

# Heat Exchanger Systems Inc.

CONSULTING ENGINEERS

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TELEX 951417

January 9, 1985

Mr. S.J. Maggio  
Arcor  
Maple and Plane Streets  
Rockland, MA 02370

Re: Tubesheet Coatings Tests

Dear Mr. Maggio:

Heat Exchanger Systems, Inc. (HES) has completed the coatings pre-qualification testing in which your coating material was evaluated. As explained in earlier correspondence, our objective was to pre-qualify coatings for an application at Arizona Public Service (APS) Company's Four Corners Station. This application is for several corroded carbon steel tubesheets in two Admiralty brass tubed condensers. In addition to the obvious requirement of corrosion protection, we seek a coating which will permit flexing of the tubesheet (which we believe is occurring) and which will add strength to weakened tube joints.

The sample tubesheets which were coated by your company contained tubes that were lightly rolled. This light rolling provided a tube-tubesheet joint push-out strength of 500 lbs.  $\pm$  100 lbs. prior to application of the coating system. The incremental, additional tube-tubesheet joint strength contributed by your coating system was determined by HES. In addition, deflection tests were performed on the plate which was also coated with your coating system. The following are the results of these tests:

- An average increase in tube-tubesheet joint push-out strength of 650 lbs. was achieved.
- The plate deflected 2.0 inches at mid-span without coating failure.

...and that the deflection resistance of your product is superior. However, the increase in tube-tubesheet joint strength is less than that which is desired and needed by APS. The comparatively low joint strength increase achieved by your product may be a reflection of the substantially lower cross-sectional thickness of the Arcor coating material applied when compared to that of other evaluated coating systems. HES has no doubts about the adequacy of your material in less unusual applications. We wish you success in your endeavors.

Your efforts in participating in this test program are well appreciated by both APS and HES.

Sincerely,

Robert J. Bell

Robert J. Bell  
Director of Engineering

RJB/lbm

cc: George Spires  
HES File #132

NOTE: ARCOR S-16 was applied at approx. 25 mils.  
OTHER systems were applied at approx. 250 mils.  
ARCOR was 1/10th the thickness, yet exhibited  
1/3 to 1/2 the joint strength !