

1 December 2014

Ms. Cassady Kristensen
Kennecott Utah Copper
4700 Daybreak Parkway
South Jordan, UT 84095

Dear Ms. Kristensen,

With this letter we are submitting the final report, the final data report and all data collected for the Bingham Mine Cold-Air Pool Structure and Evolution Project, a four-year research project that began on 1 October 2010. This research project, conducted under Research Agreement no. 10020948 between the University of Utah and Kennecott Utah Copper, investigated the meteorology in the Bingham Canyon Mine associated with wintertime multi-day or persistent cold-air pools.

Project activities and meteorological analyses from all winters have been reported previously in monthly reports, on a webpage (http://www.inssc.utah.edu/~hoch/BCM_Experiment.xhtml), in Powerpoint presentations at Kennecott and in a presentation at the Utah Division of Air Quality arranged by KUC. In addition, the progress and results of our research have been presented at technical conferences, in a master's thesis, and in peer-reviewed professional journals.

In this final report we have therefore focused on recent analyses and research that have not been previously reported. The final report focuses on meteorological analyses of a cold-air pool episode that occurred in January 2014, including the description and sample application of a new method that we have developed to estimate ventilation and escape fractions from the mine. This report is accompanied by a data report describing the data sets and a 64 GB USB flash drive (UU-BCMEDATA) containing the 37 GB of data collected as part of this project.

This research project has provided partial support for four graduate students in the Atmospheric Sciences Department. Mr. Joe Young's M.S. thesis was fully supported by this project. Smaller contributions to our analyses have also come from Ms. Allison Charland, Mr. (now Dr.) Erik Crosman and Ms. (now Dr.) Manuela Lehner.

Theses and peer-reviewed journal papers include:

Young, Joseph, 2013: Investigation of wintertime cold-air pools and aerosol layers in the Salt Lake Valley using a lidar ceilometer. M. S. thesis, Department of Atmospheric Sciences, University of Utah, 106pp.

Whiteman, C. D., and S. W. Hoch, 2014: Pseudo-vertical temperature profiles in a broad valley from lines of temperature sensors on the sidewalls. *J. Appl. Meteor. Climatol.*, **53**, 2430-2437.

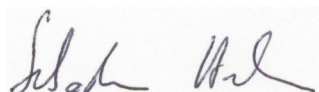
Young, J. S., and C. D. Whiteman, 2014: Laser ceilometer investigation of persistent wintertime cold-air pools in Utah's Salt Lake Valley. *J. Appl. Meteor. Climatol.* Submitted.

We thank you for the research funding and technical and administrative support over the lifetime of this project and appreciate very much the opportunity to be of service to Kennecott Utah Copper.

Best regards,



C. David Whiteman



Sebastian W. Hoch