

**ANNUAL PROJECT REPORT  
AS OF DECEMBER 1992**

**1. PROJECT SPONSOR:**

Ohio University  
Athens, Ohio 45701

**2. PROJECT MANAGER:**

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Associate Professor

**TELEPHONE:** (614) 593-2581

**3. OCDO GRANT NO#:** CDO/R-89-4

**4. PROJECT:** Final Report

**5. PROJECT TITLE:** Study of In-Duct Spray Drying Using Condensation Aerosol

**6. PROJECT TERM: FROM** June 1990 **TO** June 1992

<b>7. PROJECT</b>	<b><u>NAME</u></b>	<b><u>COST-SHARE</u></b>
<b>CO-SPONSORS:</b>	OCDO	\$ 89,609
	Ohio University	<u>75,903</u>
<b>TOTAL PROJECT COST:</b>		\$165,512

**I. ABSTRACT**

**8. OBJECTIVES**

Ohio Coals are characterized by high sulfur content. When burned in Ohio power plants, sulfur dioxide is produced and must be removed to meet environmental standards. The in-duct spray drying process is emerging as one of the most cost-effective processes to retrofit Ohio power plants for the removal of sulfur dioxide. This project aims to improve the sulfur removal efficiency of in-duct spray drying process by using a condensation aerosol instead of a dispersion aerosol, such as an atomizer spray. Specifically, the first objective is to develop a condensation aerosol generator to produce aerosols with more surface area and higher sorbent content for reaction. The second objective is to develop a more efficient in-duct spray drying process using condensation aerosol. If successful, it is expected that the cost of burning Ohio coal in power plants should be reduced.

**9. WORK DONE AND CONCLUSIONS:**

The condensation aerosol was generated successfully. It was then tested in a simulated in-duct spray dryer. The sulfur removal efficiency obtained varies from 61% to 96% under various operating conditions. Therefore it is possible to remove 90% of SO<sub>2</sub> using condensation aerosol in an-duct

spray dryer. Since the costs of this technology should be similar to those of dry injection processes. At this stage of the development, it seems that this new technology is attractive both technically and economically.

#### **10. PLANS FOR COMING YEAR:**

Proposals will be submitted to seek funds to develop this process on a larger scale.

### **II. HIGHLIGHTS/ACCOMPLISHMENTS**

11. It is demonstrated that the sulfur removal efficiency in an in-duct spray drying process can be improved to 90% or above using condensation aerosol instead of dispersion aerosol.

### **III. ARTICLES/PRESENTATIONS**

12. Chen, W. J. and Chang, S. M., "Recent Development in Flue Gas Desulfurization," Presented at the 1992 International Power Engineering Conference, Organized by ASME, CSPE, JSME, Hangzhou, China, May 17-21, 1992.

Chen, W. J., Chang, S. M. and Adikesavalu, R., "In-Duct Spray Drying Using Condensation Aerosols," presented at the Ninth Annual International Pittsburgh Coal Conference, Pittsburgh, Pennsylvania, October 12-16, 1992.