Introduction

We have experienced problems with the precipitator that removes fly ash from the boiler exhaust gas at the Platte Generating Station, with plant outages in Spring and Fall 2001. We have developed specifications for engineering services to resolve these problems and received proposals from three engineering firms in response to these specifications. This report presents the problems, the specifications, and our recommendations.

Summary

The problems are the buildup of fly ash in the precipitator and ducts, the recent plant outages due to this buildup, and the failure of two previous attempts to resolve the problems. The specifications, recently revised, detail the work necessary to address these problems satisfactorily. Of the three engineering firms that responded to our specifications, we recommend Sargent and Lundy as the most capable firm with the lowest bid.

Precipitator Problems

For many years the plant has experienced precipitator problems with ash build up in the first field and on the inlet distribution plates. Plant maintenance people and contractors have repaired cracks in the metal ducts and expansion joints and welded plates over areas of corrosion in the ducts. During plant outages in Spring and Fall 2001, observers have seen moisture in the precipitator and ducts, which contributes to ash build up. We believe that the duct lagging and flashing is inadequate and allows water to leak through, contacting the 750° F. duct and causing thermal expansion in the metal and thus creating the cracks.

Attempts to Resolve the Problems

We have made two previous attempts to resolve these problems, both unsuccessful.

In 1997 Lutz, Daily and Brain was contracted to investigate the problem and recommend a solution. They looked at the ducts during the turbine outage and recommended installing an additional metal roof over the economizer outlet expansion joint area, extending the precipitator roof over the inlet ducts and replacing the corroded duct. During the Spring 2001 outage, they investigated the
area again to see if the condition had worsened. Two insulating contractors visited the plant this Summer, and both believe that the water is entering because the original design of the lagging and flashing was inadequate and because of damage over the years by workman walking on the lagging.

In October 2001, a precipitator repair contractor and an insulating contractor were hired to review the problem. Insulation and lagging were removed over one of the economizer expansion joints and the top of the west precipitator inlet duct. Cracks were discovered in both places, and the extent of the leakage became evident. The original design of lagging and flashing does not have enough overlap or slope to keep water from blowing under the edges, and there are valleys that retain water. There are lots of water leaks near the economizer expansion joints, and the joints appear to be near the end of their life and will have to be replaced. They are metal joints about 8 feet by 30 feet and cannot be replaced in one piece. Investigation is required to determine whether the newer design of high temperature fabric joints can function in this location and, if not, how metal replacement joints can be installed.

Current Situation

We have developed and revised a specification for engineering services based upon our latest findings. In September 2001, a specification for engineering services was sent out for bid requesting services to investigate the problem, determine a way to stop the water ingress, determine the method of duct repair, investigate economizer and precipitator expansion joint material and replacement, and prepare specifications for bid to contractors. After the Fall 2001 outage, we determined that this scope was not entirely correct since duct deterioration was less than expected and the precipitator expansion joints are in good condition. We decided that the platform at the economizer outlet needs to be extended to prevent workmen from walking on the lagging and expansion joint cover while maintaining the oxygen sensors and flue gas analyzer. The precipitator inlet distribution baffles need to be replaced or modified.

Repair Options

We currently have three firms available to provide engineering services in response to our specification, including Lutz, Daily and Brain and two others. We attach an evaluation of these three firms. I have adjusted their bids based on a revised scope which includes the lagging and flashing modifications, the economizer platform addition, the economizer expansion joints replacement, the inlet distribution baffle work, and preparing drawings and specifications for bid. Lutz, Daily and Brain has prior experience with the precipitator problem. Both Black and Veatch and Sargent and Lundy have experience with high temperature duct design and repair. They have visited the plant and understand the problem.

Recommendations

We recommend against awarding the work to Lutz, Daily and Brain and in favor of awarding the work to Sargent and Lundy. Lutz, Daily and Brain received the award in 1997 to investigate the problem, determine a solution, and prepare
drawings and repair specifications for the modifications required. They never completed the work, which is the reason for the credit they offered in their current proposal. Their proposal to install a metal check-plate roof over some of the leaking areas is not a good solution and, in my opinion, will not stop all the leaks and may cause expansion problems. I do not believe that they have enough experience with duct design, flashing and lagging, and expansion joints in high temperature applications to satisfactorily complete this project.

I recommend that the award be made to Sargent and Lundy since they are the lowest bidder with the experience to successfully complete the repairs.