

**Temperature Sensor Audit Procedure – Response to Comments**  
**Alaska Department of Environmental Conservation**  
**Monitoring & Quality Assurance Group**  
**February 24, 2011**

The Alaska Department of Environmental Conservation (Department) is providing the following response to questions that we receive regarding ambient temperature audit procedures.

**May a one-point temperature check be used?** A one-point temperature check does not establish linearity over a temperature range, nor does it verify sensor accuracy at low temperatures which are regularly encountered during winter at sites in Alaska. It will only establish that probe's accuracy for that specific audit/calibration point. A proper audit will demonstrate the accuracy of the sensor throughout the range of temperatures it will be operating. Bracketing the entire operating range during an audit is ideal, but the Department acknowledges this may not be feasible due to the unusually wide range of temperatures encountered, and the safety and logistical challenges that exist conducting meteorological monitoring at many remote sites in the state. However, the Department maintains that a multi-point temperature sensor audit (minimum of 3 points) shall be performed, with a low point below 0° F (preferably -10 to -20° F) or whatever is representative of the average low temperature for that airshed.

<http://www.dec.state.ak.us/air/doc/Met%20Measurements%20Data%20Validation%20Table%20Rev%2002.pdf>

**What methods do we recommend for conducting temperature audits/calibrations?** The Department does not endorse any specific method for obtaining temperature audit or calibration test points. However, we believe there are various means to accomplish the above requirements. The simplest procedure may be to conduct the audit when the site's ambient air temperature is at or just below 0° F and use this temperature as the low point. NIST-traceable cold-temperature blocks can typically reach temperatures of -30° C and can be operated from a small generator, or possibly with a battery pack and inverter. A slurry of NaCl/ice can reach approximately -4° F, and a CaCl<sub>2</sub>/ice slurry may yield a temperature as low as -30° F. Frozen CO<sub>2</sub> (dry ice) could also be used at some sites to obtain a low-temperature point; airline regulations may make this difficult if transportation to the site includes commercial flights but transporting dry ice on a chartered flight is allowed.