

### 7.3 Development and Evaluation of Two-Stage Electrostatic Precipitators

Objective: To evaluate, at large pilot scale, two-stage electrostatic precipitator concepts and to increase the design certainty of two-stage electrostatic precipitators (ESP) and maximize the performance and economics of such systems by understanding the fundamentals of the two-stage ESP.

Approach: Performance and economics of two-stage ESP based on the trielectrode and cold pipe prechargers will be evaluated using a 30,000 and a 10,000 ACFM pilot scale system. Theoretical bench scale and pilot scale studies will be conducted to develop sound theory, design models, and operational procedures for two-stage ESP. Pilot plant research will be conducted to develop improved downstream collectors for two-stage ESP. Planned work includes investigation of electron charging, pulse power, modified electrode geometries and operation procedures.

Rationale: Pilot plant studies have shown that first generation two-stage ESP require 40-50% less capital investment than conventional particulate control technology. However, because of limited design certainty, vendors, architects and engineers, and users, who attended a recent peer review of the program, have all said that rapid commercialization of the technology requires additional pilot plant evaluation and an improved understanding of the two-stage ESP technology.

Resources (\$1000's):

FY81	FY82	FY83
1424	815	650

Milestones:

- ° Complete shakedown of transportable ESP; 4/82
- ° Evaluation report on 30,000 ACFM pilot plant using one type of low sulfur coal and trielectrode precharger; 10/82
- ° Publish performance model for first generation two-stage ESP; 12/82
- ° Complete first field test of trielectrode system on second type of low sulfur coal using transportable ESP; 12/82