FINAL 7-May-2003

Agenda Item Summary

Subject for discussion

Radon Resistant New Construction (RRNC)

General direction sought

Staff was instructed to prepare an ordinance that would amend the building code to require radon resistant new construction (RRNC). Staff was instructed to bring the ordinance to the City Council for consideration at the same time as the International Residential Code (IRC), which has been scheduled for September 2003. This study session is get the concurrence of the Council regarding RRNC in advance of IRC adoption.

Specific questions to be answered

1. Is the Council ready to vote on RRNC? The IRC includes a basic RRNC requirement as an option for local governments in high radon areas, and staff has prepared code language and cost-benefit analysis for this option. Alternatives have been suggested. Does Council desire further information on alternatives, or on any other issues, prior to a vote?
2. Does the Council still want to vote on this issue along with the IRC in September? If the Council prefers, it can adopt IRC Appendix F now, although its effective date would be delayed to coincide with the effective date of the IRC.
3. Multi-family issue – Since the IRC covers only single-family detached, duplexes, and single-family-attached (town homes), RRNC would generally not be required for multi-family dwellings. Does Council want staff to include RRNC for other multi-family dwellings in the next update of the Building Code, which is scheduled for 2004?

Executive summary

Radon is a naturally occurring radioactive gas that can enter homes. Prolonged exposure to this gas can increase the potential for lung cancer. In Health Effects of Exposure to Radon (BEIR VI), the National Academy of Sciences estimates that radon causes approximately 14,000 to 21,000 lung cancer deaths per year in the United States. USEPA has designated Larimer County as a radon Zone 1 area, where homes are likely to have radon levels above four pico-Curies per liter of air (pCi/L), and where USEPA recommends use of radon-resistant new construction.

The City has been responding to concerns about radon since 1988, when the city cosponsored a radon study of 100 Fort Collins homes. Since then, our public information program has encouraged residents to test their homes and to mitigate them whenever high

radon levels are found, and many residents have done so. We encourage testing by offering low-cost test kits. Since 1997, the City has required that radon information be given to homebuyers. As a result, testing and mitigation of homes at point of sale has become common. For builders who choose to install radon resistant features, the Fort Collins Building Code specifies how it is to be done. Voluntary RRNC is not common, however. Last year, 1230 single family homes were constructed and only 80 (7%) included a radon-reduction system.

Retrofitting a home for radon reduction costs $800 to $2500, compared with $350 to $500 to install a basic radon system during construction. Many homes are being retrofitted with radon reduction systems, because about ¾ of homes test above four pCi/L in the short-term screening test that is commonly used during real estate transactions. It seems a natural next step for the City to consider whether to include a basic radon reduction system in every new home.

Adopted City plans and policies address this issue. The 2000-03 Air Quality Action Plan calls for consideration of RRNC. Air quality policies in City Plan state an objective, "to increase the percentage of residents taking action to reduce exposure to indoor air pollution." These same policies also call out a higher priority for education and incentives (voluntary) than for ordinances (mandatory). A key policy question is, therefore, does the community benefit of RRNC rise to a level that warrants making it a requirement?

Council members had asked staff to prepare an RRNC ordinance for consideration along with the International Residential Code (IRC). Since the IRC covers only single-family dwellings, staff seeks clarification whether the Council would also like staff to prepare radon requirements for multi-family dwellings. These could be considered when Council next amends the multi-family portions of the Building Code, which is scheduled for 2004.

Staff proposes that City Council consider adoption of IRC Appendix F, which would require a passive radon reduction system in single-family dwellings. This approach is accepted by national and international building code organizations. It was included in the IRC as an option for local governments in high radon areas to adopt, and similar requirements are gradually being adopted by an increasing number of municipalities. We have made minor amendments to Appendix F (Attachment 1) to make it consistent with our current radon requirements. In general, the required construction methods are intended to resist radon entry and prepare the building for post-construction radon mitigation, if needed. The techniques vary for different foundations and site requirements, but the basic elements are:

- Gas Permeable Layer A 4-inch layer of clean gravel or a soil gas mat is placed beneath the slab to allow the soil gas to move freely underneath the house.
- Plastic Sheeting In crawlspaces, plastic sheeting is placed over the crawlspace floor to help prevent the soil gas from entering the home.

- Sealing and Caulking All openings in the concrete foundation floor are sealed to reduce soil gas entry. Plastic sheeting in crawlspaces is sealed to foundation walls.
- Vent Pipe A 3-inch gas-tight or PVC pipe (commonly used for plumbing) runs from the gas permeable layer through the house to the roof to safely vent radon and other soil gases above the house.
- Junction Box An electrical junction box is installed in case an electric venting fan is needed later.

Commenters have suggested various alternatives to the above proposal, which are described in Attachment 2. For example, the City could adopt Larimer County requirements verbatim (Attachment 3). The Air Quality Advisory Board recommended a "full-active" system, i.e., mandatory installation of a fan in addition to the proposed passive radon reduction system. Another commenter suggested a performance-based approach, i.e., instead of requiring RRNC, the City should require that each new house be tested and that the test result must fall below a specific level. However, staff has not developed these alternatives for Council review, because staff believes that the IRC-based proposal is responsive to Council's request, and it is ready for an up-or-down decision. Does the Council desire further development of ordinance alternatives prior to a vote on the issue?

What are the costs and benefits of requiring RRNC? Using the BEIR VI risk estimates based on uranium miner studies, staff calculated (Attachment 4) that constructing 14,000 single-family homes with passive radon reduction systems each costing $500 would result in avoiding about 150 lung cancer cases during the first 75 years the homes are occupied, at a cost of about $50,000 per lung cancer avoided.

The Poudre Health Services District independently examined the costs and benefits (Attachment 5). Using risk estimates based on case-control studies of people exposed to residential radon levels, the Health District calculated that requiring RRNC would cost about $12,000 per year of life saved, which falls within the "good buy" range when compared with other strategies for prevention of disease and premature death. The Health District Board voted to support the City of Fort Collins proposal to require the installation of radon passive mitigation systems in new construction.

Staff gathered input from the public between January and April 2003, using presentations to City Council Boards and other interest groups, articles inviting comment in organization newspapers, and letters to interest groups inviting comment. Staff also created a web site for information and public comments on the proposal. Advertisements in seven publications encouraged the public to comment using the web site or using a voice-mail comment line. Attachment 6 contains a more detailed description of the public outreach effort and comments received, and Attachment 7 is a list of radon questions and answers.

Staff gave presentations to City Council Boards and other community groups, and they generally supported the proposal. There were questions about the logistics of the

proposal such as who would install/ inspect the systems and the required specifications of passive radon systems. There were some concerns about the increased cost of housing, increased government regulation, and differences in City and County regulations. In general, the citizens present thought that the proposal made sense and was a good idea. The Air Quality Advisory Board recommended that the ordinance should go farther and require installation of a fan, making the system active rather than passive.

Comments left via the website and voice mail were mixed. Most of the comments (29 out of 49) were against the proposal, citing the cost of the systems, lack of citizen choice, and skepticism of the health risks associated with radon exposure. There were three neutral comments. The comments supporting the proposal (17 out of 49) cited the health benefits and cost effectiveness of passive radon systems installed during construction versus "retrofitting."

Letters of comment from the Environmental Protection Agency and the Western Regional Radon Training Center strongly support the proposal. Letters from Wellington realtor Doug Anderson strongly opposed both the RRNC proposal and the existing ordinance requiring that homebuyers be given radon information at point of sale. The Fort Collins Coloradoan published an editorial that supports requiring RRNC.

List of attachments

1. International Residential Code Appendix F, amended
2. Alternatives suggested
3. Larimer County radon requirements
4. Cost benefit analysis (by City staff)
5. Cost benefit analysis (by Poudre Health Services District staff)
6. Public input summary
7. Radon Questions and Answers