-256.41	861	197
12/31/03	499.10	524.90	624.63	49.91	52.49	62.46	100.00	-50.09	-47.51	-37.54	-324.70	-314.57	-293.95	861	197
12/31/04	485.20	526.90	627.01	48.52	52.69	62.70	100.00	-51.48	-47.31	-37.30	-376.18	-361.88	-331.24	861	197
12/31/05	485.20	544.50	647.96	48.52	54.45	64.80	100.00	-51.48	-45.55	-35.20	-427.66	-407.43	-366.45	861	197
12/31/06	485.20	534.10	635.58	48.52	53.41	63.56	100.00	-51.48	-46.59	-36.44	-479.14	-454.02	-402.89	861	197
12/31/07	485.20	534.30	635.82	48.52	53.43	63.58	100.00	-51.48	-46.57	-36.42	-530.62	-500.59	-439.31	861	197
12/31/08	485.20	526.80	626.89	48.52	52.68	62.69	100.00	-51.48	-47.32	-37.31	-582.10	-547.91	-476.62	861	197
12/31/09	485.20	525.00	624.75	48.52	52.50	62.48	100.00	-51.48	-47.50	-37.53	-633.58	-595.41	-514.15	861	197
12/31/10	485.20	544.70	649.38	48.52	54.47	64.94	100.00	-51.48	-45.53	-35.06	-685.06	-640.94	-549.21	861	197
12/31/11	485.20	532.70	633.91	48.52	53.27	63.39	100.00	-51.48	-46.73	-36.61	-736.54	-687.67	-585.82	861	197
12/31/12	485.20	534.80	636.41	48.52	53.48	63.64	100.00	-51.48	-46.52	-36.36	-788.02	-734.19	-622.17	861	197
12/31/13	485.20	524.70	624.39	48.52	52.47	62.44	100.00	-51.48	-47.53	-37.56	-839.50	-781.72	-659.74	861	197
12/31/14	485.20	526.30	626.30	48.52	52.63	62.63	100.00	-51.48	-47.37	-37.37	-890.98	-829.09	-697.11	861	197
12/31/15	485.20	546.80	650.69	48.52	54.68	65.07	100.00	-51.48	-45.32	-34.93	-942.46	-874.41	-732.04	861	197
12/31/16	485.20	546.80	650.69	48.52	54.68	65.07	100.00	-51.48	-45.32	-34.93	-993.94	-919.73	-766.97	861	197
12/31/17	485.20	546.80	650.69	48.52	54.68	65.07	100.00	-51.48	-45.32	-34.93	-1045.42	-965.05	-801.90	861	197
12/31/18	485.20	546.80	650.69	48.52	54.68	65.07	100.00	-51.48	-45.32	-34.93	-1096.90	-1010.37	-836.83	861	197
Totals:	12,252.02	13,117.33	14,852.71	1,275.14	1,361.67	1,535.21	2,363.98	-1,096.90	-1,010.37	-836.83					

Table F (page 1 of 2)
1998 SysAsh Projections

Duke Power Company
1998 Monthly Coal Ash Production and Utilization Tracking (as of 7/31/98): Sheet 1 of 2

Notes: 1. All coal consumption, ash production, and ash utilization quantities are in 1000's of dry tons.
2. Projected ash production is based on ENPRO EN9803ST base coal consumption scenario (assuming 10% ash) dated February, 1998.

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JAN Coal Consumption	71.77	483.48	36.19	110.78	3.96	2.03	478.47	10.48	1,197.151	1,197.151
JAN % Ash	10.70	9.08	13.37	8.23	10.17	8.73	10.20	10.66		
JAN Ash Produced	7.68	43.90	4.84	9.12	0.40	0.18	48.80	1.12	116.04	116.04
Utilization: Concrete		16.43		0.20					16.64	16.64
Mineral Filler							0.49		0.49	0.49
Structural Fill									0.00	0.00
JTM Bottom Ash		1.96					3.50		5.46	5.46
Duke Bottom Ash							0.67		0.67	0.67
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	7.68	17.39	4.64	8.91	0.40	0.18	2.13	1.12	42.65	42.65
Net Ash Placed in Landfills		8.11					42.02		50.13	50.13
JAN Total Ash Utilized	0.00	18.40	0.00	0.20	0.00	0.00	4.65	0.00	23.25	23.25
FEB Coal Consumption	39.56	431.62	1.66	64.28	0.00	0.00	343.31	14.35	894.783	2,091.934
FEB % Ash	11.32	9.14	13.66	8.32	0.00	0.00	10.16	11.14		
FEB Ash Produced	4.48	39.45	0.23	5.35	0.00	0.00	34.95	1.60	86.05	202.09
Utilization: Concrete		20.33		0.20					20.53	37.17
Mineral Filler							0.61		0.61	1.10
Structural Fill									0.00	0.00
JTM Bottom Ash		2.57					4.28		6.85	12.31
Duke Bottom Ash							0.30		0.30	0.97
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	4.48	8.63	0.23	5.15	0.00	0.00	0.14	1.60	20.22	62.87
Net Ash Placed in Landfills		7.92					29.62		37.55	87.68
FEB Total Ash Utilized	0.00	22.89	0.00	0.20	0.00	0.00	5.19	0.00	28.29	51.54
MAR Coal Consumption	141.67	405.22	24.78	109.41	22.27	22.94	360.82	36.05	1,123.161	3,215.095
MAR % Ash	10.85	9.42	13.71	7.98	10.89	8.10	10.35	10.46		
MAR Ash Produced	15.37	38.17	3.40	8.73	2.43	1.86	37.34	3.77	111.07	313.16
Utilization: Concrete		26.47		1.71					28.19	65.35
Mineral Filler							0.63		0.63	1.73
Structural Fill									0.00	0.00
JTM Bottom Ash		2.67					4.99		7.66	19.97
Duke Bottom Ash							1.08		1.08	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	15.37	1.89	3.40	7.02	2.43	1.86	11.79	3.77	47.53	110.40
Net Ash Placed in Landfills		7.13					18.85		25.98	113.66
MAR Total Ash Utilized	0.00	29.15	0.00	1.71	0.00	0.00	6.70	0.00	37.56	89.10
APR Coal Consumption	81.49	458.93	8.53	48.38	1.95	5.53	417.24	12.52	1,034.581	4,249.676
APR % Ash	11.05	9.44	14.46	8.75	10.44	8.37	11.62	10.77		
APR Ash Produced	9.00	43.32	1.23	4.23	0.20	0.46	48.48	1.35	108.29	421.45
Utilization: Concrete		30.98		0.95					31.93	97.28
Mineral Filler							0.86		0.86	2.59
Structural Fill							22.99		22.99	22.99
JTM Bottom Ash		3.08					5.54		8.62	28.59
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	9.00	3.66	1.23	3.28	0.20	0.46	-8.05	1.35	11.15	121.55
Net Ash Placed in Landfills		5.60					27.14		32.75	146.41
APR Total Ash Utilized	0.00	34.06	0.00	0.95	0.00	0.00	29.39	0.00	64.40	153.50
MAY Coal Consumption	173.34	470.83	59.24	135.63	40.77	50.66	387.65	78.74	1,396.865	5,646.541
MAY % Ash	10.51	9.55	13.48	7.80	10.85	8.23	10.87	9.66		
MAY Ash Produced	18.22	44.96	7.99	10.58	4.42	4.17	42.14	7.61	140.08	561.53
Utilization: Concrete		33.42		1.51					34.93	132.21
Mineral Filler							0.60		0.60	3.19
Structural Fill							67.71		67.71	90.70
JTM Bottom Ash		2.00					5.05		7.05	35.64
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	18.22	2.42	7.99	9.07	4.42	4.17	-41.01	7.61	12.88	134.42
Net Ash Placed in Landfills		7.13					9.79		16.92	163.33
MAY Total Ash Utilized	0.00	35.42	0.00	1.51	0.00	0.00	73.36	0.00	110.29	263.78
JUN Coal Consumption	246.23	487.13	91.67	162.70	62.31	80.07	397.90	107.85	1,635.855	7,282.396
JUN % Ash	10.30	9.74	12.92	8.33	10.93	8.46	9.46	9.93		
JUN Ash Produced	25.36	47.45	11.84	13.55	6.81	6.77	37.64	10.71	160.14	721.67
Utilization: Concrete		38.74		1.12					39.87	172.08
Mineral Filler							0.65		0.65	3.84
Structural Fill							79.81		79.81	170.51
JTM Bottom Ash		1.86					4.79		6.65	42.29
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	25.36	6.84	11.84	12.43	6.81	6.77	-50.28	10.71	30.49	164.92
Net Ash Placed in Landfills							2.67		2.67	165.99
JUN Total Ash Utilized	0.00	40.61	0.00	1.12	0.00	0.00	85.25	0.00	126.98	390.76

Table F (page 2 of 2)
1998 SysAsh Projections

Duke Power Company
1997 Monthly Coal Ash Production and Utilization Tracking (as of 9/30/97): Sheet 2 of 2

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JUL Coal Consumption	221.45	545.57	84.11	168.82	53.87	63.85	483.70	100.64	1,721.997	9,004.393
JUL % Ash	10.55	9.98	13.74	8.22	11.15	8.33	10.09	9.97		
JUL Ash Produced	23.36	54.45	11.56	13.88	6.01	5.32	48.80	10.03	173.41	895.08
Utilization: Concrete		41.59		0.66					42.25	214.33
Mineral Filler							0.62		0.62	4.46
Structural Fill							20.23		20.23	190.74
JTM Bottom Ash		1.84					5.53		7.37	49.65
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	23.36	7.33	11.56	13.21	6.01	5.32	20.21	10.03	97.03	261.94
Net Ash Placed in Landfills		3.70					2.22		5.91	171.91
JUL Total Ash Utilized	0.00	43.42	0.00	0.66	0.00	0.00	26.38	0.00	70.47	461.23
AUG Coal Consumption	203.00	517.00	72.00	140.00	39.00	56.00	474.00	81.00	1,582.000	10,586.393
AUG % Ash	9.06	9.56	12.05	9.17	10.62	10.45	11.27	9.33		
AUG Ash Produced	18.39	49.43	8.68	12.84	4.14	5.85	53.42	7.56	160.30	1055.38
Utilization: Concrete									0.00	214.33
Mineral Filler									0.00	4.46
Structural Fill									0.00	190.74
JTM Bottom Ash									0.00	49.65
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	18.39	49.43	8.68	12.84	4.14	5.85	50.48	7.56	157.37	419.31
Net Ash Placed in Landfills							2.94		2.94	174.84
AUG Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	461.23
SEP Coal Consumption	116.00	481.00	49.00	115.00	22.00	38.00	409.00	67.00	1,297.000	11,883.393
SEP % Ash	9.16	9.77	11.12	8.90	11.52	9.50	10.62	9.42		
SEP Ash Produced	10.63	46.99	5.45	10.24	2.53	3.61	43.44	6.31	129.19	1,184.58
Utilization: Concrete									0.00	214.33
Mineral Filler									0.00	4.46
Structural Fill									0.00	190.74
JTM Bottom Ash									0.00	49.65
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	10.63	46.99	5.45	10.24	2.53	3.61	43.44	6.31	129.19	548.50
Net Ash Placed in Landfills									0.00	174.84
SEP Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	461.23
OCT Coal Consumption	76.00	473.00	20.00	99.00	15.00	27.00	384.00	54.00	1,148.000	13,031.393
OCT % Ash	10.18	9.42	13.29	9.03	11.74	10.20	10.98	9.43		
OCT Ash Produced	7.74	44.56	2.66	8.94	1.76	2.75	42.16	5.09	115.66	1,300.24
Utilization: Concrete									0.00	214.33
Mineral Filler									0.00	4.46
Structural Fill									0.00	190.74
JTM Bottom Ash									0.00	49.65
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	7.74	44.56	2.66	8.94	1.76	2.75	42.16	5.09	115.66	664.17
Net Ash Placed in Landfills									0.00	174.84
OCT Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	461.23
NOV Coal Consumption	66.00	388.00	27.00	105.00	13.00	23.00	370.00	54.00	1,046.000	14,077.393
NOV % Ash	9.80	9.50	11.00	9.00	11.00	10.00	11.00	10.00		
NOV Ash Produced	6.47	36.86	2.97	9.45	1.43	2.30	40.70	5.40	105.58	1,405.82
Utilization: Concrete									0.00	214.33
Mineral Filler									0.00	4.46
Structural Fill									0.00	190.74
JTM Bottom Ash									0.00	49.65
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	6.47	36.86	2.97	9.45	1.43	2.30	40.70	5.40	105.58	769.74
Net Ash Placed in Landfills									0.00	174.84
NOV Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	461.23
DEC Coal Consumption	77.00	395.00	36.00	89.00	13.00	16.00	347.00	45.00	1,018.000	15,095.393
DEC % Ash	9.80	9.50	11.00	9.00	11.00	10.00	11.00	10.00		
DEC Ash Produced	7.55	37.53	3.96	8.01	1.43	1.60	38.17	4.50	102.74	1,508.56
Utilization: Concrete									0.00	214.33
Mineral Filler									0.00	4.46
Structural Fill									0.00	190.74
JTM Bottom Ash									0.00	49.65
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	7.55	37.53	3.96	8.01	1.43	1.60	38.17	4.50	102.74	872.48
Net Ash Placed in Landfills									0.00	174.84
DEC Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	461.23
Year to Date Coal Consumed	1,513.508	5,536.777	510.184	1,348.002	287.129	385.079	4,853.076	661.638		15,095.393
Year to Date Ash Produced	154.24	527.06	64.60	114.91	31.57	34.68	516.05	65.05		1,508.56
Utilization: Concrete	0.00	207.96	0.00	6.37	0.00	0.00	0.00	0.00		214.33
Mineral Filler	0.00	0.00	0.00	0.00	0.00	0.00	4.46	0.00		4.46
Structural Fill	0.00	0.00	0.00	0.00	0.00	0.00	190.74	0.00		190.74
JTM Bottom Ash	0.00	15.98	0.00	0.00	0.00	0.00	33.68	0.00		49.65
Duke Bottom Ash	0.00	0.00	0.00	0.00	0.00	0.00	2.05	0.00		2.05
Mill Rejects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Other: Ash Removal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Ash Sluiced to Basins	154.24	263.53	64.80	108.54	31.57	34.68	149.88	65.05	872.48	872.48
Net Ash Placed in Landfills	0.00	39.60	0.00	0.00	0.00	0.00	135.24	0.00	174.84	174.84
YTD Total Ash Utilized	0.00	223.94	0.00	6.37	0.00	0.00	230.93	0.00	461.23	461.23
YTD Percent Ash Utilized	0.0%	42.5%	0.0%	5.5%	0.0%	0.0%	44.7%	0.0%	0.93	30.6%
YTD + Projected Ash Production	154.24	527.06	64.80	114.91	31.57	34.88	516.05	65.05		1508.56
YTD + Projected Ash Utilization	0.00	223.94	0.00	6.37	0.00	0.00	230.93	0.00		461.23
YTD + Projected % Ash Utilization	0.0%	42.5%	0.0%	5.5%	0.0%	0.0%	44.7%	0.0%		30.6%

Table 2A (page 1 of 4)
Scenario 2A: 20-Year NPV - Truck Ash With No Liner or Leachate Collection System

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Placed in Landfill (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Landfill per Year (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Total "Pond" Ash Placed in Landfill per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Landfill per Year (1000's tons)		479.40	473.41	579.16	579.16	572.41	574.21	589.96
CUMULATIVE ASH PLACED ON-SITE (1000's tons)		479.40	952.81	1,531.97	2,111.13	2,683.54	3,257.76	3,847.71
Ash Sales to Concrete Market		$0	$0	$0	$0	$0	$0	$0
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	$0	$205,900	$211,974	$218,227	$224,665	$231,293	$238,116	$245,140
Engineering	$31,000				$31,000			
Groundwater wells		$10,000				$10,000		
Groundwater analysis		$60,000						
Drainage and sedimentation control		$31,000	$31,000				$31,000	$31,000
Grubbing		$31,000	$31,000			$31,000	$31,000	
Stockpile cover soil		$81,000	$81,000				$81,000	$81,000
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$1,226,819	$1,226,819	$1,212,509	$1,216,325	$1,249,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$31,000	$1,644,336	$1,561,629	$1,642,819	$1,673,819	$1,669,509	$1,775,325	$1,777,715
O&M (including inflation)	$31,000	$1,692,844	$1,655,124	$1,792,640	$1,880,243	$1,930,726	$2,113,664	$2,178,947
Subtotal (without inflation)								
CAPITAL (including inflation)	$0	$0	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($31,000)	($1,486,944)	($1,443,150)	($1,574,313)	($1,655,578)	($1,699,433)	($1,875,549)	($1,933,807)

Table 2A (page 2 of 4)
Scenario 2A: 20-Year NPV - Truck Ash With No Liner or Leachate Collection System

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Placed in Landfill (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Landfill per Year (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Total "Pond" Ash Placed in Landfill per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Landfill per Year (1000's tons)	580.69	580.87	574.21	572.59	591.13	579.52	581.32	572.32
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**4,428.40**	**5,009.27**	**5,583.48**	**6,156.07**	**6,747.20**	**7,326.72**	**7,908.04**	**8,480.36**
Ash Sales to Concrete Market	$0	$0	$0	$0	$0	$0	$0	$0
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$252,372**	**$259,817**	**$267,481**	**$275,372**	**$283,496**	**$291,859**	**$300,468**	**$309,332**
Engineering		$31,000					$31,000	
Groundwater wells			$10,000					$10,000
Groundwater analysis								
Drainage and sedimentation control				$31,000	$31,000			
Grubbing			$31,000	$31,000				$31,000
Stockpile cover soil				$81,000	$81,000			
Haul and cover silo ash (@ current contract rates)	$1,230,063	$1,230,444	$1,216,325	$1,212,891	$1,252,196	$1,227,582	$1,231,398	$1,212,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,646,063	$1,677,444	$1,673,325	$1,771,891	$1,780,196	$1,643,582	$1,678,398	$1,669,318
O&M (including inflation)	**$2,077,099**	**$2,179,141**	**$2,237,916**	**$2,439,646**	**$2,523,387**	**$2,398,469**	**$2,521,529**	**$2,581,870**
Subtotal (without inflation)								
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($1,824,727)**	**($1,919,324)**	**($1,970,435)**	**($2,164,274)**	**($2,239,892)**	**($2,106,610)**	**($2,221,061)**	**($2,272,538)**

Table 2A (page 3 of 4)
Scenario 2A: 20-Year NPV - Truck Ash With No Liner or Leachate Collection System

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Placed in Landfill (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Landfill per Year (1000's tons)	473.58	492.12	492.12	492.12	492.12
Total "Pond" Ash Placed in Landfill per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Landfill per Year (1000's tons)	573.58	592.12	592.12	592.12	592.12
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**9,053.94**	**9,646.06**	**10,238.18**	**10,830.30**	**11,422.42**
Ash Sales to Concrete Market	$0	$0	$0	$0	$0
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$318,458**	**$327,852**	**$337,524**	**$347,481**	**$357,731**
Engineering					
Groundwater wells					
Groundwater analysis					
Drainage and sedimentation control	$31,000	$31,000			
Grubbing	$31,000				
Stockpile cover soil	$81,000	$81,000			
Haul and cover silo ash (@ current contract rates)	$1,214,990	$1,254,294	$1,254,294	$1,254,294	$1,254,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,773,990	$1,782,294	$1,670,294	$1,670,294	$1,670,294
O&M (including inflation)	**$2,824,702**	**$2,921,645**	**$2,818,820**	**$2,901,975**	**$2,987,583**
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($2,506,245)**	**($2,593,793)**	**($2,481,296)**	**($2,554,494)**	**($2,629,852)**

Table 2A (page 4 of 4)
Scenario 2A: 20-Year NPV - Truck Ash With No Liner or Leachate Collection System

ASSUMPTIONS	
2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
$2,500.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)

Table 2B (page 1 of 4)
Scenario 2B: 20-Year NPV - Truck Ash and Cap With No Liner or Leachate Collection System

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Placed in Landfill (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Landfill per Year (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Total "Pond" Ash Placed in Landfill per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Landfill per Year (1000's tons)		479.40	473.41	579.16	579.16	572.41	574.21	589.96
CUMULATIVE ASH PLACED ON-SITE (1000's tons)		**479.40**	**952.81**	**1,631.97**	**2,111.13**	**2,683.54**	**3,257.75**	**3,847.71**
Ash Sales to Concrete Market		$0	$0	$0	$0	$0	$0	$0
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$0**	**$205,900**	**$211,974**	**$218,227**	**$224,665**	**$231,293**	**$238,116**	**$245,140**
Engineering	$31,000				$31,000			
Groundwater wells		$10,000				$10,000		
Groundwater analysis		$60,000						
Drainage and sedimentation control		$31,000	$31,000				$31,000	$31,000
Grubbing		$31,000	$31,000			$31,000	$31,000	
Stockpile cover soil		$81,000	$81,000				$81,000	$81,000
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$1,226,819	$1,226,819	$1,212,509	$1,216,325	$1,249,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Cap		$354,000	$354,000	$354,000	$354,000	$354,000	$354,000	$354,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$31,000	$1,998,336	$1,915,629	$1,996,819	$2,027,819	$2,023,509	$2,129,325	$2,131,715
O&M (including inflation)	**$31,000**	**$2,057,287**	**$2,030,318**	**$2,178,802**	**$2,277,900**	**$2,340,114**	**$2,535,129**	**$2,612,845**
Subtotal (without inflation)								
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($31,000)**	**($1,851,387)**	**($1,818,344)**	**($1,960,575)**	**($2,053,235)**	**($2,108,821)**	**($2,297,013)**	**($2,367,705)**

Table 2B (page 2 of 4)
Scenario 2B: 20-Year NPV - Truck Ash and Cap With No Liner or Leachate Collection System

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Placed in Landfill (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Landfill per Year (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Total "Pond" Ash Placed in Landfill per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Landfill per Year (1000's tons)	580.69	580.87	574.21	572.59	591.13	579.52	581.32	572.32
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	4,428.40	5,009.27	5,583.48	6,156.07	6,747.20	7,326.72	7,908.04	8,480.36
Ash Sales to Concrete Market	$0	$0	$0	$0	$0	$0	$0	$0
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	$252,372	$259,817	$267,481	$275,372	$283,496	$291,859	$300,468	$309,332
Engineering		$31,000					$31,000	
Groundwater wells			$10,000					$10,000
Groundwater analysis								
Drainage and sedimentation control				$31,000	$31,000			
Grubbing			$31,000	$31,000				$31,000
Stockpile cover soil				$81,000	$81,000			
Haul and cover silo ash (@ current contract rates)	$1,230,063	$1,230,444	$1,216,325	$1,212,891	$1,252,196	$1,227,582	$1,231,398	$1,212,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Cap	$354,000	$354,000	$354,000	$354,000	$354,000	$354,000	$354,000	$354,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$2,000,063	$2,031,444	$2,027,325	$2,125,891	$2,134,196	$1,997,582	$2,032,398	$2,023,318
O&M (including inflation)	$2,523,797	$2,639,016	$2,711,358	$2,927,055	$3,025,175	$2,915,058	$3,053,358	$3,129,389
Subtotal (without inflation)								
CAPITAL (including inflation)	$0	$0	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($2,271,425)	($2,379,200)	($2,443,877)	($2,651,682)	($2,741,679)	($2,623,200)	($2,752,890)	($2,820,056)

Table 2B (page 3 of 4)
Scenario 2B: 20-Year NPV - Truck Ash and Cap With No Liner or Leachate Collection System

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Placed in Landfill (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Landfill per Year (1000's tons)	473.58	492.12	492.12	492.12	492.12
Total "Pond" Ash Placed in Landfill per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Landfill per Year (1000's tons)	573.58	592.12	592.12	592.12	592.12
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**9,053.94**	**9,646.06**	**10,238.18**	**10,830.30**	**11,422.42**
Ash Sales to Concrete Market	$0	$0	$0	$0	$0
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$318,458**	**$327,852**	**$337,524**	**$347,481**	**$357,731**
Engineering					
Groundwater wells					
Groundwater analysis					
Drainage and sedimentation control	$31,000	$31,000			
Grubbing	$31,000				
Stockpile cover soil	$81,000	$81,000			
Haul and cover silo ash (@ current contract rates)	$1,214,990	$1,254,294	$1,254,294	$1,254,294	$1,254,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Cap	$354,000	$354,000	$354,000	$354,000	$354,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$2,127,990	$2,136,294	$2,024,294	$2,024,294	$2,024,294
O&M (including inflation)	**$3,388,372**	**$3,501,943**	**$3,416,237**	**$3,517,016**	**$3,620,768**
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($3,069,915)**	**($3,174,091)**	**($3,078,713)**	**($3,169,535)**	**($3,263,037)**

Table 2B (page 4 of 4)
Scenario 2B: 20-Year NPV - Truck Ash and Cap With No Liner or Leachate Collection System

ASSUMPTIONS	
2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
$2,500.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)

Table 2C (page 1 of 4)
Scenario 2C: 20-Year NPV - Truck Ash and Cap With Liner and Leachate Collection System

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Placed in Landfill (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Landfill per Year (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Total "Pond" Ash Placed in Landfill per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Landfill per Year (1000's tons)		479.40	473.41	579.16	579.16	572.41	574.21	589.96
CUMULATIVE ASH PLACED ON-SITE (1000's tons)		479.40	952.81	1,531.97	2,111.13	2,683.54	3,257.75	3,847.71
Ash Sales to Concrete Market		$0	$0	$0	$0	$0	$0	$0
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	$0	$205,900	$211,974	$218,227	$224,665	$231,293	$238,116	$245,140
Engineering	$31,000				$31,000			
Groundwater wells		$10,000				$10,000		
Groundwater analysis		$60,000						
Drainage and sedimentation control		$31,000	$31,000				$31,000	$31,000
Grubbing		$31,000	$31,000			$31,000	$31,000	
Stockpile cover soil		$81,000	$81,000				$81,000	$81,000
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$1,226,819	$1,226,819	$1,212,509	$1,216,325	$1,249,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Cap and synthetic liner		$978,000	$978,000	$978,000	$978,000	$978,000	$978,000	$978,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$31,000	$2,622,336	$2,539,629	$2,620,819	$2,651,819	$2,647,509	$2,753,325	$2,755,715
O&M (including inflation)	$31,000	$2,699,695	$2,691,677	$2,859,671	$2,978,865	$3,061,747	$3,278,050	$3,377,682
Subtotal (without inflation)								
CAPITAL (including inflation)	$0	$0	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($31,000)	($2,493,795)	($2,479,703)	($2,641,444)	($2,754,190)	($2,830,454)	($3,039,935)	($3,132,542)

Table 2C (page 2 of 4)
Scenario 2C: 20-Year NPV - Truck Ash and Cap With Liner and Leachate Collection System

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Placed in Landfill (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Landfill per Year (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Total "Pond" Ash Placed in Landfill per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Landfill per Year (1000's tons)	580.69	580.87	574.21	572.59	591.13	579.52	581.32	572.32
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**4,428.40**	**5,009.27**	**5,583.48**	**6,156.07**	**6,747.20**	**7,326.72**	**7,908.04**	**8,480.36**
Ash Sales to Concrete Market	$0	$0	$0	$0	$0	$0	$0	$0
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$252,372**	**$259,817**	**$267,481**	**$275,372**	**$283,496**	**$291,869**	**$300,468**	**$309,332**
Engineering		$31,000					$31,000	
Groundwater wells			$10,000					$10,000
Groundwater analysis								
Drainage and sedimentation control				$31,000	$31,000			
Grubbing			$31,000	$31,000				$31,000
Stockpile cover soil				$81,000	$81,000			
Haul and cover silo ash (@ current contract rates)	$1,230,063	$1,230,444	$1,216,325	$1,212,891	$1,252,196	$1,227,582	$1,231,398	$1,212,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Cap and synthetic liner	$978,000	$978,000	$978,000	$978,000	$978,000	$978,000	$978,000	$978,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$2,624,063	$2,655,444	$2,651,325	$2,749,891	$2,758,196	$2,621,582	$2,656,398	$2,647,318
O&M (including inflation)	**$3,311,197**	**$3,449,645**	**$3,545,900**	**$3,786,215**	**$3,909,681**	**$3,825,657**	**$3,990,820**	**$4,094,505**
Subtotal (without inflation)								
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($3,058,825)**	**($3,189,828)**	**($3,278,419)**	**($3,510,843)**	**($3,626,185)**	**($3,533,799)**	**($3,690,351)**	**($3,785,173)**

Table 2C (page 3 of 4)
Scenario 2C: 20-Year NPV - Truck Ash and Cap With Liner and Leachate Collection System

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Placed in Landfill (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Landfill per Year (1000's tons)	473.58	492.12	492.12	492.12	492.12
Total "Pond" Ash Placed in Landfill per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Landfill per Year (1000's tons)	573.58	592.12	592.12	592.12	592.12
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**9,053.94**	**9,646.06**	**10,238.18**	**10,830.30**	**11,422.42**
Ash Sales to Concrete Market	$0	$0	$0	$0	$0
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$318,458**	**$327,852**	**$337,524**	**$347,481**	**$357,731**
Engineering					
Groundwater wells					
Groundwater analysis					
Drainage and sedimentation control	$31,000	$31,000			
Grubbing	$31,000				
Stockpile cover soil	$81,000	$81,000			
Haul and cover silo ash (@ current contract rates)	$1,214,990	$1,254,294	$1,254,294	$1,254,294	$1,254,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Cap and synthetic liner	$978,000	$978,000	$978,000	$978,000	$978,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$2,751,990	$2,760,294	$2,648,294	$2,648,294	$2,648,294
O&M (including inflation)	**$4,381,960**	**$4,524,841**	**$4,469,311**	**$4,601,156**	**$4,736,890**
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($4,063,502)**	**($4,196,989)**	**($4,131,787)**	**($4,253,675)**	**($4,379,158)**

Table 2C (page 4 of 4)
Scenario 2C: 20-Year NPV - Truck Ash and Cap With Liner and Leachate Collection System

ASSUMPTIONS	
2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
$2,500.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)

Table 3A (page 1 of 4)
Scenario 3A: 20-Year NPV - Truck Ash to Business Park With No Revenues

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	579.16	579.16	572.41	574.21	589.96
CUMULATIVE ASH PLACED ON-SITE (1000's tons)		479.40	952.81	1,631.97	2,111.13	2,683.54	3,257.75	3,847.71
Phase 1 Land Sales @ $0/acre								
Phase 2 Land Sales @ $0/acre								
Phase 3 Land Sales @ $0/acre								
Phase 4 Land Sales @ $0/acre								
Ash Sales to Concrete Market								
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	$0	$205,900	$211,974	$218,227	$224,665	$231,293	$238,116	$245,140
Engineering	$33,000							$33,000
Drainage and sedimentation control		$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing		$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil		$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$1,226,819	$1,226,819	$1,212,509	$1,216,325	$1,249,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,521,629	$1,745,819	$1,745,819	$1,731,509	$1,735,325	$1,801,715
O&M (including inflation)	$33,000	$1,579,599	$1,612,730	$1,904,927	$1,961,122	$2,002,426	$2,066,041	$2,208,364
Subtotal (without inflation)								
CAPITAL (including inflation)	$0	$0	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($33,000)	($1,373,699)	($1,400,755)	($1,686,700)	($1,736,457)	($1,771,134)	($1,827,925)	($1,963,224)

Table 3A (page 2 of 4)
Scenario 3A: 20-Year NPV - Truck Ash to Business Park With No Revenues

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	580.69	580.87	574.21	572.59	591.13	579.52	581.32	572.32
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**4,428.40**	**5,009.27**	**5,583.48**	**6,156.07**	**6,747.20**	**7,326.72**	**7,908.04**	**8,480.36**
Phase 1 Land Sales @ $0/acre	$0							
Phase 2 Land Sales @ $0/acre						$0		
Phase 3 Land Sales @ $0/acre								
Phase 4 Land Sales @ $0/acre								
Ash Sales to Concrete Market								
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without Inflation)	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$252,372**	**$259,817**	**$267,481**	**$275,372**	**$283,496**	**$291,869**	**$300,468**	**$309,332**
Engineering					$33,000			
Drainage and sedimentation control	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000
Haul and cover silo ash (@ current contract rates)	$1,230,063	$1,230,444	$1,216,325	$1,212,891	$1,252,196	$1,227,582	$1,231,398	$1,212,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without Inflation)	$1,749,063	$1,749,444	$1,735,325	$1,731,891	$1,804,196	$1,746,582	$1,750,398	$1,731,318
O&M (including inflation)	**$2,207,071**	**$2,272,675**	**$2,320,836**	**$2,384,572**	**$2,557,407**	**$2,548,776**	**$2,629,898**	**$2,677,763**
Subtotal (without Inflation)								
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($1,954,699)**	**($2,012,858)**	**($2,053,364)**	**($2,109,200)**	**($2,273,911)**	**($2,256,917)**	**($2,329,229)**	**($2,368,431)**

Table 3A (page 3 of 4)
Scenario 3A: 20-Year NPV - Truck Ash to Business Park With No Revenues

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	473.58	492.12	492.12	492.12	492.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	573.58	592.12	592.12	592.12	592.12
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**9,053.94**	**9,646.06**	**10,238.18**	**10,830.30**	**11,422.42**
Phase 1 Land Sales @ $0/acre					
Phase 2 Land Sales @ $0/acre					
Phase 3 Land Sales @ $0/acre					$0
Phase 4 Land Sales @ $0/acre					
Ash Sales to Concrete Market					
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$318,458**	**$327,852**	**$337,624**	**$347,481**	**$367,731**
Engineering				$33,000	
Drainage and sedimentation control	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil	$48,000	$48,000	$48,000	$48,000	$48,000
Haul and cover silo ash (@ current contract rates)	$1,214,990	$1,254,294	$1,254,294	$1,254,294	$1,254,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,733,990	$1,773,294	$1,773,294	$1,806,294	$1,773,294
O&M (including inflation)	**$2,761,011**	**$2,906,891**	**$2,992,645**	**$3,138,262**	**$3,171,816**
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($2,442,553)**	**($2,579,039)**	**($2,655,121)**	**($2,790,781)**	**($2,814,084)**

Table 3A (page 4 of 4)
Scenario 3A: 20-Year NPV - Truck Ash to Business park With No Revenues

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)

Table 3B (page 1 of 4)
Scenario 3B: 20-Year NPV - Dense Phase Pumping to Business Park With No Revenues

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	579.16	579.16	572.41	574.21	589.96
CUMULATIVE ASH PLACED ON-SITE (1000's tons)		479.40	952.81	1,531.97	2,111.13	2,683.54	3,257.75	3,847.71
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Ash Sales to Concrete Market								
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	$0	$205,900	$211,974	$218,227	$224,665	$231,293	$238,116	$245,140
Engineering	$33,000						$33,000	
Dense Phase Pumping System O&M		$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000
Bulldozer Operation		$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000
Power Demand		$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000
Dense Phase Pumping System Relocation				$300,000		$300,000		$300,000
Drainage and sedimentation control		$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing		$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil		$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Boral contract minimum payment		$750,000	$750,000	$750,000	$750,000	$750,000		
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,704,000	$1,704,000	$2,004,000	$1,704,000	$2,004,000	$987,000	$1,254,000
O&M (including inflation)	$33,000	$1,754,268	$1,806,019	$2,186,637	$1,914,146	$2,317,652	$1,175,101	$1,537,029
Dense Phase Pumping System		$3,500,000						
Subtotal (without inflation)		$3,500,000	$0	$0	$0	$0	$0	$0
CAPITAL (including inflation)	$0	$3,603,250	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($33,000)	($5,151,618)	($1,594,045)	($1,968,410)	($1,689,481)	($2,086,259)	($936,985)	($1,291,889)

Table 3B (page 2 of 4)
Scenario 3B: 20-Year NPV - Dense Phase Pumping to Business Park With No Revenues

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	580.69	580.87	574.21	572.59	591.13	579.52	581.32	572.32
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**4,428.40**	**5,009.27**	**5,583.48**	**6,156.07**	**6,747.20**	**7,326.72**	**7,908.04**	**8,480.36**

	2006	2007	2008	2009	2010	2011	2012	2013
Phase 1 Land Sales	$0							
Phase 2 Land Sales						$0		
Phase 3 Land Sales								
Phase 4 Land Sales								
Ash Sales to Concrete Market								
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$252,372**	**$259,817**	**$267,481**	**$275,372**	**$283,496**	**$291,859**	**$300,468**	**$309,332**

	2006	2007	2008	2009	2010	2011	2012	2013
Engineering				$33,000				
Dense Phase Pumping System O&M	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000
Bulldozer Operation	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000
Power Demand	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000
Dense Phase Pumping System Relocation		$300,000		$300,000		$300,000		$300,000
Drainage and sedimentation control	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Boral contract minimum payment								
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$954,000	$1,254,000	$954,000	$1,287,000	$954,000	$1,254,000	$954,000	$1,254,000
O&M (including inflation)	**$1,203,813**	**$1,629,051**	**$1,275,886**	**$1,772,019**	**$1,352,274**	**$1,829,954**	**$1,433,235**	**$1,939,513**

	2006	2007	2008	2009	2010	2011	2012	2013
Dense Phase Pumping System								
Subtotal (without inflation)	$0	$0	$0	$0	$0	$0	$0	$0
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

	2006	2007	2008	2009	2010	2011	2012	2013
NET CASH FLOW (including inflation)	**($951,442)**	**($1,369,234)**	**($1,008,405)**	**($1,496,647)**	**($1,068,778)**	**($1,538,095)**	**($1,132,766)**	**($1,630,181)**

Table 3B (page 3 of 4)

Scenario 3B: 20-Year NPV - Dense Phase Pumping to Business Park With No Revenues

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	473.58	492.12	492.12	492.12	492.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	573.58	592.12	592.12	592.12	592.12
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**9,053.94**	**9,646.06**	**10,238.18**	**10,830.30**	**11,422.42**
Phase 1 Land Sales					
Phase 2 Land Sales					
Phase 3 Land Sales					$0
Phase 4 Land Sales					
Ash Sales to Concrete Market					
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$318,458**	**$327,852**	**$337,524**	**$347,481**	**$357,731**
Engineering			$33,000		
Dense Phase Pumping System O&M	$300,000	$300,000	$300,000	$300,000	$300,000
Bulldozer Operation	$60,000	$60,000	$60,000	$60,000	$60,000
Power Demand	$75,000	$75,000	$75,000	$75,000	$75,000
Dense Phase Pumping System Relocation		$300,000		$300,000	
Drainage and sedimentation control	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil	$48,000	$48,000	$48,000	$48,000	$48,000
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Boral contract minimum payment					
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$954,000	$1,254,000	$987,000	$1,254,000	$954,000
O&M (including inflation)	**$1,519,043**	**$2,055,633**	**$1,665,680**	**$2,178,704**	**$1,706,379**
Dense Phase Pumping System					
Subtotal (without inflation)	$0	$0	$0	$0	$0
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($1,200,685)**	**($1,727,781)**	**($1,328,156)**	**($1,831,223)**	**($1,348,647)**

Table 3B (page 4 of 4)
Scenario 3B: 20-Year NPV - Dense Phase Pumping to Business Park With No Revenues

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)

Table 3C (page 1 of 4)
Scenario 3C: 20-Year NPV - Truck Ash to Business Park With $15-30K Revenues

	1998	1999	2000	2001	2002	2003	2004
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00
Ash Content		9%	9%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)		0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	579.16	579.16	572.41	574.21
CUMULATIVE ASH PLACED ON-SITE (1000's tons)		**479.40**	**952.81**	**1,531.97**	**2,111.13**	**2,683.54**	**3,257.75**
Phase 1 Land Sales @ $15,000/acre							
Phase 2 Land Sales @ $22,500/acre							
Phase 3 Land Sales @ $30,000/acre							
Phase 4 Land Sales							
Ash Sales to Concrete Market							
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$0**	**$205,900**	**$211,974**	**$218,227**	**$224,665**	**$231,293**	**$238,116**
Engineering	$33,000						$33,000
Drainage and sedimentation control		$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing		$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil		$48,000	$48,000	$48,000	$48,000	$48,000	$48,000
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$1,226,819	$1,226,819	$1,212,509	$1,216,325
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,521,629	$1,745,819	$1,745,819	$1,731,509	$1,768,325
O&M (including inflation)	**$33,000**	**$1,579,599**	**$1,612,730**	**$1,904,927**	**$1,961,122**	**$2,002,426**	**$2,105,330**
Subtotal (without inflation)							
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($33,000)**	**($1,373,699)**	**($1,400,755)**	**($1,686,700)**	**($1,736,457)**	**($1,771,134)**	**($1,867,215)**

Table 3C (page 2 of 4)
Scenario 3C: 20-Year NPV - Truck Ash to Business Park With $15-30K Revenues

	2005	2006	2007	2008	2009	2010	2011
Unit 1 Coal Consumption (1000's tons)	1,029.00	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,011.00	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00
Unit 3 Coal Consumption (1000's tons)	1,712.00	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00
Unit 4 Coal Consumption (1000's tons)	1,692.00	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00
Total Coal Consumption (1000's tons)	5,444.00	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00
Ash Content	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	544.40	534.10	534.30	526.90	525.10	545.70	532.80
Fly-Ash Production @ 90% (1000's tons)	489.96	480.69	480.87	474.21	472.59	491.13	479.52
Bottom Ash Production @ 10% (1000's tons)	54.44	53.41	53.43	52.69	52.51	54.57	53.28
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	489.96	480.69	480.87	474.21	472.59	491.13	479.52
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	589.96	580.69	580.87	574.21	572.59	591.13	579.52
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**3,847.71**	**4,428.40**	**5,009.27**	**5,583.48**	**6,156.07**	**6,747.20**	**7,326.72**
Phase 1 Land Sales @ $15,000/acre		$1,027,500					
Phase 2 Land Sales @ $22,500/acre							$969,750
Phase 3 Land Sales @ $30,000/acre							
Phase 4 Land Sales							
Ash Sales to Concrete Market							
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$1,227,500	$200,000	$200,000	$200,000	$200,000	$1,169,750
REVENUES (including inflation)	**$245,140**	**$1,548,932**	**$259,817**	**$267,481**	**$275,372**	**$283,496**	**$1,707,008**
Engineering					$33,000		
Drainage and sedimentation control	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000
Haul and cover silo ash (@ current contract rates)	$1,249,715	$1,230,063	$1,230,444	$1,216,325	$1,212,891	$1,252,196	$1,227,582
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,768,715	$1,749,063	$1,749,444	$1,735,325	$1,764,891	$1,771,196	$1,746,582
O&M (including inflation)	**$2,167,916**	**$2,207,071**	**$2,272,675**	**$2,320,836**	**$2,430,008**	**$2,510,630**	**$2,548,776**
Subtotal (without inflation)							
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($1,922,775)**	**($658,139)**	**($2,012,858)**	**($2,053,354)**	**($2,154,636)**	**($2,227,135)**	**($841,768)**

Table 3C (page 3 of 4)
Scenario 3C: 20-Year NPV - Truck Ash to Business Park With $15-30K Revenues

	2012	2013	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	909.00	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,015.00	1,011.00	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,715.00	1,508.00	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,709.00	1,699.00	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,348.00	5,248.00	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.80	524.80	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	481.32	472.32	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	53.48	52.48	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	481.32	472.32	473.58	492.12	492.12	492.12	492.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	581.32	572.32	573.58	592.12	592.12	592.12	592.12
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**7,908.04**	**8,480.36**	**9,053.94**	**9,646.06**	**10,238.18**	**10,830.30**	**11,422.42**
Phase 1 Land Sales @ $15,000/acre							
Phase 2 Land Sales @ $22,500/acre							
Phase 3 Land Sales @ $30,000/acre							$1,500,000
Phase 4 Land Sales							
Ash Sales to Concrete Market							
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$1,700,000
REVENUES (including inflation)	**$300,468**	**$309,332**	**$318,458**	**$327,852**	**$337,524**	**$347,481**	**$3,040,717**
Engineering					$33,000		
Drainage and sedimentation control	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000
Haul and cover silo ash (@ current contract rates)	$1,231,398	$1,212,318	$1,214,990	$1,254,294	$1,254,294	$1,254,294	$1,254,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,750,398	$1,731,318	$1,733,990	$1,773,294	$1,806,294	$1,773,294	$1,773,294
O&M (including inflation)	**$2,629,698**	**$2,677,763**	**$2,761,011**	**$2,906,891**	**$3,048,336**	**$3,080,928**	**$3,171,815**
Subtotal (without inflation)							
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($2,329,229)**	**($2,368,431)**	**($2,442,553)**	**($2,579,039)**	**($2,710,812)**	**($2,733,447)**	**($131,099)**

Table 3C (page 4 of 4)
Scenario 3C: 20-Year NPV - Truck Ash to Business Park With $15-30K Revenues

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)

Table 3D (page 1 of 4)

Scenario 3D: 20-Year NPV - Truck Ash to Business Park With $30-60K Revenues

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	579.16	579.16	572.41	574.21	589.96
CUMULATIVE ASH PLACED ON-SITE (1000's tons)		479.40	952.81	1,531.97	2,111.13	2,683.54	3,257.75	3,847.71
Phase 1 Land Sales @ $30,000/acre								
Phase 2 Land Sales @ $45,000/acre								
Phase 3 Land Sales @ $60,000/acre								
Phase 4 Land Sales								
Ash Sales to Concrete Market								
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	$0	$205,900	$211,974	$218,227	$224,665	$231,293	$238,116	$245,140
Engineering	$33,000						$33,000	
Drainage and sedimentation control		$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing		$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil		$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$1,226,819	$1,226,819	$1,212,509	$1,216,325	$1,249,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,521,629	$1,745,819	$1,745,819	$1,731,509	$1,768,325	$1,768,715
O&M (including inflation)	$33,000	$1,579,599	$1,612,730	$1,904,927	$1,961,122	$2,002,426	$2,105,330	$2,167,916
Subtotal (without inflation)								
CAPITAL (including inflation)	$0	$0	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($33,000)	($1,373,699)	($1,400,756)	($1,686,700)	($1,736,457)	($1,771,134)	($1,867,215)	($1,922,776)

Table 3D (page 2 of 4)
Scenario 3D: 20-Year NPV - Truck Ash to Business Park With $30-60K Revenues

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	580.69	580.87	574.21	572.59	591.13	579.52	581.32	572.32
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	4,428.40	5,009.27	5,583.48	6,156.07	6,747.20	7,326.72	7,908.04	8,480.36

	2006	2007	2008	2009	2010	2011	2012	2013
Phase 1 Land Sales @ $30,000/acre	$2,055,000							
Phase 2 Land Sales @ $45,000/acre						$1,939,500		
Phase 3 Land Sales @ $60,000/acre								
Phase 4 Land Sales								
Ash Sales to Concrete Market								
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without Inflation)	$2,255,000	$200,000	$200,000	$200,000	$200,000	$2,139,500	$200,000	$200,000
REVENUES (including inflation)	$2,845,492	$259,817	$267,481	$275,372	$283,496	$3,122,158	$300,468	$309,332

	2006	2007	2008	2009	2010	2011	2012	2013
Engineering					$33,000			
Drainage and sedimentation control	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000	$48,000
Haul and cover silo ash (@ current contract rates)	$1,230,063	$1,230,444	$1,216,325	$1,212,891	$1,252,196	$1,227,582	$1,231,398	$1,212,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without Inflation)	$1,749,063	$1,749,444	$1,735,325	$1,731,891	$1,804,196	$1,746,582	$1,750,398	$1,731,318
O&M (including Inflation)	$2,207,071	$2,272,675	$2,320,836	$2,384,672	$2,557,407	$2,548,776	$2,629,698	$2,677,763

	2006	2007	2008	2009	2010	2011	2012	2013
Subtotal (without Inflation)								
CAPITAL (including inflation)	$0	$0	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	$638,421	($2,012,858)	($2,053,354)	($2,109,200)	($2,273,911)	$573,382	($2,329,229)	($2,368,431)

Table 3D (page 3 of 4)

Scenario 3D: 20-Year NPV - Truck Ash to Business Park With $30-60K Revenues

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	473.58	492.12	492.12	492.12	492.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	573.58	592.12	592.12	592.12	592.12
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	9,053.94	9,646.06	10,238.18	10,830.30	11,422.42
Phase 1 Land Sales @ $30,000/acre					
Phase 2 Land Sales @ $45,000/acre					
Phase 3 Land Sales @ $60,000/acre					$3,000,000
Phase 4 Land Sales					
Ash Sales to Concrete Market					
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$3,200,000
REVENUES (including inflation)	$318,458	$327,852	$337,524	$347,481	$5,723,702
Engineering			$33,000		
Drainage and sedimentation control	$30,000	$30,000	$30,000	$30,000	$30,000
Grubbing	$25,000	$25,000	$25,000	$25,000	$25,000
Stockpile cover soil	$48,000	$48,000	$48,000	$48,000	$48,000
Haul and cover silo ash (@ current contract rates)	$1,214,990	$1,254,294	$1,254,294	$1,254,294	$1,254,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,733,990	$1,773,294	$1,806,294	$1,773,294	$1,773,294
O&M (including inflation)	$2,761,011	$2,906,891	$3,048,336	$3,080,928	$3,171,816
Subtotal (without inflation)					
CAPITAL (including inflation)	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($2,442,553)	($2,579,039)	($2,710,812)	($2,733,447)	$2,551,887

Table 3D (page 4 of 4)
Scenario 3D: 20-Year NPV - Truck Ash to Business Park With $30-60K Revenues

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)

Table 4A1 (page 1 of 4)
Scenario 4A: 20-Year NPV - Combustion Optimization and Truck Ash to Business Park at $3/ton Revenue

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)				200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	279.16	279.16	272.41	274.21	289.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	379.16	379.16	372.41	374.21	389.96
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)		**479.40**	**952.81**	**1,331.97**	**1,711.13**	**2,083.54**	**2,457.75**	**2,847.71**
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Unit Efficiency Improvements			$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market			$0	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$962,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600
REVENUES (including inflation)	**$0**	**$205,900**	**$1,020,231**	**$1,705,010**	**$1,755,308**	**$1,807,089**	**$1,860,398**	**$1,915,280**
Engineering	$33,000							
Drainage and sedimentation control		$30,000	$21,000	$21,000	$21,000	$21,000	$21,000	$21,000
Grubbing		$25,000	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil		$48,000	$33,600	$33,600	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$802,819	$802,819	$788,509	$792,325	$825,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,490,729	$1,290,919	$1,290,919	$1,276,609	$1,280,425	$1,313,815
O&M (including inflation)	**$33,000**	**$1,579,599**	**$1,579,980**	**$1,408,569**	**$1,450,122**	**$1,476,351**	**$1,524,447**	**$1,610,344**
Study			$35,000					
Mill Air/Fuel Measuring Device			$132,000					
Mill Classifier Blades and Deflector Skirt			$165,000					
Mill Rotating Throat and Deflector			$352,000					
Subtotal (without inflation)			$684,000					
CAPITAL (including inflation)	**$0**	**$0**	**$724,951**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($33,000)**	**($1,373,699)**	**($1,284,700)**	**$296,441**	**$305,186**	**$330,738**	**$335,951**	**$304,936**

Table 4A1 (page 2 of 4)
Scenario 4A: 20-Year NPV - Combustion Optimization and Truck Ash to Business Park at $3/ton Revenue

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	280.69	280.87	274.21	272.59	291.13	279.52	281.32	272.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	380.69	380.87	374.21	372.59	391.13	379.52	381.32	372.32
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**3,228.40**	**3,609.27**	**3,983.48**	**4,356.07**	**4,747.20**	**5,126.72**	**5,508.04**	**5,880.36**
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Unit Efficiency Improvements	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600
REVENUES (including inflation)	**$1,971,781**	**$2,029,948**	**$2,089,832**	**$2,151,482**	**$2,214,951**	**$2,280,292**	**$2,347,560**	**$2,416,813**
Engineering			$33,000					
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000	$21,000	$21,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)	$806,063	$806,444	$792,325	$788,891	$828,196	$803,582	$807,398	$788,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,294,163	$1,294,544	$1,313,425	$1,307,891	$1,316,296	$1,291,682	$1,295,498	$1,276,418
O&M (including inflation)	**$1,633,051**	**$1,681,722**	**$1,756,684**	**$1,800,783**	**$1,865,820**	**$1,884,943**	**$1,946,282**	**$1,974,187**
Study								
Mill Air/Fuel Measuring Device								
Mill Classifier Blades and Deflector Skirt								
Mill Rotating Throat and Deflector								
Subtotal (without inflation)								
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**$338,730**	**$348,227**	**$333,248**	**$350,699**	**$349,131**	**$395,348**	**$401,278**	**$442,626**

Table 4A1 (page 3 of 4)
Scenario 4A: 20-Year NPV - Combustion Optimization and Truck Ash to Business Park at $3/ton Revenue

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	273.58	292.12	292.12	292.12	292.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	373.58	392.12	392.12	392.12	392.12
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**6,253.94**	**6,646.06**	**7,038.18**	**7,430.30**	**7,822.42**
Phase 1 Land Sales					
Phase 2 Land Sales					
Phase 3 Land Sales					
Phase 4 Land Sales					
Unit Efficiency Improvements	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600
REVENUES (including inflation)	**$2,488,109**	**$2,561,508**	**$2,637,073**	**$2,714,867**	**$2,794,956**
Engineering			$33,000		
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600
Haul and cover silo ash (@ current contract rates)	$790,990	$830,294	$830,294	$830,294	$830,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,279,090	$1,318,394	$1,351,394	$1,349,294	$1,318,394
O&M (including inflation)	**$2,036,679**	**$2,161,192**	**$2,280,638**	**$2,344,269**	**$2,358,155**
Study					
Mill Air/Fuel Measuring Device					
Mill Classifier Blades and Deflector Skirt					
Mill Rotating Throat and Deflector					
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**$451,430**	**$400,317**	**$356,435**	**$370,598**	**$436,800**

Table 4A1 (page 4 of 4)
Scenario 4A: 20-Year NPV - Combustion Optimization and Truck Ash to Business Park at $3/ton Revenue

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
200.00	Ash Sold to Concrete Market (1000's tons)
$3.00	Net Revenue for Fly Ash Sales (per ton)
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)
7	Active Cell in Business Park (acres)

Table 4A2 (page 1 of 4)

Scenario 4A: 20-Year NPV - Combustion Optimization and Truck Ash to Business Park at $5/ton Revenue

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)				200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	279.16	279.16	272.41	274.21	289.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	379.16	379.16	372.41	374.21	389.96
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)		**479.40**	**952.81**	**1,331.97**	**1,711.13**	**2,083.54**	**2,457.75**	**2,847.71**
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Unit Efficiency Improvements			$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market			$0	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600
REVENUES (including inflation)	**$0**	**$205,900**	**$1,020,231**	**$2,141,464**	**$2,204,638**	**$2,269,674**	**$2,336,630**	**$2,405,560**
Engineering	$33,000							
Drainage and sedimentation control		$30,000	$21,000	$21,000	$21,000	$21,000	$21,000	$21,000
Grubbing		$25,000	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil		$48,000	$33,600	$33,600	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$802,819	$802,819	$788,509	$792,325	$825,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,490,729	$1,290,919	$1,290,919	$1,276,609	$1,280,425	$1,313,815
O&M (including inflation)	**$33,000**	**$1,579,599**	**$1,579,980**	**$1,408,569**	**$1,450,122**	**$1,476,351**	**$1,524,447**	**$1,610,344**
Study			$35,000					
Mill Air/Fuel Measuring Device			$132,000					
Mill Classifier Blades and Deflector Skirt			$165,000					
Mill Rotating Throat and Deflector			$352,000					
Subtotal (without inflation)			$684,000					
CAPITAL (including inflation)	**$0**	**$0**	**$724,951**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($33,000)**	**($1,373,699)**	**($1,284,700)**	**$732,895**	**$754,516**	**$793,323**	**$812,183**	**$795,216**

Table 4A2 (page 2 of 4)
Scenario 4A: 20-Year NPV - Combustion Optimization and Truck Ash to Business Park at $5/ton Revenue

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	280.69	280.87	274.21	272.59	291.13	279.52	281.32	272.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	380.69	380.87	374.21	372.59	391.13	379.52	381.32	372.32
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**3,228.40**	**3,609.27**	**3,983.48**	**4,356.07**	**4,747.20**	**5,126.72**	**5,508.04**	**5,880.36**
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Unit Efficiency Improvements	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600
REVENUES (including inflation)	**$2,476,524**	**$2,549,582**	**$2,624,794**	**$2,702,226**	**$2,781,942**	**$2,864,009**	**$2,948,497**	**$3,035,478**
Engineering			$33,000					
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000	$21,000	$21,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)	$806,063	$806,444	$792,325	$788,891	$828,196	$803,582	$807,398	$788,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,294,163	$1,294,544	$1,313,425	$1,307,891	$1,316,296	$1,291,682	$1,295,498	$1,276,418
O&M (including inflation)	**$1,633,051**	**$1,681,722**	**$1,756,584**	**$1,800,783**	**$1,865,820**	**$1,884,943**	**$1,946,282**	**$1,974,187**
Study								
Mill Air/Fuel Measuring Device								
Mill Classifier Blades and Deflector Skirt								
Mill Rotating Throat and Deflector								
Subtotal (without inflation)								
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**$843,473**	**$867,860**	**$868,211**	**$901,443**	**$916,122**	**$979,066**	**$1,002,215**	**$1,061,291**

Table 4A2 (page 3 of 4)

Scenario 4A: 20-Year NPV - Combustion Optimization and Truck Ash to Business Park at $5/ton Revenue

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	273.58	292.12	292.12	292.12	292.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	373.58	392.12	392.12	392.12	392.12
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**6,253.94**	**6,646.06**	**7,038.18**	**7,430.30**	**7,822.42**

	2014	2015	2016	2017	2018
Phase 1 Land Sales					
Phase 2 Land Sales					
Phase 3 Land Sales					
Phase 4 Land Sales					
Unit Efficiency Improvements	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600
REVENUES (including inflation)	**$3,125,024**	**$3,217,213**	**$3,312,120**	**$3,409,828**	**$3,510,418**

	2014	2015	2016	2017	2018
Engineering			$33,000		
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600
Haul and cover silo ash (@ current contract rates)	$790,990	$830,294	$830,294	$830,294	$830,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,279,090	$1,318,394	$1,351,394	$1,349,294	$1,318,394
O&M (including inflation)	**$2,036,679**	**$2,161,192**	**$2,280,838**	**$2,344,269**	**$2,358,155**

	2014	2015	2016	2017	2018
Study					
Mill Air/Fuel Measuring Device					
Mill Classifier Blades and Deflector Skirt					
Mill Rotating Throat and Deflector					
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**

	2014	2015	2016	2017	2018
NET CASH FLOW (including inflation)	**$1,088,345**	**$1,056,021**	**$1,031,482**	**$1,065,559**	**$1,152,263**

Table 4A2 (page 4 of 4)

Scenario 4A: 20-Year NPV - Combustion Optimization and Truck Ash to Business Park at $5/ton Revenue

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
200.00	Ash Sold to Concrete Market (1000's tons)
$5.00	Net Revenue for Fly Ash Sales (per ton)
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)
7	Active Cell in Business Park (acres)

Table 4B1 (page 1 of 4)
Scenario 4B: 20-Year NPV - Electrostatic Separation and Truck Ash to Business Park at $3/ton Revenue

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)				200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	279.16	279.16	272.41	274.21	289.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	379.16	379.16	372.41	374.21	389.96
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)		479.40	952.81	1,331.97	1,711.13	2,083.54	2,457.75	2,847.71
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Unit Efficiency Improvements			$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market			$0	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$962,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600
REVENUES (including inflation)	$0	$205,900	$1,020,231	$1,705,010	$1,755,308	$1,807,089	$1,860,398	$1,915,280
Engineering	$33,000							
Drainage and sedimentation control		$30,000	$21,000	$21,000	$21,000	$21,000	$21,000	$21,000
Grubbing		$25,000	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil		$48,000	$33,600	$33,600	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$802,819	$802,819	$788,509	$792,325	$825,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,490,729	$1,290,919	$1,290,919	$1,276,609	$1,280,425	$1,313,815
O&M (including inflation)	$33,000	$1,579,599	$1,579,980	$1,408,569	$1,450,122	$1,476,351	$1,524,447	$1,610,344
Electrostatic Separation System			$5,000,000					
Subtotal (without inflation)			$5,000,000					
CAPITAL (including inflation)	$0	$0	$5,299,351	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($33,000)	($1,373,699)	($5,859,100)	$296,441	$305,186	$330,738	$335,951	$304,936

Table 4B1 (page 2 of 4)
Scenario 4B: 20-Year NPV - Electrostatic Separation and Truck Ash to Business Park at $3/ton Revenue

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	280.69	280.87	274.21	272.59	291.13	279.52	281.32	272.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	380.69	380.87	374.21	372.59	391.13	379.52	381.32	372.32
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**3,228.40**	**3,609.27**	**3,983.48**	**4,356.07**	**4,747.20**	**5,126.72**	**5,508.04**	**5,880.36**
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Unit Efficiency Improvements	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without Inflation)	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600
REVENUES (including inflation)	**$1,971,781**	**$2,029,948**	**$2,089,832**	**$2,151,482**	**$2,214,951**	**$2,280,292**	**$2,347,660**	**$2,416,813**
Engineering			$33,000					
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000	$21,000	$21,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)	$806,063	$806,444	$792,325	$788,891	$828,196	$803,582	$807,398	$788,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,294,163	$1,294,544	$1,313,425	$1,307,891	$1,316,296	$1,291,682	$1,295,498	$1,276,418
O&M (including inflation)	**$1,633,051**	**$1,681,722**	**$1,756,684**	**$1,800,783**	**$1,865,820**	**$1,884,943**	**$1,946,282**	**$1,974,187**
Electrostatic Separation System								
Subtotal (without inflation)								
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**$338,730**	**$348,227**	**$333,248**	**$350,699**	**$349,131**	**$395,348**	**$401,278**	**$442,626**

Table 4B1 (page 3 of 4)
Scenario 4B: 20-Year NPV - Electrostatic Separation and Truck Ash to Business Park at $3/ton Revenue

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	273.58	292.12	292.12	292.12	292.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	373.58	392.12	392.12	392.12	392.12
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	6,253.94	6,646.06	7,038.18	7,430.30	7,822.42
Phase 1 Land Sales					
Phase 2 Land Sales					
Phase 3 Land Sales					
Phase 4 Land Sales					
Unit Efficiency Improvements	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600
REVENUES (including inflation)	$2,488,109	$2,561,508	$2,637,073	$2,714,867	$2,794,955
Engineering			$33,000		
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600
Haul and cover silo ash (@ current contract rates)	$790,990	$830,294	$830,294	$830,294	$830,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,279,090	$1,318,394	$1,351,394	$1,349,294	$1,318,394
O&M (including inflation)	$2,036,679	$2,161,192	$2,280,638	$2,344,269	$2,358,155
Electrostatic Separation System					
Subtotal (without inflation)					
CAPITAL (including inflation)	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	$451,430	$400,317	$356,435	$370,598	$436,800

Table 4B1 (page 4 of 4)
Scenario 4B: 20-Year NPV - Electrostatic Separation and Truck Ash to Business Park at $3/ton Revenue

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
200.00	Ash Sold to Concrete Market (1000's tons)
$3.00	Net Revenue for Fly Ash Sales (per ton)
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)
7	Active Cell in Business Park (acres)

Table 4B2 (page 1 of 4)
Scenario 4B: 20-Year NPV - Electrostatic Separation and Truck Ash to Business Park at $5/ton Revenue

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)				200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	279.16	279.16	272.41	274.21	289.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	379.16	379.16	372.41	374.21	389.96
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)		**479.40**	**952.81**	**1,331.97**	**1,711.13**	**2,083.54**	**2,457.75**	**2,847.71**
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Unit Efficiency Improvements			$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market			$0	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600
REVENUES (including inflation)	**$0**	**$205,900**	**$1,020,231**	**$2,141,464**	**$2,204,638**	**$2,269,674**	**$2,336,630**	**$2,405,660**
Engineering	$33,000							
Drainage and sedimentation control		$30,000	$21,000	$21,000	$21,000	$21,000	$21,000	$21,000
Grubbing		$25,000	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil		$48,000	$33,600	$33,600	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$802,819	$802,819	$788,509	$792,325	$825,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,490,729	$1,290,919	$1,290,919	$1,276,609	$1,280,425	$1,313,815
O&M (including inflation)	**$33,000**	**$1,579,699**	**$1,579,980**	**$1,408,569**	**$1,450,122**	**$1,476,351**	**$1,524,447**	**$1,610,344**
Electrostatic Separation System			$5,000,000					
Subtotal (without inflation)			$5,000,000					
CAPITAL (including inflation)	**$0**	**$0**	**$5,299,351**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($33,000)**	**($1,373,699)**	**($5,869,100)**	**$732,895**	**$754,516**	**$793,323**	**$812,183**	**$795,216**

Table 4B2 (page 2 of 4)
Scenario 4B: 20-Year NPV - Electrostatic Separation and Truck Ash to Business Park at $5/ton Revenue

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	280.69	280.87	274.21	272.59	291.13	279.52	281.32	272.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	380.69	380.87	374.21	372.59	391.13	379.52	381.32	372.32
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**3,228.40**	**3,609.27**	**3,983.48**	**4,356.07**	**4,747.20**	**5,126.72**	**5,508.04**	**5,880.36**
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Unit Efficiency Improvements	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600
REVENUES (including inflation)	**$2,476,524**	**$2,549,582**	**$2,624,794**	**$2,702,226**	**$2,781,942**	**$2,864,009**	**$2,948,497**	**$3,035,478**
Engineering			$33,000					
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000	$21,000	$21,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)	$806,063	$806,444	$792,325	$788,891	$828,196	$803,582	$807,398	$788,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,294,163	$1,294,544	$1,313,425	$1,307,891	$1,316,296	$1,291,682	$1,295,498	$1,276,418
O&M (including inflation)	**$1,633,051**	**$1,681,722**	**$1,756,584**	**$1,800,783**	**$1,865,820**	**$1,884,943**	**$1,946,282**	**$1,974,187**
Electrostatic Separation System								
Subtotal (without inflation)								
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**$843,473**	**$867,860**	**$868,211**	**$901,443**	**$916,122**	**$979,065**	**$1,002,215**	**$1,061,291**

Table 4B2 (page 3 of 4)
Scenario 4B: 20-Year NPV - Electrostatic Separation and Truck Ash to Business Park at $5/ton Revenue

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	273.58	292.12	292.12	292.12	292.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	373.58	392.12	392.12	392.12	392.12
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**6,253.94**	**6,646.06**	**7,038.18**	**7,430.30**	**7,822.42**
Phase 1 Land Sales					
Phase 2 Land Sales					
Phase 3 Land Sales					
Phase 4 Land Sales					
Unit Efficiency Improvements	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600
REVENUES (including inflation)	**$3,126,024**	**$3,217,213**	**$3,312,120**	**$3,409,828**	**$3,510,418**
Engineering			$33,000		
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600
Haul and cover silo ash (@ current contract rates)	$790,990	$830,294	$830,294	$830,294	$830,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,279,090	$1,318,394	$1,351,394	$1,349,294	$1,318,394
O&M (including inflation)	**$2,036,679**	**$2,161,192**	**$2,280,638**	**$2,344,269**	**$2,358,155**
Electrostatic Separation System					
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**$1,088,345**	**$1,056,021**	**$1,031,482**	**$1,065,559**	**$1,152,263**

Table 4B2 (page 4 of 4)
Scenario 4B: 20-Year NPV - Electrostatic Separation and Truck Ash to Business Park at $5/ton Revenue

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
200.00	Ash Sold to Concrete Market (1000's tons)
$5.00	Net Revenue for Fly Ash Sales (per ton)
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)
7	Active Cell in Business Park (acres)

Table 4C1 (page 1 of 4)
Scenario 4C: 20-Year NPV - Ash Reburn and Truck Ash to Business Park at $3/ton Revenue

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)				200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	279.16	279.16	272.41	274.21	289.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	379.16	379.16	372.41	374.21	389.96
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)		**479.40**	**952.81**	**1,331.97**	**1,711.13**	**2,083.54**	**2,457.75**	**2,847.71**
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Heat Recovery			$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market			$0	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$962,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600
REVENUES (including inflation)	**$0**	**$205,900**	**$1,020,231**	**$1,705,010**	**$1,755,308**	**$1,807,089**	**$1,860,398**	**$1,915,280**
Engineering	$33,000							
Drainage and sedimentation control		$30,000	$21,000	$21,000	$21,000	$21,000	$21,000	$21,000
Grubbing		$25,000	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil		$48,000	$33,600	$33,600	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$802,819	$802,819	$788,509	$792,325	$825,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,490,729	$1,290,919	$1,290,919	$1,276,609	$1,280,425	$1,313,815
O&M (including inflation)	**$33,000**	**$1,579,599**	**$1,579,980**	**$1,408,569**	**$1,450,122**	**$1,476,351**	**$1,524,447**	**$1,610,344**
Ash Reburn System			$10,000,000					
Subtotal (without inflation)			$10,000,000					
CAPITAL (including inflation)	**$0**	**$0**	**$10,598,703**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($33,000)**	**($1,373,699)**	**($11,158,451)**	**$296,441**	**$305,186**	**$330,738**	**$335,951**	**$304,936**

Table 4C1 (page 2 of 4)
Scenario 4C: 20-Year NPV - Ash Reburn and Truck Ash to Business Park at $3/ton Revenue

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	280.69	280.87	274.21	272.59	291.13	279.52	281.32	272.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	380.69	380.87	374.21	372.59	391.13	379.52	381.32	372.32
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	3,228.40	3,609.27	3,983.48	4,356.07	4,747.20	5,126.72	5,508.04	5,880.36
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Heat Recovery	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600
REVENUES (including inflation)	$1,971,781	$2,029,948	$2,089,832	$2,151,482	$2,214,951	$2,280,292	$2,347,560	$2,416,813
Engineering			$33,000					
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000	$21,000	$21,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)	$806,063	$806,444	$792,325	$788,891	$828,196	$803,582	$807,398	$788,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,294,163	$1,294,544	$1,313,425	$1,307,891	$1,316,296	$1,291,682	$1,295,498	$1,276,418
O&M (including inflation)	$1,633,051	$1,681,722	$1,766,584	$1,800,783	$1,865,820	$1,884,943	$1,946,282	$1,974,187
Ash Reburn System								
Subtotal (without inflation)								
CAPITAL (including inflation)	$0	$0	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	$338,730	$348,227	$333,248	$350,699	$349,131	$395,348	$401,278	$442,626

Table 4C1 (page 3 of 4)
Scenario 4C: 20-Year NPV - Ash Reburn and Truck Ash to Business Park at $3/ton Revenue

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	273.58	292.12	292.12	292.12	292.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	373.58	392.12	392.12	392.12	392.12
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	6,253.94	6,646.06	7,038.18	7,430.30	7,822.42
Phase 1 Land Sales					
Phase 2 Land Sales					
Phase 3 Land Sales					
Phase 4 Land Sales					
Heat Recovery	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,562,600	$1,562,600	$1,562,600	$1,562,600	$1,562,600
REVENUES (including inflation)	$2,488,109	$2,561,508	$2,637,073	$2,714,867	$2,794,965
Engineering			$33,000		
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600
Haul and cover silo ash (@ current contract rates)	$790,990	$830,294	$830,294	$830,294	$830,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,279,090	$1,318,394	$1,351,394	$1,349,294	$1,318,394
O&M (including inflation)	$2,036,679	$2,161,192	$2,280,638	$2,344,269	$2,358,165
Ash Reburn System					
Subtotal (without inflation)					
CAPITAL (including inflation)	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	$451,430	$400,317	$356,435	$370,598	$436,800

Table 4C1 (page 4 of 4)
Scenario 4C: 20-Year NPV - Ash Reburn and Truck Ash to Business Park at $3/ton Revenue

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
200.00	Ash Sold to Concrete Market (1000's tons)
$3.00	Net Revenue for Fly Ash Sales (per ton)
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)
7	Active Cell in Business Park (acres)

Table 4C2 (page 1 of 4)
Scenario 4C: 20-Year NPV - Ash Reburn and Truck Ash to Business Park at $5/ton Revenue

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)				200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	279.16	279.16	272.41	274.21	289.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	379.16	379.16	372.41	374.21	389.96
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)		479.40	952.81	1,331.97	1,711.13	2,083.54	2,457.75	2,847.71
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Heat Recovery			$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market			$0	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600
REVENUES (including inflation)	$0	$205,900	$1,020,231	$2,141,464	$2,204,638	$2,269,674	$2,336,630	$2,405,560
Engineering	$33,000							
Drainage and sedimentation control		$30,000	$21,000	$21,000	$21,000	$21,000	$21,000	$21,000
Grubbing		$25,000	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil		$48,000	$33,600	$33,600	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$802,819	$802,819	$788,509	$792,325	$825,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,490,729	$1,290,919	$1,290,919	$1,276,609	$1,280,425	$1,313,815
O&M (including inflation)	$33,000	$1,579,599	$1,579,980	$1,408,569	$1,450,122	$1,476,351	$1,524,447	$1,610,344
Ash Reburn System			$10,000,000					
Subtotal (without inflation)			$10,000,000					
CAPITAL (including inflation)	$0	$0	$10,598,703	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($33,000)	($1,373,699)	($11,158,451)	$732,895	$754,516	$793,323	$812,183	$795,216

Table 4C2 (page 2 of 4)
Scenario 4C: 20-Year NPV - Ash Reburn and Truck Ash to Business Park at $5/ton Revenue

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	280.69	280.87	274.21	272.59	291.13	279.52	281.32	272.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	380.69	380.87	374.21	372.59	391.13	379.52	381.32	372.32
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	3,228.40	3,609.27	3,983.48	4,356.07	4,747.20	5,126.72	5,508.04	5,880.36
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Heat Recovery	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600
REVENUES (including inflation)	$2,476,524	$2,549,582	$2,624,794	$2,702,226	$2,781,942	$2,864,009	$2,948,497	$3,035,478
Engineering			$33,000					
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000	$21,000	$21,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)	$806,063	$806,444	$792,325	$788,891	$828,196	$803,582	$807,398	$788,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,294,163	$1,294,544	$1,313,425	$1,307,891	$1,316,296	$1,291,682	$1,295,498	$1,276,418
O&M (including inflation)	$1,633,051	$1,681,722	$1,756,584	$1,800,783	$1,865,820	$1,884,943	$1,946,282	$1,974,187
Ash Reburn System								
Subtotal (without inflation)								
CAPITAL (including inflation)	$0	$0	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	$843,473	$867,860	$868,211	$901,443	$916,122	$979,066	$1,002,215	$1,061,291

Table 4C2 (page 3 of 4)
Scenario 4C: 20-Year NPV - Ash Reburn and Truck Ash to Business Park at $5/ton Revenue

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	273.58	292.12	292.12	292.12	292.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	373.58	392.12	392.12	392.12	392.12
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**6,253.94**	**6,646.06**	**7,038.18**	**7,430.30**	**7,822.42**
Phase 1 Land Sales					
Phase 2 Land Sales					
Phase 3 Land Sales					
Phase 4 Land Sales					
Heat Recovery	$762,600	$762,600	$762,600	$762,600	$762,600
Ash Sales to Concrete Market	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,962,600	$1,962,600	$1,962,600	$1,962,600	$1,962,600
REVENUES (including inflation)	**$3,125,024**	**$3,217,213**	**$3,312,120**	**$3,409,828**	**$3,510,418**
Engineering			$33,000		
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600
Haul and cover silo ash (@ current contract rates)	$790,990	$830,294	$830,294	$830,294	$830,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,279,090	$1,318,394	$1,351,394	$1,349,294	$1,318,394
O&M (including inflation)	**$2,036,679**	**$2,161,192**	**$2,280,638**	**$2,344,269**	**$2,358,155**
Ash Reburn System					
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**$1,088,345**	**$1,056,021**	**$1,031,482**	**$1,065,559**	**$1,152,263**

Table 4C2 (page 4 of 4)
Scenario 4C: 20-Year NPV - Ash Reburn and Truck Ash to Business Park at $5/ton Revenue

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
200.00	Ash Sold to Concrete Market (1000's tons)
$5.00	Net Revenue for Fly Ash Sales (per ton)
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)
7	Active Cell in Business Park (acres)

Table 4D1 (page 1 of 4)
Scenario 4D: 20-Year NPV - Carbon Flotation and Truck Ash to Business Park at $3/ton Revenue

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)				200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	279.16	279.16	272.41	274.21	289.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	379.16	379.16	372.41	374.21	389.96
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)		**479.40**	**952.81**	**1,331.97**	**1,711.13**	**2,083.64**	**2,457.75**	**2,847.71**
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Ash Sales to Concrete Market			$0	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$200,000	$800,000	$800,000	$800,000	$800,000	$800,000
REVENUES (including inflation)	**$0**	**$205,900**	**$211,974**	**$872,909**	**$898,660**	**$925,170**	**$952,463**	**$980,561**
Engineering	$33,000							
Drainage and sedimentation control		$30,000	$21,000	$21,000	$21,000	$21,000	$21,000	$21,000
Grubbing		$25,000	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil		$48,000	$33,600	$33,600	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$802,819	$802,819	$788,509	$792,325	$825,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,490,729	$1,290,919	$1,290,919	$1,276,609	$1,280,425	$1,313,815
O&M (including inflation)	**$33,000**	**$1,579,699**	**$1,579,980**	**$1,408,569**	**$1,450,122**	**$1,476,351**	**$1,524,447**	**$1,610,344**
Carbon Flotation System			$15,000,000					
Subtotal (without inflation)			$15,000,000					
CAPITAL (including inflation)	**$0**	**$0**	**$15,898,054**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($33,000)**	**($1,373,699)**	**($17,266,059)**	**($535,660)**	**($551,462)**	**($551,181)**	**($571,984)**	**($629,784)**

Table 4D1 (page 2 of 4)
Scenario 4D: 20-Year NPV - Carbon Flotation and Truck Ash to Business Park at $3/ton Revenue

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	280.69	280.87	274.21	272.59	291.13	279.52	281.32	272.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	380.69	380.87	374.21	372.59	391.13	379.52	381.32	372.32
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	3,228.40	3,609.27	3,983.48	4,356.07	4,747.20	5,126.72	5,508.04	5,880.36
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Ash Sales to Concrete Market	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$800,000	$800,000	$800,000	$800,000	$800,000	$800,000	$800,000	$800,000
REVENUES (including inflation)	$1,009,487	$1,039,267	$1,069,925	$1,101,488	$1,133,982	$1,167,436	$1,201,874	$1,237,329
Engineering			$33,000					
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000	$21,000	$21,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)	$806,063	$806,444	$792,325	$788,891	$828,196	$803,582	$807,398	$788,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,294,163	$1,294,544	$1,313,425	$1,307,891	$1,316,296	$1,291,682	$1,295,498	$1,276,418
O&M (including inflation)	$1,633,051	$1,681,722	$1,756,684	$1,800,783	$1,865,820	$1,884,943	$1,946,282	$1,974,187
Carbon Flotation System								
Subtotal (without inflation)								
CAPITAL (including inflation)	$0	$0	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($623,564)	($642,455)	($686,658)	($699,295)	($731,837)	($717,509)	($744,408)	($736,858)

Table 4D1 (page 3 of 4)
Scenario 4D: 20-Year NPV - Carbon Flotation and Truck Ash to Business Park at $3/ton Revenue

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	273.58	292.12	292.12	292.12	292.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	373.58	392.12	392.12	392.12	392.12
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**6,253.94**	**6,646.06**	**7,038.18**	**7,430.30**	**7,822.42**
Phase 1 Land Sales					
Phase 2 Land Sales					
Phase 3 Land Sales					
Phase 4 Land Sales					
Ash Sales to Concrete Market	$600,000	$600,000	$600,000	$600,000	$600,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$800,000	$800,000	$800,000	$800,000	$800,000
REVENUES (including inflation)	**$1,273,830**	**$1,311,408**	**$1,350,095**	**$1,389,923**	**$1,430,925**
Engineering			$33,000		
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600
Haul and cover silo ash (@ current contract rates)	$790,990	$830,294	$830,294	$830,294	$830,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,279,090	$1,318,394	$1,351,394	$1,349,294	$1,318,394
O&M (including inflation)	**$2,036,679**	**$2,161,192**	**$2,280,638**	**$2,344,269**	**$2,358,155**
Carbon Flotation System					
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($762,849)**	**($849,783)**	**($930,543)**	**($954,346)**	**($927,230)**

Table 4D1 (page 4 of 4)
Scenario 4D: 20-Year NPV - Carbon Flotation and Truck Ash to Business Park at $3/ton Revenue

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
200.00	Ash Sold to Concrete Market (1000's tons)
$3.00	Net Revenue for Fly Ash Sales (per ton)
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)
7	Active Cell in Business Park (acres)

Table 4D2 (page 1 of 4)
Scenario 4D: 20-Year NPV - Carbon Flotation and Truck Ash to Business Park at $5/ton Revenue

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Pond Ash Removed and Utilized (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)				200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)		379.40	373.41	279.16	279.16	272.41	274.21	289.96
Total "Pond" Ash Placed in Business Park per Year (1000's tons)		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)		479.40	473.41	379.16	379.16	372.41	374.21	389.96
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)		479.40	952.81	1,331.97	1,711.13	2,083.54	2,457.75	2,847.71
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Ash Sales to Concrete Market			$0	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000
REVENUES (including inflation)	$0	$205,900	$211,974	$1,309,364	$1,347,990	$1,387,756	$1,428,694	$1,470,841
Engineering	$33,000							
Drainage and sedimentation control		$30,000	$21,000	$21,000	$21,000	$21,000	$21,000	$21,000
Grubbing		$25,000	$17,500	$17,500	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil		$48,000	$33,600	$33,600	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)		$1,015,336	$1,002,629	$802,819	$802,819	$788,509	$792,325	$825,715
Additional 6" of cover soil		$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash		$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$33,000	$1,534,336	$1,490,729	$1,290,919	$1,290,919	$1,276,609	$1,280,425	$1,313,815
O&M (including inflation)	$33,000	$1,579,599	$1,579,980	$1,408,569	$1,450,122	$1,476,351	$1,524,447	$1,610,344
Carbon Flotation System			$15,000,000					
Subtotal (without inflation)			$15,000,000					
CAPITAL (including inflation)	$0	$0	$15,898,054	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($33,000)	($1,373,699)	($17,266,059)	($99,205)	($102,132)	($88,596)	($95,763)	($139,503)

Table 4D2 (page 2 of 4)
Scenario 4D: 20-Year NPV - Carbon Flotation and Truck Ash to Business Park at $5/ton Revenue

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	280.69	280.87	274.21	272.59	291.13	279.52	281.32	272.32
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	380.69	380.87	374.21	372.59	391.13	379.52	381.32	372.32
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**3,228.40**	**3,609.27**	**3,983.48**	**4,356.07**	**4,747.20**	**5,126.72**	**5,508.04**	**5,880.36**
Phase 1 Land Sales								
Phase 2 Land Sales								
Phase 3 Land Sales								
Phase 4 Land Sales								
Ash Sales to Concrete Market	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000
REVENUES (including inflation)	**$1,514,231**	**$1,558,901**	**$1,604,888**	**$1,652,232**	**$1,700,973**	**$1,751,152**	**$1,802,811**	**$1,855,994**
Engineering			$33,000					
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000	$21,000	$21,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500	$17,500	$17,500	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600	$33,600	$33,600	$33,600
Haul and cover silo ash (@ current contract rates)	$806,063	$806,444	$792,325	$788,891	$828,196	$803,582	$807,398	$788,318
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,294,163	$1,294,544	$1,313,425	$1,307,891	$1,316,296	$1,291,682	$1,295,498	$1,276,418
O&M (including inflation)	**$1,633,051**	**$1,681,722**	**$1,756,584**	**$1,800,783**	**$1,865,820**	**$1,884,943**	**$1,946,282**	**$1,974,187**
Carbon Flotation System								
Subtotal (without inflation)								
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($118,820)**	**($122,821)**	**($151,696)**	**($148,551)**	**($164,846)**	**($133,792)**	**($143,471)**	**($118,193)**

Table 4D2 (page 3 of 4)
Scenario 4D: 20-Year NPV - Carbon Flotation and Truck Ash to Business Park at $5/ton Revenue

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Pond Ash Removed and Utilized (1000's tons)	100.00	100.00	100.00	100.00	100.00
Ash Sold to Concrete Market per Year (1000's tons)	200.00	200.00	200.00	200.00	200.00
Total "Silo" Ash Placed in Business Park per Year (1000's tons)	273.58	292.12	292.12	292.12	292.12
Total "Pond" Ash Placed in Business Park per Year (1000's tons)	100.00	100.00	100.00	100.00	100.00
Total Ash Utilized in Business Park per Year (1000's tons)	373.58	392.12	392.12	392.12	392.12
CUMULATIVE ASH TO BUSINESS PARK (1000's tons)	**6,253.94**	**6,646.06**	**7,038.18**	**7,430.30**	**7,822.42**
Phase 1 Land Sales					
Phase 2 Land Sales					
Phase 3 Land Sales					
Phase 4 Land Sales					
Ash Sales to Concrete Market	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000
REVENUES (including inflation)	**$1,910,746**	**$1,967,113**	**$2,025,142**	**$2,084,884**	**$2,146,388**
Engineering			$33,000		
Drainage and sedimentation control	$21,000	$21,000	$21,000	$30,000	$21,000
Grubbing	$17,500	$17,500	$17,500	$25,000	$17,500
Stockpile cover soil	$33,600	$33,600	$33,600	$48,000	$33,600
Haul and cover silo ash (@ current contract rates)	$790,990	$830,294	$830,294	$830,294	$830,294
Additional 6" of cover soil	$16,000	$16,000	$16,000	$16,000	$16,000
Remove ponded ash	$400,000	$400,000	$400,000	$400,000	$400,000
Subtotal (without inflation)	$1,279,090	$1,318,394	$1,351,394	$1,349,294	$1,318,394
O&M (including inflation)	**$2,036,679**	**$2,161,192**	**$2,280,638**	**$2,344,269**	**$2,358,155**
Carbon Flotation System					
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($125,933)**	**($194,079)**	**($255,496)**	**($259,385)**	**($211,767)**

Table 4D2 (page 4 of 4)
Scenario 4D: 20-Year NPV - Carbon Flotation and Truck Ash to Business Park at $5/ton Revenue

ON-SITE STRUCTURAL FILL STORAGE CAPACITY

Project Phase	Site Area (acres)	Storage Volume (1000's tons)	Cumulative Storage Volume (1000's tons)
1	68.5	4025.65	4025.65
2	43.1	3168.73	7194.38
3	50.0	4130.92	11325.30
4	43.8	728.32	12053.62

ASSUMPTIONS

2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
200.00	Ash Sold to Concrete Market (1000's tons)
$5.00	Net Revenue for Fly Ash Sales (per ton)
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)
7	Active Cell in Business Park (acres)

Table 5A (page 1 of 4)

Scenario 5A: 20-Year NPV - Raise Dike to El. 820, Upgrade Sluicing System, Add Secondary Cell, and Sluice Ash to Basin

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Ash Sold to Concrete Market per Year (1000's tons)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Ash to Basin per Year (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
CUMULATIVE ASH PLACED ON-SITE (1000's tons)		421.56	836.46	1,368.86	1,901.26	2,426.16	2,953.06	3,497.46
Ash Sales to Concrete Market								
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	$0	$205,900	$211,974	$218,227	$224,665	$231,293	$238,116	$245,140
Ash Sluice System Maintenance			$293,000	$293,000	$293,000	$293,000	$293,000	$293,000
Boral contract minimum payment		$750,000	$750,000	$750,000	$750,000	$750,000		
Subtotal (without inflation)	$0	$750,000	$1,043,000	$1,043,000	$1,043,000	$1,043,000	$293,000	$293,000
O&M (including inflation)	$0	$772,125	$1,105,445	$1,138,055	$1,171,628	$1,206,191	$348,840	$359,130
Engineering		$100,000						
Geotechnical Study		$75,000						
Upgrade Ash Sluice System		$869,000						
Secondary Cell Construction		$15,080,000						
Rebuild Bottom Ash Sales Facility		$250,000						
Subtotal (without inflation)		$16,374,000						
CAPITAL (including inflation)	$0	$16,857,033	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	$0	($17,423,258)	($893,471)	($919,828)	($946,963)	($974,898)	($110,724)	($113,990)

Table 5A (page 2 of 4)

Scenario 5A: 20-Year NPV - Raise Dike to El. 820, Upgrade Sluicing System, Add Secondary Cell, and Sluice Ash to Basin

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Ash to Basin per Year (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	4,031.56	4,565.86	5,092.76	5,617.86	6,163.56	6,696.36	7,231.16	7,755.96
Ash Sales to Concrete Market								
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	$252,372	$259,817	$267,481	$275,372	$283,496	$291,859	$300,468	$309,332
Ash Sluice System Maintenance	$293,000	$293,000	$293,000	$293,000	$293,000	$293,000		
Boral contract minimum payment								
Subtotal (without inflation)	$293,000	$293,000	$293,000	$293,000	$293,000	$293,000	$0	$0
O&M (including inflation)	$369,725	$380,632	$391,860	$403,420	$415,321	$427,573	$0	$0
Engineering								
Geotechnical Study								
Upgrade Ash Sluice System								
Secondary Cell Construction								
Rebuild Bottom Ash Sales Facility								
Subtotal (without inflation)								
CAPITAL (including inflation)	$0	$0	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	($117,353)	($120,815)	($124,379)	($128,048)	($131,825)	($135,714)	$300,468	$309,332

Table 5A (page 3 of 4)

Scenario 5A: 20-Year NPV - Raise Dike to El. 820, Upgrade Sluicing System, Add Secondary Cell, and Sluice Ash to Basin

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00
Total Ash to Basin per Year (1000's tons)	526.20	546.80	546.80	546.80	546.80
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	8,282.16	8,828.96	9,375.76	9,922.56	10,469.36
Ash Sales to Concrete Market					
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	$318,458	$327,852	$337,524	$347,481	$357,731
Ash Sluice System Maintenance					
Boral contract minimum payment					
Subtotal (without inflation)	$0	$0	$0	$0	$0
O&M (including inflation)	$0	$0	$0	$0	$0
Engineering					
Geotechnical Study					
Upgrade Ash Sluice System					
Secondary Cell Construction					
Rebuild Bottom Ash Sales Facility					
Subtotal (without inflation)					
CAPITAL (including inflation)	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	$318,458	$327,852	$337,524	$347,481	$357,731

Table 5A (page 4 of 4)
Scenario 5A: 20-Year NPV - Raise Dike to El. 820, Upgrade Sluicing System, Add Secondary Cell, and Sluice Ash to Basin

ASSUMPTIONS	
2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)

Table 5B (page 1 of 4)
Scenario 5B: 20-Year NPV - Raise Dike to El. 824, Upgrade Sluicing System, and Sluice Ash to Basin

	1998	1999	2000	2001	2002	2003	2004	2005
Unit 1 Coal Consumption (1000's tons)		891.00	865.00	1,026.00	901.00	1,022.00	1,028.00	1,029.00
Unit 2 Coal Consumption (1000's tons)		913.00	897.00	887.00	1,006.00	1,010.00	1,013.00	1,011.00
Unit 3 Coal Consumption (1000's tons)		1,325.00	1,582.00	1,714.00	1,712.00	1,510.00	1,721.00	1,712.00
Unit 4 Coal Consumption (1000's tons)		1,555.00	1,266.00	1,697.00	1,705.00	1,707.00	1,507.00	1,692.00
Total Coal Consumption (1000's tons)		4,684.00	4,610.00	5,324.00	5,324.00	5,249.00	5,269.00	5,444.00
Ash Content		9%	9%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
Fly-Ash Production @ 90% (1000's tons)		379.40	373.41	479.16	479.16	472.41	474.21	489.96
Bottom Ash Production @ 10% (1000's tons)		42.16	41.49	53.24	53.24	52.49	52.69	54.44
Ash Sold to Concrete Market per Year (1000's tons)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Ash to Basin per Year (1000's tons)		421.56	414.90	532.40	532.40	524.90	526.90	544.40
CUMULATIVE ASH PLACED ON-SITE (1000's tons)		421.56	836.46	1,368.86	1,901.26	2,426.16	2,953.06	3,497.46
Ash Sales to Concrete Market								
Bottom Ash Sales		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	$0	$205,900	$211,974	$218,227	$224,665	$231,293	$238,116	$245,140
Ash Sluice System Maintenance			$293,000	$293,000	$293,000	$293,000	$293,000	$293,000
Boral contract minimum payment		$750,000	$750,000	$750,000	$750,000	$750,000		
Subtotal (without inflation)	$0	$750,000	$1,043,000	$1,043,000	$1,043,000	$1,043,000	$293,000	$293,000
O&M (including inflation)	$0	$772,125	$1,105,445	$1,138,055	$1,171,628	$1,206,191	$348,840	$359,130
Engineering		$100,000						
Geotechnical Study		$150,000						
Upgrade Ash Sluice System		$869,000						
Secondary Cell Construction		$10,000,000						
Rebuild Bottom Ash Sales Facility		$250,000						
Subtotal (without inflation)		$11,369,000						
CAPITAL (including inflation)	$0	$11,704,386	$0	$0	$0	$0	$0	$0
NET CASH FLOW (including inflation)	$0	($12,270,611)	($893,471)	($919,828)	($946,963)	($974,898)	($110,724)	($113,990)

Table 5B (page 2 of 4)
Scenario 5B: 20-Year NPV - Raise Dike to El. 824, Upgrade Sluicing System, and Sluice Ash to Basin

	2006	2007	2008	2009	2010	2011	2012	2013
Unit 1 Coal Consumption (1000's tons)	1,029.00	905.00	1,033.00	1,027.00	1,030.00	1,030.00	909.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	889.00	1,012.00	1,015.00	1,010.00	1,009.00	890.00	1,015.00	1,011.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,513.00	1,713.00	1,717.00	1,704.00	1,715.00	1,508.00
Unit 4 Coal Consumption (1000's tons)	1,706.00	1,709.00	1,708.00	1,501.00	1,701.00	1,704.00	1,709.00	1,699.00
Total Coal Consumption (1000's tons)	5,341.00	5,343.00	5,269.00	5,251.00	5,457.00	5,328.00	5,348.00	5,248.00
Ash Content	10%	10%	10%	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
Fly-Ash Production @ 90% (1000's tons)	480.69	480.87	474.21	472.59	491.13	479.52	481.32	472.32
Bottom Ash Production @ 10% (1000's tons)	53.41	53.43	52.69	52.51	54.57	53.28	53.48	52.48
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Ash to Basin per Year (1000's tons)	534.10	534.30	526.90	525.10	545.70	532.80	534.80	524.80
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**4,031.56**	**4,565.86**	**5,092.76**	**5,617.86**	**6,163.56**	**6,696.36**	**7,231.16**	**7,755.96**
Ash Sales to Concrete Market								
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$252,372**	**$259,817**	**$267,481**	**$275,372**	**$283,496**	**$291,859**	**$300,468**	**$309,332**
Ash Sluice System Maintenance	$293,000	$293,000	$293,000	$293,000	$293,000	$293,000	$293,000	$293,000
Boral contract minimum payment								
Subtotal (without inflation)	$293,000	$293,000	$293,000	$293,000	$293,000	$293,000	$293,000	$293,000
O&M (including inflation)	**$369,725**	**$380,632**	**$391,860**	**$403,420**	**$415,321**	**$427,573**	**$440,186**	**$453,172**
Engineering								
Geotechnical Study								
Upgrade Ash Sluice System								
Secondary Cell Construction								
Rebuild Bottom Ash Sales Facility								
Subtotal (without inflation)								
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($117,353)**	**($120,815)**	**($124,379)**	**($128,048)**	**($131,825)**	**($135,714)**	**($139,718)**	**($143,840)**

Table 5B (page 3 of 4)
Scenario 5B: 20-Year NPV - Raise Dike to El. 824, Upgrade Sluicing System, and Sluice Ash to Basin

	2014	2015	2016	2017	2018
Unit 1 Coal Consumption (1000's tons)	1,030.00	1,030.00	1,030.00	1,030.00	1,030.00
Unit 2 Coal Consumption (1000's tons)	1,012.00	1,012.00	1,012.00	1,012.00	1,012.00
Unit 3 Coal Consumption (1000's tons)	1,717.00	1,717.00	1,717.00	1,717.00	1,717.00
Unit 4 Coal Consumption (1000's tons)	1,503.00	1,709.00	1,709.00	1,709.00	1,709.00
Total Coal Consumption (1000's tons)	5,262.00	5,468.00	5,468.00	5,468.00	5,468.00
Ash Content	10%	10%	10%	10%	10%
Total Ash Production (1000's tons)	526.20	546.80	546.80	546.80	546.80
Fly-Ash Production @ 90% (1000's tons)	473.58	492.12	492.12	492.12	492.12
Bottom Ash Production @ 10% (1000's tons)	52.62	54.68	54.68	54.68	54.68
Ash Sold to Concrete Market per Year (1000's tons)	0.00	0.00	0.00	0.00	0.00
Total Ash to Basin per Year (1000's tons)	526.20	546.80	546.80	546.80	546.80
CUMULATIVE ASH PLACED ON-SITE (1000's tons)	**8,282.16**	**8,828.96**	**9,375.76**	**9,922.56**	**10,469.36**
Ash Sales to Concrete Market					
Bottom Ash Sales	$200,000	$200,000	$200,000	$200,000	$200,000
Subtotal (without inflation)	$200,000	$200,000	$200,000	$200,000	$200,000
REVENUES (including inflation)	**$318,458**	**$327,852**	**$337,524**	**$347,481**	**$357,731**
Ash Sluice System Maintenance	$293,000	$293,000	$293,000	$293,000	$293,000
Boral contract minimum payment					
Subtotal (without inflation)	$293,000	$293,000	$293,000	$293,000	$293,000
O&M (including inflation)	**$466,540**	**$480,303**	**$494,472**	**$509,059**	**$524,076**
Engineering					
Geotechnical Study					
Upgrade Ash Sluice System					
Secondary Cell Construction					
Rebuild Bottom Ash Sales Facility					
Subtotal (without inflation)					
CAPITAL (including inflation)	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH FLOW (including inflation)	**($148,083)**	**($152,451)**	**($156,949)**	**($161,579)**	**($166,345)**

Table 5B (page 4 of 4)
Scenario 5B: 20-Year NPV - Raise Dike to El. 824, Upgrade Sluicing System, and Sluice Ash to Basin

ASSUMPTIONS	
2.95%	Inflation
9.00%	Ash Content - Regulated Market
10.00%	Ash Content - Deregulated Market
$3,000.00	Drainage and sedimentation control (per acre)
$2,500.00	Grubbing (per acre)

RESEARCH AND DEVELOPMENT

Utilization of coal ash continues to be a research objective of the Research and Development Department of Duke Energy. Plant operating conditions-such as use of fuel additives, boiler types, emission control technologies, and alternative or blended fuels-all influence the form and properties of coal combustion by-products (CCBs). Through tailored collaboration studies and continued support of research projects with the Electric Power Research Institute (EPRI), the influence these changes have on wastestreams and utilization of ash can be determined. Wastestreams of Marshall have been characterized and evaluated as part of EPRI research projects. The following is a brief description of coal ash issues and a status of on-going and past EPRI supported research pertinent to coal ash utilization.

Issues

Each year the electric utility industry generates almost 90 million tons of coal ash and scrubber sludge. These combustion by-products can be reused commercially in building materials, highway construction, and manufacturing, yet only a quarter of the volume generated is currently sold. The majority of coal combustion by-products (CCBs) are still relegated to ponds and landfills at an annual cost of about $1 billion. Beyond the immediate expense, disposal carries the risk of future liability for groundwater contamination or ash pond runoff. Laws seeking to safeguard against soil and groundwater contamination such as the Resource Conservation and Recovery Act (RCRA), "Superfund," community right-to-know statutes, toxics release inventory reporting requirements, and state and local groundwater protection regulations have helped spur initiatives to protect the environment and promote the reuse of material. This regulatory climate provides a strong incentive for utilities to examine new approaches for managing CCBs to promote reuse. There are many technical and economic considerations influencing the use of CCBs from fossil-fired power plants, including 1) limited availability of disposal sites and restrictions on their use; 2) increased by-product transportation costs due to longer haul distances; 3) competing materials for reuse applications in the marketplace; 4) limited commercial experience with the material; 5) variability of the by-product impacting reuse options; and 6) impact of installation of post-combustion NOx controls on product quality. Reuse options must also be evaluated to minimize potential product liability.

EPRI Solutions

EPRI's Combustion By-Product Use Target unifies the utility industry effort to convert CCBs from a financial and environmental liability to an asset, and thus help utilities reduce disposal cost and associated future liabilities. By expanding the array of uses for ash and sludge, this target provides economic benefits to utilities by increasing both the volume and profit margin of by-product sales.

Research by this target provides electric utilities with information and tools to support decisions on increasing the utilization of CCBs. The research encompasses work on evaluating the environmental performance of CCBs in field structural applications; on CCBs as a soil amendment to improve textural and structural characteristics of soils; on CCBs as a soil amendment mixed with organic materials (e.g., sewage sludge) for agriculture and land reclamation (e.g., strip mines); on beneficiating high-carbon or ammonia-contaminated fly ashes; and on high-value use of specific fly ash components such as cenospheres and applications in metal matrix composites. Research will be conducted both in the laboratory and in the field.

Throughout the course of this work, EPRI emphasizes cooperation with other industries and government partners. As well as leveraging costs, this collaborative approach accelerates commercialization and regulatory acceptance of new products. This target delivers information and tools that can be used by the industry to increase the utilization of CCBs in construction, agriculture, and land reclamation of disturbed and mined lands. Increased CCB use has the potential to decrease disposal costs and generate revenue. The benefits that accrue from investing in this target range from O&M savings that improve a company's competitive position to fostering a cleaner environment and a "green" public image. CCBs can also be used to support utility greenhouse emission reduction goals by offsetting the emissions of $CO2$ produced in cement manufacture. For example, for each ton of coal ash used to displace portland cement, 0.95 tons of $CO2$ emissions are eliminated.

In seeking new markets or increased use in existing markets, EPRI assigns priority to applications that consume large quantities of ash, tolerate a wide range of ash characteristics, avoid disposal costs, and generate revenue (or incur minimal cost) for utilities. A secondary effort aims to develop high-value CCB uses despite initially low-volume market potential. In addition, use of CCBs in many of these applications can help a utility's customers (e.g., foundries, automotive plants, battery manufacturers) improve their competitive position and therefore help the utility retain them as customers. New and enhanced applications are pursued through industry partnerships, leveraged by government or other external sources, and subsequently demonstrated through similar industry/end-user/government cooperative mechanisms. Such a program can establish alliances to jump-start commercialization and deal effectively with regulatory and institutional barriers. Some of these uses for CCBs could become commercial business opportunities as well (e.g., autoclaved aerated concrete manufacture, or Ashalloys™ for auto parts).

1997 EPRI Products Available

EPRI Product/Deliverable	**Date**	**% Complete**	**Orderable Number / Comments**
Guidelines for highway applications of clean coal by-products	8/30/97	100	TR-108403.
Report on ash-derived aluminum composites for autos	9/16/97	100	TR-108531.
Lightweight high volume fly ash concrete (final report)	1/30/97	100	TR-107685 presented to American Concrete Institute Conference in October.
Interim guidelines for control of alkali-aggregate expansion	12/22/97	100	TR-109132.

EPRI Product/Deliverable	Date	% Complete	Orderable Number / Comments
in concrete			
Manual on high-carbon ash applications	2/28/97	100	TR-106747.
Preliminary technology assessment report on dry triboelectrostatic separation processes	12/12/97	100	TR-109016.
Evaluation Report of Bench Scale (5 to 20 #/hr) process for continuous triboelectrostatic separation of high LOI ash; Engineering & Econ Report	1998/99	15	Continuous separation lab-scale unit fabricated. Work stopped due to budget reduction.
Report on ash-derived lead composites for batteries	12/2/97	100	TR-109042.
Final demonstration report on NSP spray dryer ash use in road-based construction	9/29/97	100	TR-108402. This was a part of a large project, with over 15 reports.
Guidelines for Control of Acid Mine Drainage Using Flyash and FBC materials (TC)	1999	10	Construction contract awarded. Injection to start 3/98.
Advanced Autoclaved Aerated Concrete Product Development	1999	80	Project initiated to prepare design guides for reinforced AAC. Also providing marketing assistance.
Guide for Manufacture of High-Volume Fly Ash Blended Cement	1999	20	An interim report on Phase 2, deferred to 1999 due to budget shortfall. Work on Phase 1 report restarted 1/98. Draft due 4/98.
Salt-scaling of High Volume Fly Ash Concrete Protection Guide	6/30/98	70	This project is 50% cofunded with CANMET. Work suspended in late 1997 due to budget shortfall.
Guide for Using Ash to Control Alkali-Aggregate Expansion in Concrete.	12/23/97 12/31/98	80	This international consortium project is conducted by CANMET for 20 member organizations. TR-109132 published on Class F (bituminous) ashes. 1998 guide will add Class C ashes.
Ash-derived lead matrix application reports for use in lead-acid batteries. (TC)	12/31/98	75	Deliverable is annual update, TR-109402. Preliminary lab results show no interference with battery electrochemistry.

EPRI Product/Deliverable	Date	% Complete	Orderable Number / Comments
Assessment of Concrete Containing High Carbon Content Wood Ash for Commercial Application and ASTM Standard Development. (TC)	6/30/98	80	TC Project with Southern Company & Univ of Alabama at Birmingham. Draft report expected 2/98.

Pre-1997 EPRI Products Available

- **Ash Use in Building Materials**
  A summary of information on by-product use alternatives, including applications in cement and concrete

  - TR-105812, Environmental and Physical properties of Autoclaved Cellular Concrete, May 1996.
  - TR-105527, Laboratory Characterization of Atmospheric Fluidized-Bed Combustion By-Products, September 1995.
  - TR-105236, Use of FGD Gypsum and Building Ash in Roadway and Building Construction, August 1995.
  - TR-104657, Proceedings, 11th International Symposium on Use and Management of Coal Combustion By-Products (CCBs), 2 vols., January 1995.
  - TR-103856, Use of FGD Gypsum and Bottom Ash in Roadway and Building Construction, July 1994.
  - TR-103652, The Gypsum Industry and FGD Gypsum Utilization: A Utility Guide, March 1994.
  - TR-103151, Investigation of High-Volume Fly Ash Concrete Systems, October 1993.
  - TR-101774, Proceedings: Tenth International Ash Use Symposium, 2 vols., February 1993.
  - TR-101686, Institutional Constraints to Coal Fly Ash Use in Construction, December 1992.
  - TR-100707, Utilization of Coal Combustion By-Products for Masonry Construction, May 1992.
  - TR-100577, Supplemental Proceedings: Fourth International Conference on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, April 1992.
  - TR-100563, Low-Cost Ash-Derived Construction Materials, April 1992.
  - TR-100473, High-Volume Fly Ash Concrete Technology, April 1992.
  - GS-7122, AFBC No-Cement Concrete Potential, Part 2: Microstructure, January 1991.
  - GS-6129, Ash-in-Concrete Model Development, January 1989.
  - CS-6100, Laboratory Testing of Fly Ash Slurry, December 1988.
  - CS-5116, Classification of Fly Ash for Use in Cement and Concrete, April 1987.

- EPRI Project Prospectus, Preserving and Expanding Cement Markets for Utility Coal Fly Ash, October 1995.
- Electric Power Research Institute, "Fly Ash ACC Block Nearing Commercialization," Combustion By-Product Utilization Research, Vol. 11, No. 1, August 1994.
- Innovators, Delmarva Ash Management Program Increases Revenue, Avoids Landfill Construction, IN-104354, November 1994.
- Innovators, Coal Ash Management Benefits Environment, Wisconsin Electric, IN-103091, December 1993.
- First Use, Flowable Fly Ash Cuts Cost of Constructing Cooling Tower, FS9023, June 1990.

- **Ash Use in Highway Construction**
  Demonstration of high-volume coal ash utilization projects and design/construction manuals

  - TR-105527, Laboratory Characterization of Atmospheric Fluidized-Bed Combustion By-Products, September 1995.
  - TR-103856, Use of FGD Gypsum and Bottom Ash in Roadway and Building Construction, July 1994.
  - TR-101774, Proceedings: Tenth International Ash Use Symposium, 2 vols., February 1993.
  - TR-100472, Fly Ash Design Manual for Road and Site Applications, Vol. 1: Dry or Conditioned Placement, Vol. 2: Slurried Placement, April 1992.
  - The following reports summarize highway construction projects using coal ash: TR-100328, Kansas, January 1992. GS-7175, Michigan, February 1991. GS-6540, Delaware, November 1989. GS-6481, Delaware, August 1989. GS-6460, Kansas, August 1989. GS-6431, Pennsylvania, June 1989. GS-6175, Georgia, February 1989. GS-6155, Michigan, January 1989. CS-5225, Georgia, June 1987.
  - CS-6100, Laboratory Testing of Fly Ash Slurry, December 1988.
  - CS-5981, Fly Ash Construction Manual for Road and Site Application, 2 vols., October 1988.
  - CS-4446, High-Volume Fly Ash Utilization Projects in the United States and Canada, February 1986.
  - Innovators, Delmarva Ash Management Program Increases Revenue, Avoids Landfill Construction, IN-104354, November 1994.
  - First Use, High-Volume Ash Utilization in Highway Applications, FS9012, March 1990.
  - Technical Brief, Environmental Performance Assessment of Coal Ash Use Sites, TB-103178, November 1993.
  - EPRI videotape, The Coal Ash Phoenix, GS90-03.
  - EPRI videotape, Ash: A New Road to Lower Construction Costs, CC87-05, April, 1988.

- **Ash Use in Manufacturing**
  Potential high revenue markets for ash-based products

  - TR-106168, Casting of Ashalloy™ Metal Matrix Composites: 1994 Annual Report, May 1996.
  - TR-105822, Casting of Ashalloy™ Metal Matrix Composites: 1993 Annual Report, May 1996.
  - TR-104409, Solidification Processing of Metal Matrix-Fly Ash Particle Composites, October 1994.
  - TR-101774, Proceedings: Tenth International Ash Use Symposium, 2 vols., February 1993.
  - GS-7059, Market Opportunities For Fly Ash Fillers in North America, November 1990.
  - CS-5982, Evaluation of Pozzolanic Applications for Leached Fly Ash, August 1988.
  - CS-4765, Evaluation of Plastic Filler Applications for Leached Fly Ash, September 1986.
  - CS-4384, Recovery of Metal Oxides From Fly Ash Including Ash Beneficiation Products, 3 vols., February 1986.

- **Carbon Burn-Out Process for Ash Carbon Reduction**
  A fluidized-bed process for combusting residual carbon in fly ash to improve ash marketability

  - TR-106061, Evaluation of Carbon Burn-Out Technology Applied to Roll Mill Ash, May 1996.
  - TR-105825, Fly Ash Carbon Burn-Out at TVA's Albert and Shawnee Stations: Site Specific Application Study, May 1996.
  - TR-102429, Fly Ash Beneficiation by Carbon Burn-Out, May 1996.
  - Boyd and J.W. Cochran, "Beneficiation of Fly Ash By Carbon Burn Out," 10th International Coal Ash Use Symposium, American Coal Ash Association, Inc., January 1993.
  - Boyd, J.W. Cochran, and P. Hay, "Fly Ash Beneficiation by Carbon Burn-Out," American Power Conference, April 1994.
  - Technical Brief, Recent Results From Fly Ash Beneficiation by Carbon Burn-Out, TB-103832, July 1994.
  - Technical Brief, Fly Ash Beneficiation by Carbon Burn-Out, TB-101714, December 1992.

- **Disposal of High-Volume Combustion Wastes**
  Guides to the disposal of coal ash and flue gas desulfurization (FGD) by-products

  - TR-102367, The Effects of Flue Gas Desulfurization (FGD) System Additives on Solid By-Products, December 1995.

- TR-105527, Laboratory Characterization of Atmospheric Fluidized-Bed Combustion By-Products, September 1995.
- TR-104731, FGD By-Product Disposal Manual, 4th ed., August 1995.
- TR-104137, Coal Ash Disposal Manual, 3rd ed., January 1995.
- TR-103958, Organic and Inorganic Hazardous Waste Stabilization Using Coal Combustion By-Product Materials, September 1994.
- TR-103915, Sodium-Based Flue Gas Desulfurization Sludge Disposal Ponds, April 1994.
- TR-103914, Calcium-Based Flue Gas Desulfurization Sludge Disposal Ponds, April 1994.
- TR-103652, The Gypsum Industry and Flue Gas Desulfurization (FGD) Gypsum Utilization: A Utility Guide, February 1994.
- TR-103298, Land Application of Coal Combustion By-Products, June 1995.
- TR-102575, Analysis of Markets for Coal Combustion By-Products Use in Agriculture and Land Reclamation, December 1993.
- TR-102154, Landfill Characteristics of Circulating-Fluidized-Bed Combustion Ash, July 1993.
- TR-101999, Physical and Hydraulic Properties of Fly Ash and Other By-Products From Coal Combustion, April 1993.
- TR-101785, Detailed Physical, Chemical, and Mineralogical Analyses of Selected Coal and Oil Combustion Ashes, May 1993.
- GS-7226, Compatibility of Admix and Synthetic Liner Materials With Clean Coal Technology By-Products, March 1991.
- GS-6622, Laboratory Characterization of Advanced SO2 Control By-Products: Dry Sodium and Calcium In-Duct Injection Wastes, December 1989.
- CS-6044, Advanced SO2 Control By-Product Utilization: Laboratory Evaluation, September 1988.
- CS-5783, Laboratory Characterization of Advanced SO2 Control By-Products: Furnace Sorbent Injection Wastes, May 1988.
- CS-5782, Laboratory Characterization of Advanced SO2 Control By-Products: Spray Dryer Wastes, May 1988.
- CS-5625, Sampling and Analytic Protocol for Advanced SO2 Control By-Products, February 1988.
- CS-5355, Evaluation of the Toxicity Characteristic Leaching Procedure (TCLP) on Utility Wastes, August 1987.
- CS-5269, Utilization Potential of Advanced SO2 Control By-Products, June 1987.
- CS-5076, Management of Solid By-Products From Advanced SO2 Control Systems, April 1987.
- CS-4402, Advanced SO2 Control Solid-Waste Management Planning Study, February 1986.
- CS-3936, Coal Waste Artificial Reef Program, March 1985.
- CS-3071, Conscience Bay Coal Waste Artificial Reef Studies, May 1983.
- CS-2557, Manual for Upgrading Existing Disposal Facilities, August 1982.

- Technical Brief, Boiler Slag: Characterization of Slags From Coal-Fired Power Plants, TB-103176, October 1993.
- Technical Brief, Waste Disposal Field Study of Circulating Fluidized-Bed Combustion Ash, TB-101067, January 1993.
- Technical Brief, Spray Dryer Waste Management Guidelines, TB.GS.63.2.89, February 1989.
- EPRI videotape, Coal Waste Artificial Reef, CC83-02, December 1983.

- **Liners and Barriers for Groundwater Protection**

  Evaluations of the compatibility of synthetic and natural liners with utility wastes; a review of design options for storage and disposal facilities

  - TR-103322, Guidelines for Design and Installation of By-Product Containment Facilities, November 1994.
  - GS-7226, Compatibility of Admix and Synthetic Liner Materials With Clean Coal Technology By-Products, March 1993.
  - GS-6798, Enhanced Liners for Utility By-Products, March 1990.
  - GS-6381, Liner-Waste Compatibility Studies for Coal-Fired Power Plants, May 1989.
  - CS-5801, Interaction Between Coal Combustion By-Products and Natural Liners, June 1988.
  - CS-5426, Liner-Waste Compatibility Studies for Coal-Fired Power Plants (Interim Report), September 1987.
  - Technical Brief, Improved Liners for Utility By-Product Disposal, TB-106035, in press.
  - Technical Brief, Selecting Suitable Liners for Waste Disposal Areas, TB.GS.72.5.89, May 1989.

- **Groundwater Manuals Product**

  Comprehensive guides to evaluate potential groundwater problems in power plant siting and operation

  - Groundwater Assessment and Remediation Technologies, forthcoming.
  - GS-7534, Groundwater Manual for the Electric Utility Industry, 2nd ed., Vol. 1: Groundwater Laws, Geologic Formations and Groundwater Aquifers, October 1991.
  - CS-3901, Groundwater Manual for the Electric Utility Industry, Vols. 2 and 3., March 1985.

DRAFT
CONCEPTUAL
ASH MANAGEMENT PLANS
FOR
FOSSIL STATIONS

Duke Energy
September 1998

EXECUTIVE SUMMARY

As discussed with the Division of Water Quality and Division of Solid Waste of NCDENR in April 1998, the concept of on-site ash management for beneficial use at fossil stations can provide a cost-effective environmental management option. Designating beneficial use areas within the ash basin drainage area on-site will enable closure of the ash basin in phases, as part of the life-of-station ash management plans. Focusing on beneficial use of ash per the general ash reuse permit (#WQ0000452) and solid waste regulations is expected to increase the market value of this property, as has been the case with off-site structural fill projects. Development in such a manner would also encourage development of businesses on-site that use ash to make other products, thus enhancing local economic growth and further beneficial uses of ash.

A conceptual ash management plan for Marshall Steam Station is presented. An on-site structural fill project is proposed that would comply with the same regulations as off-site structural fill projects currently permitted. Since the proposed structural fill site is located in the ash basin area of Marshall Steam Station, review and concurrence by NCDENR with this conceptual plan will be needed prior to proceeding.

INTRODUCTION

A total of seven coal-fired steam electric generating stations are owned and operated by Duke Energy in North Carolina. Planning for disposal and beneficial use of coal ash is an on-going process through the life of each station. The type of coal burned, the operational characteristics of each station, and environmental requirements influence ash management plans. Through research and environmental monitoring programs, an understanding of the characteristics of coal ash and environmentally acceptable uses are continuing to influence recycling efforts. This understanding and beneficial use has also been recognized by NCDENR and encouraged per the general ash reuse permit and solid waste regulations of North Carolina. The purpose of this plan is to review the existing ash management plans and develop life-of-station plans with more focus on cost-effective environmental management and beneficial use options.

Objectives:

1. Propose a permitting process for development of Life-of-Station ash management plans with a focus on beneficial use per the general ash reuse permit (WQ0000452) and the solid waste regulations (15A NCAC 13B.1700. Requirements for Beneficial Use of Coal Combustion Byproducts).
2. Develop ash management plans for each station, starting with the station that has the least capacity remaining in its ash basin

PROPOSED PERMITTING PROCESS

The present NCDENR permitting program and regulations for disposal of ash continues to encourage environmentally acceptable beneficial disposal options. One option that has been successful in the clay soils of the Piedmont region is the use of ash for structural fill in construction projects. Enhancing this option for development of structural fill projects on-site is the focus of this proposed permitting process. Having the flexibility to haul, sluice, and/or dense phase pump the ash, as well as mix ash from the ash basin with ash from the silo, in on-site and off-site structural fill projects is preferred. This would enable possible combinations of transporting methods that could enhance wastewater treatment processes, pollution prevention, and handling costs. Under the existing regulatory requirements the following scenario would be followed.

Water Quality
An application for an Authorization to Construct (ATC) permit to modify the ash basin area per design specifications of the structural fill project will be submitted to the NCDENR Division of Water Quality Division for approval. Coal ash removed from the basin would be utilized as specified in the general ash reuse permit. The ash reuse application provides additional ash storage capacity in the basin while at the same time provides a beneficial use for the ash.

Solid Waste

Two ash landfills are presently regulated by the Solid Waste Division as a sanitary landfills. The fly ash collected in temporary storage silos would be utilized per beneficial use solid waste regulations. Notification and reporting will be completed per the requirements of the utilization regulations.

PROPOSED LIFE-OF-STATION ASH MANAGEMENT PLANS

Description of Ash Disposal Systems

Proposed changes to ash disposal systems primarily focus on reducing the number of times the ash is handled and on-site structural fill projects for beneficial use. The current ash disposal system of each station consists of an ash pond, commonly referred to as the ash basin. This system is a part of the wastewater treatment system with an associated National Pollutant Discharge Elimination System (NPDES) permitted discharge. Bottom ash and pyrites are commonly sluiced to the ash basin, where they are either separated for beneficial use or placed in the basin. Fly ash is either sluiced to the basin or collected in temporary storage silos for subsequent utilization or for disposal in the ash basin and/or ash landfill. When fly ash is transported by trucks, the fly ash is conditioned from the ash storage silos (fly ash moistened to near optimum water content) and is subsequently placed as a compacted fill.

Proposed Station Ash Management Plans

The priority for development of ash management plans for each station is listed in Table 1. The conceptual ash management plan for Marshall Steam Station is attached, as an example of how life-of-station planning with a focus on beneficial use provides a cost-effective disposal option.

Table 1. Priority for development of life-of-station ash management plans

Priority	Station	Ash Basin Capacity Remaining (1000's of tons) to Year	Landfill Capacity Remaining (1000's of tons) to Year
1	Marshall	196.0k tons to >Year 2018?	451.6k tons to Year 2000?
2	Dan River	196.7k tons to Year 1999	no landfill
3	Riverbend	492.0k tons to Year 2000	no landfill
4	Allen	3,412.0k tons to Year 2007	no landfill
5	Cliffside	1,481.0k tons to Year 2010	no landfill
6	Buck	1,481.0k tons to Year 2011	no landfill
7	Belews	5,264k tons to >Year 2018	6,027k tons to >Year 2018

CONCEPTUAL

ASH MANAGEMENT PLAN

FOR

MARSHALL STEAM STATION

Duke Energy

September 1998

Introduction

As discussed with the Division of Water Quality and Division of Solid Waste of NCDENR in April 1998, the concept of on-site ash management for beneficial use at Marshall Steam Station (MSS) provides a cost-effective environmental management option. Designating beneficial use areas within the ash basin drainage area on-site will enable closure of the ash basin in phases, as part of the life-of-station ash management plan for MSS. Focusing on beneficial use of ash per the general ash reuse permit (#WQ0000452) and solid waste regulations is expected to increase the market value of this property, as has been the case with off-site structural fill projects. Development in such a manner would also encourage development of businesses on-site that use ash to make other products, thus enhancing local economic growth and further beneficial uses of ash.

As a part of Duke Energy's ash management plan at Marshall, an on-site structural fill project would comply with the same regulations as off-site structural fill projects currently permitted. Since the proposed structural fill site is located in the ash basin area of MSS, review and concurrence by NCDENR with this conceptual plan will be needed prior to proceeding.

Ash Basin Area Description

The ash basin area at MSS consists of the ash storage pond, referred to as the ash basin, and a dry ash storage area, referred to as the ash landfill. During normal plant operations, bottom ash and pyrites are sluiced to the ash basin and fly ash is collected in temporary storage silos for subsequent utilization or for disposal in the ash landfill. The ash basin and associated outlet works are part of the station wastewater treatment system with an NPDES permitted discharge, outfall 002 (see attached drawing). This discharge to Lake Norman is regulated under NPDES permit #NC0004987

The Ash Basin has a total ash storage capacity of approximately 4,860,000 tons. This does not include ash presently stored in coves that are isolated from the Ash Basin by dikes. Based on a physical survey in December 1997, the remaining capacity of the basin was 196,600 tons (refer to Figure 2). The natural drainage area to the basin is 1,180 acres. The drainage from an additional 15 acres of station roofs and yard area are routed to one of two yard sumps with pump discharge to the basin. Other inflows to the Ash Basin include stormwater runoff from the 46 acre cola pile, powerhouse sump pump discharge, sanitary waste treatment system effluent, and boiler chemical cleaning wastes. The nominal crest elevation of the Main Dike which forms the Ash Basin is 798.5 ft. Nominal full pond elevation is 790 ft. A reinforced concrete drainage tower with a 30-inch diameter polyethylene pipe serves as the primary discharge from the Ash Basin to Lake Norman. The water level of the Ash Basin is controlled by the addition or removal of stop logs. In addition to the drainage tower, a vegetated emergency spillway (nominal crest elevation 795 ft.) provides discharge capacity for flood control.

Periodic removal of ash from the Ash Basin is necessary to maintain the 554.91 acre-feet of free water volume required for wastewater treatment per the NPDES permit.

The Ash Landfill is regulated as a sanitary waste landfill under the State of North Carolina Solid Waste Permit #18-04. As of December 1997, the remaining capacity of the ash landfill is approximately 451,600 tons (refer to Figure 3).

During normal plant operations, fly ash is collected from the precipitators and conveyed to one of three 2000 ton silos located adjacent to the power plant. Conditioned fly ash (fly ash moistened to near optimum water content) is transported by trucks from the storage silos and placed as a compacted fill in the ash landfill.

When the equipment used to collect and convey fly ash to the silos is not functioning, the station has the capability to sluice fly ash to the ash basin. Fly ash is also sluiced to the ash basin as a part of the wastewater treatment process to maintain proper ash basin chemistry.

Bottom ash and pyrites are collected separately. Pyrites collected in several pyrite hoppers are routed to a single pyrite tank and subsequently sluiced to the ash basin in a single pipeline. Bottom ash is collected in a pyrite-free state in a bottom ash hopper. Bottom ash is mixed with water and pumped approximately 2,900 feet to the ash basin in a single pipeline for Units 1 and 2 and another pipeline for Units 3 and 4. Under normal operating conditions, both bottom ash pipelines are diverted to one of two concrete settling ponds that trap a majority of the bottom ash. As the discharge of bottom ash is alternated between settling ponds, so to is the excavation of bottom ash from the "dry, full" pond. Bottom ash excavated from the settling ponds is subsequently processed and stockpiled for utilization.

In addition to collecting fly ash from MSS, fly ash produced by Belews Creek Steam Station is also temporarily stored in one of the MSS fly ash silos. The purpose of dedicating a portion of silo storage for Belews Creek fly ash is to serve as a storage depot and facilitate the sale of Belews Creek fly ash in the local area.

Projected Ash Production and Remaining Ash Storage Capacity

Coal consumption forecasts are used to estimate projected ash production assuming coal consists of 10% ash (base case - regulated). In addition, ash is assumed to consist of 90% fly ash and 10% bottom ash. Estimates were calculated assuming 100,000 tons of annual bottom ash utilization, 200,000 tons of annual fly ash utilization, and only sluicing of bottom ash to the ash basin.

Using the conditions described above, the ash basin is projected to have unlimited storage capacity (assumed bottom ash utilization exceeds production) and the ash landfill is projected to reach full capacity by mid-2000.

Project Description

The concept of on-site ash management for beneficial use at MSS provides a cost-effective environmental management option. Designating beneficial use areas within the ash basin drainage area on-site will enable closure of the ash basin in phases, as part of the life-of-station ash management plan for MSS. Focusing on beneficial use of ash per the general ash reuse permit (#WQ0000452) and solid waste regulations is expected to increase the market value of this property, as has been the case with off-site structural fill projects. Development in such a manner could also encourage development of businesses on-site that use ash to make other products relocate, thus enhancing local economic growth and further beneficial uses of ash.

The proposed structural fill project consists of 205.4 acres on the north side of the MSS property east of Steam Plant Road and south of Island Point Road (State Road 1838) as shown on the attached drawing. The project will be done in four phases consecutively. Based on annual production estimates of 500,000 tons of silo ash and removal of 100,000 tons of ash from the MSS ash basin, a total of 10 million cubic yards or 12 million conditioned tons of MSS ash over a 20 year time period will be utilized by the project

- **Phase I** is 68.5 acres and will utilize a volume of 3.35 million cubic yards or 4.03 million tons of ash . The estimated duration of this phase is 6.7 years.

- **Phase II** is 43 acres and will utilize a volume of 2.64 million cubic yards or 3.17 million tons of ash. The estimated duration of this phase is 5.3 years.

- **Phase III** is 50 acres and will utilize a volume of 3.44 million cubic yards or 4.13 million tons of ash. The estimated duration of this phase is 6.9 years.

- **Phase IV** is 43.8 acres and will utilize a volume of 0.61 million cubic yards or 0.73 million tons of ash. The estimated duration of this phase is 1.2 years.

Each phase would be developed with intentions of marketing for beneficial use upon completion. Additional project phases could be added through purchase of adjacent property tracts.

This project would be permitted under NCDENR-DSW .1700 regulations as a beneficial use for an engineered ash fill project. This project is estimated to provide a disposal capacity for MSS ash produced through the year 2018 or longer, depending on other competing beneficial uses.

Permitting Process

Having the flexibility to haul, sluice, and/or dense phase pump the ash, as well as mix ash from the basin with ash from the silo, in on-site and off-site structural fill projects is preferred. This would enable possible combinations of transporting methods that could enhance wastewater treatment processes, pollution prevention, and handling costs. Under the existing regulatory requirements the following scenario would be followed.

Water Quality

An application for an Authorization to Construct (ATC) permit to modify the ash basin area per design specifications of the structural fill project will be submitted to the NCDENR Division of Water Quality Division for approval. Coal ash removed from the basin would be utilized as specified in the general ash reuse permit. The ash reuse application provides additional ash storage capacity in the basin while at the same time provides a beneficial use for the ash.

Solid Waste

The fly ash collected in temporary storage silos would be utilized per beneficial use solid waste regulations. Notification and reporting will be completed per the requirements of the utilization regulations.

The landfill is permitted through the NCDENR Solid Waste Division per Sanitary Landfill Permit No. 18-04. Notification of closure is planned when this landfill reaches its maximum storage capacity.

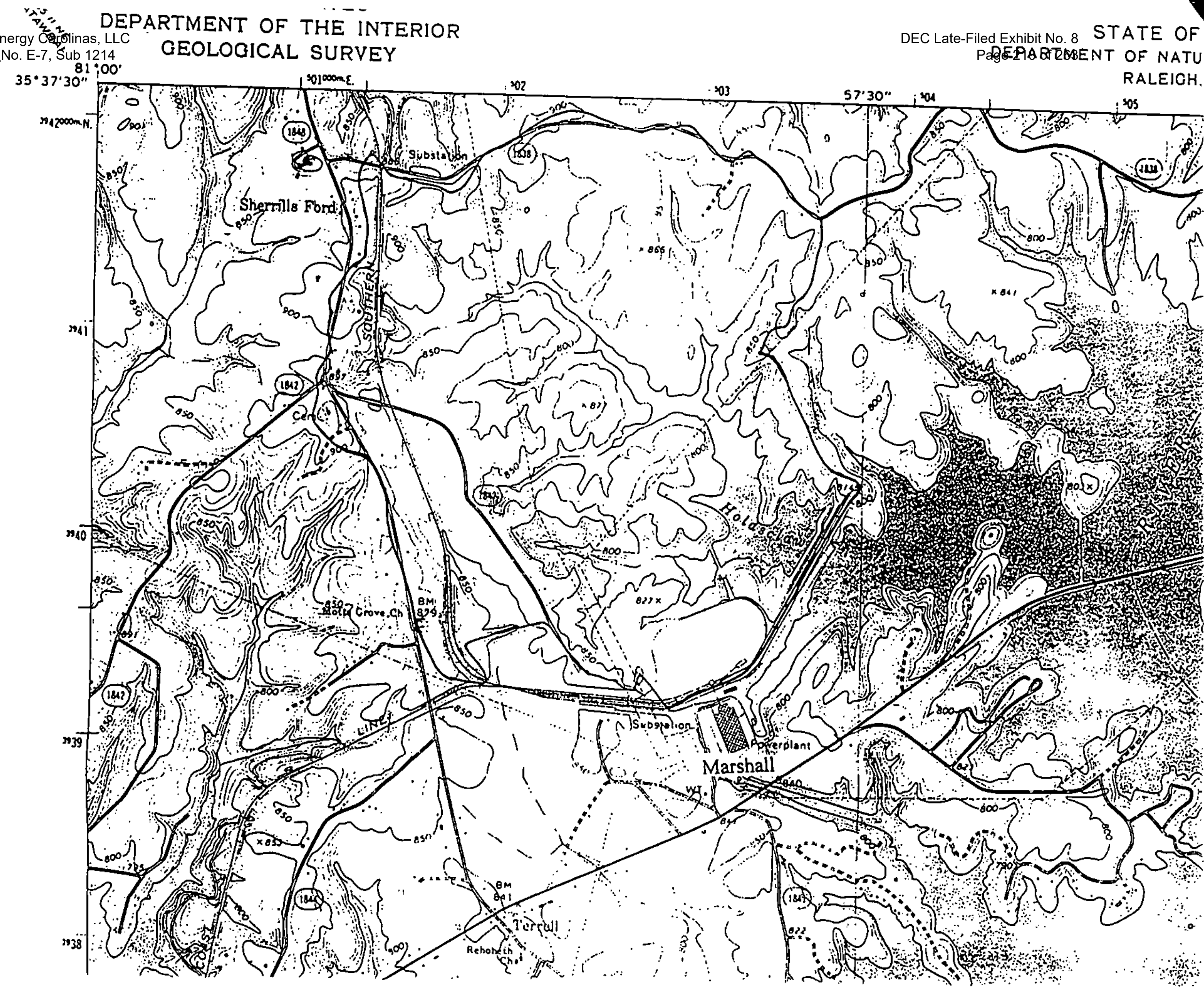


Figure 1. A USGS topographic map of the Marshall Steam Station site.

Duke Power
A Duke Energy Company

Duke Power
Group Environment, Health & Safety
13339 Hagers Ferry Road
Huntersville, NC 28078-7929

October 26, 1998

Ms. Colleen Sullins, Chief
Division of Water Quality
North Carolina Department of Environment
and Natural Resources
512 North Salisbury Street
P.O. Box 29535
Raleigh, NC 27626-0535

Mr. Dexter Mathews, Chief
Division of Solid Waste
North Carolina Department of Environment
and Natural Resources
401 Oberlin Road
Suite 150
Raleigh, NC 27605

Subject: Marshall Steam Station
NPDES Permit No. NC0004987
Conceptual Ash Management Plan
Authorization to Construct
Ash Utilization Project

Dear Ms. Sullins and Mr. Mathews:

As discussed with the Division of Water Quality and the Division of Solid Waste of NCDENR in April 1998, the concept of on-site ash management for beneficial use at fossil stations can provide a cost-effective environmental management option. Beneficial use of ash per the general ash reuse permit (#WQ0000452) and solid waste management rules is the focus of the attached proposed conceptual ash management plan. A conceptual ash management plan for the Duke Energy fossil stations in North Carolina and a specific plan for Marshall Steam Station have been prepared for your review and input. An on-site structural fill project is proposed that will incorporate the use of both silo (dry ash) and ponded ash, and comply with the same regulations/requirements as off-site structural fill projects. Per requirement of the NPDES permit for Marshall Steam Station, an Authorization to Construct Permit from the Division of Water Quality is requested to construct an on-site structural fill project within the drainage area of the Marshall's ash basin and property boundary. This will not result in any major impact on the present wastewater treatment system or processes at Marshall Steam Station.

Enclosed is a check for the application fee of $400.00 to initiate processing of the authorization to construct permit request. As requested, three copies of the plans have been sent to the Division of Water Quality and one copy to the Division of Solid Waste.

In the near future, we will be scheduling a meeting with you to discuss the plans and requirements for notification to the Division of Solid Waste for the projects. If you have any questions, please contact Larry Evans (704) 875-5956 and/or Ron Lewis (704) 875-5968.

Sincerely,

Angela M. Grooms

Angela M. Grooms
Manager, Water Protection

Michael A. Ruhe

Michael A. Ruhe, CHMM
Manager, Waste Management

LDE/REL/10986

Enclosures

bc w/enclosures:	G.D. Blevins	EC10C
	D.L. Burrell	Marshall
	J.W. Calhoun	EC11E
	J.E. Ellington	Marshall
	L.D. Evans	MG03A5
	S.J. Immel	WC32B
	R.E. Lewis	MG03A5
	J.W. Newell	WC32B
	G.S. Rice	PB05E
	Record Number MS-004775	
	File: 006021MS	
bc w/o enclosures:	M.E. Hollis	MG03A5
	N.H. Taylor	EC12I

DRAFT
CONCEPTUAL
ASH MANAGEMENT PLANS
FOR
FOSSIL STATIONS

Duke Energy
October 1998

EXECUTIVE SUMMARY

As discussed with the Division of Water Quality and the Division of Solid Waste of NCDENR in April 1998, the concept of on-site ash management for beneficial use at fossil stations can provide a cost-effective environmental management option. Designating beneficial use areas within an ash basin drainage area on-site will enable closure of ash basins in phases, as part of a station's ash management plan. Focusing on beneficial use of ash per the general ash reuse permit (#WQ0000452) and solid waste regulations is expected to increase the market value of the property, as has been the case with off-site structural fill projects. Development in such a manner would also encourage development of businesses on-site that use ash to make other products, thus enhancing local economic growth and further beneficial uses of ash and recovery of a valuable resource.

A conceptual ash management plan for Marshall Steam Station is presented. An on-site structural fill project is proposed that would comply with the same regulations as off-site structural fill projects currently permitted. Since the proposed structural fill site is located in the ash basin area of Marshall Steam Station, review and concurrence by NCDENR with this conceptual plan will be requested prior to proceeding.

INTRODUCTION

A total of seven coal-fired steam electric generating stations are owned and operated by Duke Energy in North Carolina. Planning for storage and beneficial use of coal ash is an on-going process through the life of each station. The type of coal burned, the operational characteristics of each station, and environmental requirements influence ash management plans. Through research and environmental monitoring programs, an understanding of the characteristics of coal ash and environmentally acceptable uses are continuing to influence recycling efforts. This understanding and beneficial use has also been recognized by NCDENR and regulated per the general ash reuse permit and solid waste regulations of North Carolina. The purpose of this plan is to review the existing ash management plans and develop station plans with more focus on cost-effective environmental management and beneficial use options.

Objectives:

1. Propose a permitting process for development of Station ash management plans with a focus on beneficial use per the general ash reuse permit (WQ0000452) and the solid waste regulations (15A NCAC 13B.1700. Requirements for Beneficial Use of Coal Combustion Byproducts).
2. Develop ash management plans for each station, starting with the station that has the least capacity remaining in its ash basin and/or ash landfill.

PROPOSED PERMITTING PROCESS

The present NCDENR permitting program and regulations for storage of ash continues to encourage environmentally acceptable beneficial storage options. One option that has been successful in the clay soils of the Piedmont region is the use of ash for structural fill in construction projects. Enhancing this option for development of structural fill projects on-site is the focus of this proposed permitting process. Having the flexibility to haul, sluice, and/or dense phase pump the ash, as well as mix ash from the ash basin with ash from the silo, in on-site and off-site structural fill projects is preferred. This would enable possible combinations of transporting methods that could enhance wastewater treatment processes, pollution prevention, and handling costs. Under the existing regulatory requirements the following scenario would be followed.

Water Quality

An application for an Authorization to Construct (ATC) permit to modify the ash basin area per design specifications of the structural fill project will be submitted to the NCDENR Division of Water Quality for approval. Coal ash removed from the basin would be utilized as specified in the general ash reuse permit. The ash reuse application provides additional ash storage capacity in the basin while at the same time provides a beneficial use for the ash.

Solid Waste

The fly ash collected in temporary storage silos would be utilized per Section .1700 of the Solid Waste Management Rules. Notification and reporting will be completed per the requirements of the utilization regulations.

Two ash landfills are presently regulated by the Division of Solid Waste. The landfills are permitted through the NCDENR Solid Waste Division per Landfill Permit No. 85-03 for Belews Creek Steam Station and Permit No. 18-04 Marshall Steam Station. Notification of closure is planned when these landfills reach their maximum storage capacity.

Sedimentation and Erosion Control – Stormwater Permitting

Since all drainage from the structural fill areas will discharge to the ash basin for co-treatment with other stormwater runoff and station wastewater prior to discharge from an NPDES permitted outfall, stormwater permitting can be incorporated with the NPDES permitting process. Sedimentation and erosion control practices described in the "North Carolina Erosion and Sediment Control Planning and Design Manual" for the piedmont region of North Carolina will be utilized as needed to minimize runoff of ash and sediment to the ash basin. Best management practices will include:

- All erosion and sediment control devices will be checked for stability and operation following every runoff producing event. Any necessary repairs will be made immediately to maintain all devices as designed.

- All seeded areas shall be fertilized, reseeded as necessary, and mulched according to the specifications for surface stabilization in the North Carolina Erosion and Sedimentation Planning and Design Manual.
- Ensure that fill material is free of brush, rubbish, logs, stumps, building debris, and other materials inappropriate for constructing stable fills.
- Keep diversions and other water conveyances free of sediment during all phases of development.
- Handle seep or springs encountered during construction in accordance with engineered recommendations.
- Permanently stabilize all graded areas immediately after final grading is completed on each area.
- Periodically check all graded areas and the supporting erosion and sedimentation control devices, especially after heavy rainfalls. Promptly remove all sediment from diversions and other drainage structures. If washouts or breakouts occur, repair them immediately.
- For fill slopes, leave the final 4 to 6 inches loose and uncompacted in order to provide a better environment for vegetation to be established.
- For cut slopes, roughen the surface by operating tracked equipment up and down the slope such that grooves perpendicular to the slope are formed. Do not back-blade during the final grading operation.

PROPOSED STATION ASH MANAGEMENT PLANS

Description of Ash Storage Systems

Proposed changes to ash storage systems primarily focus on reducing the number of times the ash is handled and on-site structural fill projects for beneficial use. The current ash storage system of each station consists of an ash pond, commonly referred to as the ash basin. This system is a part of the wastewater treatment system with an associated National Pollutant Discharge Elimination System (NPDES) permitted discharge. Bottom ash and pyrites are commonly sluiced to the ash basin, where they are either separated for beneficial use or placed in the basin. Fly ash is either sluiced to the basin or collected in temporary storage silos for subsequent utilization or for storage in the ash basin and/or ash landfill. When fly ash is transported by trucks, the fly ash is conditioned from the ash storage silos (fly ash moistened to near optimum water content) and is subsequently placed as a compacted fill.

Proposed Station Ash Management Plans

The priority for development of ash management plans for each station is listed in Table 1. The conceptual ash management plan for Marshall Steam Station is attached, as an example of how station planning with a focus on beneficial use provides a cost-effective storage option.

Table 1. Priority for development of station ash management plans

Priority	Station	Ash Basin Capacity Remaining (1000's of tons) to Year	Landfill Capacity Remaining (1000's of tons) to Year
1	Marshall	196.0 tons to >Year 2018	451.6 tons to Year 2000
2	Dan River	196.7 tons to Year 1999	no landfill
3	Riverbend	492.0 tons to Year 2000	no landfill
4	Allen	3,412.0 tons to Year 2007	no landfill
5	Cliffside	1,481.0 tons to Year 2010	no landfill
6	Buck	1,481.0 tons to Year 2011	no landfill
7	Belews Creek	5,264 tons to >Year 2018	6,027 tons to >Year 2018

CONCEPTUAL

ASH MANAGEMENT PLAN

FOR

MARSHALL STEAM STATION

Duke Energy

October 1998

Introduction

As discussed with the Division of Water Quality and the Division of Solid Waste of NCDENR in April 1998, the concept of on-site ash management for beneficial use at Marshall Steam Station (MSS) provides a cost-effective environmental management option. Designating beneficial use areas within the ash basin drainage area on-site will enable closure of the ash basin in phases, as part of the station ash management plan for MSS. Focusing on beneficial use of ash per the general ash reuse permit (#WQ0000452) and solid waste regulations is expected to increase the market value of this property, as has been the case with off-site structural fill projects. Development in such a manner would also encourage development of businesses on-site that use ash to make other products, thus enhancing local economic growth and further beneficial uses of ash.

As a part of Duke Energy's ash management plan at Marshall, an on-site structural fill project would comply with the same regulations as off-site structural fill projects currently permitted. Since the proposed structural fill site is located in the ash basin area of MSS, review and concurrence by NCDENR with this conceptual plan will be needed prior to proceeding.

Ash Basin Area Description

The ash basin area at MSS consists of the ash storage pond, referred to as the ash basin, and a dry ash storage area, referred to as the ash landfill. During normal plant operations, bottom ash and pyrites are sluiced to the ash basin and fly ash is collected in temporary storage silos for subsequent utilization or for storage in the ash landfill. The ash basin and associated outlet works are part of the station wastewater treatment system with an NPDES permitted discharge, outfall 002 (Figure 1). This discharge to Lake Norman is regulated under NPDES permit #NC0004987.

The Ash Basin has a total ash storage capacity of approximately 4,860,000 tons. This does not include ash presently stored in coves that are isolated from the Ash Basin by dikes. Based on a physical survey in December 1997, the remaining capacity of the basin was 196,600 tons. The natural drainage area to the basin is 1,180 acres. The drainage from an additional 15 acres of station roofs and yard area are routed to one of two yard sumps where wastewater is pumped to the basin. Other inflows to the Ash Basin include stormwater runoff from the 46 acre coal pile, powerhouse sump pump discharge, sanitary waste treatment system effluent, and boiler chemical cleaning wastes. The nominal crest elevation of the main dike which forms the Ash Basin is 798.5 ft. Nominal full pond elevation is 790 ft. A reinforced concrete drainage tower with a 30-inch diameter polyethylene pipe serves as the primary discharge from the Ash Basin to Lake Norman. The water level of the Ash Basin is controlled by the addition or removal of stop logs. In addition to the drainage tower, a vegetated emergency spillway (nominal crest elevation 795 ft) provides discharge capacity for flood control.

Periodic removal of ash from the Ash Basin is necessary to maintain the 554.91 acre-feet of free water volume required for wastewater treatment per the NPDES permit.

The Ash Landfill is regulated under the State of North Carolina Solid Waste Permit #18-04. As of December 1997, the remaining capacity of the ash landfill was approximately 451,600 tons.

During normal plant operations, fly ash is collected from the precipitators, conveyed to one of three silos, each with a 2000 ton capacity, and located adjacent to the power plant. Conditioned fly ash (fly ash moistened to near optimum water content) is transported by trucks from the storage silos and placed as a compacted fill in the ash landfill.

When the equipment used to collect and convey fly ash to the silos is not functioning, the station has the capability to sluice fly ash to the ash basin. Fly ash is also sluiced to the ash basin as a part of the wastewater treatment process to maintain proper ash basin chemistry.

Bottom ash and pyrites are collected separately. Pyrites collected in several pyrite hoppers are routed to a single pyrite tank and subsequently sluiced to the ash basin in a single pipeline. Bottom ash is collected in a pyrite-free state in a bottom ash hopper. Bottom ash is mixed with water and pumped approximately 2,900 feet to the ash basin in a single pipeline for Units 1 and 2 and another pipeline for Units 3 and 4. Under normal operating conditions, both bottom ash pipelines are diverted to one of two concrete settling ponds that trap a majority of the bottom ash. As the discharge of bottom ash is alternated between settling ponds, so is the excavation of bottom ash from the "dry, full" pond. Bottom ash excavated from the settling ponds is subsequently processed and stockpiled for utilization.

In addition to collecting fly ash from MSS, fly ash produced by Belews Creek Steam Station is also temporarily stored in one of the MSS fly ash silos. The purpose of dedicating a portion of silo storage for Belews Creek fly ash is to serve as a storage depot and facilitate the sale of fly ash in the local area.

Projected Ash Production and Remaining Ash Storage Capacity

Coal consumption forecasts are used to estimate projected ash production assuming coal consists of 10% ash (base case - regulated). In addition, ash is assumed to consist of 90% fly ash and 10% bottom ash. Estimates were calculated assuming 100,000 tons of annual bottom ash utilization, 200,000 tons of annual fly ash utilization, and only sluicing of bottom ash to the ash basin.

Using the conditions described above, the ash basin is projected to have unlimited storage capacity (assumed bottom ash utilization exceeds production) and the ash landfill is projected to reach full capacity by mid-2000.

Project Description

The proposed structural fill project consists of 205.4 acres on the north side of the MSS property east of Steam Plant Road and south of Island Point Road (State Road 1838) as shown on Figure 2. The soils within the project area are mapped as Pacolet and Wilkes per the USDA Soil Conservation Service Soil Survey of Catawba County, North Carolina (October, 1975). In 1991, a subsurface investigation to support the design of an embankment across the ash basin was completed and data from 17 samples obtained from 4 soil borings performed in the vicinity of the project were reviewed. The boring logs indicated the surface soils (to depths of about 20 feet) are classified as a silty fine to medium sand. Gradation tests indicated the surface soils average approximately 30% (by weight) passing the number 200 sieve.

The project will be done in four phases consecutively. Based on annual production estimates of 500,000 tons of silo ash and removal of 100,000 tons of ash from the MSS ash basin, a total of 10 million cubic yards (12 million tons) of MSS ash over a 20 year time period will be utilized by the project

- **Phase I** is 68.5 acres and will utilize a volume of 3.35 million cubic yards or 4.03 million tons of ash. The estimated duration of this phase is 6.7 years.

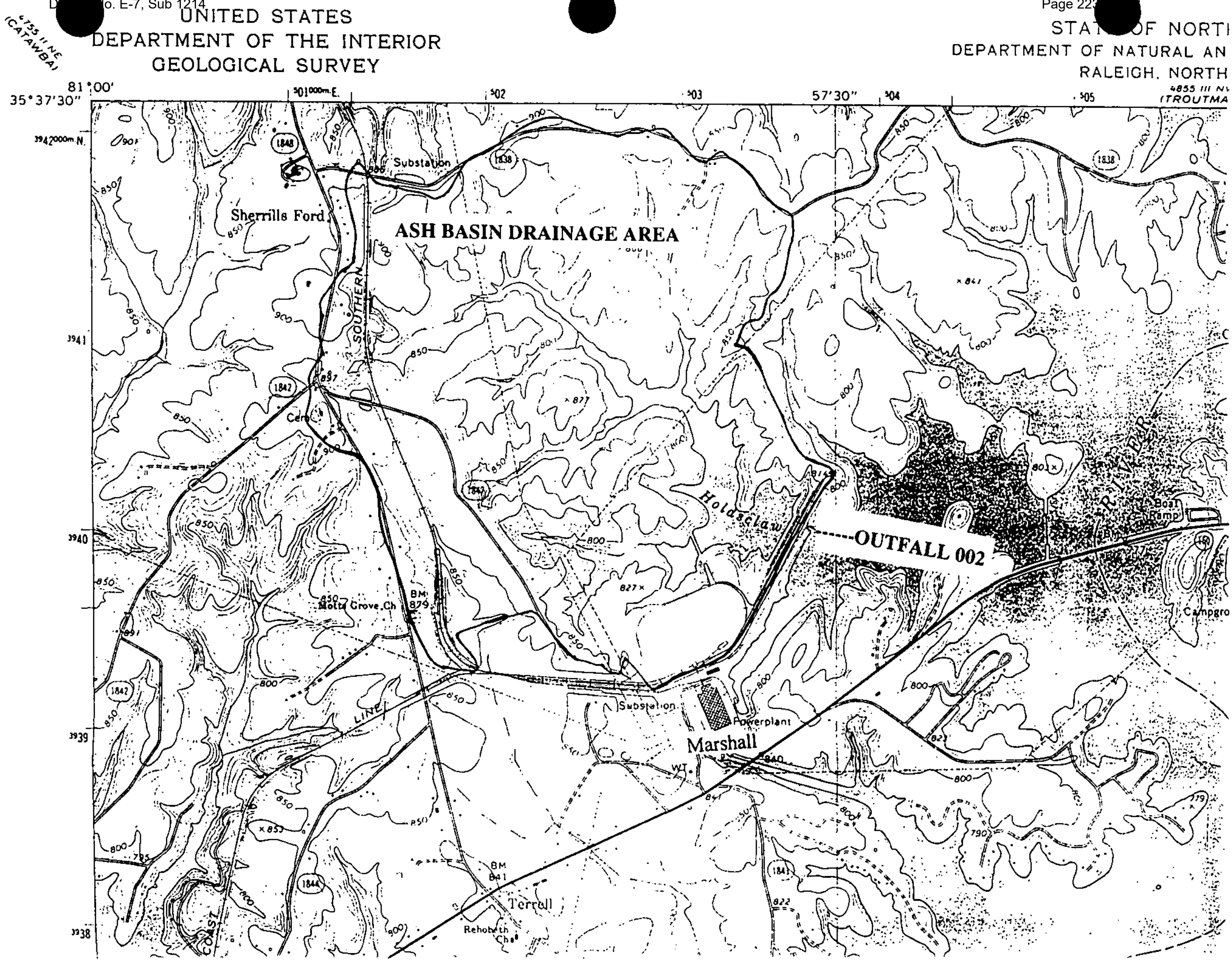
- **Phase II** is 43 acres and will utilize a volume of 2.64 million cubic yards (3.17 million tons) of ash. The estimated duration of this phase is 5.3 years.

- **Phase III** is 50 acres and will utilize a volume of 3.44 million cubic yards (4.13 million tons) of ash. The estimated duration of this phase is 6.9 years.

- **Phase IV** is 43.8 acres and will utilize a volume of 0.61 million cubic yards (0.73 million tons) of ash. The estimated duration of this phase is 1.2 years.

Each phase would be developed with intentions of selling or leasing the land for beneficial use upon completion. The order in which the phases will be initiated and completed has not been determined. Additional project phases could be added through purchase of adjacent property tracts.

This project would be permitted per the process outlined in the draft conceptual ash management plan for fossil stations under Section .1700 of the Solid Waste Management Rules and under the general Ash Reuse Permit as a beneficial use for an engineered ash fill project. Because this project includes areas under the regulatory authority of both Divisions (Water Quality and Solid Waste), meetings with the Divisions will be required to determine details for compliance with all requirements. This project is estimated to provide a storage capacity for MSS ash produced through the year 2018 or longer, depending on other competing beneficial uses.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OUTFALL 002
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Powerplant
Terrell
Rehobeth Ch
Campgro
Boat Ramp
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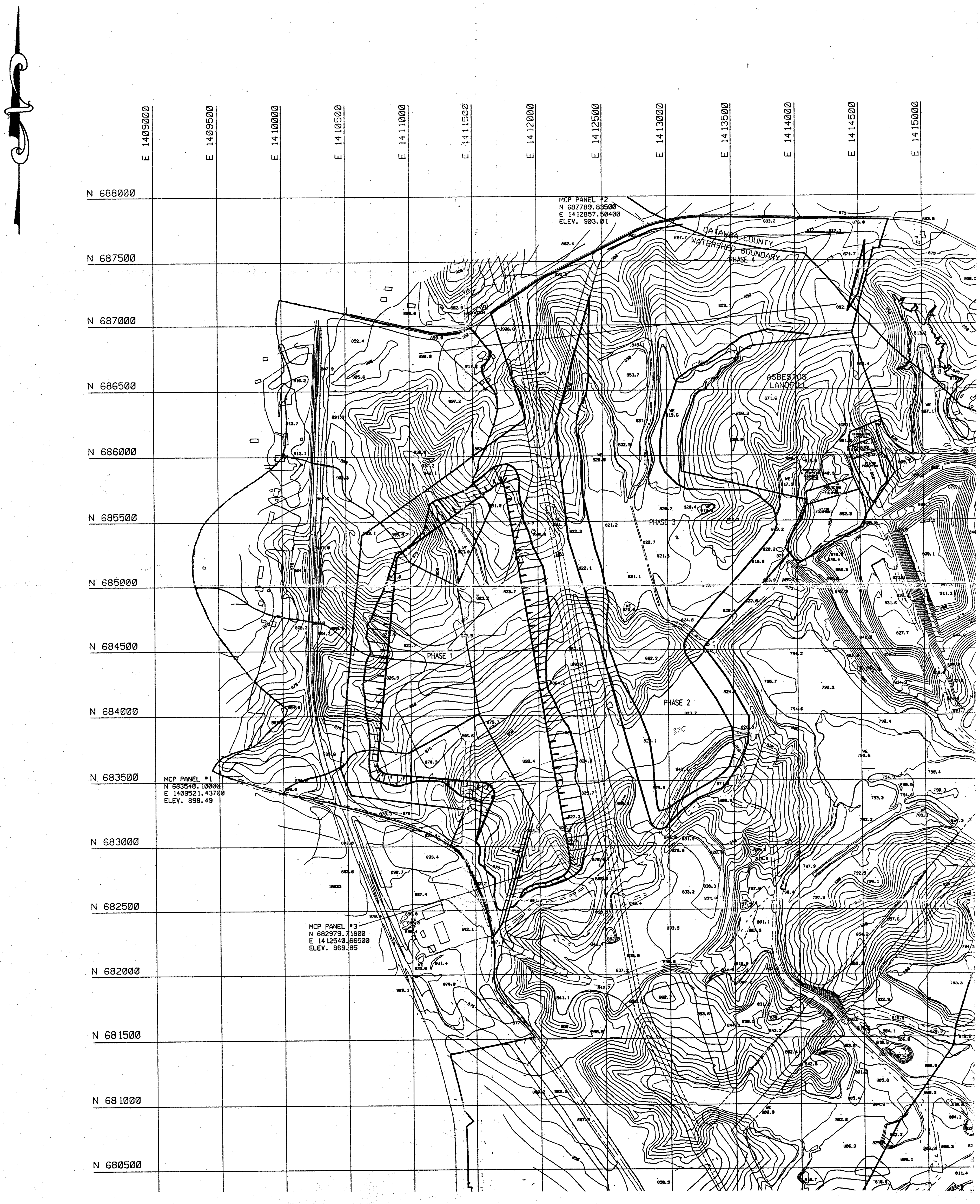
LINE
COAST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ASBESTOS
LANDFILL
PHASE 3
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PHASE 2
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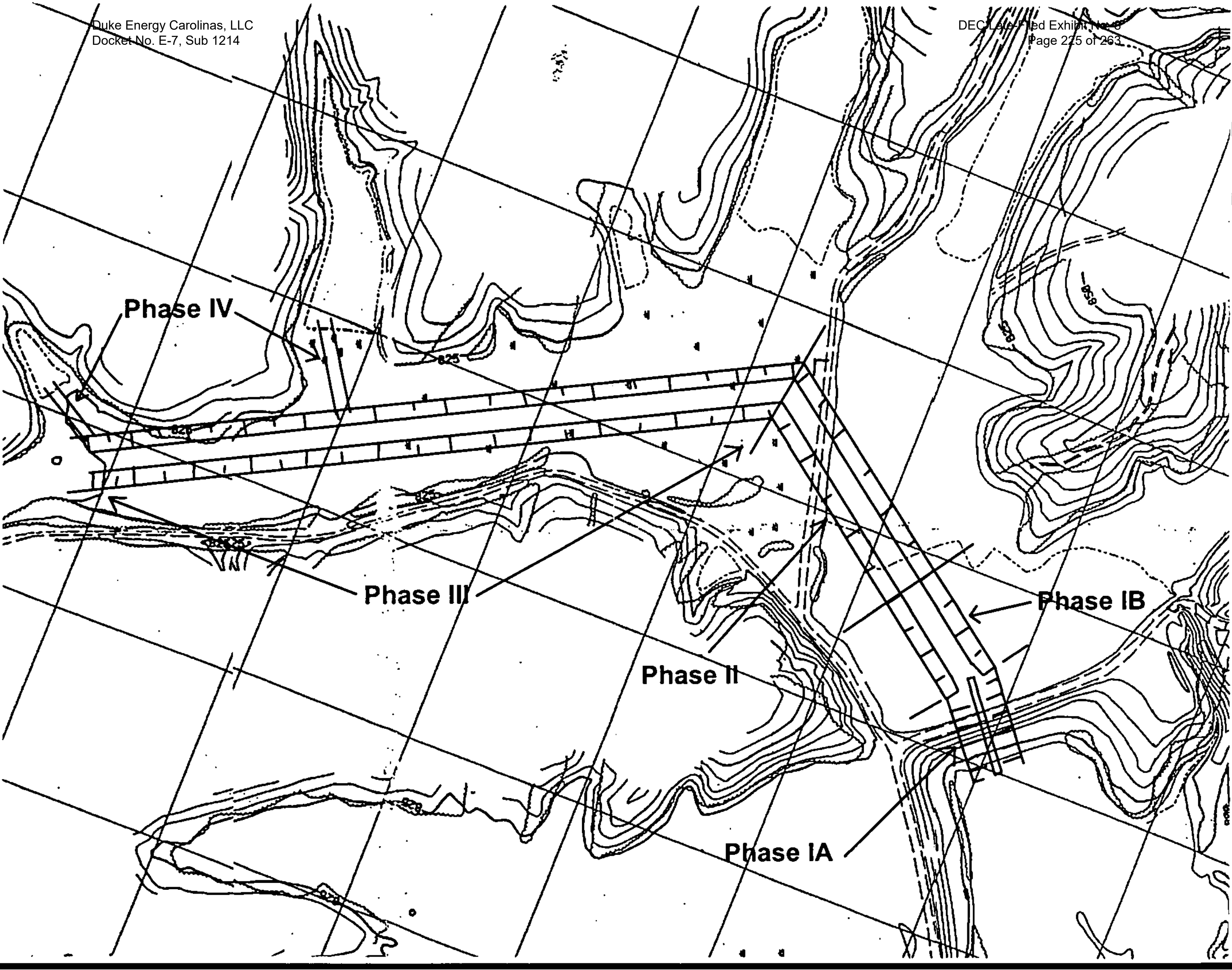
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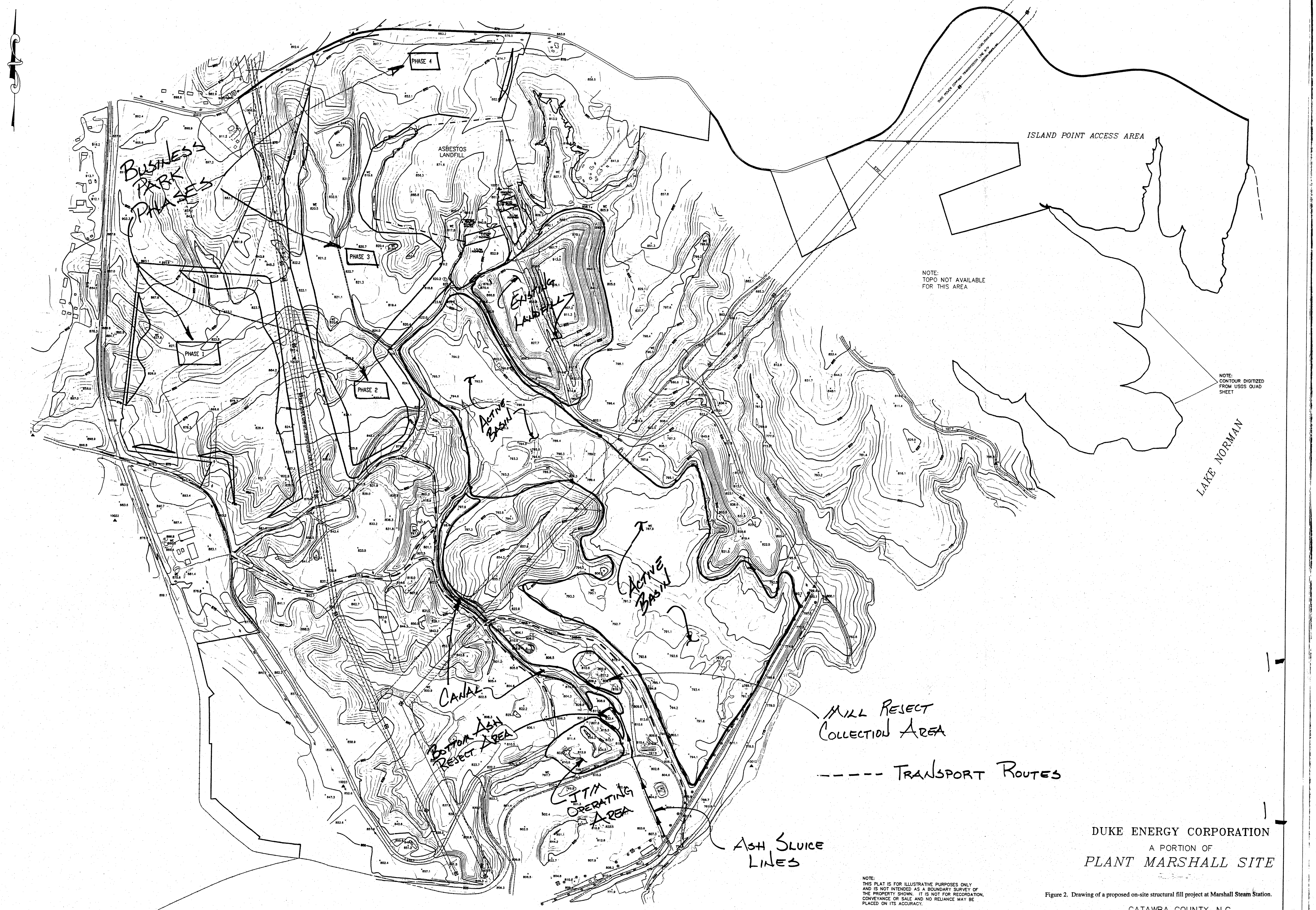

DUKE ENERGY CORPORATION

A PORTION OF

PLANT MARSHALL SITE

Figure 2. Drawing of a proposed on-site structural fill project at Marshall Steam Station.

CATAWBA COUNTY, N.C.

SCALE: 1" = 400' FEBRUARY 26, 1998

REQUEST NO. 96478

NOTE:
THIS PLAT IS FOR ILLUSTRATIVE PURPOSES ONLY AND IS NOT INTENDED AS A BOUNDARY SURVEY OF THE PROPERTY SHOWN. IT IS NOT FOR RECORDATION, CONVEYANCE OR SALE AND NO RELIANCE MAY BE PLACED ON ITS ACCURACY.

ASBESTOS LANDFILL AND FOOTPRINTS FROM MARSHALL STEAM STATION DRAWING M-10A LAST REVISED APRIL 1, 1996

CONSTRUCTION PHASE FOOTPRINTS FROM DRAWING PROVIDED BY FRANK BURNS

CONFIDENTIAL

ASH MANAGEMENT PLAN

FOR

RIVERBEND STEAM STATION

Duke Energy Corporation

March 1999

CONTENTS

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SUMMARY

EXECUTIVE SUMMARY AND RECOMMENDATIONS

Riverbend Steam Station ash is at full pond capacity in early 2001, based on pond capacity curves and actual production since the 1994-95 ash recovery project. Therefore a spring 2000 project is recommended with pre-project activities in 1999. Project schedules show choices between single and two-phased construction. 500,000 tons (417,000 cubic yards) is recommended for removal from the Primary Cell by methods described in this Plan. Removal of this volume allows for an estimated six (6) additional years of pond storage. Construction will be competitively bid to ash marketing and/or construction contractors.

Potential off-site projects will be marketed in 1999 and 2000. Off-site projects could substitute for all or part of the on-site project if economically feasible (i.e lower cost per ton than on-site). Application of ash benefication technologies is not recommended for Riverbend Steam Station.

If project budget accrual funding does not allow for this scope, then the project could be executed with a reduced volume within the same proposed schedules. Future need to perform pond removal could be adjusted to a more frequent basis depending on actual volume removed in 2000.

TEXT

INTRODUCTION

Planning for storage and/or beneficial reuse of coal ash is an on-going process through the life of Riverbend Steam Station (RSS). The type of coal burned, the operational characteristics of RSS units, and environmental requirements influence Riverbend's ash management plans. The purpose of this plan is to review RSS ash management plans and develop plans that include at least annual review of individual station ash management plans, focusing on cost-effective environmental management and beneficial use options.

Riverbend has an ash sluice system and ash basin for co-management of high and low volume waste streams that are regulated per an NPDES (National Pollutant Discharge Elimination System) permit. This includes co-management of coal ash and pyrites with other inflows to the ash basin that includes storm water runoff (including runoff from the coal pile), powerhouse basement sump flow, sanitary waste effluent, and boiler chemical cleaning waste. Riverbend does not have a dry fly ash handling system or permitted sanitary landfill for storage of conditioned fly ash (fly ash wet to near optimum moisture content).

Group EH&S has initiated discussions with NCDENR about proposed ash management planning with a focus on beneficial use of ash (i.e. on-site structural fill projects for beneficial use of ash).

Objectives:

1. Develop process for station review / revision of ash management plans and interface with station business plan and station permits / management plans for air, land, groundwater and surface water.
2. Develop ash management plans that include ash reuse options (consider ash basins, landfills, off-site storage, ash enhancement, etc.).
3. Estimate costs for ash storage that include ash reuse options and ensure compliance with proposed/pending environmental regulations
4. Provide an annual report detailing projected ash production, ash basin storage capacity, ash landfill storage capacity, ash removed and/or landfilled quantities, etc.

Operational Planning Team:

Core team members are chosen from groups that need to interface in the planning process. These individuals are responsible for providing interface with their respective group to provide the necessary expertise and information to develop and implement ash management plans. The present core team consists of the following groups and members:

- Team Sponsor - Fuels Procurement Coal Ash Group Manager (Steve Immel)
- Team Coordinator - Fuels Procurement Coal Ash (Jeff Newell)
- Riverbend Convert Energy (Gary Davis)
- Riverbend Business Manager (Tammie Smith/Joseph Willis)
- Riverbend EH&S (Steve Rutledge)
- Fossil Maintenance/Support (Gary Blevins)
- Water Protection-Group EH&S (Ron Lewis)

The following group and support members:
- Metro Region Manager (Rick Deese)
- Business Manager Fuels Procurement Coal Ash (Joe White)
- Waste-Group EH&S (Larry Evans)
- Air-Group EH&S (Bill Horton)
- Environmental Engineering-Group EH&S (Bill Miller)
- Research and Development (Tim Shawver)
- Fossil Group EH&S Manager (John Calhoun)

Operational Planning Schedule for Ash Management Plans

The following is listing of suggested ash management planning activities for each quarter:

Last quarter of each year (October through December):
- Core team members meet to review ash management plan
- Identify tentative ash management needs for station and budget requirements for the next five years
- Review and identify potential ash enhancement options
- Review and identify research and development needs
- Plan and budget for physical survey of RSS ash storage sites as needed

First quarter of each year (January through March):
- Designated team members meet with management to review tentative RSS Ash Management Plan
- Update RSS Ash Management Plan and communicate budget needs for operational planning

Second quarter of each year (April through June):
- Core team reviews operational plans and updates any changes

Third quarter of each year (July through September):
- Core team review final operation plan and updates any changes.

SYSTEM DESCRIPTION

Process and Waste Stream

The flyash produced by Units 4 and 5 is collected in electrostatic precipitators, routed to a hydroveyor for mixing with water, and piped to an air separator tank. The air separator tank, which services Units 4 and 5, has an outlet elevation of 786 ft. This provides sufficient head to convey the ash slurry by gravity through a single 3,350 ft. pipeline consisting of 10-inch and 12-inch diameter pipe. The pipeline discharges to the Primary Cell of the Ash Basin at elevation 730 ft. The bottom ash produced by Units 4 and 5 is collected at the bottom of the boilers, mixed with water and pumped through a 10-inch diameter pipeline that joins the Units 4/5 flyash pipeline in the Boiler Room.

The flyash and bottom ash produced by Units 6 and 7 is collected an conveyed in a similar manner to that produced by Units 4 and 5. The fly-ash is conveyed by gravity from the Unit 6/7 air separator tank (outlet elevation 763 ft.) through a single 3,150 ft. pipeline consisting of 10-inch and 12-inch diameter pipe. The Units 6/7 ash pipeline generally parallels the Units 4/5 ash pipeline and also discharges to the Primary Cell of the Ash Basin at elevation 730 ft. The bottom ash produced by Units 6 and 7 is collected at the bottom of the boilers, mixed with water, and pumped through a 10-inch diameter pipeline that joins the Units 6/7 flyash pipeline in the Boiler Room.

The pyrites produced by units 4, 5, 6, and 7 are collected at the coal mills, dumped into a sump located between the Unit 6 and Unit 7 boilers, and pumped in a slurry through a single 3,100 ft. pipeline consisting of 7-inch, 8-inch and 10-inch diameter pipe. The pyrite pipeline generally parallels both ash pipelines and discharges to the Primary Cell of the Ash Basin at elevation 730 ft.

In addition to flyash and bottom ash, there are other inflows to the Primary Cell of the Ash Basin. These include stormwater runoff (including runoff from coal pile), Turbine Room sumps, a yard drainage sump, Boiler Room sumps, sanitary waste effluent, and boiler chemical cleaning wastes.

Ash Basin

The Ash Basin consists of the Primary Cell, Secondary Cell, Dredge Pond, and associated outlet works. Plant wastes are discharged to the Primary Cell where most solids are settled out. An earthen divider dike separates the Primary Cell from the Secondary Cell. A reinforced concrete drainage tower with a 36-inch diameter reinforced concrete pipe drains the Primary Cell to the Secondary Cell. Through the addition or removal of stoplogs, the drainage tower also provides the means to control the water surface elevation in the Primary Cell.

Primary Cell

The Ash Basin Primary Cell has a total ash storage capacity of approximately 1,200 acre-ft. The natural drainage area of the Primary Cell is 66 acres. The drainage from an additional 21.8 acres of plant roofs and yard area (including 13 acres of coal pile) are routed to a yard sump which discharges to the Primary Cell bringing the total Primary Cell drainage area to 87.8 acres. The nominal crest elevation of the dike which forms the Primary Cell is 730 ft. Per the physical survey of the Ash Basin that was performed in August, 1993, the water surface area at elevation 725 ft. (full pond elevation) is 34.9 acres.

Secondary Cell

The Secondary Cell functions primarily as a polishing pond. A reinforced concrete drainage structure having a 30-inch diameter corrugated metal pipe drains the Secondary Cell to Mountain Island Lake. The discharge from the Secondary Cell to Mountain Island Lake is regulated as outfall 002 under NPDES permit NC0004961.

The Secondary Cell has a drainage area of 32.7 acres. The nominal crest elevation of the dike which forms the Secondary Cell is 720 ft. Per the August, 1993 survey, the water surface area at elevation 715 ft. (full pond elevation) is 24.3 acres.

Dredge Pond

The Dredge Pond is located upstream of the Primary Cell and is separated from the Primary Cell by the Dredge Dike, an earthen dike with a total crest length of approximately 1,400 ft. The Dredge pond functions as a temporary holding area and is designed to receive dredged ash from the Primary Cell. In order to facilitate dewatering of the dredge ash, the central 150 ft. of the dike is constructed of graded filters and geosynthetic fabric which provides for gravity drainage of water from the Dredge Pond to the Primary Cell. To maintain the drainage capability of the Dredge Dike, periodic repairs will be necessary. In the past, ash has been excavated from the Dredge pond and utilized off site in structural fill projects.

The drainage area of the Dredge Pond, which forms a portion of the Primary Cell's drainage area, is 8.9 acres. The central portion of the Dredge Dike has a nominal crest elevation of 744 ft.; the remaining portion of the Dredge Dike has nominal crest elevation of 746 ft. At a uniform storage elevation of 742 ft., the Dredge Pond has the capacity to store approximately 72,000 cubic yards of ash.

REGULATORY STATUS AND COMPLIANCE

Water Quality

The Riverbend Ash Basin system is utilized for the treatment and/or storage of all of the station's high volume wastes (fly ash and bottom ash) and how volume wastes (chemical cleaning wastes, regeneration wastes, sump wastewaters, coal pile runoff, etc.). The discharge of the ash basin system is permitted as outfall 002 of the Riverbend NPDES Permit (# NC0004961). There have been no significant non-compliances associated with the Riverbend NPDES Permit.

The Division of Water Quality of North Carolina has issued an Ash Reuse Permit (#WQ0000452) as a non-discharge permit for the utilization of coal ash (fly and bottom ash) removed from the Riverbend Ash Basin. Coal ash removed from the ash basin must be utilized in applications specified in the ash reuse permit. The applications, including those for on-site utilizations, must meet all conditions of the permit including set-back (buffer) and reporting requirements. These ash reuse applications are used to provide additional ash storage capacity in the basin system. There have been no non-compliances associated with the Riverbend Ash Reuse Permit.

Solid Waste

Because all coal ash (fly and bottom ash) at Riverbend is wet sluiced to the ash basin system and there is no means of dry management of the ash, coal ash must first be removed from the ash basin system (NPDES permitted system) prior to nay disposition. Therefore, the disposition of all ash at Riverbend is regulated by the Division of Water Quality of North Carolina under the ash reuse permit (discussed above) and not by the Division of Solid Waste of North Carolina. In the future, if ash is to be removed from the ash basin system and landfilled on-site, the landfill must be permitted through the Division of Water Quality. In addition, if dry management of coal ash is established at Riverbend, the landfilling and/or utilization of dry managed coal ash must be regulated through the Division of Solid Waste of North Carolina.

Watershed Regulations

Mountain Island Lake has been designated a WS-IV designation, with Riverbend Steam Station in the Critical Area. The final watershed regulations in North Carolina will not allow a new coal ash landfill within the plant boundary. Dry ash landfilling of Riverbend's ash could only occur outside the Critical Area of the Mountain Island Lake watershed.

Watershed regulations must be addresses through Gaston county. The proposed 2000 structural ash fill project design returns all runoff drainage to the Primary Ash Basin. As a result, erosion control permits to NCDENR-Mooresville will not be required. However, since the project is within the Critical Area of Mountain Island Lake, the watershed regulations will need to be addressed to Gaston County.

ASH PRODUCTION AND POND STORAGE CAPACITY

SMP&O Resource Planning Group coal consumption forecasts and TSG, Fuels Support Group coal ash content projections are used to estimate projected ash production. Two rates of ash production are considered:

1. The base coal consumption scenario (which represents the best estimate for coal consumption based on projected energy demands, the Integrated Resource Plan, scheduled plant outages, etc.) and,

2 The high coal ash production scenario, based on historical differences between base case coal consumption projections and actual coal consumption at Riverbend Steam Station, a 50% increase over the base case projection as described above is judged to be a reasonable scenario to consider for ash production.

The Primary Cell of the Ash Basin is projected to reach full capacity in late 2001 as shown on Figures 1 and 2. Removal of 500,000 tons (417,000 cubic yards) of Primary Cell ash buys approximately six (6) additional years of pond storage.

1994-1995 ASH RECOVERY PROJECT

Approximately 404,000 tons of ash was excavated from the Riverbend Primary Cell between September 1994 and May 1995 by Trans-Ash. This project was a Duke-subsidized project at a cost of $2,800,105 or $6.93/ton that extended the pond capacity for 5-6 years. The pond ash was hauled approximately two miles to property owned by New Covenant United Methodist Church fronting on NC Highway 16. The pond ash was placed, compacted and covered as a structural fill by contract between Trans-Ash and the church. The church facility was constructed in 1996 adjacent to the fill with parking and recreation areas above the fill. Some public relations issues were addressed including maintenance of the state road near the pond access.

ASH PRODUCTION AND UTILIZATION OPTIONS

Off-Site Options

Off-site structural ash fill projects will be marketed in the area of Riverbend in 1999 and 2000. Off-site projects could substitute for all or part of the on-site project if economically feasible. Potential off-site projects require business case justification compared to on-site options outlined by this plan. Off-site projects would need to be lower cost per ton than on-site projects. Positive and negative (truck traffic impact) community relations factors will be considered. Potential marketable off-site projects in the Riverbend area may include:

1. Commercial property development along NC Highway 16 corridor.
2. Industrial property development near Mount. Holly.
3. New public school sites in eastern Gaston County.
4. Construction of new NC Highway 16 and I-485.

Riverbend Steam Station has significant long-term on–site storage space for ash storage. However, it is recommended that off-site options continue to be explored and compared to on-site options, especially where potential revenues to offset disposal costs are feasible.

On-Site Option: Phase 1 Primary Cell Excavation and Placement

Phase 1 of the 2000 project proposed excavation of 500,000 tons (or 417,000 cubic yards) of Primary Cell ash for placement in an ash storage area south of the Primary Cell. The pond excavation plan is as listed below. Refer to Schematic Excavation Plan shown on Figure 3.

1. Slowly lower water in Primary and Secondary Cells to El 712.

2. Allow cells to drain and stabilize for one week.

3. Place silt fencing around both the Primary and Secondary Cell discharge towers.

4. Excavate ditches in Primary Cell with trackhoe as shown on the Schematic Excavation Plan (Figure 3).

5. Periodically excavate ditches to prevent ash prevent ash from reaching the tower.

6. Excavate approximately 200,000 tons in Primary Cell, Area 1 from El 720 to El 712 (8 feet depth).

7. Excavate in approximately 300,000 tons in Primary Cell, Area 2 from El 720 to El 712 (8 feet depth).

The storage area will fill the existing Dredge Pond and be constructed above it to El 788. The following scope and equipment are specified:

Scope	Quantity	Units	Comments	
• Clearing	4.1	Acre		
• Silt fence	3000	ln ft		
• Ash excavation	500,000	Tons	417,000	cy
• Ash placement	500,000	Tons	417,000	cy
• Soil cover	6800	cy	1 ft on slopes, 6" on top	
• Grassing	6.3	Acres		
• Ditching	2000	ln ft		
• Haul road gravel surface	91	Tons		

Equipment	Quantity	Units	Comments	
• 5 cy track loader with 10 foot reach	1	Ea		
• 20 cy dump truck	10	Ea		
• D7 dozer	1	Ea		
• Vibratory steel wheel compactor	1	Ea		
• Production/dump truck/day	384	Tons		
• Work days required	104	Days	5	Months

Ash removed from the Primary Cell will be placed by truck or dredge methods in the existing Dredge Pond (72,000 cy). Ash will then be hauled and placed above the Dredge Pond as shown on the drawing. Cover soil will be borrowed from the area shown on the drawing. Ash will be placed in a controlled manner with a compaction requirement of 95% standard Proctor density. This allows for potential future development and construction on the site above the fill. The density testing contractor will be contracted by Ash Management to allow third party quality control. Fill surface elevation will not exceed El 785 ft to accommodate a future tie-in with the adjacent existing hill and road. Slopes will be designed at 3:1. A one-way truck route will be established to facilitate on-site hauling. Dust control will be handled by water spray trucks.

Schedule

Several pre-project preparation activities will be implemented in 1999. These activities are shown on Figure 4 Implementation Schedule. Final engineering, specification preparation and Erosion Control Plan will be executed from March to May 1999. This will allow for bidding in June-July 1999. Project bids any alternate methods will be shared with Riverbend Station Management when complete.

Regulatory permitting will be executed upon completion of final engineering in the June to August time frame. Permitting for the "Riverbend On-Site Ash Storage Area – Phase 1" (2000 project) will be processed by Duke Energy's Reuse Permit. Since all runoff is being returned to the Primary Cell, Erosion Control Permits should not be needed. An Erosion Control Plan is to be prepared for potential submittal with other permits and for contingency. Since Mountain Island Lake is in a critical watershed area, it will be necessary to submit project plans to Gaston County. It should be noted that a regulatory risk exists which could force the project off-site at a potentially higher subsidized cost than on-site estimates.

Scheduling of project construction shown on Figures 4 and 5 depends on factors including bids, permitting, pond capacity and budget. Ash Management recommends that project construction begin in the Spring of 2000 and no later than Fall of 2000. This schedule aligns with pond capacity needs and construction bids. The project could start as late as Fall 2000 at Riverbend Station Management's risk. The project could be split into phases in 2000 and 2001 based on peak ash production, outages, and construction methods. Mobilization cost would increase with phases.

FUTURE ON-SITE EXCAVATION AND STORAGE OPTIONS

Direct Excavation from Primary Cell

Remove ash directly from Primary Cell using conventional earth moving equipment on a regular basis. This would require lowering the water elevation of the Primary Cell in order to expose and dry out as much ash as possible. The ash removed from the Primary Cell would be utilized off site, perhaps in structural fill applications. From September, 1994 to May, 1995, approximately 404,000 cubic yards of ash were removed from the Primary Cell in this manner and utilized in off site structural fill projects.

Dredge Ash From Primary Cell to Dredge Pond

In the past, ash has been dredged from the Primary Cell to the Dredge Pond, then excavated from the Dredge Pond and placed in off site structural fill projects. In July, 1994, the Dredge Dike drainage filter was repaired in order to facilitate future ash removals from the Dredge Pond. The Dredge Pond is essentially empty at present.

However, dredging requires double handling and the size of utilization projects is limited by the capacity of the Dredge Pond (approximately 72,000 cubic yards). Considering the current Dredge Pond ash storage capacity, a dredge cycle time of 2 years, and the projected coal consumption for Riverbend, pursuing this option alone without other utilization options will likely result in exceeding the ash storage capacity of the Primary Cell over a long period of time.

Sluicing Ash from Units 4 and 5 Directly to Dredge Pond

It has been determined that the existing air separator tank which services Units 4 and 5 provides sufficient head to sluice flyash directly to the Dredge Pond. In addition, the existing bottom ash pumps which service Units 4 and 5 provide sufficient capacity to pump bottom ash directly to the Dredge Pond. The existing ash sluice pipe could be extended approximately 450 feet. in order to discharge directly to the northwest corner of the Dredge Pond at approximately elevation 747.0 ft. The capability to sluice ash to the Primary Cell would be maintained. This option eliminates the double handling of ash, however ash removal from the Dredge Pond would be limited by the rate at which Units 4 and 5 produce ash and by the storage capacity of the Dredge Pond. As described above in the dredging option, pursuing this option alone would like result in the storage capacity of the Primary Cell being exceeded over a long period of time.

This option is not recommended to be executed prior to the Phase 1 2000 project since the existing ash sluice lines would need be extended by approximately 450 feet. Filling of the Dredge Pond will be bid as part of the scope for the Phase 1 2000 project.

Future Phase 2 Storage:

A future Phase 2 on-site ash storage area (proposed 2006-7 timeframe) could be constructed east of Phase 1 (2000 project). This area will be used as a cover soil borrow source for Phase 1. This area, combined with the area to the south of Phase 1 and north of paved County Road #1912 could be tied together to create a potential site for development. Phase 2 would be built around existing Henderson Cemetery which would be preserved. This historic cemetery is excluded from Duke Riverbend Station property and reportedly has Henderson family and slave graves dating back to the Civil War. All final elevations would be tied into previous and future phases. All runoff would be designed to return to the Primary Cell by grading of existing topography.

Future Phase 3 Storage:

A future Phase 3 on-site ash storage area could be constructed west and southwest of Phase 1 on the sloped wooded hillside between Phase 1 and the Station. It could also include areas between the transmission towers. All final elevations would be tied into previous and future phases. All runoff would be designed to return to the Primary Cell by grading of existing topography and/or by draining to the existing coal yard sump drain with return sluice line to the Primary Cell.

Future Phase 4:

A future Phase 4 on-site ash storage area may be feasible in the cleared valley northeast of Phase 2 (1994 site location not used). A large dike would need to be constructed at the north end which would return all runoff to the Primary and/or Secondary Cell. If additional future storage space is required, Phase 1 could be extended to the north by reducing the size and capacity of the Primary Cell. A combination of Phases 1-4 should allow sufficient on site space for ash storage for the life of Riverbend Station. Calculations of estimated volumes for future phases will be include in the final engineering scope of Phase 1.

Ash Benefication

Ash benefication options continue to be studied for potential application at Duke fossil stations. These technologies become important as low Nox rules impact to quality of marketable concrete grade ash from Duke fossil stations. Ash benefication technologies are outlined in detail in the Marshall Ash Management Plan. Application of these technologies at Riverbend Steam Station is not recommended due to capital investment, concrete market proximity to Belews Creek and CP&L-Roxboro, size and age of station.

CONCLUSIONS AND RECOMMENDATIONS

Riverbend Steam Station ash is at full pond capacity in early 2001, based on pond capacity curves and actual production since the 1994-95 ash recovery project. Therefore a spring 2000 project is recommended with pre-project activities in 1999. Project schedules show choices between single and two-phased construction. 500,000 tons (417,000 cubic yards) is recommended for removal from the Primary Cell by methods described in this Plan. Removal of this volume allows for an estimated six (6) additional years of pond storage. Construction will be competitively bid to ash marketing and/or construction contractors.

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FIGURES

FIGURES

SUPPORT DOCUMENTS

DRAWING

Duke Power Company
Fossil/Hydro Dept.
1998 Ash Storage Forecast

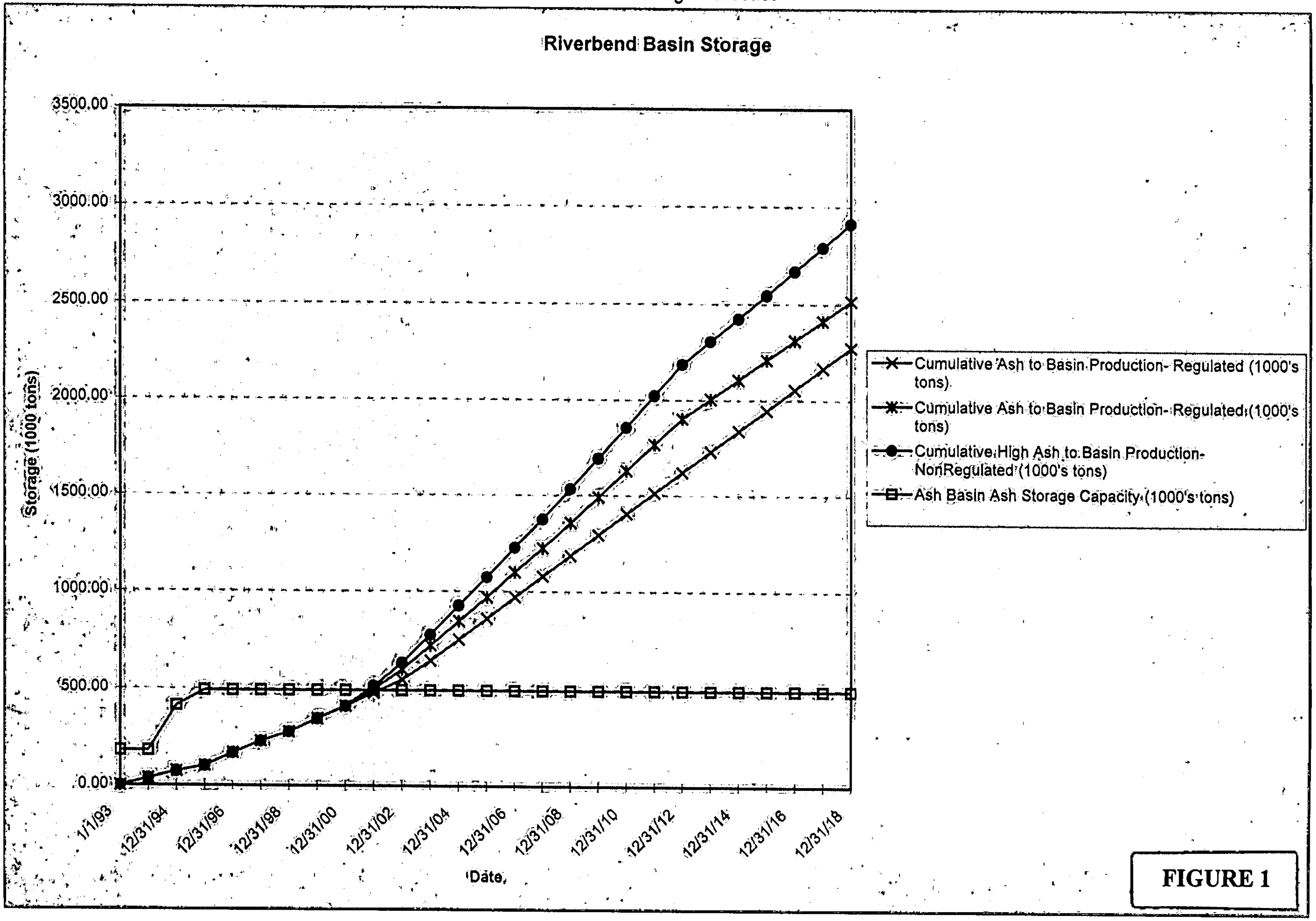
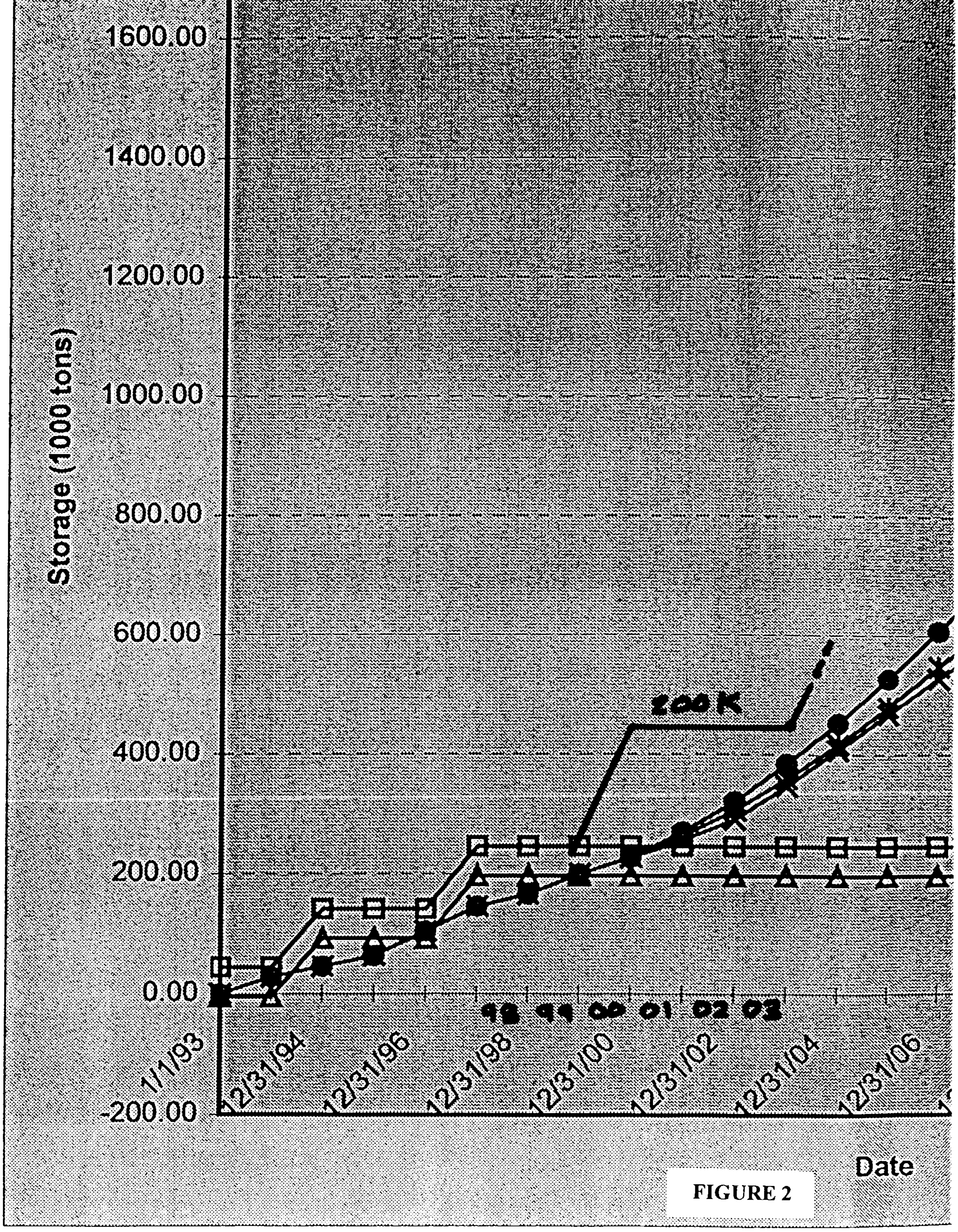


FIGURE 1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1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
-200.00
1/1/93
12/31/94
12/31/96
12/31/98
12/31/00
12/31/02
12/31/04
12/31/06
Date
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98 99 00 01 02 03

FIGURE 2

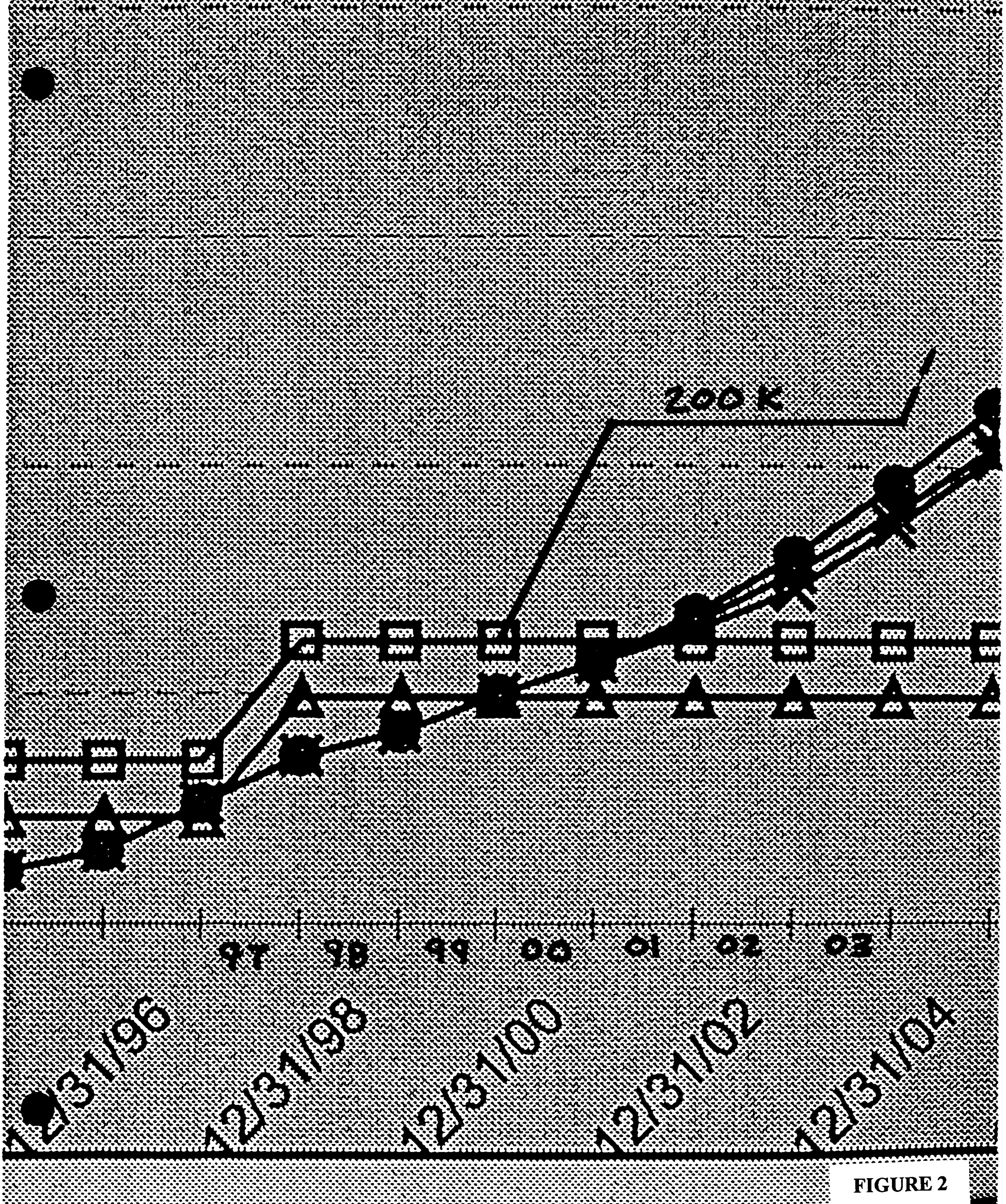

FIGURE 2

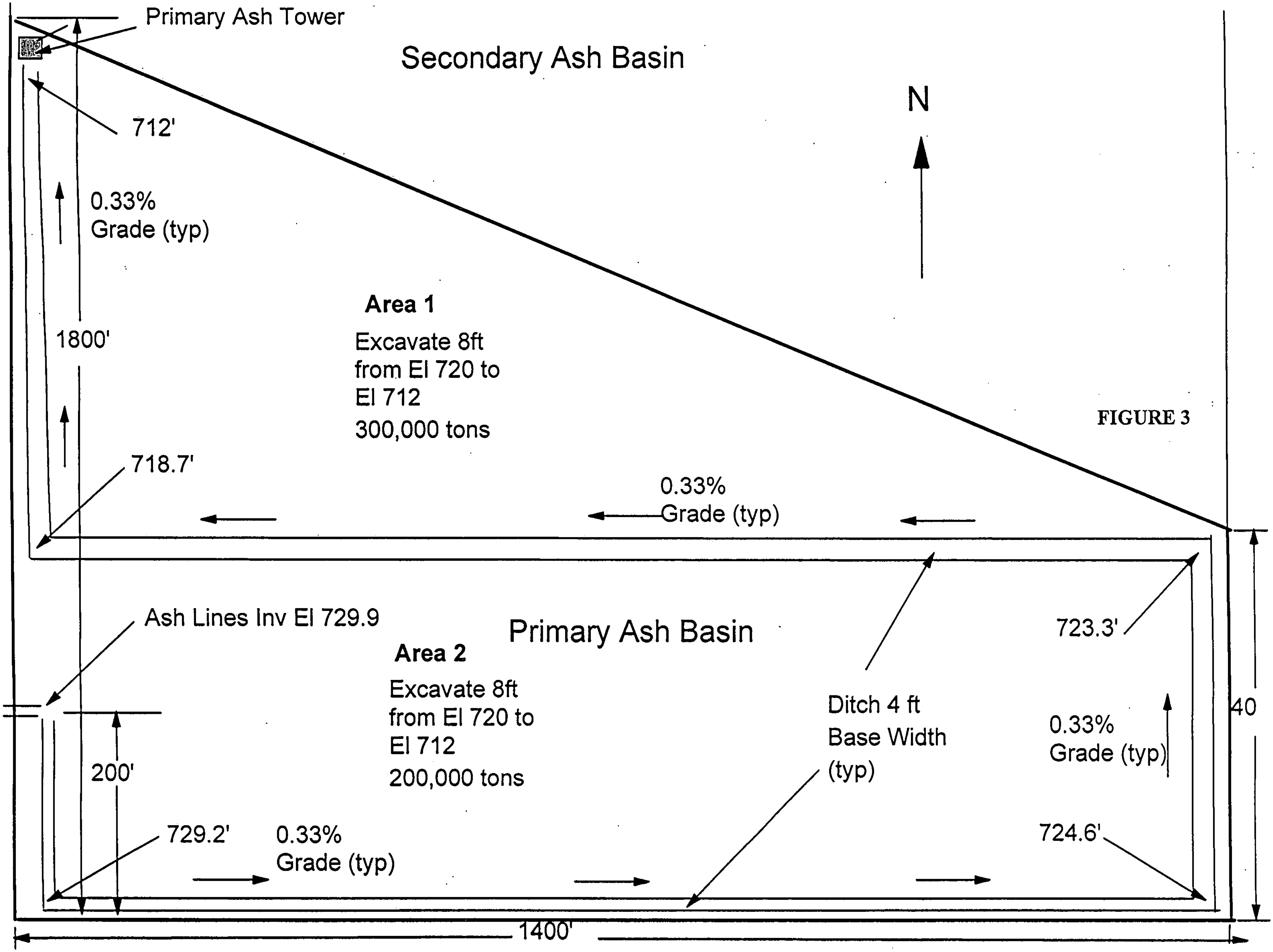
Primary Ash Tower
Secondary Ash Basin
N
712'
0.33%
Grade (typ)
1800'
Area 1
Excavate 8ft
from El 720 to
El 712
300,000 tons
718.7'
0.33%
Grade (typ)
Ash Lines Inv El 729.9
Primary Ash Basin
Area 2
Excavate 8ft
from El 720 to
El 712
200,000 tons
723.3'
Ditch 4 ft
Base Width
(typ)
0.33%
Grade (typ)
40
200'
729.2'
0.33%
Grade (typ)
724.6'
1400'

FIGURE 3

ID	Task Name	Duration
1	Ash Mgt Plan Prep	30 days
2	Prelim Engineering	10 days
3	Pond Excavation Plan	7 days
4	Riverbend Meeting	1 day
5	Ash Mgt Plan Issue	1 day
6	Off-Site Project Marketing	154 days
7	Final Engineering	65 days
8	Final Spec/Excav Plan	65 days
9	Permitting	65 days
10	Bid to Contractors	10 days
11	Bid Review	20 days
12	Award Bid	5 days
13	Mobilize Construct	5 days
14	Clear/Grub/Place Prep	20 days
15	Ash Haul & Place	110 days
16	Cover, Seed & Close	5 days

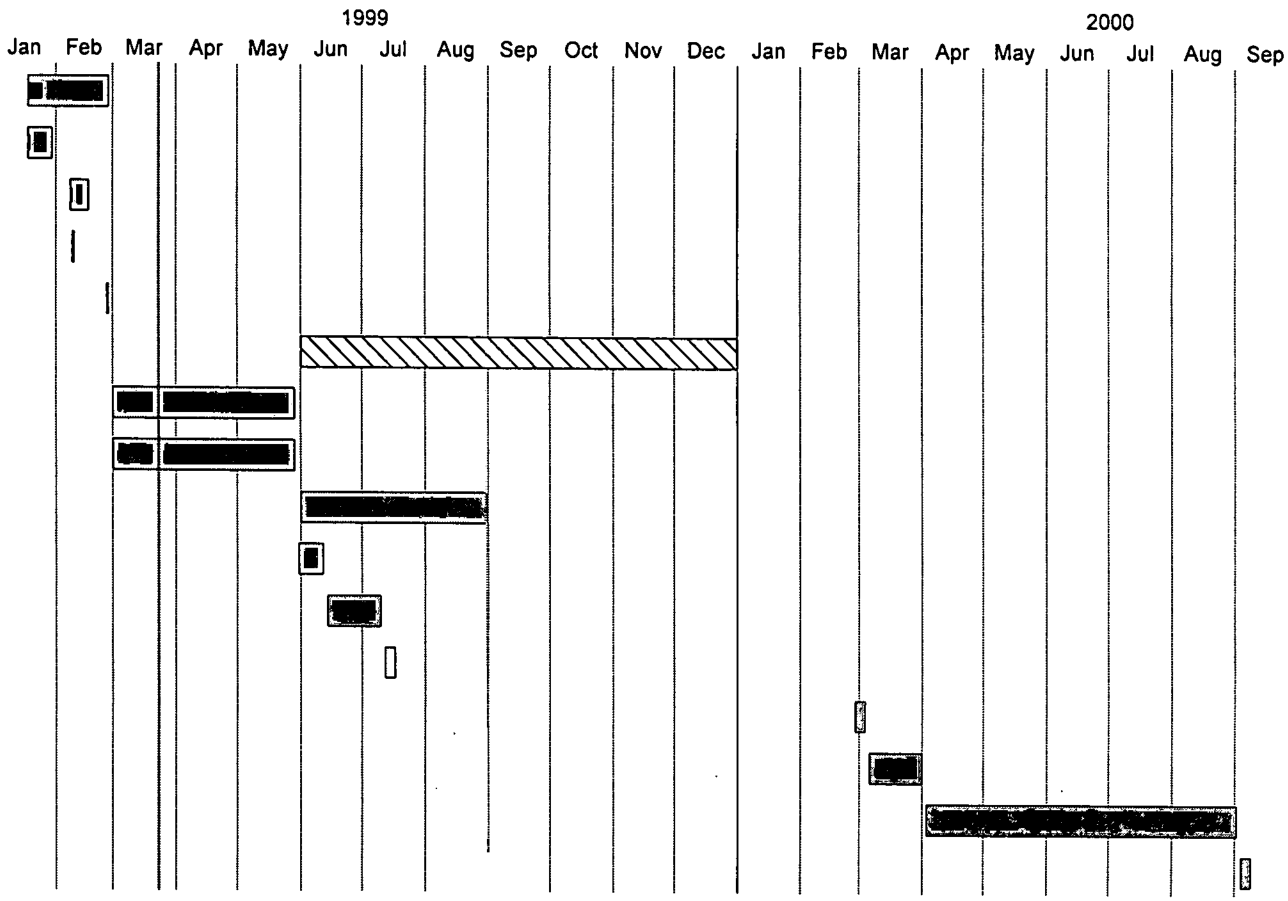

FIGURE 4

ID		Task Name	Duration
1		Ash Mgt Plan Prep	30 days
2		Prelim Engineering	10 days
3		Pond Excavation Plan	7 days
4		Riverbend Meeting	1 day
5		Ash Mgt Plan Issue	1 day
6		Off-Site Project Marketing	154 days
7		Final Engineering	65 days
8		Final Spec/Excav Plan	65 days
9		Permitting	65 days
10		Bid to Contractors	10 days
11		Bid Review	20 days
12		Award Bid	5 days
13		Mobilize Construct	5 days
14		Clear/Grub/Place Prep	20 days
15		Ash Haul & Place - Ph 1	65 days
16		Ash Haul & Place - Ph 2	65 days
17		Cover, Seed & Close	5 days

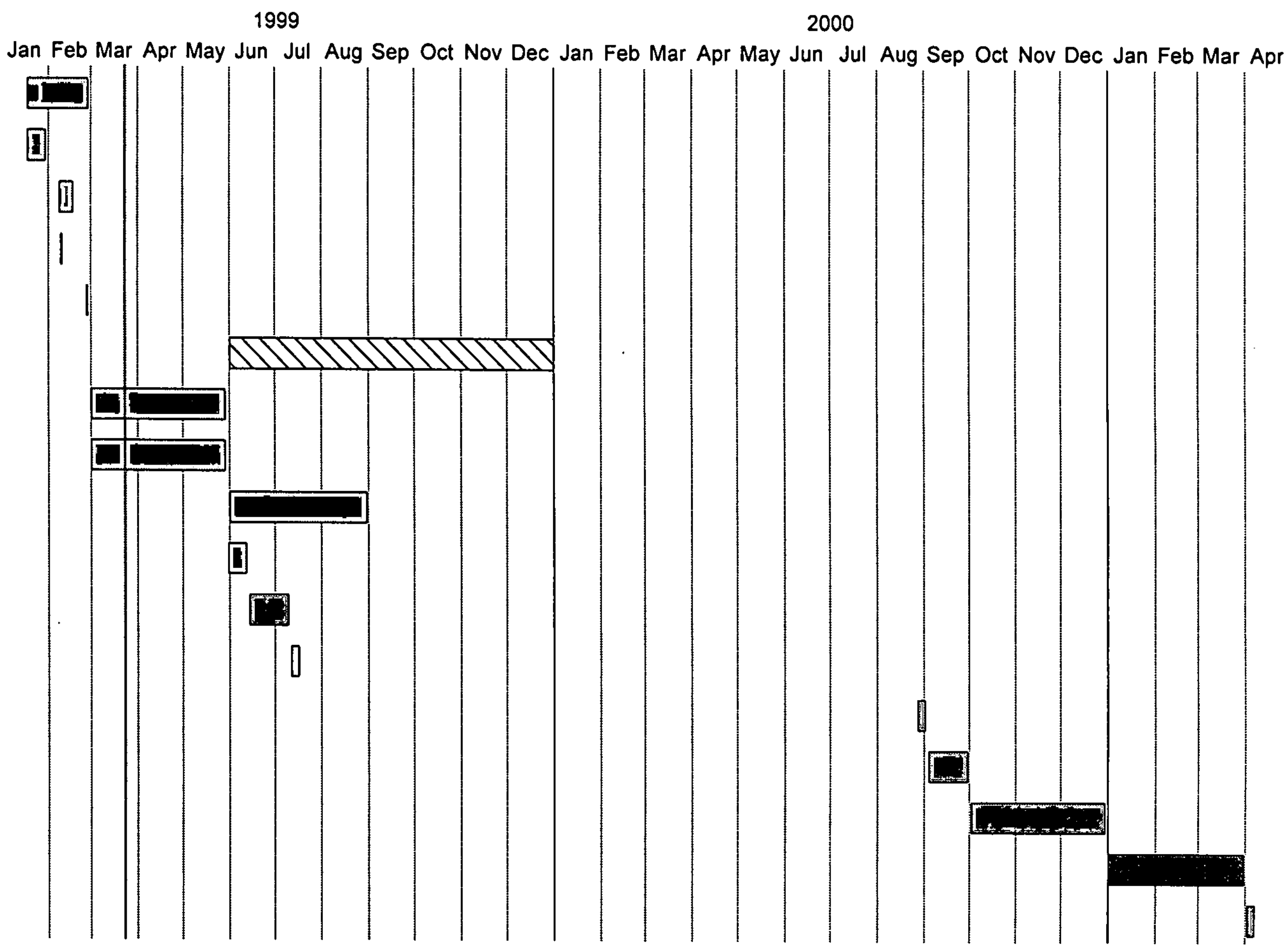

FIGURE 5

Duke Energy Carolinas, LLC
Docket No. E-7, Sub 1214

SUPPORT

Ash Management
Duke Power Co.
1999 Dan River Ash Placement Plan

Riverbend Primary Cell Ash Basin Excavation

1. Lower water level in primary and secondary cell to El 712 slowly.
2. Allow basins to drain and stabilize for one week.
3. Place silt fencing around both the primary and secondary ash towers.
4. Excavate ditches with trackhoe as shown on the excavation plan. Ditch is sloped 0.33% to tower.
5. Periodically excavate ditches to prevent ash from reaching the tower.
6. Excavate in primary cell, Area 1 from El 720 to El 712 (8 ft depth). Quantity is approximately 500,000 tons.

See schematic excavation plan

Ash Management
Duke Power Co.
1999 Dan River Ash Storage Plan

Riverbend Ash Fill Placement

Phase I Fill to El 788

Work Items				
Clearing	4.1	Acre		
Silt Fence	3000	ln ft		
Ash Excavation	400,000	Tons	333,000	cy
Ash Placement	400,000	Tons	333,000	cy
Soil Cover	6800	cy	1 ft on slopes, 6 in on top	
Grassing	6.3	Acre		
Ditching	2000	ln ft		
Haul Road Gravel Surface	91	Tons		

Equipment		
5 cy track loader 10 ft reach	1	Ea
20 cy dump truck	10	Ea
D7 dozer	1	Ea
Vibratory steel wheel compactor	1	Ea
Production/dump truck/day	384	Tons
Work days required	104	Days

Duke Energy Corporation
1999 Ash Basin Landfill Forecast
Actual Ash Production and Utilization

1999 Monthly Ash Production & Utilization

Notes:
1. All coal consumption, ash production, and ash utilization quantities are in 1000's of dry tons.

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JAN Coal Consumption	177.00	474.00	79.00	151.00	54.00	73.00	461.00	74.00	1,543.000	1,543.000
JAN % Ash	10.70	9.08	13.37	8.23	10.17	8.73	10.20	10.66		
JAN Ash Produced	18.94	43.04	10.56	12.43	5.49	6.37	47.02	7.89	151.74	151.74
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	18.94	29.74	10.56	12.43	5.49	6.37	28.73	7.89	120.15	120.15
Net Ash Placed in Landfills		13.30					18.29		31.59	31.59
JAN Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FEB Coal Consumption	155.00	438.00	57.00	137.00	33.00	66.00	438.00	67.00	1,391.000	2,934.000
FEB % Ash	11.32	9.14	13.66	8.32	0.00	0.00	10.18	11.14		
FEB Ash Produced	17.55	40.03	7.79	11.40	0.00	0.00	44.59	7.46	128.82	280.56
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	17.55	40.03	7.79	11.40	0.00	0.00	44.59	7.46	128.82	248.97
Net Ash Placed in Landfills									0.00	31.59
FEB Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAR Coal Consumption	202.00	253.00	74.00	154.00	44.00	71.00	431.00	88.00	1,317.000	4,251.000
MAR % Ash	10.85	9.42	13.71	7.98	10.89	8.10	10.35	10.46		
MAR Ash Produced	21.92	23.83	10.15	12.29	4.79	5.75	44.61	9.20	132.54	413.10
Utilization: Concrete										0.00
Mineral Filler										0.00
Structural Fill										0.00
JTM Bottom Ash										0.00
Duke Bottom Ash										0.00
Mill Rejects										0.00
Other: Ash Removal										0.00
Net Ash Sluiced to Basins	21.92	23.83	10.15	12.29	4.79	5.75	44.61	9.20	132.54	381.51
Net Ash Placed in Landfills									0.00	31.59
MAR Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
APR Coal Consumption	157.00	192.00	71.00	64.00	47.00	64.00	375.00	41.00	1,011.000	5,262.000
APR % Ash	11.05	9.44	14.46	8.75	10.44	8.37	11.62	10.77		
APR Ash Produced	17.35	18.12	10.27	5.60	4.91	5.36	43.58	4.42	109.59	522.69
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	17.35	18.12	10.27	5.60	4.91	5.36	43.58	4.42	109.59	491.10
Net Ash Placed in Landfills									0.00	31.59
APR Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAY Coal Consumption	178.00	450.00	82.00	131.00	60.00	77.00	425.00	77.00	1,480.000	6,742.000
MAY % Ash	10.51	9.55	13.48	7.80	10.85	8.23	10.87	9.66		
MAY Ash Produced	18.71	42.98	11.05	10.22	6.51	6.34	46.20	7.44	149.44	672.13
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	18.71	42.98	11.05	10.22	6.51	6.34	46.20	7.44	149.44	640.54
Net Ash Placed in Landfills									0.00	31.59
MAY Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUN Coal Consumption	202.00	501.00	70.00	123.00	29.00	70.00	439.00	80.00	1,514.000	8,256.000
JUN % Ash	10.30	9.74	12.92	8.33	10.93	8.46	9.46	9.93		
JUN Ash Produced	20.81	48.80	9.04	10.25	3.17	5.92	41.53	7.94	147.46	819.59
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	20.81	48.80	9.04	10.25	3.17	5.92	41.53	7.94	147.46	788.00
Net Ash Placed in Landfills									0.00	31.59
JUN Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Duke Energy Corporation
1999 Ash Basin Landfill Forecast
Actual Ash Production and Utilization

1999 Monthly Coal Ash Production and Utilization Tracking (as of 1/28/99): Sheet 2 of 2

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JUL Coal Consumption	198.00	527.00	60.00	125.00	32.00	54.00	429.00	67.00	1,492.000	9,748.000
JUL % Ash	10.55	9.98	13.74	8.22	11.15	8.33	10.09	9.97		
JUL Ash Produced	20.89	52.59	8.24	10.28	3.57	4.50	43.29	6.68	150.03	969.62
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	20.89	52.59	8.24	10.28	3.57	4.50	43.29	6.68	150.03	938.03
Net Ash Placed in Landfills									0.00	31.59
JUL Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AUG Coal Consumption	183.00	491.00	57.00	116.00	36.00	57.00	422.00	64.00	1,426.000	11,174.000
AUG % Ash	9.01	10.09	13.57	8.72	10.96	8.36	10.26	9.27		
AUG Ash Produced	16.49	49.54	7.73	10.12	3.95	4.77	43.30	5.93	141.82	1111.44
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	16.49	49.54	7.73	10.12	3.95	4.77	43.30	5.93	141.82	1079.85
Net Ash Placed in Landfills									0.00	31.59
AUG Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEP Coal Consumption	193.00	465.00	56.00	121.00	18.00	53.00	309.00	75.00	1,290.000	12,464.000
SEP % Ash	9.09	10.30	13.10	9.37	9.75	9.17	9.98	9.73		
SEP Ash Produced	17.54	47.90	7.34	11.34	1.76	4.86	30.84	7.30	128.86	1,240.31
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	17.54	47.90	7.34	11.34	1.76	4.86	30.84	7.30	128.86	1208.72
Net Ash Placed in Landfills									0.00	31.59
SEP Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OCT Coal Consumption	187.00	358.00	73.00	154.00	39.00	61.00	316.00	80.00	1,268.000	13,732.000
OCT % Ash	9.95	10.09	14.39	8.86	9.16	9.97	10.30	9.88		
OCT Ash Produced	18.61	36.12	10.50	13.64	3.57	6.08	32.55	7.90	128.98	1,369.29
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	18.61	36.12	10.50	13.64	3.57	6.08	32.55	7.90	128.98	1337.70
Net Ash Placed in Landfills									0.00	31.59
OCT Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOV Coal Consumption	198.00	476.00	77.00	143.00	25.00	73.00	300.00	78.00	1,370.000	15,102.000
NOV % Ash	10.21	10.58	14.22	9.01	10.41	11.06	10.39	11.13		
NOV Ash Produced	20.22	50.36	10.95	12.88	2.60	8.07	31.17	8.68	144.94	1,514.23
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	20.22	50.36	10.95	12.88	2.60	8.07	31.17	8.68	144.94	1482.64
Net Ash Placed in Landfills									0.00	31.59
NOV Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DEC Coal Consumption	217.00	527.00	62.00	145.00	31.00	62.00	358.00	62.00	1,464.000	16,566.000
DEC % Ash	9.80	9.50	11.00	9.00	11.00	10.00	11.00	10.00		
DEC Ash Produced	21.27	50.07	6.82	13.05	3.41	6.20	39.38	6.20	146.39	1,660.62
Utilization: Concrete									0.00	0.00
Mineral Filler									0.00	0.00
Structural Fill									0.00	0.00
JTM Bottom Ash									0.00	0.00
Duke Bottom Ash									0.00	0.00
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	21.27	50.07	6.82	13.05	3.41	6.20	39.38	6.20	146.39	1629.03
Net Ash Placed in Landfills									0.00	31.59
DEC Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year to Date Coal Consumed	2,247.000	5,152.000	818.000	1,564.000	448.000	781.000	4,703.000	853.000		16,566.000
Year to Date Ash Produced	230.27	503.38	110.45	133.49	43.72	64.22	488.04	87.05		1,660.62
Utilization: Concrete	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Mineral Filler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Structural Fill	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
JTM Bottom Ash	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Duke Bottom Ash	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Mill Rejects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Other: Ash Removal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Ash Sluiced to Basins	230.27	490.09	110.45	133.49	43.72	64.22	469.75	87.05	1629.03	1629.03
Net Ash Placed in Landfills	0.00	13.30	0.00	0.00	0.00	0.00	18.29	0.00	31.59	31.59
YTD Total Ash Utilized	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
YTD Percent Ash Utilized	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.00	0.0%
YTD + Projected Ash Production	230.27	503.38	110.45	133.49	43.72	64.22	488.04	87.05		1660.62
YTD + Projected Ash Utilization	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
YTD + Projected % Ash Utilization	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%

2/8/99

jwj9519

Updated BC moisture to landfill 11/98

Duke Energy Corporation
1998 Ash Basin Landfill Forecast
Actual Ash Production and Utilization

1998 Monthly Ash Production & Utilization

Notes:
1. All coal consumption, ash production, and ash utilization quantities are in 1000's of dry tons.

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JAN Coal Consumption	71.77	483.48	36.19	110.78	3.96	2.03	478.47	10.48	1,197.151	1,197.151
JAN % Ash	10.70	9.08	13.37	8.23	10.17	8.73	10.20	10.66		
JAN Ash Produced	7.68	43.90	4.84	9.12	0.40	0.18	48.80	1.12	116.04	116.04
Utilization: Concrete		16.43		0.20					16.64	16.64
Mineral Filler							0.49		0.49	0.49
Structural Fill									0.00	0.00
JTM Bottom Ash		1.96					3.50		5.46	5.46
Duke Bottom Ash							0.67		0.67	0.67
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	7.68	22.68	4.84	8.91	0.40	0.18	2.13	1.12	47.94	47.94
Net Ash Placed in Landfills		2.82					42.02		44.84	44.84
JAN Total Ash Utilized	0.00	18.40	0.00	0.20	0.00	0.00	4.65	0.00	23.25	23.25
FEB Coal Consumption	39.56	431.62	1.66	64.28	0.00	0.00	343.31	14.35	894.783	2,091.934
FEB % Ash	11.32	9.14	13.66	8.32	0.00	0.00	10.18	11.14		
FEB Ash Produced	4.48	39.45	0.23	5.35	0.00	0.00	34.95	1.60	86.05	202.09
Utilization: Concrete		20.33		0.20					20.53	37.17
Mineral Filler							0.61		0.61	1.10
Structural Fill									0.00	0.00
JTM Bottom Ash		2.57					4.28		6.85	12.31
Duke Bottom Ash							0.30		0.30	0.97
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	4.48	8.60	0.23	5.15	0.00	0.00	10.23	1.60	30.28	78.23
Net Ash Placed in Landfills		7.95					19.53		27.48	72.32
FEB Total Ash Utilized	0.00	22.89	0.00	0.20	0.00	0.00	5.19	0.00	28.29	51.54
MAR Coal Consumption	141.67	405.22	24.78	109.41	22.27	22.94	360.82	36.05	1,123.161	3,215.095
MAR % Ash	10.85	9.42	13.71	7.98	10.89	8.10	10.35	10.46		
MAR Ash Produced	15.37	38.17	3.40	8.73	2.43	1.86	37.34	3.77	111.07	313.16
Utilization: Concrete		26.47		1.71					28.19	65.35
Mineral Filler							0.63		0.63	1.73
Structural Fill									0.00	0.00
JTM Bottom Ash		2.67					4.99		7.66	19.97
Duke Bottom Ash							1.08		1.08	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	15.37	1.87	3.40	7.02	2.43	1.86	11.79	3.77	47.51	125.74
Net Ash Placed in Landfills		7.15					18.85		26.00	98.32
MAR Total Ash Utilized	0.00	29.15	0.00	1.71	0.00	0.00	6.70	0.00	37.56	89.10
APR Coal Consumption	81.49	458.93	8.53	48.38	1.95	5.53	417.24	12.52	1,034.581	4,249.676
APR % Ash	11.05	9.44	14.46	8.75	10.44	8.37	11.62	10.77		
APR Ash Produced	9.00	43.32	1.23	4.23	0.20	0.46	48.48	1.35	108.29	421.45
Utilization: Concrete		30.98		0.95					31.93	97.28
Mineral Filler							0.86		0.86	2.59
Structural Fill							22.99		22.99	22.99
JTM Bottom Ash		3.08					5.54		8.62	28.59
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	9.00	3.67	1.23	3.28	0.20	0.46	-8.05	1.35	11.15	136.89
Net Ash Placed in Landfills		5.60					27.14		32.74	131.06
APR Total Ash Utilized	0.00	34.06	0.00	0.95	0.00	0.00	29.39	0.00	64.40	153.50
MAY Coal Consumption	173.34	470.83	59.24	135.63	40.77	50.66	387.65	78.74	1,396.865	5,646.541
MAY % Ash	10.51	9.55	13.48	7.80	10.85	8.23	10.87	9.66		
MAY Ash Produced	18.22	44.96	7.99	10.58	4.42	4.17	42.14	7.61	140.08	561.53
Utilization: Concrete		33.42		1.51					34.93	132.21
Mineral Filler							0.60		0.60	3.19
Structural Fill							67.71		67.71	90.70
JTM Bottom Ash		2.00					5.05		7.05	35.64
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	18.22	2.42	7.99	9.07	4.42	4.17	-41.06	7.61	12.82	149.71
Net Ash Placed in Landfills		7.13					9.84		16.97	148.04
MAY Total Ash Utilized	0.00	35.42	0.00	1.51	0.00	0.00	73.36	0.00	110.29	263.78
JUN Coal Consumption	246.23	487.13	91.67	162.70	62.31	80.07	397.90	107.85	1,635.855	7,282.396
JUN % Ash	10.30	9.74	12.92	8.33	10.93	8.46	9.46	9.93		
JUN Ash Produced	25.36	47.45	11.84	13.55	6.81	6.77	37.64	10.71	160.14	721.67
Utilization: Concrete		38.74		1.12					39.87	172.08
Mineral Filler							0.65		0.65	3.84
Structural Fill							79.81		79.81	170.51
JTM Bottom Ash		1.86					4.79		6.65	42.29
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	25.36	2.34	11.84	12.43	6.81	6.77	-50.23	10.71	26.04	175.75
Net Ash Placed in Landfills		4.50					2.63		7.12	155.16
JUN Total Ash Utilized	0.00	40.61	0.00	1.12	0.00	0.00	85.25	0.00	126.98	390.76

Duke Energy Corporation
1998 Ash Basin Landfill Forecast
Actual Ash Production and Utilization

1998 Monthly Coal Ash Production and Utilization Tracking (as of 9/30/98): Sheet 2 of 2

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JUL Coal Consumption	221.45	545.57	84.11	168.82	53.87	63.85	483.70	100.64	1,721.997	9,004.393
JUL % Ash	10.55	9.98	13.74	8.22	11.15	8.33	10.09	9.97		
JUL Ash Produced	23.36	54.45	11.56	13.88	6.01	5.32	48.80	10.03	173.41	895.08
Utilization: Concrete		41.59		0.66					42.25	214.33
Mineral Filler							0.62		0.62	4.46
Structural Fill							20.23		20.23	190.74
JTM Bottom Ash		1.84					5.53		7.37	49.65
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	23.36	7.33	11.56	13.21	6.01	5.32	20.28	10.03	97.10	272.85
Net Ash Placed in Landfills		3.69					2.15		5.84	161.00
JUL Total Ash Utilized	0.00	43.42	0.00	0.66	0.00	0.00	26.38	0.00	70.47	461.23
AUG Coal Consumption	236.13	569.93	93.56	177.68	58.28	75.98	510.40	106.58	1,828.540	10,832.933
AUG % Ash	9.01	10.09	13.57	8.72	10.96	8.36	10.26	9.27		
AUG Ash Produced	21.28	57.51	12.70	15.49	6.39	6.35	52.37	9.88	181.96	1077.04
Utilization: Concrete		37.76		0.82					38.58	252.91
Mineral Filler							0.84		0.84	5.30
Structural Fill							38.94		38.94	229.69
JTM Bottom Ash		1.84					5.01		6.84	56.50
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	21.28	7.60	12.70	14.68	6.39	6.35	4.64	9.88	83.51	356.37
Net Ash Placed in Landfills		10.31					2.94		13.24	174.24
AUG Total Ash Utilized	0.00	39.60	0.00	0.82	0.00	0.00	44.79	0.00	85.20	546.44
SEP Coal Consumption	116.00	481.00	49.00	115.00	22.00	38.00	409.00	67.00	1,297.000	12,129.933
SEP % Ash	9.09	10.30	13.10	9.37	9.75	9.17	9.98	9.73		
SEP Ash Produced	10.54	49.54	6.42	10.78	2.15	3.48	40.82	6.52	130.25	1,207.29
Utilization: Concrete		38.25		2.74					40.99	293.90
Mineral Filler							0.84		0.84	6.14
Structural Fill							2.81		2.81	232.50
JTM Bottom Ash		2.65					4.48		7.13	63.63
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	10.54	-3.62	6.42	8.04	2.15	3.48	6.38	6.52	39.91	396.27
Net Ash Placed in Landfills		12.27					26.30		38.57	212.81
SEP Total Ash Utilized	0.00	40.90	0.00	2.74	0.00	0.00	8.14	0.00	51.77	598.21
OCT Coal Consumption	129.81	533.83	39.75	121.75	15.50	19.33	423.53	61.53	1,345.038	13,474.971
OCT % Ash	9.95	10.09	14.39	8.86	9.16	9.97	10.30	9.88		
OCT Ash Produced	12.92	53.86	5.72	10.79	1.42	1.93	43.62	6.08	136.34	1,343.63
Utilization: Concrete		40.63		3.09					43.72	337.61
Mineral Filler							0.82		0.82	6.96
Structural Fill									0.00	232.50
JTM Bottom Ash		0.92					5.04		5.96	69.59
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	12.92	1.00	5.72	7.70	1.42	1.93	13.33	6.08	50.09	446.37
Net Ash Placed in Landfills		11.32					24.43		35.75	248.56
OCT Total Ash Utilized	0.00	41.55	0.00	3.09	0.00	0.00	5.86	0.00	50.49	648.70
NOV Coal Consumption	69.84	427.29	43.22	111.44	0.46	2.82	393.66	18.83	1,067.570	14,542.541
NOV % Ash	10.21	10.58	14.22	9.01	10.41	11.06	10.39	11.13		
NOV Ash Produced	7.13	45.21	6.15	10.04	0.05	0.31	40.90	2.10	111.88	1,455.51
Utilization: Concrete		36.49		3.66					40.16	377.77
Mineral Filler							0.62		0.62	7.58
Structural Fill									0.00	232.50
JTM Bottom Ash		0.22					4.14		4.36	73.94
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	7.13	4.06	6.15	6.38	0.05	0.31	13.73	2.10	39.90	486.27
Net Ash Placed in Landfills		4.43					22.42		26.85	275.41
NOV Total Ash Utilized	0.00	36.71	0.00	3.66	0.00	0.00	4.76	0.00	45.13	693.83
DEC Coal Consumption	51.36	485.40	32.85	92.34	84.00	3.35	378.32	18.58	1,146.200	15,688.741
DEC % Ash	9.80	9.50	11.00	9.00	11.00	10.00	11.00	10.00		
DEC Ash Produced	5.03	46.11	3.61	8.31	9.24	0.34	41.62	1.86	116.12	1,571.63
Utilization: Concrete		32.32		2.18					34.50	412.27
Mineral Filler							0.62		0.62	8.20
Structural Fill									0.00	232.50
JTM Bottom Ash		0.49					3.45		3.93	77.87
Duke Bottom Ash									0.00	2.05
Mill Rejects									0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	5.03	7.83	3.61	6.13	9.24	0.34	17.91	1.86	51.94	538.21
Net Ash Placed in Landfills		5.48					19.64		25.12	300.53
DEC Total Ash Utilized	0.00	32.81	0.00	2.18	0.00	0.00	4.07	0.00	39.05	732.88
Year to Date Coal Consumed	1,578.653	5,780.229	564.567	1,418.217	365.370	364.559	4,983.984	633.162		15,688.741
Year to Date Ash Produced	160.38	563.94	75.68	120.85	39.51	31.17	517.49	62.62		1,571.63
Utilization: Concrete	0.00	393.41	0.00	18.85	0.00	0.00	0.00	0.00		412.27
Mineral Filler	0.00	0.00	0.00	0.00	0.00	0.00	8.20	0.00		8.20
Structural Fill	0.00	0.00	0.00	0.00	0.00	0.00	232.50	0.00		232.50
JTM Bottom Ash	0.00	22.08	0.00	0.00	0.00	0.00	55.79	0.00		77.87
Duke Bottom Ash	0.00	0.00	0.00	0.00	0.00	0.00	2.05	0.00		2.05
Mill Rejects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Other: Ash Removal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Ash Sluiced to Basins	160.38	65.79	75.68	101.99	39.51	31.17	1.07	62.62	538.21	538.21
Net Ash Placed in Landfills	0.00	82.65	0.00	0.00	0.00	0.00	217.88	0.00	300.53	300.53
YTD Total Ash Utilized	0.00	415.49	0.00	18.85	0.00	0.00	298.54	0.00	732.88	732.88
YTD Percent Ash Utilized	0.0%	73.7%	0.0%	15.6%	0.0%	0.0%	57.7%	0.0%	1.47	46.6%
YTD + Projected Ash Production	160.38	563.94	75.68	120.85	39.51	31.17	517.49	62.62		1571.63
YTD + Projected Ash Utilization	0.00	415.49	0.00	18.85	0.00	0.00	298.54	0.00		732.88
YTD + Projected % Ash Utilization	0.0%	73.7%	0.0%	15.6%	0.0%	0.0%	57.7%	0.0%		46.6%

2/8/99

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Updated BC moisture to landfill 11/98

Duke Energy Corporation
1997 Ash Basin Landfill Forecast
Actual Ash Production and Utilization

1997 Monthly Ash Production & Utilization

Notes:
1. All coal consumption, ash production, and ash utilization quantities are in 1000's of dry tons.

Month	Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
JAN Coal Consumption	263.12	496.37	80.27	151.56	53.01	62.53	490.04	83.68	1,680.582	1,680.582
JAN % Ash	10.69	9.00	10.75	8.21	9.78	10.39	9.32	8.57		
JAN Ash Produced	28.13	44.67	8.63	12.44	5.18	6.50	45.67	7.17	158.40	158.40
Utilization: Concrete		20.93					2.08		23.01	23.01
Mineral Filler							0.64		0.64	0.64
Structural Fill							36.73		36.73	36.73
JTM Bottom Ash		0.57					3.66		4.23	4.23
Duke Bottom Ash							6.10		6.10	6.10
Mill Rejects							0.00		0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	28.13	2.76	8.63	12.44	5.18	6.50	-5.00	7.17	65.82	65.82
Net Ash Placed in Landfills		20.41					1.47		21.88	21.88
JAN Total Ash Utilized	0.00	21.50	0.00	0.00	0.00	0.00	49.20	0.00	70.70	70.70
FEB Coal Consumption	163.89	468.05	28.00	68.45	7.35	5.03	425.20	18.52	1,184.490	2,865.072
FEB % Ash	10.91	9.03	11.46	8.00	10.84	9.00	9.80	7.29		
FEB Ash Produced	17.88	42.26	3.21	5.48	0.80	0.45	41.67	1.35	113.10	271.50
Utilization: Concrete		26.08					0.48		26.55	49.56
Mineral Filler							0.63		0.63	1.26
Structural Fill							34.59		34.59	71.32
JTM Bottom Ash		0.78					2.86		3.64	7.86
Duke Bottom Ash							6.98		6.98	13.08
Mill Rejects							0.00		0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	17.88	4.79	3.21	5.48	0.80	0.45	-3.86	1.35	30.09	95.91
Net Ash Placed in Landfills		10.62					0.00		10.62	32.50
FEB Total Ash Utilized	0.00	26.86	0.00	0.00	0.00	0.00	45.53	0.00	72.39	143.09
MAR Coal Consumption	87.03	483.20	19.67	77.29	3.66	5.49	436.41	17.37	1,130.102	3,995.174
MAR % Ash	11.04	9.14	12.55	7.27	11.58	8.72	9.65	8.28		
MAR Ash Produced	9.61	44.16	2.47	5.62	0.42	0.48	42.11	1.44	106.31	377.81
Utilization: Concrete		32.12							32.12	81.68
Mineral Filler							0.61		0.61	1.87
Structural Fill							31.69		31.69	103.01
JTM Bottom Ash		1.54					3.09		4.63	12.49
Duke Bottom Ash							10.57		10.57	23.65
Mill Rejects							0.00		0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	9.61	3.78	2.47	5.62	0.42	0.48	-3.85	1.44	19.96	115.87
Net Ash Placed in Landfills		6.73					0.00		6.73	39.23
MAR Total Ash Utilized	0.00	33.66	0.00	0.00	0.00	0.00	45.96	0.00	79.62	222.71
APR Coal Consumption	199.19	504.09	44.86	116.86	15.43	3.40	433.19	40.17	1,357.189	5,352.363
APR % Ash	11.35	9.35	11.69	8.21	11.29	8.43	10.15	8.14		
APR Ash Produced	22.61	47.13	5.24	9.59	1.74	0.29	43.97	3.27	133.85	511.66
Utilization: Concrete		33.91					0.00		33.91	115.59
Mineral Filler		0.00					0.68		0.68	2.56
Structural Fill							41.37		41.37	144.38
JTM Bottom Ash		3.08					3.17		6.25	18.74
Duke Bottom Ash							1.36		1.36	25.01
Mill Rejects							0.00		0.00	0.00
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	22.61	1.49	5.24	9.59	1.74	0.29	-2.61	3.27	41.62	157.49
Net Ash Placed in Landfills		8.66					0.00		8.66	47.89
APR Total Ash Utilized	0.00	36.99	0.00	0.00	0.00	0.00	46.58	0.00	83.57	306.28
MAY Coal Consumption	216.75	392.07	64.27	51.99	33.50	16.05	393.97	75.95	1,244.535	6,596.898
MAY % Ash	10.32	9.40	11.58	8.68	10.67	8.53	9.83	8.44		
MAY Ash Produced	22.37	36.85	7.44	4.51	3.57	1.37	38.73	6.41	121.26	632.91
Utilization: Concrete		31.77					0.30		32.08	147.67
Mineral Filler							0.99		0.99	3.55
Structural Fill							40.72		40.72	185.10
JTM Bottom Ash		3.24					3.37		6.61	25.35
Duke Bottom Ash							15.82		15.82	40.83
Mill Rejects							2.46		2.46	2.46
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	22.37	1.84	7.44	4.51	3.57	1.37	-24.94	6.41	22.58	180.07
Net Ash Placed in Landfills		0.00					0.00		0.00	47.89
MAY Total Ash Utilized	0.00	35.01	0.00	0.00	0.00	0.00	63.67	0.00	98.68	404.96
JUN Coal Consumption	156.38	399.18	52.80	93.44	30.47	46.30	412.57	57.52	1,248.657	7,845.555
JUN % Ash	10.37	9.50	12.76	8.49	10.36	9.16	11.29	8.94		
JUN Ash Produced	16.22	37.92	6.74	7.93	3.16	4.24	46.58	5.14	127.93	760.84
Utilization: Concrete		32.38					0.58		32.96	180.62
Mineral Filler							0.78		0.78	4.33
Structural Fill					52.25		42.02		94.27	279.37
JTM Bottom Ash		3.48					3.67		7.15	32.51
Duke Bottom Ash							1.07		1.07	41.91
Mill Rejects							0.00		0.00	2.46
Other: Ash Removal									0.00	0.00
Net Ash Sluiced to Basins	16.22	0.80	6.74	7.93	-49.09	4.24	-1.54	5.14	-9.56	170.51
Net Ash Placed in Landfills		1.26					0.00		1.26	49.15
JUN Total Ash Utilized	0.00	35.86	0.00	0.00	52.25	0.00	48.12	0.00	136.23	541.19

Duke Energy Corporation
1997 Ash Basin Landfill Forecast
Actual Ash Production and Utilization

Month		Allen	Belews Creek	Buck	Cliffside	Dan River	Lee	Marshall	Riverbend	Incrmntl Total	Cumultv Total
	JUL Coal Consumption	218.20	519.69	94.01	151.94	61.86	71.14	478.22	101.49	1,696.555	9,542.110
	JUL % Ash	9.46	9.26	10.99	8.71	10.55	9.27	10.73	8.86		
JUL Ash Produced		20.64	48.12	10.33	13.23	6.53	6.59	51.31	8.99	165.76	926.60
Utilization:	Concrete		34.51					0.72		35.23	215.86
	Mineral Filler		0.00					1.03		1.03	5.36
	Structural Fill					52.25		41.52		93.77	373.14
	JTM Bottom Ash		4.43					5.13		9.56	42.06
	Duke Bottom Ash							0.00		0.00	41.91
	Mill Rejects							0.00		0.00	2.46
Other:	Ash Removal							9.15		9.15	9.15
	Net Ash Sluiced to Basins	20.64	1.39	10.33	13.23	-45.72	6.59	3.16	8.99	18.62	189.13
	Net Ash Placed in Landfills		7.79					0.00		7.79	56.94
JUL Total Ash Utilized		0.00	38.94	0.00	0.00	52.25	0.00	48.40	0.00	139.59	680.78
	AUG Coal Consumption	189.54	551.69	65.04	120.69	29.98	35.86	448.04	55.73	1,496.569	11,038.679
	AUG % Ash	9.06	9.56	12.05	9.17	10.62	10.45	11.27	9.33		
AUG Ash Produced		17.17	52.74	7.84	11.07	3.18	3.75	50.49	5.20	151.44	1078.04
Utilization:	Concrete		39.85					0.19		40.05	255.90
	Mineral Filler							0.85		0.85	6.21
	Structural Fill							27.91		27.91	401.05
	JTM Bottom Ash		2.51					4.79		7.31	49.37
	Duke Bottom Ash									0.00	41.91
	Mill Rejects							0.00		0.00	2.46
Other:	Ash Removal							20.94		20.94	30.09
	Net Ash Sluiced to Basins	17.17	2.53	7.84	11.07	3.18	3.75	5.72	5.20	56.46	245.59
	Net Ash Placed in Landfills		7.84					0.00		7.84	64.78
AUG Total Ash Utilized		0.00	42.37	0.00	0.00	0.00	0.00	33.75	0.00	76.12	756.89
	SEP Coal Consumption	215.15	336.11	75.69	119.44	36.26	36.06	460.98	44.98	1,324.673	12,363.352
	SEP % Ash	9.16	9.77	11.12	8.90	11.52	9.50	10.62	9.42		
SEP Ash Produced		19.71	32.84	8.42	10.63	4.18	3.43	48.96	4.24	132.39	1,210.43
Utilization:	Concrete		28.60		0.05			0.22		28.86	284.77
	Mineral Filler							1.13		1.13	7.34
	Structural Fill							7.35		7.35	408.40
	JTM Bottom Ash		2.78					5.81		8.59	57.96
	Duke Bottom Ash							2.81		2.81	44.71
	Mill Rejects							1.21		1.21	3.67
Other:	Ash Removal							25.72		25.72	55.81
	Net Ash Sluiced to Basins	19.71	0.57	8.42	10.58	4.18	3.43	4.72	4.24	55.83	301.41
	Net Ash Placed in Landfills		0.89							0.89	65.68
SEP Total Ash Utilized		0.00	31.38	0.00	0.05	0.00	0.00	18.52	0.00	49.95	806.84
	OCT Coal Consumption	212.95	552.48	66.93	102.06	36.09	19.42	473.34	30.55	1,493.820	13,857.172
	OCT % Ash	10.18	9.42	13.29	9.03	11.74	10.20	10.98	9.43		
OCT Ash Produced		21.68	52.04	8.89	9.22	4.24	1.98	51.97	2.88	152.90	1,363.33
Utilization:	Concrete		38.78		0.12			0.25		39.14	323.91
	Mineral Filler							2.29		2.29	9.63
	Structural Fill							4.39		4.39	412.79
	JTM Bottom Ash		2.69					6.10		8.79	66.75
	Duke Bottom Ash							2.34		2.34	47.05
	Mill Rejects							1.20		1.20	4.87
Other:	Ash Removal							0.00		0.00	55.81
	Net Ash Sluiced to Basins	21.68	4.28	8.89	9.10	4.24	1.98	35.40	2.88	88.46	389.87
	Net Ash Placed in Landfills		6.29							6.29	71.97
OCT Total Ash Utilized		0.00	41.47	0.00	0.12	0.00	0.00	16.57	0.00	58.16	864.99
	NOV Coal Consumption	235.89	547.64	75.81	135.07	23.55	39.66	350.96	74.57	1,483.150	15,340.322
	NOV % Ash	10.24	9.36	12.95	8.62	11.36	9.32	10.39	9.80		
NOV Ash Produced		24.16	51.26	9.82	11.64	2.68	3.70	36.46	7.31	147.02	1,510.35
Utilization:	Concrete		27.54		0.38					27.92	351.83
	Mineral Filler							1.23		1.23	10.86
	Structural Fill							1.90		1.90	414.69
	JTM Bottom Ash		3.20					3.02		6.22	72.97
	Duke Bottom Ash									0.00	47.05
	Mill Rejects									0.00	4.87
Other:	Ash Removal							0.00		0.00	55.81
	Net Ash Sluiced to Basins	24.16	1.15	9.82	11.26	2.68	3.70	15.28	7.31	75.35	465.22
	Net Ash Placed in Landfills		19.37					15.03		34.40	106.37
NOV Total Ash Utilized		0.00	30.74	0.00	0.38	0.00	0.00	6.15	0.00	37.27	902.26
	DEC Coal Consumption	231.29	563.96	89.32	122.43	51.61	55.99	514.75	83.73	1,713.080	17,053.402
	DEC % Ash	11.59	9.71	12.98	8.69	10.91	9.82	10.52	9.53		
DEC Ash Produced		26.81	54.76	11.59	10.64	5.63	5.50	54.15	7.98	177.06	1,687.41
Utilization:	Concrete		22.92		0.23			0.79		23.95	375.77
	Mineral Filler							0.72		0.72	11.58
	Structural Fill									0.00	414.69
	JTM Bottom Ash		2.55					3.44		5.99	78.96
	Duke Bottom Ash							5.68		5.68	52.72
	Mill Rejects							0.00		0.00	4.87
Other:	Ash Removal							0.00		0.00	55.81
	Net Ash Sluiced to Basins	26.81	10.84	11.59	10.41	5.63	5.50	-11.76	7.98	66.99	532.21
	Net Ash Placed in Landfills		18.45					55.29		73.74	180.10
DEC Total Ash Utilized		0.00	25.47	0.00	0.23	0.00	0.00	10.63	0.00	36.33	938.59
Year to Date Coal Consumed		2,389.369	5,814.511	756.678	1,311.226	382.763	396.928	5,317.666	684.261		17,053.402
Year to Date Ash Produced		246.97	544.78	90.62	112.01	41.31	38.27	552.08	61.38		1,687.41
Utilization:	Concrete	0.00	369.38	0.00	0.78	0.00	0.00	5.61	0.00		375.77
	Mineral Filler	0.00	0.00	0.00	0.00	0.00	0.00	11.58	0.00		11.58
	Structural Fill	0.00	0.00	0.00	0.00	104.50	0.00	310.19	0.00		414.69
	JTM Bottom Ash	0.00	30.85	0.00	0.00	0.00	0.00	48.11	0.00		78.96
	Duke Bottom Ash	0.00	0.00	0.00	0.00	0.00	0.00	52.72	0.00		52.72
	Mill Rejects	0.00	0.00	0.00	0.00	0.00	0.00	4.87	0.00		4.87
Other:	Ash Removal	0.00	0.00	0.00	0.00	0.00	0.00	55.81	0.00		55.81
	Net Ash Sluiced to Basins	246.97	36.23	90.62	111.23	-63.19	38.27	10.71	61.38		532.21
	Net Ash Placed in Landfills	0.00	108.32	0.00	0.00	0.00	0.00	112.05	0.00		220.36
YTD Total Ash Utilized		0.00	400.23	0.00	0.78	104.50	0.00	433.08	0.00		938.59
YTD Percent Ash Utilized		0.0%	73.5%	0.0%	0.7%	253.0%	0.0%	78.4%	0.0%		55.6%
YTD + Projected Ash Production		246.97	544.78	90.62	112.01	41.31	38.27	552.08	61.38		1687.41
YTD + Projected Ash Utilization		0.00	400.23	0.00	0.78	104.50	0.00	433.08	0.00		938.59
YTD + Projected % Ash Utilization		0.0%	73.5%	0.0%	0.7%	253.0%	0.0%	78.4%	0.0%		55.6%

Riverbend Ash Production

	1996	1997	1998	1999	2000	2001	2002	2003
Coal Burn	724,531	684,261	633,162	853,000	957,000	995,000	1,012,000	1,029,000
Total Ash Production	66,430	61,380	62,620	85,300	95,700	99,500	101,200	102,900

*** Years 1999 through 2003 estimated at 10% ash**

jwj9519 2/5/99

DRAWING

DWG. NO. RB-0001.01

Conceptual Ash Storage Plan
For Review by Duke Ash Management
Not For Construction

DUKE POWER COMPANY
RIVERBEND STEAM STATION

1994 SITE PLAN

NO.	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE
ORIG.	RELEASED FOR INFORMATION	LDI	2-10-94	JWG	5-10-94	JDS	5-10-94

INSPECTED: CIVIL WAIVED; ELEC. WAIVED; MECH. WAIVED

DESIGNER W.D.WHISENANT DATE 5/10/94
DRAWN LD ISAACS DATE 2-10-94
CHECKED J.W.GOBLE DATE 5/10/94
INSP. — DATE
INSP. — DATE
APPR. J.D.SOLOMON DATE 5/10/94
SCALE 1"=200'
DWG. NO. RB-0001.01
REV. 0

ERN: RB000FQK

Duke Energy Carolinas, LLC’s
Late-Filed Exhibit No. 9

Docket No. E-7, Sub 1214

Duke Energy Carolinas
Docket E-7, Sub 1214
Late-Filed Exhibit No. 9
October 23, 2020

Late filed exhibit on conversion to dry fly ash handling at Duke Energy Carolina's Coal Plants

The request was for any studies, reports, cost/benefit analyses, or similar documents that the Company has been able to find that informed decisions on converting to dry ash at Belews Creek, Marshall, and any other of the Company's coal fired units.

Response

While the company has been unable to find specific studies, report, analyses, or cost/benefit analyses related to the conversion to dry fly ash as the Company's coal fired units (unless noted below), the following information has been obtained from information in the DEC Coal Combustion Products 10 Year Plans ("10-Year Plans"), discussions with personnel from the Company's Fossil-Hydro organization, and discussions with personnel who were involved in the development of the 10-Year Plans. Note that the 10-Year Plans were primarily used to evaluate real estate on-site for the management of ash generated within the next 10 years. Sluicing of fly ash, if basin capacity was available, remained the lowest cost option to manage ash generated at the stations, but options such as conversation to dry handling and subsequent landfilling of the ash were options to be explored if projected ash production was expected to exceed basin capacity at the time that the report was written. Additional information was included in the 10-Year Plans starting in 2010 based upon the anticipated Federal CCR Rule and included information for both Subtitle D and Subtitle C regulations and potential responses by the company on a per plant basis. Total conversion costs, with and without adjustments, were included for both potential Federal CCR Options, in the 2010 10-Year Plan. All 10-Year Plans referenced in this Late Files Exhibit have been produced in response to data requests and in the Relativity Database (see Docket E-7, Sub 1214, response to AGO DEC Data Request No. 4).

It is important to note that the ash basins also received bottom ash and wastewater from plant operations, as they were the primary water treatment system at the plant. Accordingly, dry fly ash handling would not have eliminated the need for the basins, and, even for those plants that did have dry fly ash systems, the basins were utilized during unit startups and when the dry fly ash systems required maintenance.

Conversions to dry ash handling of both bottom ash and fly ash were not required by regulations until the passage of the Federal CCR Rule in 2015 and the North Carolina

Coal Ash Management Act in September 2014. Prior to these regulations, conversions occurred either in response to site-specific environmental events, due to the marketability of the ash, or due to space constraints.

The NC Coal Ash Management Act:

- Prohibited the discharge of stormwater into CCR Surface Impoundments by December 31, 2019 for active plants and by December 31, 2018 for inactive plants
- Required conversion to dry bottom ash collection or retirement by December 31, 2019
- Required conversion to dry fly ash by December 31, 2018

The 2015 Federal CCR rule required that CCR and non-CCR waste streams cease being placed into a CCR unit within six months of a determination that the CCR unit was not in compliance with any location restriction or standard. The waste streams have included stormwater, bottom ash and fly ash.

Conversions were also required in the Special Orders of Consent (SOC) negotiated between the North Carolina Department of Environmental Quality (NCDEQ) and the Company. Specifically:

- Allen's SOC required conversion to dry bottom ash collection by March 31, 2019
- Marshall's SOC required conversion to dry bottom ash collection by January 31, 2019
- Cliffside/Rogers' SOC required conversion to dry fly ash by March 31, 2018 and to dry bottom ash by August 31, 2018
- Belews Creek's SOC required conversion to dry bottom ash collection by September 30, 2018

Allen Station

In 1999 the Company explored options at Allen for the potential to sell fly ash for beneficial use. (See attached document labeled 'Confidential Allen Dry Ash Collection.pdf'), but that project was not implemented.

The Allen Station started adding equipment for dry fly ash handling in 2007, primarily because of space constraints in the ash basin. The Retired Ash Basin Landfill was constructed in the same timeframe such that it was able to accept dry ash starting in 2010.

In addition, in 2003 the ash basin had a selenium excursion due to the type of coal used. In response, the plant installed a Chemical Injection Facility and reconfigured the basin into cells.

The 2003 10-Year Plan does state that "Dry fly ash handling is currently being investigated as an action item resulting from the selenium NOV Root Cause Team," and also contains some high-level costs based upon a "similar system at Marshall" for both dry fly ash and dry bottom ash handling, with bottom ash handling being through "the installation of six dewatering units." It is unknown if this "comparable" system at Marshall was for a total ash handling system or just the new equipment that is referenced as being installed in 2005 in the Marshall section below.

There is also a recommendation in the 2003 10-Year Plan to perform "a detailed study/evaluation of dry ash handling / dense phase slurry, including landfill costs, should be performed as soon as achievable" with a target date of October 2004. The attachment "Allen Ash Handling Study (2005).xls" includes some scenarios evaluated for dry ash handling. This led to the Company's installation of dry fly ash handling equipment in 2007.

The 2008 10-Year Plan indicates that fly ash "is currently wet sluiced to the Ash Basin, excavated, and then placed in Structural Fills in and around the Ash Basin under the Ash Reuse Permit issued by the NCDENR Division of Water Quality" and that the conversion to dry fly ash handling is expected to be completed in 2009. Bottom ash was, at that time, co-mingled with fly ash and the future state was to continue to sluice the bottom ash to the basin.

The 2009 10-Year Plan has the same current and future state for fly ash and bottom ash as the 2008 10-Year Plan.

The 2010 10-Year Plan's current and future state for fly ash was dry handling. Bottom ash management did not change from the 2009 10-Year Plan.

The 2011 10-Year Plan's current and future state for fly ash and bottom ash did not change from the 2010 10-Year Plan.

Allen converted to dry bottom ash management in 2019. Process water and stormwater water projects that rerouted these flows to other treatment systems, away from the basin, were completed in 2018.

<u>Belews Creek Steam Station</u>

Belews Creek converted to dry fly ash handling in 1985 to address selenium issue in Belews Lake. Belews Creek had an arrangement with a company called Monier who constructed the dry ash handling system in order to sell the ash into the concrete market. See "Belews Disposal of Fly Ash.pdf".

According to the 1985 "ASCE Water Quality Issues at Fossil Fuel Plants (incl. Belews Lake Selenium)," provided as Public Staff Junis Exhibit 9; Docket E-7, Sub 1146 (Rule

9d Supplement Doc. Ex. 1953-1965), also included as DEC Joint Exhibit 11 in Docket E-7, Sub 1214, the dry ash handling system became fully operational in February 1985. The description of how the Company chose dry ash handling starts on page 47 (Doc. Ex. 1962):

> "In cooperation with the North Carolina Division of Environmental Management (NCDEM), Duke Power Company evaluated corrective actions to deal with the Belews Lake ash basin effluent/Se problem, including conventional water treatment, in-basin treatment of ash sluice water by an acid/ferric iron process, relation of the treated discharge to the nearby Dan River, conversion to dry fly ash handling, or some combination of these alternatives.
>
> Following a trial acid treatment that provided encouraging results, discussions occurred with NCDEM on a proposed rerouting of the ash pond effluent to the Dan River while treating the ash basin. An application for a permit for this discharge was submitted in 1981. While permit review proceeded, Duke Power received a proposal at the end of 1982 from Monier Resources, Inc. to expand an existing dry fly ash sales pilot plant on site…"
>
> "Because the contractor would pay all capital expenses, this option was attractive, and a contract was signed with Monier in 1983. An agreement was also reached with NCDEM on a biological monitoring program for the Dan River and on interim acid treatment in the ash pond during conversion to the dry fly ash system."

Therefore, based upon the information available, capital costs related to the conversion to dry fly ash was paid by a contractor, who had a market for the dry fly ash.

The 2003 10-Year Plan states that the fly ash was handled dry and that the system was capable of processing fly ash at start-up with increased O&M costs. It also states that bottom ash was handled dry but, based upon discussions with knowledgeable individuals and information in the subsequent 10-Year Plans, bottom ash was handled wet and then subsequently dried for sales. This method of harvesting bottom ash from the basin, and subsequently processing it for sales, was a low-cost option to allow sales of bottom ash without the system converting to full dry bottom ash handling.

The 2008 10-Year Plan states that the station handles fly ash dry and that bottom ash is wet-sluiced to the basin. Fly ash is either sold or placed in an on-site structural fill, with a future plan for it to be placed in the under-construction Craig Road Landfill. It also indicates that "bottom ash is currently captured, processed and marketed as a lightweight aggregate for concrete block production and in bagged concrete products." There was no change to the future state of bottom ash handling.

The 2009 10-Year Plan states that fly ash continues to be handled dry, with material that cannot be sold placed in the on-site Structural Fill or the Craig Road Landfill. There is no change from the 2008 10-Year Plan with respect to bottom ash.

The 2010 10-Year Plan indicates the same handling methods of fly and bottom ash as the 2009 10-Year Plan. It does note that due to the recession, the volume of landfilled ash was anticipated to increase because the market did not support sales.

The 2011 10-Year Plan indicates the same handling methods of fly and bottom ash as shown in the 2010 10-Year Plan. It also noted that bottom ash may not be collected for sales due to a decrease in the bottom ash market.

Belews Creek converted to dry bottom ash management in 2018. Process water and stormwater water projects that rerouted these flows to other treatment systems, away from the basin, were completed in 2019. Upgrades that removed the need for fly ash to be sent to the basin during start-ups and maintenance were completed in 2018.

Buck Steam Station

The Buck station did not convert to dry fly ash. The 2003 10-Year plan did contain a reference to “Perform a Dry Ash Handling Study” associated with the year 2005, but the Company has not been able to locate a study. While the Company has not be able to locate a copy of this study, if it had resulted in a recommendation to pursue dry ash handling as the low-cost option, it would have been pursued at that time. This 10-year plan also contains some high-level costs to convert to dry fly ash based upon a “similar system at Marshall.” It is unknown if this “comparable” system at Marshall was for a total ash handling system or just the new equipment that is referenced as being installed in 2005 in the Marshall section below.

The 2008 10-Year Plan included the expected retirement of Units 3 in mid-2011 and Unit 4 in mid-2020. It also states that both fly ash and bottom ash are handled wet, with no future changes expected. The Financial Plan includes a future pond expansion and/or dry stack and a future on-site lined landfill, and the fly ash market overview portion of the document states: “Buck does not have a dry ash collection system and given the probability of Bucks units being retired in the next ten years, currently there is no economic justification for dry ash conversion.”

The 2009 10-Year Plan included the expected retirement of Units 3 and 4 at Buck to occur in May 2011 and 2012, respectively. The current and future management of fly and bottom ash did not change from the 2008 10-Year Plan. The fly ash market overview summary included the same statement as in the 2008 10-Year Plan concerning conversion to dry ash.

The 2010 10-Year Plan included the expected retirement of Units 3-4 to occur in October 2011. The current and future management of fly and bottom ash did not change from the 2009 10-Year Plan. The fly ash market overview summary included a similar statement as in the 2009 10-Year Plan concerning conversion to dry ash.

The 2011 10-Year Plan included the expected retirement of Units 3-4 in May 2011 and Units 5-6 in January 2015. The current and future management of fly and bottom ash did not change from the 2010 10-Year Plan. The fly ash market overview summary included a similar statement as in the 2010 10-Year Plan concerning conversion to dry ash.

The coal units at Buck retired in 2013.

Process water and stormwater water projects that rerouted these flows, which were required for the operation of the Combined Cycle plant, to other treatment systems, away from the basin, were completed in 2018.

Cliffside Steam Station

Cliffside Units 1-4 did not convert to dry fly ash. Cliffside Unit 5 had dry fly ash handling before 1993 used to capture some portion of the fly ash for sale by Monier. In approximately 1999, an additional ash silo was installed by the then fly ash marketer, SEFA in order to capture and sell ash that was within the specification requirements for marketing. Remaining ash was sluiced to the basin, making it a wet/dry hybrid. Unit 5 went to total dry fly ash handling in 2017. While Unit 6 was built with dry fly ash and bottom ash capability, the Unit 6 preheater dry fly ash system conversion was completed in 2018 in order for the Company to be in compliance with the Effluent Guideline regulations on the treatment of ash contact water.

The 2003 10-Year Plan does contain some high-level costs for conversion of Units 1-4 to dry fly ash based upon "a similar system at Marshall," but a recommendation to look at fly ash conversation was not made in this document. It is unknown if this "comparable" system at Marshall was for a total ash handling system or just the new equipment that is referenced as being installed in 2005 in the Marshall section below.

The 2008 10-Year Plan states that non-specification fly ash is sluiced to the ash basin and that fly ash of marketable quality is collected dry for sales. The future state of fly ash states "if a plan under discussion to utilize the ash basin as a service water make up source during drought conditions becomes a reality, Cliffside fly ash would be completely dry handled." Bottom ash was wet sluiced, but the future state indicates that "preliminary engineering is under way to look at the potential conversion of Unit 5 to a dry handling system." The document also states that Units 1-4 were expected to retire before March 2012.

The 2009 10-Year Plan included the expected retirement of Units 1-4 to occur in April 2012. There is no change in current or future state for fly ash from the 2008 10-Year Plan. While there is no change to the current state of bottom ash management, the future state indicates "conversion of Unit 5 to dry bottom ash handling is still under consideration. The dry bottom ash decision will be influenced by the outcome of the ash basin conversion to service water project." The document also states that Units 1-4 were expected to retire in October 2011.

The 2010 10-Year Plan included the same expected retirement of Units 1-4 as the 2009 10-Year Plan. Information was not provided on the current state of ash management, but the Marketing Plan states that fly ash from Units 1-4 is sluiced to the basin and that Unit 5 has a dry fly ash collection system. It also states that the market for bottom ash is "bleak."

The 2011 10-Year Plan has the same information in it as the 2010 10-Year Plan.

Cliffside Unit #5 converted to dry bottom ash management in 2018. Process water and stormwater water projects that rerouted these flows to other treatment systems, away from the basin, were completed in 2019. Upgrades that removed the need for fly ash to be sent to the basin during start-ups and maintenance were completed in 2018.

Dan River Steam Station

The Dan River station did not convert to dry fly ash. The 2003 10-Year Plan did contain a reference to "Perform Study to Evaluate Dry Ash Handling" associated with the year 2005/2006, but the Company has not been able to locate a study. While the Company has not be able to locate a copy of this study, if it had resulted in a recommendation to pursue dry ash handling as the low-cost option, it would have been pursued at that time. The 2003 10-Year Plan also contains some high-level costs for conversion to dry fly ash based upon a "similar system at Marshall." It is unknown if this "comparable" system at Marshall was for a total ash handling system or just the new equipment that is referenced as being installed in 2005 in the Marshall section below.

The 2008 10-Year Plan states that fly ash and bottom ash was handled wet and that there were no changes expected in handling. The units were scheduled to retire in mid-2013. Similar to Buck, the marketing overview states that there was "no economic justification for dry ash conversion" due to the probability of the units retiring.

The 2009 10-Year Plan included the expected retirement of Units 1-2 in mid-2012 and Unit 3 in mid- 2013. There is no change in the current or future state of fly and bottom ash handling from the 2008 10-Year Plan. There is also a statement in indicating that final closure methods of CCR units will be State dependent. The marketing overview states that dry ash collection is not economically justifiable due to the probably date of retirement.

The 2010 10-Year Plan included the expected retirement of Units 1-2 in October 2012 and Unit 3 in October 2013. Later in the document it states that all units are to retire in 2012. There is no change to the method of fly and bottom ash handling from the 2009 10-Year Plan.

The 2011 10-Year Plan had the same information related to ash handling as the 2010 10-Year Plan. There is also a statement in the recommendations section that EH&S is to submit a Closure Plan by October 2011, although the recommendations section references Riverbend rather than Dan River.

Marshall Station

Marshall had dry ash handling by the late 1970s, installed by Amax Fly Ash Corporation for the purpose of sales. In 1993, Marshall had a contract with a company called Monier (later Boral, then BMTI), which owned and operated the collection equipment and ash silos. Unsold ash went to the 1804 landfill, which Monier also operated. See the attached document labeled 'Marshall 1983 Fly Ash Disposal.pdf' for information on both Amax and Monier. A landfill was used partly because the basin was nearly full.

By the early 2000s, Marshall no longer produced saleable ash, so the agreement with BMTI was terminated. Under the terms of the agreement, BMTI had to remove its equipment unless Duke chose to purchase it. Duke elected instead to install new equipment, which occurred around 2005, in a separate location at the plant in order to make room for a scrubber. The 2003 10-Year Plan does have a strategy recommendation of "Pursue installation of a new dry ash handling system, including demolition of the existing system and silos" with a target date of 2004. This work was completed as noted.

The 2003 10-Year Plan indicates that both fly ash and bottom ash are dry handled at Marshall," but based upon conversations with employees knowledgeable about historical operation and based upon information in subsequent 10-Year Plans, bottom ash was sluiced to a portion of the basin where it was dried for eventual sales into the cement industry. This method of harvesting bottom ash from the basin, and subsequently processing it for sales, was a low-cost option to allow sales of bottom ash without the system converting to full dry bottom ash handling.

The 2008 10-Year Plan states that fly ash was handled dry and that bottom ash was sluiced to the ash basin where it was "collected, processed and marketed as a lightweight aggregate for concrete block production." There were no expected future changes to the management of bottom ash. Evaluations were on-going for an ash beneficiation plant to be installed at the site.

The 2009 10-Year Plan was essentially identical to the 2008 10-Year Plan.

The 2010 10-Year Plan does not have any changes to either the current or future handling of fly and bottom ash. The ash beneficiation plant was placed "on-hold due to the recession's impact on the fly ash market."

The 2011 10-Year Plan has essentially the same information in it as the 2010 10-Year Plan.

Marshall converted to dry bottom ash management in 2018. Process water and stormwater water projects that rerouted these flows to other treatment systems, away from the basin, were completed in 2018. Upgrades that removed the need for fly ash to be sent to the basin during start-ups and maintenance were completed in 2019.

Riverbend Steam Station

The Riverbend station did not convert to dry fly ash. The 2003 10-Year Plan did contain a reference to "Perform Study to Evaluate Dry Ash Handling" associated with the year 2005/2006, but the Company has not been able to locate a study. While the Company has not be able to locate a copy of this study, if it had resulted in a recommendation to pursue dry ash handling as the low-cost option, it would have been pursued at that time. The 2003 10-Year Plan also contains some high-level costs for conversion to dry fly ash based upon a "similar system at Marshall". It is unknown if this "comparable" system at Marshall was for a total ash handling system or just the new equipment that is referenced as being installed in 2005 in the Marshall section above.

The 2008 10-Year Plan states that fly ash and bottom ash are sluiced, with no changes anticipated in the future. Units 4-5 were expected to be retired in mid-2015, with Unit 6 in 2016 and Unit 7 in 2017. An evaluation was recommended to determine on and off-site locations for additional ash storage if generation continued until the expected retirement dates. The ash marketing overview included similar language as in the Buck report with respect to dry ash conversion not being economically justifiable due to the proposed plant retirement dates.

The 2009 10-Year Plan was essentially the same as the 2008 10-Year Plan.

The 2010 10-Year Plan included the same expected retirement dates as shown in the 2009 10-Year Plan and the same methods of ash handling.

The 2011 10-Year Plan includes the same information on fly and bottom ash handling as the 2010 10-Year Plan.

W.S. Lee Steam Station

The W.S. Lee station did not convert to dry fly ash. The 2003 10-Year Plan contained some high-level costs for conversion to dry fly ash based upon a "similar system at Marshall," but a recommendation to look at fly ash conversation was not made in this document. It is unknown if this "comparable" system at Marshall was for a total ash handling system or just the new equipment that is referenced as being installed in 2005 in the Marshall section above. The 2008 10-Year Plan states that both bottom ash and fly ash were sluiced to the basin, with no expected future changes in management. A budget grade estimate of $15-25M to convert to dry fly ash appears to have been completed in 2006, but there is also a statement that "the likelihood of producing fly ash suitable for sales in traditional fly ash markets such as ready-mix concrete is low."

The 2009 10-Year Plan is essentially identical to the information provided in the 2008 10-Year Plan.

The 2010 10-Year Plan states that both bottom and fly ash continues to be sluiced to the basin.

The 2011 10-Year Plan is essentially identical to the 2010 10-Year Plan with respect to fly ash and bottom ash handling.

Allen Steam Station
Ash Handling Studies, 2005

Option	Description
0.1	Maintain Wet Ash Handling System with Periodic Ash Basin Excavations and Placement of Ash in Unlined & Uncapped On-Site Fills
0.2	Maintain Wet Ash Handling System with Periodic Ash Basin Excavations and Placement of Ash in Lined and Capped On-Site Fills
1.1	Convert to Dry Fly Ash Handling System w/ wet backup, periodic ash basin excavations and placement of ash in unlined & uncapped on-site fills
1.2	Convert to Dry Fly Ash Handling System w/ wet backup, periodic ash basin excavations and placement of ash in lined & capped on-site fills
2.1	Convert to Dry Fly Ash Handling System w/ dry backup, periodic ash basin excavations, and placement of ash in unlined & uncapped on-site fills
2.2	Convert to Dry Fly Ash Handling System w/ dry backup, periodic ash basin excavations, and placement of ash in lined & capped on-site fills
3.1.1	Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ zero sales revenue, periodic ash basin excavations, and placement of disposal ash in unlined &
3.1.2	Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ revenue from 50% saleable fly ash, periodic ash basin excavations, and placement of disposal a
3.1.3	Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ revenue from 100% saleable fly ash, periodic ash basin excavations, and placement of disposal
3.2.1	Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ zero sales revenue, periodic ash basin excavations, and placement of disposal ash in lined & ca
3.2.2	Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ revenue from 50% saleable fly ash, periodic ash basin excavations, and placement of disposal a
3.2.3	Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ revenue from 100% saleable fly ash, periodic ash basin excavations, and placement of disposal
4.1.1	Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ zero sales revenue, periodic ash basin excavations, and placement of disposal ash in unlined & unc
4.1.2	Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ revenue from 50% saleable fly ash, periodic ash basin excavations, and placement of disposal ash i
4.1.3	Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ revenue from 100% saleable fly ash, periodic ash basin excavations, and placement of disposal ash
4.2.1	Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ zero sales revenue, and placement of disposal ash in lined & capped on-site fills
4.2.2	Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ revenue from 50% saleable fly ash, and placement of disposal ash in lined & capped on-site fills
4.2.3	Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ revenue from 100% saleable fly ash, and placement of disposal ash in lined & capped on-site fills

Allen Steam Station - Summary of Ash Handling Options

	Ash Handling Qty's (tons)				Treatment of Ash Fills			Fly Ash Beneficiation Assumptions				
Option	Sluice Btm Ash	Dry Btm Ash	Sluice Fly Ash	Dry Fly Ash	Synthetic Liner	Leachate Collection	Synthetic Cap	Install Fly Ash Beneficiation Facility?	Qty of Sales Fly Ash (000's tons)	Duke Revenue from Qty of Sales Fly Ash	Qty of Non-Sales Fly Ash	Value of waste heat returned to Station
0.1	75,000	-	300,000	-	No	No	No	No	N/A	N/A	N/A	N/A
0.2	75,000	-	300,000	-	Yes	Yes	Yes	No	N/A	N/A	N/A	N/A
1.1	75,000	-	15,000	285,000	No	No	No	No	N/A	N/A	N/A	N/A
1.2	75,000	-	15,000	285,000	Yes	Yes	Yes	No	N/A	N/A	N/A	N/A
2.1	-	75,000	-	300,000	No	No	No	No	N/A	N/A	N/A	N/A
2.2	-	75,000	-	300,000	Yes	Yes	Yes	No	N/A	N/A	N/A	N/A
3.1.1	75,000	-	15,000	285,000	No	No	No	Yes	142,500	-	142,500	Unknown
3.1.2	75,000	-	15,000	285,000	No	No	No	Yes	142,500	997,500	142,500	Unknown
3.1.3	75,000	-	15,000	285,000	No	No	No	Yes	285,000	1,995,000	-	Unknown
3.2.1	75,000	-	15,000	285,000	Yes	Yes	Yes	Yes	142,500	-	142,500	Unknown
3.2.2	75,000	-	15,000	285,000	Yes	Yes	Yes	Yes	142,500	997,500	142,500	Unknown
3.2.3	75,000	-	15,000	285,000	Yes	Yes	Yes	Yes	285,000	1,995,000	-	Unknown
4.1.1	-	75,000	-	300,000	No	No	No	Yes	150,000	-	150,000	Unknown
4.1.2	-	75,000	-	300,000	No	No	No	Yes	150,000	1,050,000	150,000	Unknown
4.1.3	-	75,000	-	300,000	No	No	No	Yes	300,000	2,100,000	-	Unknown
4.2.1	-	75,000	-	300,000	Yes	Yes	Yes	Yes	150,000	-	150,000	Unknown
4.2.2	-	75,000	-	300,000	Yes	Yes	Yes	Yes	150,000	1,050,000	150,000	Unknown
4.2.3	-	75,000	-	300,000	Yes	Yes	Yes	Yes	300,000	2,100,000	-	Unknown

Notes:
1. Based on actual and projected ash production for years 2004 - 2010, use average annual ash production of: 375,000 tons
2. Assume split between bottom ash and fly ash to be: 20% bottom ash, 80% fly ash
3. For dry fly ash handling w/ wet backup, assume: 95% collected dry, 5% sluiced to basin
4. Duke revenue from saleable fly ash - use: $ 7.00 per ton

1. Estimate Ash Sluicing and Dry Fly Ash Handling O&M Costs

A. Allen Cost Data - Ref. Section 4 (Ash Handling) of Benchmark Based Budgeting Template

Year	Actual O&M Costs: Non-Labor	Labor	O&M IPE's	Total	Qty Ash Produced (000's tons)	Unit Cost ($ / ton)
2000	$ 258,334	$ 132,297	$ 21,917	$ 412,548	247,680	$ 1.67
2001	283,401	131,009	161,140	575,550	256,270	2.25
2002	239,402	170,956	16,914	427,272	239,270	1.79
2003	266,900	220,844	-	487,744	290,250	1.68
2004	507,607	320,483	104,656	932,746	330,617	2.82
Average	$ 311,129	$ 195,118	$ 60,925	$ 567,172	272,817	**$ 2.04**

B. Belews Creek Cost Data - Ref. Section 4 (Ash Handling) of Benchmark Based Budgeting Template

Year	Actual O&M Costs: Non-Labor	Labor	O&M IPE's	Total	Qty Ash Produced (000's tons)	Unit Cost ($ / ton)
2000	$ 168,726	$ 120,243		$ 288,969	517,240	$ 0.56
2001	572,277	167,507	151,749	891,533	635,610	1.40
2002	622,183	118,877	320,421	1,061,481	692,610	1.53
2003	348,407	133,900	855,551	1,337,858	517,130	2.59
2004	750,402	193,208	812,432	1,756,042	683,157	2.57
Average	$ 492,399	$ 146,747	$ 535,038	$ 1,067,177	609,149	**$ 1.73**

C. Marshall Cost Data - Ref. Section 4 (Ash Handling) of Benchmark Based Budgeting Template

Year	Actual O&M Costs (including Ash Contracts listed below): Non-Labor	Labor	O&M IPE's	Total	Qty Ash Produced (000's tons)	Unit Cost ($ / ton)
2000	$ 1,787,701	$ 107,650	$ 130,843	$ 2,026,194	560,100	$ 3.62
2001	2,295,876	86,636	543,316	2,925,828	535,260	5.47
2002	2,404,345	90,445	23,638	2,518,428	577,110	4.36
2003	2,705,607	-	53,282	2,758,889	614,082	4.49
2004	2,276,769	-	171,619	2,448,388	612,264	4.00
Average	$ 2,294,060	$ 56,946	$ 184,540	$ 2,535,545	579,763	**$ 4.39**
Year	Ash Contracts (Boral Operations at Ash Landfill / Ash Structural Fill)					
			Average:	$ 1,952,713	579,763	**$ 3.37**

D. Results:

O&M Ash Sluicing Costs (ash to basin): **$2.00 / ton** based on Allen's average unit cost from part A above
O&M Dry Ash Handling Costs (ash to Silo): **$1.50 / ton** based on avg of MS & BC non-contract unit costs - parts B and C above
O&M Dry Ash Handling Costs (ash from Silo to on-site fill): **$3.50 / ton** based on MS average unit cost - part C above

2. Summary of Fill Areas

0.X, 1.X, and 2.X Options		3.1.1, 3.1.2, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.2.1, 4.2.2 Options		3.1.3, 3.2.3, 4.1.3, 4.2.3 Options	
Area 3B		**Area 3B**		**Area 3B**	
Ash Storage Quantities:		Ash Storage Quantities:		Ash Storage Quantities:	
2,881,400	cy	2,881,400	cy	2,881,400	cy
2,801	000's tons	2,801	000's tons	2,801	000's tons
7.5	yrs @ 375k per yr	12.2	yrs @ 230k per yr	32.9	yrs @ 85k per yr
Nominal Footprint Area:		Nominal Footprint Area:		Nominal Footprint Area:	
50.0	Acres	50.0	Acres	50.0	Acres
Area 4BG		**Area 4BG**		**Area 4BG**	
Ash Storage Quantities:		Ash Storage Quantities:		Ash Storage Quantities:	
2,100,000	cy	2,100,000	cy	2,100,000	cy
2,041	000's tons	2,041	000's tons	2,041	000's tons
5.4	yrs @ 375k per yr	8.9	yrs @ 230k per yr	24.0	yrs @ 85k per yr
Nominal Footprint Area:		Nominal Footprint Area:		Nominal Footprint Area:	
40.4	Acres	40.4	Acres	40.4	Acres
Area 6,7,8,9BG		**Area 6,7,8,9BG**		**Area 6,7,8,9BG**	
Ash Storage Quantities:		Ash Storage Quantities:		Ash Storage Quantities:	
1,985,470	cy	1,985,470	cy	1,985,470	cy
1,930	000's tons	1,930	000's tons	1,930	000's tons
5.1	yrs @ 375k per yr	8.4	yrs @ 230k per yr	22.7	yrs @ 85k per yr
Nominal Footprint Area:		Nominal Footprint Area:		Nominal Footprint Area:	
46.0	Acres	46.0	Acres	46.0	Acres

Summary of Annual Cash Flows

0 Option	1	2	3	4	5	6
0.1	$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 10,800,000	$ 10,800,000	$ 2,675,000
0.2	2,841,667	2,841,667	2,841,667	19,550,000	19,550,000	2,675,000
Min	2,841,667	2,841,667	2,841,667	10,800,000	10,800,000	2,675,000
Max	2,841,667	2,841,667	2,841,667	19,550,000	19,550,000	2,675,000
Avg	2.84	2.84	2.84	15.18	15.18	2.68
1.1	2,841,667	2,841,667	2,841,667	18,192,500	18,192,500	2,067,500
1.2	2,841,667	2,841,667	2,841,667	26,942,500	26,942,500	2,067,500
2.1	2,841,667	2,841,667	2,841,667	19,502,500	19,502,500	1,877,500
2.2	2,841,667	2,841,667	2,841,667	28,252,500	28,252,500	1,877,500
Min	2,841,667	2,841,667	2,841,667	18,192,500	18,192,500	1,877,500
Max	2,841,667	2,841,667	2,841,667	28,252,500	28,252,500	2,067,500
Avg	2.84	2.84	2.84	23.22	23.22	1.97
3.1.1	2,841,667	2,841,667	2,841,667	18,742,500	17,928,750	1,253,750
3.1.2	2,841,667	2,841,667	2,841,667	29,192,500	27,378,750	253,750
3.1.3	2,841,667	2,841,667	2,841,667	25,942,500	22,630,000	(1,245,000)
3.2.1	2,841,667	2,841,667	2,841,667	27,492,500	26,678,750	1,253,750
3.2.2	2,841,667	2,841,667	2,841,667	37,942,500	36,128,750	253,750
3.2.3	2,841,667	2,841,667	2,841,667	31,192,500	27,880,000	(1,245,000)
4.1.1	2,841,667	2,841,667	2,841,667	20,052,500	19,265,000	1,090,000
4.1.2	2,841,667	2,841,667	2,841,667	30,502,500	28,715,000	90,000
4.1.3	2,841,667	2,841,667	2,841,667	27,252,500	24,202,500	(1,172,500)
4.2.1	2,841,667	2,841,667	2,841,667	28,802,500	28,015,000	1,090,000
4.2.2	2,841,667	2,841,667	2,841,667	39,252,500	37,465,000	90,000
4.2.3	2,841,667	2,841,667	2,841,667	32,502,500	29,452,500	(1,172,500)
Min	2,841,667	2,841,667	2,841,667	18,742,500	17,928,750	(1,245,000)
Max	2,841,667	2,841,667	2,841,667	39,252,500	37,465,000	1,253,750
Avg	2.8417	2.8417	2.8417	28.9975	27.6969	0.0044

Year

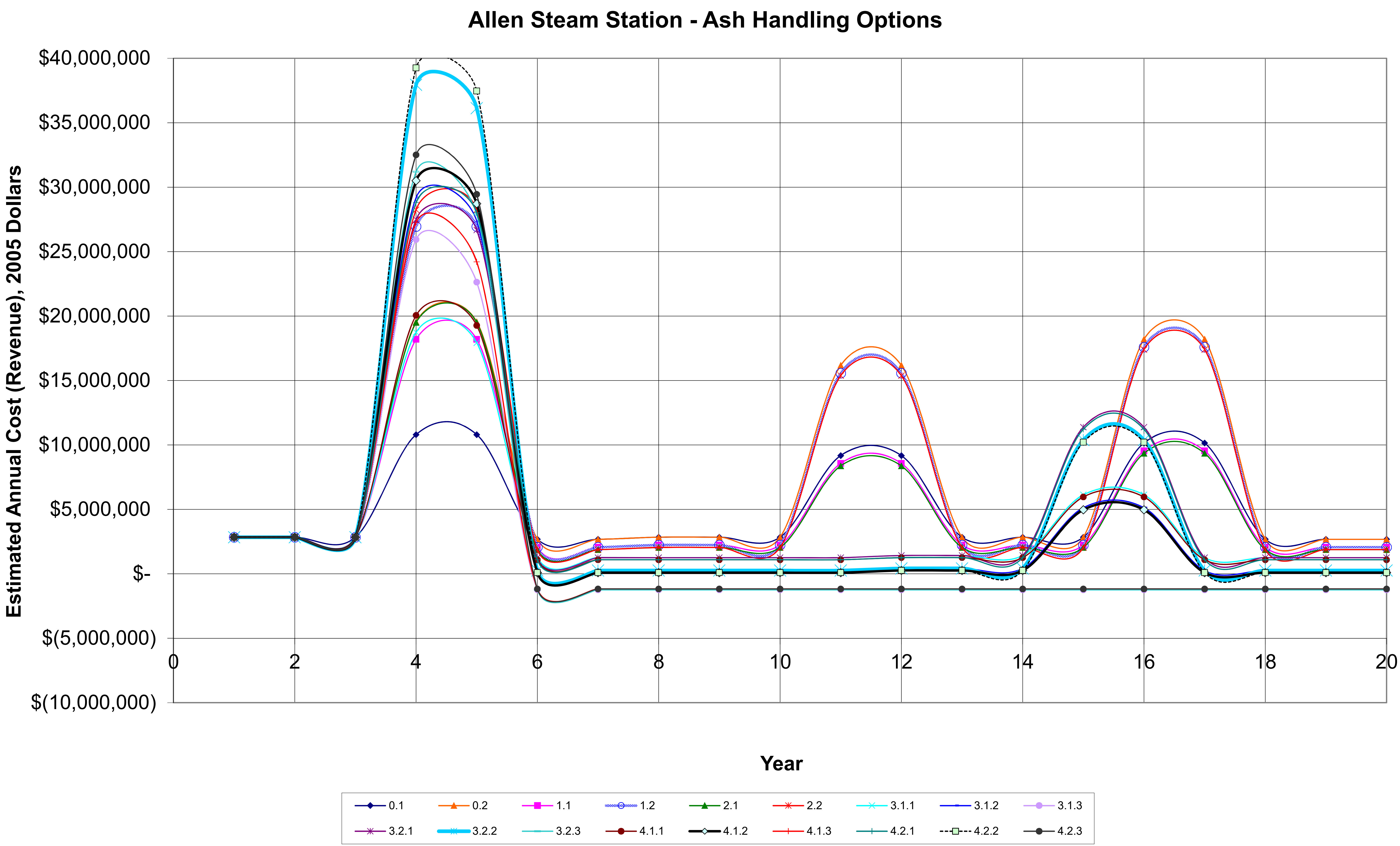
7	8	9	10	11	12	13
$ 2,675,000	$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 9,175,000	$ 9,175,000	$ 2,841,667
2,675,000	2,841,667	2,841,667	2,841,667	16,175,000	16,175,000	2,841,667
2,675,000	2,841,667	2,841,667	2,841,667	9,175,000	9,175,000	2,841,667
2,675,000	2,841,667	2,841,667	2,841,667	16,175,000	16,175,000	2,841,667
2.68	2.84	2.84	2.84	12.68	12.68	2.84
2,067,500	2,234,167	2,234,167	2,234,167	8,567,500	8,567,500	2,234,167
2,067,500	2,234,167	2,234,167	2,234,167	15,567,500	15,567,500	2,234,167
1,877,500	2,044,167	2,044,167	2,044,167	8,377,500	8,377,500	2,044,167
1,877,500	2,044,167	2,044,167	2,044,167	15,377,500	15,377,500	2,044,167
1,877,500	2,044,167	2,044,167	2,044,167	8,377,500	8,377,500	2,044,167
2,067,500	2,234,167	2,234,167	2,234,167	15,567,500	15,567,500	2,234,167
1.97	2.14	2.14	2.14	11.97	11.97	2.14
1,253,750	1,253,750	1,253,750	1,253,750	1,253,750	1,420,417	1,420,417
253,750	253,750	253,750	253,750	253,750	420,417	420,417
(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)
1,253,750	1,253,750	1,253,750	1,253,750	1,253,750	1,420,417	1,420,417
253,750	253,750	253,750	253,750	253,750	420,417	420,417
(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)
1,090,000	1,090,000	1,090,000	1,090,000	1,090,000	1,256,667	1,256,667
90,000	90,000	90,000	90,000	90,000	256,667	256,667
(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)
1,090,000	1,090,000	1,090,000	1,090,000	1,090,000	1,256,667	1,256,667
90,000	90,000	90,000	90,000	90,000	256,667	256,667
(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)
(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)
1,253,750	1,253,750	1,253,750	1,253,750	1,253,750	1,420,417	1,420,417
0.0044	0.0044	0.0044	0.0044	0.0044	0.0877	0.0877

14	15	16	17	18	19	20
$ 2,841,667	$ 2,841,667	$ 10,150,000	$ 10,150,000	$ 2,675,000	$ 2,675,000	$ 2,675,000
2,841,667	2,841,667	18,200,000	18,200,000	2,675,000	2,675,000	2,675,000
2,841,667	2,841,667	10,150,000	10,150,000	2,675,000	2,675,000	2,675,000
2,841,667	2,841,667	18,200,000	18,200,000	2,675,000	2,675,000	2,675,000
2.84	2.84	14.18	14.18	2.68	2.68	2.68
2,234,167	2,234,167	9,542,500	9,542,500	2,067,500	2,067,500	2,067,500
2,234,167	2,234,167	17,592,500	17,592,500	2,067,500	2,067,500	2,067,500
2,044,167	2,044,167	9,352,500	9,352,500	1,877,500	1,877,500	1,877,500
2,044,167	2,044,167	17,402,500	17,402,500	1,877,500	1,877,500	1,877,500
2,044,167	2,044,167	9,352,500	9,352,500	1,877,500	1,877,500	1,877,500
2,234,167	2,234,167	17,592,500	17,592,500	2,067,500	2,067,500	2,067,500
2.14	2.14	13.47	13.47	1.97	1.97	1.97
1,420,417	6,128,750	6,128,750	1,253,750	1,253,750	1,253,750	1,253,750
420,417	5,128,750	5,128,750	253,750	253,750	253,750	253,750
(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)
1,420,417	11,378,750	11,378,750	1,253,750	1,253,750	1,253,750	1,253,750
420,417	10,378,750	10,378,750	253,750	253,750	253,750	253,750
(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)
1,256,667	5,965,000	5,965,000	1,090,000	1,090,000	1,090,000	1,090,000
256,667	4,965,000	4,965,000	90,000	90,000	90,000	90,000
(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)
1,256,667	11,215,000	11,215,000	1,090,000	1,090,000	1,090,000	1,090,000
256,667	10,215,000	10,215,000	90,000	90,000	90,000	90,000
(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)	(1,172,500)
(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)	(1,245,000)
1,420,417	11,378,750	11,378,750	1,253,750	1,253,750	1,253,750	1,253,750
0.0877	5.0669	5.0669	0.0044	0.0044	0.0044	0.0044

Ranges of NPV Results

Scenario	Low NPV	High NPV
1 (Wet)	$ 43	$ 67
2 (Dry w/out)	$ 47	$ 73
3 (Dry w/)	$ 24	$ 60

Scenario	/ **Data for Chart**	
1 (Wet)	$ 43	$ 24
2 (Dry w/out)	$ 47	$ 26
3 (Dry w/)	$ 24	$ 36


Allen Steam Station - Ash Handling Options
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$35,000,000
$30,000,000
$25,000,000
$20,000,000
$15,000,000
$10,000,000
$5,000,000
$-
$(5,000,000)
$(10,000,000)
Estimated Annual Cost (Revenue), 2005 Dollars
0
2
4
6
8
10
12
14
16
18
20
Year
0.1
0.2
1.1
1.2
2.1
2.2
3.1.1
3.1.2
3.1.3
3.2.1
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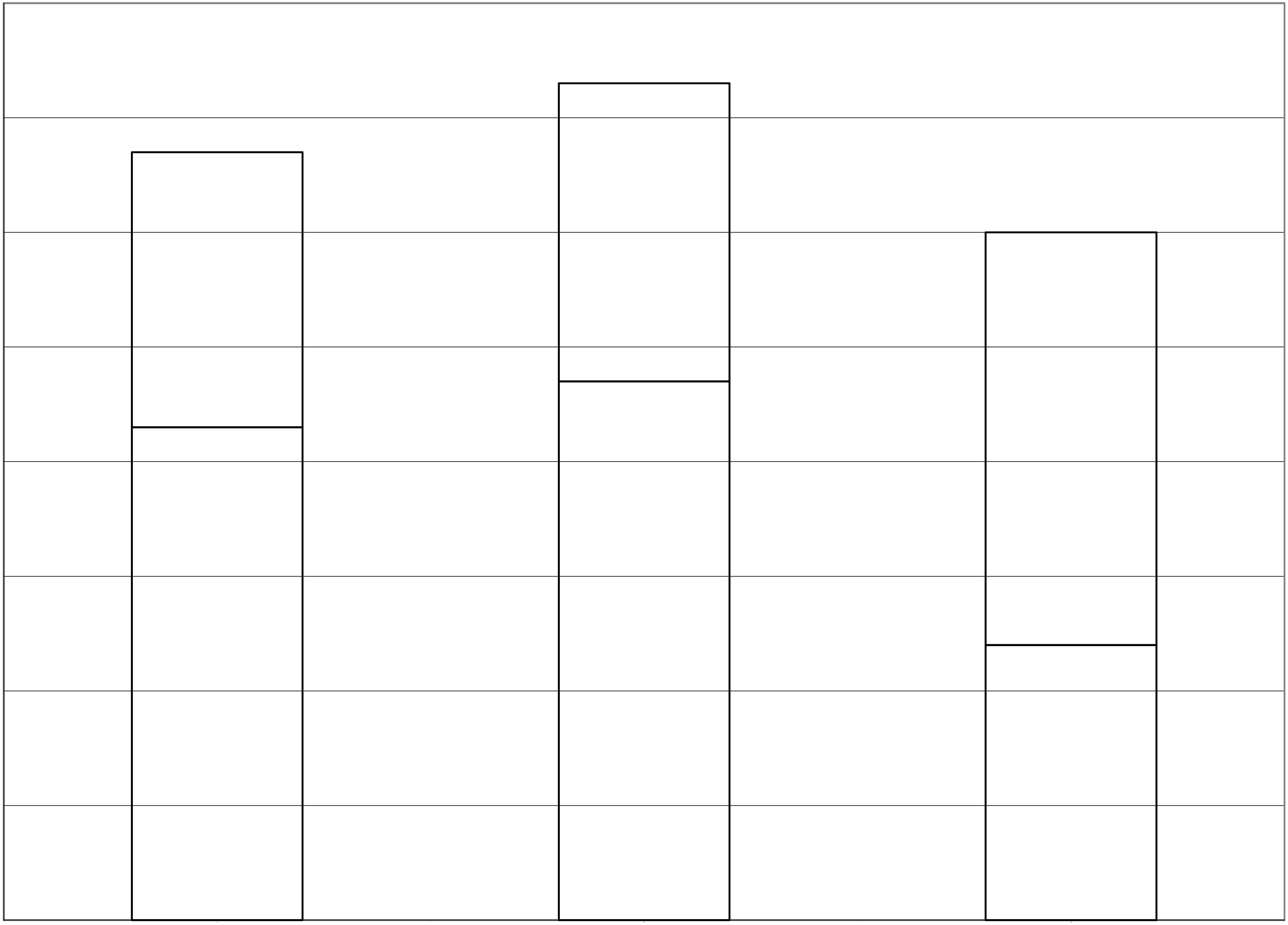
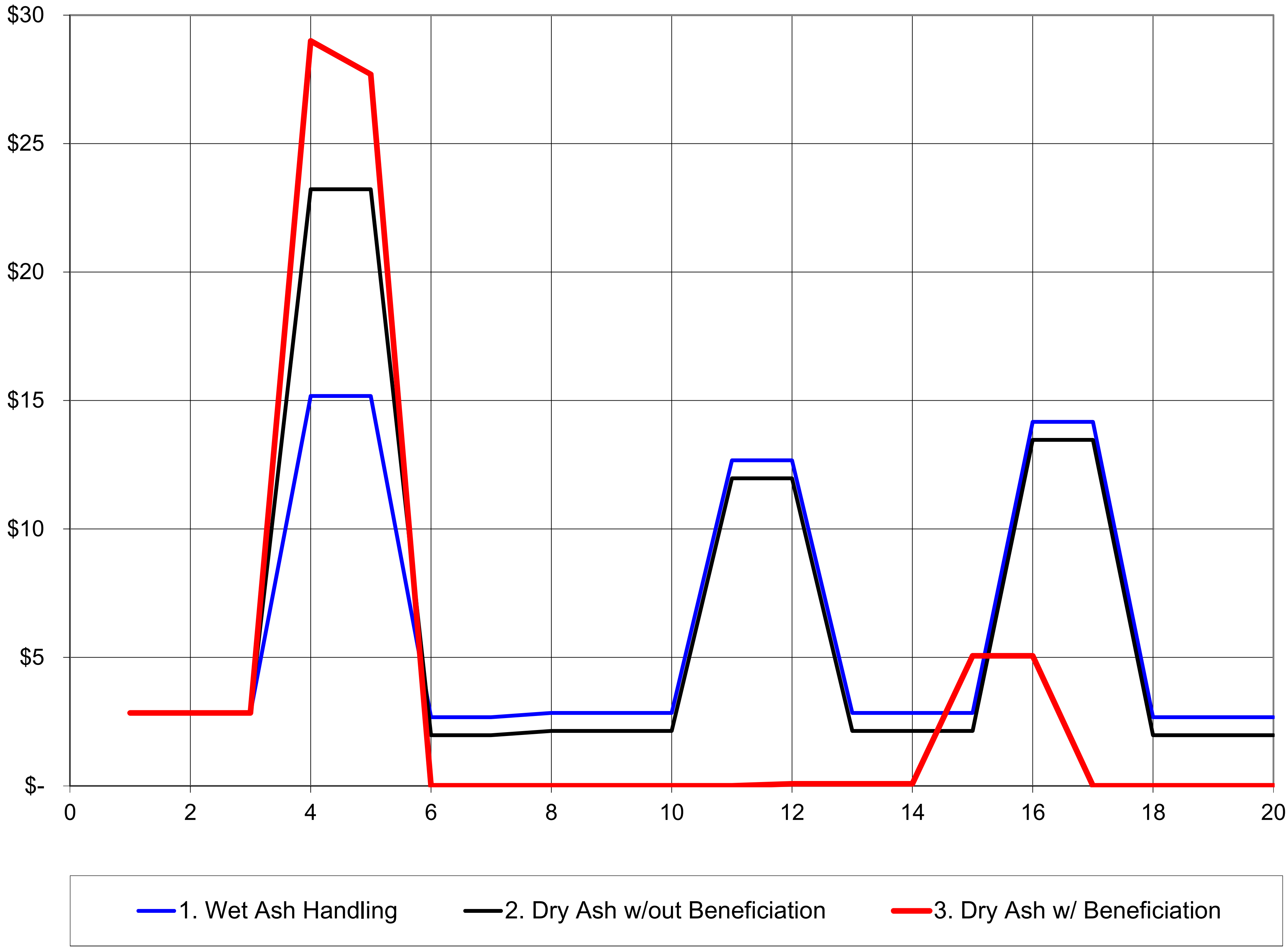
4.2.3

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$25
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$15
$10
$5
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0
2
4
6
8
10
12
14
16
18
20
1. Wet Ash Handling
2. Dry Ash w/out Beneficiation
3. Dry Ash w/ Beneficiation

Allen Steam Station - 2005 Ash Handling Studies

Option X.Y.Z: Description

A. Capital Costs

	No.	Description	Units	Year-----> Unit Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000
A.	2.0	Ash Structural Fill / Landfill Costs		
A.	2.1	Land Purchase	Acres	$ 10,000
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000
A.	2.5	Synthetic Cap	Acres	150,000
A.	3.0	Dry Ash Handling Systems		
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)
		Subtotal - Annual Capital Costs (2005 Dollars):		
		Present Worth of Annual Capital Costs (2005 Dollars):		

B. O & M Costs

	No.	Description	Units	Year-----> Unit Cost
B.	1.0	Ash Conveyance Costs		
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50
B.	2.0	O & M Ash Excavate, Haul, and Place		
		O & M Ash Excavation	ton	$ 1.50
		O & M Ash Haul and Place	ton	3.50
B.	3.0	Environmental Monitoring & Management		
B.	3.1	Leachate Management	EA	$ 25,000
B.	3.2	Groundwater Monitoring	EA	5,000
B.	3.3	Chemical Injection Facility	EA	50,000

Subtotal - Annual O & M Costs (2005 Dollars):			
Present Worth of Annual O & M Costs (2005 Dollars):			

Total (Capital + O & M) Annual Revenue Requirements:	
Total (Capital + O & M) Annual PWRR (2005 Dollars):	

Legend

	Input provided by CCP
	Output developed by F

1		2		3		4	
Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
0.333333	$ 166,667	0.333333	$ 166,667	0.333333	$ 166,667		$ -
	$ -		$ -		$ -		$ -
	-		-		-	25	1,250,000
	-		-		-	25	6,875,000
	-		-		-		-
	-		-		-		-
	$ -		$ -		$ -		$ -
	-		-		-		-
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ 8,125,000

1		2		3		4	
Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
375,000	$ 750,000	375,000	$ 750,000	375,000	$ 750,000	375,000	$ 750,000
	-		-		-		-
375,000	$ 562,500	375,000	$ 562,500	375,000	$ 562,500	375,000	$ 562,500
375,000	1,312,500	375,000	1,312,500	375,000	1,312,500	375,000	1,312,500
	$ -		$ -		$ -		$ -
	-		-		-		-
1	50,000	1	50,000	1	50,000	1	50,000

	$ 2,675,000		$ 2,675,000		$ 2,675,000		$ 2,675,000
	$ 2,675,000		$ 2,675,000		$ 2,675,000		$ 10,800,000
	$ -		$ -		$ -		$ -

Group
/H Business Group based on input from CCP Group

5		6		7		8	
Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
	$ -		$ -		$ -	0.333333	$ 166,667
	$ -		$ -		$ -		$ -
25	1,250,000		-		-		-
25	6,875,000		-		-		-
	-		-		-		-
	-		-		-		-
	$ -		$ -		$ -		$ -
	-		-		-		-
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
	$ 8,125,000		$ -		$ -		$ -

5		6		7		8	
Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
375,000	$ 750,000	375,000	$ 750,000	375,000	$ 750,000	375,000	$ 750,000
	-		-		-		-
375,000	$ 562,500	375,000	$ 562,500	375,000	$ 562,500	375,000	$ 562,500
375,000	1,312,500	375,000	1,312,500	375,000	1,312,500	375,000	1,312,500
	$ -		$ -		$ -		$ -
	-		-		-		-
1	50,000	1	50,000	1	50,000	1	50,000

	$ 2,675,000		$ 2,675,000		$ 2,675,000		$ 2,675,000
	$ 10,800,000		$ 2,675,000		$ 2,675,000		$ 2,675,000
	$ -		$ -		$ -		$ -

Capital Costs (Year 2005 Dollars)

9		10		11		12	
Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
0.333333	$ 166,667	0.333333	$ 166,667		$ -		$ -
	$ -		$ -		$ -		$ -
	-		-	20	1,000,000	20	1,000,000
	-		-	20	5,500,000	20	5,500,000
	-		-		-		-
	-		-		-		-
	$ -		$ -		$ -		$ -
	-		-		-		-
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
	$ -		$ -		$ 6,500,000		$ 6,500,000

O & M Costs (Year 2005 Dollars)

9		10		11		12	
Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
375,000	$ 750,000	375,000	$ 750,000	375,000	$ 750,000	375,000	$ 750,000
	-		-		-		-
375,000	$ 562,500	375,000	$ 562,500	375,000	$ 562,500	375,000	$ 562,500
375,000	1,312,500	375,000	1,312,500	375,000	1,312,500	375,000	1,312,500
	$ -		$ -		$ -		$ -
	-		-		-		-
1	50,000	1	50,000	1	50,000	1	50,000

	$ 2,675,000		$ 2,675,000		$ 2,675,000		$ 2,675,000

	$ 2,675,000		$ 2,675,000		$ 9,175,000		$ 9,175,000
	$ -		$ -		$ -		$ -

13		14		15		16	
Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
0.333333	$ 166,667	0.333333	$ 166,667	0.333333	$ 166,667		$ -
	$ -		$ -		$ -		$ -
	-		-		-	23	1,150,000
	-		-		-	23	6,325,000
	-		-		-		-
	-		-		-		-
	$ -		$ -		$ -		$ -
	-		-		-		-
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ 7,475,000

13		14		15		16	
Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
375,000	$ 750,000	375,000	$ 750,000	375,000	$ 750,000	375,000	$ 750,000
	-		-		-		-
375,000	$ 562,500	375,000	$ 562,500	375,000	$ 562,500	375,000	$ 562,500
375,000	1,312,500	375,000	1,312,500	375,000	1,312,500	375,000	1,312,500
	$ -		$ -		$ -		$ -
	-		-		-		-
1	50,000	1	50,000	1	50,000	1	50,000

	$ 2,675,000		$ 2,675,000		$ 2,675,000		$ 2,675,000
	$ 2,675,000		$ 2,675,000		$ 2,675,000		$ 10,150,000
	$ -		$ -		$ -		$ -

17		18		19		20	
Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
23	1,150,000		-		-		-
23	6,325,000		-		-		-
	-		-		-		-
	-		-		-		-
	$ -		$ -		$ -		$ -
	-		-		-		-
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
	$ -		$ -		$ -		$ -
	$ 7,475,000		$ -		$ -		$ -

17		18		19		20	
Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
375,000	$ 750,000	375,000	$ 750,000	375,000	$ 750,000	375,000	$ 750,000
	-		-		-		-
375,000	$ 562,500	375,000	$ 562,500	375,000	$ 562,500	375,000	$ 562,500
375,000	1,312,500	375,000	1,312,500	375,000	1,312,500	375,000	1,312,500
	$ -		$ -		$ -		$ -
	-		-		-		-
1	50,000	1	50,000	1	50,000	1	50,000

	$ 2,675,000		$ 2,675,000		$ 2,675,000		$ 2,675,000
	$ 10,150,000		$ 2,675,000		$ 2,675,000		$ 2,675,000
	$ -		$ -		$ -		$ -

Total (Capital + O & M for 20 yr study period) PWRR, 2005 Dollars:	**$ -**

Allen Steam Station - 2005 Ash Handling Studies

Option 0.1: Maintain Wet Ash Handling System with Periodic Ash Basin Excavations and Placement of Ash in Unlined & Uncapped On-Site Fills

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	1,000,000	1,000,000	-	-	-	1,150,000	1,150,000	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	5,500,000	5,500,000	-	-	-	6,325,000	6,325,000	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 8,125,000	$ 8,125,000	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ 6,500,000	$ 6,500,000	$ 166,667	$ 166,667	$ 166,667	$ 7,475,000	$ 7,475,000	$ -	$ -	$ -
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 10,800,000	$ 10,800,000	$ 2,675,000	$ 2,675,000	$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 9,175,000	$ 9,175,000	$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 10,150,000	$ 10,150,000	$ 2,675,000	$ 2,675,000	$ 2,675,000
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 0.2: Maintain Wet Ash Handling System with Periodic Ash Basin Excavations and Placement of Ash in Lined & Capped On-Site Fills

					Capital Costs (Year 2005 Dollars)																			
A.	**Capital Costs**			Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	1,000,000	1,000,000	-	-	-	1,150,000	1,150,000	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	5,500,000	5,500,000	-	-	-	6,325,000	6,325,000	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	5,000,000	5,000,000	-	-	-	-	-	4,000,000	4,000,000	-	-	-	4,600,000	4,600,000	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	3,750,000	3,750,000	-	-	-	-	-	3,000,000	3,000,000	-	-	-	3,450,000	3,450,000	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 16,875,000	$ 16,875,000	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ 13,500,000	$ 13,500,000	$ 166,667	$ 166,667	$ 166,667	$ 15,525,000	$ 15,525,000	$ -	$ -	$ -
		Present Worth of Annual Capital Costs (2005 Dollars):																						

					O & M Costs (Year 2005 Dollars)																			
B.	**O & M Costs**			Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000	$ 750,000
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500	$ 562,500
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,675,000
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 19,550,000	$ 19,550,000	$ 2,675,000	$ 2,675,000	$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 16,175,000	$ 16,175,000	$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 18,200,000	$ 18,200,000	$ 2,675,000	$ 2,675,000	$ 2,675,000
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 1.1: Convert to Dry Fly Ash Handling System w/ wet backup, periodic ash basin excavations and placement of ash in unlined & uncapped on-site fills

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	1,000,000	1,000,000	-	-	-	1,150,000	1,150,000	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	5,500,000	5,500,000	-	-	-	6,325,000	6,325,000	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ 8,000,000	$ 8,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 16,125,000	$ 16,125,000	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ 6,500,000	$ 6,500,000	$ 166,667	$ 166,667	$ 166,667	$ 7,475,000	$ 7,475,000	$ -	$ -	$ -
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 18,192,500	$ 18,192,500	$ 2,067,500	$ 2,067,500	$ 2,234,167	$ 2,234,167	$ 2,234,167	$ 8,567,500	$ 8,567,500	$ 2,234,167	$ 2,234,167	$ 2,234,167	$ 9,542,500	$ 9,542,500	$ 2,067,500	$ 2,067,500	$ 2,067,500
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 1.2: Convert to Dry Fly Ash Handling System w/ wet backup, periodic ash basin excavations and placement of ash in lined & capped on-site fills

A. Capital Costs — Capital Costs (Year 2005 Dollars)

	No.	Description	Units	Unit Cost (Year----->)	1 Cost	2 Cost	3 Cost	4 Cost	5 Cost	6 Cost	7 Cost	8 Cost	9 Cost	10 Cost	11 Cost	12 Cost	13 Cost	14 Cost	15 Cost	16 Cost	17 Cost	18 Cost	19 Cost	20 Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	1,000,000	1,000,000	-	-	-	1,150,000	1,150,000	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	5,500,000	5,500,000	-	-	-	6,325,000	6,325,000	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	5,000,000	5,000,000	-	-	-	-	-	4,000,000	4,000,000	-	-	-	4,600,000	4,600,000	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	3,750,000	3,750,000	-	-	-	-	-	3,000,000	3,000,000	-	-	-	3,450,000	3,450,000	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ 8,000,000	$ 8,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 24,875,000	$ 24,875,000	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ 13,500,000	$ 13,500,000	$ 166,667	$ 166,667	$ 166,667	$ 15,525,000	$ 15,525,000	$ -	$ -	$ -
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B. O & M Costs — O & M Costs (Year 2005 Dollars)

	No.	Description	Units	Unit Cost (Year----->)	1 Cost	2 Cost	3 Cost	4 Cost	5 Cost	6 Cost	7 Cost	8 Cost	9 Cost	10 Cost	11 Cost	12 Cost	13 Cost	14 Cost	15 Cost	16 Cost	17 Cost	18 Cost	19 Cost	20 Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500	$ 2,067,500
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 26,942,500	$ 26,942,500	$ 2,067,500	$ 2,067,500	$ 2,234,167	$ 2,234,167	$ 2,234,167	$ 15,567,500	$ 15,567,500	$ 2,234,167	$ 2,234,167	$ 2,234,167	$ 17,592,500	$ 17,592,500	$ 2,067,500	$ 2,067,500	$ 2,067,500
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 2.1: Convert to Dry Fly Ash Handling System w/ dry backup, periodic ash basin excavations, and placement of ash in unlined & uncapped on-site fills

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	1,000,000	1,000,000	-	-	-	1,150,000	1,150,000	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	5,500,000	5,500,000	-	-	-	6,325,000	6,325,000	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	9,500,000	9,500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 17,625,000	$ 17,625,000	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ 6,500,000	$ 6,500,000	$ 166,667	$ 166,667	$ 166,667	$ 7,475,000	$ 7,475,000	$ -	$ -	$ -
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 19,502,500	$ 19,502,500	$ 1,877,500	$ 1,877,500	$ 2,044,167	$ 2,044,167	$ 2,044,167	$ 8,377,500	$ 8,377,500	$ 2,044,167	$ 2,044,167	$ 2,044,167	$ 9,352,500	$ 9,352,500	$ 1,877,500	$ 1,877,500	$ 1,877,500
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 2.2: Convert to Dry Fly Ash Handling System w/ dry backup, periodic ash basin excavations, and placement of ash in Lined & Capped on-site fills

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	1,000,000	1,000,000	-	-	-	1,150,000	1,150,000	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	5,500,000	5,500,000	-	-	-	6,325,000	6,325,000	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	5,000,000	5,000,000	-	-	-	-	-	4,000,000	4,000,000	-	-	-	4,600,000	4,600,000	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	3,750,000	3,750,000	-	-	-	-	-	3,000,000	3,000,000	-	-	-	3,450,000	3,450,000	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	9,500,000	9,500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 26,375,000	$ 26,375,000	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ 13,500,000	$ 13,500,000	$ 166,667	$ 166,667	$ 166,667	$ 15,525,000	$ 15,525,000	$ -	$ -	$ -
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500	1,312,500
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500	$ 1,877,500
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 28,252,500	$ 28,252,500	$ 1,877,500	$ 1,877,500	$ 2,044,167	$ 2,044,167	$ 2,044,167	$ 15,377,500	$ 15,377,500	$ 2,044,167	$ 2,044,167	$ 2,044,167	$ 17,402,500	$ 17,402,500	$ 1,877,500	$ 1,877,500	$ 1,877,500
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 3.1.1: Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ zero sales revenue, periodic ash basin excavations, and placement of disposal ash in unlined & uncapped on-site fills

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	-	-	-	-	750,000	750,000	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	-	-	-	-	4,125,000	4,125,000	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ 8,000,000	$ 8,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 550,000	$ 550,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 16,675,000	$ 16,675,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ 4,875,000	$ 4,875,000	$ -	$ -	$ -	$ -
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,067,500	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 18,742,500	$ 17,928,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,420,417	$ 1,420,417	$ 1,420,417	$ 6,128,750	$ 6,128,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 3.1.2: Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ revenue from 50% saleable fly ash, periodic ash basin excavations, and placement of disposal ash in unlined & uncapped on-site fill

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	-	-	-	-	750,000	750,000	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	-	-	-	-	4,125,000	4,125,000	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ 8,000,000	$ 8,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 11,000,000	$ 11,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 27,125,000	$ 26,125,000	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (833,333)	$ (833,333)	$ (833,333)	$ 3,875,000	$ 3,875,000	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,067,500	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 29,192,500	$ 27,378,750	$ 253,750	$ 253,750	$ 253,750	$ 253,750	$ 253,750	$ 253,750	$ 420,417	$ 420,417	$ 420,417	$ 5,128,750	$ 5,128,750	$ 253,750	$ 253,750	$ 253,750	$ 253,750
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 3.1.3: Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ revenue from 100% saleable fly ash, periodic ash basin excavations, and placement of disposal ash in unlined & uncapped on-site fill

A.	**Capital Costs**				**Capital Costs (Year 2005 Dollars)**																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	750,000	750,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	4,125,000	4,125,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ 8,000,000	$ 8,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 11,000,000	$ 11,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 23,875,000	$ 21,875,000	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	**O & M Costs**				**O & M Costs (Year 2005 Dollars)**																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,067,500	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 25,942,500	$ 22,630,000	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 3.2.1: **Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ zero sales revenue, periodic ash basin excavations, and placement of disposal ash in lined & capped on-site fill:**

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	-	-	-	-	750,000	750,000	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	-	-	-	-	4,125,000	4,125,000	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	5,000,000	5,000,000	-	-	-	-	-	-	-	-	-	3,000,000	3,000,000	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	3,750,000	3,750,000	-	-	-	-	-	-	-	-	-	2,250,000	2,250,000	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ 8,000,000	$ 8,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 550,000	$ 550,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 25,425,000	$ 25,425,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ 10,125,000	$ 10,125,000	$ -	$ -	$ -	$ -
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,067,500	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 27,492,500	$ 26,678,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,420,417	$ 1,420,417	$ 1,420,417	$ 11,378,750	$ 11,378,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 3.2.2: Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ revenue from 50% saleable fly ash, periodic ash basin excavations, and placement of disposal ash in lined & capped on-site fill

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	-	-	-	-	750,000	750,000	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	-	-	-	-	4,125,000	4,125,000	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	5,000,000	5,000,000	-	-	-	-	-	-	-	-	-	3,000,000	3,000,000	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	3,750,000	3,750,000	-	-	-	-	-	-	-	-	-	2,250,000	2,250,000	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ 8,000,000	$ 8,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 11,000,000	$ 11,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 35,875,000	$ 34,875,000	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (833,333)	$ (833,333)	$ (833,333)	$ 9,125,000	$ 9,125,000	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750	498,750
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,067,500	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750	$ 1,253,750
		Present Worth of Annual O & M Costs (2005 Dollars):																						

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Total (Capital + O & M) Annual Revenue Requirements:	$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 37,942,500	$ 36,128,750	$ 253,750	$ 253,750	$ 253,750	$ 253,750	$ 253,750	$ 253,750	$ 420,417	$ 420,417	$ 420,417	$ 10,378,750	$ 10,378,750	$ 253,750	$ 253,750	$ 253,750	$ 253,750
Total (Capital + O & M) Annual PWRR (2005 Dollars):	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 3.2.3: Convert to Dry Fly Ash Handling System w/ wet backup, install fly ash beneficiation w/ revenue from 100% saleable fly ash, periodic ash basin excavations, and placement of disposal ash in lined & capped on-site fill:

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	750,000	750,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	4,125,000	4,125,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	3,000,000	3,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	2,250,000	2,250,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ 8,000,000	$ 8,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 11,000,000	$ 11,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 29,125,000	$ 27,125,000	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000	$ 180,000
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500	427,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000	$ 135,000
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 2,067,500	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000	$ 755,000
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 31,192,500	$ 27,880,000	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)	$ (1,245,000)
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 4.1.1: Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ zero sales revenue, periodic ash basin excavations, and placement of disposal ash in unlined & uncapped on-site fill:

A. Capital Costs — Capital Costs (Year 2005 Dollars)

	No.	Description	Units	Year-----> Unit Cost	1 Cost	2 Cost	3 Cost	4 Cost	5 Cost	6 Cost	7 Cost	8 Cost	9 Cost	10 Cost	11 Cost	12 Cost	13 Cost	14 Cost	15 Cost	16 Cost	17 Cost	18 Cost	19 Cost	20 Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	-	-	-	-	750,000	750,000	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	-	-	-	-	4,125,000	4,125,000	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	9,500,000	9,500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 550,000	$ 550,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 18,175,000	$ 18,175,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ 4,875,000	$ 4,875,000	$ -	$ -	$ -	$ -
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B. O & M Costs — O & M Costs (Year 2005 Dollars)

	No.	Description	Units	Year-----> Unit Cost	1 Cost	2 Cost	3 Cost	4 Cost	5 Cost	6 Cost	7 Cost	8 Cost	9 Cost	10 Cost	11 Cost	12 Cost	13 Cost	14 Cost	15 Cost	16 Cost	17 Cost	18 Cost	19 Cost	20 Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 1,877,500	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 20,052,500	$ 19,265,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,256,667	$ 1,256,667	$ 1,256,667	$ 5,965,000	$ 5,965,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 4.1.2: Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ revenue from 50% saleable fly ash, periodic ash basin excavations, and placement of disposal ash in unlined & uncapped on-site fill:

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	-	-	-	-	750,000	750,000	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	-	-	-	-	4,125,000	4,125,000	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	9,500,000	9,500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 11,000,000	$ 11,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 28,625,000	$ 27,625,000	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (833,333)	$ (833,333)	$ (833,333)	$ 3,875,000	$ 3,875,000	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 1,877,500	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 30,502,500	$ 28,715,000	$ 90,000	$ 90,000	$ 90,000	$ 90,000	$ 90,000	$ 90,000	$ 256,667	$ 256,667	$ 256,667	$ 4,965,000	$ 4,965,000	$ 90,000	$ 90,000	$ 90,000	$ 90,000
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 4.1.3: Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ revenue from 100% saleable fly ash, periodic ash basin excavations, and placement of disposal ash in unlined & uncapped on-site fill

A. Capital Costs — Capital Costs (Year 2005 Dollars)

	No.	Description	Units	Year-----> Unit Cost	1 Cost	2 Cost	3 Cost	4 Cost	5 Cost	6 Cost	7 Cost	8 Cost	9 Cost	10 Cost	11 Cost	12 Cost	13 Cost	14 Cost	15 Cost	16 Cost	17 Cost	18 Cost	19 Cost	20 Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	750,000	750,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	4,125,000	4,125,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	9,500,000	9,500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 11,000,000	$ 11,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 25,375,000	$ 23,375,000	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B. O & M Costs — O & M Costs (Year 2005 Dollars)

	No.	Description	Units	Year-----> Unit Cost	1 Cost	2 Cost	3 Cost	4 Cost	5 Cost	6 Cost	7 Cost	8 Cost	9 Cost	10 Cost	11 Cost	12 Cost	13 Cost	14 Cost	15 Cost	16 Cost	17 Cost	18 Cost	19 Cost	20 Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 1,877,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500
		Present Worth of Annual O & M Costs (2005 Dollars):																						

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Total (Capital + O & M) Annual Revenue Requirements:	$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 27,252,500	$ 24,202,500	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)
Total (Capital + O & M) Annual PWRR (2005 Dollars):	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 4.2.1: Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ zero sales revenue, and placement of disposal ash in lined & capped on-site fills

A. Capital Costs — Capital Costs (Year 2005 Dollars)

	No.	Description	Units	Year-----> Unit Cost	1 Cost	2 Cost	3 Cost	4 Cost	5 Cost	6 Cost	7 Cost	8 Cost	9 Cost	10 Cost	11 Cost	12 Cost	13 Cost	14 Cost	15 Cost	16 Cost	17 Cost	18 Cost	19 Cost	20 Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	-	-	-	-	750,000	750,000	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	-	-	-	-	4,125,000	4,125,000	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	5,000,000	5,000,000	-	-	-	-	-	-	-	-	-	3,000,000	3,000,000	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	3,750,000	3,750,000	-	-	-	-	-	-	-	-	-	2,250,000	2,250,000	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	9,500,000	9,500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 550,000	$ 550,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 26,925,000	$ 26,925,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ 10,125,000	$ 10,125,000	$ -	$ -	$ -	$ -
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B. O & M Costs — O & M Costs (Year 2005 Dollars)

	No.	Description	Units	Year-----> Unit Cost	1 Cost	2 Cost	3 Cost	4 Cost	5 Cost	6 Cost	7 Cost	8 Cost	9 Cost	10 Cost	11 Cost	12 Cost	13 Cost	14 Cost	15 Cost	16 Cost	17 Cost	18 Cost	19 Cost	20 Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 1,877,500	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 28,802,500	$ 28,015,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,256,667	$ 1,256,667	$ 1,256,667	$ 11,215,000	$ 11,215,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 4.2.2: Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ revenue from 50% saleable fly ash, and placement of disposal ash in lined & capped on-site fills

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	1,250,000	1,250,000	-	-	-	-	-	-	-	-	-	750,000	750,000	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	6,875,000	6,875,000	-	-	-	-	-	-	-	-	-	4,125,000	4,125,000	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	5,000,000	5,000,000	-	-	-	-	-	-	-	-	-	3,000,000	3,000,000	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	3,750,000	3,750,000	-	-	-	-	-	-	-	-	-	2,250,000	2,250,000	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	9,500,000	9,500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 11,000,000	$ 11,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 37,375,000	$ 36,375,000	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (833,333)	$ (833,333)	$ (833,333)	$ 9,125,000	$ 9,125,000	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)	$ (1,000,000)
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000	525,000
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 1,877,500	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000	$ 1,090,000
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 39,252,500	$ 37,465,000	$ 90,000	$ 90,000	$ 90,000	$ 90,000	$ 90,000	$ 90,000	$ 256,667	$ 256,667	$ 256,667	$ 10,215,000	$ 10,215,000	$ 90,000	$ 90,000	$ 90,000	$ 90,000
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Allen Steam Station - 2005 Ash Handling Studies

Option 4.2.3: Convert to Dry Ash Handling System w/ dry backup, install fly ash beneficiation w/ revenue from 100% saleable fly ash, and placement of disposal ash in lined & capped on-site fills

A.	Capital Costs				Capital Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
A.	1.0	Site Characterization Study, Design, and Permit	LS	$500,000	$ 166,667	$ 166,667	$ 166,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.0	Ash Structural Fill / Landfill Costs																						
A.	2.1	Land Purchase	Acres	$ 10,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	2.2	Mobilization & Contractor Temp Facilities	Acres	50,000	-	-	-	750,000	750,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.3	Site Prep (Clear, grub, grade, drain, Erosion Control, etc)	Acres	275,000	-	-	-	4,125,000	4,125,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.4	Synthetic Liner & Leachate Collection	Acres	200,000	-	-	-	3,000,000	3,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	2.5	Synthetic Cap	Acres	150,000	-	-	-	2,250,000	2,250,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	3.0	Dry Ash Handling Systems																						
A.	3.1	Dry Fly Ash Handling System w/ Wet Fly Ash Backup	LS	$ 16,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	3.2	Dry Ash Handling System w/ Dry Ash Backup	LS	19,000,000	-	-	-	9,500,000	9,500,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A.	4.0	Fly Ash Beneficiation Facility	LS	$ 22,000,000	$ -	$ -	$ -	$ 11,000,000	$ 11,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	5.0	Sales Ash Storage Facility	LS	$ 3,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
A.	6.0	Duke Revenue from Saleable Fly Ash	EA	$ (1,000,000)	$ -	$ -	$ -	$ -	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)
		Subtotal - Annual Capital Costs (2005 Dollars):			$ 166,667	$ 166,667	$ 166,667	$ 30,625,000	$ 28,625,000	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)	$ (2,000,000)
		Present Worth of Annual Capital Costs (2005 Dollars):																						

B.	O & M Costs				O & M Costs (Year 2005 Dollars)																			
				Year----->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	No.	Description	Units	Unit Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost	Cost
B.	1.0	Ash Conveyance Costs																						
B.	1.1	O & M Wet Ash Sluicing Costs (ash to basin)	ton	$ 2.00	$ 750,000	$ 750,000	$ 750,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	1.2	O & M Dry Ash Handling Costs (ash to silo)	ton	1.50	-	-	-	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500	562,500
B.	2.0	O & M Ash Excavate, Haul, and Place																						
		O & M Ash Excavation	ton	$ 1.50	$ 562,500	$ 562,500	$ 562,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		O & M Ash Haul and Place	ton	3.50	1,312,500	1,312,500	1,312,500	1,312,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500	262,500
B.	3.0	Environmental Monitoring & Management																						
B.	3.1	Leachate Management	EA	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
B.	3.2	Groundwater Monitoring	EA	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B.	3.3	Chemical Injection Facility	EA	50,000	50,000	50,000	50,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
		Subtotal - Annual O & M Costs (2005 Dollars):			$ 2,675,000	$ 2,675,000	$ 2,675,000	$ 1,877,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500	$ 827,500
		Present Worth of Annual O & M Costs (2005 Dollars):																						
		Total (Capital + O & M) Annual Revenue Requirements:			$ 2,841,667	$ 2,841,667	$ 2,841,667	$ 32,502,500	$ 29,452,500	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)	$ (1,172,500)
		Total (Capital + O & M) Annual PWRR (2005 Dollars):			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

ALLEN 1999 ASH STORAGE FORECAST - SENSITIVITY ANALYSIS SUMMARY

Case	Project	Capacity	Comments
Current status/ baseline case @ 10% coal + 10% ash*	**Jan 05**	**Sept 06*- Jan 10**	*uses high ash content case of 10.0% for1999-2003 and 11.5% for 2004+
20% coal + 10% ash*	Jan 05	Mar 06	
10% coal + 15% ash	**Jan 04**	**Jan 05**	
10% coal + 20% ash	Jan 03	Jan 04	

Assumptions/Exclusions/Risks:

1. Project one (1) budget year in advance of full capacity at high ash content case.
2. Excludes potential increase in TSS, pH and iron environmental compliance risk and interim measures to decrease this risk.
3. Excludes potential compliance risk due to one pond system.
4. Excludes Primary Pond discharge tower refurbishment.
5. Excludes implementation of dry ash handling.

Duke Power Company
Power Generation Department
1999 Ash Storage Forecast

Allen Steam Station
Ash Basin Storage Capacity Status

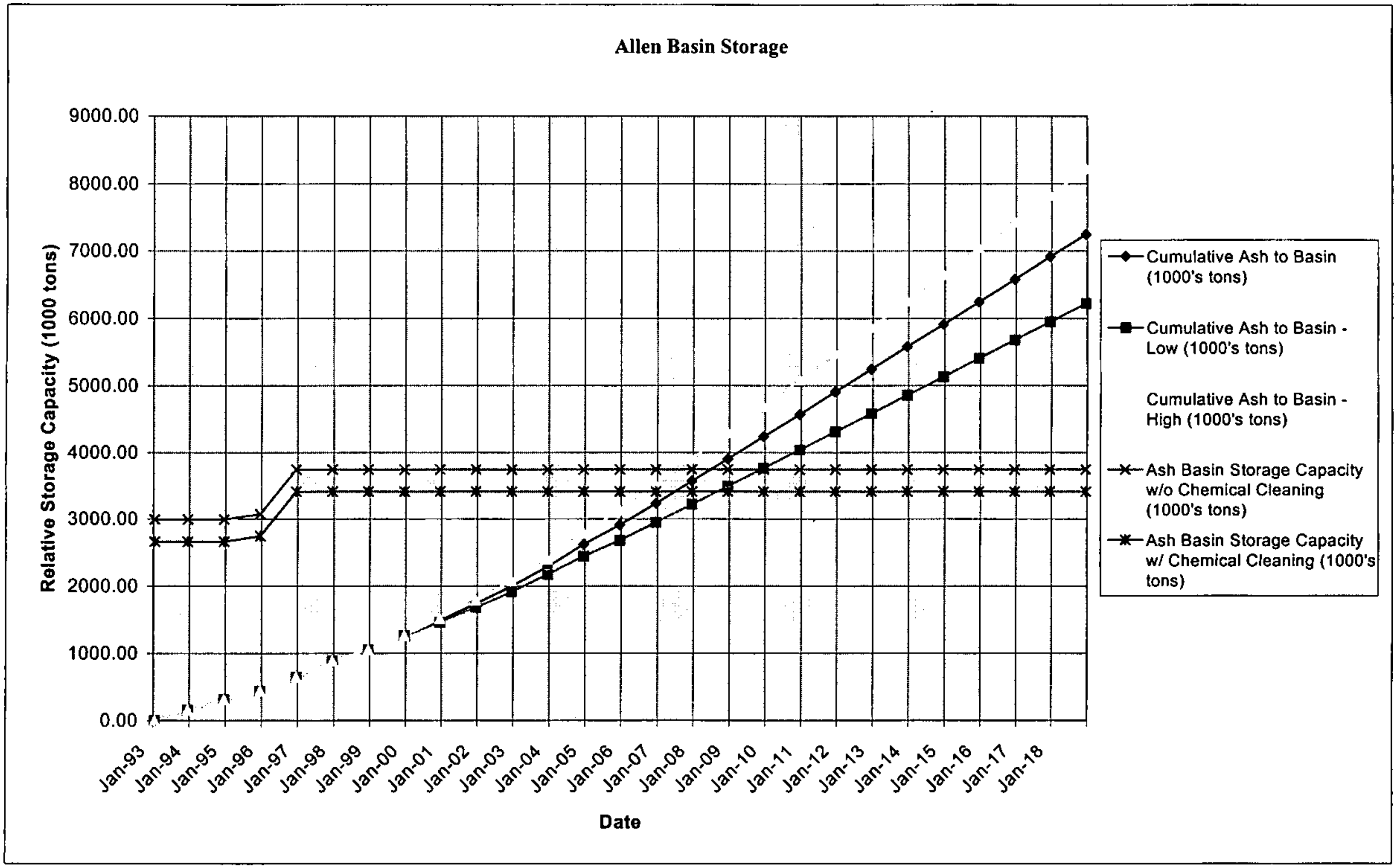
Projected Ash Loadings (lbs/Mbtu):

	1999-2003	2004+
High Ash Content	10.0	11.5
Medium Ash Content	9.0	9.8
Low Ash Content	8.0	8.0

Date of Most Recent Physical Survey: 1/8/97

Date	Annual Ash Production - Medium (1000's tons)	Annual Ash Production - Low (1000's tons)	Annual Ash Production - High (1000's tons)	Annual Ash Utilization (1000's tons)	Cumulative Ash to Basin (1000's tons)	Cumulative Ash to Basin - Low (1000's tons)	Cumulative Ash to Basin - High (1000's tons)	Ash Basin Storage Capacity w/o Chemical Cleaning (1000's tons)	Ash Basin Storage Capacity w/ Chemical Cleaning (1000's tons)	
1/1/93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2993	2661	
12/31/93	158.60	158.60	158.60	0.00	158.60	158.60	158.60	2993	2661	
12/31/94	156.90	156.90	156.90	0.00	315.50	315.50	315.50	2993	2661	
12/31/95	128.00	128.00	128.00	0.00	443.50	443.50	443.50	3077	2745	
12/31/96	202.12	202.12	202.12	0.00	645.62	645.62	645.62	3744	3412	
12/31/97	246.97	246.97	246.97	0.00	892.59	892.59	892.59	3744	3412	
12/31/98	160.38	160.38	160.38	0.00	1052.97	1052.97	1052.97	3744	3412	
12/31/99	215.52	215.52	215.52	0.00	1268.49	1268.49	1268.49	3744	3412	
12/31/00	223.99	199.10	248.88	0.00	1492.48	1467.59	1517.37	3744	3412	
12/31/01	244.58	217.40	271.75	0.00	1737.05	1684.99	1789.12	3744	3412	
12/31/02	258.98	230.20	287.75	0.00	1996.03	1915.19	2076.87	3744	3412	
12/31/03	291.38	259.00	323.75	0.00	2287.40	2174.19	2400.62	3744	3412	
12/31/04	332.34	271.30	389.99	0.00	2619.75	2445.49	2790.61	3744	3412	
12/31/05	288.37	235.40	338.39	0.00	2908.11	2680.89	3129.00	3744	3412	
12/31/06	326.95	266.90	383.67	0.00	3235.06	2947.79	3512.67	3744	3412	Storage capacity reached w/
12/31/07	334.43	273.00	392.44	0.00	3569.49	3220.79	3905.10	3744	3412	allowance for chemical cleaning
12/31/08	334.43	273.00	392.44	0.00	3903.91	3493.79	4297.54	3744	3412	Storage capacity reached w/o
12/31/09	334.43	273.00	392.44	0.00	4238.34	3766.79	4689.98	3744	3412	allowance for chemical cleaning
12/31/10	334.43	273.00	392.44	0.00	4572.76	4039.79	5082.42	3744	3412	
12/31/11	334.43	273.00	392.44	0.00	4907.19	4312.79	5474.85	3744	3412	
12/31/12	334.43	273.00	392.44	0.00	5241.61	4585.79	5867.29	3744	3412	
12/31/13	334.43	273.00	392.44	0.00	5576.04	4858.79	6259.73	3744	3412	
12/31/14	334.43	273.00	392.44	0.00	5910.46	5131.79	6652.17	3744	3412	
12/31/15	334.43	273.00	392.44	0.00	6244.89	5404.79	7044.60	3744	3412	
12/31/16	334.43	273.00	392.44	0.00	6579.31	5677.79	7437.04	3744	3412	
12/31/17	334.43	273.00	392.44	0.00	6913.74	5950.79	7829.48	3744	3412	
12/31/18	334.43	273.00	392.44	0.00	7248.16	6223.79	8221.92	3744	3412	
Totals:	7248.16	6223.79	8221.92	0.00						

Duke Power Company
Power Generation Department
1999 Ash Storage Forecast



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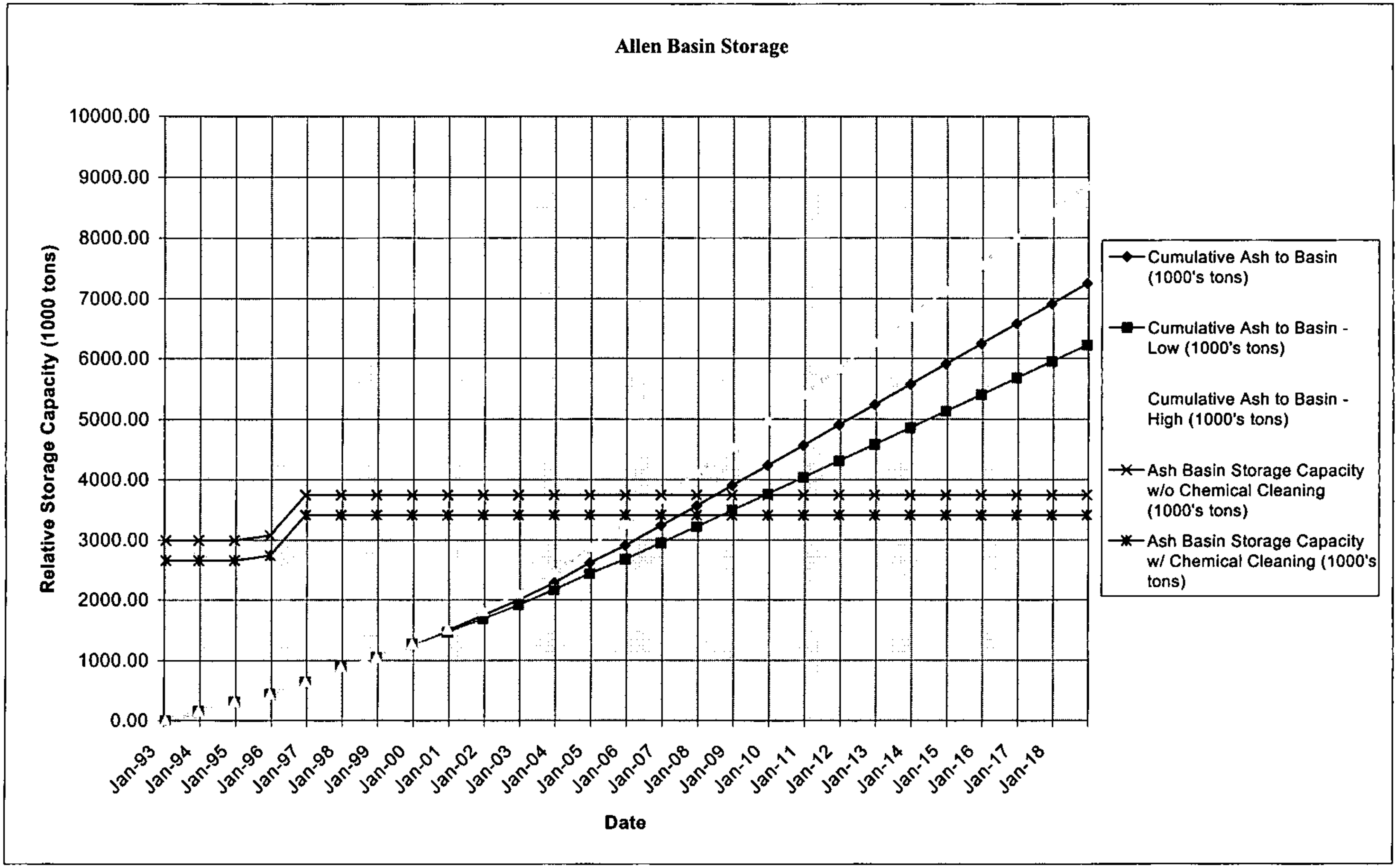
1999 Ash Storage Forecast



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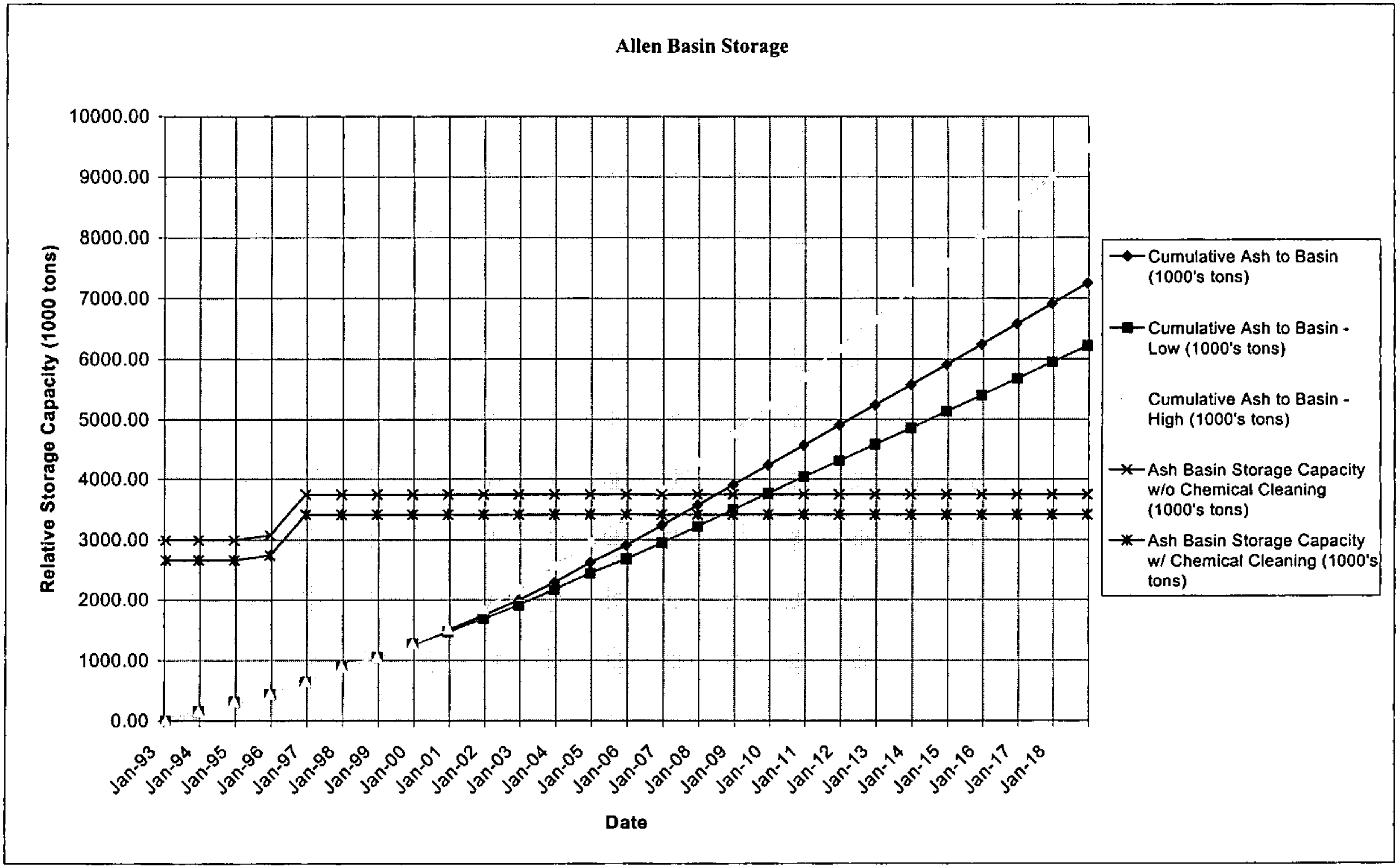

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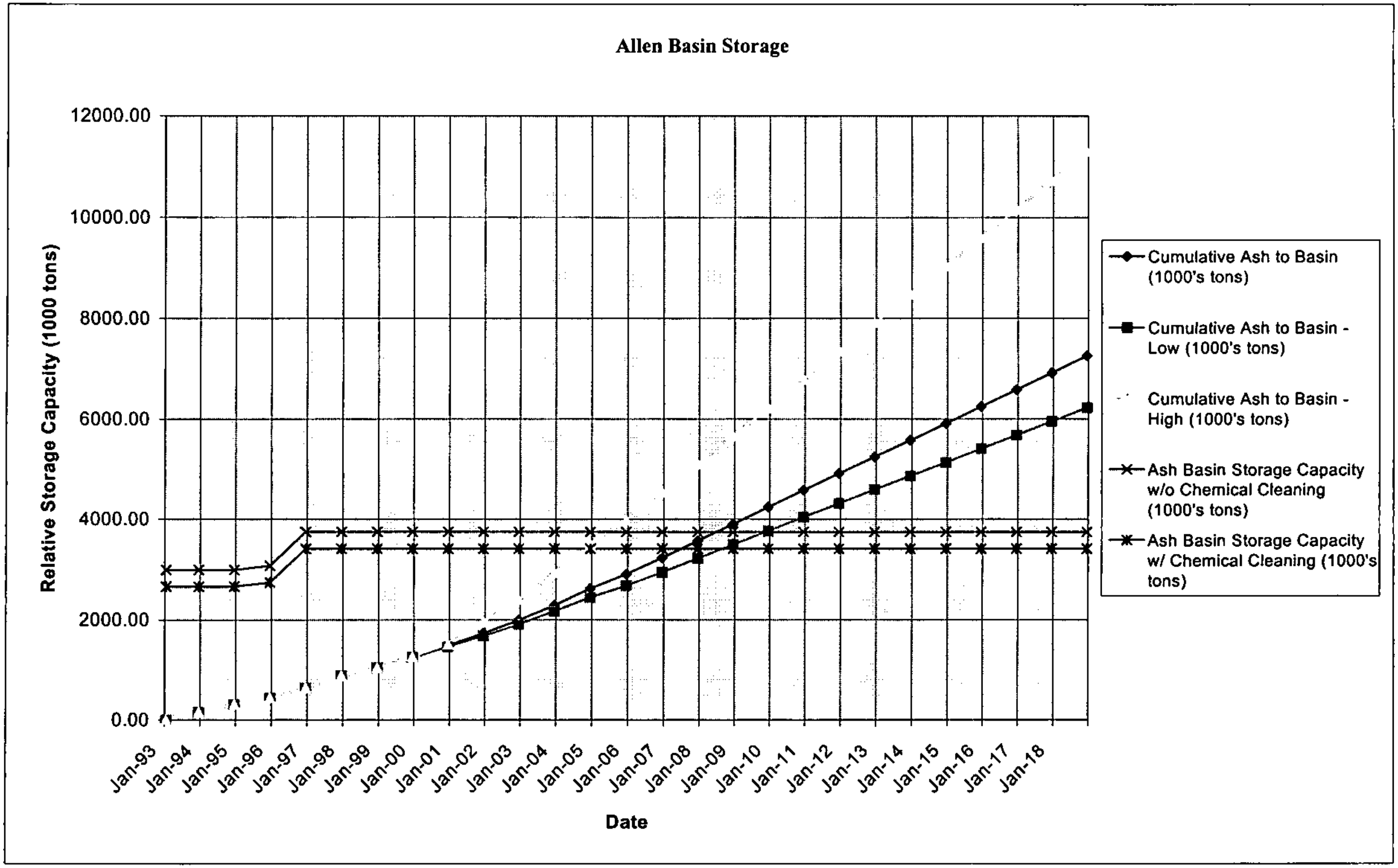

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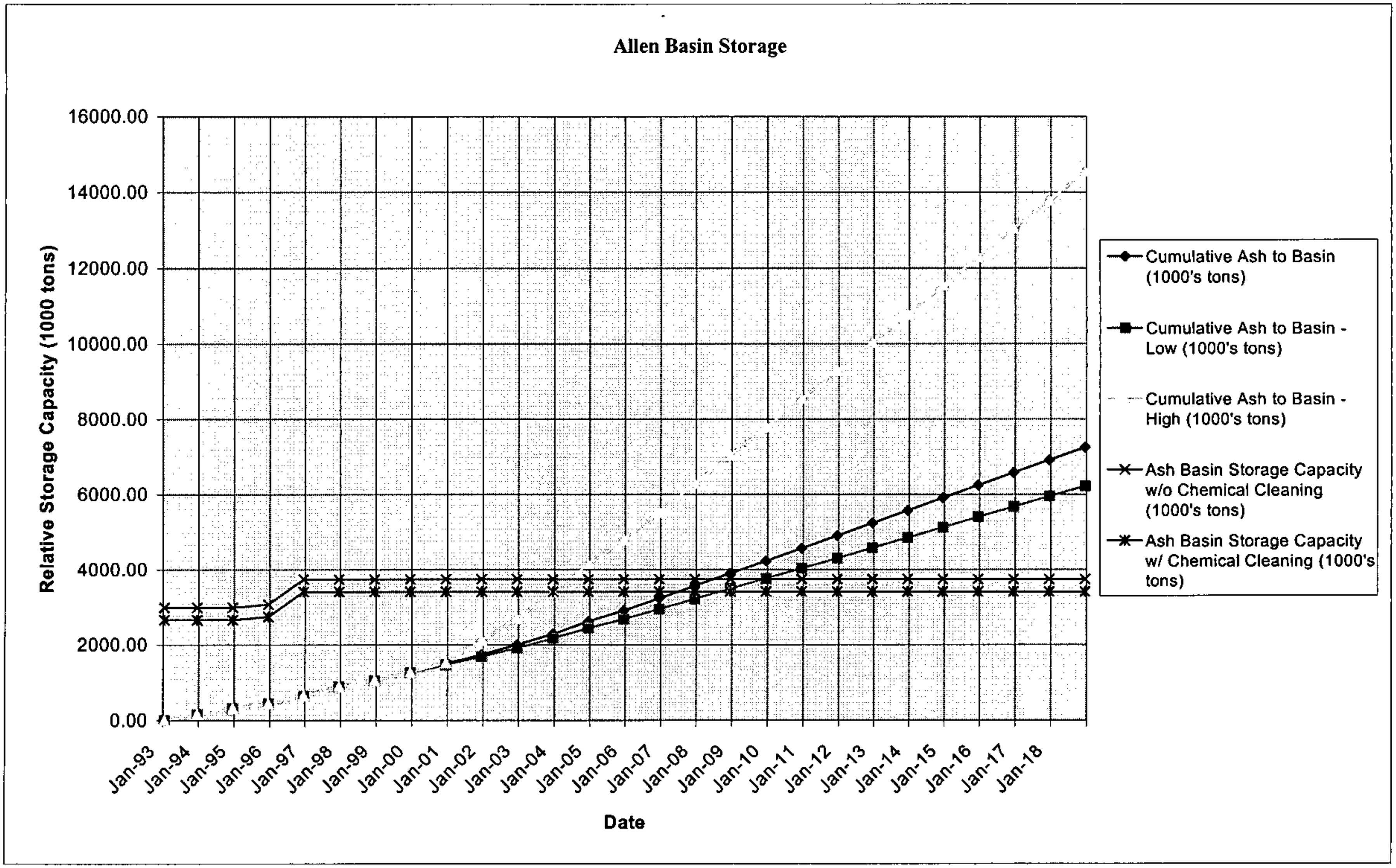

Plant Allen Ash Storage Options

Summary of NPV's with IRR of 9.5%

	6 years	10 years
Do Nothing: (Continue sluicing ash and clean pond at $3 / ton)	$1.74 M	$2.95 M
Install ash collection system & storage at $1.45M (sales from units #1 & #2)	$1.66 M	$2.00 M
Install ash collection system & storage at $1.80 M (sales from units #1, #2, & #5)	$1.66 M	$1.58 M

- Payback period of approximately 5 – 6 years.
- Savings due to reduced pond clean out volumes.
- Revenues from sales based on 60 / 40 share with ash vendor.
- Ash samples tested from unit #1 & #2 hoppers at various loads indicate marginal quality ash.
- Assumed a gradual increase in sales over a 3 to 4 year period.
- Ash samples were not taken from unit # 5 due to hot side precip.
- Estimate for ash collection and storage system provided by ESI.

Mtg. 9/22
Steve Rutledge
Ronnie Campbell

Plant Allen Ash Storage Options

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10/15/99 02:32 PM

To: Robert S Rutledge/Gen/DukePower@DukePower, Ronnie R Campbell/Gen/DukePower@DukePower, Tony R Mathis/Corp/DukePower@DukePower
cc: Tammie C Smith/Gen/DukePower@DukePower, James K Queen/Gen/DukePower@DukePower, David P Barnhardt/Gen/DukePower@DukePower, John E Ellington/Gen/DukePower@DukePower, Jeffrey W Newell/Corp/DukePower@DukePower, Joseph White Jr/Corp/DukePower@DukePower, Larry S Harper/Corp/DukePower@DukePower, Ronald E Lewis/Gen/DukePower@DukePower
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Plant Allen Ash Storage Options.(

As we discussed, due to the length of payback on our capital investment (5 to 6 years), in conjunction with the negative impact on ash LOI associated with the various proposed NOx technologies, the decision was made to hold off on additional testing of ash samples by South Eastern Fly Ash (SEFA) on Units #1 & #2. The Ash Management Group has received a detail summary of the fly ash sampling which was performed by SEFA. We have requested that SEFA hold off on future testing until early next year after Unit #5 has completed modifications in converting to a "cold side" precipitator. Our plans are to test Unit #5 ash at that time to determine the potential marketability of that Unit's flyash.

If I have misstated anything in this summary or recommendations moving forward, please do not hesitate to give me a call.
Thanks.

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Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Pond Clean Out Project in Tons								1000				1000
Pond Clean Out Project @ $3/T	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,000,000	$ -	$ -	$ -	$ 3,000,000
Total Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,000,000	$ -	$ -	$ -	$ 3,000,000
	NPV, 6 years	NPV, 10 years										
Continue to Sluice Ash and Clean Pond	$1,740,350	$2,950,892	$ -	$ -	$ -	$ -	$ -	$ 3,000,000	$ -	$ -	$ -	$ 3,000,000

Sluice 100% Ash Clean Pond @ $3 / ton

Plant Allen Ash Storage Options

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Dry Ash Handling and Storage System Cost				$ 1,450,000								
Pond Clean Out Project in Tons (1000's)								835				840
Pond Clean Out Project @ $3 / Ton	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,505,000	$ -	$ -	$ -	$ 2,520,000
Projected Fly Ash Sales in Tons				15	30	40	40	40	40	40	40	40
Projected Fly Ash Revenues @ $9/ton	$ -	$ -	$ -	$ (135,000)	$ (270,000)	$ (360,000)	$ (360,000)	$ (360,000)	$ (360,000)	$ (360,000)	$ (360,000)	$ (360,000)
Total Cost less Revenue	$ -	$ -	$ -	$ 1,315,000	$ (270,000)	$ (360,000)	$ (360,000)	$ 2,145,000	$ (360,000)	$ (360,000)	$ (360,000)	$ 2,160,000
	NPV, 6 years	NPV, 10 years										
Duke Finance 100% ash system												
Fly Ash Revenues @ 60/40 split	$1,656,339	$2,003,965	$ -	$ 1,315,000	$ (270,000)	$ (360,000)	$ (360,000)	$ 2,145,000	$ (360,000)	$ (360,000)	$ (360,000)	$ 2,160,000

Dry Collection for Ash Sales; Duke financing of ash system; Sluice Remaining Ash and Clean Pond @ $3 / ton, Collect Units #1 #2 only

Plant Allen Ash Storage Options

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Dry Ash Handling and Storage System Cost				$ 1,800,000								
Pond Clean Out Project in Tons (1000's)								795				760
Pond Clean Out Project @ $3 / Ton	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,385,000	$ -	$ -	$ -	$ 2,280,000
Projected Fly Ash Sales in Tons				15	30	40	60	60	60	60	60	60
Projected Fly Ash Revenues @ $9/ton	$ -	$ -	$ -	$ (135,000)	$ (270,000)	$ (360,000)	$ (540,000)	$ (540,000)	$ (540,000)	$ (540,000)	$ (540,000)	$ (540,000)
Total Cost less Revenue	$ -	$ -	$ -	$ 1,665,000	$ (270,000)	$ (360,000)	$ (540,000)	$ 1,845,000	$ (540,000)	$ (540,000)	$ (540,000)	$ 1,740,000
	NPV, 6 years	NPV, 10 years										
Duke Finance 100% ash system												
Fly Ash Revenues @ 60/40 split	$1,659,867	$1,576,034	$ -	$ 1,665,000	$ (270,000)	$ (360,000)	$ (540,000)	$ 1,845,000	$ (540,000)	$ (540,000)	$ (540,000)	$ 1,740,000

Dry Collection for Ash Sales; Duke financing of ash system; Sluice Remaining Ash and Clean Pond @ $3 / ton, Collect Units #1, #2 #5 only

Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Pond Clean Out Project in Tons								1000				1000
Pond Clean Out Project @ $4/T	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,000,000	$ -	$ -	$ -	$ 4,000,000
Total Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,000,000	$ -	$ -	$ -	$ 4,000,000
	NPV, 6 years	NPV, 10 years										
Continue to Sluice Ash and Clean Pond	$2,320,466	$3,934,523	$ -	$ -	$ -	$ -	$ -	$ 4,000,000	$ -	$ -	$ -	$ 4,000,000

Sluice 100% Ash Clean Pond @ $4 / ton

Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Dry Ash Handling and Storage System Cost				$ 1,450,000								
Pond Clean Out Project in Tons (1000's)								835				840
Pond Clean Out Project @ $4 / Ton	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,340,000	$ -	$ -	$ -	$ 3,360,000
Projected Fly Ash Sales in Tons				15	30	40	40	40	40	40	40	40
Projected Fly Ash Revenues @ $9/ton	$ -	$ -	$ -	$ (135,000)	$ (270,000)	$ (360,000)	$ (360,000)	$ (360,000)	$ (360,000)	$ (360,000)	$ (360,000)	$ (360,000)
Total Cost less Revenue	$ -	$ -	$ -	$ 1,315,000	$ (270,000)	$ (360,000)	$ (360,000)	$ 2,980,000	$ (360,000)	$ (360,000)	$ (360,000)	$ 3,000,000
	NPV, 6 years	NPV, 10 years										
Duke Finance 100% ash system												
Fly Ash Revenues @ 60/40 split	$2,140,737	$2,827,314	$ -	$ 1,315,000	$ (270,000)	$ (360,000)	$ (360,000)	$ 2,980,000	$ (360,000)	$ (360,000)	$ (360,000)	$ 3,000,000

Dry Collection for Ash Sales; Duke financing of ash system; Sluice Remaining Ash and Clean Pond @ $4 / ton, Collect Units #1 #2 only

Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Dry Ash Handling and Storage System Cost				$ 1,800,000								
Pond Clean Out Project in Tons (1000's)								795				760
Pond Clean Out Project @ $4 / Ton	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,180,000	$ -	$ -	$ -	$ 3,040,000
Projected Fly Ash Sales in Tons				15	30	40	60	60	60	60	60	60
Projected Fly Ash Revenues @ $9/ton	$ -	$ -	$ -	$ (135,000)	$ (270,000)	$ (360,000)	$ (540,000)	$ (540,000)	$ (540,000)	$ (540,000)	$ (540,000)	$ (540,000)
Total Cost less Revenue	$ -	$ -	$ -	$ 1,665,000	$ (270,000)	$ (360,000)	$ (540,000)	$ 2,640,000	$ (540,000)	$ (540,000)	$ (540,000)	$ 2,500,000
	NPV, 6 years	NPV, 10 years										
Duke Finance 100% ash system												
Fly Ash Revenues @ 60/40 split	$2,121,060	$2,343,898	$ -	$ 1,665,000	$ (270,000)	$ (360,000)	$ (540,000)	$ 2,640,000	$ (540,000)	$ (540,000)	$ (540,000)	$ 2,500,000

Dry Collection for Ash Sales; Duke financing of ash system; Sluice Remaining Ash and Clean Pond @ $4 / ton, Collect Units #1, #2 #5 only

Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Dry Ash Handling and Storage System Cost			$ 1,300,000									
Ash Landfill Permit and Prep			$ 500,000	$ 500,000								
Projected Fly Ash Sales in Tons			15	30	40	60	70	70	70	70	70	70
Projected Fly Ash Revenues @ $9/ton	$ -	$ -	$ (135,000)	$ (270,000)	$ (360,000)	$ (540,000)	$ (630,000)	$ (630,000)	$ (630,000)	$ (630,000)	$ (630,000)	$ (630,000)
Dry Ash Disposal Fee @ $3/T			$ 575,415	$ 545,553	$ 521,160	$ 600,655	$ 632,919	$ 632,919	$ 632,919	$ 632,919	$ 632,919	$ 632,919
Total Cost less Revenue	$ -	$ -	$ 2,240,415	$ 775,553	$ 161,160	$ 60,655	$ 2,919	$ 2,919	$ 2,919	$ 2,919	$ 2,919	$ 2,919
	NPV, 6 years	NPV, 10 years										
Duke Finance 100% storage												
Fly Ash Sold @ 60 / 40 split	$2,861,347	$2,866,773	$ 2,240,415	$ 775,553	$ 161,160	$ 60,655	$ 2,919	$ 2,919	$ 2,919	$ 2,919	$ 2,919	$ 2,919

100% Dry Ash Handling

Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Dry Ash Handling and Storage System Cost			$ 1,300,000									
Ash Landfill Permit and Prep			$ 500,000	$ 500,000								
Projected Fly Ash Sales in Tons			15	30	70	100	100	100	100	100	100	100
Projected Fly Ash Revenues @ $9/ton	$ -	$ -	$ (135,000)	$ (270,000)	$ (630,000)	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)
Dry Ash Disposal Fee @ $3/T			$ 575,415	$ 545,553	$ 431,160	$ 480,655	$ 542,919	$ 542,919	$ 542,919	$ 542,919	$ 542,919	$ 542,919
Total Cost less Revenue	$ -	$ -	$ 2,240,415	$ 775,553	$ (198,840)	$ (419,345)	$ (357,081)	$ (357,081)	$ (357,081)	$ (357,081)	$ (357,081)	$ (357,081)
	NPV, 6 years	NPV, 10 years										
Duke Finance 100% storage												
Fly Ash Sold @ 60 / 40 split	$1,815,752	$1,151,948	$ 2,240,415	$ 775,553	$ (198,840)	$ (419,345)	$ (357,081)	$ (357,081)	$ (357,081)	$ (357,081)	$ (357,081)	$ (357,081)

100% Dry Ash Handling; Inflated Sales Projections

Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Dry Ash Handling and Storage System Cost			$ 1,300,000									
Pond Clean Out Project in Tons								715				720
Pond Clean Out Project @ $4 / Ton	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,860,000	$ -	$ -	$ -	$ 2,880,000
Projected Fly Ash Sales in Tons			15	30	40	60	70	70	70	70	70	70
Projected Fly Ash Revenues @ $9/ton	$ -	$ -	$ (135,000)	$ (270,000)	$ (360,000)	$ (540,000)	$ (630,000)	$ (630,000)	$ (630,000)	$ (630,000)	$ (630,000)	$ (630,000)
Total Cost less Revenue	$ -	$ -	$ 1,165,000	$ (270,000)	$ (360,000)	$ (540,000)	$ (630,000)	$ 2,230,000	$ (630,000)	$ (630,000)	$ (630,000)	$ 2,250,000
	NPV, 6 years	NPV, 10 years										
Duke Finance 100% storage												
Fly Ash Sold @ 60 / 40 split	$1,082,405	$1,073,373	$ 1,165,000	$ (270,000)	$ (360,000)	$ (540,000)	$ (630,000)	$ 2,230,000	$ (630,000)	$ (630,000)	$ (630,000)	$ 2,250,000

Dry Collection for Ash Sales, Sluice Remaining Ash and Clean Pond @ $4 / ton

Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Dry Ash Handling and Storage System Cost			$ 1,300,000									
Pond Clean Out Project in Tons								715				720
Pond Clean Out Project @ $3 / Ton	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,145,000	$ -	$ -	$ -	$ 2,160,000
Projected Fly Ash Sales in Tons			15	30	40	60	70	70	70	70	70	70
Projected Fly Ash Revenues @ $9/ton	$ -	$ -	$ (135,000)	$ (270,000)	$ (360,000)	$ (540,000)	$ (630,000)	$ (630,000)	$ (630,000)	$ (630,000)	$ (630,000)	$ (630,000)
Total Cost less Revenue	$ -	$ -	$ 1,165,000	$ (270,000)	$ (360,000)	$ (540,000)	$ (630,000)	$ 1,515,000	$ (630,000)	$ (630,000)	$ (630,000)	$ 1,530,000
	NPV, 6 years	NPV, 10 years										
Duke Finance 100% storage												
Fly Ash Sold @ 60 / 40 split	$667,622	$368,060	$ 1,165,000	$ (270,000)	$ (360,000)	$ (540,000)	$ (630,000)	$ 1,515,000	$ (630,000)	$ (630,000)	$ (630,000)	$ 1,530,000

Dry Collection for Ash Sales, Sluice Remaining Ash and Clean Pond @ $3 / ton

Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Dry Ash Handling and Storage System Cost			$ 1,300,000									
Pond Clean Out Project in Tons								585				600
Pond Clean Out Project @ $3 / Ton	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,755,000	$ -	$ -	$ -	$ 1,800,000
Projected Fly Ash Sales in Tons			15	30	70	100	100	100	100	100	100	100
Projected Fly Ash Revenues @ $9/ton	$ -	$ -	$ (135,000)	$ (270,000)	$ (630,000)	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)
Total Cost less Revenue	$ -	$ -	$ 1,165,000	$ (270,000)	$ (630,000)	$ (900,000)	$ (900,000)	$ 855,000	$ (900,000)	$ (900,000)	$ (900,000)	$ 900,000
	NPV, 6 years	**NPV, 10 years**										
Duke Finance 100% storage												
Fly Ash Sold @ 60 / 40 split	($342,820)	($1,289,570)	$ 1,165,000	$ (270,000)	$ (630,000)	$ (900,000)	$ (900,000)	$ 855,000	$ (900,000)	$ (900,000)	$ (900,000)	$ 900,000

Dry Collection for Ash Sales; Inflated Ash Sales; Sluice Remaining Ash and Clean Pond @ $3 / ton

Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Dry Ash Handling and Storage System Cost			$ 1,300,000									
Pond Clean Out Project in Tons								715				720
Pond Clean Out Project @ $3 / Ton	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,145,000	$ -	$ -	$ -	$ 2,160,000
Projected Fly Ash Sales in Tons			15	30	40	60	70	70	70	70	70	70
Projected Fly Ash Revenues @ $7/ton	$ -	$ -	$ (105,000)	$ (210,000)	$ (280,000)	$ (420,000)	$ (490,000)	$ (490,000)	$ (490,000)	$ (490,000)	$ (490,000)	$ (490,000)
Total Cost less Revenue	$ -	$ -	$ 1,195,000	$ (210,000)	$ (280,000)	$ (420,000)	$ (490,000)	$ 1,655,000	$ (490,000)	$ (490,000)	$ (490,000)	$ 1,670,000
	NPV, 6 years	NPV, 10 years										
Duke Finance 100% storage												
Fly Ash Sold @ 60 / 40 split	$1,059,609	$1,020,303	$ 1,195,000	$ (210,000)	$ (280,000)	$ (420,000)	$ (490,000)	$ 1,655,000	$ (490,000)	$ (490,000)	$ (490,000)	$ 1,670,000

Dry Collection for Ash Sales; Reduced Revenues per ton; Sluice Remaining Ash and Clean Pond @ $3 / ton

Plant Allen Ash Storage Options

Internal Rate of Return	9.5%											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal Consumption:	1579	2143	2213	2267	2287	2658	2870	2870	2870	2870	2870	2870
Ash Content (%)	10.2%	10.4%	10.5%	10.5%	10.5%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Total Ash Production	161.058	222.872	232.365	238.035	240.135	292.38	315.7	315.7	315.7	315.7	315.7	315.7
Fly Ash Production @ 89%	143.3	198.4	206.8	211.9	213.7	260.2	281.0	281.0	281.0	281.0	281.0	281.0
Dry Ash Handling and Storage System Cost			$ -									
Pond Clean Out Project in Tons								715				720
Pond Clean Out Project @ $4 / Ton	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,860,000	$ -	$ -	$ -	$ 2,880,000
Projected Fly Ash Sales in Tons			15	30	40	60	70	70	70	70	70	70
Projected Fly Ash Revenues @ $3/ton	$ -	$ -	$ (45,000)	$ (90,000)	$ (120,000)	$ (180,000)	$ (210,000)	$ (210,000)	$ (210,000)	$ (210,000)	$ (210,000)	$ (210,000)
Total Cost less Revenue	$ -	$ -	$ (45,000)	$ (90,000)	$ (120,000)	$ (180,000)	$ (210,000)	$ 2,650,000	$ (210,000)	$ (210,000)	$ (210,000)	$ 2,670,000
	NPV, 6 years	NPV, 10 years										
Duke Finance 0% ash system												
Fly Ash Revenues @ $3 / ton	$1,071,152	$1,842,889	$ (45,000)	$ (90,000)	$ (120,000)	$ (180,000)	$ (210,000)	$ 2,650,000	$ (210,000)	$ (210,000)	$ (210,000)	$ 2,670,000

Dry Collection for Ash Sales; Vendor financing of ash system; Sluice Remaining Ash and Clean Pond @ $4 / ton

**Duke Energy Corp. -
Ash Management Group**

Fax

John,
FYI & return.
8/23

To: David Barnhardt

From: Tony Mathis

CC: Steve Immel

Date: 8/23/99

Re: Allen Fly Ash – Confidentiality Agreement

David, please find attached a copy of the signed Confidentiality Agreement between Duke Energy and Southeastern Fly Ash for your records and information. I will retain the original in our files, but it can be made available to you should the need arise. Please review and let me know if this signed agreement addresses the confidentiality concerns for Plant Allen. Upon your approval, I would appreciate it if you would make Keith Queen and Joel Shelton aware that this Confidentiality Agreement has been signed and is in place.

In addition, thanks for the plant's cooperation in working with Southeastern Fly Ash to date and over the next few weeks. We were on site on 8/19 with Southeastern to collect some ash samples from the precipitators and they have requested to come back on site this week to collect some additional high capacity samples (during the day time hours) and low capacity samples (during the night time hours). I will continue to coordinate their visits through Joel Shelton if that is in agreement with you.

Please let me know should any concerns develop and we will keep you posted on the potential marketability of the fly ash.

Thanks,

Tony

Tony Mathis, Ash Contracts Manager
Fuels Procurement / Ash Management

CONFIDENTIALITY AND NON-DISCLOSURE AGREEMENT

Duke Energy Corporation, a North Carolina corporation, with its principal offices at 422 South Church Street, Charlotte, North Carolina 28201-1244 and Southeastern Fly Corporation, a Fly Ash Marketing Company, with its principal offices at 2999 Sunset Blvd, Columbia, South Carolina 29169, intend to disclose to Southeastern Fly Ash Company, in connection with Duke Energy's Power Plant Operations at Plant Allen, certain confidential, non-public and/or proprietary information and know-how relating to Duke's respective businesses, including without limitation, certain business plans, financial information, pricing information, products, software structure, customers, marketing processes, and operations. The party disclosing the information is hereinafter referred to as the "Owner" and the party to whom the information is disclosed is hereinafter referred to as the "Recipient."

In consideration of the covenants and agreements herein contained and intending to be legally bound hereby, Recipient hereby agrees that Recipient shall not disclose to any other person, firm, corporation, organization or entity the information it receives from Owner which, at the time of disclosure to Recipient, is clearly designated as confidential or proprietary information (hereinafter referred to as the "Proprietary Information"). Recipient shall take precautions to prevent any breach of confidentiality and in any event shall use at least the same degree of care to avoid disclosure of the Proprietary Information as Recipient employs with respect to its own proprietary information of like importance. Recipient shall not use Proprietary Information for any purpose other than for the potential marketing or actual marketing purposes of the Duke Energy Fly Ash. The Proprietary Information shall be disclosed by Recipient only to those of its employees having a need to know such Proprietary Information in connection with the marketing of Duke Energy's Fly Ash.

All Proprietary Information in written form delivered by Owner to Recipient pursuant hereto shall be and remain the property of Owner, shall be promptly returned to Owner upon Owner's request, or destroyed at Owner's option.

Recipient's obligations hereunder shall continue for a period of ten (10) years after the date hereof, and thereafter shall terminate and be of no further force or effect.

Nothing contained herein shall be construed as granting or conferring any rights by license or otherwise, express, implied, or otherwise for any invention, discovery or improvement made, conceived or acquired prior to or after the date of this Agreement.

This Agreement shall be construed in accordance with the laws of the State of North Carolina. The parties agree to submit to the jurisdiction of the state and federal courts located in the State of North Carolina.

IN WITNESS WHEREOF, this Agreement is effective as of August 11, 1999.

Southeastern Fly Ash Company	Duke Energy Corporation
By: [signature]	By: Tony R. Mathis
Name: Jimmy Knowles	Name: Tony R. Mathis
Title: Vice President Southeastern Fly Ash Company	Title: Ash Management Ash Contracts Manager

Duke Energy Corp. - Ash Management Group

Memo

To: David Barnhardt

From: Tony Mathis

CC: Jimmy Knowles (Southeastern Fly Ash)
Steve Immel
Allen Ash Management File

Date: 8/25/99

Re: Allen Fly Ash – **REVISED** Confidentiality Agreement

David, please find attached a copy of the signed **REVISED** Confidentiality Agreement between Duke Energy and Southeastern Fly Ash for your records and information. I will retain the original in our files, but it can be made available to you should the need arise. Please review and let me know if this signed agreement addresses the confidentiality concerns for Plant Allen. Upon your approval, I would appreciate it if you would make Keith Queen, Joel Shelton, and others at Plant Allen that may be working with Southeastern, aware that this Confidentiality Agreement has been signed and is in place.

Please let me know should any concerns develop and we will keep you posted on the potential marketability of the fly ash.

Thanks,

Tony Mathis, Ash Contracts Manager
Fuels Procurement / Ash Management

CONFIDENTIALITY AND NON-DISCLOSURE AGREEMENT

Duke Energy Corporation, a North Carolina corporation, with its principal offices at 422 South Church Street, Charlotte, North Carolina 28201-1244 and Southeastern Fly Corporation, a Fly Ash Marketing Company, with its principal offices at 2999 Sunset Blvd, Columbia, South Carolina 29169, intend to disclose to Southeastern Fly Ash Company, in connection with Duke Energy's Power Plant Operations at Plant Allen, certain confidential, non-public and/or proprietary information and know-how relating to Duke's respective businesses, including without limitation, certain business plans, financial information, pricing information, products, software structure, customers, marketing processes, and operations. The party disclosing the information is hereinafter referred to as the "Owner" and the party to whom the information is disclosed is hereinafter referred to as the "Recipient."

In consideration of the covenants and agreements herein contained and intending to be legally bound hereby, Recipient hereby agrees that Recipient shall not disclose to any other person, firm, corporation, organization or entity any information it receives from Owner. **All information conveyed from the Owner to the Recipient through discussions, observations, hardcopy/electronic sources, overhearing of other's conversations, samplings, etc., pertaining to Plant Allen or any of the Owner's other power stations or businesses, shall be designated as "Confidential", "Non-Public", and/or "Proprietary Information" (hereinafter referred to as the "Proprietary Information").** Recipient shall take precautions to prevent any breach of confidentiality and in any event shall use at least the same degree of care to avoid disclosure of the Proprietary Information as Recipient employs with respect to its own proprietary information of like importance. Recipient shall not use Proprietary Information for any purpose other than for the potential marketing or actual marketing purposes of the Duke Energy Fly Ash. The Proprietary Information shall be disclosed by Recipient only to those of its employees having a need to know such Proprietary Information in connection with the marketing of Duke Energy's Fly Ash.

All Proprietary Information in written form delivered by Owner to Recipient pursuant hereto shall be and remain the property of Owner, shall be promptly returned to Owner upon Owner's request, or destroyed at Owner's option.

Recipient's obligations hereunder shall continue for a period of ten (10) years after the date hereof, and thereafter shall terminate and be of no further force or effect.

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Southeastern Fly Ash Company	**Duke Energy Corporation**
By:	By:
Name: Jimmy Knowles	Name: Tony R Mathis
Title: Vice President	Title: Ash Contracts Manager

POTENTIAL ASH MARKETING AT ALLEN STEAM STATION

Cost of Dry Handling:

- Existing facilities
- System Capacity (200K tons or 50K tons + landfill or sluice)
- O&M cost of dry ash disposal
- Cost of landfill permit
- ~ $500K for new facility
- Storage

Sale of Fly Ash:

- LOI projections ~ 8% average (need < 4%)
- LOI monitoring
- LOI improvement
- Ash production projections (see table)
- Coal burn projections
- NOx impact on ash quality
- Ash enhancement (carbon reduction) technologies
- Potential revenues
- Duke ash market
- Competitor ash markets

Cost of Ash Sluice:

- O&M
- Pipe
- Permit compliance and environmental support

Cost of Ash Basin "Clean-out"

- Allen Ash Management Plan
- Pond Capacity Curves
- Projected date 2006
- 1 M tons buys 5 years

ALLEN ON-SITE ASH STORAGE OPTIONS FOR 2006

1. Retired Pond:
a. North of Ash Blvd:

- 20' stack ~ 1.6 M tons
- 40' stack ~ 3.2 M tons

b. South of Ash Blvd:

- 20' stack ~ 865 K tons
- 40' stack ~ 1.73 M tons

2. Primary Pond:
a. Southeast Cove:

- 20' stack ~ 740 K tons
- 40' stack ~ 1.48 M tons

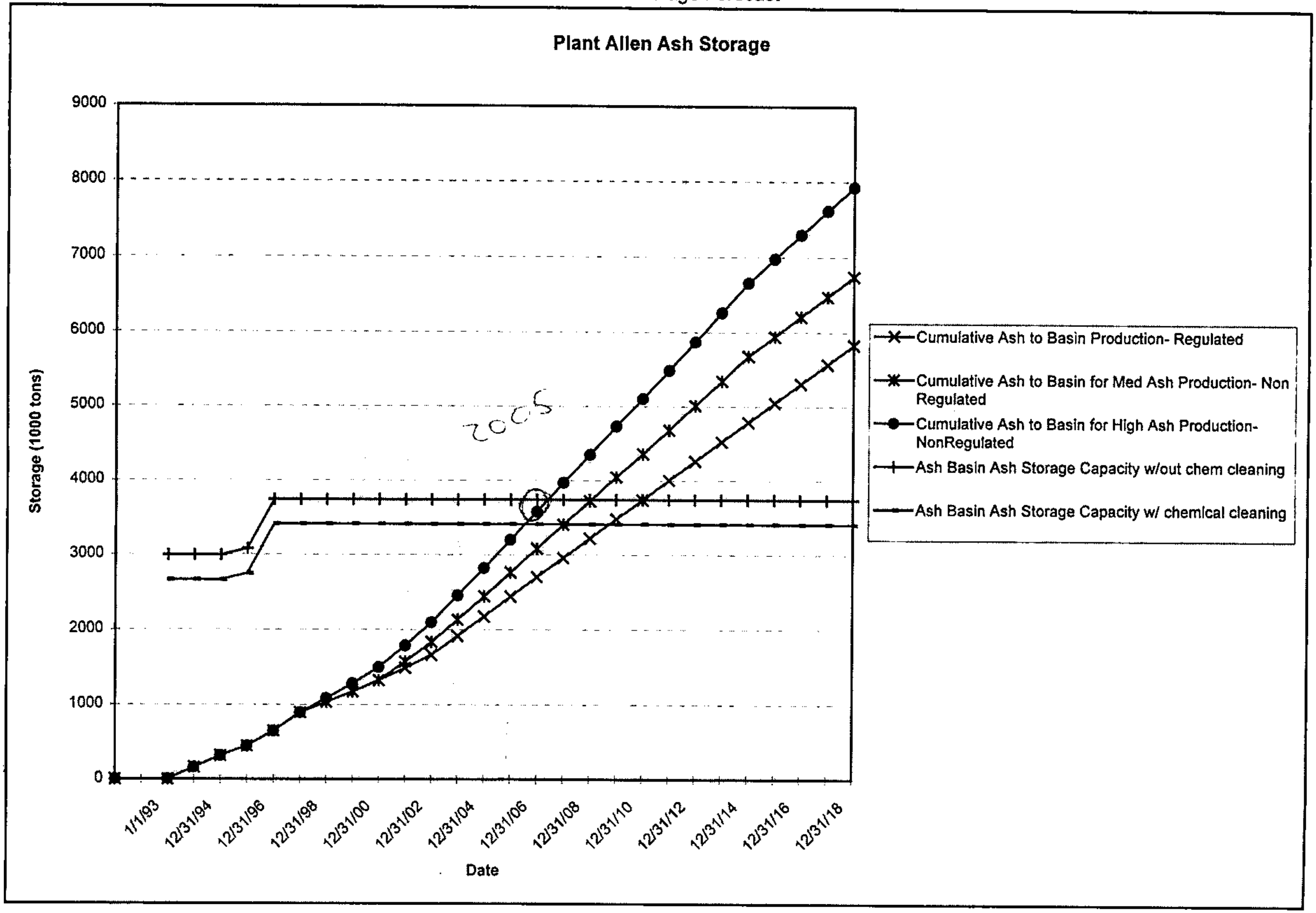
b. North of Southeast cove (south of discharge tower):

- 20' stack ~ 740 K tons
- 40' stack ~ 1.48 M tons

Plant Allen Ash Production

	1996	1997	1998	1999	2000
Total Ash Production:	202.10	247.00	160.40	237.4	232.4
Average % Ash Coal	10.0%	10.3%	10.1%	10.5%	10.5%
Unit #1				28.1	
Unit #2				21.1	
Unit #3				54.5	
Unit #4				53.7	
Unit #5				53.8	
Fly Ash Production (89%):	179.87	219.83	142.76	211.29	206.84

Duke Power Company
Fossil/Hydro Dept.
1998 Ash Storage Forecast



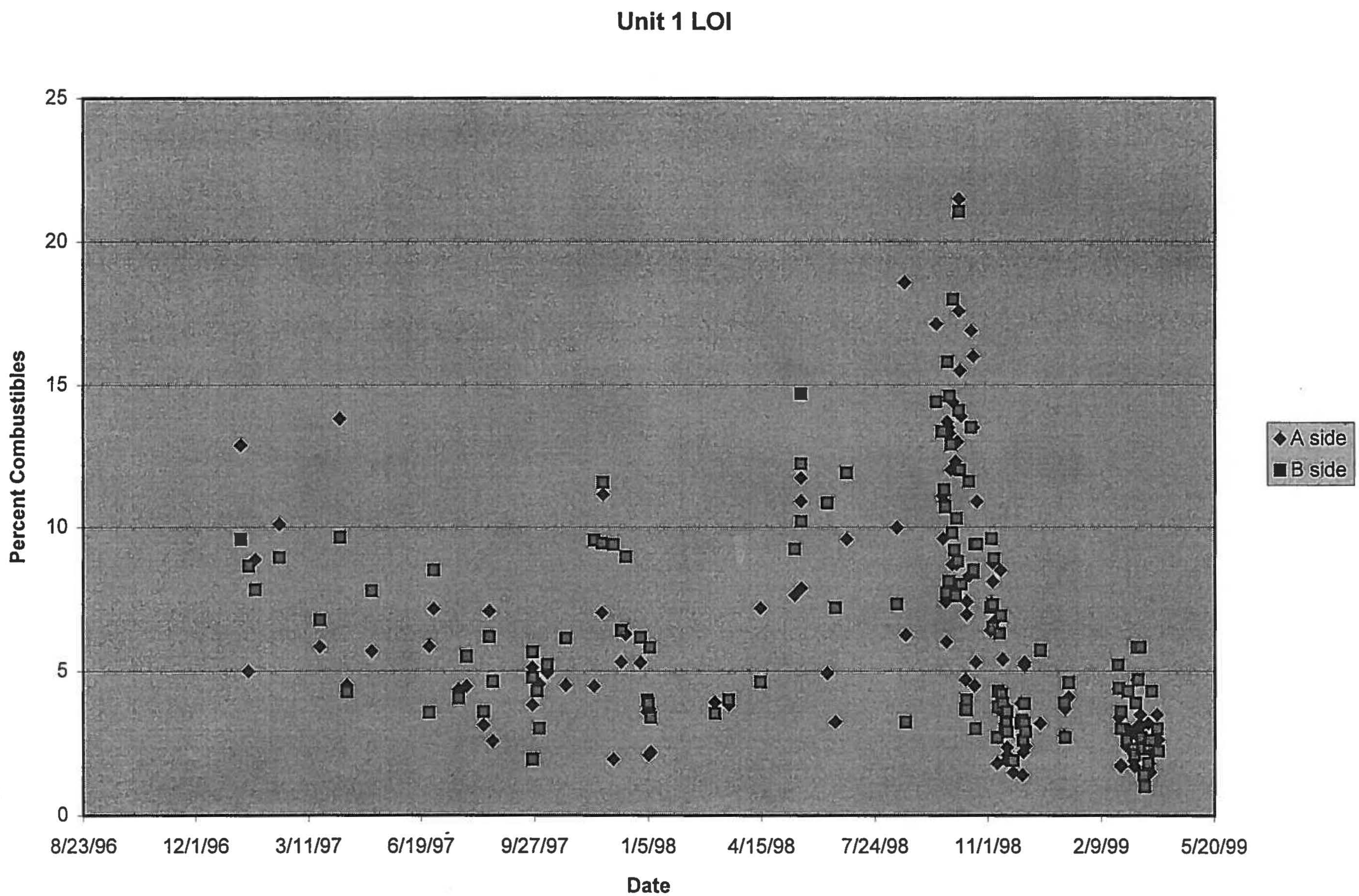
Duke Power Company
Fossil/Hydro Dept.
1998 Ash Storage Forecast

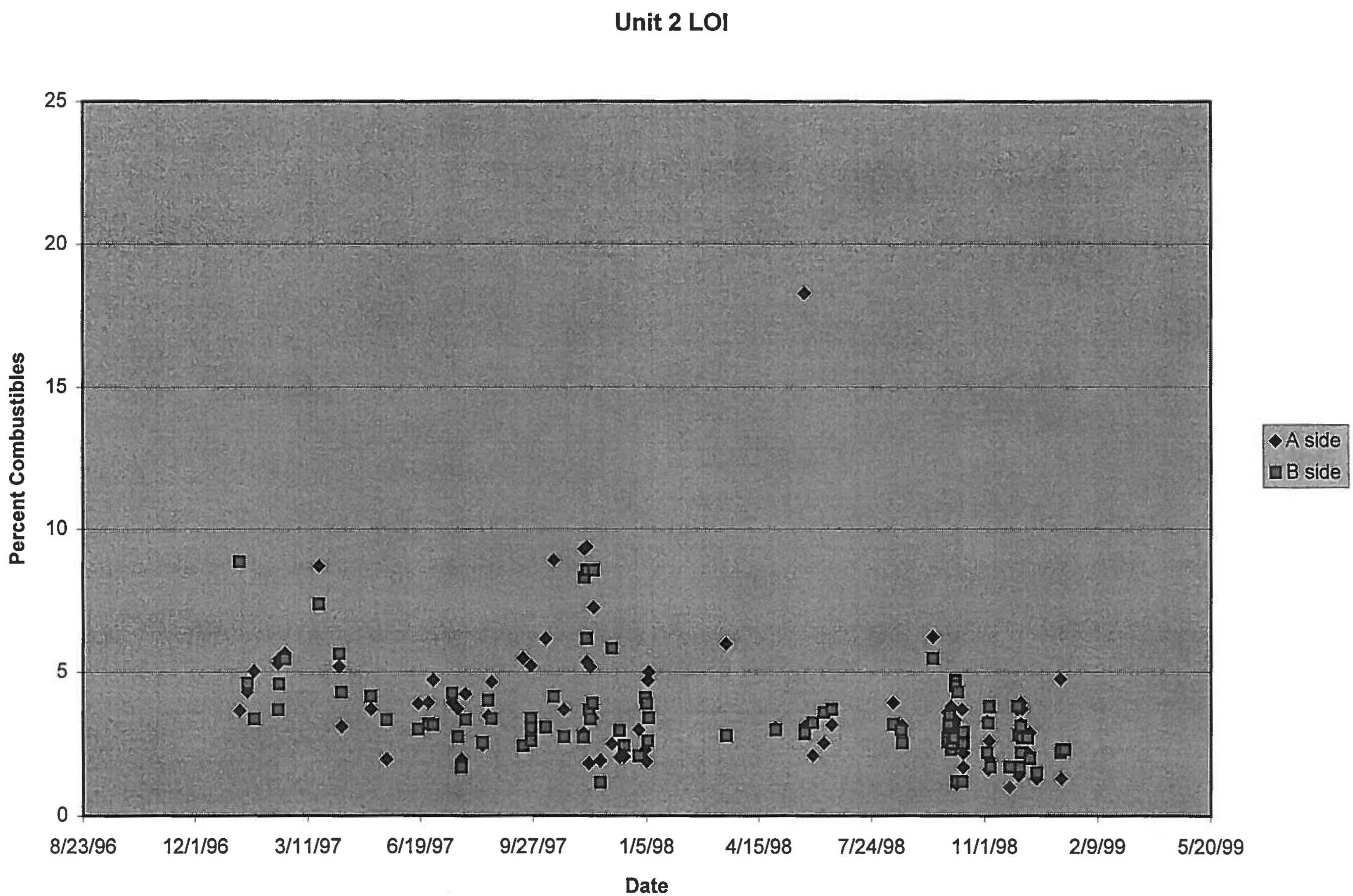
Allen Steam Station

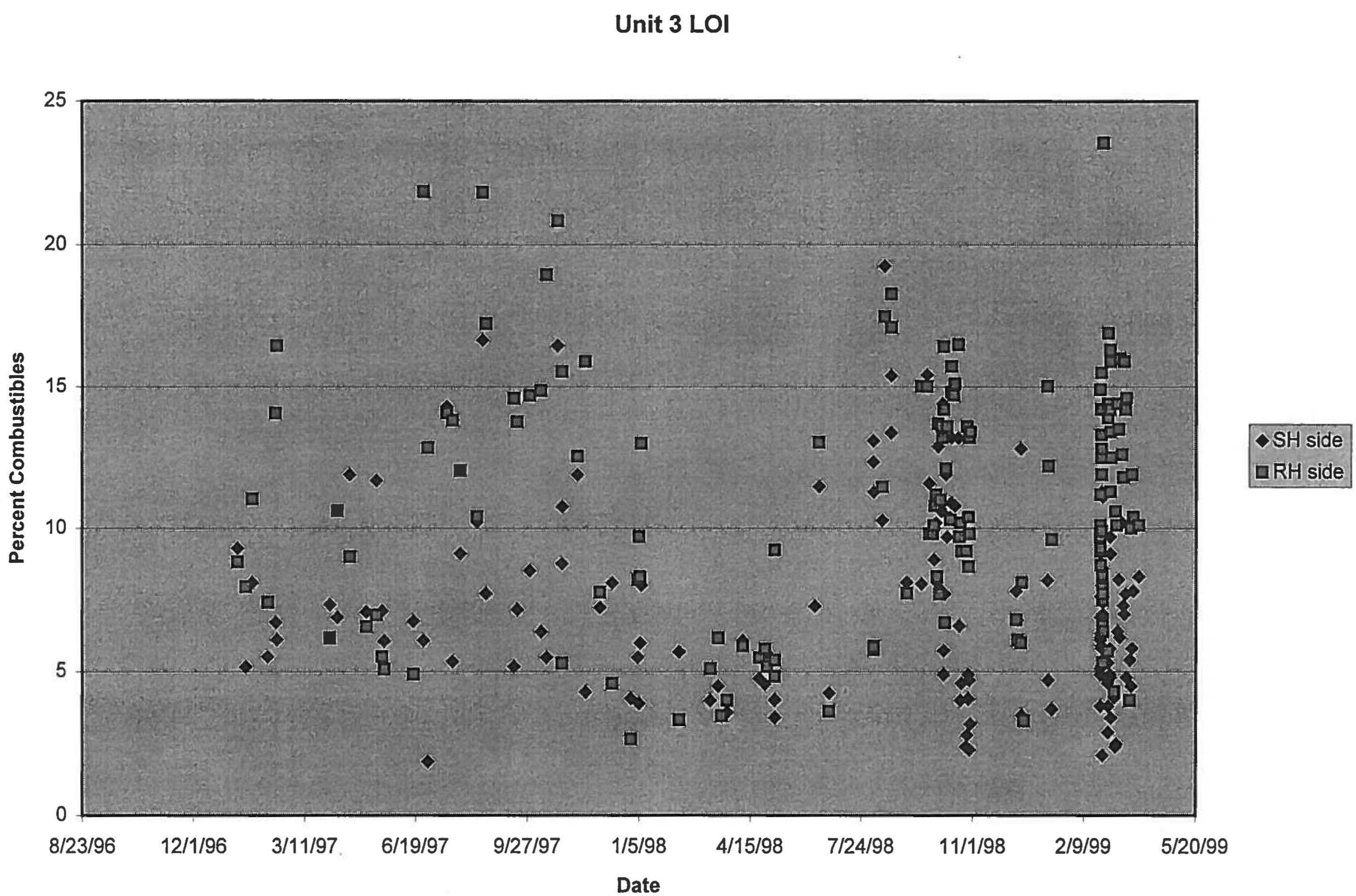
Ash Production Projections Based On:
- Coal Consumption with Utility Regulation Medium Ash Content (8.5% till 2002, 10% after 2002)
- Coal Consumption with Utility Deregulation Medium Ash Content (8.5% till 2002, 10% after 2002)
- Coal Consumption with Utility Deregulation High Ash Content (10% till 2002, 11.9% after 2002

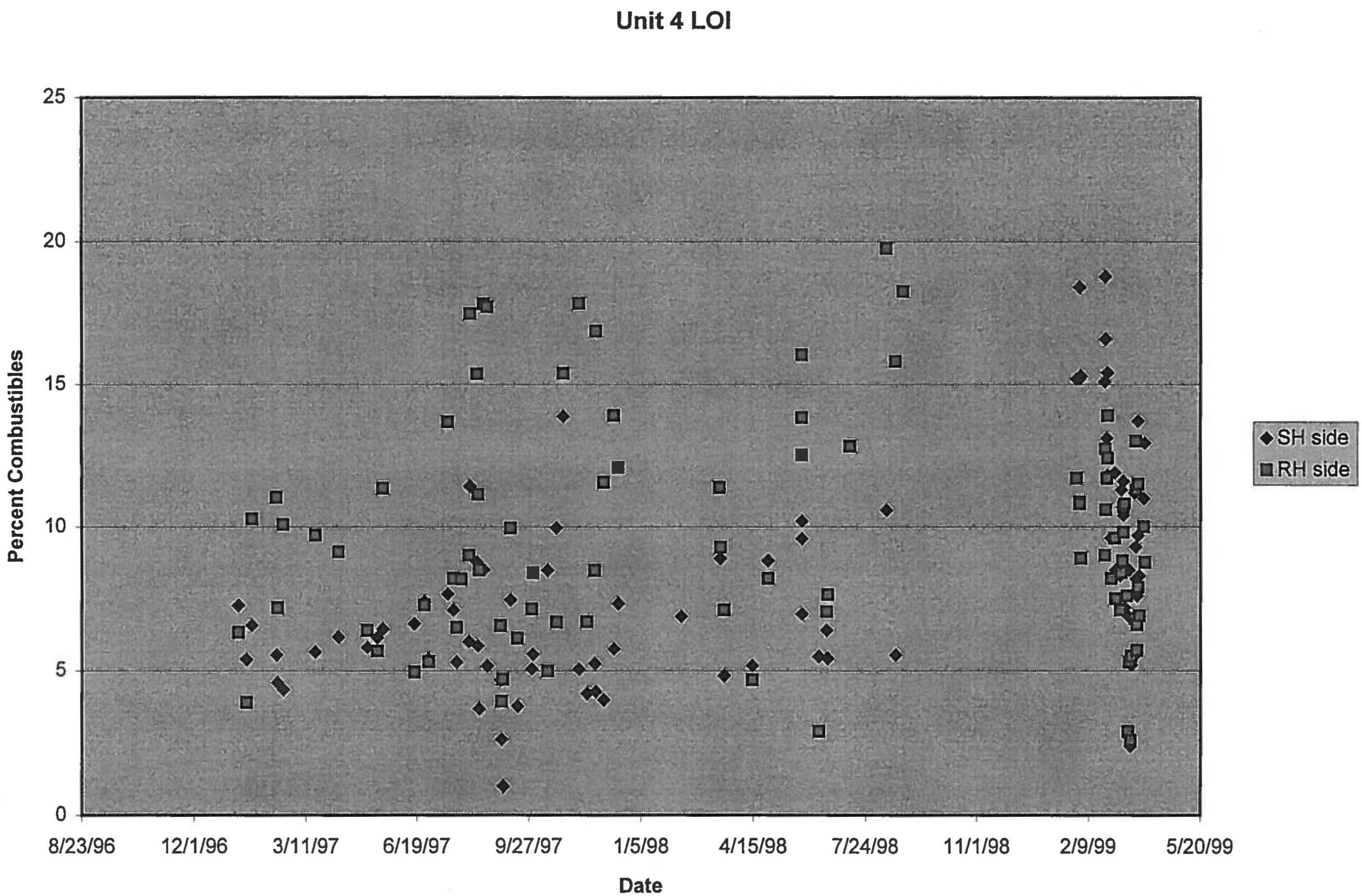
Date of Most Recent Physical Survey: 01/08/97

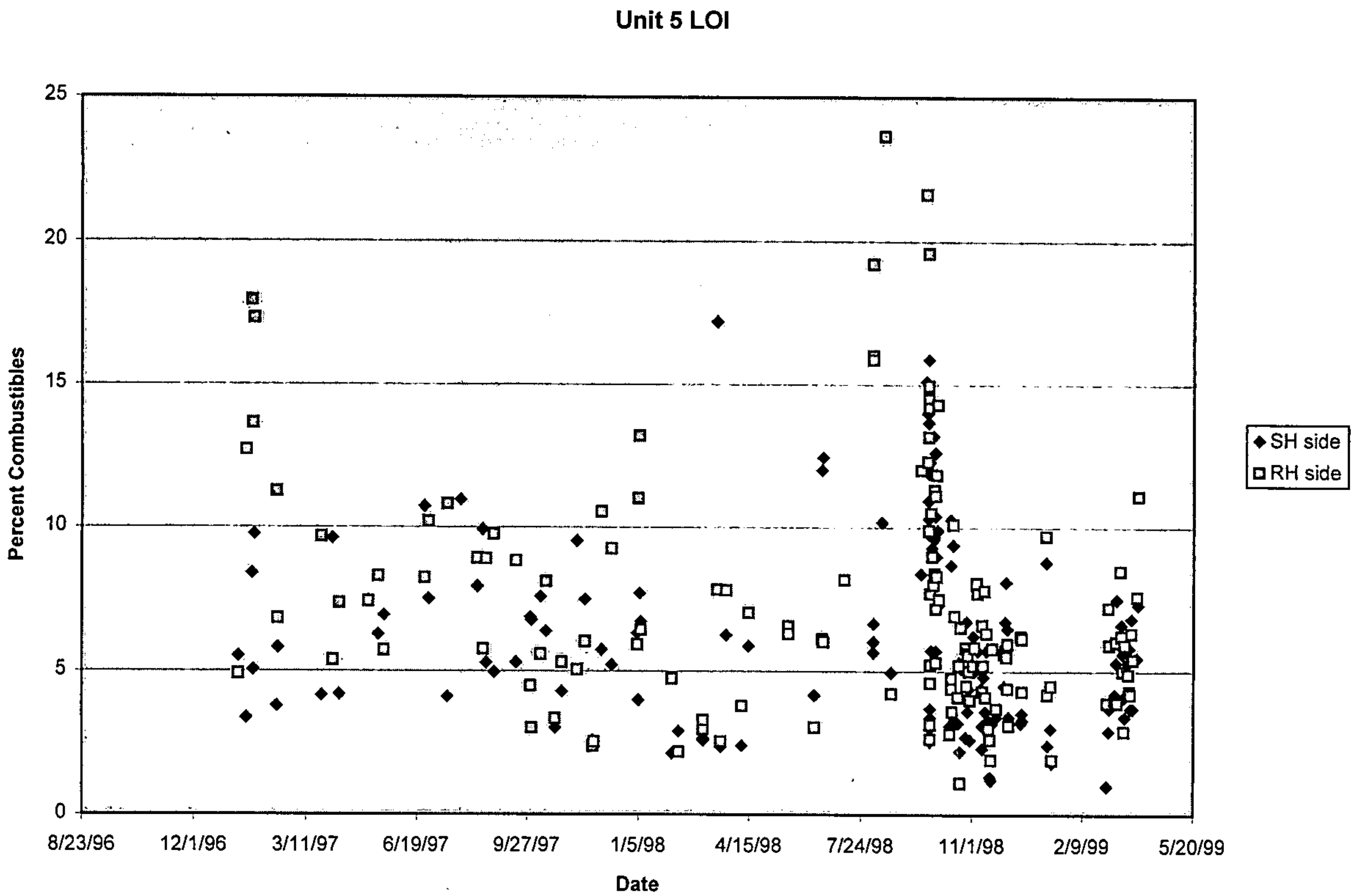
Date	Annual Ash Production- **Regulated** (1000's tons)	Annual Ash Production- **Non Regulated** (1000's tons)	Annual High Ash Production- **NonRegulated** (1000's tons)	Cumulative Ash to Basin Production- **Regulated** (1000's tons)	Cumulative Ash to Basin for Med Ash Production- **Non Regulated** (1000's tons)	Cumulative Ash to Basin for High Ash Production- **NonRegulated** (1000's tons)	Ash Basin Ash Storage Capacity w/out chem cleaning (1000's tons)	Ash Basin Ash Storage Capacity w/ chemical cleaning (1000's tons)
1/1/93	0.00	0.00	0.00	0.00	0.00	0.00	2993	2661
12/31/93	158.60	158.60	158.60	158.60	158.60	158.60	2993	2661
12/31/94	156.90	156.90	156.90	315.50	315.50	315.50	2993	2661
12/31/95	128.00	128.00	128.00	443.50	443.50	443.50	3077	2745
12/31/96	202.12	202.12	202.12	645.62	645.62	645.62	3744	3412
12/31/97	246.97	246.97	246.97	892.59	892.59	892.59	3744	3412
12/31/98	136.94	136.94	191.71	1029.53	1029.53	1084.30	3744	3412
12/31/99	140.51	140.51	196.71	1170.03	1170.03	1281.01	3744	3412
12/31/00	155.04	155.04	217.06	1325.07	1325.07	1498.06	3744	3412
12/31/01	163.03	247.86	291.60	1488.10	1572.93	1789.66	3744	3412
12/31/02	174.59	259.17	308.90	1662.69	1832.10	2098.56	3744	3412
12/31/03	251.30	299.00	355.81	1913.99	2131.10	2454.37	3744	3412
12/31/04	260.90	306.70	364.97	2174.89	2437.80	2819.35	3744	3412
12/31/05	260.90	320.10	380.92	2435.79	2757.90	3200.26	3744	3412
12/31/06	260.90	323.00	384.37	2696.69	3080.90	3584.63	3744	3412
12/31/07	260.90	324.10	385.68	2957.59	3405.00	3970.31	3744	3412
12/31/08	260.90	317.90	378.30	3218.49	3722.90	4348.61	3744	3412
12/31/09	260.90	322.50	383.78	3479.39	4045.40	4732.39	3744	3412
12/31/10	260.90	313.30	372.83	3740.29	4358.70	5105.22	3744	3412
12/31/11	260.90	320.20	381.04	4001.19	4678.90	5486.25	3744	3412
12/31/12	260.90	331.80	382.94	4262.09	5010.70	5869.20	3744	3412
12/31/13	260.90	331.50	394.49	4522.99	5342.20	6263.68	3744	3412
12/31/14	260.90	331.90	394.96	4783.89	5674.10	6658.64	3744	3412
12/31/15	260.90	267.20	317.97	5044.79	5941.30	6976.61	3744	3412
12/31/16	260.90	267.20	317.97	5305.69	6208.50	7294.58	3744	3412
12/31/17	260.90	267.20	317.97	5566.59	6475.70	7612.55	3744	3412
12/31/18	260.90	267.20	317.97	5827.49	6742.90	7930.51	3744	3412
Totals:	5827.49	6742.90	7930.51					


Unit 1 LOI
Percent Combustibles
25
20
15
10
5
0
8/23/96
12/1/96
3/11/97
6/19/97
9/27/97
1/5/98
4/15/98
7/24/98
11/1/98
2/9/99
5/20/99
Date
A side
B side


Unit 2 LOI
Percent Combustibles
25
20
15
10
5
0
8/23/96
12/1/96
3/11/97
6/19/97
9/27/97
1/5/98
4/15/98
7/24/98
11/1/98
2/9/99
5/20/99
Date
A side
B side


Unit 3 LOI
Percent Combustibles
25
20
15
10
5
0
8/23/96
12/1/96
3/11/97
6/19/97
9/27/97
1/5/98
4/15/98
7/24/98
11/1/98
2/9/99
5/20/99
Date
SH side
RH side


Unit 4 LOI
Percent Combustibles
25
20
15
10
5
0
8/23/96
12/1/96
3/11/97
6/19/97
9/27/97
1/5/98
4/15/98
7/24/98
11/1/98
2/9/99
5/20/99
Date
SH side
RH side


Unit 5 LOI
Percent Combustibles
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10
5
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8/23/96
12/1/96
3/11/97
6/19/97
9/27/97
1/5/98
4/15/98
7/24/98
11/1/98
2/9/99
5/20/99
Date
SH side
RH side

Jimmy Knowles <jimmy@sefaflyash.com> on 09/13/99 10:38:19 AM

To: Tony R Mathis/Corp/DukePower@DukePower
cc:
Subject: Fly Ash Hopper Checks @ Allen

Tony,

Following are the data we discussed. If possible we would like to include info from the previous day's bunker coal analyses as additional "unit conditions" parameters. You can fax (803-794-4458) or e-mail (jimmy@sefaflyash.com) that information to us and we will append it to these data.

As we discussed on the phone, the quality of the Allen fly ash is marginal at best (Unit 2 seems to consistently be better than Unit 1). Currently, most of the fly ash analyzed is not marketable (i.e.- over 4.0% LOI). At low load the LOI improves, but the quantity of fly ash produced decreases significantly. If the overall LOI can be lowered to under 4% LOI on a consistent basis, then it may be advisable to attempt a marketing effort. However, we cannot determine if the units are even able to consistently produce specification-grade fly ash (less than 4.0% LOI).

If the Allen Plant personnel want try to lower the LOI on Units 1&2, we will work with them to secure and evaluate fly ash hopper samples. It may be that the plant is currently producing the best quality product possible or perhaps they have some ideas as to how to adjust operations so as to improve the quality.

After you send us the information on the coal characteristics, we will evaluate the data accumulated so far and sit down with you to develop an action plan. Thanks,

Jimmy Knowles

- 9908HopperChecks1&2.xls

#	DATE	TIME	TES / MIL	MW	AF	FF	MIL MAS	OPA	TILTS	NOX	O-A	O-B	9-12	13-16	AVG
1	08/19/99	1300	UNIT 2										3.32	3.34	3.33
2	08/26/99	1430	UNIT 2	165	106	106	95	5	24.0	0.4000	2.5	2.5	4.16	3.33	3.74
3	08/31/99	1400	UNIT 2	64	43	43	46	0	26.0	0.4300	5.0	5.1	1.61	2.81	2.21
4	09/02/99	1445	UNIT 2	176	106	106	106	5	25.0	0.4400	2.5	2.5	3.19	2.92	3.05
5	09/09/99	1530	UNIT 2	177	107	107	112	5	15.0	0.4100	2.6	2.6	5.62	4.79	5.20
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				146	91	91		4	22.5	0.4200	3.2	3.2	3.58	3.44	3.51

#	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	2.65	2.35	3.74	4.57	2.82	2.75	3.94	3.86				3.58			
2	4.92	3.42	3.95	4.38	3.73	2.84	3.43	3.32							
3	1.19	1.74	1.23	2.31	2.45	3.07	2.88	2.86							
4	2.62	3.07	3.54	3.53	3.05	2.39	3.50	2.75							
5	5.65	4.96	5.65	6.22	4.39	3.66	4.52	6.62							
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	3.41	3.11	3.62	4.20	3.29	2.94	3.65	3.88	#DIV/0!	#DIV/0!	#DIV/0!	3.58	#DIV/0!	#DIV/0!	#DIV/0!

ALLEN STEAM PLANT

#	DATE	TIME	NOTES / MILLS	MW	AF	FF	MIL MAS	OPA	TILTS	NOX	O-A	O-B	9-12	13-16	AVG
1	08/19/99	1300	UNIT 1	180	109	109	122	10	27.0	0.4700	2.5	2.8	4.06	5.55	4.80
2	08/26/99	1430	UNIT 1	176	107	107	129	7	16.0	0.4300	2.5	2.5	6.20	7.20	6.70
3	08/31/99	1400	UNIT 1	69	44	45	54	1	16.0	0.4500	5.0	5.1	1.22	3.34	2.28
4	09/02/99	1445	UNIT 1	176	107	107	122	5	22.0	0.4600	2.5	2.5	3.77	4.28	4.02
5	09/09/99	1530	UNIT 1	180	110	110	137	7	16.0	0.4500	2.6	2.6	7.31	8.40	7.85
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				156	95	96		6	19.4	0.4520	3.0	3.1	4.51	5.75	5.13

SEFA9/21/99

ALLEN STEAM PLANT

#	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	4.45	4.67	3.48	3.65	7.27	5.62	4.50	4.79				3.58			
2	5.89	7.73	4.38	6.82	7.77	6.85	6.46	7.73							
3	1.03	0.99	1.75	1.12	3.70	3.42	3.33	2.92							
4	4.58	4.04	3.06	3.43	5.00	4.59	3.60	3.94							
5	7.83	7.06	6.78	7.58	9.14	9.27	6.80	N.S.							
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	4.76	4.90	3.89	4.52	6.58	5.95	4.94	4.85	#DIV/0!	#DIV/0!	#DIV/0!	3.58	#DIV/0!	#DIV/0!	#DIV/0!

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To: Tony R Mathis/Corp/DukePower@DukePower
cc:
Subject: Fly Ash Hopper Checks @ Allen

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Jimmy Knowles

- 9908HopperChecks1&2.xls

#	DATE	TIME	TES / MIL	MW	AF	FF	MIL MAS	OPA	TILTS	NOX	O-A	O-B	9-12	13-16	AVG
1	08/19/99	1300	UNIT 2										3.32	3.34	3.33
2	08/26/99	1430	UNIT 2	165	106	106	95	5	24.0	0.4000	2.5	2.5	4.16	3.33	3.74
3	08/31/99	1400	UNIT 2	64	43	43	46	0	26.0	0.4300	5.0	5.1	1.61	2.81	2.21
4	09/02/99	1445	UNIT 2	176	106	106	106	5	25.0	0.4400	2.5	2.5	3.19	2.92	3.05
5	09/09/99	1530	UNIT 2	177	107	107	112	5	15.0	0.4100	2.6	2.6	5.62	4.79	5.20
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29															
30															
				146	91	91		4	22.5	0.4200	3.2	3.2	3.58	3.44	3.51

#	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	2.65	2.35	3.74	4.57	2.82	2.75	3.94	3.86				3.58			
2	4.92	3.42	3.95	4.38	3.73	2.84	3.43	3.32							
3	1.19	1.74	1.23	2.31	2.45	3.07	2.88	2.86							
4	2.62	3.07	3.54	3.53	3.05	2.39	3.50	2.75							
5	5.65	4.96	5.65	6.22	4.39	3.66	4.52	6.62							
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	3.41	3.11	3.62	4.20	3.29	2.94	3.65	3.88	#DIV/0!	#DIV/0!	#DIV/0!	3.58	#DIV/0!	#DIV/0!	#DIV/0!

ALLEN STEAM PLANT

#	DATE	TIME	NOTES / MILLS	MW	AF	FF	MIL MAS	OPA	TILTS	NOX	O-A	O-B	9-12	13-16	AVG
1	08/19/99	1300	UNIT 1	180	109	109	122	10	27.0	0.4700	2.5	2.8	4.06	5.55	4.80
2	08/26/99	1430	UNIT 1	176	107	107	129	7	16.0	0.4300	2.5	2.5	6.20	7.20	6.70
3	08/31/99	1400	UNIT 1	69	44	45	54	1	16.0	0.4500	5.0	5.1	1.22	3.34	2.28
4	09/02/99	1445	UNIT 1	176	107	107	122	5	22.0	0.4600	2.5	2.5	3.77	4.28	4.02
5	09/09/99	1530	UNIT 1	180	110	110	137	7	16.0	0.4500	2.6	2.6	7.31	8.40	7.85
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				156	95	96		6	19.4	0.4520	3.0	3.1	4.51	5.75	5.13

ALLEN STEAM PLANT

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1	4.45	4.67	3.48	3.65	7.27	5.62	4.50	4.79				3.58			
2	5.89	7.73	4.38	6.82	7.77	6.85	6.46	7.73							
3	1.03	0.99	1.75	1.12	3.70	3.42	3.33	2.92							
4	4.58	4.04	3.06	3.43	5.00	4.59	3.60	3.94							
5	7.83	7.06	6.78	7.58	9.14	9.27	6.80	N.S.							
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SEFA9/21/99

STEAM & POWER ESI SPECIAL FORCES

ESI Inc. of Tennessee
1250 Roberts Boulevard
Kennesaw, Georgia 30144
Ph: 770-427-6200
Fax: 770-425-3660

FAX

"E-mail is faster..."

To:	Tony R. Mathis, P.E.	**From:**	Jeff White
Company:	Duke Energy	**Date:**	7/26/99
Fax:	704-382-4568	**Project:**	99999
Phone:	704-382-7721	**CC:**	File
Re:	Plant Allen	**Pages:**	1

☒ **Urgent** ☒ **For Review** ☐ **Please Comment & Reply** ☐ **Please Recycle**

● **Comments:**

Tony,

Based on my conversations with you and Tom Hendrix of Southeast Flyash, I understand that the interest in Plant Allen's ash handling conversion to a dry system has heated up. With this in mind Tom suggested that I try and respond ASAP with a budgetary number for the pnuematic conveying and storage systems. I happened to have quoted a very similar installation to VEPCO a couple of months ago and I have used this proposal to take an educated guess at the Plant Allen system. With this in mind, I would estimate the installed cost of a new pnuematic conveying and storage system to be on the order of $ 1,450,000 +/- 20%. The system includes conveying line, blowers, load out silo's, controls and electical equipment installed at the Plant Allen facility. All this is based on a quick look at the facility. If I were given more time and if the Duke wants to take a serious look at the installation, I would be happy to come up with a firm cost for the facility.

I hope this helps for now.

Thanks,

Jeff

Units #1 & #2
Cluster of silos: 1500 Tons
Not new controls.
Not selective collections.

T:\PROPOSAL\DUK55301 - Allan Plant\Corresp\Client\fPlant Allen.doc

Jeffrey W Newell 06/29/99 03:53 PM

To: Stephen J Immel/Corp/DukePower@DukePower
cc:
Subject: Allen LOI

Comparing Robert Dorroh's note to my estimation of currently marketable Allen ash by average of LOIs less than 5% in the past 2.5 years:

Cold Side

Unit 1 =	17,984 cy	64%
Unit 2 =	14,595 cy	69%
Unit 3 =	11,990 cy	22%
Unit 4 =	4,833 cy	9%
Unit 5 =	20,982 cy	39%
Total =	70,384 cy (I estimated 92,654 cy)	

} 30% Cold Side

Alan Nietering. 825-3282

Cold Side 2/99

Units 1+2 = 32,579 cy

Robert's team did not speculate on future potential LOI improvement based on NOX mods and unknown future coal supply.

* Linton Hutchinson: amonia slip / impact on sales

* Next Steps: - Better estimate on system.
- preliminary proposal. from vendor
- Check w/ Robert Dorroh on LOI readings

: List of assumptions / : amonia slip.

Jeffrey W Newell 06/28/99 10:11 AM

To: Stephen J Immel/Corp/DukePower@DukePower
cc:
Subject: Allen LOI

This just in... Also, Robert says that ash samples are always taken from the same location at the middle sampler of the superheat (SH) and reheat (RH) furnaces at full load conditions which means that LOIs documented may be represented conservatively or higher than the total average for Allen. Allen runs full load about 65%, mid load about 10% and low load about 25% of the time.

--------------------- Forwarded by Jeffrey W Newell/Corp/DukePower on 06/28/99 09:51 AM ---------------------------

Robert L Dorroh Jr
06/28/99 09:42 AM

To: Jeffrey W Newell/Corp/DukePower@DukePower
cc: Kenneth F Barna/Gen/DukePower@DukePower, David K Walker/Gen/DukePower@DukePower, Perry A Craig/Gen/DukePower@DukePower
Subject: Allen LOI

Jeff,
You had asked me to develop some statistics on the LOI here at Allen. I researched the data that I have, which goes from 1/97 to the present (approximately the last 2 - 1/2 years.) I looked at the total ash samples that we took on each unit (for both sides), and then how many were less than 5%. I also looked at the data for just this year. I came up with the following info:

	Unit 1	%	Unit 2	%
Total samples	143		94	
Total samples after 1/1/99	43		8	
Total A samples <5%	73	51%	71	76%
Total B samples <5%	69	48%	81	86%
Total A samples <5% after 1/1/99	35	81%	4	50%
Total B samples<5% after 1/1/99	33	77%	5	63%

	Unit 3	%	Unit 4	%	Unit 5	%
Total samples	194		114		171	
Total samples after 1/1/99	80		56		45	
Total SH samples <5%	64	33%	14	12%	68	
Total RH samples <5%	19	10%	12	11%	53	
Total SH samples <5% after 1/1/99	30	38%	2	4%	19	
Total RH samples<5% after 1/1/99	4	5%	5	9%	19	

Some comments that I would like to add:
1)In general, it appears that units 1 and 2 produce better flyash. There could be a number of reasons for this. However, I suspect that we run a higher O2 on the boilers on 1&2, and I say this for 2 reasons. First, in the testing that I have done, the preheater gas inlet O2 is normally consistently higher than the boiler economizer outlet O2 that we control by. While the problem could be

associated with a leaking expansion joint, I think that the reason is that we have only 2 O2 sampling ports on these boilers, and they are not necessarily very representative of the true average. Second, the operators may run a slightly higher O2 setpoint on units 1&2, since we are not normally fan limited on those units.

2)With the boiler upgrades, we plan to convert the hot side precipitator to the cold side, and add boiler surface. This mod has already taken place on unit 4. These mods should help reduce LOI in two ways. First, we should have a little more room on our fans (we are not ID fan limited on unit 4, now), and we should be able to achieve a better steam temp, allowing us to lower our burner tilts. All of this should lead to better LOI. However, as you can see from the numbers above, unit 4 produces rather disappointing flyash, even with the mods. We have been working to try to improve the numbers, and we have been hurt by some problems (The waterwalls were pretty clean, so we had to run the tilts up; and, we had some mill problems on that unit). We will continue to work on this unit.

3)There are some wild cards out there. There are future mods planned for the boilers to meet lower NOX limits. These NOX mods could hurt the LOI numbers. In addition, we don't know what our future coal blends will be. I talked to Ken Barna, our boiler person here at the station, about what he thought the LOI numbers might do in the future. He was unwilling to offer any speculation without knowing what our future coal supply is going to look like.

Let me know if you have any comments or questions.

Robert

Jeffrey W Newell 06/29/99 03:53 PM

To: Stephen J Immel/Corp/DukePower@DukePower
cc:
Subject: Allen LOI

lower in Spring than Fall for Capacity factors.

Comparing Robert Dorroh's note to my estimation of currently marketable Allen ash by average of LOIs less than 5% in the past 2.5 years:

Unit 1 =	17,984 cy	3.8%	165 Mw
Unit 2 =	14,595 cy	4.9%	165 Mw
Unit 3 =	11,990 cy	7.2%	265 Mw
Unit 4 =	4,833 cy	6.6%	275 Mw
Unit 5 =	20,982 cy	3.1%.	270 Mw
Total =	70,384 cy (I estimated 92,654 cy)		≈1140 Mw.

> 45-50% Capacity factors.

Units 1+2 = 32,579 cy

Robert's team did not speculate on future potential LOI improvement based on NOX mods and unknown future coal supply.

Unit #4 amonia injection only.

.45#/Mbtu Nox currently.

Joel Stolton

Confidentiality agreement / Immel/Mathis has lead.

Coordinate first meeting.

Coal Supply variation.

Jeffrey W Newell 06/28/99 10:11 AM

To: Stephen J Immel/Corp/DukePower@DukePower
cc:
Subject: Allen LOI

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Let me know if you have any comments or questions.
Robert

MONIER RESOURCES, INC.

11100 OSGOOD
SAN ANTONIO, TEXAS 78233
TELEPHONE: (512) 654-7381
TWX: 910/871-1140

December 21, 1982

Mr. Carl E. Brown
Fuel and Ash Management
Duke Power Company
Fossil Production Department
P.O. Box 33189
422 South Church Street
Charlotte, NC 28242

Dear Mr. Brown:

We at Monier Resources, Inc. are pleased to make the following proposal to the Duke Power Company for the conversion of the Belews Creek Steam Electric Station from a wet sluice ash disposal system to a dry/damp fly ash disposal system.

While full detail of the proposal is contained in the attachments and inclusions to this letter, we would like to summarize highlights of that proposal:

- MRI would install all capital equipment required for storage, dampening, and handling of fly ash required for the disposal operation.

- MRI will own, operate, and maintain all equipment associated with disposal operation.

- MRI will provide all operating personnel at the plant for handling ash, for trucking the ash, and for operation and maintenance of the landfill.

MRI proposes a ten-year contract with Duke Power under which MRI would dispose of fly ash according to the following schedule:

a. If MRI disposes of 500,000 tons per year of fly ash, the charge to Duke Power will be $3.50 per ton.

b. If MRI disposes of 400,000 tons per year of fly ash, the charge to Duke Power will be $4.00 per ton of fly ash disposal.

The above prices would be escalated/de-escalated annually in accordance with a mutually agreeable index. A sliding scale formula would be designed to accommodate the actual disposal tonnage should it be greater or lesser than stated above, but such a formula would be based on the above-quoted charges.

We believe that this gives Duke Power the most economical and effective ash disposal operation possible.

After you have reviewed the attached detailed proposal, should you have any questions, we would be most happy to meet Duke Power personnel at your invitation to discuss the proposal in greater detail.

Respectfully submitted,

Robert Lister

R.A. Lister
Manager, Engineering Services

Robert G. Hilton

Robert G. Hilton
Director of Programs Management

G.J. Gordon

G.J. Gordon
President

/lmg

enclosure

DETAILED PROPOSAL

FOR THE MANAGEMENT AND DISPOSAL OF FLY ASH

FOR THE BELEWS CREEK STEAM ELECTRIC STATION OF THE DUKE POWER COMPANY

December 21, 1982

SECTION 1 - PROPOSAL SUMMARY

Monier Resources, Inc. (MRI) proposes to assume the management and disposal operations for fly ash at the Belews Creek Steam Electric Station of the Duke Power Company (Duke). This offer is made for a period of ten years and would be subject to the successful negotiation of a contract between MRI and Duke. MRI would propose to install dry ash handling facilities for the collection of fly ash and subsequent dampening of the fly ash. All roads between the power plant and the landfill, to be located on Duke property across Route 1809, will be upgraded according to proper design methods and subject to Duke's approval.

MRI will provide all operating personnel for the loading of trucks, delivery of the ash to the landfill, and proper placement and compaction of the ash in the landfill. MRI will also prepare the landfill site in accordance with proper engineering design and subject to Duke's approval. It is assumed that should any permits be necessary for the site, such permits will be obtained and paid for by Duke.

MRI will operate the landfill in such a manner as to minimize exposed fly ash and to contain any runoff. The landfill will be operated to the point of closure, with MRI providing all final cover and seeding.

MRI will at all times provide for the capability of sales of conditioned ash either directly from the Belews Creek plant site or the disposal site. Revenue from this utilization would be shared according to a formula based on the initial fly ash sales contract between Duke and MRI.

SECTION 2 - DRY FLY ASH DISPOSAL FACILITY SYSTEM DESCRIPTION

MRI will install sufficient conveying and storage facilities to augment existing ash handling equipment and to provide sufficient transfer and storage capacity to handle all the fly ash produced at the Belews Creek Station Units No. 1 and No. 2. It is fully intended that the system design would be compatible with the existing dry fly ash sales facility and in fact would provide extra storage capacity to enhance future sales.

The reconfigured piping system would include separate pipelines from each of the four precipitators to the storage facility. A covered pipe trench is planned for installation between Precipitator 2A and the storage silos. The location of the storage silos and piping can be seen in the attached Figure 1.

Two 1500-ton capacity storage silos would be installed between Precipitator 2A and the existing fly ash sales silos. These silos would be cone-bottomed and of steel construction with individual ash conditioners elevated for direct loading into dump trucks. Arrangement would also provide for parallel traffic flow from each disposal silo and from the sales facility. Traffic flow would be straight through rather than the existing turnaround route presently used for sales shipments.

The silo facility would be equipped with sufficient baghouse venting capability to receive fly ash from all four precipitators simultaneously. The design for each of the four fly ash conveying pipelines would incorporate sufficient valves and connections to allow the reception of fly ash from any precipitator into either of the new silos or directly into the existing sales silos. Plant fly ash control systems would be modified to allow selective collection and segregation of ash into the four silos (two new, two existing) while at the same time maintaining the flexibility of continuous removal of fly ash from the precipitators.

The new silo facility will incorporate intersilo transfer equipment to further enhance reliability and allow the future possibility of loading fly ash from the vent disposal silos into dry bulk tankers for railcars for sales.

A detailed equipment list is attached.

SECTION 3 - TRANSPORTATION OF FLY ASH

All fly ash for disposal would be dampened using conventional pre-wetter systems to mix the fly ash and water. The fly ash would then be loaded at approximately 15% - 20% moisture into large off-road vehicles. These vehicles are expected to carry approximately 30 - 35 tons each.

The haul road selected is shown in the attached Figure 2. Trucks would make a full circle around the powerhouse and head out to cross Route 1809. All trucks would then continue along a road to be built on Duke property, across Route 1809.

In order to accommodate the appropriate amount of truck traffic and to keep such traffic at reasonable flow levels, it is generally envisioned that fly ash will be hauled on a one to two shift basis, as needed, depending on plant load. Further, in order to keep traffic moving appropriately, it is envisioned that all roads would be upgraded.

Figure 2 gives brief detail of road upgrading. It is expected that the in-plant roads and the road leading to the intersection would be upgraded by the application of an additional four inches of asphalt. The intersection of the main highway will be covered in concrete, thus ensuring the county and state a minimal problem from crossing traffic.

The road leading across Duke property to the landfill will be constructed by stabilizing 24 inches of fly ash and soil. The road will be maintained with a bottom ash cover. It would be expected that Duke would provide the bottom ash for the cover. MRI would maintain all roads.

SECTION 4 - LANDFILL

The landfill site selected by MRI engineering personnel is the same site originally designated by Duke engineering personnel in an earlier dry fly ash disposal study. In the opinion of MRI personnel, the area shown in Figure 3 (attached) is adequate for the ten-year life of the fly ash contract provided that a final grade of elevation 850 will be allowed for in the fly ash structural fill.

It is the intention of MRI engineering personnel to use stabilized fly ash to construct cofferdams at the bottom of each series of ravines (see Figure 4). The cofferdams would serve to control water runoff from the area during landfill construction and would become the final toe of the landfill upon closure and coverage with soil.

Equipment requirements in the landfill, according to MRI's operating plan, will include one water truck, one loader, and one dozer. (These may be rubber-tired or tracked, depending on selection at the time.) Within this proposal, MRI s total scope of landfill operation will be as follows:

a. MRI will clear and prepare the site in sections, fully upgrading each area for operation as a landfill;

b. MRI will place all necessary cofferdams;

c. MRI will place and compact all fly ash;

d. MRI will provide all final cover and seeding, as required through the life of the contract;

e. MRI will maintain either a well or water source such that MRI can control all potential future dust in the landfill.

It is expected that any monitoring wells to be placed on the site, if required, will be placed and monitored by Duke. However, MRI reserves the right to have access to any of such monitoring wells or split samples with Duke.

SECTION 5 - ADVANTAGES FOR DUKE

The conversion from a wet sluice system to a damp disposal system offers many advantages to Duke. The major advantages can be enumerated as follows:

1. Because it is a damp system, there is no excess water to be treated and discharged. The only water used in the system will be totally contained within the landfill, thus minimizing any potential environmental problems.

2. This type of landfilling technique requires the minimum amount of land to dispose of the maximum quantity of fly ash possible. This, in turn, minimizes land investments and potential upkeep associated with that land.

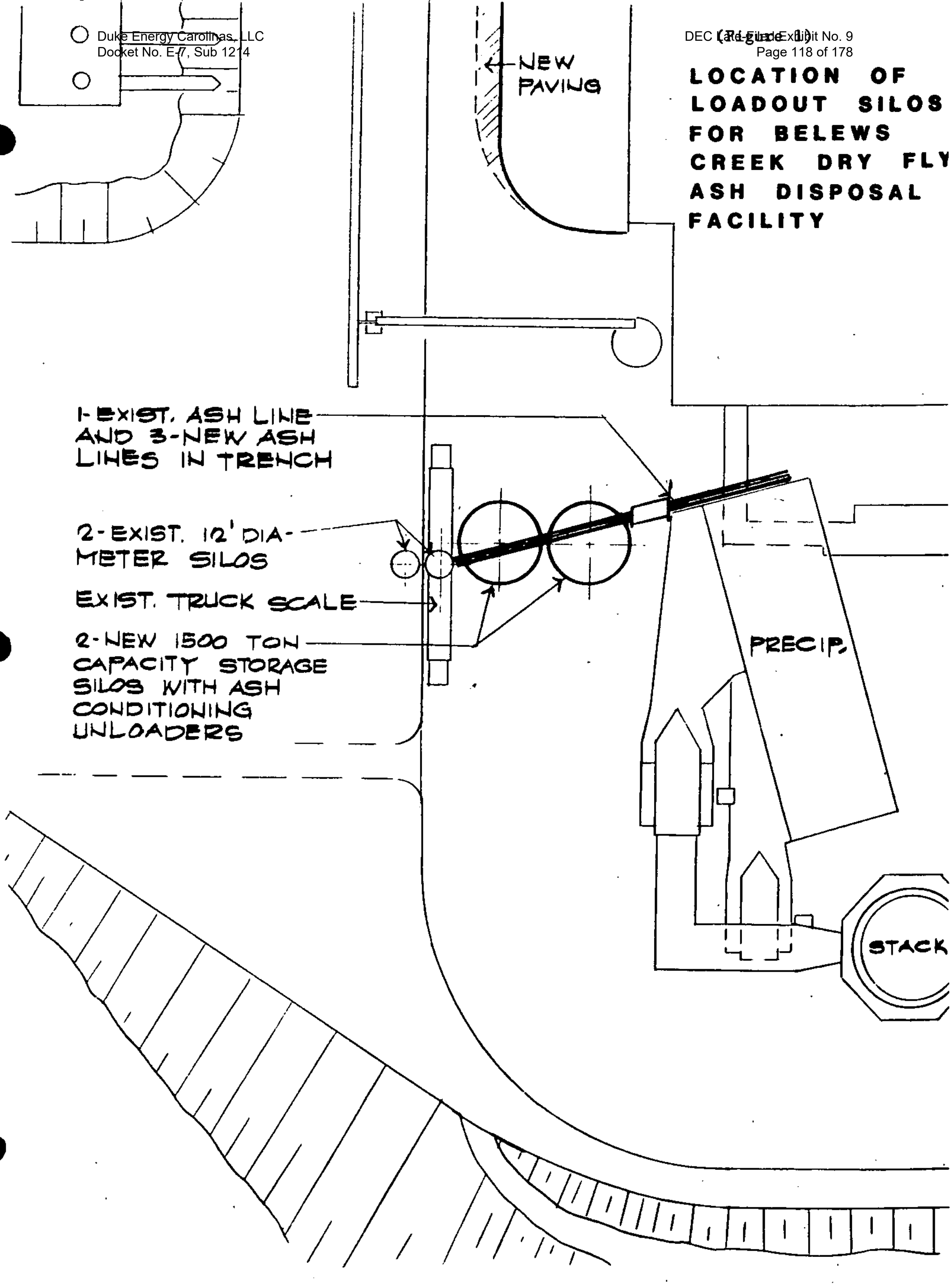
3. The installation of additional silo capacity can be very beneficial to the ultimate desire of Duke and MRI to maximize the sale of fly ash into conventional markets. This added storage capacity should enable sales of fly ash to escalate rapidly as the North Carolina markets begin their economic recoveries.

4. The installation of a system to dampen fly ash will mean that Duke and MRI can for the first time begin to look at utilization of fly ash in road construction and other stabilization applications. These are potentially very large markets for fly ash, which could reduce ultimate disposal volumes and to an even greater extent than the recovery of the concrete markets.

5. The adoption of such a system would not only provide Duke with a minimal fly ash disposal cost but would also give Duke the maximum potential situation for disposal of fly ash through sales, and thus minimization of total costs.

(Figure 1)

LOCATION OF LOADOUT SILOS FOR BELEWS CREEK DRY FLY ASH DISPOSAL FACILITY



BELEWS CREEK DRY FLY ASH DISPOSAL FACILITY

EQUIPMENT LIST

1. Ten-inch piping and supports from Precipitators 2A, 2B, and 1B to the fly ash storage facility.

2. Covered concrete pipe trench for four ash pipelines and utilities between precipitator 2A and the silo facility.

3. Valves and connections from each of four ash pipelines to two new disposal silos and two existing sales silos.

4. Solenoid valves, conduit, and control wiring for new valves.

5. Two 1500-ton capacity steel silos with 60-degree cone bottoms, structural supports, platforms, handrails, and access ladders.

6. Concrete silo foundations.

7. Two ash conditioning unloaders.

8. Silo discharge control valves.

9. Water piping, valves, supports for water supply to ash conditioner.

10. Aeration pads, piping, and blowers for aeration of new silos.

11. Baghouse vent filter and exhausting fan to vent new disposal silos.

12. Air compressor, compressed air piping, valves, air filters, and dryers to operate silo valves and pulse clean vent filter.

13. Intersilo transfer feeder blower, piping, valves, and supports.

14. Silo level detectors.

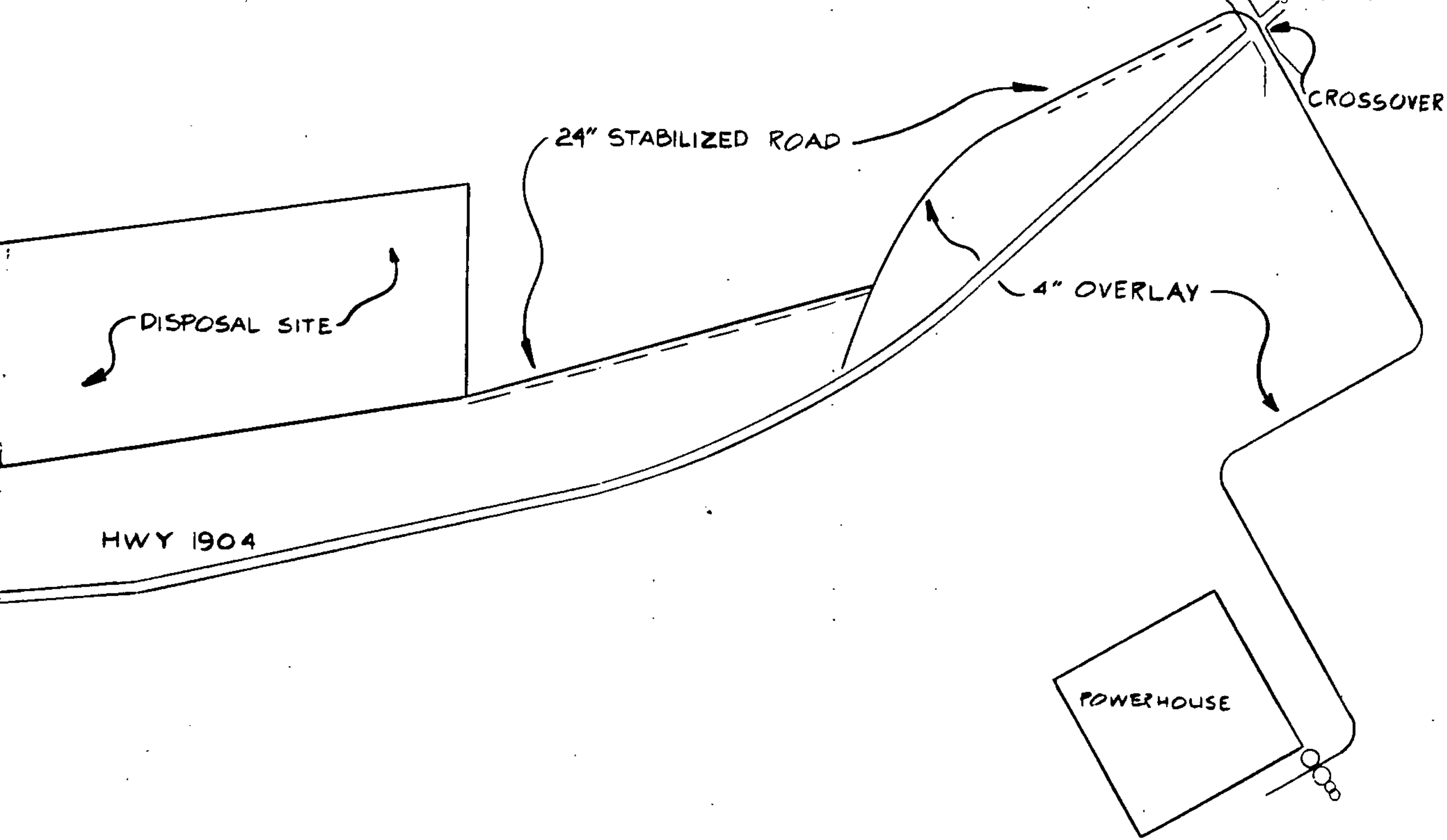
15. Ash conditioner vent lines and silo cross vent duct.

16. Site grading, curbs, drains, and paving to control runoff in the silo area.

17. Electric power supply for new silo facility.

18. Electric wiring, conduit, switch gear, and controls in silo area.

19. Painting.



(Figure 2)

ENGINEERING SERVICES MONIER RESOURCES, INC. SAN ANTONIO, TEXAS		
DRAWN BY	APPROVED BY G. W. R.	DATE DEC	PROJECT NO
JOB DUKE POWER COMPANY			
LOCATION BELEWS CREEK			
TITLE ROADS UPGRADING			DRAWING NO

DATE	DESCRIPTION
REVISIONS	

CONTOUR INTERVALS- 10'

(Figure 3)

ENGINEERING SERVICES

MONIER RESOURCES, INC.
SAN ANTONIO, TEXAS

DRAWN BY: | APPROVED BY: G. W. R. | DATE: DEC. | PROJECT NO.

JOB: DUKE POWER COMPANY

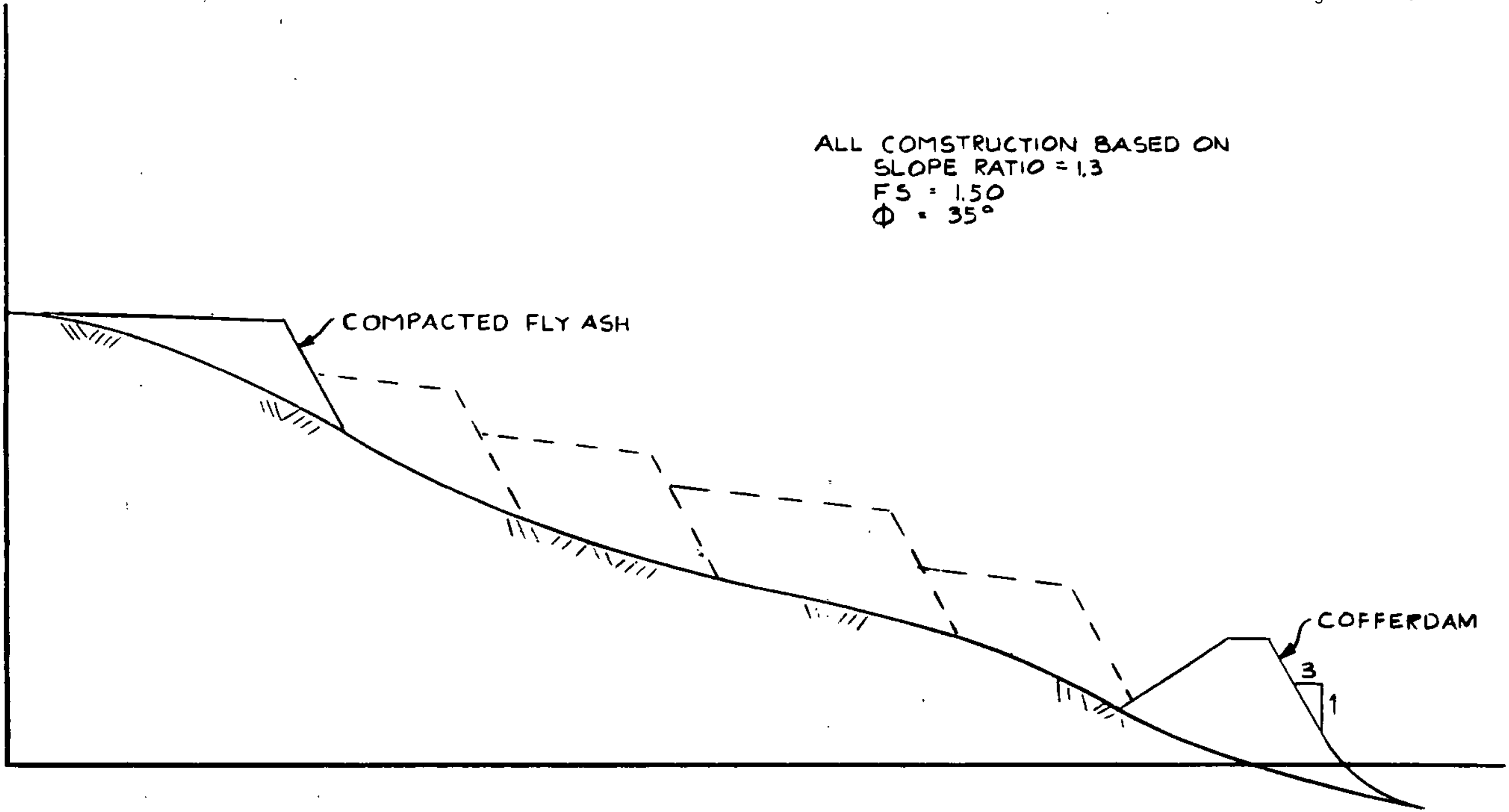
LOCATION: BELEWS CREEK

TITLE: ASH STORAGE AREA

DRAWING NO.

DATE | DESCRIPTION

REVISIONS



TYPICAL STAGE OF ASH LANDFILLING

NOT TO SCALE

(Figure 4)

ENGINEERING SERVICES

MONIER RESOURCES, INC.
11100 OSGOOD
SAN ANTONIO, TEXAS
(512) [illegible]

DRAWN BY: [illegible]	APPROVED BY: [illegible]	DATE: DEC. [illegible]	PROJECT NO.

JOB: DUKE POWER COMPANY
LOCATION: BELEWS CREEK
TITLE:
DRAWING NO.
DESCRIPTION

AMENDMENT NO. 6

MONEX RESOURCES, INC. AND DUKE POWER COMPANY do hereby mutually agree and consent to amend the Belews Creek Fly Ash Disposal Agreement dated September 1, 1983, as previously amended, between the parties which Agreement is hereby modified in the following respect only:

1. Section 2.6 - Modify the section as added by Amendment No. 5 as follows: "Designated Raleigh Sales Area" means the area defined as Wake County, North Carolina.

Except as expressly modified herein the Fly Ash Disposal Agreement between the parties shall remain in full force and effect and is hereby ratified and affirmed.

MONEX RESOURCES, INC.
By: James B Mabel
Title: Vice President, Environmental & Contracts
Date: October 7, 1994

DUKE POWER COMPANY
By: ____________________
Title: ____________________
Date: ____________________

M-2793-A

OLD

FLY ASH DISPOSAL AGREEMENT

DUKE POWER COMPANY

MARSHALL STEAM STATION

MONIER RESOURCES, INCORPORATED

DECEMBER 8, 1983

AMENDMENT NO. 6

MONEX RESOURCES, INC. and DUKE POWER COMPANY do hereby mutually agree to the amendment of the Fly Ash Disposal Agreement between the parties dated December 8, 1983 which Agreement is hereby modified in the following respects only:

1. &3.11 Substitute the following: "DUKE and its subsidiaries may use any Fly Ash which MONEX RESOURCES, INC. does not purchase. MONEX RESOURCES, INC. shall provide the Fly Ash, either dry or conditioned, to DUKE and DUKE shall pay MONEX RESOURCES, INC. $1.00 per ton (F.O.B. Station).

Except as expressly modified herein the Fly Ash Disposal Agreement between the parties shall remain in full force and effect and is hereby ratified and affirmed.

MONEX RESOURCES, INC.
By: James B Merkel
Title: Vice President
Environmental and Contracts
Date: April 21, 1995

DUKE POWER COMPANY
By: John P. Nerison
Title: Contracting Agent
Date: 4/25/95

AMENDMENT NO. 5

MONEX RESOURCES, INC. and DUKE POWER COMPANY do hereby mutually agree to the amendment of the Fly Ash Disposal Agreement between the parties dated December 8, 1983 which Agreement is hereby modified in the following respect only:

1. Add Sections 7.4A, 7.4B and 7.4C after Section 7.3D of the Contract as follows:

7.4A MONEX's indemnity of DUKE under Section 7 shall not apply to fly ash used, transferred or sold by DUKE or its subsidiaries pursuant to Section 3.11 or to Section 3.10(B) of this Agreement.

7.4B DUKE shall and does hereby agree to indemnify, hold harmless and defend MONEX from all Liabilities and the payment of any sum or sums of money arising out of an order, judgment or DUKE approved settlement to any person or entity whatsoever, including, without limitation, third parties, subcontractors and agents, in connection with injuries to persons (including death) or damage to property, in any way arising out of or relating to the sale, transfer or use of Fly Ash pursuant to section 3.11 of this Agreement by DUKE, its agents or any party claiming by, through or under DUKE.

7.4C DUKE further agrees to indemnify, hold harmless and defend MONEX from all Liabilities and the payment of any sum or sums of money arising out of an order, judgment or DUKE approved settlement to any person or entity whatsoever, including without limitation, third parties, subcontractors, and agents that may be made and brought against MONEX by any third party arising out of ash used, transferred or sold by DUKE or its subsidiaries pursuant to Section 3.11 of this Agreement because of any liability that is or may be claimed against MONEX or imposed upon MONEX as the owner/operator or fly ash process and handling equipment on the premises. Notwithstanding anything herein to the contrary, the provisions of this 7.4(C) shall not apply to Liabilities proximately caused by the solely negligent acts of MONEX, it employees, agents or subcontractors.

MONEX shall promptly transmit to DUKE notice of all such claims and all pleading and papers served on MONEX due to such claims.

2. Section 10.2 - At the end of the Section add the following:

> "The provisions of this Section 10.2 do not apply to any ash used, transferred or sold by Duke or its subsidiaries pursuant to Sections 3.10 (B) and 3.11 of this Agreement."

Except as expressly modified herein, the Fly Ash Disposal Agreement (as previously amended) between the parties dated December 8, 1983 shall remain in full force and effect and is hereby ratified and confirmed.

MONEX RESOURCES, INC.	DUKE POWER COMPANY
By: ______________________	By: ______________________
Title: ______________________	Title: ______________________
Date: ______________________	Date: ______________________

AMENDMENT NO. 3

MONEX RESOURCES, INC. and DUKE POWER COMPANY do hereby mutually agree to the amendment of the Fly Ash Disposal Agreement between the parties dated December 8, 1983 which Agreement is hereby modified in the following respects only:

1. §2.5 - Add a new section as follows: "Designated Raleigh Sales Area" means the metropolitan area in and around the city of Raleigh, North Carolina."

2. §2.6 - Add a new section as follows: "Designated Virginia Sales Area" means the metropolitan areas in and around the cities of Norfolk, Virginia Beach and Hampton, Richmond and Petersburg, Charlottesville, and Washington, Alexandria and Arlington."

3. §3.3 - Modify the first sentence as follows: "MONEX shall pay to DUKE for all Fly Ash removed from the Station during each calendar month, except for sales to purchasers of Fly Ash hauled to the Station from DUKE's Belews Creek or Cliffside Stations, ten percent (10%) of the price charged by MONEX to the purchasers of such Fly Ash (F.O.B. the Station).

4. §3.5 A. - Modify as follows: "DUKE shall pay to MONEX for all Fly Ash deposited by MONEX in the Disposal Sites or sold by MONEX to a purchaser in the Designated Raleigh or Virginia Sales Areas during each calendar month a disposal charge calculated in accordance with the following:

   A. The Base Disposal Charge per Ton for calendar months in which Duke makes at least twelve thousand (12,000) Tons of Fly Ash available to MONEX is calculated according to the following formula:

$$\text{Base Disposal Charge} = \frac{\$787{,}027 - 12(T+S)}{144{,}144}$$

Where T = the number of Tons of Fly Ash deposited by MONEX in the Disposal Sites during the applicable calendar month, and

Where S = the number of Tons of Fly Ash sold by MONEX to purchasers in the Designated Raleigh or Virginia Sales Areas during the applicable calendar month.

The Base Disposal Charge shall be deemed to be $2.73 (adjusted in accordance with §§3.5.A.1 and A.2) whenever T is greater than 32,792.79."

(§3.5 A.1. and A.2. remain unchanged)

5. <u>§3.6.C.</u> - Add at the end of the last sentence the following: "; provided, however, if MONEX automates their weight docket generation process as detailed in the following sentences, each invoice shall be paid within thirty (30) days. The weight docket generation process shall be automated by connection with electronic scales which will provide (without human intervention) gross and tare weights of truck and rail cars which carry Fly Ash, whether for sale or for disposal. Net weight shall be calculated and recorded with the date (again without human intervention). This information, along with such other information as is necessary to meet the RCRA manifest requirements (including, without limitation, location, docket number, ash type, intended use, destination, customer number and shipper) shall be entered in a computer data base and provided to DUKE by computer diskette (or equivalent) along with a paper copy summary by day and by month."

6. §3.6D. - Add a new section as follows:

"D. Copies of MONEX's weight slips from a certified scale for all Fly Ash removed from the Station for sales to purchasers in the Designated Raleigh or Virginia Sales Areas during the preceding month."

7. §9.1 - Modify as follows:

"The term of this Agreement shall commence on the date first above written and shall continue through December 31, 2001."

Except as expressly modified herein, the Fly Ash Disposal Agreement (as previously amended) between the parties dated December 8, 1983 shall remain in full force and effect and is hereby ratified and confirmed.

MONEX RESOURCES, INC.

By: [signature]

Title: PRESIDENT

Date: Dec 12 1991

DUKE POWER COMPANY

By: [signature]

Title: VP Fossil & Hydro Gen

Date: Dec 12, 1991

DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
FOSSIL PRODUCTION

TELEPHONE
(704) 373-4083

April 22, 1987

Mr. Gerry J. Gordon, President
Monier Resources, Incorporated
45 N. E. Loop 410, Suite 700
San Antonio, Texas 78216

Dear Mr. Gordon:

Pursuant to your letter of April 2, 1987, and Section IX, TERM, paragraph 9.1 of FLY ASH DISPOSAL AGREEMENT dated December 8, 1983, by and between DUKE POWER COMPANY (hereinafter referred to as "DUKE") and MONIER RESOURCES, INC. (hereinafter referred to as "MONIER"), DUKE agrees to extend said Agreement beyond September 30, 1993, an additional term of five (5) years. All other conditions of the FLY ASH DISPOSAL AGREEMENT are to remain in effect.

We are appreciative of Monier continuing to provide the best possible service available in the disposal of fly ash at Marshall.

Sincerely,

William O. Parker

William O. Parker, Jr.

WOPJr:kk

AMENDMENT NO. 1

MONIER RESOURCES, INC. ("MONIER") and DUKE POWER COMPANY ("DUKE") hereby mutually agree to the amendment of the Fly Ash Disposal Agreement between the parties dated December 8, 1983 for the Marshall Steam Station which Agreement is modified in the following respects only:

1. §1 - Insert a new paragraph between the fourth and fifth "WHEREAS" paragraphs as follows: "WHEREAS, DUKE wants to make available to PROGRESS MATERIALS, INC. ("PMI") quantities of dry Fly Ash for the production of Aardelite Aggregate only, and not in competition with MONIER Fly Ash sales.

2. §3.1 - Modify the first sentence as follows: "Beginning on or before December 28, 1987, MONIER shall dispose of all Fly Ash produced during the remaining term of this Agreement in accordance with the following priorities: (i) purchase of Fly Ash for use as cement replacement in concrete and removal from the Station, (ii) delivery of Fly Ash to Progress Materials, Inc. ("PMI") in accordance with §4.1, (iii) purchase of Fly Ash for purposes other than cement replacement in concrete and removal from the Station, or (iv) deposit of Fly Ash in the Disposal Sites."

3. §3.3 - Insert ", except for Fly Ash delivered to PMI for the manufacture of Aardelite Aggregate," between "month" and "ten".

4. §3.4 - Insert "or delivered to PMI" between "MONIER" and "in".

5. §3.5 - Insert "or delivered to PMI" between "Sites" and "during".

6. §3.5A. - Add the following paragraph following the definition of "T" as follows: "The Base Disposal Charge per Ton shall be deemed to be $2.73 (adjusted in accordance with §§3.5 A.1 and A.2) where T is greater than 32,792.79."

7. §3.5B - Insert "for disposal or delivery to PMI" between "MONIER" and "during".

8. §3.5D - Add a new paragraph D. as follows: "D. Duke shall be entitled to a credit against monthly disposal charges equal to $0.70 per Ton (adjusted in accordance with §§3.5 A.1 and A.2) for each Ton of Fly Ash delivered to PMI.

9. §3.6 - Add a new paragraph at the beginning of this section as follows: "Within twenty (20) days after the end of each calendar month, DUKE shall provide MONIER with documentation from PMI indicating the amount of Fly Ash received by PMI during the month. These quantities of Fly Ash reported each month shall be subject to quarterly adjustments based on PMI's documentation of the amount of Aardelite Aggregate shipped and the amount of Fly Ash incorporated into the Aardelite Aggregate."

10. §3.6C - Change "sixty (60)" to "forty-five (45)".

11. §3.10A - Insert "each time" between "Ash" and "from".

12. §4.1 - Add a new sentence at the end as follows:
"MONIER shall also deliver Fly Ash to PMI at no cost in accordance with operating procedures satisfactory to Duke through a tie-in line furnished by PMI."

13. §4.2 - Add a new sentence at the end as follows: "MONIER shall not be responsible to DUKE for the operation of equipment installed by PMI for the transport or storage of Fly Ash or for the manufacture of Aardelite Aggregate.

Except as expressly modified herein, the Fly Ash Disposal Agreement between the parties shall remain in full force and effect and is hereby ratified and affirmed.

MONIER RESOURCES, INC.

By: [signature]

Title: President

Date: January 25, 1988

DUKE POWER COMPANY

By: [signature]

Title: Vice President

Date: January 15, 1988

and

By: [signature]

Title: Director of Purchases

Date: January 15, 1988

APPROVED AS TO FORM
W. J. FORMAN

DUKE POWER COMPANY

Form 00184 (6-81)

Dev./Station ______ **Unit** ___ **File No.** ______

Subject ______

By ______ **Date** ______

Sheet No. ___ **of** ___ Problem No. ______ **Checked By** ______ **Date** ______

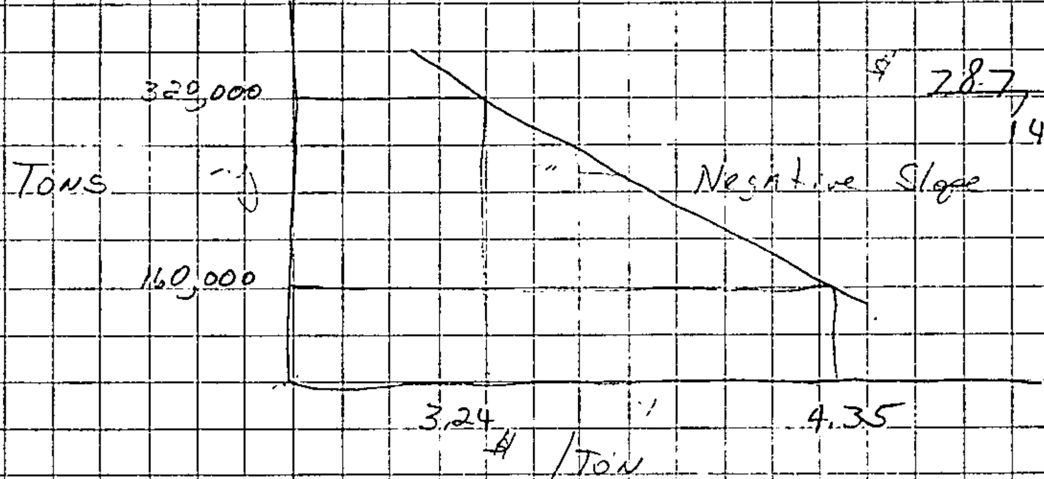
$\Sigma +$

Enter

\$4.35 / ton @ 160,000 TPY (≡ 13,333 TPM)

3.24 ← B 320,000 (≡ 26,667 TPM)

$\frac{787,027 - 12T}{144,144}$ / TON



$m = \frac{320,000 - 160,000}{4.35 - 3.24} = \frac{160,000}{1.11} = 144,144.1441$ } Manual Calc

787,027 Y - Intercept } Using HP 33E Calc
−144,144.1441 Slope

$y = mx + B$

$320,000 = -144,144(3.24) + B$

$787,027 = B$

$d = \frac{787,027 - 12T}{144,144}$ $D = dT = \left(\frac{787,027 - 12T}{144,144}\right)T$

$D = \frac{787,027T - 12T^2}{144,144} =$

$D = \frac{787,021T}{144,144} - \frac{12T^2}{144,144}$

$D' = \frac{787,027}{144,144} - \frac{2(12)T}{144,144}$

Maximum Price / Min. Purchase

$T(2.73) = 32,792.79$ Tons
$d = \$2.73$ / ton

$D' = 0 \Rightarrow \frac{787,027}{144,144} = \frac{24(T)}{144,144} \Rightarrow T = 2.73$

FLY ASH DISPOSAL AGREEMENT

THIS AGREEMENT is made and entered into as of the 8th day of December, 1983, by and between DUKE POWER COMPANY (hereinafter referred to as "DUKE"), a corporation organized and existing under the laws of the State of North Carolina with its principal offices in Charlotte, North Carolina and MONIER RESOURCES, INC. (hereinafter referred to as "MONIER"), a corporation organized and existing under the laws of the State of Ohio with with its principal offices in San Antonio, Texas.

SECTION I

RECITALS

WHEREAS, DUKE is a public utility engaged in the generation and sale of electrical energy and uses coal as a fuel in its Marshall Steam Station Units No. 1, No. 2, No. 3 and No. 4 (hereinafter referred to as "the Station").

WHEREAS, there is a by-product resulting from the burning of coal known as fly ash and DUKE desires to dispose of this material.

WHEREAS, MONIER is experienced in the marketing and disposal of fly ash and desires to purchase or dispose of all fly ash produced at the Station.

WHEREAS, DUKE is willing to have all fly ash from the Station purchased or disposed of by MONIER under the terms and conditions hereinafter set forth.

WHEREAS, the sale of fly ash from the Station is presently covered by the agreement dated July 23, 1973 between DUKE and AMAX FLY ASH CORPORATION (hereinafter referred to as the "Sales Agreement") and the parties desire to enter into this Agreement and to terminate the Sales Agreement.

NOW THEREFORE, in consideration of the mutual promises and covenants hereinafter contained, the parties hereto agree upon the following terms and conditions for the disposal and sale of fly ash.

SECTION II

DEFINITIONS

2.1 "Fly Ash" means fine, solid, non-combustible particles of ash collected from the flue gas (by means of mechanical or electrostatic precipitators) resulting as a by-product from the combustion of pulverized coal at the Station.

2.2 "Disposal Sites" means the areas at the Station designated by DUKE, as set forth on the map attached hereto as Exhibit 1, for the disposal of Fly Ash.

2.3 "Monier Operating Areas" means the areas at the Station designated by DUKE, as set forth on the map attached hereto as Exhibit 2, wherein all MONIER facilities, equipment, activities and operations pursuant to this Agreement (except for MONIER's disposal activities relating to the Disposal Sites) shall be confined.

2.4 "Ton" means a net ton of two thousand (2,000) pounds avoirdupois.

SECTION III

Amendment 1

DISPOSAL OF FLY ASH

3.1 V Beginning on or before December 31, 1984, MONIER shall dispose of all Fly Ash produced during the remaining term of this Agreement by depositing it in the Disposal Sites or by purchasing and removing it from the Station. DUKE makes no guarantee, representation or warranty of the quantities of Fly Ash that will be produced at the Station, which shall be under the control of DUKE in its sole discretion and judgment at all times. MONIER recognizes that DUKE's primary obligation is to generate and sell electricity as a public utility and that production of Fly Ash may be reduced, suspended or eliminated due to purchase of replacement power, rescheduling of electric generation, use of fuel other than coal or for any other reason at any time in the sole discretion and judgment of DUKE. DUKE agrees not to make Fly Ash available to others for disposal. ?

3.2 MONIER agrees to use its best efforts to diligently promote the sale of Fly Ash and to diligently dispose of Fly Ash not purchased so as to maximize the amount of available storage volume for Fly Ash in the silos. MONIER further agrees to use its best efforts to remove purchased Fly Ash from the silos on the MONIER Operating Area rather than from the Disposal Sites. The methods used by MONIER in promoting Fly Ash shall at all times be subject to the approval of DUKE, which approval shall not be unreasonably withheld.

3.3 A. MONIER shall pay to DUKE for all Fly Ash removed from the Station during each calendar month Amend 1 ten percent (10%) of the price charged by MONIER to the purchasers of such Fly Ash (F.O.B. the Station). This price shall not be deemed to include sales to subsidiaries or affiliates of MONIER; in the event of sales to such subsidiaries or affiliates, the price shall be deemed to be the price (F.O.B. the Station) charged by the subsidiary or affiliate for the sale of Fly Ash to a non-subsidiary, non-affiliated third-party.

B. In the event DUKE diverts Fly Ash into the DUKE Fly Ash disposal system due to the malfunction or the unavailability of the MONIER Fly Ash disposal system, MONIER agrees to dredge such Fly Ash from the ash basin at its sole expense or, if Duke so elects, to reimburse DUKE for the cost (including fringe benefits, payroll taxes and unproductive time) of dredging such Fly Ash from the ash basin as calculated by DUKE.

The number of tons of Fly Ash diverted by DUKE shall be calculated according to the following formula:

$$\# \text{ of Tons} = \text{KWH} \times \frac{\text{BTU}}{\text{KWH}} \times \frac{1}{\text{HHV}} \times \frac{\text{TON}}{2{,}000} \times \frac{\%\ \text{ASH}}{100} \times .8$$

Where KWH = kilowatt hours generated by the affected Station units while the Fly Ash is being diverted as calculated by DUKE.

Where $\frac{\text{BTU}}{\text{KWH}}$ = average heat rate for the affected Station units while the Fly Ash is being diverted as calculated by DUKE.

Where HHV = the higher heat value for the affected Station units while the Fly Ash is being diverted as calculated by DUKE.

Where TON = Ton

Where % ASH = the average ash content of coal burned in the affected Station units while the Fly Ash is being diverted as calculated by DUKE.

3.4 MONIER, acting as an independent contractor for DUKE, shall dispose of all Fly Ash not purchased by MONIER Amend 1 in the Disposal Sites.

3.5 DUKE shall pay to MONIER for all Fly Ash deposited by MONIER in the Disposal Sites Amend 1 during each calendar month a disposal charge calculated in accordance with the following:

A. The Base Disposal Charge per Ton for calendar months in which DUKE makes at least twelve thousand (12,000) Tons of Fly Ash available to MONIER is calculated according to the following formula:

$$\text{Base Disposal Charge} = \frac{\$\ 787{,}027-(12\text{x}T)}{144{,}144}$$

Where T = the number of Tons of Fly Ash deposited by MONIER in the Disposal Sites during the applicable calendar month

[Amend 1]

1. The Base Disposal Charge per Ton shall be adjusted commencing January 1, 1984, for changes in the Producer Prices and Price Indexes for commodity groupings and individual items, Table 6, Industrial Commodities (hereinafter referred to as "PPI") published by the U.S. Department of Labor, Bureau of Labor Statistics. The first PPI published (unadjusted) for December, 1983 shall be the Base Index. The Base Disposal Charge shall be adjusted upward or downward by one percent (1%) of the Base Disposal Charge for each percentage point of change between the Base Index and the first PPI published (unadjusted) for the immediately preceding month of December. Invoices issued for the months prior to the publication of the first unadjusted PPI shall be adjusted to make the Base Disposal Charge adjustment effective as of January 1st of each year.

2. The calculation of the Adjusted Base Disposal Charge during each calendar year period beginning January 1, 1984 and continuing thereafter is illustrated by the following formula:

$$\text{Adjusted Base Disposal Charge} = \left[\frac{(PPI - BI)}{BI} \times \$\ \text{Base Disposal Charge}\right] + \$\ \text{Base Disposal Charge}$$

Where PPI = the first PPI published (unadjusted) for the immediately preceding month of December; and
Where BI = the Base Index.

3. In the event that the PPI is no longer published or if the method of calculating the PPI should be changed, the parties shall mutually agree upon a suitable alternative means for adjusting the Base Disposal Charge.

~133,900 TFM Coal
126,000
135,000
11%

B. After MONIER begins disposal of Fly Ash in the Disposal Sites, in the event DUKE has not made at least twelve thousand (12,000) Tons of Fly Ash available to MONIER Amend 1 during a calendar month, DUKE shall pay to MONIER a disposal charge of $53,500.00 for such month.

C. The amount payable by Duke for Fly Ash disposal may be adjusted by mutual agreement to reflect substantial changes in costs incurred by MONIER in the disposal of Fly Ash resulting from federal, state or local environmental, health, safety or sanitation laws, rules, or regulations not in effect on the date of this Agreement.

D. Amend 1

3.6 Within thirty (30) days after the end of each calendar month, MONIER shall provide DUKE with the following documentation: All Para per Amend 1

A. Copies of MONIER's weight slips from a certified scale for those trucks weighed and a disposal summary containing such information as DUKE may request for all Fly Ash disposed of in the Disposal Sites during the preceding month and calculation of the disposal charges.

B. Copies of MONIER'S weight slips from a certified scale and a shipping summary containing such information as DUKE may request for all Fly Ash removed from the Station during the preceding month stating the number of Tons and the sale price for Fly Ash sold by MONIER (F.O.B. the Station).

C. Copies of MONIER'S weight slips from a certified scale and a shipping summary for all Fly Ash delivered to Duke pursuant to §3.10B during the preceding month.

Thereafter, MONIER will invoice DUKE for amounts due MONIER pursuant to §3.5, §3.10B and §3.11 after applying a credit for amounts due DUKE pursuant to §3.3 and §3.7. In the event the credited amount exceeds the disposal charge and charges pursuant to §3.10B and §3.11, the excess credits shall be carried forward and applied in subsequent months. Each invoice shall be paid within sixty 45 Amend 1 ~~(60)~~ days from receipt of the invoice.

3.7 All taxes, levies, governmental impositions, assessments, fees, permits, licenses or other governmental charges including, without limitation, sales, use, ad valorem and property taxes arising out of or in connection with

Station ______ Unit ______ Rev. ______ File No. ______ Sheet ______ Of ______

Subject BC Agree

By CEB Date 7-30-92

Prob No. ______ Checked By ______ Date ______

Page	Para	Statement
7	3.11	Duke may use ash MRI not purchase
3	3.1	Duke agrees not to make f/a avail to others for disp
7	3.9	Title to ash purch by MRI pass when loaded on carrier for removal fr Sta
7	3.10B	Duke have prior right to 5,000 TPM at #2/ton w/30 da written notice, Exc for f/a suitable for use in conc

MONIER's performance of this Agreement, including the construction, ownership or operation of any MONIER facilities or equipment, the purchase or re-sale of Fly Ash, and the purchase of goods and services from DUKE by MONIER shall be paid by MONIER or reimbursed to DUKE by MONIER; provided, however, MONIER shall not be responsible for the payment of any franchise or net income taxes of DUKE in connection with this Agreement, or for the payment of any permits which may be required for DUKE to use the Disposal Sites.

3.8 MONIER shall maintain accurate and detailed books, records, and accounts of all its operations hereunder, including the quantities of Fly Ash it disposes of in the Disposal Sites, amounts charged for the sale of Fly Ash and the quantities of Fly Ash it removes from the Station. Such records and computations shall be consistent with generally accepted accounting principles. DUKE, its employees and its independent auditors shall have the right to audit at DUKE'S expense all such books, records and accounts. Such books, records, and accounts shall be made available by MONIER at reasonable times for audit during the term of this Agreement and for one (1) year after final payment under this Agreement. In addition, employees and agents designated by DUKE shall at all times have access to the MONIER Operating Area and the Disposal Sites.

3.9 Title to Fly Ash disposed of in the Disposal Sites shall remain in DUKE. Title to and risk of loss of Fly Ash purchased by MONIER shall pass to MONIER when such Fly Ash has been loaded on the carrier for removal from the Station. Title

3.10 A. DUKE shall have the prior right at any time and at no cost to DUKE to have MONIER deliver to DUKE up to one (1) Ton of Fly Ash each time (Amend 1) from MONIER'S silos or from the Disposal Sites for sampling for environmental, maintenance or other testing purposes and to perform air and ground water sampling on the MONIER Operating Area and Disposal Sites.

B. DUKE shall have the prior right to have MONIER make available to DUKE up to five thousand (5,000) Tons of Fly Ash per month from MONIER's silos at a price of $2.00 per Ton (F.O.B. the Station) by giving MONIER thirty (30) days prior written notice; provided, however, in any month in which DUKE takes more than fifty percent (50%) of the Fly Ash suitable for sale to purchasers of Fly Ash for use in concrete based upon the average monthly sales of Fly Ash to such purchasers for the previous twelve (12) months, the price shall be seventy percent (70%) of the then current price per Ton (F.O.B. the Station) to such purchasers.

3.11 DUKE and its subsidiaries may use any Fly Ash which MONIER does not purchase after a reasonable opportunity at no cost to DUKE; provided, however, DUKE shall reimburse MONIER for any reasonable, additional Disposal Sites maintenance costs resulting from such use.

SECTION IV

FLY ASH SUPPLY AND MONIER OPERATIONS

4.1 DUKE shall make Fly Ash available to MONIER in accordance with mutually agreed upon operating procedures for placement of Fly Ash in MONIER'S Fly Ash storage silos; provided, however, Duke shall have the right to discontinue making Fly Ash available and to otherwise dispose of the Fly Ash generated whenever Station operations are adversely affected, or are likely to be adversely affected, by MONIER operations hereunder in Duke's judgment. DUKE shall handle railcars scheduled by MONIER in accordance with mutually agreed upon operating procedures; provided, however, MONIER shall pay all demurrage or detention charges to the railroad regardless of fault. Add per Amend 1

4.2 MONIER shall purchase, operate and maintain all equipment and facilities associated with its operations at the Station. MONIER agrees that its methods of operation in connection with the handling, storing, loading, removing and disposal of Fly Ash or otherwise in connection with this Agreement shall be performed in a manner satisfactory to DUKE and in accordance with all federal, state and local laws, rules and regulations and shall not in any way interfere, hinder or adversely affect or potentially interfere, hinder or adversely affect the operations or property of DUKE or constitute a nuisance to DUKE. MONIER agrees that its facilities, equipment and vehicles shall operate essentially dust free and without excessive noise in DUKE's judgment. Furthermore, MONIER agrees to comply with any reasonable directions or recommendations made by DUKE in connection with MONIER's operations on the MONIER Operating Area and the Disposal Sites. Add per Amend 1

4.3 All Fly Ash destined for the Disposal Sites shall be dampened using conventional pre-wetter systems to mix the Fly Ash and water. The Fly Ash shall then be loaded at fifteen percent (15%) to twenty percent (20%) moisture content and transported by large trucks. These trucks shall not exceed the limits set forth in North Carolina General Statutes §20-118 and shall carry a maximum load per axle of sixteen (16) Tons. These trucks shall be operated in a prudent manner and in accordance with speed limits and rules prescribed by DUKE. MONIER shall use the route shown in Exhibit 1 for transporting Fly Ash. Trucks shall make a full circle within the MONIER Operating Area and then continue along the plant road behind the plant, across the ashline trench bridge below the ash basin dike, to the Disposal Sites. MONIER shall haul Fly Ash on a one or two shift basis, as needed, depending on Station generation.

4.4 MONIER'S landfill operations on the Disposal Sites shall include, without limitation:

A. Clear and prepare the Disposal Sites (except for trees which shall be cut and removed by DUKE) in section, fully upgrading each area for operation as a landfill, including ditches, culverts and underdrainage systems as necessary to prevent surface run-off or ground water from interfering with placement of compacted Fly Ash;

B. Construct at the bottom of each series of ravines all necessary cofferdams using stablized Fly Ash to control water runoff from the area during Disposal Sites construction, to become the final toe of the landfill upon closure and coverage with soil and to prevent ash, silt or other material from emptying into the ash basin;

C. Place and compact all Fly Ash to attain not less than ninety percent (90%) of the Standard Proctor Density, ASTM D 698, Method C. A standard Proctor should be established quarterly or whenever warranted by a change in material. All compaction shall be done with moisture content of the Fly Ash between five percent (5%) drier and five percent (5%) wetter than optimum moisture. MONIER shall perform at least one (1) field density test for every two thousand (2,000) tons of Fly Ash placed in the Disposal Sites and provide DUKE with the results of such tests upon request.

D. Provide all final cover from areas designated by DUKE at the Station (minimum of one (1) foot of soil to be provided on horizontal surfaces and a minimum of two (2) feet of soil to be provided on slopes steeper than five (5%) percent) and seeding;

E. Maintain either an adequate well or water source so that MONIER can control all potential future dust in the landfill.

4.5 To minimize the potential for interruption of Station operations by MONIER, MONIER shall provide standby equipment and procedures for the removal, diversion, or transfer of Fly Ash from the silos capable of:

A. Wet unloading;

B. Removing dry Fly Ash from the silos;

C. Providing a bulk pneumatic tanker with a wet inductor for Fly Ash removal within three (3) hours; and,

D. Providing an adequate number of spare pre-wetter system components and large vehicles to maintain required rates of disposal or removal without interruption due to mechanical failure.

4.6 MONIER shall have the right to purchase and remove from the Disposal Sites all or any part of the Fly Ash stored there, subject to the provisions of §3.2. and §3.11.

4.7 MONIER agrees to transfer any employee, agent or subcontractor working on the MONIER Operating Area or Disposal Sites if so requested by DUKE, provided DUKE has reasonable cause for such request.

4.8 DUKE shall provide to MONIER the following utilities:

A. access to a source of electric power, and

B. access to water for use at the Station

4.9 Each party shall provide the other party with splits from any sampling it performs when requested by the other party.

SECTION V

FACILITIES AND EQUIPMENT

5.1 Before proceeding with the construction, installation or modification of any facilities or equipment on the MONIER Operating Area or on the Disposal Sites, MONIER shall submit such detailed plans, calculations, drawings, specifications and timetables for said facilities and equipment as may be requested by DUKE to DUKE for DUKE's review. MONIER shall not begin any work on said facilities or equipment until MONIER has received DUKE's written approval.

5.2 Subject to the provisions of § 5.1, MONIER, at its expense, shall install facilities and equipment and modify existing facilities and equipment to provide damp Fly Ash processing, loading and trucking capabilities on the MONIER Operating Area and disposing at the Disposal Sites including, without limitation:

A. Sufficient conveying and storage facilities to augment existing Fly Ash handling equipment and to provide sufficient transfer and storage capacity to handle all the Fly Ash produced at the Station. The system design shall be compatible with the existing dry Fly Ash sales facility.

B. The piping system shall be modified to allow Fly Ash from all eight precipitators to go to the existing four silos. The two pressure Fly Ash systems on Units No. 3 and No. 4 will tie into the three MONIER silos. The two vacuum Fly Ash systems on Units No. 3 and No. 4 will go to a new collector/pressure transfer tank which will tie into the three MONIER silos. The pressure Fly Ash systems on Units No. 1 and No. 2 will tie into the DUKE silo between said Units. The vacuum Fly Ash systems on Units No. 1 and

No. 2 will go to a new collector/pressure transfer tank which will tie into the DUKE silo. The DUKE silo will have a transfer line to the MONIER silos. The system layout and location of the storage silos and piping can be seen in Exhibit 3.

C. MONIER will install a wet unloader on MONIER silos No. 1 and No. 3 and on the DUKE silo for a total of three (3) wet unloaders. The MONIER silos shall be upgraded to prevent leaks into their interior.

D. The MONIER silos shall be equipped with sufficient baghouse venting capability to receive Fly Ash from all eight precipitators simultaneously. The DUKE silo will have sufficient baghouse venting capability to receive Fly Ash from all four Unit No. 1 and No. 2 precipitators simultaneously.

E. The design for each of the Fly Ash conveying pipelines shall incorporate sufficient valves and connections to allow the simultaneous reception of Fly Ash from either of the pressure Fly Ash systems or the collector/pressure transfer tank (the vacuum system) to any of the silos (Units No. 3 and No. 4 to the MONIER silos and Units No. 1 and No. 2 to the DUKE silo). Plant Fly Ash control systems shall be modified to allow selective collection and segregation of Fly Ash into the MONIER and DUKE silos while at the same time maintaining the flexibility of continuous removal of Fly Ash from the precipitators and silos.

F. The MONIER silos shall incorporate inter-silo transfer equipment to further enhance reliability and allow the future possibility of loading Fly Ash from the MONIER silos into dry bulk tankers or railcars for sales. The DUKE silo shall have a transfer line to the MONIER silos. The MONIER silos shall have sufficient piping, valves and baghouse capacity to allow simultaneous Fly Ash receipt from all four units.

G. The Fly Ash transportation route shall be upgraded by MONIER as described in Exhibit 4 attached hereto. MONIER shall upgrade, design, build and maintain the route to DUKE'S satisfaction.

H. Vehicles sufficient to transport the Fly Ash and maintain the Disposal Sites. These vehicles may be rubber-tired or tracked; provided, however, tracked vehicles shall only be used on the Disposal Sites.

I. Additional equipment as shown on the list in Exhibit 5 attached hereto.

5.3 Subject to the provisions of §5.1, MONIER shall prepare the Disposal Sites in accordance with proper engineering design. Any permits necessary for the Disposal Sites shall be obtained and paid for by DUKE. The areas shown in Exhibit 1 are estimated to be adequate for the term of this Agreement by DUKE for the Fly Ash structural fill; provided, however, in the event said areas are not adequate, MONIER, at its expense, shall prepare additional Disposal Sites on adjacent property as directed by Duke. Final slopes of placed fill in the Disposal Sites shall be a minimum of ninety (90) feet from the centerline of the haul road and may slope upward at a slope no steeper than three (3) horizontal to one (1) vertical.

5.4 MONIER shall retain ownership of MONIER'S owned facilities and equipment on the MONIER Operating Area and the Disposal Sites. MONIER agrees not to remove any of the facilities and equipment located on the MONIER Operating Area or the Disposal Sites without DUKE's prior written permission, which shall not be unreasonably withheld. Upon termination of this Agreement, DUKE shall have the option to purchase any or all of the MONIER owned equipment and facilities at the Station at the fair market value of such equipment and facilities at the time of termination. Fair market value of such equipment and facilities shall be determined by mutual agreement or by an independent appraiser mutually agreed upon by MONIER and DUKE. To exercise its purchase option, DUKE shall so notify MONIER within thirty (30) days after termination of this Agreement or within thirty (30) days after agreement on fair market value or receipt of the independent appraiser's report, whichever is the later, and DUKE shall pay MONIER the fair market value for the equipment and facilities purchased within ninety (90) days after termination of this Agreement or within ninety (90) days after agreement on fair market value or receipt of the independent appraiser's report, whichever is the later. In the event DUKE does not exercise its purchase option as to all MONIER equipment and facilities, MONIER shall dismantle and remove the remaining equipment and facilities from the MONIER Operating Area and the Disposal Sites and restore the MONIER Operating Area and the Disposal Sites Area to DUKE'S reasonable satisfaction within ninety (90) days after the termination of this Agreement.

5.5 DUKE, at its expense, shall maintain its equipment and facilities at the Station except for the DUKE silo. MONIER, at its expense, shall maintain its facilities and equipment on the MONIER Operating Area and on the Disposal Sites and the DUKE silo.

SECTION VI

REGULATION

6.1 If federal, state or local governmental bodies or agencies impose new laws, statutes, orders, ordinances, rules, regulation, requirements, controls, restrictions, or standards (hereinafter collectively referred to as "Laws") or give existing Laws new applications or interpretations which prevent either party from fulfilling or which require a material increase in capital or operating expenditures to fulfill all or any part of its obligations under this Agreement, said party shall notify the other and the parties shall promptly consider what changes are necessary to comply with said Laws without materially increased capital or operating expenditures by either party; provided, however, no change shall be implemented without the consent of both parties. In the event the parties do not mutually agree upon what changes to make within ninety (90) days after the initial notification, either party may elect to terminate this Agreement by giving the other party thirty (30) days prior written notice of such termination.

6.2 If a federal, state or local Law is violated by MONIER, MONIER shall indemnify and hold DUKE harmless from all liabilities, damages, losses, injuries (including death), claims, suits, penalties, fines and costs and expenses of suit (including reasonable and necessary attorney's fees and costs of investigation and defense) (hereinafter collectively referred to as "Liabilities") asserted against DUKE and the payment of any sum or sums of money arising out of or resulting from such violation. DUKE shall promptly transmit to MONIER notice of all such claims and all pleadings and papers served on DUKE due to such claims.

6.3 If a federal, state or local Law is jointly or concurrently violated by MONIER and DUKE, then all Liabilities and the payment of any sum or sums of money arising out of an order, judgment or jointly approved settlement resulting from such violation shall be borne by the parties hereto in such proportion as may be determined by mutual agreement, by a final judgment or in the absence of either such determination, then equally between MONIER and DUKE; provided, however, in the case of such joint or concurrent violation, each party shall bear its own attorney's fees.

SECTION VII

INDEMNITY AND INSURANCE

7.1 MONIER shall, at its own expense, defend any suit or proceeding brought against DUKE based upon a claim that the subsequent use of Fly Ash sold to MONIER infringes any United States patent or other property right, but not to the extent such patent is infringed by DUKE's making of Fly Ash and MONIER shall indemnify and hold DUKE harmless from all Liabilities relating thereto or incurred as a result thereof. DUKE shall give MONIER prompt notice in writing of any claim of infringement and of the institution of any such suit or proceeding and shall cooperate with MONIER in its defense.

7.2A. MONIER shall and does hereby agree to indemnify, hold harmless and defend DUKE from all Liabilities and the payment of any sum or sums of money arising out of an order, judgment or MONIER approved settlement to any person or entity whatsoever, including, without limitation, their parties, subcontractors and agents and employees of either DUKE or MONIER, in connection with injuries to persons (including death) or damage to property including property of DUKE, in any way arising out of or relating to this Agreement or the sale, delivery, recovery, handling, disposal, loading, removing, transportation, ownership or use of Fly Ash by MONIER, its agents or any party claiming by, through or under MONIER, or MONIER'S operation or maintenance of its equipment and facilities, including, without limitation, all liens, garnishments and attachments.

MONIER further agrees to indemnify, hold harmless and defend DUKE from all Liabilities and the payment of any sum or sums of money arising out of an order, judgment or MONIER approved settlement to any person or entity whatsoever, including without limitation, third parties, subcontractors and agents and employees of either DUKE or MONIER that may be made and brought against DUKE by any employee, officer or agent of MONIER or by any third party visiting the Station premises solely for the purposes of conducting business with MONIER because of any liability that is or may be claimed against DUKE or imposed upon DUKE as the owner of the premises and the owner and operator of the Station and its environs. Notwithstanding anything herein to the contrary, the provisions of this 7.2(A) shall not apply to Liabilities proximately caused by the solely negligent acts of DUKE, its employees, agents or subcontractors.

DUKE shall promptly transmit to MONIER notice of all such claims and all pleadings and papers served on DUKE due to such claims.

7.2B. If any Liabilities and the payment of any sum or sums of money arising out of an order, judgment or jointly approved settlement are attributable to the joint or concurrent negligence of MONIER and DUKE or the employees, agents or subcontractors of either of them, then such Liabilities and such sum or sums of money shall be borne by the parties hereto in such proportion as may be determined by mutual agreement, by a final judgment or in the absence of either such determination, then equally between MONIER and DUKE. In the case of joint or concurrent negligence, each party shall bear its own attorney's fees.

7.3A. MONIER agrees to furnish and maintain during the term of this Agreement, at its expense, the following types and amounts of insurance (with no more than a $50,000 deductible):

	COVERAGE	LIMITS
(1)	Worker's Compensation	Statutory
(2)	Employer's Liability	$ 500,000
(3)	General Liability (bodily injury and property damage, including contractual liability coverage)	$2,000,000

(4)	Automobile Liability (bodily injury and property damage, including contractual liability coverage)	$2,000,000

7.3B. All of the aforementioned insurance shall be placed with an insurance company licensed to do business in the State of North Carolina and shall be endorsed to cover the liability assumed by MONIER under the provisions of this Agreement, said endorsement to be worded substantially as follows: "During the effective period of the policy mentioned herein, it is agreed that this insurance specifically covers liability assumed by the insured under the provisions of the agreement entered into by the insured and the DUKE POWER COMPANY dated December 8th, 1983." In addition, each of the above required policies shall be endorsed to include DUKE as additional insured and with a provision whereby the insurance company will notify DUKE thirty (30) days prior to the effective date of cancellation or material change in any of the said policies.

7.3C. As evidence of this insurance and prior to the beginning of any activity in connection with this Agreement, MONIER shall submit to DUKE a certification which states that the said policies have been properly endorsed to meet the above requirements.

7.3D. It is understood, however, that the provisions requiring MONIER to carry said insurance shall not be construed as in any manner waiving or restricting the liability of MONIER under this Agreement.

SECTION VIII

DUKE SUPPLIED GOODS AND SERVICES

8.1 DUKE may, in its sole discretion, supply MONIER with goods and services requested by MONIER. MONIER shall promptly reimburse DUKE for the cost of such goods and services (including fringe benefits, payroll taxes and unproductive time) upon receipt of an invoice from DUKE.

8.2 DUKE WARRANTS THAT ITS SERVICES ARE PERFORMED, WITHIN THE LIMITS PRESCRIBED BY MONIER, WITH THE USUAL THOROUGHNESS AND COMPETENCE OF THE MECHANICAL AND ELECTRICAL CONTRACTING PROFESSION. NO OTHER WARRANTY OR REPRESENTATION, WHETHER STATUTORY, EXPRESSED OR IMPLIED (INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE), IS INCLUDED OR INTENDED. SUBJECT TO THE PROVISIONS OF §10.2, THE SOLE LIABILITY OF DUKE ARISING OUT OF OR IN CONNECTION WITH THE SERVICES SHALL BE LIMITED TO REDOING AT DUKE'S EXPENSE ANY SERVICES PERFORMED BY DUKE WHICH HAVE FAILED TO MEET THE ABOVE WARRANTY, IF SUCH FAILURE IS PROMPTLY REPORTED TO DUKE AFTER THE DISCOVERY THEREOF BUT IN ALL EVENTS NOT LATER THAN 365 DAYS FOLLOWING PERFORMANCE OF THE APPLICABLE SERVICES. THE FOREGOING REMEDY SHALL BE MONIER'S SOLE REMEDY UNDER THIS AGREEMENT AND MONIER RELEASES DUKE FROM ALL FURTHER LIABILITY.

DUKE MAKES NO REPRESENTATIONS, GUARANTEES OR WARRANTIES, EXPRESSED OR IMPLIED, WRITTEN OR ORAL, ARISING BY LAW OR OTHERWISE, INLCUDING THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUALITY, CAPACITY, USEFULNESS, PRODUCTIVITY OR TRADE USAGE WHICH ARE EXPRESSLY DISCLAIMED REGARDING ANY GOODS SUPPLIED HEREUNDER. SUCH GOODS ARE SOLD ON AN "AS IS", WITH ALL FAULTS BASIS. MONIER EXPRESSLY AGREES THAT DUKE SHALL HAVE NO RESPONSIBILITY OR LIABILITY TO ANY PERSON OR ENTITY WHATSOEVER ARISING OUT OF OR RELATING TO MONIER'S USE OF SUCH GOODS.

SECTION IX

TERM

9.1 The term of this Agreement shall commence on the date first above written and shall continue for an initial period through December 31, 1993. Unless written notice of termination is given by one party and received by the other party on or before September 30, Extended 5 yrs to 1998 – Extended to 2001 1993, this Agreement shall be automatically renewed for additional terms of five (5) years until terminated by written notice from one party to the other party given not less than three (3) months prior to the end of one of the subsequent five (5) year renewal terms.

9.2 In the event DUKE is unable to make a minimum of one hundred thousand (100,000) Tons of Fly Ash available to MONIER during any period of twenty-four (24) consecutive calendar months, MONIER may terminate this Agreement by giving DUKE sixty (60) days prior written notice.

9.3 In the event MONIER does not purchase a minimum of fifty thousand (50,000) Tons of Fly Ash made available at the silos by DUKE during any period of twelve (12) consecutive calendar months after December 31, 1984, DUKE may terminate this Agreement by giving MONIER sixty (60) days prior written notice.

9.4 In the event MONIER fails, except when excused under the provisions of 11.1, to perform any of its obligations under this Agreement and should it not correct such failure within thirty (30) days after having received notice of same from DUKE, DUKE may terminate this Agreement by giving written notice of such termination to MONIER; provided, however, in the event MONIER fails, or in DUKE's opinion is likely to fail, to perform any of its obligations under this Agreement and such failure results, or in DUKE'S opinion is likely to result, in the reduction of electrical generation at the Station, DUKE may terminate this Agreement by giving written notice of such termination to MONIER, notwithstanding the provisions of §11.1. Any such termination by DUKE shall be in addition to and without prejudice to any other rights or remedies that DUKE may have.

9.5 Termination of this Agreement by either party as provided herein shall not relieve either party of any of its contractual obligations, including without limitation, payment, which may have accrued prior to such termination.

SECTION X

LIMITATION OF LIABILITY

10.1 MONIER UNDERSTANDS AND AGREES THAT FLY ASH PURCHASED FROM DUKE IS SOLD "AS IS" AND AS PRODUCED WITH ALL FAULTS. DUKE MAKES NO WARRANTY, REPRESENTATION, OR GUARANTEE, EXPRESS OR IMPLIED, WRITTEN OR ORAL, ARISING BY LAW OR OTHERWISE, AND DUKE HEREBY DISCLAIMS ALL WARRANTIES OF MERCHANTABILITY, QUALITY AND FITNESS OF FLY ASH FOR A PARTICULAR PURPOSE. DUKE SHALL NOT BE RESPONSIBLE FOR ANY APPLICATION OR USE OF FLY ASH PURCHASED BY MONIER FROM DUKE.

10.2 NOTWITHSTANDING ANYTHING IN THIS AGREEMENT TO THE CONTRARY, IN NO EVENT SHALL DUKE BE LIABLE TO MONIER WHETHER IN

wrongfull act for which civil action will lie, except one involving breach of contract; [illegible]

CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY), UNDER ANY WARRANTY OR OTHERWISE ARISING OUT OF OR RELATING TO THIS AGREEMENT FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, ANY LOSS OF USE OF PROPERTY, EQUIPMENT OR SYSTEMS, LOSS OF PROFITS OR REVENUE OR LOSS OF USE THEREOF, LOSS BY REASON OF FACILITY SHUTDOWN OR INTERRUPTION, COSTS OF CAPITAL OR EXPENSES THEREOF, LOSS RESULTING FROM THE FAILURE OF GOODS AND SERVICES TO PERFORM THE FUNCTION OR SERVE THE PURPOSE INTENDED, OR CLAIMS OF MONIER'S

FLY ASH CUSTOMERS OR OF ANY THIRD PARTY AND MONIER HEREBY RELEASES DUKE FROM ANY LIABILITY FOR ALL SUCH LOSSES AND DAMAGES. IN ANY EVENT, DUKE'S TOTAL CUMULATIVE LIABILITY FOR CLAIMS OF WHATEVER NATURE BY MONIER FOR ANY LOSS OR DAMAGE ARISING OUT OF OR RELATING TO THIS AGREEMENT, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY), UNDER ANY WARRANTY OR OTHERWISE SHALL NOT EXCEED IN THE AGGREGATE THE AMOUNT OF $50,000.00 AND MONIER HEREBY RELEASES DUKE FROM ANY LIABILITY IN EXCESS OF SUCH AMOUNT. IN APPLYING THE MONETARY LIMITATION TO DUKE'S TOTAL CUMULATIVE LIABILITY, SUCH LIABILITY SHALL BE REDUCED BY THE SUM OF ANY DAMAGES PAID BY DUKE TO MONIER AND ANY COSTS INCURRED BY DUKE IN REPERFORMING ANY OF DUKE'S SERVICES PURSUANT TO §8.2 (BUT DOES NOT INCLUDE PAYMENTS BY DUKE PURSUANT TO §3.5, §3.10B AND §3.11).

SECTION XI

GENERAL

11.1. The following events and conditions shall, if beyond the control and not due to the fault or negligence of the party hereto whose performance is affected thereby, be deemed to constitute force majeure: acts of God, wars, riots and other violent civil disturbances, strikes, lockouts and other disabling labor disturbances, unavailability of fuel, water, steam or electric power, unavailability of essential transportation facilities, requirements of applicable Laws and any other events or conditions, whether similar or dissimilar to the foregoing, which prevent or delay performance.

If force majeure shall prevent or delay DUKE, in whole or in part from providing Fly Ash to MONIER or performing any of DUKE's obligations under this Agreement, or if force majeure shall prevent or delay MONIER from disposing of or purchasing Fly Ash or performing any of MONIER's obligations under this Agreement, then, if the affected party shall so notify the other party hereto, such affected party shall be excused from performance under this Agreement to the extent caused by the force majeure so long as the force majeure shall continue.

The party affected by force majeure shall at all times use reasonable efforts to overcome and alleviate the effects of the force majeure. This §11.1 shall not relieve DUKE or MONIER from their respective payment obligations.

11.2 MONIER is and shall be in the performance of all obligations pursuant to this Agreement an independent contractor. All employees of MONIER and all employees of DUKE shall be and remain at all times employees of such respective employers and shall not in any way or at any time be or be deemed for any purpose to be employees or agents of the other employer. Notwithstanding anything in this Agreement to the contrary, the parties do not intend to hereby create any relationship of agency, partnership or joint venture between DUKE and MONIER.

11.3 This Agreement and the rights and obligations arising under it may not be assigned, subcontracted or otherwise transferred in whole or in part by either party without the prior written consent of the other party, except to a successor to substantially all of the business of a party in the United States or to an affiliate of a party, provided that the assigning, subcontracting or transferring party shall remain fully liable to the other party under this Agreement. Subject to the above, this Agreement shall be binding upon and inure to the benefit of the parties and their respective successors, assigns and subcontractors.

11.4 All notices given under this Agreement shall be in writing and shall be delivered by certified mail, postage prepaid, addressed to the other party at its address set forth below, or at such other address as either party shall by notice give to the other:

MONIER RESOURCES, INC.
45 N.E. Loop 410, Suite 700
San Antonio, Texas 78216

Attention: President

DUKE POWER COMPANY
422 South Church Street
P. O. Box 33189
Charlotte, North Carolina 28242

Attention: W. O. Parker, Jr., Vice President, Fossil Production

All notices sent by mail shall be effective on the date of receipt by the other party.

11.5 The parties hereby agree that the Sales Agreement shall terminate effective December 8, 1983.

11.6 The provisions of this Agreement providing for limitation of, indemnification or protection against liability of DUKE shall also protect its directors, officers, employees and subsidiaries or affiliated entities of DUKE and their directors, officers and employees, shall apply regardless of the fault, negligence or strict liability of DUKE, its directors, officers and employees to the full extent permitted by law and shall survive the termination of this Agreement.

11.7 The provisions of §III, §5.4, §6.2, §6.3, §7.1, §7.2A, §7.2B, §VIII, §9.5, §X and §XI shall survive the termination of this Agreement and shall remain operative and in full force and effect to the full extent permitted by law.

11.8 This Agreement shall be governed by and construed in accordance with the laws of the State of North Carolina.

11.9 The terms and conditions set forth herein are intended by DUKE and MONIER to constitute a final, complete and exclusive statement of their agreement and all prior proposals, communications, negotiations, understandings and representations relating to the subject matter of this Agreement, whether oral or written, are hereby superseded, abrogated and withdrawn. This Agreement shall not be supplemented, modified or amended except in writing and signed by both parties. Waiver by either party of any default of the other party hereunder shall not be deemed a waiver of any other default. Either party may at any time insist upon strict compliance with these terms and conditions notwithstanding any previous custom, practice or course of dealing to the contrary.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized officers as of the day and year first above written.

DUKE POWER COMPANY

By ____________________

Name W.O. Parker, Jr.

Title Vice President

MONIER RESOURCES, INC.

By ____________________

Name G. J. Gordon

Title President

APPROVED AS TO FORM
W. J. BOWMAN

and

By ____________________

Name W.T. Robertson, Jr.

Title Director of Purchases

WAIVER AND CONSENT BY REAL PROPERTY OWNER

THIS WAIVER AND CONSENT BY REAL PROPERTY OWNER is made and entered into between SIGNAL CAPITAL CORPORATION, a Delaware corporation, with offices at 700 North Pearl, Suite 1940, Dallas, Texas 75201 (hereinafter referred to as "Secured Party"), and Duke Power Company (hereinafter referred to as "Owner"), and affects that real property in the County of Catawba, State of North Carolina, commonly known as the Plant Marshall (hereinafter referred to as the "Premises").

This Waiver and Consent by Real Property Owner is executed to induce Secured Party to enter into or refrain from terminating that certain Loan and Security Agreement and/or other agreement or agreements (herein collectively referred to as the "Loan Agreement") between Secured Party and MONIER RESOURCES, INC., an Ohio corporation, with its chief executive office at 45 N.E. Loop 410, Suite 700, San Antonio, Texas 78216 (hereinafter referred to as the "Borrower"), which Loan Agreement, among other things, is or will be given by Borrower to Secured Party for the purpose of securing payment of all of Borrower's Liabilities (as defined in the Loan Agreement) and performance of all duties now or hereafter owing by Borrower to Secured Party, of every kind and description. This Waiver and Consent by Real Property Owner does not amend any of the terms of the Loan Agreement and reference thereto is made for further particulars.

Under the terms of the Loan Agreement, Secured Party has loaned or has agreed to loan credit or monies to Borrower against the security of collaterial, which includes, among other things, merchandise, inventory, supplies, equipment, furniture, furnishings, fixtures, machinery and tools, together with all additions, substitutions, replacements, improvements and repairs to same (hereinafter referred to as the "Collateral"), which Collateral is or shall be located on and may be affixed to the premises or improvements thereon.

Secured Party and Owner agree that:

1. Nothwithstanding any provisions of any lease or agreement between Owner and Borrower pertaining to the Premises, this Waiver and Consent shall govern the rights between them pertaining to the Collateral.

2. The Collateral (a) shall be and remain personal property, notwithstanding the manner of their annexation to the Premises, their adaptability to the uses and purposes for which the Premises are used and the intentions of the party making the annexation; and (b) shall not become fixtures.

3. Owner waives each and every right which Owner now has, or may hereafter have, under the laws of the State of North Carolina, or by virtue of any lease or agreement now in effect, to levy or distrain upon for rent in arrears, in advance, or both, or to claim or assert any right or title to, interest in or lien upon the Collateral except as to any purchase option right Owner may have under existing written agreement with Borrower.

4. Owner consents to the installation of the Collateral on the Premises, agrees that Secured Party may do to and with the Collateral any or all of the acts below enumerated, and grants Secured Party a license to enter the Premises to do any or all of the following to said Collateral: assemble, have appraised, display, sever, remove, maintain, prepare for sale or lease, repair, lease, transfer and/or sell at public auction(s) or private sale(s) the Collateral, or any part thereof, subject to any purchase option right Owner may have under existing written agreement with Borrower.

5. The waivers and consents herein granted shall continue until such time as all Liabilities of Borrower to Secured Party and expenses (including, without limitation, reasonable attorney's fees) have been paid to or recovered by Secured Party and all covenants and conditions as specifically enumerated in the Loan Agreement have been fully performed.

6. Secured Party shall have the right and license to come on the Premises for the purposes described in Paragraph 4 above, for a period of up to ninety (90) days (at Secured Party's discretion), following Owner's authorizing Secured Party's entry to the Premises, or abandonment of the Premises by Borrower, whichever occurs later. Secured Party shall pay Owner, periodically, a daily license fee equivalent to one-thirtieth (1/30th) of any minimum monthly rental provided for in the lease agreement between Owner and Borrower. Any extensions of the foregoing period shall be with the written consent of Owner and at the same rate. All structural damage to the Premises caused by the removal of the Collateral shall be repaired by Secured Party at its expense.

7. Secured Party may cure any default by Borrower in the payment of rental due under said lease or agreement without acceleration. Should Owner select a successor contractor for Borrower, Secured Party shall have the right to sell or lease the Collateral in place to such successor contractor should Owner not exercise any purchase rights Owner may have. If the successor contractor elects not to purchase the Collateral on price and terms acceptable to Secured Party and Owner does not exercise any purchase right it may have, Secured Party shall have all the rights to remove and sell the Collateral it deems in its best interest.

8. Secured Party may, without affecting the validity of this Waiver and Consent by Real Property Owner, extend the times of payment of any indebtedness of Borrower to Secured Party or the performance of any of the terms and conditions of any such Loan Agreement, without the consent of the Owner and without giving notice thereof to Owner.

9. This Waiver and Consent by Real Property Owner shall be interpreted under the laws of the State of North Carolina and shall inure to the benefit of and be binding upon the successors, heirs and assigns of Owner and Secured Party.

DATED: ____________________

SECURED PARTY

SIGNAL CAPITAL CORPORATION

By: ____________________

Its: ____________________

OWNER:

Duke Power Company

By: William O. Parker Jr.

Title: Vice President, Fossil Production

APPROVED AS TO FORM
W. DOANMAN

STATE OF NORTH CAROLINA

COUNTY OF MECKLENBURG

I, Sadie M. McIntyre, a Notary Public for said County and State do hereby certify that WILLIAM O. PARKER, JR. personally appeared before me this day and acknowledged the due execution of the foregoing Waiver And Consent By Real Property Owner.

WITNESS my hand and notarial seal this 14th day of September, 1987.

Sadie M. McIntyre
Notary Public

My Commission Expires:

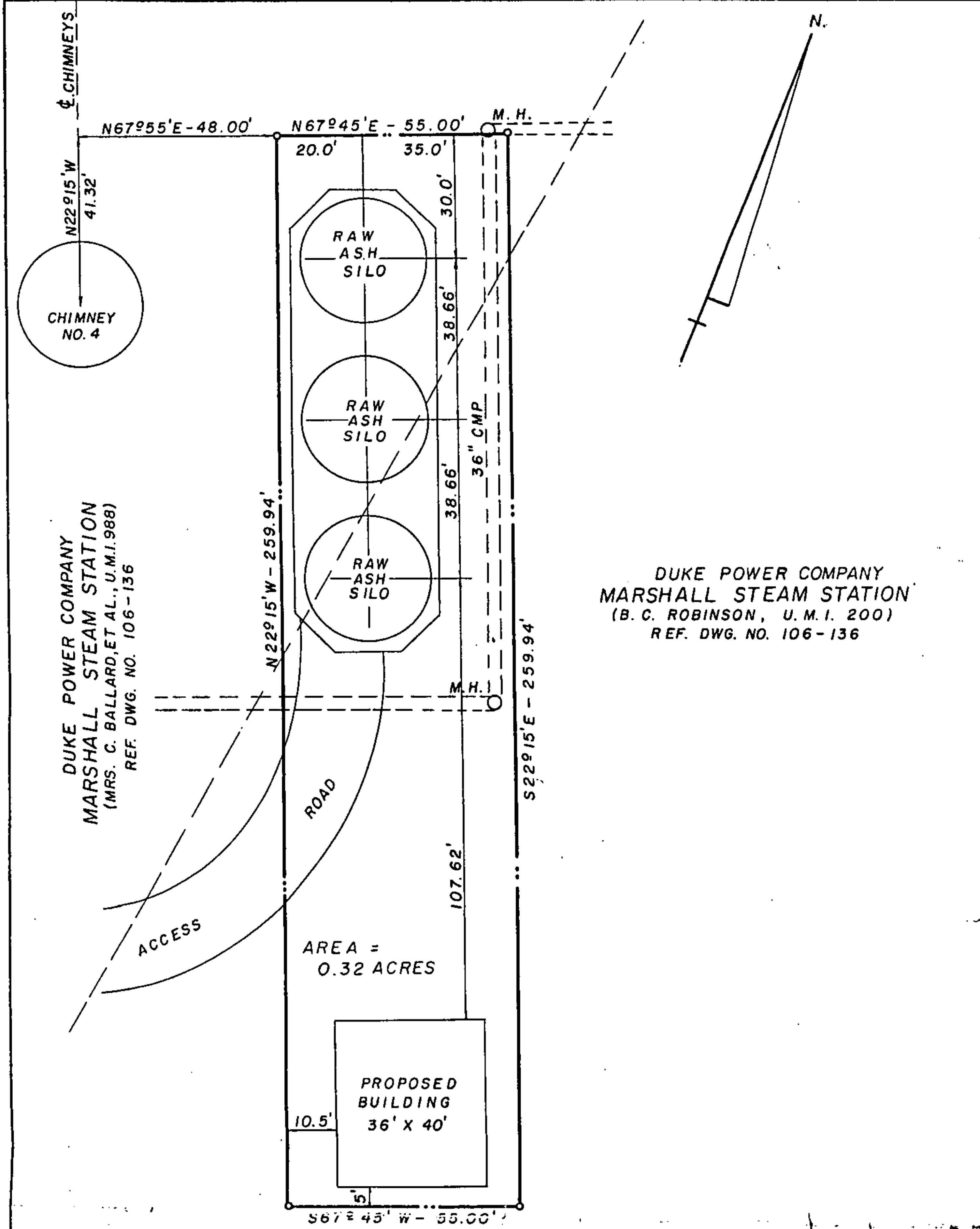
May 16, 1992

(NOTARIAL SEAL)

____
Notary Public in and for
__________ County, __________

My Commission Expires:

____



DUKE POWER COMPANY
MARSHALL STEAM STATION
PROPERTY LEASED TO
AMAX
FLY ASH CORPORATION
TERRELL, N. C.
CATAWBA COUNTY
SCALE: 1" = 30'
DECEMBER 13, 1977
MTN. IS. DWG. NO. 1166

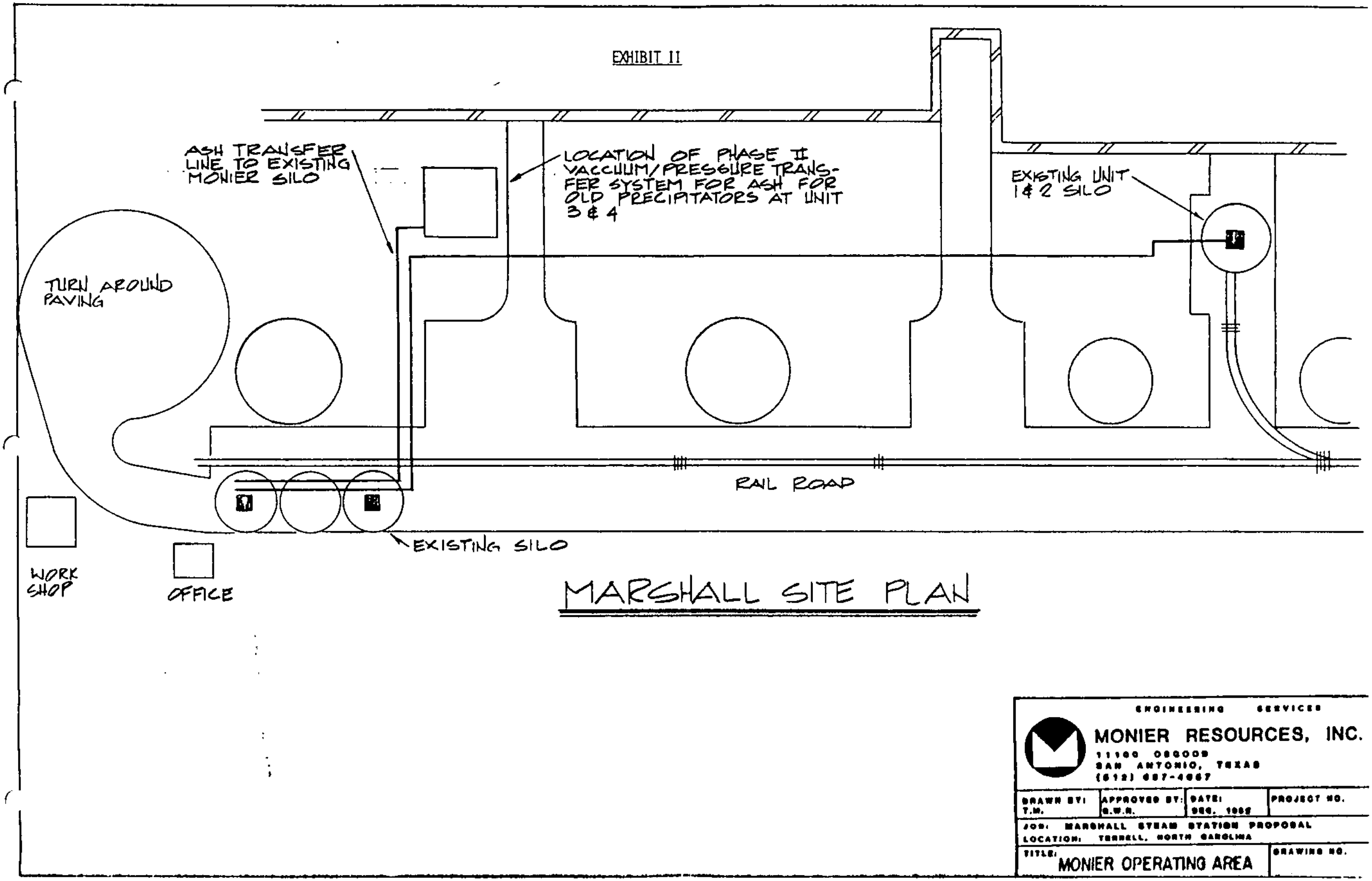
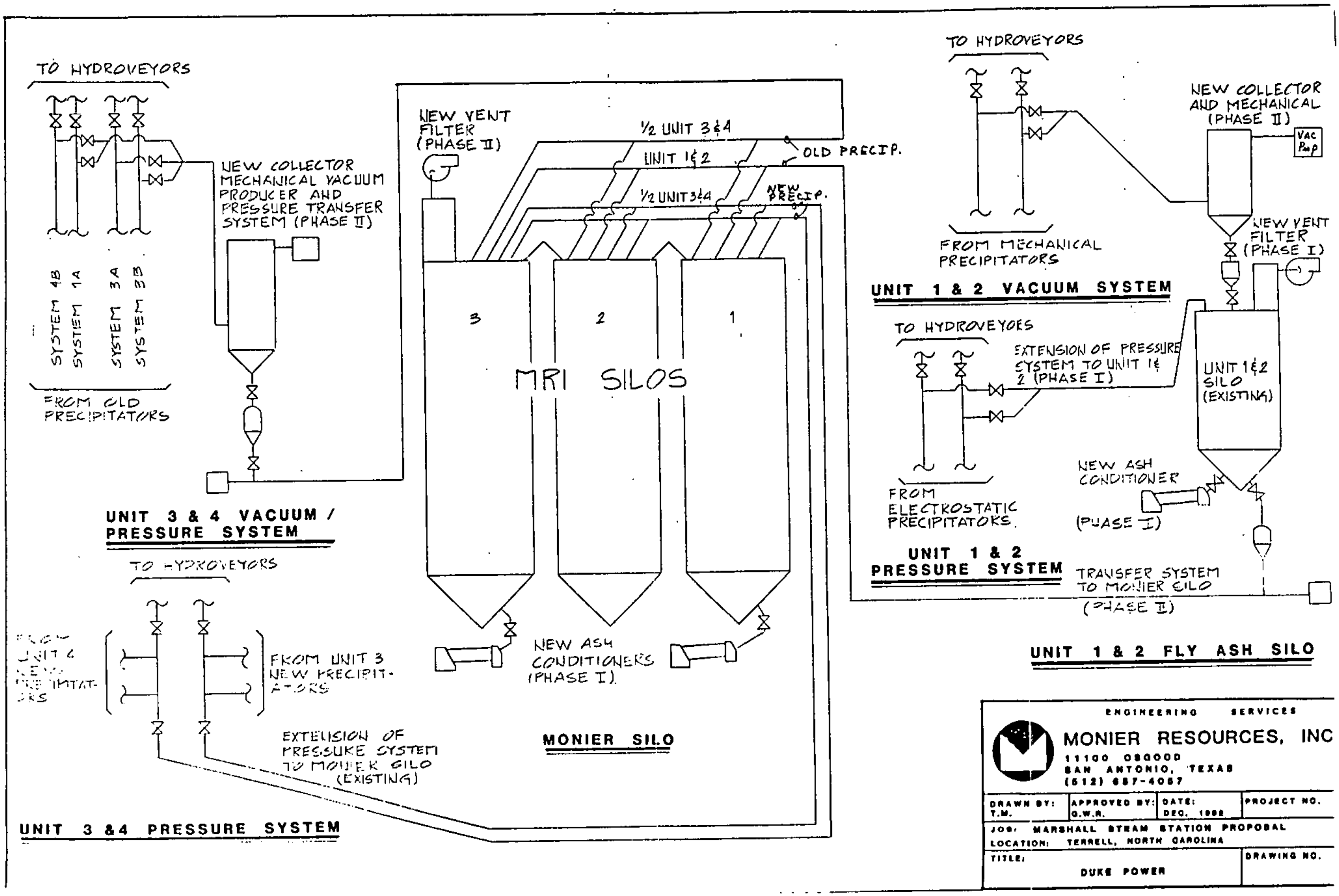


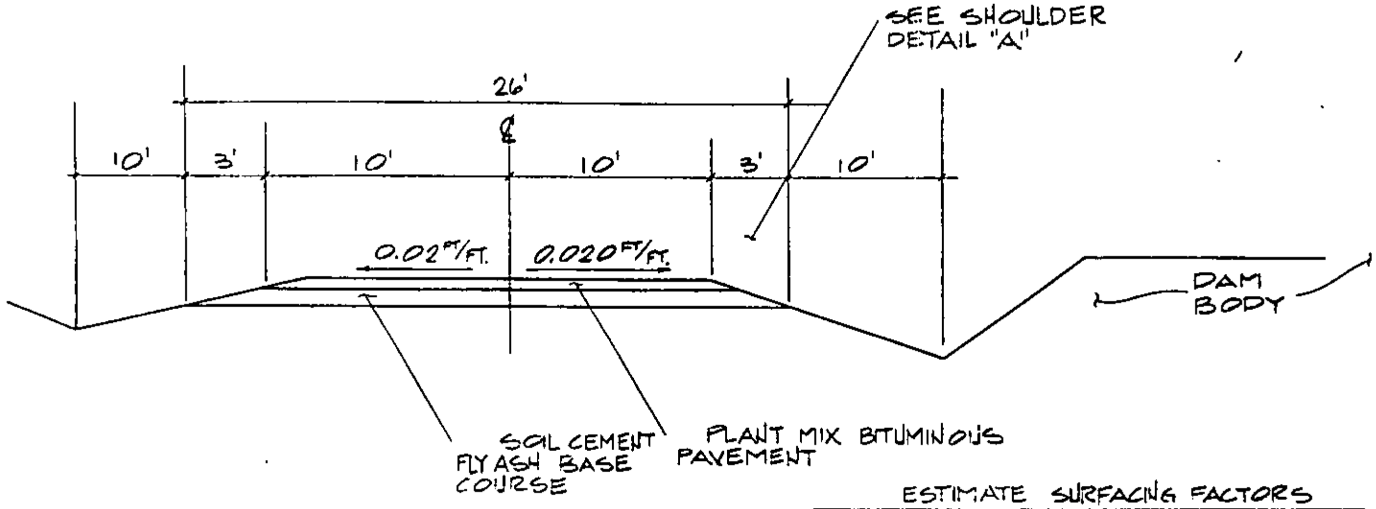
EXHIBIT II
ASH TRANSFER LINE TO EXISTING MONIER SILO
LOCATION OF PHASE II VACCUUM/PRESSURE TRANSFER SYSTEM FOR ASH FOR OLD PRECIPITATORS AT UNIT 3 & 4
EXISTING UNIT 1 & 2 SILO
TURN AROUND PAVING
RAIL ROAD
EXISTING SILO
WORK SHOP
OFFICE
MARSHALL SITE PLAN
ENGINEERING SERVICES
MONIER RESOURCES, INC.
SAN ANTONIO, TEXAS
DRAWN BY: T.M.
APPROVED BY:
DATE:
PROJECT NO.
JOB: MARSHALL STEAM STATION PROPOSAL
LOCATION: TERRELL, NORTH CAROLINA
TITLE: MONIER OPERATING AREA
DRAWING NO.

EXHIBIT III


TO HYDROVEYORS
SYSTEM 4B
SYSTEM 1A
SYSTEM 3A
SYSTEM 3B
FROM OLD PRECIPITATORS
NEW COLLECTOR MECHANICAL VACUUM PRODUCER AND PRESSURE TRANSFER SYSTEM (PHASE II)
UNIT 3 & 4 VACUUM / PRESSURE SYSTEM
NEW VENT FILTER (PHASE II)
1/2 UNIT 3&4
UNIT 1&2
1/2 UNIT 3&4
OLD PRECIP.
NEW PRECIP.
3
2
1
MRI SILOS
NEW ASH CONDITIONERS (PHASE I)
MONIER SILO
TO HYDROVEYORS
FROM UNIT 3 NEW PRECIPITATORS
EXTENSION OF PRESSURE SYSTEM TO MONIER SILO (EXISTING)
UNIT 3 &4 PRESSURE SYSTEM
TO HYDROVEYORS
FROM MECHANICAL PRECIPITATORS
NEW COLLECTOR AND MECHANICAL (PHASE II)
VAC PUMP
NEW VENT FILTER (PHASE I)
UNIT 1 & 2 VACUUM SYSTEM
TO HYDROVEYORS
EXTENSION OF PRESSURE SYSTEM TO UNIT 1& 2 (PHASE I)
UNIT 1&2 SILO (EXISTING)
FROM ELECTROSTATIC PRECIPITATORS
NEW ASH CONDITIONER (PHASE I)
UNIT 1 & 2 PRESSURE SYSTEM
TRANSFER SYSTEM TO MONIER SILO (PHASE II)
UNIT 1 & 2 FLY ASH SILO
ENGINEERING SERVICES
MONIER RESOURCES, INC
11100 OSGOOD
SAN ANTONIO, TEXAS
(512) 687-4057
DRAWN BY: T.M.
APPROVED BY: G.W.R.
DATE: DEC. 1992
PROJECT NO.
JOB: MARSHALL STEAM STATION PROPOSAL
LOCATION: TERRELL, NORTH CAROLINA
TITLE: DUKE POWER
DRAWING NO.

MONIER RESOURCES
OP-M-1083

EXHIBIT IV



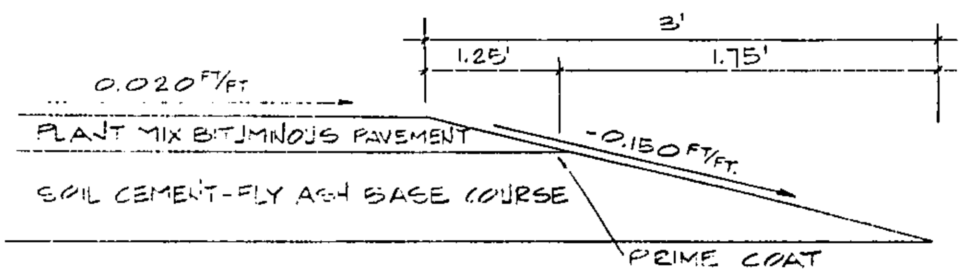
TYPICAL ROADWAY SECTION

NOTES:

1. USE FLAT BACK SLOPE AT END OF CUTS AND CUT DITCH FAR ENOUGH TO CARRY ALL WATER CLEAR OF ROADWAY EMBANKMENT.
2. ROADSIDE IMPROVEMENTS INCLUDED IN THIS CONTRACT INCLUDE:
   ROUNDING SLOPES
   FLATENING SLOPES
   DIVERTING WATER TO PIPE TRENCH
   BUILDING DIKE/DITCH TO DIVERT WATER & CONTROLLING EROSION
3. THE SOIL-CEMENT-FLYASH BASE COURSE SHALL DEVELOPE 300 PSI IN 7 DAY AS PER ASTM C 593.
4. THE PROPORTIONS AND SPREAD RATES WILL BE DETERMINED BY THE PROJECT ENGINEER
5. A TACK-COAT WILL BE APPLIED TO THE STABILIZED BASE COURSE WITHIN 12 HRS. OF CONSTRUCTION
6. THE PLANT MIX BITUMINOUS PAVEMENT SHALL BE PLACED IN ONE LIFT TO PRODUCE A COMPACTED THICKNESS OF
7. THE CONTRACTOR SHALL HAVE THE OPTION OF USING EITHER 85-100 PENETRATION ASPHALT, AC-10 MODIFIED ASPHALT OR CSS-1 EMULSIFIED ASPHALT FOR TACK COAT.
8. AC-10 VISCOSITY GRADE ASPHALT MAY BE SUBSTITUTED FOR 85-100 PENETRATION GRADE ASPHALT IN THE PLANT MIX BITUMINOUS PAVEMENT

ESTIMATE SURFACING FACTORS

ITEM	ASPHALT MATERIAL 85-100	ASPHALT MATERIAL CSS-1	ASPHALT MATERIAL AC-10	LBS.PER CU.YD.	ASPHALT MATERIAL MC-70/250
PLANT MIX. BIT PAVING	≈6% BY WT. OF TOTAL MIX			4000	
TACK COAT	0.02-0.15 GAL/SQ.YD.	0.02-0.15 GAL/SQ.YD.	0.02-0.15 GAL/SQ.YD.		
PRIME COAT					0.14-0.16 GAL/SQ.YD.



SHOULDER SECTION DETAIL 'A'

ENGINEERING SERVICES
MONIER RESOURCES, INC.
11100 OSGOOD
SAN ANTONIO, TEXAS

DRAWN BY:	APPROVED BY:	DATE:	PROJECT NO.
R. S.	R. A. L.	AUG 1983	

PLANT: MARSHALL
LOCATION: NORMAN, N CAROLINA
TITLE: HAUL ROAD
DRAWING NO.

EXHIBIT V

EQUIPMENT LIST

MARSHALL STEAM STATION

BILL OF MATERIALS FOR MARSHALL

ITEM

PHASE I
WET UNLOADERS

Three Wet Unloaders

Water Supply Piping and Valves

Silo Transition Piece and Spool Pieces

Ash Valves

Wet Unloader Support Structure

Electrical Supply and Controls

Aeration Blower

Aeration Piping

UNIT 1 AND 2 PRESSURE SYSTEM CONNECTING TO SILO 4

Segregating Valves

Piping and Supports

Electrical Controls, Conduit, Wiring

SILO 4 VENT FILTER

Vent Filter

Vent Fan

Duct

Vent Filter Supports

Electrical Supply and Controls (Vent Fan and Pulse Unit)

Compressed Air Piping

Compressed Air Dryer

Air Compressor

REFURBISHING SILO 1, 2 & 3 EQUIPMENT

Slide Gate Valves

Slide Gates

Piping

Bill of Materials for Marshall (Cont'd.)
Page 2

ITEM

PHASE II

UNIT 1, 2 VACUUM SYSTEM TO SILO 4

Collector

Collector Support Structure

Bags and Cages

Intervent Piping

Valves

Collector Controls

Airlock Pot

Vacuum Piping (Ash and Air) with Supports

Vacuum Pump

Vacuum Pump Support Structure or Foundation

After Filter and Supports

Compressed Air Supply (Same as Vent Filter)

Segregating Valves

Processor Controller

UNIT 3/4 VACUUM/PRESSURE TRANSFER SYSTEM

Vacuum Piping

Segregating Valves

Pipe Supports (Vacuum and Pressure)

Collector

Collector Foundation/Support

Bags and Cages

Air Lock Pot

Automatic Transfer Valves

Transfer Blower

Transfer Piping

Silo Diverter Valves

Silo 1, 2, 3 Level Indicator

Electrical Equipment, Conduit, Wiring, Controls

Compressed Air Piping

Bill of Materials for Marshall (Cont'd.)
Page 3

ITEM

SILO 4 TRANSFER SYSTEM

Ash Outlet and Spool Pieces

Air Lock Pot

Ash Line Pot

Aeration Piping

Aeration Blower

Automatic Transfer Valves

Transfer Blower

Transfer Piping

Pipe Supports

Diverter Valves at Silo 1, 2, 3

Access Platform for Piping

Transfer System Foundation/Support

Electrical Equipment, Controls, Conduit, Wiring

INCREASE VENT FILTER CAPACITY AT SILOS 1, 2, 3

Vent Filter(s)

Vent Fan(s)

Vent Fan(s)

Vent Fan(s)

Vent Fan(s)

Compressed Air Supply Piping

Compressed Air Dryer

Electrical Controls, Wiring, Conduit

AW/pjb

Please see me

AMAX Resource Recovery Systems, Inc.
A SUBSIDIARY OF AMAX INC.

March 20, 1979

Mr. R. W. Bostian
Duke Power Company
Steam Production Department
General Offices
422 South Church Street
Charlotte, NC 28242

Dear Mr. Bostian:

In reply to your request for AMAX's determination of "depreciated equipment cost" as defined in Article I-D of the Duke/AMAX agreement dated July 23, 1973, I have enclosed a copy of a memo from George Schmitz, ARRS Controller.

Mr. Schmitz has tabulated the year end depreciated equipment cost since beginning operations at Plant Marshall and for all the years in the future.

Very truly yours,

AMAX RESOURCE RECOVERY SYSTEMS, INC.

J. J. Cordiano
President

JJC:sc

Enclosure

cc: G. Schmitz

350 PRADO EAST, 5600 ROSWELL RD., N.E., ATLANTA, GA. 30342
(404) 256-2315

[ER-OFFICE MEMORANDU

AMAX Resource Recovery Systems, Inc.

TO: Mr. J. J. Cordiano **DATE:** March 14, 1979

FROM: G. A. Schmitz

SUBJECT: PLANT MARSHALL DEPRECIATED EQUIPMENT COST

In reference to Ralph Bostian's March 6th memo, the following data is presented.

As a note of information, Plant Marshall was completed late in 1974 according to our records. Although start-up began in 1974, it was not until 1975 that acceptable levels of ash were processed and shipped.

Installed Equipment Cost	12/31/74	$618,264.38
Depreciated Equipment Cost (At Year End)	12/31/75	577,046.75
	12/31/76	535,829.12
	12/31/77	494,611.49
	12/31/78	453,393.86
	12/31/79	412,176.23
	12/31/80	370,958.60
	12/31/81	329,740.97
	12/31/82	288,523.34
	12/31/83	247,305.71
	12/31/84	206,088.08
	12/31/85	164,870.45
	12/31/86	123,652.82
	12/31/87	82,435.19
	12/31/88	41,217.56

G. A. Schmitz

GAS:ps

570.01

April 11, 1975

"ATTACHMENTS NOT INCLUDED"

Mr. R. W. Bostian

Attn: Mr. T. K. Anderson

002

MS 570.01

RE: Marshall 3-4
Sale of Fly Ash
Amax Fly Ash Corporation
Justification of Cost Overrun
File: M 75-C

Please refer to our letter dated July 29, 1974, covering the cost estimate for the referenced job. As you know, the cost of this project was originally estimated to be $15,000 and it was for this amount that the initial work order (#11629) was written. A revised cost estimate totaling $491,206 was made and submitted to Steam on July 29, 1974. This estimate increased the cost of the project by $476,206 over the original $15,000 estimate. A supplemental work order for this additional cost was never written.

Enclosed for your review is a comparison of the actual cost as of January 1, 1975, to the estimated cost of July 29. This comparison shows that the actual cost overruns the July 29 estimate by the amount of $177,634.89 and points out the areas where overruns occurred. Since the only work order written for this project was for the amount of $15,000, the total overrun in the cost of this project amounts to $653,840.89. We request that you review the enclosed data and write a supplemental work order in the amount of $653,840.89 to cover this overrun.

Please contact us if you have any questions or need additional information.

L. C. Dail, Chief Engineer
Civil/Environmental Division

By: I. W. Pearce, Principal Engineer

IWP/JAL/gc

4/11/75

Enclosure

cc: J. A. Lee
H. L. Huggett

009 378261

MS 570-01 081575

MARSHALL 3-4

Sale of Fly Ash

	July 29 Cost Estimate			Actual Cost	Overrun
	Amax	Precipitator	Total		
Company Labor	$ 50,000	$ 10,000	$ 60,000	$ 89,846.64	$ 29,846.64
Outside Contract Work					
Ash Bridge Fnda and Conduit MH's	$ 8,280	--			
Sewer and Pipe MH's	$ 4,700	--			
Upgrading 32 hoppers and assoc. piping for 230°F	$ 20,000	$140,000			
Nuvalo Pipe Contract UCCS	$ 52,968	--			
Ash Pipe Bridge (Struct. Steel) MAT	$ 44,063	--			
CT Main (Design Services)	$ 30,000	--			
Total	$160,011	$140,000	$300,011	$391,993.56	$ 91,982.56
Material					
Electrical	$ 42,000	$ 40,000			
Rebars (Mill Power Supply Co.)	$ 540	--			
Total	$ 42,540	$ 40,000	$ 82,540	$155,469.57	$ 72,929.57
Engineering					
Electrical	$ 1,830	$ 1,170			
Civil	$ 1,000	--			
Total	$ 2,830	$ 1,170	$ 4,000	$ 11,096.12	$ 7,096.12
Contingencies	$ 25,538	$ 19,117	$ 44,655	--	$-44,655.00
Funds in construction	--	--	--	$ 20,435.00	$ 20,435.00
Total	$280,919	$210,287	$491,206	$668,840.89	$177,634.89*

* Note: W.O. #11629 was written for $15,000
Total Overrun amounts to $653,840.89

FORM 201

DUKE POWER COMPANY

SPECIAL WORK ORDER REQUEST

MS 570-01

ADVANCE [ ] REGULAR [X] SUPPLEMENTAL [ ] (Show Detail)

PROJECT: Amax Fly Ash Corporation Project
LOCATION: Marshall Steam Station, Terrell, N. C.

EST. NET PROJECT COST $ 15,000.00

ST. NO.	PROJECT NO.	DEPT. OR DIST.	COUNTY	APPROVED TO DATE
		Steam Prod.	Catawba	$

DESCRIPTION: The company has signed an agreement with Amax Fly Ash Corporation under which Amax will build fly ash storage, classification, load out and truck weighing facilities at Marshall Steam Station. This work order request covers the tie-in of units 3 and 4 ash system to the Amax facility and the supply of necessary power, water and sewage services. Although no funds for this project were included in the 1973 Marshall Capital Budget, funds are available in the Steam Production Department Contingent Budget.

	LISTING OF WORK TASKS	BUDGET CLASS	TO BE CLOSED BY	(a) ESTIMATED CONSTRUCTION COSTS*	(b) SALVAGE LESS COST OF REMOVAL*	LOC. NO. - W.O. NO.
1	x Fly Ash Project			$15,000.00	-	2210-11629-312
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
	* ATTACH SUPPORTING DETAIL		TOTALS	$15,000.00	$ -	

ESTIMATED NET COST ($a \pm b$) $ 15,000.00

EST. COST OF ENVIRONMENTAL CONTROL IN (a) $15,000.00

INCLUDED IN BUDGET YES __ NO X YEAR(S) ______

EST. ANNUAL ADDITIONAL REVENUE $

EST. NET COST / EST. ANNUAL ADDITIONAL REVENUE =

PREPARED BY R. W. Bostian DATE 10-8-73

PROJECT SCHEDULED COMPLETION DATE

INSERVICE DATE APPROVED & COMPLETED BY

CLOSED AND FILED BY DATE

APPROVALS		DATE
DISTRICT MANAGER		
DEPARTMENT MANAGER	[signature]	10/5/73
VICE PRESIDENT		
SENIOR VICE PRESIDENT	[signature]	10/15/73
EXECUTIVE COMMITTEE		

Duke Energy Carolinas, LLC’s
Late-Filed Exhibit No. 16

Docket No. E-7, Sub 1214

Narrative response to DEC Late-Filed Exhibit No. 16:

Please see response to DEC Late-Filed Exhibit No. 9.

Duke Energy Carolinas, LLC's
Late-Filed Exhibit No. 17

Docket No. E-7, Sub 1214

Narrative Response:

The Company has not been able to locate any documents prior to 2007 comparable in purpose and use to DEC's May 29, 2007 Duke Energy Environmental Management Program for Coal Combustion Products for Duke Energy Carolinas.

Duke Energy Carolinas, LLC’s
Late-Filed Exhibit No. 19

Docket No. E-7, Sub 1214

Narrative Response:

The Company has no documents directly comparable to Progress Energy's November 1, 2004 L. V. Sutton Long Term Ash Strategy Study Phase Report (AGO Wells Cross-Exam Exhibit 3, Docket No. E-2, Sub 1142).

However, the documents that focused on ash strategy have been provided in the response to Duke Energy Carolinas, LLC's response to Late-Filed Exhibit No. 8.

Duke Energy Carolinas, LLC’s
Late-Filed Exhibit No. 21

Docket No. E-7, Sub 1214

Narrative Response:

Please see Duke Energy Carolinas, LLC’s response to Late-Filed Exhibit No. 9.

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing *Late-Filed Exhibit Nos. 8, 9, 16, 17, 19 and 21* as filed in Docket No. E-7, Sub 1214 were served via electronic delivery or mailed, first-class, postage prepaid, upon all parties of record.

This, the 2nd day of November, 2020.

/s/Mary Lynne Grigg
Mary Lynne Grigg
McGuireWoods LLP
501 Fayetteville Street, Suite 500
PO Box 27507 (27611)
Raleigh, North Carolina 27601
Telephone: (919) 755-6573
mgrigg@mcguirewoods.com

Attorney for Duke Energy Carolinas, LLC