

February 17, 2000

Ms. Helen Armandula
LIGO Livingston Observatory
19100 Ligo Lane
Livingston, LA 70754

Re: Failure Analysis of Aluminum Dumbbell
LIGO Account No 5F518, SEAL Job No 1086

Dear Ms. Armandula:

Two aluminum dumbbell assemblies which were glued to a glass surface were sent to SEAL Laboratories to determine why the adhesive failed.

ANALYTICAL PROCEDURES

The aluminum and adhesive bonding surfaces were examined in a Scanning Electron Microscope (SEM) to determine the failure mode. The surfaces were then analyzed using Electron Spectroscopy for Chemical Analysis (ESCA) a surface analysis technique, to identify any surface contaminants which could lead to failure.

SUMMARY AND CONCLUSIONS

The SEM images of both the aluminum dumbbell bonding surface and the mating adhesive surface, are presented below:

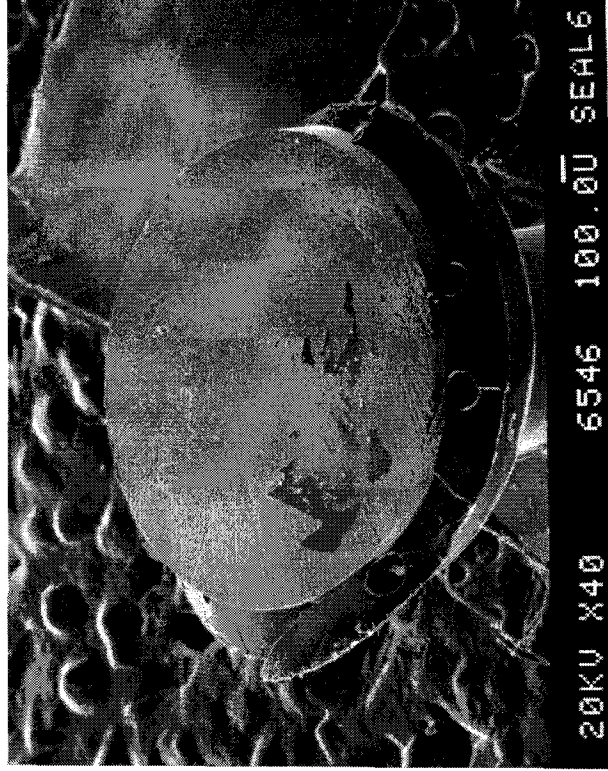


Figure 1. 40X SEM Image of Aluminum Dumbbell Bonding Surface

cc: M. Barton
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J. Romie
D. Shoemaker
S. Whitcomb