

Protecting People and Families from Radon

A Federal Action Plan for Saving Lives

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A collaborative effort led by the U.S. Environmental Protection Agency with the U.S. Department of Health and Human Services, U.S. Department of Agriculture, U.S. Department of Defense, U.S. Department of Energy, U.S. Department of Housing and Urban Development, U.S. Department of Interior, U.S. Department Veterans Affairs, and U.S. General Services Administration.

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A FEDERAL ACTION PLAN FOR SAVING LIVES

The *Federal Radon Action Plan (Action Plan)* presents a multi-year approach to protecting public health, especially of families, by reducing the risk from radon exposure. The federal government's policies and programs directly or indirectly have influence over an estimated 7.5 million homes, schools, and daycare facilities. An estimated one-half million of these homes, schools and daycare facilities potentially have an elevated radon level.

This *Action Plan* is the result of a collaborative effort led by the U.S. Environmental Protection Agency (EPA) with the U.S. Departments of Health and Human Services (HHS), Agriculture (USDA), Defense (DOD), Energy (DOE), Housing and Urban Development (HUD), Interior (DOI), Veterans Affairs (VA) and the General Services Administration (GSA). Representatives of these agencies have met regularly since November 2010 to assess the government's current activities to address radon risks and identify ways to increase the effectiveness of federal action to reduce lung cancer risk from indoor radon exposure. The *Federal Radon Action Plan Workgroup* has focused on leveraging programs and increasing the efficiency of radon-related activities to have a greater impact on public health. Healthy People 2020—a ten year, national agenda for improving the health of all Americans—includes the following objectives for radon risk reduction.

- Have an operating radon mitigation system in 3.1 million (30 percent) of the estimated 9.2 million homes with an elevated radon level.
- Increase to 100 the percentage of new single family homes constructed with radon-reducing features in high-radon potential areas.

The Healthy People 2020 radon objectives demonstrate that exposure to elevated indoor radon levels is an important national public health issue. Healthy People 2020 also points to solutions: mitigate high radon levels and construct radon-resistant new buildings.

The strategy for federal radon action presented here outlines actions federal agencies can take within existing resources and program capacities to advance the Healthy People 2020 radon objectives and launch an ambitious national effort to end all avoidable radon-induced lung cancer death. This *Action Plan* envisions unified federal action as the catalyst to increased and more effective state

and local activity, private and nonprofit sector engagement and voluntary individual action. Strategic federal action can demonstrate the importance, feasibility and value of radon risk reduction in ways that spur radon partners and individual Americans to action.

The *ultimate* public health goal this Action Plan highlights is the elimination of preventable radon-induced cancer through expanded radon testing of existing homes, mitigation of high radon levels within those homes, and radon-resistant new construction. This strategy lays a path to achieving that goal and meeting the Healthy People 2020 radon objectives.

The Problem

Radon causes an estimated 21,000 lung cancer deaths in the United States every year.¹ Radon risk estimates are based on extensive epidemiological studies, and there is convincing evidence about its link to lung cancer.

- According to Dr. R. William Field, U.S. radon expert (University of Iowa), radon is the leading environmental cause of cancer death in North America.²
- Radon is the second leading cause of lung cancer after active smoking and the leading cause among non-smokers.³
 - Smoking has a synergistic effect on radon-related lung cancer.
 - Source reduction from radon is the only way to protect non-smokers from radon-related lung cancer.
- An estimated 88 percent of Americans do not know that radon is the second leading cause of lung cancer, according to survey data.⁴

Many radon-induced lung cancer deaths are preventable.

- Testing for and mitigating high radon levels uses tested, time-proven, straightforward techniques.
- There is extensive knowledge on how to build new homes to resist radon intrusion.

Many low- and middle-income Americans either cannot or will not pay for radon mitigation.

- Without financial assistance, many low income Americans do not have the financial resources to mitigate high radon levels.

- Without economic incentives, many middle income Americans are not yet convinced of the value of mitigating high radon levels.

Because of recent housing booms, today there are more homes in the United States with elevated radon levels than ever before.⁵

Current Reality

Too few homes, schools and daycare facilities are tested for radon. An even smaller number are mitigated when high radon levels are found. Although the technical knowledge exists to reduce radon risks, the United States has not yet achieved the level of voluntary action required to make a real impact on indoor radon exposure.

Three fundamental — and interrelated — barriers prevent widespread, voluntary radon risk reduction:

- Limited public understanding of the gravity of the risk and the fact that the solution is proven and uses readily available technology.
- Perceived high costs of mitigation and radon-resistant construction relative to the perceived increased value at the time of resale.
- Limited nationwide availability of certified radon measurement and mitigation professionals.⁶

Accordingly, there are three major and interrelated opportunities for changing the status quo, dramatically reducing radon exposure, and preventing thousands of lung cancer deaths annually:

- Demonstrate the importance, feasibility and value of radon testing and mitigation.
- Provide economic incentives to encourage those who have sufficient resources to test and mitigate, and provide direct support to reduce the risk for those who lack sufficient resources.
- Build demand for services from the professional, nationwide radon services industry.

Radon risk is reduced when homes, schools, and daycare facilities that test high for radon are mitigated, and when new buildings are constructed using radon-resistant techniques. Building owners, occupants, landlords and managers, architects, builders and many others can take actions to reduce radon risk, but few localities mandate radon testing, mitigation or radon-resistant construction, and current levels of voluntary action are insufficient to address the risk.⁷

In existing homes, most radon testing and mitigation occurs as part of a real estate transaction — less than 30 percent of tested homes are tested outside of a real estate transaction. Most homeowners explain their decision not to test for or mitigate high radon levels based on misperceptions: the perceived high cost relative to low return at the time of resale on the mitigation investment and underestimating the seriousness of the health risk. No states require disclosure of radon risk during real estate transactions; although in a limited number of states, real estate disclosure has become the norm.

In renter-occupied homes, there is virtually nothing a renter can do to limit exposure to high radon levels and there are no known requirements or incentives for landlords to test or mitigate.

In new construction, the small percentage of homes built radon-resistant are the result of either a voluntary commitment to a green building standard — and not all green building standards address radon — or a local requirement to use radon-resistant construction techniques in high radon risk zones. Very few localities require radon-resistant construction in high risk zones.⁸ Provisions that require radon-resistant new construction in universally adopted building codes, such as the International Code Council's construction codes, can address this issue; many localities and agencies use these codes to guide their construction specifications.

In the case of schools and daycare facilities, there are no federal health and safety requirements for radon that address risks to occupant health. Few states and localities address radon in their requirements or guidance for school and daycare construction and operation.

The Solution

The *Federal Radon Action Plan* presents a strategy for launching a transformation in public attitudes and behavior towards radon risk in the United States. Key state, industry and nonprofit sector allies stand ready to build on the federal strategy to create and sustain a national radon risk reduction campaign. The national campaign will increase public understanding of the risk; advance effective national, state and local radon policy; promote testing, mitigation and radon-resistant construction as standard practice in green building, real estate and construction industries; and deliver financing and other incentives to help homeowners mitigate high radon levels. This national radon effort — led jointly by the federal government and key national partners — will fundamentally change home builder, buyer and owner expectations and behavior, to promote testing in all American homes and mitigation of high radon levels wherever they are found.

Reducing risks posed by radon can be implemented as part of a holistic approach to reduce the overall risk of lung cancer in the home. Since the lung cancer risk from high levels of radon is high for everyone, all people, whether they smoke or not, should test for and mitigate high levels of radon in their homes. In addition to reducing radon levels, smokers should quit smoking and families should establish household rules against smoking tobacco products in the home. This comprehensive approach can reduce risks from lung cancer and other diseases as well as the synergistic risk from active smoking and radon exposure. Testing for and mitigating high levels of radon, quitting smoking, and eliminating exposure to secondhand smoke are the best ways to reduce the overall risk of lung cancer.

Radon Risk Reduction: An Opportunity for the Federal Family

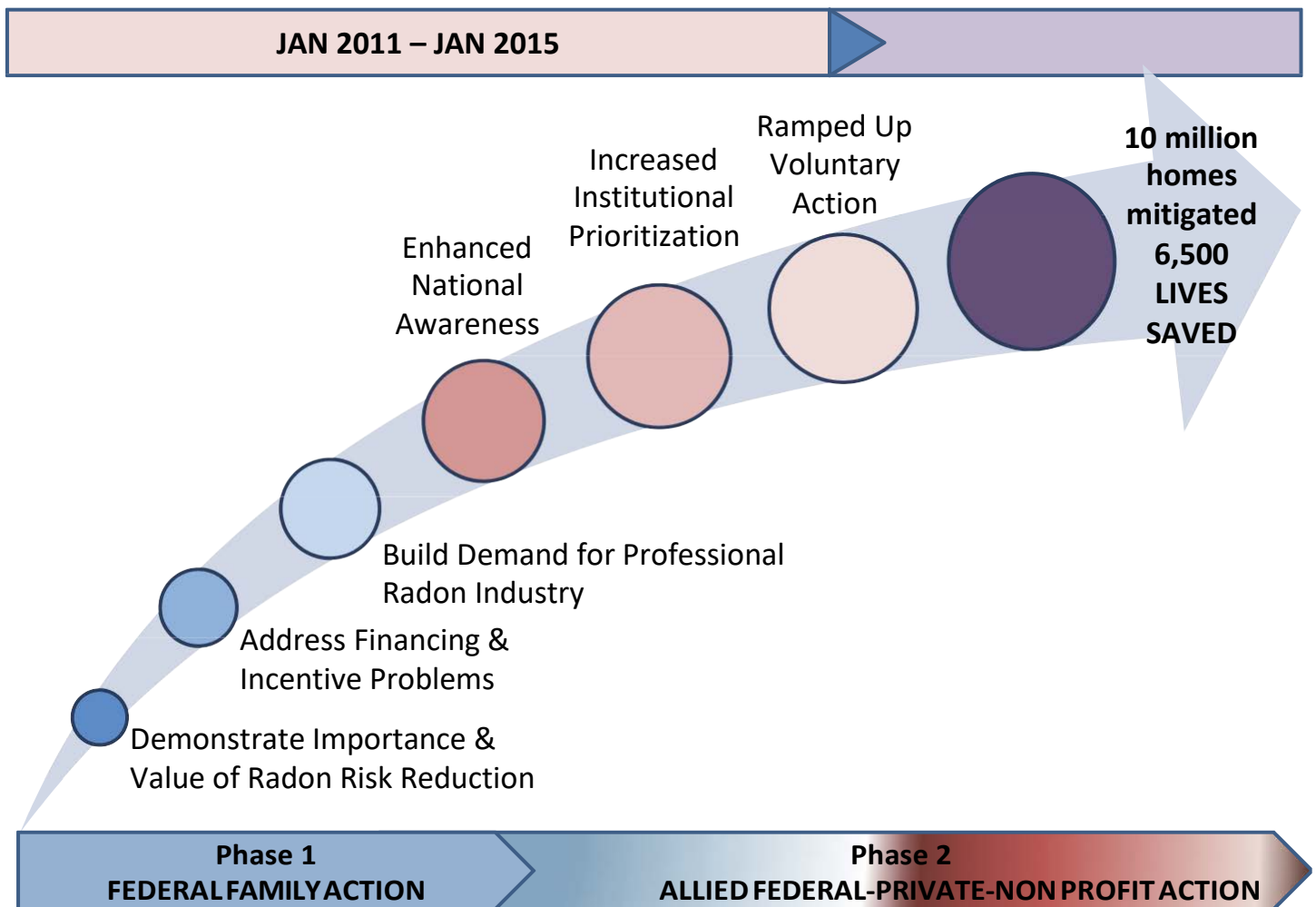
Federal agencies, departments, offices and programs must respond to Presidential and Congressional calls to address

public health risks and preventable illness. By extending the reach, scope and impact of existing programs, the federal government can immediately reduce lung cancer risk for occupants in the homes, schools and daycare facilities the government owns, manages and administers; promote radon risk reduction in the homes, schools and daycare facilities its programs influence; and advance policies to help homeowners, buyers and builders address radon risk nationwide. Collectively, these actions have the potential to represent a measurable and comparatively cost-effective federal approach to improving public health and preventing cancer deaths.⁹

The Federal Family's Power to Save Lives: Leadership, Leverage and Visibility

The federal approach to radon takes advantage of the government's unique ability to lead through demonstration, leverage programs across agencies to maximize their benefits, and use the broad visibility of government action to drive public understanding and focus public activity.

ELIMINATING PREVENTABLE RADON RISK



Leadership

The federal government has direct access to an estimated five million homes, schools and daycare facilities.¹⁰ In addition, the federal government has indirect access to an estimated 2.5 million homes through its financing and standard setting programs.¹¹ Federal programs that own, manage, administer, finance and develop policies for homes, schools and daycare facilities can lead efforts to reduce lung cancer risk from radon by delivering, requiring and financing radon testing and mitigation, and promoting radon-resistant construction.

Leverage

The federal government can leverage its programs that fund activity in homes to reduce radon risks during home assessment, renovation, retrofit, rehabilitation, repair and other home-based programs.

Visibility

The federal government can use its purchasing power and the power of its unified voice to deliver a clear message to help increase public understanding of the risk and the simplicity of the solution, and build the market for certified radon testing, mitigation and radon-resistant construction services. Unified action addressing radon risk in federally-owned, managed and financed homes and promoting radon risk reduction nationally will stimulate the radon mitigation industry, help save jobs for the estimated 3,000 certified radon professionals active today and create jobs for new industry members. The federal government has an unparalleled ability to deliver a consistent national message about the seriousness of the risk to accompany its ramped-up action on radon.

PROTECTING LOW-INCOME AMERICANS

The federal government has a unique opportunity to address radon risk in low-income communities. Most federal programs that own, manage and finance housing or deliver home improvements focus on low-income homes. A significant proportion of the radon risk reduction that the federal government can deliver and influence will protect the lives of low-income Americans who would otherwise have no way to reduce their radon risk.

Laying the Groundwork for Federal Action

In November 2010, May and June 2011, federal leaders convened to discuss ways the federal government can promote radon risk reduction, determine a process for capturing these commitments and implement the commitments after the *Action Plan's* release. The table on page 5 presents a framework used to design a federal response to radon and identify strategies agencies can pursue to advance radon risk reduction on a national scale.

FEDERAL GOVERNMENT ACTIONS TO REDUCE RADON RISK

DEMONSTRATE
the importance
of radon risk
reduction

- EPA, HUD, USDA, and HHS will collaborate on an interagency radon outreach initiative that builds on existing campaigns addressing home-based risks and or healthy homes.
- DOD will develop a communications campaign to educate all personnel—living both on and off base—about the health risks associated with radon exposure and solutions to address these risks.
- HUD will incorporate radon testing and mitigation into as many agency programs as possible to include public and other assisted housing.
- HUD will prepare a plan within the next 18 months to collect radon test results as part of its ongoing inspection protocol of public and assisted housing as the first step in conducting a baseline study of its housing stock.
- HHS will include radon in healthy homes activities (CDC National Center for Environmental Health).
- HHS will work to increase radon awareness among states participating in the National Comprehensive Cancer Control Program (CDC Division of Cancer Prevention and Control).
- HHS and EPA will explore including radon in environmental health tracking (CDC's National Center for Environmental Health).
- HHS will update the current Toxicological Profile for Radon (Agency for Toxic Substances and Disease Registry).
- DOE and HUD will promote radon awareness through their weatherization and healthy homes outreach.
- DOI will send a message on the hazards of radon to its approximately 70,000 employees.

**ADDRESS
FINANCE**
and incentive
issues to drive
testing and
mitigation

- HUD's Power Saver Loan Program will make radon mitigation an explicitly eligible/allowable expense within the 25% non-energy related set-aside.
- USDA will develop working agreements with nonprofits that can assist 504 home repair grantees and loan recipients in funding mitigation efforts whenever radon is found at or above the EPA 4 pCi/L action level.
- USDA will educate Rural Housing Guarantee Program lenders and State Housing Finance Authorities about radon risks and encourage the testing of existing homes in Zones 1 (high) and 2 (medium) areas.
- USDA will leverage financing through renovation/repair programs and essential community programs to test and mitigate radon in schools and daycare facilities.
- VA will promote radon testing and mitigation through a comprehensive disclosure of the radon health risk to borrowers.
- VA will explore providing a radon mitigation cost set-aside through its Home Loan Guarantee program.
- EPA, HUD and USDA will engage the philanthropic community to support radon risk reduction in the context of their support for local healthy homes programs.
- EPA and Treasury will work together to facilitate the deductibility of radon testing/mitigation costs within Health Spending Accounts.

**BUILD
DEMAND**
for services
from the
professional,
nationwide
industry

- DOD will review and update, as appropriate, the Unified Facility Criteria to reflect current standards for radon measurement, mitigation, and radon-resistant new construction for low-rise buildings (e.g., multifamily, schools, daycare facilities).
- DOD will identify the universe of low-rise buildings in high radon potential areas (Zone 1) and, for those buildings not previously addressed, develop a testing and mitigation plan for those at or above the EPA 4 pCi/L action level.
- EPA will invest in new standards of practice for school measurement and mitigation, multifamily mitigation, and quality assurance.
- DOE will finish the radon study as part of the National Evaluation to determine whether the Weatherization Assistance Program (WAP) impacts radon levels in homes.
- DOE will test various remediation protocols to determine what level of effort is required when radon is discovered in a home or when the level rises after WAP services are delivered.
- DOE will add a healthy homes curriculum to WAP training requirements that includes radon identification and remediation protocols.
- DOE will include training, described above, as part of DOE's routine health and safety trainings such that every worker in the WAP network will be trained over the next 2 years.
- HUD's Healthy Homes Production Program grantees will check for sources of radiation, such as from radon, as required by HUD's Healthy Homes Rating Tool. Mitigation is required for high radon levels.
- USDA will collaborate with the Cooperative Extension Service (CES) to focus their testing efforts on new and existing Rural Housing financed properties.
- USDA will educate multifamily housing developers about radon risks and what construction mitigation strategies can be used when radon is found.
- USDA will promote radon testing and mitigation through Rural Development Housing and Community Facilities Programs.
- DOI, through the National Park Service, will test approximately 5,000 residential units for radon.
- DOI, through the Bureau of Indian Affairs, will test approximately 3,500 residential units and 500 schools, and will work with Tribes to increase awareness of the radon risk.
- GSA will explore testing for radon and mitigating high levels in childcare facilities through the Federal Real Property Program.
- GSA will promote professional radon services to federal tenants.

SOURCES

¹U.S. Environmental Protection Agency. 2003. *EPA Assessment of Risks from Radon in Homes*. Accessed April 16, 2011. Available online at <http://www.epa.gov/rpdweb00/docs/assessment/402-r-03-003.pdf>.

²Field R.W. (2011). "Radon: An Overview of Health Effects." In: Nriagu JO (ed.) *Encyclopedia of Environmental Health*, volume 4, pp.745-753. Burlington: Elsevier.

³World Health Organization. 2009. *Handbook on Indoor Radon: A Public Health Perspective*.

⁴"Americans in the Dark About Lung Cancer." Accessed April 19, 2011. National Lung Cancer Partnership. 2011. Available online at: <http://www.nationallungcancerpartnershipnews.org/omk.php?pid=1188&sid=S2011042007190370S6NP&pr=1804>.

⁵Angell, W.J. 2008. "The US radon problem, policy, program and industry: achievements, challenges and strategies." *Oxford Journals, Radiation Protection Dosimetry*, Vol 130, Issue 1: 8-13. Available at: <http://rpd.oxfordjournals.org/content/130/1/8.full?keytype=ref&ijkey=oUK4il9FRACYAS5>.

⁶The National Environmental Health Association National Radon Proficiency Program (NEHA NRPP) and National Radon Safety Board (NRSB) offer independent certification and accreditation for radon professionals; many state radon program websites provide links to certified service providers.

⁷"RRNC Codes by State." Accessed April 13, 2011. http://www.epa.gov/radon/rrnc/code_listing.html.

Environmental Law Institute. 2004. *Database Excerpt: Radon Laws*. Database of State Air Quality Laws. Accessed April 13, 2011. Available online at: http://www.afhh.org/hps/radondocs/eli_database_radon_state_laws.pdf.

⁸12.2 percent of new single family homes built during 2008 had radon-resistant features. Thirty-one percent of those homes were built in Zone 1. National Association of Home Builders (NAHB). 2009. "Number of Homes Built with Radon-Resistant New Construction." National Association of Home Builders (NAHB) Research Center Survey of New homes Built During 2008.

⁹U.S. EPA estimates an average cost per life saved of \$80,000 for radon-resistant new construction, and \$400,000 for mitigating existing homes. Unpublished EPA benefit-cost data (2004, updates); based on the Technical Support Document for the 1992 Citizen's Guide to Radon (EPA 400-R-92-011, May 1992).

¹⁰U.S. General Services Administration (GSA), 2009. "FY 2009 Federal Real Property Report."

¹¹U.S. Department of Housing and Urban Development (HUD). FHA Mutual Mortgage Insurance Fund. (Annual Report to Congress.) Information available at: www.expectmore.gov.

United States Department of Agriculture. Rural Housing Single Service Family Housing Loan Guarantees and Direct Service Loans. Information available at: www.expectmore.gov.

Department of Defense. DOD Defense Housing. Information available at: www.expectmore.gov.

Veteran Affairs. VA Home Loans. Information available at: www.expectmore.gov.

APPENDIX 1: OVERVIEW OF CURRENT FEDERAL ACTION ON RADON

AGENCY	CURRENT ACTION ON RADON
U.S. Department of Agriculture (USDA)	<ul style="list-style-type: none"> USDA partnered with EPA on the <i>Healthy Indoor Air for America's Homes</i> program in the mid 1990s, a national initiative through Cooperative Extension Systems to assist states with the measurement and mitigation of radon. USDA developed radon guidance for federal land managers, specifically "Rehabilitating Affordable Rural Housing" and "A Guide for Financing Radon Mitigation to Reduce Exposure in Existing Housing." USDA supported public outreach on radon through education programs, public newsletters, promotion of the Radon Poster Contest, and National Radon Awareness Week.
U.S. Department of Defense (DOD)	<ul style="list-style-type: none"> DOD currently has an active program to test housing stock, and to mitigate if levels are found to be at or above the EPA radon action level of 4 pCi/L. The DOD <i>Unified Facilities Guide Specifications</i> address radon testing and mitigation. Radon testing and mitigation are also incorporated into three sets of active DOD building criteria.
U.S. Department of Energy (DOE)	<ul style="list-style-type: none"> DOE is conducting a field study on the link between weatherization and radon levels in homes through the Weatherization Assistance Program. The Weatherization Assistance Program's new Program Guidance permits Weatherization crews to test for radon. Radon measures are addressed in DOE's "Workforce Guidelines for Home Energy Upgrades," released through Vice President Biden's "Recovery Through Retrofit" Initiative.
U.S. Department of Health and Human Services (HHS)	<ul style="list-style-type: none"> The Centers for Disease Control and Prevention (CDC) has co-authored every version of the <i>Citizen's Guide to Radon</i> with EPA. The National Institutes of Health (NIH) have conducted research on radon, including occupational and residential research on the health effects of indoor radon, and an updated analysis of radon exposure data from miners. NIH contributed to the National Academy of Sciences' Biological Effects of Ionizing Radiation, Reports IV and VI (BEIRIV, BEIRVI), and participated in the North American Residential Radon pooling study. NIH gave testimony on radon health risk to the President's Cancer Panel. The Office of the Surgeon General (OSG) issued a "National Health Advisory on Radon" in 2005, and included radon in its 2009 "Call to Action to Promote Healthy Homes." OSG has coordinated with EPA on public service announcements highlighting the Surgeon General's 2005 advisory.
U.S. Department of Housing and Urban Development (HUD)	<ul style="list-style-type: none"> HUD incorporated radon into its healthy homes strategic plan, <i>Leading Our Nation to Healthier Homes</i>. The HUD Office of Healthy Homes is seeking increased collaboration with other HUD offices that oversee housing assistance and mortgage programs to promote radon testing and mitigation. A Radon and Mold Release Agreement (HUD-9548-E) is required in all sales contracts for HUD-acquired single family properties. A HUD form discussing radon and home inspections (HUD-92564-CN) is required to be provided by mortgagees to prospective homebuyers at first contact for all new transactions involving single family FHA mortgage insurance on existing property. The HUD Section 203(k) mortgage financing program is HUD's primary tool for rehabilitating and improving single family homes. The program allows home buyers to finance the purchase and repair or improvement of a home using a single mortgage loan. Reducing radon levels in a home is an improvement that can be financed through the Section 203(k) program.
U.S. Department of Interior (DOI)	<ul style="list-style-type: none"> The U.S. Fish and Wildlife Service has a radon policy for measurement and mitigation for radon exposure in owned or leased buildings and non-public water sources. The U.S. Fish and Wildlife Service has a Hazard Communication Program which provides a framework for providing health and safety information and training for special emphasis programs, including radon.
U.S. Department of Veterans Affairs (VA)	<ul style="list-style-type: none"> The VA Home Loan Guaranty program tends to be guided by HUD policy on radon testing and mitigation. VA is reviewing its real estate valuation/appraisal procedures to account for radon.

AGENCY	CURRENT ACTION ON RADON
U.S. Environmental Protection Agency (EPA)	<ul style="list-style-type: none"> • EPA provides the scientific foundation on radon, and facilitates the development of technical guidance, protocols and standards needed for risk reduction. • EPA provides \$8 million in radon grants to states and tribes each year to fund state-wide radon risk reduction programs. • EPA supports outreach and education campaigns, as well as partnerships with states, tribes, NGOs and the radon services industry.
U.S. General Services Administration (GSA)	<ul style="list-style-type: none"> • GSA conducts radon testing in all of its leased and new-owned buildings. If levels are found to be at or above the EPA radon action level of 4 pCi/L during testing, the property must be mitigated and retested following the mitigation. • Radon services are included in two GSA Schedules.

APPENDIX 2: FEDERAL RADON ACTION PLAN WORKGROUP — KEY MILESTONES AND AGREEMENTS

This workgroup is housed under the interagency Healthy Homes Workgroup. Over the next year the workgroup will continue to meet regularly. The primary function of the group will be to implement the *Action Plan*. Key benchmarks for the group include:

- Monthly-bi-monthly workgroup meetings
- Quarterly meetings with managers
- Mid-year check-in with senior leaders
- One-year anniversary reconvene with senior leaders to recognize achievements