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PROCESS INSTRUMENTATION

SITRANS LR560 reliably monitors coal level in huge silo

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When delivering electricity to one of the largest electric power markets in the world, there is no room for second guessing over which level instruments will align correctly with the automation process to ensure that erroneous coal inventory levels are not the cause for electrical power interruptions.

Located in the heart of Texas, a two-unit 800 megawatt power generation plant is part of a power generation group that delivers over 15,000 mega-watts of power in the state. At the 1,600 megawatt facility, efficiency and environmental responsibility go hand-in-hand. This power plant uses lignite as its energy source. Lignite is a lower grade of coal, but with technological advances the power plant manages to produce 800 megawatts per generation unit while at the same time mini-mizing environmental impact.

What is impressive at this plant is the amount of raw material that goes through on a daily basis, and how clean the process is in terms of what leaves via the steam stacks and the cleanliness of

the plant itself. It's no wonder that this location has been the recipient of dozens of awards from several entities.

It is quite mind-boggling to grasp that 7,000 tons of coal are delivered via a railcar twice a day and go through a giant silo with 10,000 ton of capacity. Knowing this can easily paint a picture that the material in the silo is fairly dynamic and it requires that the level in the silo is monitored reliably to make sure coal is available 24/7.

Similar to many areas of the country, power consumption demand can be great - season dependent of course. The Texas heat requires top performance from a power plant to keep everyone cool. This was one of the reasons the power plant supervisor was open to trying the SITRANS LR560: the first radar level transmitter that is able to operate at nearly 80 GHz. He learned through his local representative that this radar transmitter could reach the lowest level in the giant silo unimpeded; thus, removing any questions concerning the silo's inventory levels.

The challenge

Managing the process of a power plant goes beyond monitoring the level of what is inside the silos to run the operation successfully. All operational aspects play an intricate part to ensure consistent results day-in and day-out. If inventory levels are not certain because reliable level measurements are not always available, extra manpower has to be utilized to make sure the desired output does not suffer.

Initially, that was the issue at this power plant with the main coal storage silo. The radar transmitter that was first used to monitor the level of the silo operated at 26 GHz. Before 2011, that was the highest operating frequency of any radar level transmitter for solid level measurement. This particular radar transmitter has a lot of signal strength; however, when the material level reached below 30% of the capacity of the silo, inconsistent level readings were often reported.

The main storage silo is roughly 100ft tall and over 45ft in diameter. A silo of this magnitude requires serious structural support. Some of these supports were not in the best location in relation to the process connection where the radar transmitter was installed. Based on the design, a 26 GHz radar transmitter with a 4-inch horn antenna yields a signal with a beam angle of 8 degrees. This is not bad, but when obstructions degrade the signal or when the material levels reach down to the conical section of the silo, reliability can prove problematic without extensive instrument setup. The only alternative is to move the instrument to a more favorable process connection location. Often, this is not possible due to a lack of installation ports for instrumentation, and time-consuming retrofits tend to be expensive.

Solution

The instrument technician was advised to try and mitigate some of the issues by using advanced settings on the existing instrument, but there was still room for improvement especially while the coal level was nearing the conical section of the silo. This is when the local representative offered to test the SITRANS LR560 radar transmitter.

The SITRANS LR560 78 GHz operating frequency has a signal beam angle of just 4 degrees. This allows the radar transmitter to reach deeper into the silo

than other radar transmitters operating at much lower frequencies. It also means that obstructions play virtually no role in degrading the signal due to the more focused signal of this radar transmitter. The SITRANS LR560 was installed in the same location as the other radar transmitter. Furthermore, the new instrument did not require any extra setup beyond the basic configuration. This consists of the low and high set points representing the 100% span in the silo, the units of measurement, silo type, and the speed of response to track the material accordingly. It does not get any easier than that. The simplicity this instrument can be setup with is almost perplexing considering the amount of effort that was previously applied to obtain not as reliable level measurements in the past.

Benefits

After the installation of the SITRANS LR560, the operators monitored its performance for a period of time and were confident that this radar transmitter could be trusted to provide reliable level measurements regardless of the level in the silo. As time went on, and new level instrumentation was needed in coal bunkers where aging ultrasonic level technology was being used, the SITRANS LR560 was selected to replace those instruments as well. The plant supervisor kindly expressed his gratitude

for the support he had received from Siemens and the local representative. He is confident now that coal levels are tracked reliably with the SITRANS LR560.

Again, the ease of installation and setup was made clear by one of the new operators who said that he was asked to install a new LR560 radar transmitter. Although he had never touched one prior to this, he said that it was very easy to operate.

There are many flights of stairs that go up to the main silo - a good work out for anybody, even for those in good shape. Not only does the SITRANS LR560 provide reliable level measurement, but unless someone wants to enjoy the panoramic view from the very top of the silo, there is no need to spend the man hours climbing up there to see if the levels are correct. It is good to know that the SITRANS LR560 plays a small role in an important process that helps this facility continue powering the great state of Texas.



SITRANS LR560 radar level monitor

Legal Manufacturer

Siemens Industry, Inc.
100 Technology Drive
Alpharetta, GA 30005
United States of America
Telephone: +1 (800) 365-8766
usa.siemens.com/pi
Order No.: PICS-00183-0122

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