Coal-fired Power Industry

Coal Combustion Residues (CCRs) Material Handling Considerations

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Topics

• Process Considerations for CCR retrofits
• Dry Ash - Pneumatic Options
• Mechanical Materials Handling
• Dewatering options for BOTTOM ASH, FLY ASH, and GYPSUM
Wet-to-Dry CCRs
Some Process Considerations

BOTTOM ASH
- in situ dewater or off-line / centralized
- combine with other CCR waste streams?

FLY ASH
- total hoppers and locations/clearances/orientations (ECON, APH, ESP, BH)
- dry silo / dome type and location
- truck haulage methods (dry PD trailer for future sales and/or covered haulers for landfill)

GYPSUM
- thickener / filter locations
- reblend with other bulk solid and/or liquid waste streams

TRANSFER PATH
- Distance, rate, route ➔ Pneumatic / Mechanical / Slurry/Paste

DESTINATION
- storage type (dry silo, dome, conditioned piles)
- coverage
- runoff
- Containment and final placement
- BOP/mechanical: for example, truck scales (local or for commerce)
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Fly Ash Dust Collector

Dry Pressure Conveying

Dry Ash Silo

Ash Loadout Dry or Conditioned
Traditional Fly Ash Handling Systems
Dry pneumatic fly ash options
Dry Fly Ash Pneumatic Retrofit Schedule

<table>
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<th>Task Name</th>
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<th>2012</th>
<th>2013</th>
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<td>Q4</td>
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Mechanical Conveying of CCRs

- Long Haul Pipe-Conveyors for bulk solids
- FLSmidth Wadgassen GmbH (formerly KOCH) and Dearborn Mid-West Conveyor Company (exclusive US licensee of FLSmidth/Koch technology)
Fly Ash Dust Collector

Air inlet

Ash Intake Valves

H₂O

Stack Out

One Source

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Ex-situ Bottom Ash dewatering

FLSmidth offers three (3) technologies depending on the application.

- The horizontal belt filter when fly ash and bottom ash are mixed together
- High Volume Screw Classifier
- Submerged Chain Conveyor
CLASSIFICATION

Hydrocyclones

Spiral Classifiers
Vacuum Belt Filter
PASTE TECHNOLOGY

- FLSmidth’s PPSM technology
- PPL Colstrip Station converted from dilute slurry to paste
- ~70% solids
- Increased capacity of storage volume by 160M ft³
- Increased usable life of storage volume by 10 years
- Liquid seepage went from a concern to “negligible”
  - Data from Golder Associates.
CONTACTS:
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THANK YOU