



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
Volume 1 – Summary Report
September 29, 2010

EXHIBIT 1-2 Capital Cost Estimate Outline



EXHIBIT 1-2

CAPITAL COST ESTIMATE OUTLINE

DIRECT COSTS

PROJECT DIRECT COSTS					
ACCT	COST ESTIMATE CATEGORY	EQUIPMENT/MATERIAL COST RESPONSIBILITY	CONSTRUCTION/ERECTION COST RESPONSIBILITY	ESTIMATE BASIS	NOTES
1.0	ID FANS	S&L	S&L	Previous OEM proposals and S&L Estimates	1
2.0	WET ESP	S&L	S&L	Previous OEM proposals and S&L Estimates	
3.0	NEW STACK	AEP	AEP	Previous AEP Projects	
4.0	LIMESTONE HANDLING SYSTEM	S&L	S&L	Previous OEM proposals and S&L Estimates	
5.0	REAGENT PREPARATION ISLAND	S&L	S&L	Previous OEM proposals and S&L Estimates	
6.0	BYPRODUCT DEWATERING ISLAND	S&L	S&L	Previous OEM proposals and S&L Estimate	
7.0	ABSORBER ISLAND	S&L	S&L	Previous OEM proposals and S&L Estimates	1, 2
8.0	FGD WASTE WATER TREATMENT PLANT	S&L	S&L	Previous OEM proposals and S&L Projects	
9.0	COMPRESSED AIR SYSTEM	S&L	S&L	Past & Current S&L Projects	
10.0	SERVICE WATER SYSTEM	S&L	S&L	Past & Current S&L Projects	
11.0	POTABLE WATER SYSTEM	S&L	S&L	Past & Current S&L Projects	

EXHIBIT 1-2

CAPITAL COST ESTIMATE OUTLINE

DIRECT COSTS

PROJECT DIRECT COSTS					
ACCT	COST ESTIMATE CATEGORY	EQUIPMENT/MATERIAL COST RESPONSIBILITY	CONSTRUCTION/ERECTION COST RESPONSIBILITY	ESTIMATE BASIS	NOTES
12.0	FGD SUBSTATION	S&L	S&L	Past & Current S&L Projects	
13.0	FGD DCS SYSTEM	S&L	S&L	Past S&L Projects Adjusted to Meet AEP Design Criteria	
14.0	CEM SYSTEM	AEP	AEP	Previous AEP Projects	
15.0	RAIL INFRASTRUCTURE	S&L	S&L	Past & Current S&L Projects	
16.0	SITE IMPROVEMENTS - CIVIL WORK	S&L	S&L	Past & Current S&L Projects	
17.0	BOP ITEMS	S&L	S&L	Past & Current S&L Projects	
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	S&L	S&L	Site Plans	
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	AEP	AEP	Previous AEP Projects	

Notes: 1) Noise Mitigation costs were considered for ID fan insulation and lagging and blower bldg construction.
2) Ductwork costs are based upon general arrangement layouts.

[illegible]



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EXHIBIT 1-6.1
Capital Cost Estimate Summary
Wet FGD Base Case

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
16.2	ROADS & SURFACING		\$ -	\$ 605,100	\$ 833,500	\$ 1,438,600
16.3	LIMESTONE HANDLING & STORAGE		\$ -	\$ 340,100	\$ 541,700	\$ 881,800
16.4	GYPSUM HANDLING & STORAGE		\$ -	\$ 1,147,200	\$ 1,784,100	\$ 2,931,300
16.5	GYPSUM RUNOFF POND		\$ 60,000	\$ 110,400	\$ 312,600	\$ 483,000
16.6	BYPRODUCT POND PUMP STRUCTURE - CONCRETE		\$ -	\$ 47,000	\$ 105,400	\$ 152,400
16.7	NEW CONCRETE ENCASEMENT	8' X 4' X 40' - FOR EXISTING ASH PIPE HAUL ROAD CROSSING	\$ -	\$ 15,200	\$ 33,500	\$ 48,700
16.8	TRUCK WASH AREA		\$ -	\$ 47,300	\$ 83,100	\$ 130,400
16.9	TRUCK SCALE & CONCRETE APPROACH		\$ 170,000	\$ 27,300	\$ 92,000	\$ 289,300
16.10	STORMWATER DRAINAGE TRENCH	2' W X 3' DEEP CAST-IN-PLACE CONCRETE TRENCH W/REINFORCING & HS-20 RATED GRATE COVERS	\$ -	\$ 472,500	\$ 480,800	\$ 953,300
16.11	STORMWATER RUNOFF POND		\$ -	\$ 15,000	\$ 122,600	\$ 137,600
16.12	STORM WATER POND PUMP STRUCTURE - CONCRETE		\$ 90,000	\$ 42,300	\$ 182,200	\$ 314,500
16.13	OILY WATER SEWER		\$ 4,500	\$ 80,600	\$ 186,100	\$ 271,200
16.14	OIL SEPARATOR	500 GPM W/ INTEGRAL LIFT STATION	\$ 100,000	\$ -	\$ 116,100	\$ 216,100
16.15	SANITARY SEWER		\$ -	\$ 22,200	\$ 96,900	\$ 119,100
16.16	 SANITARY LIFT STATION	PACKAGED TYPE COMPLETE WITH PUMPS, 100,000 GPD	\$ 150,000	\$ -	\$ 49,200	\$ 199,200
16.17	CONSTRUCTION LAYDOWN AREA	ALLOWANCE FOR 10 ACRES, DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED	\$ -	\$ 875,000	\$ 1,035,000	\$ 1,910,000
16.18	CRAFT PARKING	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 20,000 SY INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 225,000	\$ 517,800	\$ 742,800

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
16.19	CONTRACTOR OFFICES (AREA)	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 5,000 SY AREA (TRAILERS BY CONTRACTORS) INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 56,300	\$ 129,400	\$ 185,700
16.20	NEW PERMANENT STORAGE	INCLUDES LIGHTING AND H&V. SUBCONTRACT PRICE INCLUDES ELECTRICAL AND H&V	\$ 1,700,000	\$ -	\$ -	\$ 1,700,000
16.21	FOUNDATIONS FOR THE NEW WAREHOUSE		\$ -	\$ 532,900	\$ 867,800	\$ 1,400,700
16.22	NEW TEMPORARY STORAGE	WEATHER TIGHT CANVAS ENCLOSURE. INCLUDES LIGHTING AND H&V. SUBCONTRACT PRICE INCLUDES ELECTRICAL AND H&V	\$ 450,000	\$ -	\$ -	\$ 450,000
16.23	FOUNDATIONS FOR TEMPORARY STORAGE		\$ -	\$ 99,500	\$ 157,200	\$ 256,700
16.24	LABOR BUS SERVICE FROM PARKING LOT TO CONSTRUCTION AREA AND ACCESS CONTROL	ALLOWANCE FOR 36 MONTHS BASED ON 2 BUSES OPERATING CONTINUOUSLY FOR 5X10 WORKWEEK. SUBCONTRACT COST INCLUDES EQUIPMENT, MATERIAL AND LABOR	\$ 1,368,000	\$ -	\$ -	\$ 1,368,000
16.25	EROSION & SEDIMENT CONTROL		\$ -	\$ 15,800	\$ 25,900	\$ 41,700
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 4,092,500	\$ 4,776,700	\$ 8,268,900	\$ 17,138,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 204,600	\$ 1,218,100	\$ 3,169,400	\$ 4,592,100

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - WFGD BASE EST-1 - 4.5 LB/MMBTU
COST ESTIMATE SUMMARY

Estimate No.: 30708C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SITE IMPROVEMENTS - CIVIL WORK	\$ 4,297,100	\$ 5,994,800	\$ 11,438,300	\$ 21,730,200
17.0	BOP ITEMS					
17.1	PIPE INSULATION	AVERAGE 6" PIPE SIZE	\$ -	\$ 78,000	\$ 243,100	\$ 321,100
17.2	HEAT TRACING		\$ -	\$ 332,700	\$ 474,800	\$ 807,500
17.3	TOUCH UP PAINT (INCLUDES PAINTING CS PIPE)		\$ -	\$ 181,900	\$ 697,600	\$ 879,500
17.4	HOISTS & TROLLEYS		\$ 180,000	\$ 210,000	\$ 245,300	\$ 635,300
17.5	MISC AUX STEEL FOR PIPE SUPPORTS	FIELD FABRICATED	\$ -	\$ 140,000	\$ 583,500	\$ 723,500
17.6	MISC PIPE SUPPORT FOUNDATIONS		\$ -	\$ 10,500	\$ 21,000	\$ 31,500
17.7	EYE WASH STATIONS		\$ 30,000	\$ 5,000	\$ 30,700	\$ 65,700
17.8	FIRE PROTECTION FOR MISC BUILDINGS & AREAS		\$ -	\$ 420,000	\$ 343,500	\$ 763,500
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 210,000	\$ 1,378,100	\$ 2,639,500	\$ 4,227,600
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,500	\$ 351,416	\$ 1,012,192	\$ 1,374,107
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 220,500	\$ 1,729,500	\$ 3,651,700	\$ 5,601,700
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE					
18.1	RELOCATE HYDROGEN STORAGE TANK		\$ -	\$ 15,600	\$ 86,800	\$ 102,400
18.2	NEW HYDROGEN LINE TO PLANT		\$ -	\$ 62,100	\$ 150,600	\$ 212,700
18.3	RELOCATE MISC. UNDERGROUND UTILITIES	ALLOWANCE	\$ -	\$ 125,000	\$ 170,500	\$ 295,500
18.4	OUTAGE TIE-IN DUCTWORK	ALLOWANCE FOR 85 TON DUCTWORK	\$ -	\$ 276,300	\$ 527,700	\$ 804,000
18.5	RELOCATED WAREHOUSE - FOUNDATIONS		\$ -	\$ 342,600	\$ 534,900	\$ 877,500
18.6	RELOCATE EXISTING WAREHOUSE BUILDING	150' L X 75' W X 25' H	\$ -	\$ 95,600	\$ 1,121,500	\$ 1,217,100



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EXHIBIT 1-6.2
Capital Cost Estimate Summary
Dry FGD Base Case w/o ESP

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30713C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	TRUCK & RAIL INFRASTRUCTURE	\$ 223,100	\$ 2,565,500	\$ 2,863,700	\$ 5,652,300
16.0	SITE IMPROVEMENTS - CIVIL WORK					
16.1	SITE GRADING		\$ -	\$ -	\$ 538,800	\$ 538,800
16.2	ROADS & SURFACING		\$ -	\$ 918,600	\$ 1,237,000	\$ 2,155,600
16.3	NEW CONCRETE ENCASEMENT	16' X 4' X 40' - FOR EXISTING ASH PIPE HAUL ROAD CROSSING	\$ -	\$ 144,300	\$ 286,600	\$ 430,900
16.4	TRUCK WASH AREA		\$ -	\$ 47,300	\$ 83,100	\$ 130,400
16.5	TRUCK SCALE & CONCRETE APPROACH		\$ 170,000	\$ 27,300	\$ 92,000	\$ 289,300
16.6	PROCESS WATER STORAGE BASIN		\$ 60,000	\$ 110,400	\$ 312,600	\$ 483,000
16.7	PROCESS WATER STORAGE BASIN PUMP STRUCTURE - CONCRETE		\$ -	\$ 47,000	\$ 105,400	\$ 152,400
16.8	STORMWATER DRAINAGE TRENCH	2' W X 3' DEEP CAST-IN-PLACE CONCRETE TRENCH W/REINFORCING & HS-20 RATED GRATE COVERS	\$ -	\$ 499,500	\$ 508,300	\$ 1,007,800
16.9	STORMWATER RUNOFF POND		\$ -	\$ 15,000	\$ 122,600	\$ 137,600
16.10	STORM WATER POND PUMP STRUCTURE - CONCRETE		\$ 90,000	\$ 42,300	\$ 182,200	\$ 314,500
16.11	OILY WATER SEWER		\$ 4,500	\$ 105,000	\$ 223,600	\$ 333,100
16.12	OIL SEPARATOR	500 GPM W/ INTEGRAL LIFT STATION	\$ 100,000	\$ -	\$ 116,100	\$ 216,100
16.13	SANITARY SEWER		\$ -	\$ 22,200	\$ 96,900	\$ 119,100
16.14	SANITARY LIFT STATION	PACKAGED TYPE COMPLETE WITH PUMPS, 100,000 GPD	\$ 150,000	\$ -	\$ 49,200	\$ 199,200
16.15	CONSTRUCTION LAYDOWN AREA	ALLOWANCE FOR 10 ACRES, DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED	\$ -	\$ 700,000	\$ 828,000	\$ 1,528,000

Sargent & Lundy, LLC

AEP

Estimate No.: 30713C

BIG SANDY UNIT 2

Project No.: 12721-000

FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM BTU

Date: 9/29/2010

COST ESTIMATE SUMMARY

Preparer: MNO

Reviewer: JMK

Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
16.16	CRAFT PARKING	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 20,000 SY INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 180,000	\$ 414,200	\$ 594,200
16.17	CONTRACTOR OFFICES (AREA)	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 5,000 SY AREA (TRAILERS BY CONTRACTORS) INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 45,000	\$ 103,600	\$ 148,600
16.18	NEW PERMANENT STORAGE	INCLUDES LIGHTING AND H&V. SUBCONTRACT	\$ 850,000	\$ -	\$ -	\$ 850,000
16.19	FOUNDATIONS FOR THE NEW WAREHOUSE		\$ -	\$ 273,500	\$ 450,200	\$ 723,700
16.20	NEW TEMPORARY STORAGE	WEATHER TIGHT CANVAS ENCLOSURE. INCLUDES	\$ 450,000	\$ -	\$ -	\$ 450,000
16.21	FOUNDATIONS FOR TEMPORARY STORAGE		\$ -	\$ 99,500	\$ 157,200	\$ 256,700
16.22	LABOR BUS SERVICE FROM PARKING LOT TO CONSTRUCTION AREA AND ACCESS CONTROL	ALLOWANCE FOR 36 MONTHS BASED ON 2	\$ 1,368,000	\$ -	\$ -	\$ 1,368,000
16.23	EROSION & SEDIMENT CONTROL		\$ -	\$ 12,400	\$ 20,400	\$ 32,800
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 3,242,500	\$ 3,289,300	\$ 5,928,000	\$ 12,459,800

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - DRY FGD EST BASE (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30713C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 162,100	\$ 838,800	\$ 2,156,500	\$ 3,157,400
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SITE IMPROVEMENTS - CIVIL WORK	\$ 3,404,600	\$ 4,128,100	\$ 8,084,500	\$ 15,617,200
17.0	BOP ITEMS					
17.1	PIPE INSULATION	AVERAGE 6" PIPE SIZE	\$ -	\$ 34,000	\$ 106,000	\$ 140,000
17.2	HEAT TRACING		\$ -	\$ 175,600	\$ 248,500	\$ 424,100
17.3	TOUCH UP PAINT (INCLUDES PAINTING CS PIPE)		\$ -	\$ 134,400	\$ 515,600	\$ 650,000
17.4	HOISTS & TROLLEYS		\$ 180,000	\$ 210,000	\$ 245,300	\$ 635,300
17.5	MISC AUX STEEL FOR PIPE SUPPORTS	FIELD FABRICATED	\$ -	\$ 122,500	\$ 510,600	\$ 633,100
17.6	MISC PIPE SUPPORT FOUNDATIONS		\$ -	\$ 10,500	\$ 21,000	\$ 31,500
17.7	EYE WASH STATIONS		\$ 30,000	\$ 5,000	\$ 30,700	\$ 65,700
17.8	FIRE PROTECTION FOR MISC BUILDINGS & AREAS		\$ -	\$ 360,000	\$ 294,400	\$ 654,400
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 210,000	\$ 1,052,000	\$ 1,972,100	\$ 3,234,100
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 10,500	\$ 268,260	\$ 750,694	\$ 1,029,454
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 220,500	\$ 1,320,300	\$ 2,722,800	\$ 4,263,600
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE					
18.1	RELOCATE HYDROGEN STORAGE TANK		\$ -	\$ 15,600	\$ 86,800	\$ 102,400
18.2	NEW HYDROGEN LINE TO PLANT		\$ -	\$ 62,100	\$ 150,600	\$ 212,700
18.3	RELOCATE MISC. UNDERGROUND UTILITIES	ALLOWANCE	\$ -	\$ 125,000	\$ 170,500	\$ 295,500
18.4	OUTAGE TIE-IN DUCTWORK	ALLOWANCE FOR 85 TON DUCTWORK	\$ -	\$ 276,300	\$ 527,700	\$ 804,000



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EXHIBIT 1-6.4
Capital Cost Estimate Summary
NID FGD Base Case w/o ESP

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 307270
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
16.3	NEW CONCRETE ENCASEMENT	16' X 4' X 40' - FOR EXISTING ASH PIPE HAUL ROAD CROSSING	\$ -	\$ 36,500	\$ 73,000	\$ 109,500
16.4	TRUCK SCALE & CONCRETE APPROACH		\$ 170,000	\$ 27,300	\$ 92,000	\$ 289,300
16.5	PROCESS WATER STORAGE BASIN		\$ 60,000	\$ 81,600	\$ 240,300	\$ 381,900
16.6	PROCESS WATER STORAGE BASIN PUMP STRUCTURE - CONCRETE		\$ -	\$ 47,000	\$ 105,400	\$ 152,400
16.7	STORM WATER DRAINAGE TRENCH	2' W X 3' DEEP CAST-IN-PLACE CONCRETE TRENCH W/REINFORCING & HS-20 RATED GRATE COVERS	\$ -	\$ 526,500	\$ 535,800	\$ 1,062,300
16.8	STORM WATER RUNOFF POND		\$ -	\$ 15,000	\$ 122,600	\$ 137,600
16.9	STORM WATER RUNOFF POND PUMP STRUCTURE - CONCRETE		\$ 90,000	\$ 42,300	\$ 182,200	\$ 314,500
16.10	OILY WATER SEWER		\$ 4,500	\$ 112,600	\$ 236,000	\$ 353,100
16.11	OIL SEPARATOR	500 GPM W/ INTEGRAL LIFT STATION	\$ 100,000	\$ -	\$ 116,100	\$ 216,100
16.12	SANITARY SEWER		\$ -	\$ 22,200	\$ 96,900	\$ 119,100
16.13	SANITARY LIFT STATION	PACKAGED TYPE COMPLETE WITH PUMPS, 100,000 GPD	\$ 150,000	\$ -	\$ 49,200	\$ 199,200
16.14	CONSTRUCTION LAYDOWN AREA	ALLOWANCE FOR 10 ACRES, DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED	\$ -	\$ 700,000	\$ 828,000	\$ 1,528,000
16.15	CRAFT PARKING	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 20,000 SY INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 180,000	\$ 414,200	\$ 594,200

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
16.16	CONTRACTOR OFFICES (AREA)	DOES NOT INCLUDE LAND ACQUISITION, IF REQUIRED. ALLOWANCE FOR 5,000 SY AREA (TRAILERS BY CONTRACTORS) INCLUDES: 6" BASE COURSE 10 OZ/SY GEOTEXTILE 12" SUBGRADE PREP	\$ -	\$ 45,000	\$ 103,600	\$ 148,600
16.17	TRUCK WASH AREA		\$ -	\$ 47,300	\$ 83,100	\$ 130,400
16.18	NEW PERMANENT STORAGE	INCLUDES LIGHTING AND H&V. SUBCONTRACT PRICE INCLUDES ELECTRICAL AND H&V	\$ 850,000	\$ -	\$ -	\$ 850,000
16.19	FOUNDATIONS FOR THE NEW WAREHOUSE		\$ -	\$ 273,500	\$ 450,200	\$ 723,700
16.20	NEW TEMPORARY STORAGE	WEATHER TIGHT CANVAS ENCLOSURE. INCLUDES LIGHTING AND H&V. SUBCONTRACT PRICE INCLUDES ELECTRICAL AND H&V	\$ 450,000	\$ -	\$ -	\$ 450,000
16.21	FOUNDATIONS FOR TEMPORARY STORAGE		\$ -	\$ 99,500	\$ 157,200	\$ 256,700
16.22	LABOR BUS SERVICE FROM PARKING LOT TO CONSTRUCTION AREA AND ACCESS CONTROL	ALLOWANCE FOR 36 MONTHS BASED ON 2 BUSES OPERATING CONTINUOUSLY FOR 5X10 WORKWEEK. SUBCONTRACT COST INCLUDES EQUIPMENT, MATERIAL AND LABOR	\$ 1,368,000	\$ -	\$ -	\$ 1,368,000
16.23	EROSION & SEDIMENT CONTROL	0	\$ -	\$ 12,500	\$ 20,500	\$ 33,000

Sargent & Lundy, LLC

AEP
BIG SANDY UNIT 2
FGD PROJECT - NID BASE EST (N/ESP)-1B - 3.0 LB/MM BTU
COST ESTIMATE SUMMARY

Estimate No.: 30727C
Project No.: 12721-000
Date: 9/29/2010
Preparer: MNO
Reviewer: JMK
Approver: PEF

Account No.	Item Description	Scope Definition	Total Equipment Cost	Total Material Cost	Total Construction & Erection Cost	Total Projected Cost
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 3,242,500	\$ 3,473,700	\$ 6,129,000	\$ 12,845,200
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 162,100	\$ 885,800	\$ 2,226,600	\$ 3,274,500
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SITE IMPROVEMENTS - CIVIL WORK	\$ 3,404,600	\$ 4,359,500	\$ 8,355,600	\$ 16,119,700
17.0	BOP ITEMS					
17.1	PIPE INSULATION	AVERAGE 6" PIPE SIZE	\$ -	\$ 34,000	\$ 106,000	\$ 140,000
17.2	HEAT TRACING		\$ -	\$ 175,600	\$ 248,500	\$ 424,100
17.3	TOUCH UP PAINT (INCLUDES PAINTING CS PIPE)		\$ -	\$ 176,700	\$ 677,900	\$ 854,600
17.4	HOISTS & TROLLEYS		\$ 150,000	\$ 175,000	\$ 204,400	\$ 529,400
17.5	MISC AUX STEEL FOR PIPE SUPPORTS	FIELD FABRICATED	\$ -	\$ 122,500	\$ 510,600	\$ 633,100
17.6	MISC PIPE SUPPORT FOUNDATIONS		\$ -	\$ 10,500	\$ 21,000	\$ 31,500
17.7	EYE WASH STATIONS	WITH 50 KW HEATERS	\$ 30,000	\$ 5,000	\$ 30,700	\$ 65,700
17.8	FIRE PROTECTION FOR MISC BUILDINGS & AREAS	STAND PIPE FOR BUILDINGS	\$ -	\$ 300,000	\$ 245,300	\$ 545,300
90.0	SUBTOTAL - EQUIPMENT, MATERIAL AND LABOR COSTS		\$ 180,000	\$ 999,300	\$ 2,044,400	\$ 3,223,700
	SUBTOTAL - OTHER DIRECT & CONSTRUCTION INDIRECT COSTS		\$ 9,000	\$ 254,822	\$ 786,346	\$ 1,050,167
	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	BOP ITEMS	\$ 189,000	\$ 1,254,100	\$ 2,830,700	\$ 4,273,900
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE					
18.1	RELOCATE HYDROGEN STORAGE TANK		\$ -	\$ 15,600	\$ 86,800	\$ 102,400
18.2	NEW HYDROGEN LINE TO PLANT		\$ -	\$ 62,100	\$ 150,600	\$ 212,700
18.3	RELOCATE MISC. UNDERGROUND UTILITIES	ALLOWANCE	\$ -	\$ 125,000	\$ 170,500	\$ 295,500



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WFGD, DFGD, IAQCS & NID Technologies
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EXHIBIT 1-9

DFGD Technology Comparison

EXHIBIT 1-9 DFGD TECHNOLOGY COMPARISON

DFGD		Estimate 1A ESP 3.0 lb SO ₂ /Mmbtu	Estimate 1B ESP 1.7 lb SO ₂ /Mmbtu	Estimate 2A N/ESP 3.0 lb SO ₂ /Mmbtu	Estimate 2B N/ESP 1.7 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
1.0	ID FANS	\$ 39,266,900	\$ 39,266,900	\$ 39,795,200	\$ 39,795,200	The ID Fans without the ESP are larger (i.e. cost more) because they replace the existing Booster Fans.
2.0	FABRIC FILTERS	\$ 50,644,800	\$ 50,854,400	\$ 51,406,500	\$ 51,747,900	
3.0	NEW STACK	\$ 22,252,500	\$ 22,252,500	\$ 22,252,500	\$ 22,252,500	
4.0	LIME HANDLING SYSTEM	\$ 20,516,100	\$ 14,705,000	\$ 19,102,600	\$ 14,270,500	The lime consumption rate is almost double for 3.0 vs. 1.7 with ESP. There is also a difference in lime consumptions between ESP and No ESP. Without the ESP the approach to saturation temperature is reduced which improves the lime utilization thereby leading to slightly less lime consumption. The lime equipment (blowers etc.) is the same regardless. The main delta is the storage equipment (i.e. Storage silo)
5.0	LIME SLAKER BUILDING	\$ 20,115,400	\$ 15,849,400	\$ 19,140,000	\$ 15,267,900	
6.0	BYPRODUCT WASTE & FLY ASH HANDLING SYSTEMS	\$ 19,469,700	\$ 18,728,800	\$ 15,622,000	\$ 14,548,500	
7.0	ABSORBER ISLAND	\$ 161,224,700	\$ 161,224,700	\$ 152,735,800	\$ 152,735,800	The absorber itself is sized on the actual flue gas flow rates which are roughly equivalent.
8.0	ACTIVATED CARBON INJECTION SYSTEM	\$ 6,317,900	\$ 6,317,900	\$ 6,317,900	\$ 6,317,900	
9.0	COMPRESSED AIR SYSTEM	\$ 4,434,100	\$ 4,434,100	\$ 4,434,100	\$ 4,434,100	
10.0	SERVICE WATER SYSTEM	\$ 4,497,800	\$ 4,497,800	\$ 4,497,800	\$ 4,497,800	
11.0	POTABLE WATER SYSTEM	\$ 1,166,000	\$ 1,166,000	\$ 1,166,000	\$ 1,166,000	
12.0	FGD SUBSTATION	\$ 9,387,700	\$ 9,387,700	\$ 9,497,300	\$ 9,497,300	
13.0	FGD DCS SYSTEM	\$ 6,120,400	\$ 6,120,400	\$ 6,120,400	\$ 6,120,400	
14.0	CEM SYSTEM	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	
15.0	TRUCK & RAIL INFRASTRUCTURE	\$ 5,652,300	\$ 5,652,300	\$ 5,652,300	\$ 5,652,300	
16.0	SITE IMPROVEMENTS - CIVIL WORK	\$ 15,617,200	\$ 15,617,200	\$ 15,617,200	\$ 15,617,200	
17.0	BOP ITEMS	\$ 4,263,600	\$ 4,263,600	\$ 4,263,600	\$ 4,263,600	
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ 4,670,200	\$ 4,670,200	\$ 4,670,200	\$ 4,670,200	
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	\$ 862,500	\$ 862,500	\$ 862,500	\$ 862,500	

EXHIBIT 1-9 DFGD TECHNOLOGY COMPARISON

DFGD		Estimate 1A ESP 3.0 lb SO ₂ /Mmbtu	Estimate 1B ESP 1.7 lb SO ₂ /Mmbtu	Estimate 2A N/ESP 3.0 lb SO ₂ /Mmbtu	Estimate 2B N/ESP 1.7 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
99.0	PROJECT INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	
	CONSTRUCTION MANAGEMENT	\$ 11,963,800	\$ 11,648,900	\$ 11,567,400	\$ 11,284,300	
	S-U / COMMISSIONING	\$ 3,987,900	\$ 3,883,000	\$ 3,855,800	\$ 3,761,400	
	CRAFT START-UP SUPPORT	\$ 1,647,500	\$ 1,625,300	\$ 1,581,200	\$ 1,561,800	
	INITIAL FILLS	\$ 1,196,400	\$ 1,164,900	\$ 1,156,700	\$ 1,128,400	
	OPERATOR & TRAINING MANUALS	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	
	NOISE ABATEMENT FOR 85 DBA REQUIREMENT	\$ 2,750,000	\$ 2,750,000	\$ 2,750,000	\$ 2,750,000	
	SUBTOTAL - INDIRECT COSTS	\$ 47,245,600	\$ 46,772,100	\$ 46,611,100	\$ 46,185,900	
	SUBTOTAL - CONTRACTOR'S G&A AND PROFIT	\$ 31,518,180	\$ 30,355,500	\$ 31,282,470	\$ 30,056,325	Subtotal of Contractor's G&A and Profit, which is included in accounts 1 through 19 above.
	SPARE PARTS:	\$ 1,811,700	\$ 1,699,800	\$ 1,780,600	\$ 1,679,600	
	CONTINGENCY	\$ 66,341,200	\$ 65,104,400	\$ 63,953,800	\$ 63,192,400	
	ESCALATION	\$ 56,364,359	\$ 55,362,000	\$ 54,885,900	\$ 53,852,622	
	TOTAL PROJECT COST	\$ 570,556,459	\$ 557,236,000	\$ 552,811,800	\$ 541,054,622	
	REFERENCE COSTS:					
A	ESP DEMOLITION	\$ 1,749,400	\$ 1,749,400	\$ 832,300	\$ 832,300	
B	REMOVE BOOSTER AIR FANS			\$ 111,000	\$ 111,000	
C	REMOVAL OF FUEL OIL TANK			\$ 1,749,400	\$ 1,749,400	



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EXHIBIT 1-10

IAQCS Technology Comparison



EXHIBIT 1-10

IAQCS - PHASED TECHNOLOGY COMPARISON

IAQCS - PHASED		Estimate 2A ESP 1.7 lb SO ₂ /Mmbtu	Estimate 3A ESP 3.0 lb SO ₂ /Mmbtu	Estimate 2B N/ESP 1.7 lb SO ₂ /Mmbtu	Estimate 3B N/ESP 3.0 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
1.0	ID FANS	\$ 71,323,000	\$ 71,323,000	\$ 72,769,700	\$ 72,769,700	The ID Fans without the ESP are larger (i.e. cost more) because they replace the existing Booster Fans. The Fabric Filter equipment costs are slightly larger at the lower coal sulfur levels because there is more actual flow rate i.e. there is more bag area in the same footprint. The lime consumption rate is almost double for 3.0 vs. 1.7 with ESP. There is also a difference in lime consumptions between ESP and No ESP. Without the ESP the approach to saturation temperature is reduced which improves the lime utilization thereby leading to slightly less lime consumption. The lime equipment (blowers etc.) is the same regardless. The main delta is the storage equipment (i.e. Storage silo)
2.0	FABRIC FILTERS	\$ 50,875,000	\$ 50,665,400	\$ 51,768,600	\$ 51,427,200	
3.0	NEW STACK	\$ 36,202,000	\$ 36,202,000	\$ 36,202,000	\$ 36,202,000	
4.0	LIME HANDLING SYSTEM	\$ 14,705,000	\$ 20,516,100	\$ 14,270,500	\$ 19,102,600	
5.0	LIME SLAKER BUILDING	\$ 15,849,400	\$ 20,115,400	\$ 15,267,900	\$ 19,140,000	The lime consumption rate is almost double for 3.0 vs. 1.7 with ESP. There is also a difference in lime consumptions between ESP and No ESP. Without the ESP the approach to saturation temperature is reduced which improves the lime utilization thereby leading to slightly less lime consumption. The lime equipment (blowers etc.) is the same regardless. The main delta is the storage equipment (i.e. Storage silo)
6.0	BYPRODUCT WASTE & FLY ASH HANDLING SYSTEMS	\$ 18,768,800	\$ 19,480,400	\$ 14,548,500	\$ 15,622,000	
7.0	SPRAY DRYER ABSORBER ISLAND	\$ 135,935,200	\$ 135,935,200	\$ 127,446,400	\$ 127,446,400	With the ESP in service additional Fly Ash equipment is required including a silo for blending the fly ash with the byproduct. The silo sizes with the ESP in service are significantly smaller than without the ESP. This results from the fly ash being removed prior the waste being sent to the silo. The absorber itself is sized on the actual flue gas flow rates which are roughly equivalent.
8.0	ACTIVATED CARBON INJECTION SYSTEM	\$ 6,317,900	\$ 6,317,900	\$ 6,317,900	\$ 6,317,900	
9.0	COMPRESSED AIR SYSTEM	\$ 6,814,300	\$ 6,814,300	\$ 6,814,300	\$ 6,814,300	
10.0	SERVICE WATER SYSTEM	\$ 5,454,700	\$ 5,454,700	\$ 5,454,700	\$ 5,454,700	
11.0	POTABLE WATER SYSTEM	\$ 1,375,410	\$ 1,375,410	\$ 1,375,410	\$ 1,375,410	
12.0	FGD SUBSTATION	\$ 10,565,000	\$ 10,565,000	\$ 10,871,900	\$ 10,871,900	
13.0	FGD DCS SYSTEM	\$ 6,120,400	\$ 6,120,400	\$ 6,120,400	\$ 6,120,400	
14.0	CEM SYSTEM	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	
15.0	TRUCK & RAIL INFRASTRUCTURE	\$ 8,955,400	\$ 8,955,400	\$ 8,955,400	\$ 8,955,400	
16.0	SITE IMPROVEMENTS - CIVIL WORK	\$ 19,779,900	\$ 19,779,900	\$ 19,759,200	\$ 19,803,100	
17.0	BOP ITEMS	\$ 4,263,600	\$ 4,263,600	\$ 4,262,300	\$ 4,262,300	
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ 5,542,100	\$ 5,542,100	\$ 5,542,100	\$ 5,542,100	
19.0	ARSENIC, ASBESTOS, LEAD ABATEMENT	\$ 862,500	\$ 862,500	\$ 862,500	\$ 862,500	

EXHIBIT 1-10

IAQCS - PHASED TECHNOLOGY COMPARISON

IAQCS - PHASED		Estimate 2A ESP 1.7 lb SO ₂ /Mmbtu	Estimate 3A ESP 3.0 lb SO ₂ /Mmbtu	Estimate 2B N/ESP 1.7 lb SO ₂ /Mmbtu	Estimate 3B N/ESP 3.0 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
99.0	INDIRECT COSTS - PHASE I		\$ -			
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES	\$ 28,000,000	\$ 28,000,000	\$ 28,000,000	\$ 28,000,000	
	CONSTRUCTION MANAGEMENT	\$ 12,664,100	\$ 12,981,500	\$ 12,331,100	\$ 12,615,500	
	S-U / COMMISSIONING	\$ 4,221,400	\$ 4,327,200	\$ 4,110,400	\$ 4,205,200	
	CRAFT START-UP SUPPORT	\$ 1,717,900	\$ 1,740,100	\$ 1,657,300	\$ 1,677,100	
	INITIAL FILLS	\$ 1,266,400	\$ 1,298,100	\$ 1,233,100	\$ 1,261,500	
	OPERATOR & TRAINING MANUALS	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	
	SUBTOTAL - INDIRECT COSTS	\$ 48,569,800	\$ 49,046,900	\$ 48,031,900	\$ 48,459,300	
	SUBTOTAL - CONTRACTOR'S G&A AND PROFIT	\$ 34,883,745	\$ 35,231,085	\$ 33,716,820	\$ 34,021,470	Subtotal of Contractor's G&A and Profit, which is included in accounts 1 through 19 above.
	SPARE PARTS - PHASE I	\$ 1,762,700	\$ 1,774,300	\$ 1,750,400	\$ 1,851,300	
	CONTINGENCY - PHASE I	\$ 68,724,200	\$ 69,375,300	\$ 66,458,800	\$ 67,690,500	
	ESCALATION - PHASE I	\$ 59,514,200	\$ 107,858,500	\$ 58,150,200	\$ 59,601,900	
	PHASE I - TOTAL PROJECT COST	\$ 600,706,900	\$ 660,870,100	\$ 585,427,200	\$ 598,119,200	
	PHASE II - WET FGD					
20.0	LIMESTONE HANDLING SYSTEM	\$ 25,573,800	\$ 25,573,800	\$ 25,573,800	\$ 25,573,800	Limestone handling system costs are the same for all fuels because the equipment is assumed the same and operating durations will be adjusted as required.
21.0	REAGENT (LIMESTONE) PREPARATION ISLAND	\$ 43,106,800	\$ 47,038,200	\$ 43,106,800	\$ 47,071,900	As fuel sulfur content increases more limestone is required and more byproduct is produced, therefore the reagent prep island costs and byproduct handling costs are increased
22.0	BYPRODUCT DEWATERING ISLAND (INCLUDES REMOTE GYPSUM HANDLING AREA)	\$ 72,090,300	\$ 75,035,700	\$ 72,090,300	\$ 75,035,700	
23.0	WET FGD ABSORBER ISLAND	\$ 158,267,400	\$ 159,369,900	\$ 158,267,400	\$ 159,369,900	As the fuel sulfur content increases the liquid-to-gas ratio increases thereby increasing the size of the recirculation system and slightly increasing the Absorber Island costs
24.0	COMPRESSED AIR SYSTEM (BYPRODUCT DEWATERING AREA)	\$ 1,626,900	\$ 1,626,900	\$ 1,626,900	\$ 1,626,900	
25.0	POTABLE WATER SYSTEM	\$ 109,400	\$ 109,400	\$ 109,400	\$ 109,400	
26.0	SCR SUBSTATION UPGRADE	\$ 2,749,200	\$ 2,749,200	\$ 2,749,200	\$ 2,749,200	
27.0	FGD DCS SYSTEM	\$ 8,027,400	\$ 8,027,400	\$ 8,027,400	\$ 8,027,400	
28.0	SITE IMPROVEMENTS - CIVIL WORK	\$ 3,021,200	\$ 3,021,200	\$ 3,021,200	\$ 3,021,200	
29.0	BOP ITEMS	\$ 4,720,500	\$ 4,720,500	\$ 4,720,500	\$ 4,720,500	
30.0	SERVICE WATER SYSTEM	\$ 5,226,800	\$ 5,226,800	\$ 5,226,800	\$ 5,226,800	

EXHIBIT 1-10 **IAQCS - PHASED TECHNOLOGY COMPARISON**

IAQCS - PHASED		Estimate 2A ESP 1.7 lb SO ₂ /Mmbtu	Estimate 3A ESP 3.0 lb SO ₂ /Mmbtu	Estimate 2B N/ESP 1.7 lb SO ₂ /Mmbtu	Estimate 3B N/ESP 3.0 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
99.0	INDIRECT COSTS - PHASE II					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES	\$ 23,000,000	\$ 23,000,000	\$ 23,000,000	\$ 23,000,000	
	CONSTRUCTION MANAGEMENT	\$ 9,735,600	\$ 9,971,600	\$ 9,735,600	\$ 9,976,000	
	S-U / COMMISSIONING	\$ 3,245,200	\$ 3,323,900	\$ 3,245,200	\$ 3,325,300	
	CRAFT START-UP SUPPORT	\$ 1,482,900	\$ 1,766,900	\$ 1,482,900	\$ 1,511,800	
	INITIAL FILLS	\$ 973,600	\$ 997,200	\$ 973,600	\$ 997,600	
	OPERATOR & TRAINING MANUALS	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	
	SUBCONTRACTORS (NOISE CONSULTANT)	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	
	SUBTOTAL - INDIRECT COSTS	\$ 38,837,300	\$ 39,459,600	\$ 38,837,300	\$ 39,210,700	
	SUBTOTAL - CONTRACTOR'S G&A AND PROFIT	\$ 27,259,530	\$ 27,659,625	\$ 27,259,530	\$ 27,676,560	Subtotal of Contractor's G&A and Profit, which is included in accounts 1 through 30 above.
	SPARE PARTS - PHASE II	\$ 1,192,900	\$ 1,256,000	\$ 1,192,900	\$ 1,256,000	
	CONTINGENCY - PHASE II.	\$ 56,854,100	\$ 57,575,200	\$ 56,411,200	\$ 58,094,000	
	ESCALATION - PHASE II	\$ 105,002,400	\$ 107,858,500	\$ 104,993,300	\$ 107,828,700	
	PHASE II - TOTAL PROJECT COST	\$ 526,406,500	\$ 538,534,500	\$ 525,954,500	\$ 538,922,200	
	TOTAL PHASE I + PHASE II INDIRECT COSTS					
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES	\$ 51,000,000	\$ 51,000,000	\$ 51,000,000	\$ 51,000,000	
	CONSTRUCTION MANAGEMENT	\$ 22,399,700	\$ 22,953,000	\$ 22,066,700	\$ 22,591,500	
	S-U / COMMISSIONING	\$ 7,466,600	\$ 7,651,000	\$ 7,355,600	\$ 7,530,500	
	CRAFT START-UP SUPPORT	\$ 3,200,800	\$ 3,507,000	\$ 3,140,200	\$ 3,188,900	
	INITIAL FILLS	\$ 2,240,000	\$ 2,295,300	\$ 2,206,700	\$ 2,259,100	
	OPERATOR & TRAINING MANUALS	\$ 600,000	\$ 600,000	\$ 600,000	\$ 600,000	
	SUBCONTRACTORS (PHASE I - NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION, PHASE II - NOISE CONSULTANT ONLY)	\$ 500,000	\$ 500,000	\$ 500,000	\$ 500,000	
	NOISE ABATEMENT FOR 85 DBA REQUIREMENT	\$ 4,500,000	\$ 4,500,000	\$ 4,500,000	\$ 4,500,000	
	SUBTOTAL - INDIRECT COSTS	\$ 91,907,100	\$ 93,006,300	\$ 91,369,200	\$ 92,170,000	
	SUBTOTAL - CONTRACTOR'S G&A AND PROFIT	\$ 62,143,275	\$ 62,890,710	\$ 60,976,350	\$ 61,698,030	
	SPARE PARTS - PHASE I + PHASE II	\$ 2,955,700	\$ 3,130,300	\$ 2,943,300	\$ 3,107,300	
	CONTINGENCY (PHASE I + PHASE II)	\$ 125,578,300	\$ 126,950,500	\$ 122,870,000	\$ 125,784,500	
	ESCALATION (PHASE I + PHASE II)	\$ 164,516,600	\$ 215,717,000	\$ 163,143,500	\$ 167,430,600	
	TOTAL PROJECT COST - (PHASE I + PHASE II)	\$1,131,613,500	\$ 1,203,904,400	\$ 1,115,881,700	\$ 1,141,541,400	

EXHIBIT 1-10 **IAQCS - PHASED TECHNOLOGY COMPARISON**

IAQCS - PHASED		Estimate 2A ESP 1.7 lb SO ₂ /Mmbtu	Estimate 3A ESP 3.0 lb SO ₂ /Mmbtu	Estimate 2B N/ESP 1.7 lb SO ₂ /Mmbtu	Estimate 3B N/ESP 3.0 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
	REFERENCE COSTS:					
A	ESP DEMOLITION			\$ 832,300	\$ 832,300	
B	REMOVE BOOSTER AIR FANS			\$ 111,000	\$ 111,000	
C	REMOVAL OF FUEL OIL TANK	\$ 1,749,400	\$ 1,749,400	\$ 1,749,400	\$ 1,749,400	

EXHIBIT 1-10

IAQCS - NON PHASED TECHNOLOGY COMPARISON

IAQCS - NON PHASED		Estimate 1A ESP 4.5 lb SO ₂ /Mmbtu	Estimate 4A ESP 7.5 lb SO ₂ /Mmbtu	Estimate 1B N/ESP 4.5 lb SO ₂ /Mmbtu	Estimate 4B N/ESP 7.5 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
1.0	ID FANS	\$ 65,527,000	\$ 65,527,000	\$ 66,973,700	\$ 66,973,700	The ID Fans without the ESP are larger (i.e. cost more) because they replace the existing Booster Fans.
2.0	FABRIC FILTERS	\$ 50,619,200	\$ 50,409,500	\$ 51,427,200	\$ 51,172,300	
3.0	NEW STACK	\$ 36,202,000	\$ 36,202,000	\$ 36,202,000	\$ 36,202,000	The Fabric Filter equipment costs are slightly larger at the lower coal sulfur levels because there is more actual flow rate i.e. there is more bag area in the same footprint.
4.0	LIME HANDLING SYSTEM	\$ 11,540,400	\$ 11,973,300	\$ 11,540,400	\$ 11,973,300	
5.0	LIME SLAKER BUILDING	\$ 10,626,700	\$ 11,889,300	\$ 10,626,700	\$ 11,889,300	The lime consumption rate is almost double for 3.0 vs. 1.7 with ESP. There is also a difference in lime consumptions between ESP and No ESP. Without the ESP the approach to saturation temperature is reduced which improves the lime utilization thereby leading to slightly less lime consumption. The lime equipment (blowers etc.) is the same regardless. The main delta is the storage equipment (i.e. Storage silo)
6.0	BYPRODUCT WASTE & FLY ASH HANDLING SYSTEMS		\$ 16,637,200	\$ 12,269,500	\$ 12,295,200	
7.0	SPRAY DRYER ABSORBER ISLAND	\$ 135,935,200	\$ 135,935,200	\$ 127,446,400	\$ 127,446,400	With the ESP in service additional Fly Ash equipment is required including a silo for blending the fly ash with the byproduct. The silo sizes with the ESP in service are significantly smaller than without the ESP. This results from the fly ash being removed prior the waste being sent to the silo.
8.0	ACTIVATED CARBON INJECTION SYSTEM	\$ -	\$ -	\$ -	\$ -	
9.0	COMPRESSED AIR SYSTEM	\$ 6,814,300	\$ 6,814,300	\$ 6,814,300	\$ 6,814,300	The absorber itself is sized on the actual flue gas flow rates which are roughly equivalent.
10.0	SERVICE WATER SYSTEM	\$ 10,634,300	\$ 10,634,300	\$ 10,634,300	\$ 10,634,300	
11.0	POTABLE WATER SYSTEM	\$ 1,491,600	\$ 1,491,600	\$ 1,491,600	\$ 1,491,600	
12.0	FGD SUBSTATION	\$ 10,319,400	\$ 10,319,400	\$ 10,626,200	\$ 10,626,200	
13.0	FGD DCS SYSTEM	\$ 13,127,500	\$ 13,127,500	\$ 13,127,500	\$ 13,127,500	
14.0	CEM SYSTEM	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	
15.0	TRUCK & RAIL INFRASTRUCTURE	\$ 5,652,300	\$ 5,652,300	\$ 5,652,300	\$ 5,652,300	
16.0	SITE IMPROVEMENTS - CIVIL WORK (DFGD + WFGD AREAS)	\$ 25,128,900	\$ 25,128,900	\$ 25,128,900	\$ 25,128,900	
17.0	LIMESTONE HANDLING SYSTEM	\$ 28,746,000	\$ 28,746,000	\$ 28,746,000	\$ 28,746,000	Limestone handling system costs are the same for all fuels because the equipment is assumed the same and operating
18.0	REAGENT (LIMESTONE) PREPARATION ISLAND	\$ 50,233,500	\$ 53,610,500	\$ 50,233,500	\$ 53,610,500	
19.0	BYPRODUCT DEWATERING ISLAND (INCLUDES REMOTE GYPSUM HANDLING AREA)	\$ 77,538,200	\$ 80,304,800	\$ 77,538,200	\$ 80,304,800	As fuel sulfur content increases more limestone is required and more byproduct is produced, therefore the reagent prep island costs and byproduct handling costs are increased
20.0	WET FGD ABSORBER ISLAND	\$ 159,503,500	\$ 160,469,200	\$ 159,503,500	\$ 160,469,200	
21.0	COMPRESSED AIR SYSTEM (BYPRODUCT DEWATERING AREA)	\$ 1,626,900	\$ 1,626,900	\$ 1,626,900	\$ 1,626,900	As the fuel sulfur content increases the liquid-to-gas ratio increases thereby increasing the size of the recirculation system and slightly increasing the Absorber Island costs.
22.0	POTABLE WATER SYSTEM	\$ -	\$ -	\$ -	\$ -	

EXHIBIT 1-10

IAQCS - NON PHASED TECHNOLOGY COMPARISON

IAQCS - NON PHASED		Estimate 1A ESP 4.5 lb SO ₂ /Mmbtu	Estimate 4A ESP 7.5 lb SO ₂ /Mmbtu	Estimate 1B N/ESP 4.5 lb SO ₂ /Mmbtu	Estimate 4B N/ESP 7.5 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
23.0	SCR SUBSTATION UPGRADE	\$ 2,749,200	\$ 2,749,200	\$ 2,749,200	\$ 2,749,200	Subtotal of Contractor's G&A and Profit, which is included in accounts 1 through 28 above.
24.0	FGD DCS SYSTEM					
25.0	SITE IMPROVEMENTS - CIVIL WORK	\$ -	\$ -	\$ -	\$ -	
26.0	BOP ITEMS	\$ 9,158,400	\$ 9,158,400	\$ 9,158,400	\$ 9,158,400	
27.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ 5,542,100	\$ 5,542,100	\$ 5,542,100	\$ 5,542,100	
28.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	\$ 862,500	\$ 862,500	\$ 862,500	\$ 862,500	
99.0	INDIRECT COSTS					
	ENGINEERING,	\$ 45,000,000	\$ 45,000,000	\$ 45,000,000	\$ 45,000,000	
	CONSTRUCTION	\$ 22,157,100	\$ 22,417,100	\$ 21,850,400	\$ 22,107,700	
	S-U / COMMISSIONING	\$ 7,385,700	\$ 7,472,400	\$ 7,283,500	\$ 7,369,200	
	CRAFT START-UP SUPPORT	\$ 3,177,400	\$ 3,207,500	\$ 3,117,400	\$ 3,147,300	
	INITIAL FILLS	\$ 2,215,700	\$ 2,241,700	\$ 2,185,000	\$ 2,210,800	
	OPERATOR & TRAINING	\$ 600,000	\$ 600,000	\$ 600,000	\$ 600,000	
	SUBCONTRACTORS (NOISE &	\$ 500,000	\$ 500,000	\$ 750,000	\$ 750,000	
	NOISE ABATEMENT FOR 85	\$ 4,500,000	\$ 4,500,000	\$ 4,500,000	\$ 4,500,000	
	SUBTOTAL - INDIRECT COSTS	\$ 85,535,900	\$ 85,938,700	\$ 85,286,300	\$ 85,685,000	
	SUBTOTAL - CONTRACTOR'S G&A AND PROFIT					
	SPARE PARTS	\$ 2,957,500	\$ 3,027,200	\$ 2,957,700	\$ 3,026,900	
	CONTINGENCY	\$ 115,966,200	\$ 116,497,100	\$ 113,200,600	\$ 115,259,100	
	ESCALATION	\$ 102,500,800	\$ 103,730,600	\$ 101,295,000	\$ 102,512,500	
	TOTAL PROJECT COST	\$ 1,045,532,000	\$ 1,056,431,500	\$ 1,031,087,300	\$ 1,043,406,900	
	REFERENCE COSTS:					
A	ESP DEMOLITION			\$ 832,300	\$ 832,300	
B	REMOVE BOOSTER AIR FANS			\$ 111,000	\$ 111,000	
C	REMOVAL OF FUEL OIL TANK	\$ 1,749,400	\$ 1,749,400	\$ 1,749,400	\$ 1,749,400	



Big Sandy Unit 2
Kentucky Power Company
American Electric Power Service Corporation
Order-of-Magnitude FGD Cost Estimate
WFGD, DFGD, IAQCS & NID Technologies
Volume 1 – Summary Report
September 29, 2010

EXHIBIT 1-11

NID Technology Comparison

EXHIBIT 1-11
NID
TECHNOLOGY COMPARISON

NID		Estimate 2A ESP 1.7 lb SO ₂ /Mmbtu	Estimate 1A ESP 3.0 lb SO ₂ /Mmbtu	Estimate 3A ESP 4.5 lb SO ₂ /Mmbtu	Estimate 4A ESP 7.5 lb SO ₂ /Mmbtu	Estimate 2B N/ESP 1.7 lb SO ₂ /Mmbtu	Estimate 1B N/ESP 3.0 lb SO ₂ /Mmbtu	Estimate 3B N/ESP 4.5 lb SO ₂ /Mmbtu	Estimate 4B N/ESP 7.5 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
1.0	ID FANS	\$ 60,012,400	\$ 60,012,400	\$ 60,012,400	\$ 60,012,400	\$ 60,785,900	\$ 60,785,900	\$ 60,785,900	\$ 60,785,900	The ID Fans without the ESP are larger (i.e. cost more) because they replace the existing Booster Fans. The main difference in ID Fan account cost between the DFGD and NID is due to GA differences and the allocation of electrical equipment to particular areas.
2.0	NID MODULES	\$ 158,198,600	\$ 159,363,000	\$ 166,153,900	\$ 196,128,800	\$ 151,332,800	\$ 152,612,000	\$ 158,505,300	\$ 189,835,500	
3.0	NEW STACK	\$ 22,252,500	\$ 22,252,500	\$ 22,252,500	\$ 22,252,500	\$ 22,252,500	\$ 22,252,500	\$ 22,252,500	\$ 22,252,500	
4.0	LIME HANDLING SYSTEM	\$ 21,292,500	\$ 26,279,300	\$ 33,056,800	\$ 40,325,500	\$ 21,292,500	\$ 26,279,300	\$ 33,056,800	\$ 40,325,500	As fuel sulfur levels increase more lime is required therefore the lime handling system costs are
5.0	LIME SLAKER BUILDING									
6.0	BYPRODUCT WASTE & FLY ASH HANDLING SYSTEMS	\$ 14,407,200	\$ 16,263,300	\$ 16,620,800	\$ 18,679,400	\$ 11,034,200	\$ 12,684,900	\$ 13,257,300	\$ 15,399,900	
7.0	ABSORBER ISLAND									With the ESP in service fly ash must be pulled from a cell for blending with FGD byproduct. Significant additional equipment and a silo will be added for fly ash blending. In fact even though the byproduct quantities are increased in the no ESP case, the costs for the ESP options are higher due to this equipment addition. The silo sizes with the ESP in service are significantly smaller than without the ESP. This is a result of the fly ash being removed in the ESP prior to the FF.
8.0	ACTIVATED CARBON INJECTION SYSTEM	\$ 6,317,900	\$ 6,317,900	\$ 6,317,900	\$ 6,317,900	\$ 6,317,900	\$ 6,317,900	\$ 6,317,900	\$ 6,317,900	
9.0	COMPRESSED AIR SYSTEM	\$ 4,933,200	\$ 4,933,200	\$ 4,933,200	\$ 4,933,200	\$ 4,933,200	\$ 4,933,200	\$ 4,933,200	\$ 4,933,200	
10.0	SERVICE WATER SYSTEM	\$ 3,677,800	\$ 3,677,800	\$ 3,677,800	\$ 3,677,800	\$ 3,677,800	\$ 3,677,800	\$ 3,677,800	\$ 3,677,800	Larger auxiliary transformers are required for the ESP Out case due to the ID Fan's increase in size. A larger switchgear is required for the ESP in case due to the increased number of required feeder breakers to accommodate the relocated feeds to the existing booster fans. The net difference results in a higher ESP out cost.
11.0	POTABLE WATER SYSTEM	\$ 1,030,700	\$ 1,030,700	\$ 1,030,700	\$ 1,030,700	\$ 1,030,700	\$ 1,030,700	\$ 1,030,700	\$ 1,030,700	
12.0	FGD SUBSTATION	\$ 9,398,300	\$ 9,398,300	\$ 9,398,300	\$ 9,398,300	\$ 9,508,000	\$ 9,508,000	\$ 9,508,000	\$ 9,508,000	

EXHIBIT 1-11
NID
TECHNOLOGY COMPARISON

NID		Estimate 2A ESP 1.7 lb SO ₂ /Mmbtu	Estimate 1A ESP 3.0 lb SO ₂ /Mmbtu	Estimate 3A ESP 4.5 lb SO ₂ /Mmbtu	Estimate 4A ESP 7.5 lb SO ₂ /Mmbtu	Estimate 2B N/ESP 1.7 lb SO ₂ /Mmbtu	Estimate 1B N/ESP 3.0 lb SO ₂ /Mmbtu	Estimate 3B N/ESP 4.5 lb SO ₂ /Mmbtu	Estimate 4B N/ESP 7.5 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
13.0	FGD DCS SYSTEM									
14.0	CEM SYSTEM	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	\$ 2,426,500	
15.0	TRUCK & RAIL INFRASTRUCTURE	\$ 5,652,300	\$ 5,652,300	\$ 5,652,300	\$ 5,652,300	\$ 5,652,300	\$ 5,652,300	\$ 5,652,300	\$ 5,652,300	
16.0	SITE IMPROVEMENTS - CIVIL WORK	\$ 16,119,700	\$ 16,119,700	\$ 16,119,700	\$ 16,119,700	\$ 16,119,700	\$ 16,119,700	\$ 16,119,700	\$ 16,119,700	
17.0	BOP ITEMS	\$ 4,273,900	\$ 4,273,900	\$ 4,273,900	\$ 4,350,800	\$ 4,273,900	\$ 4,273,900	\$ 4,273,900	\$ 4,350,800	
18.0	CAPITAL REPLACEMENTS - REMOVAL AND RELOCATION OF EXISTING EQUIPMENT AND INFRASTRUCTURE	\$ 4,670,200	\$ 4,670,200	\$ 4,670,200	\$ 4,670,200	\$ 4,670,200	\$ 4,670,200	\$ 4,670,200	\$ 4,670,200	
19.0	ARSENIC, ASBESTOS , LEAD ABATEMENT	\$ 862,500	\$ 862,500	\$ 862,500	\$ 862,500	\$ 862,500	\$ 862,500	\$ 862,500	\$ 862,500	
99.0	OVERALL PROJECT INDIRECT COSTS									
	ENGINEERING, PROCUREMENT, & PROJECT SERVICES	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	
	CONSTRUCTION MANAGEMENT	\$ 10,244,000	\$ 10,484,200	\$ 10,902,000	\$ 12,083,400	\$ 9,963,300	\$ 10,200,800	\$ 10,598,100	\$ 11,822,700	
	S-U / COMMISSIONING	\$ 3,414,700	\$ 3,494,700	\$ 3,634,000	\$ 4,027,800	\$ 3,321,100	\$ 3,400,300	\$ 3,532,700	\$ 3,940,900	
	CRAFT START-UP SUPPORT	\$ 1,417,000	\$ 1,431,100	\$ 1,472,400	\$ 1,614,200	\$ 1,361,300	\$ 1,374,500	\$ 1,407,900	\$ 1,560,400	
	INITIAL FILLS	\$ 1,024,400	\$ 1,048,400	\$ 1,090,200	\$ 1,208,300	\$ 996,300	\$ 1,020,100	\$ 1,059,800	\$ 1,182,300	
	OPERATOR & TRAINING MANUALS	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	
	SUBCONTRACTORS (NOISE & DUCTWORK CONSULTANT, GEOTECHNICAL INVESTIGATION)	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	\$ 400,000	
	NOISE ABATEMENT FOR 85 DBA REQUIREMENT	\$ 2,600,000	\$ 2,600,000	\$ 2,600,000	\$ 2,600,000	\$ 2,600,000	\$ 2,600,000	\$ 2,600,000	\$ 2,600,000	
	SUBTOTAL - INDIRECT COSTS	\$ 44,400,100	\$ 44,758,400	\$ 45,398,600	\$ 47,233,700	\$ 43,942,000	\$ 44,295,700	\$ 44,898,500	\$ 46,806,300	
	SUBTOTAL - CONTRACTOR'S G&A AND PROFIT	\$ 28,358,895	\$ 28,565,520	\$ 29,122,080	\$ 31,110,540	\$ 27,213,315	\$ 27,408,015	\$ 27,866,310	\$ 29,997,600	
	SPARE PARTS:	\$ 1,409,400	\$ 1,501,700	\$ 1,633,500	\$ 1,953,300	\$ 1,419,200	\$ 1,511,500	\$ 1,647,500	\$ 1,969,400	
	CONTINGENCY	\$ 54,896,800	\$ 55,898,200	\$ 57,769,600	\$ 63,352,700	\$ 53,792,000	\$ 55,124,800	\$ 56,319,300	\$ 62,612,800	
	ESCALATION	\$ 48,570,900	\$ 49,816,200	\$ 51,924,700	\$ 57,746,800	\$ 47,501,200	\$ 48,734,300	\$ 50,762,200	\$ 56,776,800	

EXHIBIT 1-11
NID
TECHNOLOGY COMPARISON

NID		Estimate 2A ESP 1.7 lb SO ₂ /Mmbtu	Estimate 1A ESP 3.0 lb SO ₂ /Mmbtu	Estimate 3A ESP 4.5 lb SO ₂ /Mmbtu	Estimate 4A ESP 7.5 lb SO ₂ /Mmbtu	Estimate 2B N/ESP 1.7 lb SO ₂ /Mmbtu	Estimate 1B N/ESP 3.0 lb SO ₂ /Mmbtu	Estimate 3B N/ESP 4.5 lb SO ₂ /Mmbtu	Estimate 4B N/ESP 7.5 lb SO ₂ /Mmbtu	
Acct. No.	Item Description	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Total Projected Cost	Remarks
	TOTAL PROJECT COST	\$ 490,743,400	\$ 501,447,900	\$ 520,125,700	\$ 573,065,000	\$ 478,765,000	\$ 489,693,500	\$ 506,897,900	\$ 562,254,200	
	REFERENCE COSTS:									
A	ESP DEMOLITION	\$ 1,749,400	\$ 1,749,400	\$ 1,749,400	\$ 1,749,400	\$ 832,300	\$ 832,300	\$ 832,300	\$ 832,300	
B	REMOVE BOOSTER AIR FANS					\$ 111,000	\$ 111,000	\$ 111,000	\$ 111,000	
C	REMOVAL OF FUEL OIL TANK					\$ 1,749,400	\$ 1,749,400	\$ 1,749,400	\$ 1,749,400	