



Innovative Partnerships Program

New Air Pollution Control Technology for the Removal of Nitrogen Oxides from Stationary Combustion Sources

Objective

This innovation is a new nitrogen oxide (NOX)-control technology using hydrogen peroxide in high-temperature flue gas streams for stationary combustion sources. It was developed at the Kennedy Space Center in cooperation with the University of Central Florida (UCF) in Orlando as part of NASA's environmental stewardship program. UCF conducted laboratory-scale testing on hydrogen peroxide injection into high-temperature air streams containing the nitrogen oxide pollutants, resulting in a 98 percent reduction. The chemical by-products were then controlled using a liquid scrubber producing a nitrogen rich water-based waste stream. This patented technology has potential applications in industrial areas, including large utility plants and incinerators. Under an exclusive license with NASA, FMC Peroxygens will evaluate the potential of this technology and create a new market application for hydrogen peroxide (FMC's principal business) in the United States. They plan on bundling the new technology with other proprietary antipollution or pollution-mitigation methods to create a low-capital multipollutant control offering for power plants.

Technology Advantages

Potential cost savings and a favorable regulatory climate represent two potential advantages for the NOX-control technology. The technology is more cost-effective than currently used methods (e.g., selective catalytic reduction, selective noncatalytic reduction) in some emission-control scenarios. A variety of regulations have been driving the current U.S. NOX-control market and pending emission-control rules appear to be favorable for a growing market.



NASAfacts

Commercial Partner

FMC is a leading supplier of hydrogen peroxide, persulfate products, peracetic acid, and other eco-friendly specialty oxidants. Hydrogen peroxide is one of the most versatile and environmentally compatible oxidizing agents. FMC offers a broad range of concentrations and grades of hydrogen peroxide, including ultra-high purity grades used in electronics and propulsion applications. FMC is currently working on developing new applications for hydrogen peroxide and has an active project looking at NOX abatement in the U.S. utility industry.

Approach

FMC will incorporate the technology into its current NOX reduction product line. Power plants with industrial-sized boilers are targeted by FMC in its marketing strategy. Once the technology is established at a facility, the facility will have the opportunity to purchase hydrogen peroxide from FMC to operate the technology.

NASA Benefits

Nitrogen oxides are air pollutants, the emissions of which are strictly regulated under the Clean Air Act. Kennedy Space Center is permitted to emit 60 tons of NOX annually. This technology would provide an economically reasonable option for

the high-efficiency removal of NOX from stationary combustion sources like those found at Kennedy Space Center and other NASA centers.

IPP Role

- Marketed the invention to industry and published NASA Tech Briefs article.
- Provided FMC with status of intellectual property and licensing availability.
- Negotiated and finalized license agreement.

Status

Exclusive license awarded to FMC Peroxygens.

Point of Contact

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