

SCAQMD EXPECTS TIRES To Reduce NOx Emissions



The use of tires as fuel in the cement kiln is expected to reduce the key component of visible air pollution.

(Colton, CA) "The South Coast Air Quality Management District (SCAQMD) has directed the Colton Cement Plant to implement two technologies that will reduce NOx (Oxides of Nitrogen, the main component in visible smog) by 55%. The two technologies are Tire Derived Fuel and Indirect Firing of the Kiln," said Plant Manager, Mike Robertson of the California Portland Cement Company's Colton Plant.

A permit has been granted by the SCAQMD to implement the first technology, using scrap tires as fuel to provide staged combustion. The process is expected to begin in January.

According to Robertson, the process called Tire Derived Fuel or TDF will have three major benefits. One, the SCAQMD believes that it will bring an immediate 20 to 41 percent reduction in NOx emissions from the plant.

Two, TDF can potentially save the Colton Cement Plant thousands of dollars in fuel cost. "This saving will allow us to remain competitive and continue to contribute to the economic prosperity of the region, as we have for the last 105 years," said Robertson.

According to Robertson, the competition at the other three cement plants in Southern California, has been using TDF for several years to reduce fuel costs.

Three, it will provide a much needed way to dispose of a small but



SCAQMD believes that burning tires as an alternate fuel source will dramatically decrease NOx emissions.

significant part of the 14 million waste tires created every year in Southern California and 2.5 million tires stockpiled in Riverside and San Bernardino Counties.

According to an SCAQMD Environmental Impact Report or (EIR) on proposed amendments to Regulation XX dated March 1996, the downside is that the process may also increase the production of Carbon Monoxide or CO. But, even using worst-case assumptions, the facility would not violate either the one hour or eight hour state or federal standards for CO emissions. "We believe that our actual CO emission will be far below the worst case assumption," said Robertson.

The high CO estimates were based on start-up operations at Riverside Cement Company's Ore Grande plant in Victorville. "When they started using TDF they had a temporary increase in CO output," said Robertson. He added, "They have since reduced their CO output to below pre-TDF numbers."

The second process to be implemented is the indirect firing of the cement kiln. NOx is formed due to the high kiln temperatures and the available combination of nitrogen and oxygen.

Indirect firing is accomplished by conversion of the kiln's present 3,400 degree flame, to an indirect firing system coupled with a low NOx burner. The indirect firing system is essentially the same as replacing a cars carburetor with a fuel injection system. The net result is the more precise burning of fuel.

The low NOx burner is a special nozzle that shapes the flame into complex patterns forming pockets where the fuel will burn slower and more completely producing less NOx.

In addition, the fuel is currently pushed into the nozzle with a lot of air. The indirect firing system pushes the fuel into a nozzle with much less air requiring less fuel to heat the large volume of air thus reducing the production of NOx.

The indirect firing process is capable of achieving emission reduction in the 30 to 50 percent range. This \$5 Million system is projected to be implemented in 1997.

Portland Cement is made in a large rotating kiln where rocks are turned to molten lava by a flame that burns at - 3,400 degrees Fahrenheit.

The tires would be put in just behind the flame where the heat is lower. The tires provide the fuel to pre-heat the rocks to 1,800 - 2,400 degrees.

It is the 3,400 degree temperature that causes the formation of NOx. By increasing the temperature with TDF in the early part of the process, the raw cement mixture is exposed to less high heat and creates less NOx.

According to the March 1996 EIR report, when TDF replaces 20 to 30 percent of the current fuel used the resulting reduction is dramatic. The usual fuels are coal, natural gas, oil or petroleum coke.

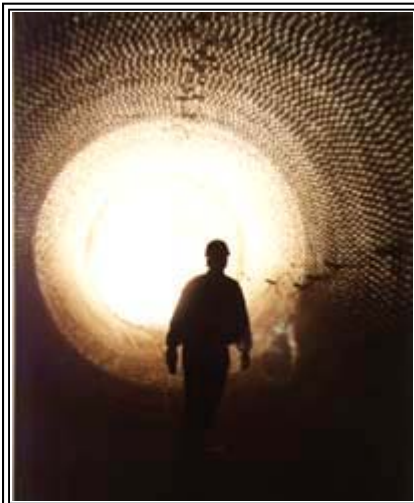
"The Riverside Cement Plant in Oro Grande demonstrated a 41 percent decrease in NOx production when they used TDF," said Robertson. "The SCAQMD is very confident that when we use TDF we will

have a similar reduction. That is why they have directed us to use this technology," he added.

Using tires as fuel in a kiln is not a new process. Germany and Japan have used this technology for more than 25 years with no reported adverse health effects.

Since 1990 more than 33 kilns at cement plants in the United States have been permitted to use TDF.

The Mojave Desert Air Quality Management District (MDAQMD), has permitted three cement plants to use TDF. The results has been dramatic decreases in NOx with no adverse health consequences.



Gary Thornberry examines the brickwork in one of the kilns.

"It was the successes in The Mojave Desert (MDAQMD) and the data from more that 30 years of European and Asian use that prompted the SCAQMD's action," said Robertson.

When using tires as fuel is first mentioned people think of a stack of burning tires giving off thick black smoke, "but that just doesn't happen in an enclosed cement kiln," said Robertson.

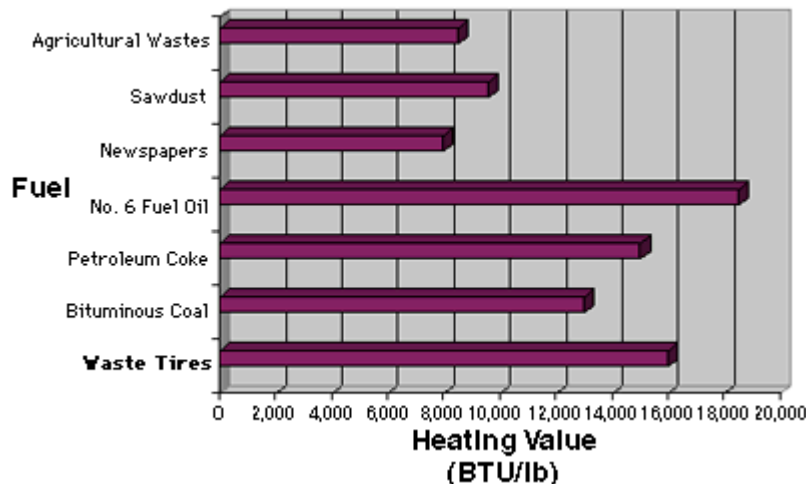
Kilns are man-made volcanoes, so hot that the tires are vaporized on insertion. "The two kilns at our plant are 15 feet around and are the length of one and one-half football fields. They operate at 3,400 to 1,200 degrees" said Robertson.

Pound for pound tires have more energy stored in them than coal.

"When you put this rich fuel source in a super hot cement kiln the tire is completely consumed as fuel, and no smoke is emitted. The steel belts and other left over metals become a needed part of the cement, "

he added.

Comparison of Fuel Characteristics



"I visited the Mitsubishi Cement Plant in the Lucerne Valley and I was impressed with the tire recycling process," said Phyllis Brooks, supervisor of the environmental enhancement program of San Bernardino County Department of Public Health, Environment Health Services Division.

"Using tires as fuel is the best way to get rid of tire piles in San Bernardino County. The tires burn completely, even the steel belts are used as part of the cement; the plants get lower emissions and the smoke stack is clear. I saw no black smoke. I have no objections to them," said Brooks.

Through the Bounce Back Tire Recycling program, San Bernardino County has diverted 24,528 tires from illegal dump sites as of June 30. This includes 2,400 tires collected from Amnesty sites in the County. All of these tires have been taken to cement plants in the high desert for use as TDF.

There is a real problem with the disposal of scrap tires. Since most of a tire is empty space when stacked in the open the resulting air pockets create places for water to collect and lead to increased problems with rats and mosquitoes. When put in land fills they take up a lot of space. They also don't stay buried and tend to float to the top, destroying the landfill cap.

There is one waste tire created for each person in Southern California every year. "It would be nice if there was a site to recycle tires in the San Bernardino Valley. Currently we haul the tires up to desert sites. I would love to work with Colton Cement to send them the tires we collect, " said Brooks.

"I am excited about recycling tires. This is going to remove a lot of scrap tires from the landscape and put them to good use making cement," said Gary Thornberry, environmental manager for Colton Cement.

Cement Plants Using Tires as Fuel

Company	City	Location
Allentown	Blandon	PA
Pt. Ashgrove	Durkee	OR
Ashgrove	Inkom	ID
Ashgrove	Leamington	UT
Ashgrove	Seattle	WA
Blue Circle	Harleyville	SC
Cal.Portland	Tucson	AZ
Cal.Portland	Mojave	CA
Calaveras	Redding	CA
CBR	Tilbury	BC
Cemex	Baja	CA
ESSROC	Frederick	MD
FLCrushed Stone	Brooksville	FL
Holnam, Inc.	Ada	OK
Holnam, Inc.	Clarksville	MO
Holnam, Inc.	Devil's Slide	UT
Holnam, Inc.	Mason City	IA
Holnam, Inc.	Midlothian	TX
Holnam, Inc.	Portland	CO

Holnam, Inc.	Seattle	WA
Holnam, Inc.	Theodore	AL
Ill. Cement	LaSalle	IL
Independent	Hagerstown	MD
Kaiser Cem.	Cupertino	CA
LaFarge	Richmond	BC
LaFarge	Whitehall	PA
Lehigh	Leeds	AL
Lehigh	Union Bridge	MD
Lone Star	Cape Girardea	MO
Lone Star	Oglesby	IL
Medusa	Clinchfield	GA
Mitsubishi	Lucerne Val.	CA
Monarch	Humboldt	KS
No.Tex.Cem	Midlothian	TX
Riverside	Ora Grande	CA
Signal Mt.	Chattanooga	TN
Southdown	Brooksville	FL
St. Lawrence	Joliette	QC

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