Quick and Low Temperature Drying Technology



(<u>Coal</u> <u>Rapid</u> <u>Air</u> <u>Pry</u> <u>Leading</u> <u>Equipment</u>)

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BHK Company Profile



Mitsubishi Hitachi Power Systems Group Babcock-Hitachi K.K.

Main Products



BHK's Boiler Experience



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Industry Recognition (BHK Benson Boiler)

EPCOR/ Genesee Power Station Unit 3, Canada

World's Top 12 Power Plants / 2005 Platts Global Energy Awards

- Power Magazine (July/Aug 2005)

Best Coal Fired Project of the Year Award

- Power Gen International 2005 in Las Vegas, USA







MidAmerican Energy/ Walter Scott, Jr. Energy Center Unit 4, USA

POWER's 2007 Plant of the Year

- Power Magazine (Aug 2007)

Best Coal Fired Project of the Year Award

- Power Gen International 2007 in New Orleans, USA

1. Introduction



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Why apply a Coal Pre-Drying System ?

- ✓ High moisture in coal has negative impacts for;
 - Boiler efficiency
 - Coal consumption
 - Emissions including SOx, NOx, CO2
- Coal pre-drying system achieves;
 Higher boiler efficiency, reduced coal consumption and reduced emissions.



2. Theory of Drying



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CRADLE: Structure

<u>C</u>oal <u>Rapid Air Dry Leading Equipment</u>



3. CRADLE Pilot Test



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4. Pilot Test Result (1): Drying Characteristics



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The following test results are within our expected range.

Calculated condition from Lab. result. (Comparison to red line)



5. Pilot Test Result (2): Efficiency



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Need

/ Large amount of heat is required in the low moisture

/ Plant efficiency increases by Pre-drying

6. Placement





7. Outline of Drying System Operation(1)



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7. Outline of Drying System Operation(2)



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Min. Pre-dry system(New Boiler)



7. Outline of Drying System Operation(3)



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8. Effects



Low Min. Load Operation

With pre drying, the boiler min. load can be reduced by approx. half from the min. load of conventional lignite boilers. The capability to operate lignite plants at lower loads may be favorable, as alternative power sources (e.g. renewable energy) are being added to the systems.

Customer Needs

Efficiency Increase by Economical Dryer

Drying technology exists for Lignite coals. But too expensive !

- ♦ High quality material.
- ♦ Large Aux. equipment.
- ♦ Need large space.

Dry lignite will improve efficiency, but not significant cost saving since lignite is cheap.

Lignite Use for IGCC

Lignite is high volatile matter and low Ash melt temperature.

Lignite has good properties for IGCC, except for the high moisture.





We want to verify CRADLE technology

	STEP 1(2014)	STEP 2(2015-7)	STEP 3
Basic and Pilot test	Basic test(Australian Pilot test(Geri Poland lignite	and German ,Indon nan Lignite) done a basic test	esian Lignite) and t 2011.
Demonstr ation test	Researchi	ng Demonstration S Demonstration t	Space and Utility est (120t/d=5t/h)
	E	esign and Election Commissioning	1.5years and Testing 1 year
Use Pre- Dry system		[IGCC for Poland lignite USC,CFB for Poland lignite

10. Demonstration Plant (120t/d=5t/h) Planning



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Conclusion

CRADLE is the most ECONOMICAL dryer in the world.

CRADLE will change the **future of Lignite**.

Dziękuję za uwagę

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