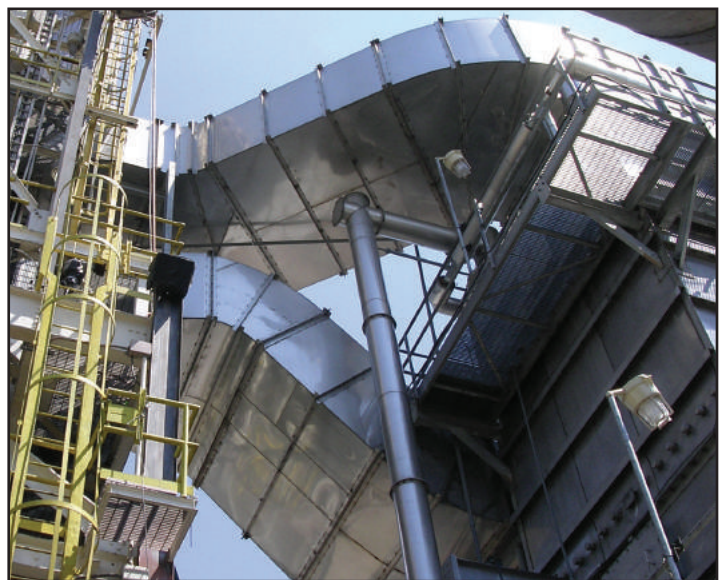
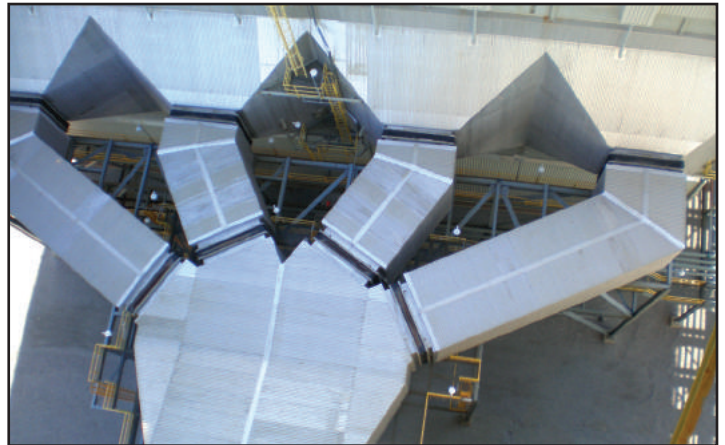


**S**outhern Environmental, Inc. has been designing ductwork for more than twenty-five years. Nearly every one of our projects has plenum or ductwork modifications included as part of the scope. Since we always include physical airflow and CFD modeling as part of our ESP and Fabric Filter designs, it is easy to also include duct modifications in the model study. If we are designing stiffening requirements for existing equipment, we can easily add the duct to that study as well. SEI routinely includes structural support steel and foundations for ductwork in its scope of supply.

SEI is able to engineer the duct “leaner” than most because we design with installation in mind and have significant experience on which to base our designs. As an example, we saved one client \$400,000 (25% of the mass) by redesigning the ducting system with our licensed structural team. This is a common experience in that our design, supply and install business model allows for efficient engineering practices.

Our in-house Structural Engineers are capable of providing complete design of the ductwork and when teamed with our fabrication shops, can fabricate and deliver the duct to the site. SEI is most competitive with ductwork in a design and supply situation. Once the layout and size of the duct has been determined, the design criteria is applied. SEI’s structural team then completes the design with stiffeners, slide plates and, if required, structural supports. SEI designs facilitate minimal total weight, number of slide plates, number of expansion joints and number of structural supports. In some cases the customer’s structural team will supply the structural steel based on the more efficient design, thus keeping their team involved in the structural design and SEI involved with the duct design. To go one step further, SEI is most competitive in an EPC situation involving its in-house, open shop construction crews.

The following case histories are representative of a few of the many projects involving ductwork.



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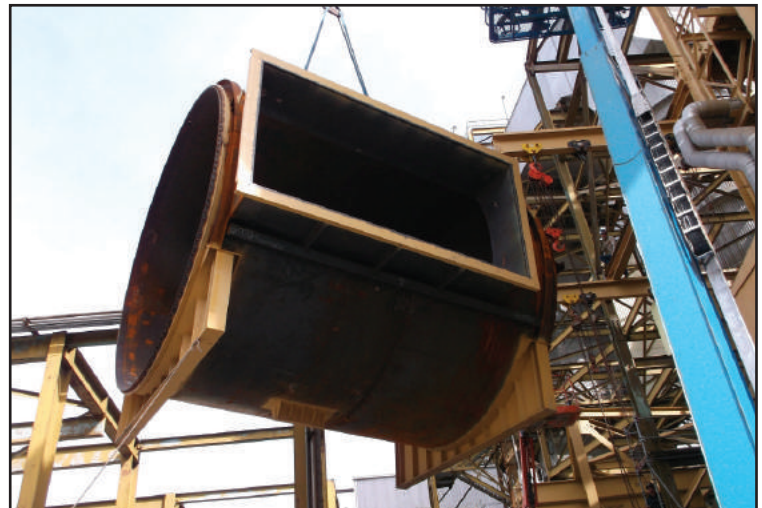
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# SEI Ductwork Capabilities

## PacifiCorp Huntington Plant - Ductwork Fabrication and Installation

SEI engineered, fabricated and installed a horizontal, 18' diameter round duct for the scrubber inlet at PacifiCorp's Huntington Plant in Utah. Total weight for this fast track project was 130 Tons. The steel had to be fabricated in a very short time frame as the contract was not executed until June and steel was due onsite in the beginning of August. SEI was able to expedite the steel fabrication to meet delivery. The installation involved a maximum crew size of thirty-one (31) and the labor involved more than 14,000 man hours. The duration of the outage was August 6, 2014 to November 27, 2014.

Pictured on the right are two of these 18' diameter duct "halves" leaving SEI's fabrication shop. The project was an excellent example of the benefit associated with engineering, fabrication and installation provided by one source, SEI.



## Ameren Duck Creek - Ductwork Fabrication



SEI teamed with Sargent and Lundy on Ameren's Coffeen Unit 2 precipitator project. This was a \$12 million engineer, fabricate and supply project for the ESP and associated ductwork. SEI designed and executed a Physical Flow Model of the ductwork from the air pre-heater to the ESP inlet. SEI also designed the duct supports, access walkways and foundations. This project included 611 tons of ductwork and 275 tons of structural steel.

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# SEI Ductwork Capabilities

## Duke Energy - Marshall Station Ductwork Fabrication

SEI completed a \$100 million new ESP project for Duke Energy's Marshall Station. This project included approximately \$10 million of ductwork. The plant was fan limited on MW output, so the ductwork design had a 3.75 in wg delta P guarantee, with liquidated damages tied to it to insure their fan capacity was not exceeded. When the project was completed, Duke saw an increase in MW output as a result of the new design that achieved an overall decrease in fan loading. Included were 4,000 tons of ductwork and 2,800 tons of structural steel.



## EPCR Crystal River – Unit 4

SEI teamed with EPCR, which is an EPC joint venture between Burns & McDonnell and Zachry. This joint venture was formed to construct AQCS retrofits for Progress Energy's Crystal River Units 4 and 5. The engineer, fabricate and supply project consisted of duct runs from the ESP through four (4) ID Fans and thence to the inlet of the absorber for each unit. The scope included 4,000 tons of ductwork and expansion joints worth about \$10 million.



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