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When and Why?

Stack Testing Using Method 2G/2H

Introduction – Ste. Genevieve Plant Overview

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Defining the Problem

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- Indirect Firing System
  - ✓ Use Kiln Stack Gas to assist in drying coal.
  - ✓ Hot gas (~385 F) can be pulled from either kiln and sent to Coal Mill.
- Teledyne Monitor Labs Ultraflow 150 Flow Monitors are located on stacks at the 95’ platform
  - ✓ Stack gas going to mill is removed before flow monitor.
- Installed a Kurz Flow Monitor in ductwork going to Ball Mill.
- Flow to Ball Mill is 12,000 – 20,000 dscfm
- When taking gas from the kiln stack.
  - ✓ If the Kurz is reading 16,000 dscfm
  - ✓ Stack TDML should drop 16,000 dscfm
- What should be happening on Kiln #2 wasn’t!

Connection to Ball Mill duct from Kiln Stacks

Kiln 2 Stack – Performing a Relative Accuracy Testing Audit (RATA)

- During the RATA's we would check with Ball Mill On/Off
  - ✓ State required that we run maximum equipment.
- When the Mill would be taking from Kiln #2 the stack test team would NOT see a drop in flow that equated to Ball Mill Flow.
- We would also see a rise in cyclonic flow in the stack only when the mill was taking gas from this stack.
  - ✓ Cyclonic measurement would be around 18 degrees.
- We would have to adjust the flow monitor to match the test team / reference method (RM).
- Didn't make sense!

Kiln 2 Stack – Performing a Relative Accuracy Testing Audit (RATA) – Method 2G/2H

- Method 2G/2H utilizes a special “head” in place of a “normal” type pitot.
  - ✓ It is considered to be a “3D” probe as it has holes drilled on all axis to measure “pitch” and “yaw” of the probe so the test team can find maximum velocity
- Now we averaged 23.10 degrees of yaw (cyclonic flow)!
- The resulting flow data made sense and matched with what the flow monitor was actually seeing as raw data all along!

3D Probe

Results

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Kiln #2 RATA Comparison

Method 2 to 2G/H (flow is in Dry Standard Cubic Feet)

Configuration	Ball Mill Flow	Method 2	Method 2G/H	Total Flow	RM
Mill taking gas	15,200	84,200	72,920	**88,120**	**88,200**
Mill NOT taking	-	88,000	88,220	**88,220**	**88,250**

What the Flow Monitor was measuring

With Mill taking Gas		Method 2	Method 2G/H
RAW Velocity	Feet per sec.	33.952	32.158
Linear Velocity	Feet per sec.	47.209	32.619

When & Why would you use this Method?

- Why would you have cyclonic flow?
  - ✓ Any type of disturbance in the stack can cause cyclonic
  - ✓ This may be as simple as the way the fan intake is connected to the stack.
- Evaluate your likelihood of having this problem.
- The first step in starting a stack test is to check for cyclonic flow.
- If you have little or no cyclonic flow then Method 2G/2H is probably not worth your time/effort/money.
- Is there a difference in accuracy between a Method 2 and 2G/H?
  - ✓ We checked the 3D probe against the normal Method 2 on our other kiln stack that does not display any cyclonic properties and we found virtually NO difference.
- Any Questions????