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Publisher's version / Version de l'éditeur:

FIRE.GOV, p. 3, 2003

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NRCC-43973

**A version of this document is published in / Une version de ce document se trouve dans:
FIRE.GOV, Winter 2003, p. 3**

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Canadian Research Has Implications for Smoke Detectors in Homes

Working with the Underwriters' Laboratories of Canada, researchers in the Fire Risk Management Program of the National Research Council of Canada's Institute for Research in Construction have demonstrated through full-scale experiments that combined ionization-photoelectric smoke detectors, can be, in some cases, more effective than ionization or photoelectric detectors used alone in homes. This research was part of an ongoing effort in the fire protection community to maximize the benefit of current smoke detector technologies to improve residential fire safety.

Two houses in the now deserted town of Kemano, British Columbia, served as test sites for the experiments: a 900-square-foot one-story house and a 1400-square-foot two-story house. In both dwellings, the researchers installed groupings of three types of detectors-photoelectric, ionization and combined photoelectric-ionization to determine the response time to various fires set in the structures.

In general, the results of the experiments were not surprising. Combined ionization-photoelectric detectors responded at the same time, or in some cases, sooner in detecting fires than ionization detectors or photoelectric detectors alone. Surprisingly, however, smoke detectors installed in the "dead air space" (the triangular area 10 cm from ceiling and wall joints in each direction) were among the first to detect fires. Theoretically, smoke detectors should not alarm rapidly or work in this space, and Canadian standards for placement of smoke detectors require that this space be avoided.

The new results relative to detection in the "dead air space" deserve further study to determine to what extent, if any, they were influenced by the temperature in the unconditioned houses (the ambient temperature was around 12°C).

Kemano Fire Studies—Part 1: Response of Residential Smoke Detectors will soon be available for downloading: <http://irc.nrc-cnrc.gc.ca/fulltext/rr108/>.

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Installing different technology smoke detectors in house.



Twenty sheets of newspaper transition from smoldering to flaming during tests.