



## Good as Gold



Like medieval alchemists, Peerless Mfg. Co. really is turning lead into gold. The new patent-pending process from the Clean Energy and Fuel Co.

(CEFCO) that it is testing for its Environmental Systems Division and for future distribution in North

America can remove valuable byproducts out of industrial exhausts and reclaim them for sale.

“We did not invent the base technology – we are licensing the manufacturing rights from the inventors,” CEO Peter Burlage explains about the process. “We are working with the inventors to do the lab testing and to complete the development and innovation to take it from invention to a fully developed product that can be utilized in multiple industries.”

Peerless Mfg. Co. now has manufacturing rights in the United States for the CEFCO technology. “Basically, the technology can be applied to any exhaust gas coming from any hydrocarbon combustion, even waste incineration,”

Burlage continues. “From the exhaust emission, it can clean up pollutants.” The process is concentrated on removing sulfur oxides, nitrogen oxides, and heavy metals. “The CEFCO system will be at the core of Peerless’ Environmental System offering for the future.”

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“The focus is primarily on hazardous air pollutants that are controlled by the EPA, but it can also handle greenhouse gas pollutants, such as carbon dioxide,” Burlage notes. The process uses a hydra-cyclone process in which a supersonic injection nozzle creates a reactive atmosphere in a chamber. The pollutant is then condensed out selectively into a fluid that is further processed into a saleable byproduct.

Such byproducts include metals, NO<sub>x</sub>, and SO<sub>x</sub> that can be converted into liquid or dry fertilizers. Carbon dioxide can be captured for use in other processes, such as enhancing oil recovery in wells, which will lead to an increase in their production.

This new technology will target stationary sources of air pollution, such as coal-fired and natural gas power generation facilities, incinerators, cement plants, large industrial furnaces and boilers, petrochemical refineries and wood processing facilities, Burlage says.

### Physics, Not Chemistry

Because the new system that Peerless is offering uses physics rather than thermodynamics from chemical reactions, and without the need for heat input or catalysts to reclaim the pollutants, it offers a distinct advantage by handling a variety of pollutants. To remove different pollutants with competing technologies, up to three different processes might be required. With Peerless’ new system offering, all three could be removed in one process.

Two primary market drivers Burlage mentions are environmental regulations and the opportunity to convert what was previously a waste stream into a revenue stream. Consequently, Peerless is now targeting markets that have a high concentration of metals in their exhaust gases and have a good regional market for fertilizer.

The reactor chambers that Peerless is now designing will be made of plate metal in sizes determined by the amount of exhaust flow. “You’ve got the typical



loads of seismic, wind and other atmospheric influences that will impact the sizing, but the size of the reactor is going to be primarily a function of the volumetric flow rate," Burlage explains. "It will be much larger for a massive coal-fired power plant than for a small kiln or process unit." The reactors will be placed between the industrial process and the inlet to the smokestack. "You could replace the stack with this separator," Burlage suggests. Because the CEFCO system is still being tested, the Peerless system costs are not finally determined. However, Burlage expects the capital costs to be similar to those of competing systems, but the operational costs will be lower.

### **Commercial Development**

Processes similar to CEFCO's have been used previously by the departments of energy and defense, in microchip manufacturing, and in the steel industry, Burlage maintains. But those systems did not target any specific pollutant. "They captured everything they could possibly capture – we are targeting very specific pollutants for very high removal rates," he says.

Although Peerless Mfg. Co. is paying a fee to CEFCO for the rights to the process, CEFCO is paying Peerless for its engineering and manufacturing expertise to test the technology for commercial application. Burlage forecasts lab testing of a pilot-sized unit will be completed in the first quarter of 2011, with a demonstration test initiated at a facility and commercial sales beginning soon after that.

"The key part here is that the technology changes from being just a pollution control solution to actually becoming a revenue-generating product," Burlage emphasizes. "That in itself is a sea change in the way industry looks at pollution control; some plants could be looking at quite a lot of revenue of saleable byproducts from their pollution." mt

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