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SUPPORT OF THE EIGHT-FOOT HIGH-TEMPERATURE TUNNEL MODIFICATIONS PROJECT

By

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SUMMARY

During the term of the task, an ultrasonic level sensor was developed to measure the liquid level in a storage vessel under high pressures, namely up to 6000 psi. The sensor is described in Ref. 1 (copy of reprint attached). A prototype sensor has been installed in the cooling-water storage vessel of the Eight-Foot High-Temperature Tunnel. Plans are being made to install the readout instrument in the control room, so that tunnel operators can monitor the water level during the course of a tunnel run.

It was discovered that the sensor will operate at cryogenic temperatures. Consequently, a sensor will be installed in the modified Eight-Foot High-Temperature Tunnel to measure the sound speed of liquid oxygen (LOX) as it is transferred from a storage vessel to the tunnel combustor at pressure of about 3000 psi. The sound speed is known to be a reliable indicator of contamination of LOX by pressurized gaseous nitrogen (Ref. 2), which will be used to effect the transfer. Subjecting the sensor to a temperature cycle from room temperature to liquid nitrogen temperature and back again several times revealed no deterioration in sensor performance. The method using this sensor is superior to the original method, which was to bleed samples of LOX from the storage vessel to an independent chamber for measurement of the sound speed.

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REFERENCES

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