

**KINGSTON FOSSIL PLANT
OPTION 3 - DRY ASH IN POND & GYPSUM IN POND
(WITH BUFFER OPTION)**

Project name KIFA050908FLY&BOTTM ASH

Engineer DAN SMITH

Estimator C. L. Tony

Labor rate table KIF 40 2004

Equipment rate table TVA Equipment

Project
Plant
Estimate #
PCN #
Requesting Engr
Option
Revision
Phase
Estimate Type
Estimate Accuracy
Est. Issue Date
Funding Type
Unit

Ash
KIF
0509308
KIF530
Dan Smith
8
0
2
Preliminary
+/- 20%
12/20/2004
Capital
N

All cost are based in 2005 dollars. Additional notes are as follow;

- (1) Closure costs not included.
- (2) Bottom ash columns are subject to change with final design.
- (3) Engineering (inc: TVA oversight, subcontracts, and geotechnical investigation) - Assumes 10% of construction cost.
- (4) Assuming a disposal rate of 475,600 cy annually (including bottom and fly ash) & gypsum/ash generating 327,360 cy annually.
- (5) Single phase power is assumed for pump installed for dredge cell average retrofit. 3-phase power is assumed not to be required.

Report format

Sorted by 'Location/Activity'
'Detail' summary

Location	Activity	Description	Takeoff Quantity	Unit	Productivity	Labor Quantity	Labor Amount	Material Amount	Sub Amount	Equip. Amount	Date Acquired	Total Cost/Unit	Total Amount	
01	Erosion Control/S P	Erect Silt Fence	1,000.00 lf	lf	0.089	88.57	1,994	502	317	-	-	2.81	2,813	
		Staples (Nonover)	4,300.00 sy	sy	0.016	68.80	1,963	5,772	175	-	-	1.84	7,311	
		D50 9' Riprap	5,210.00 ln	ln	0.320	1,689.80	49,667	59,037	26,865	-	-	24.65	129,568	
		3" Stone, 1" Thick To Prevent Erosion (Assume 105 pcf)	2,004.00 ln	ln	0.096	192.38	6,096	19,190	3,066	-	-	13.63	27,312	
		Sig 1.8 CMP Mill Spilway (19' of 48" Dia Reer Stand Pipe @ 128 FLEs)	4.00 ea	ea	166.084	664.33	20,450	20,198	2,795	-	-	10,860.64	43,443	
		Cut (Excavation For Placement Of 48" Dia Half-Round Pipe) 43 bcy	52.00 cy	cy	0.400	20.80	599	804	177	-	-	14.91	716	
		Fill With 1032 Compacted/Crushed Stone	93.00 ln	ln	0.490	37.20	1,107	804	599	-	-	26.99	2,510	
		30" Diameter CMP Culvert	1,000.00 lf	lf	0.600	600.00	17,487	26,442	3,682	-	-	47.61	47,611	
		Bedding For 30" CMP, 6" Thick	135.00 ln	ln	0.500	87.50	1,943	1,284	230	-	-	25.61	3,457	
		30" Diameter CMP Stand Pipe (SP) @ 6 Slagets w/30" Per Slagets	720.00 lf	lf	0.750	540.00	16,623	10,138	2,719	-	-	52.70	37,840	
02	Seed/Mulch	D50 9' Riprap Outlet For Metal Spilway	53.00 ln	ln	0.320	16.68	505	273	-	-	-	1.37	1,317	
		Galvanized Corrugated Metal Anti-Seep Collar	16.00 ea	ea	16.000	256.00	7,461	4,882	1,371	-	-	869.39	13,914	
		Erosion Control/S P	4,201.35 hrs	hrs	125.853	4,201.35	125,853	150,697	42,029	-	-	318.669	318,669	
		Seed/Mulch Disturbed Areas	28.00 ac	ac	-	-	-	-	-	64,619	-	-	2,465.34	64,619
		Seed/Mulch	-	hrs	-	-	-	-	-	64,619	-	-	64,619	64,619
		1032 Crushed Stone Base, 6" Depth	3,520.00 ln	ln	0.120	422.40	13,739	31,950	4,147	-	-	14.16	49,836	
		South Access Road	422.40 hrs	hrs	-	-	-	-	-	-	-	-	4,147	49,836
		Perimeter Road	6,885.00 ln	ln	0.120	826.20	26,872	62,493	8,112	-	-	14.16	97,478	
		Dig Cell#1 Opr Cost	1.00 lot	lot	1,000.000	4,978.25	10,303.210	3,333	7,312.047	-	-	0.00	0	
		03	Ph. 2 Base Construct	W6 Dp. And Stack Bottom Ash Only	678,848.00 sy	sy	375.000	1,810.26	531,659	1,284,903	2,655	-	-	1,796.263
Disposal Life (Assume Dike & Dredge Ash)	12.90 yr			yr	-	-	-	-	-	-	-	-	0.00	0
Hair Distance (Round Trip)	0.50 mile			mile	-	-	-	-	-	-	-	-	0.00	0
Dig Cell#1 Opr Cost	372,915.76 hrs			hrs	-	-	-	-	-	8,576,950	-	-	20,011,819	20,011,819
Base Layers	1.00 lot			lot	1,300.000	700.43	1,696.157	-	-	-	-	-	0.00	0
Compacted Fly Ash Base (Fill)	281,111.00 sy			sy	1,300.000	216.23	365,447	365,447	4,090	-	-	0.05	12,377	
Proofroll Subgrade	242,407.00 sy			sy	1,300.000	186.47	451,549	-	-	-	-	3.42	828,153	
2.5" Thick Bottom Ash Layer	48,481.00 sy			sy	1,300.000	37.29	90,309	-	-	-	-	3.42	165,539	
18" Dia Course Bottom Ash Drain Columns (hard 2 miles, 1.00 bcy)	281,111.00 sy			sy	1,400.000	200.70	117,943	-	-	-	-	20.54	347,537	
Bottom Ash Dike Fill	163,614.00 sy			sy	1,300.000	125.95	394,775	-	-	-	-	0.94	190,712	
04	Ph. 2 Base Construct	1.0" Layer Of Bottom Ash	280,995.00 sy	sy	1,300.000	74.95	180,672	-	-	-	3.42	568,966		
		Geosynthetic Clay Liner	41,400.00 lf	lf	0.028	2,963.11	19,286	699,908	150,642	-	-	3.21	331,262	
		Trenching For The Drain System (4" Dia Underdrains), 1.532 bcy	1,840.00 sy	sy	0.200	368.00	79,094	64,997	12,330	-	-	3.76	953,954	
		Strip Existing 1" Soil Cover (Phase 1 Expansion), 19,133 bcy	22,960.00 sy	sy	800.000	287.00	14,129	-	-	-	-	7.46	156,401	
		Anchor Trench Fill & Compact	1,977.00 sy	sy	0.200	414.60	11,935	-	-	-	-	1.27	29,659	
		2.0" Thick Bottom Ash Blanket Drain	39,111.00 sy	sy	1,300.000	30.09	36,428	-	-	-	-	8.31	17,221	
		Geomembrane	19,656.00 sy	sy	3,000.000	15.04	30,328	-	-	-	-	17.13	33,763	
		Perforated Pipe ADS Drain Tube, 6" Diameter	88,667.00 sy	sy	0.500	2,933.35	83,682	131,282	30,328	-	-	3.42	133,618	
		Geotextile For Underdrain	7,850.00 lf	lf	0.200	1,570.00	42,849	7,480	7,480	-	-	3.42	66,811	
		05	Ph. 2 Base Construct	#67 Stone For Outlet Pipe Bedding (135 pcf)	6,542.00 sy	sy	0.021	134.57	3,839	13,247	468	-	-	7.96
Solid Outlet Pipe ADS Drain 6" Diameter	1,990.00 lf			lf	0.190	238.50	6,665	14,342	468	-	-	2.68	17,643	
#67 Stone For Outlet Pipe Bedding (135 pcf)	397.00 ln			ln	0.200	392.60	10,715	3,249	2,027	-	-	14.67	20,325	
6" Dia Non-Per HDPE Corrugated Tubing Lateral Outlet Pipes (E.L. 760)	486.00 ln			ln	0.190	59.55	1,714	3,693	1,667	-	-	7.96	15,631	
1081 Crushed Stone, Bedding 6" Depth	16.00 ln			ln	0.200	8.00	230	784	406	-	-	7.96	3,922	
6" Dia Perforated HDPE Drain (E.L. 760)	2,400.00 lf			lf	0.200	480.00	13,190	3,972	27	-	-	25.61	19,111	
Geotextile Woven Mottocament	1,867.00 sy			sy	0.021	38.40	1,095	3,760	131	-	-	7.96	11,629	
1081 Crushed Stone	1,867.00 sy			sy	0.021	38.40	1,095	3,760	131	-	-	7.96	11,629	
Geotextile Woven Mottocament	1,867.00 sy			sy	0.021	38.40	1,095	3,760	131	-	-	7.96	11,629	

Location	Activity	Description	Take-off Quantity	Labor Productivity	Labor Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount	
08	Ph 2 Base Construct	Cut For Underdrain System	395.00 cy	0.200	71.20 mh	2,050	-	-	605	-	7.48	2,655	
		Backfill For Underdrain System	287.00 cy	0.250	66.75 mh	1,921	-	-	801	-	10.20	2,722	
		QA/QC For Construction Of Disposal Facility	1.00 ls	-	-	-	-	-	-	50,000	-	50,000.00	50,000.00
		Ph 2 Base Construct	1.00 ls	-	-	-	-	-	-	50,000	-	746,424	8,079,211
09	Temp Slope Protect	Cut For Ditch (5.815 boy)	6,978.00 cy	1,200.000	5.82 cd	10,951	-	-	12,041	-	3.30	23,022	
		D50 9" Riprap	4,239.00 in	0.320	1,356.48 mh	40,371	-	-	21,837	-	24.85	105,319	
		Seed Ditch	6,978.00 sy	-	-	-	-	-	3,593	-	0.51	3,593	
		Temp Slope Protect	6,978.00 sy	0.012	93.74 mh	2,389	5,464	-	427	-	-	1.19	8,280
10	Riprap Stilling Basin	Riprap D50 Size 9"	2,344.00 in	0.320	750.08 mh	22,324	-	-	12,075	-	24.85	58,237	
		Cut For Basin (3.582 boy)	4,300.00 cy	1,200.000	3.58 cd	6,767	-	-	7,420	-	3.30	14,186	
		Riprap Stilling Basin	4,300.00 cy	-	-	29,091	23,838	-	19,495	-	-	72,424	
		Riprap Stilling Basin	4,300.00 cy	-	-	29,091	23,838	-	19,495	-	-	72,424	
11	Ph 2 Initial Constr	Wet Sluice Sedimented Gypsum Quantities	451,295.00 cy	-	-	-	-	-	-	-	0.00	0	
		Initial Cons. Disposal Life	1.40 yrs	-	-	-	-	-	-	-	-	0.00	0
		Perforated Pipe ADS Drain Tube, 6" Diameter	7,370.00 lf	0.200	1,474.00 mh	40,229	12,199	-	6,228	-	-	7.96	58,686
		Geotextile For Underdrain	6,142.00 sy	0.021	128.34 mh	3,604	12,437	-	4,300	-	-	2.68	16,471
12	Ph 2 Operational Cost	#57 Slope For Underdrain	1,492.00 in	0.150	223.80 mh	6,442	13,542	-	1,902	-	-	14.67	21,887
		Solid Outlet Pipe ADS Drain 6" Diameter	1,658.00 lf	0.200	331.60 mh	9,050	2,744	-	1,408	-	-	7.96	13,202
		#57 Slope For Outlet pipe Bedding (135 pct)	338.00 in	0.150	50.40 mh	1,451	3,050	-	428	-	-	14.67	4,929
		Ph 2 Initial Constr	10	-	-	60,777	43,972	-	10,427	-	-	115,175	
13	Ph 2 Operational Cost	Cut (111.889 boy)	134,279.00 cy	375.000	358.08 cd	105,164	-	-	250,203	-	2.65	355,368	
		Rim Ditches	134,279.00 cy	-	-	105,164	-	-	250,203	-	-	355,368	
		Wet Sluice Gypsum Quantities	1,509,673.00 cy	-	-	-	-	-	-	-	-	0.00	0
		Wet Sluice Gypsum Dike Fill	285,189.00 cy	375.000	680.50 cd	199,859	-	-	475,496	-	-	2.65	675,354
14	Ph 3 Initial Constr	Stage 1 (3 To 1 Side Slopes)	1.00 lot	-	-	-	-	-	-	-	0.00	0	
		Wet Sluice Gypsum Quantities	4.90 yrs	-	-	-	-	-	-	-	-	0.00	0
		Perforated Pipe ADS Drain Tube, 6" Diameter	11,495.00 lf	0.200	2,299.00 mh	62,746	18,026	-	9,751	-	-	7.96	81,533
		Geotextile For Underdrain	9,579.00 sy	0.021	197.04 mh	5,621	19,386	-	6,701	-	-	2.68	25,687
15	Ph 2 Operational Cost	#57 Slope For Outlet pipe Bedding (135 pct)	2,325.00 in	0.150	349.20 mh	10,932	21,151	-	2,968	-	-	14.67	34,151
		Solid Outlet Pipe ADS Drain 6" Diameter	2,585.00 lf	0.200	517.20 mh	14,116	4,280	-	2,196	-	-	7.96	20,592
		#57 Slope For Outlet pipe Bedding (135 pct)	524.00 in	0.150	78.60 mh	2,283	4,756	-	688	-	-	14.67	7,887
		Ph 2 Operational Cost	12	-	-	294,698	68,599	-	491,759	-	-	855,005	
16	Ph 2 Operational Cost	Stage 2 (3 To 1 Side Slopes)	1.00 lot	-	-	-	-	-	-	-	0.00	0	
		Wet Sluice Gypsum Quantities	5.40 yrs	-	-	-	-	-	-	-	-	0.00	0
		Perforated Pipe ADS Drain Tube, 6" Diameter	11,965.00 lf	0.200	2,373.00 mh	64,765	19,639	-	10,075	-	-	7.96	94,479
		Geotextile For Underdrain	9,895.00 sy	0.021	203.40 mh	5,802	20,022	-	6,921	-	-	2.68	26,516
17	Ph 2 Operational Cost	#57 Slope For Outlet pipe Bedding (135 pct)	2,403.00 in	0.150	360.45 mh	10,376	21,811	-	3,064	-	-	14.67	35,251
		Solid Outlet Pipe ADS Drain 6" Diameter	2,670.00 lf	0.200	534.00 mh	14,574	4,419	-	2,267	-	-	7.96	21,261
		#57 Slope For Outlet Pipe Bedding (135 pct)	541.00 in	0.150	81.15 mh	2,336	4,911	-	680	-	-	14.67	7,938
		Ph 2 Operational Cost	13	-	-	304,146	70,801	-	507,589	-	-	882,536	
18	Ph 3 Initial Constr	Dry Stack Ash Quantities	677,412.00 cy	1,100.000	615.93 cd	1,348,771	-	-	904,530	-	3.33	2,253,301	
		Initial Construction Disposal Life (Assume Dry Ash Stack)	1.40 yrs	-	-	-	-	-	-	-	-	0.00	0
		Wet Sluice Gypsum Quantities	1,509,673.00 cy	-	-	-	-	-	-	-	-	0.00	0
		Wet Sluice Gypsum Dike Fill	285,189.00 cy	375.000	702.41 cd	206,292	-	-	490,801	-	-	2.65	697,093

Location	Activity	Description	Takeoff Quantity	Labor Productivity	Labor Quantity	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
15	Ph 3 Operational Cost	14	44,339.70 hrs	1,348,771	904,530	2,253,301	0	0	0	0	2,253,301	2,253,301
	Stage 1 (3 To 1 Side Slopes)	Dry Stack Ash Quantities	1,349,180.00 cy	1,100,000	1,348,771	0	0	0	0	0	0	0
	Stage 1 Disposal Life (Assume Dry Stack Area)	Haul Distance (Round Trip)	2.80 yrs									
	Ph 3 Operational Cost		0.50 mile									
16	Ph 2 Operational Cost	15	88,309.96 hrs	2,686,305	1,801,523	4,487,828	0	0	0	0	4,487,828	4,487,828
	Stage 2 (3 To 1 Side Slopes)	Dry Stack Ash Quantities	1,504,825.00 cy	1,100,000	1,504,825	0	0	0	0	0	0	0
	Stage 2 Disposal Life (Assume Dry Stack)	Haul Distance (Round Trip)	3.20 yrs									
	Ph 3 Operational Cost		0.50 mile									
17	Ph 2 Operational Cost	16	98,497.64 hrs	2,996,204	2,009,352	5,005,556	0	0	0	0	5,005,556	5,005,556
	Wet/Cast Gypsum Dike Fill		227,106.00 cy	375,000	177,865	0	0	0	0	0	0	0
	Wet Sluice Gypsum Quantities		1,344,916.00 cy									
	Stage 3 Disposal Life (Assume Dike & Sluice Gypsum)		4.80 yrs									
	Perforated Pipe ADS Drain Tube 6" Diameter		10,230.00 lf	0.200	56,841	16,932	0	0	0	0	0	0
	Geotextile For Underdrain		6,925.00 sf	0.021	17,282	17,282	0	0	0	0	0	0
	#7 Stone For Outlet Pipe Bedding (1.5' pd)		2,072.00 lf	0.150	8,947	18,807	0	0	0	0	0	0
	Solid Outlet Pipe ADS Drain 6" Diameter		2,302.00 lf	0.200	4,604	9,208	0	0	0	0	0	0
	#7 Stone For Outlet Pipe Bedding (1.5' pd)		466.00 lf	0.150	69.90	139.80	0	0	0	0	0	0
	Ph 2 Operational Cost											
18	Ph 3 Operational Cost	17	87,328.74 hrs	2,656,457	1,781,506	4,437,963	0	0	0	0	4,437,963	4,437,963
	Stage 3 (3 To 1 Side Slopes)	Dry Stack Ash Quantities	1,334,183.00 cy	1,100,000	1,334,183	0	0	0	0	0	0	0
	Stage 3 Disposal Life (Assume Dry Stack Area)	Haul Distance (Round Trip)	2.80 yrs									
	Ph 3 Operational Cost		0.50 mile									
19	Ph 2 Operational Cost	18	87,328.74 hrs	2,656,457	1,781,506	4,437,963	0	0	0	0	4,437,963	4,437,963
	Stage 4 (3 To 1 Side Slopes)	Dry Stack Ash Quantities	1,882,831.00 cy	375,000	132,225	0	0	0	0	0	0	0
	Wet/Cast Gypsum Dike Fill		702,654.00 cy									
	Wet Sluice Gypsum Quantities		2.70 yrs									
	Stage 4 Disposal Life (Assume Dike & Sluice Ash & Gypsum)											
	Perforated Pipe ADS Drain Tube 6" Diameter		7,605.00 lf	0.200	41,572	12,588	0	0	0	0	0	0
	Geotextile For Underdrain		6,338.00 sf	0.021	37,191	37,191	0	0	0	0	0	0
	#7 Stone For Outlet Pipe Bedding (1.5' pd)		1,540.00 lf	0.150	6,650	13,300	0	0	0	0	0	0
	Solid Outlet Pipe ADS Drain 6" Diameter		1,711.00 lf	0.200	3,422	6,844	0	0	0	0	0	0
	#7 Stone For Outlet Pipe Bedding (1.5' pd)		347.00 lf	0.150	52.05	104.10	0	0	0	0	0	0
	Ph 2 Operational Cost											
20	Ph 3 Operational Cost	19	37,807.40 hrs	1,150,065	771,271	1,921,336	0	0	0	0	1,921,336	1,921,336
	Stage 4 (3 To 1 Side Slopes)	Dry Stack Ash Quantities	577,613.00 cy	1,100,000	577,613	0	0	0	0	0	0	0
	Stage 4 Disposal Life (Assume Dike & Dry Stack Ash)	Haul Distance (Round Trip)	1.20 yrs									
	Ph 3 Operational Cost											
25	Dry Fly Ash Convey	25	hrs			25,675,000	0	0	0	0	25,675,000	25,675,000
	Dry Fly Ash Conversion Capital Cost		1.00 ls			25,675,000	0	0	0	0	25,675,000	25,675,000
	Dry Fly Ash Convey		hrs			25,675,000	0	0	0	0	25,675,000	25,675,000
			hrs			25,675,000	0	0	0	0	25,675,000	25,675,000

Location	Activity	Description	Take-off Quantity	Labor Productivity	Labor Quantity	Labor Amount	Material Amount	Sub Amount	Equip. Amount	Other Amount	Total Cost/Unit	Total Amount
	Construct Facilities	Mobilize, Drag Test, Misc Other, & Demobilize	1.00 ls	8,635.19	8,635.19 mth	267,000	-	-	143,900	0	410,900.00	410,900
	Construct Facilities	Construct Facilities			8,635.19 hrs	267,000			143,900			410,900
ZNON MANUAL		XCONST FACILITY			8,635.19 hrs	267,000			143,900			410,900
	Non-Manual	Non Manual	1.00 ls	16,385.78	16,385.78 mth	819,289	-	-	-	-	819,289.00	819,289
	Non-Manual	Non-Manual			16,385.78 hrs	819,289						819,289
		ZNON MANUAL			16,385.78 hrs	819,289						819,289

