(1) Our limited experience indicates that pitting corrosion failures are common, and your own micrographs suggest that pitting may be occurring. I realize that some pitting attack would not present a serious problem in the case you cite, but could you please comment on the role of pitting corrosion on incinerator alloys.

(2) Our observations indicate that thermal cycling due to shutting down influences the corrosion of different alloys in different ways. That is, if a material is attacked by condensates, then it may be more severely corroded during cycling than some other alloy resistant to this mode of deterioration. Thus, the amount of cycling must be monitored during testing in order to develop a better understanding of this deterioration of alloys. I agree with your conclusions, but I believe that this increased corrosion with cycling is largely due to the increase in time spent at lower temperatures where corrosive condensates form rather than the effect of mechanical damage due to thermal cracking of the refractory material. Wouldn’t cracking of the refractory occur even with limited cycling? Would you please comment further on this thermal cycling effect on the corrosion of alloys.

Corrosion in waste burning situations demands attention and this paper is a small contribution to the growing body of knowledge on the subject. It would be much more useful if it were more specific in describing the measurement techniques used and the conditions of service, or if it tied in to the related work by others. Many publications are available on alloy corrosion in incinerators. This technology will show faster progress if each investigator will try to show how his data relate to those of others instead of as in this paper, just putting out promotional data on a group of proprietary alloys without even mention of the fact that anyone ever did anything like this before!

It is my impression that the authors used a combination of sketchy field information and inadequate laboratory work to prove a point which should have been evident from the start of the Case No. 1 investigation.
Inclusion of a diagram or photograph of the test region depicting the two sections of the combustion chamber would have been helpful to the reader. Even a flue gas analysis would have provided critical environmental data (i.e., 2% fuel oil should give 1300-1500 ppm SO₂).

With the volumes of information in the literature regarding incinerator corrosion and the effects of "fuel" impurities on accelerating metal wastage, it would seem obvious prior to the investigation that a simple laboratory test at elevated temperature in air would not simulate the incinerator flue gas atmosphere and could not be expected to provide an adequate ranking of substitute alloys.

The selection of materials leans heavily on materials manufactured by the author's company without much technical justification for such selection.

I commend the authors for use of the internal penetration as a means for anticipation of future failure since simple metal loss often doesn't predict incipient attack.

In the second case I am intuitively suspicious of weight gain as a true comparative wastage tool since the reaction products may vary in composition. The overall approach in this case took full advantage of available information.

The inclusion of an economic assessment of replacement materials vs frequency (and cost) of replacement or downtime would further improve the usefulness of this paper.

**AUTHOR'S REPLY**

To E. Escalante

(1) The attack upon various alloys exposed in an incinerator burning paint sludges (Case No. 1 in the paper) was found to be in the same order of magnitude as that observed in laboratory tests performed in air. Very little pitting was observed in this case. The incineration environment in this case was very mild. Pitting attack is quite common in severe environments. For highly stressed components such as heat exchangers, cracking could develop following pitting attack.

(2) I agree with your comments on thermal cycling. In making materials selection for high-temperature applications, it is very important to consider possible corrosion by condensates during shutdown. Thermal cycling can also adversely affect the alloy's performance by disrupting the alloy's protective oxide scale.