

# Airborne Process Commercial Scale Demonstration

## Project Withdrawn

### Participant

Mustang Clean Energy  
(a subsidiary of Peabody Energy)

### Additional Team Members

Airborne Clean Energy, LLC  
— technology supplier/manager

Veolia Water North America  
— regeneration engineer/constructor

Icon Construction — fertilizer  
engineer/constructor

Mustang Energy Company, LLC  
— power plant owner/operator

### Location

Milan, McKinley County, NM  
(Mustang Generating Station)

### Technology

Airborne Process for  $\text{SO}_x$ ,  $\text{NO}_x$ ,  
and mercury control with salable  
fertilizer by-products

### Project Capacity/ Production

346 MW (gross); 300 MW (net)

### Coal

El Segundo subbituminous

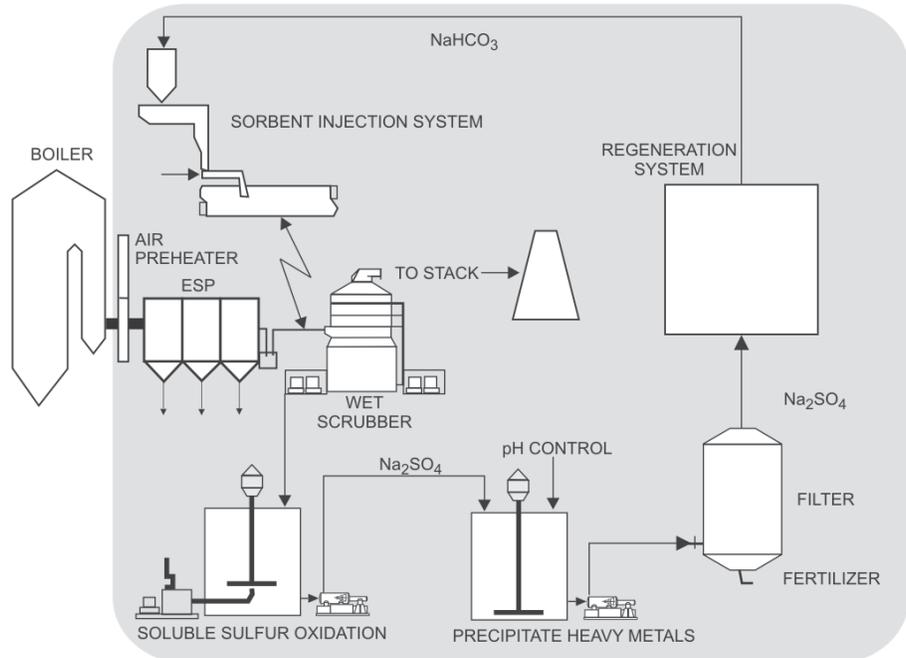
### Project Funding (Proposed)

Total	\$93,195,888	100%
DOE	19,700,000	21
Participant	73,495,888	79

## CCPI-2

## Emissions Control

Mercury	■	$\text{NO}_x$	■
$\text{SO}_2$	■	$\text{PM}_{2.5}$	■



### Objectives

To successfully demonstrate 99.5 percent removal of sulfur dioxide ( $\text{SO}_2$ ), 98 percent removal of sulfur trioxide ( $\text{SO}_3$ ), 98 percent removal of nitrogen oxides ( $\text{NO}_x$ ), and 90 percent removal of mercury while producing a high-quality, high-value granular fertilizer by-product; to improve cost competitiveness of coal-fired capacity by showing that a significant revenue stream can be generated from the fertilizer by-product; to demonstrate the commercial applicability of the Airborne Process to existing and new coal-fired plants; and to demonstrate 96 percent process availability during the first year of operation.

### Technology/Project Description

The project will demonstrate the Airborne Process for high-capture efficiency multi-pollutant emissions control, and high-value fertilizer production at the 300-MW (net) pulverized coal-fired Mustang Generating Station. In the process, dry sodium bicarbonate ( $\text{NaHCO}_3$ ) is injected in the flue gas duct downstream of the plant's particulate matter collection system (an electrostatic precipitator). The  $\text{NaHCO}_3$  mixes with the flue gas containing  $\text{SO}_2$ ,  $\text{SO}_3$  (the  $\text{PM}_{2.5}$  acid gas mist precursor), and  $\text{NO}_x$ . The sorbent and gases further react in a downstream sodium wet scrubber, forming sodium sulfate ( $\text{Na}_2\text{SO}_4$ ) and sodium nitrate ( $\text{NaNO}_3$ ). The process converts vapor-state elemental mercury to an oxidized form that is captured in the wet scrubber and precipitated from solution for safe disposal. The  $\text{Na}_2\text{SO}_4$  and  $\text{NaNO}_3$  compounds are further processed in the regeneration system by reaction with ammonium bicarbonate ( $\text{NH}_4\text{HCO}_3$ ) to form a sodium bicarbonate ( $\text{NaHCO}_3$ ) sorbent, which is reused in the flue gas scrubbing process, and an ammonium sulfate/ammonium nitrate ( $(\text{NH}_4)_2\text{SO}_4/\text{NH}_4\text{NO}_3$ ) mixture. This mixture is processed by Airborne's patented granulation process into a salable fertilizer product.

Project Duration <i>Project Withdrawn</i>	Period of Operation <i>Project Withdrawn</i>	Status/Schedule  *Estimated date
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**Benefits**

The Airborne process offers a high-capture efficiency multi-pollutant control system that enables coal-fired plants to cost-effectively comply with current and projected emission standards, while producing a valuable by-product to help offset a portion of the operating costs and pay down the capital investment. The multi-pollutant control feature reduces capital investment per pound of pollutant controlled by using common capital equipment to control more than one pollutant. In addition to offsetting some of the operating costs with a by-product revenue stream, operating costs are reduced by regenerating sorbent for the process and avoiding solid waste disposal costs.

**Status/Accomplishments**

The project was one of four projects selected under the second round of the Clean Coal Power Initiative (CCPI), which received 13 proposals.

The New Mexico air permitting process has impacted the negotiation schedule. Peabody’s application for an air permit was submitted to the state; however, the state was not anticipated to issue a permit for the project in the near future. In May 2005, DOE informed the participant that documented progress needed to be made toward obtaining an air permit, or negotiation activities could end. On June 14, 2006, DOE sent a letter to the participant withdrawing from negotiations.

<b>S T A T U S</b>	<b>R e p o r t</b>	<i>Final Report Issued</i>	<i>N/A</i>	
		<i>Draft Report Issued</i>	<i>N/A</i>	
		<i>Operation Completed</i>	<i>N/A</i>	
	<b>O p e r a t i o n</b>	<i>Operation</i>	<i>N/A</i>	
		<b>C o n s t r u c t i o n</b>	<i>Construction</i>	<i>N/A</i>
	<b>D e s i g n</b>		<i>Award</i>	<i>N/A</i>
			<b>P r e A w a r d</b>	<i>Withdrawn</i>
	<i>Selection</i>	<i>10/04</i>		

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