

# **Proposed U.S. EPA Coal Combustion Residuals Regulations:**

## **How Will It Impact Your Plant and Your Bottom Line?**

Coal Ash Ponds and  
Wastewater Treatment Issues

Hot Topic Hour on Thursday May 3, 2012  
at 10:00am CDT

# CCR Disposal:

## Is This Your Ash Fill of the Past, Present, or Yet to Come?



# *Presentation Content, Conversions and Costs*

## *What's in your Future?*

### *Introduction*

1. Ash Ponds (treatment/dewatering)
2. Dry Ash Disposal
3. Wet to Dry Equipment Conversion

### *Summary*



## *Introduction*

### *(Cont.)*

## **What's Unique? Your:**

- A. Plant's Equipment
- B. CCR Processing
- C. Disposal Site
- D. Local Economics
- E. Beneficial Reuse
- F. State Regulations

## *Introduction*

*(cont.)*

### How Do We Estimate Your Costs for Changes?

- Similarities
- Comparisons
- Multiple Resources
- Detailed Cost Estimates

# Don't Use This Slide

SARGENT & LUNDY

ASH LANDFILL COST ESTIMATE					WAGE RATE: SARPEL		PRODUCTIVITY FACTOR: 1.08	
ACCT. NO.	DESCRIPTION A	DESCRIPTION B	QTY	UM	EQUIPMENT COST	MATERIAL COST	LABOR COST	TOTAL COST
100	ASH LANDFILL - (46 ACRE FOOTPRINT)	AREA NOT FILLED	369,000	SY	0	3,644,600	3,667,000	7,511,600
100.3	TILL SUBGRADE		369,000	SY	0	0	214,000	214,000
100.4	RECOMPACT SUBGRADE INCL WATERING		85,000	CY	0	0	170,000	170,000
100.5	EARTHWORK - BERM CONSTRUCTION, INCL EXCAVATION, PLACING, COMPACTION, WATERING, DRAINAGE FEATURES		302,600	CY	0	0	2,115,300	2,115,300
100.6	90 MIL HDPE LINER		2,003,800	SF	0	557,600	521,000	1,078,600
100.7	8" DIA PIPING DR 17		22,000	LF	0	143,000	350,600	493,600
100.8	8" DIA 22.5 DEG EL DR 17		42	EA	0	2,100	29,900	32,000
100.9	CONCRETE CLEANOUT BASE - HOLD PIPE STUB-UP IN PLACE		42	EA	0	4,200	10,000	14,200
100.10	8" DIA TEE DR 17		20	EA	0	2,000	25,200	27,200
100.11	AGGREGATE INCL HAULING TO SITE & SPREADING		74,200	CY	0	2,896,800	371,000	3,267,800
100.12	SEEDING		540,000	SF	0	10,800	10,800	21,600
100.13	POLYPROPYLENE MESH 6.5 OZ/SY FOR EROSION CONTROL		5,500	SY	0	8,100	1,700	9,800
100.14	MANHOLE		10	EA	0	20,000	47,500	67,500
900	SUBTOTAL DIRECT & CONSTRUCTION INDIRECT COST				0	3,644,600	3,667,000	7,511,600
901	OTHER DIRECT & CONSTRUCTION INDIRECT COST- TOTAL	SUBTOTAL 901			0	728,500	1,658,900	2,387,400
901.1	MOBILIZATION / DEMOBILIZATION	% of ACCT NO. 900	1.0	%			38,700	38,700
901.2	COST DUE TO OVERTIME WORKING 5 -10 HOUR DAYS - TOTAL	WORKING 5 -10 HOUR DAYS	1.0	EA			545,700	545,700
901.3	PER DIEM		10.0	\$/HR			418,100	418,100
901.4	CONSUMABLES	NOT INCLUDED		%	0	0		0
901.5	FREIGHT - MATERIAL EXWORKS TO SITE	% of ACCT NO. 900	5.0	%		182,200		182,200
901.6	FREIGHT - EQUIPMENT EXWORKS TO SITE	INCLUDED IN EQUIPMENT COST		%	0			0
901.7	TAXES - SALES	NOT INCLUDED		%		0		0
901.8	CONTRACTOR'S GENERAL AND ADMINISTRATION EXPENSE	% of ACCT NO. 900	5.0	%		182,200	218,800	401,000
901.9	CONTRACTOR'S PROFIT	% of ACCT NO. 900	10.0	%		364,500	437,600	802,100
901.10	N/A	NOT INCLUDED		%	0	0	0	0
902	TOTAL DIRECT & CONSTRUCTION INDIRECT COST	SUBTOTAL 902			0	4,373,500	5,525,900	9,899,400
903	INDIRECT COST - TOTAL	SUBTOTAL 903						1,258,300
903.1	ENGINEERING, PROCUREMENT, & PROJECT SERVICES	% of ACCT NO. 902	8.0	%				792,000
903.2	CONSTRUCTION MANAGEMENT/FIELD ENGINEERING	% of ACCT NO. 902	1.5	%				148,500
903.3	S-U / COMMISSIONING	% of ACCT NO. 902	1.0	%				99,000
903.4	OWNERS COST - % of ACCT NOS. 902, 903.1, 903.2, 903.3		2.0	%				218,800
903.5	EPC FEE - % of ACCT NOS. 902, 903.1, 903.2, 903.3	NOT INCLUDED		%				0
903.5	N/A	NOT INCLUDED		%				0
904	ESCALATION COST - TOTAL	SUBTOTAL 904						0
905	CONTINGENCY COST - TOTAL	SUBTOTAL 905	20.0	%				2,231,600

## *Introduction*

*(cont.)*

## **Apply to Your Operation**

- Estimated Per Ton/Yard Costs for Disposal (construction, operation, closure)
- Typical Costs for Equipment Modifications



# 1. Existing Ash Ponds (& Disposal?)





# 1. (Cont.) and 2. Clay Liner Installation



# 1. (Cont.) and 2. Membrane Liner Placement and Seaming





# 1. (Cont.) and 2. Leachate Collection Layer & Piping Installation



# 1. (Cont.) and 2. Clay Cover Installation



# 1. (cont.) and 2. Membrane Cover and Soils





## 1. (Cont.) and 2 Costs - Subtitle D

### DISPOSAL

- **Liner System**

	Average
– Per Ton or Cubic Yard	\$6
– Per Acre	\$175,000
- **Operation**

– Per Ton or Cubic Yard	\$10
– Per Acre	\$250,000
- **Closure**

– Per Ton or Cubic Yard	\$4
– Per Acre	\$150,000

## 1. (Cont.) and 2 Costs - Subtitle C

- Hazardous Waste Landfills
  - Solid to Hazardous Waste Transition Studies
    - \$80 to \$130 per yard/ton
- Insurance/Risk, Taxes, Licensing, Training  
Containment, Administration

### 3. Wet to Dry Equipment Conversion

#### TREATMENT/HANDLING

- Dewatering Ponds/Bins
- Trucking
- Pumping Wet/Dry
- Submerged Conveyors
- Dewater Existing Fill
- Water Treatment/Reuse

### 3. (Cont.) Wet to Dry Equipment Conversion

- **Convert Bottom Ash, Fly Ash, FGD Systems Wet to Dry?**
- **Storage Containment**
  - Enclosures
  - Liners
  - Secondary Containment – Subtitle C

### 3. (Cont.) Wet to Dry Equipment Conversion

#### **EQUIPMENT (400 to 600 Megawatt Plant) PROCESSING/CONVERSION**

- Dewatering Bins/Settling Tanks      \$16 – 22 Million
- Truck Loading Bay/Hopper  
Enclosure      \$850,000 - \$1.5 Million
- Wash Down      \$300 - \$500 Thousand
- Ancillary Costs (site work)      \$1- \$2 Million



### 3. (Cont.) Wet to Dry Equipment Conversion

#### **Fly Ash/FGD Conversion**

- \$8 - \$10 Million

#### **Bottom Ash Conveyor System**

- \$10 - \$14 Million

## *Summary*

1. Ash Ponds (treatment/dewatering)
2. Dry Ash Disposal
3. Wet to Dry Equipment Conversion

**How Do I Comply at My Plant?**

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