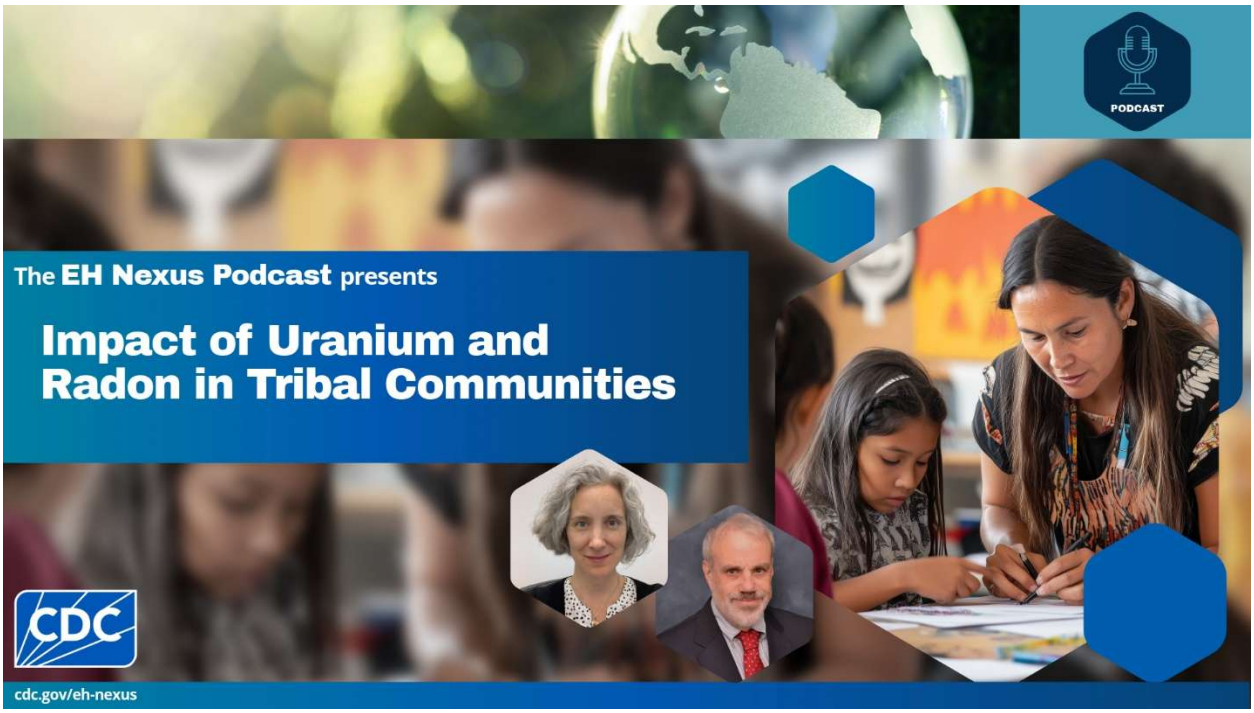

[00:00:00.00] - EH Nexus Host

Hello, everyone.

[00:00:05.19] - EH Nexus Host

Welcome back, and thank you for joining this episode of CDC's Environmental Health Nexus podcast, where we talk about environmental health topics. Today, we're joined by Jamie Rayman and Paul Charp. Studio note, you'll hear an AI host voice guiding today's conversation.

[00:00:21.17] - EH Nexus Host

During this episode, we'll discuss uranium and radon, including how these exposures can affect tribal communities and practical ways to reduce risk. We hope this helps you understand the issue and know where to find trusted information. Let's begin with brief guest introductions.

[00:00:37.08] - Jamie Rayman

Hello, everyone.

[00:00:39.19] - Paul Charp

Thank you for having us.

[00:00:42.20] - EH Nexus Host

Please tell us a little about yourself and your role.

[00:00:46.06] - Jamie Rayman

Hi, my name is Jamie Rayman. I am currently a Regional Director for the Agency for Toxic Substances and Disease Registry, or ATSDR, where I lead the Region 9 Office to resolve environmental health concerns across the Pacific Southwest, including 89 federally recognized tribes. For the past 10 years, I've been working alongside other government agencies to communicate about uranium and radon with Navajo communities.

[00:01:15.07] - Paul Charp

My name is Paul Charp. I am a health physicist, a radiation safety professional. I work in CDC's National Center for Environmental Health in the Radiation Studies program. I have been with CDC and ATSDR for about 37 years, studying radiation and radioactivity effects on public health. In my work, I have looked at several mining areas in American Indian lands, including Navajo land, several Pueblo areas, and other tribal lands impacted by uranium mining across the nation.

[00:01:53.17] - EH Nexus Host

How did CDC/ATSDR become involved in working with tribal communities, including the Navajo Nation, regarding uranium and radon?

[00:02:03.25] - Paul Charp

1979, a uranium mill in Church Rock, New Mexico, had a failure in one of its retention ponds. The failure released about 1 million gallons of radioactive waste in water. Large areas of the Navajo Nation were contaminated by this wastewater. Also, there are several hundred uranium mines in the Navajo Nation, some of which were family-run operations. The mine waste were left on family properties. In the mid-1990s, the Environmental Protection Agency, the EPA, had concerns about potential exposures of one of these mines, so ATSDR released a public health advisory. ATSDR public health advisories identify an immediate threat to human health from a hazardous substance and include recommendations to reduce exposure and any threat to human health.

[00:03:07.08] - EH Nexus Host

How did uranium and radon exposure become an issue in the Navajo Nation?

[00:03:13.02] - Jamie Rayman

Rock formations on the Navajo lands contain large amounts of naturally occurring uranium, both at the surface and underground. Between 1944 and 1986, miners removed nearly 30 million tons of uranium ore

from over 500 mines on Navajo Nation lands. Four uranium processing mills were also built on Navajo lands. The uranium was largely used to build nuclear weapons during the Cold War. Persons from the Navajo Nation worked in and near the mines and mills. Many lived and raised families nearby.

[00:03:51.29] - Jamie Rayman

The mining occupation poses many physical dangers to miners, and uranium mining poses additional health risks because of radioactivity. Until the 1980s, few safety controls existed to protect workers from the dangers of uranium mining, and families of uranium workers could be at risk of exposure to the dust and materials inadvertently brought home in workers clothing and shoes.

[00:04:21.16] - EH Nexus Host

How might people in Navajo Nation continue to be exposed to uranium and radon?

[00:04:27.06] - Jamie Rayman

Well, presently, uranium mining and milling has ceased in the Navajo Nation, but the historic mining and milling activities created and left behind waste rock and mine and mill tailings, all of which may contain uranium, radon, and other harmful elements and chemicals. That's why it's important to stay away from current and former mine sites. Staying away from the sites reduces potential exposure to direct contact with uranium, radon, dust, and radioactive materials.

[00:05:00.22] - Jamie Rayman

Many people from the Navajo Nation are involved in traditional occupations of farming and raising livestock animals. It's also important for farmers and ranchers to plant crops and graze livestock away from contaminated sites. Another way people may be exposed to uranium is by using unregulated water sources for drinking water, like using livestock wells or private wells, which are not regularly tested and treated for contaminants. This is why it's important to use piped water when it is available because water providers are required to test and treat the water they serve. It's okay to contact your local water provider to ask about water quality. Use safe water hauling practices if you are not connected to piped water.

[00:05:50.02] - EH Nexus Host

Which uranium is in the soil?

[00:05:53.13] - Paul Charp

According to the ATSDR toxicological profile, the average uranium soil concentration in the United States is three grams of uranium per million grams of soil. This means that the average amount of uranium in a square mile, one foot deep, is about four tons. There is about a one-half teaspoon of uranium in a standard-size dump truck.

[00:06:21.19] - EH Nexus Host

What is the connection between uranium and radon?

[00:06:25.23] - Paul Charp

All uranium is radioactive. It changes into different radioactive elements. Uranium can break down into radon, which is a radioactive inert gas that also ultimately decays to non-radioactive lead.

[00:06:44.28] - EH Nexus Host

How does exposure to uranium and radon affect health?

[00:06:50.01] - Paul Charp

Natural uranium is considered a heavy metal and is not very radioactive. The biggest issue with natural uranium is that it can affect kidney function. Radon, however, is an invisible, odorless, tasteless, radioactive gas. When you breathe in radon, its radioactive decay products can get trapped in your lungs. Over time, these radioactive materials increase the risk of lung cancer. It may take years before health problems appear.

[00:07:26.25] - EH Nexus Host

What activities are taking place to reduce exposure to uranium and radon in the Navajo Nation?

[00:07:35.04] - Jamie Rayman

Activities to reduce exposure to uranium and radon have been going on for many decades since the mines closed. In the 1990s, a few Navajo Nation government agencies worked on early environmental assessment and cleanup efforts. They brought their efforts to the attention of the US Congress. In 2007, Congress asked several federal agencies to address the legacy of environmental contamination and to support public health research and communication. Several ongoing environmental activities helped reduce the amount of abandoned mine material on the Navajo Nation. For example, the US Environmental Protection Agency and Navajo government agencies are assessing and cleaning up abandoned mine sites on the Navajo Nation. Other activities monitor and maintain radioactive waste safely in place at former uranium processing sites. Community outreach and education efforts share information with Navajo communities about reducing exposure to uranium and radon within households.

[00:08:46.01] - EH Nexus Host

What outreach activities are ongoing in the Navajo Nation?

[00:08:52.05] - Jamie Rayman

The Navajo Community Outreach Network is a hub of information sharing for the group of federal and Navajo government agencies working together to address uranium. CDC and ATSDR are part of this network. The agencies work together to organize community outreach events, share information, coordinate conference calls, and receive community input and feedback. The network maintains an outreach office in Window Rock, Arizona, the capital of the Navajo Nation, where community members can drop in to review information about mine and groundwater cleanup, locations of former mine sites, and tips for reducing exposure to uranium and radon. The network office also has a conference room for meetings and office resources.

[00:09:41.08] - Paul Charp

CDC is an active member of the leadership committee of the National Radon Action Plan, or NRAP. The committee is a public-private work group led by the American Lung Association. It has 12 member organizations. Other members include EPA, the Department of Housing and Urban Development, and partners representing Health, Radiation, Energy, Cancer, Tribes, and Radon Industry, science experts.

[00:10:17.27] - Paul Charp

Radon is a potential risk for all communities. However, there is evidence that the benefits of radon risk reduction are not equally shared. Some households may not reap the benefits of risk reduction if they are experiencing poverty or have low awareness of risk or how to affordably reduce the risk. Through NRAP, we are reaching out and promoting resources. Other organizations like the Institute for Tribal Environmental Professionals, or ITEP, have made it their mission to strengthen tribal capacity and sovereignty in environmental management through culturally relevant education, partnerships, and policy-based services. ITEP works closely with tribes to understand how environmental issues such as radon affect their communities and provide them with the necessary tools and resources to address these issues. Through EPA's State and Tribal Indoor Radon Grants program, or SIRG, funded tribes are able to educate tribal members, tribal councils, tribal housing authorities, and others about radon.

[00:11:44.17] - Paul Charp

They also provide training and technical support for radon testing and mitigation, as well as identifying and sharing information about best practices for building homes, schools, and other buildings that are radon resistant.

[00:12:03.08] - EH Nexus Host

What are some actions people in tribal communities can do to reduce their exposure to uranium and radon?

[00:12:10.22] - Jamie Rayman

Given the history of uranium mining and milling and the ongoing cleanup of uranium, the following public health actions can help people reduce their exposures to uranium.

[00:12:21.17] - Jamie Rayman

Use clean water supplied by public utilities. If you're on a private well, have your well tested for uranium or other radioactive materials.

[00:12:31.02] - Jamie Rayman

Keep food safe.

[00:12:33.03] - Jamie Rayman

Protect yourself from dust.

[00:12:35.16] - Jamie Rayman

Stay away from mine sites. If you have livestock, graze animals away from mine sites whenever possible.

[00:12:44.11] - Jamie Rayman

Check your home construction. Ask the local health department or environmental department to check your house for uranium and radon. Do not use mined materials for construction or landscaping. These materials can be identified by color, yellow, orange, or green, or by using a radiation detector. The local authorities should be requested to survey the materials, and if the materials are present, they can remove the radioactive material safely.

[00:13:14.23] - Paul Charp

Testing your home is the only way to know if radon levels are high. Many radon test kits can be found online or in home improvement stores. Follow the directions on the packaging for the proper placement of the device, sealing the package, and where to send the device after the test to find out your radon level. The National Radon Program Services at Kansas State University offers discounted test kits available to purchase online. If your test results show more than 4 picocurries per liter, we recommend getting a radon reduction system installed in the building. If you are interested in finding a service provider to test for radon or fix your home or building, contact your local radon or environmental program for help in finding qualified professionals in your area.

[00:14:17.08] - EH Nexus Host

What resources are available for tribal communities?

[00:14:21.20] - Paul Charp

ATSDR created toxicological profiles for uranium and radon. Each tox profile reflects a comprehensive and extensive evaluation, summary, and interpretation of available toxicological and epidemiological information on a substance. CDC offers information and resources on Radon Testing and Mitigation. EPA has the State and Tribal Indoor Radon Grants program. They also developed a Tribal Indoor Air Quality Training and Resource Directory. Housing and Urban Development published its Departmental Policy for Addressing Radon in the Environmental Review Process in January 2024.

[00:15:11.22] - Jamie Rayman

Other groups and organizations supporting tribes include the Navajo Community Outreach Network Office in Window Rock, Arizona, the Institute for Tribal Environmental Professionals, and the National Tribal Air Association.

[00:15:28.14] - EH Nexus Host

Thank you, Jamie and Paul for talking with us about the impact of uranium and radon in the environment, and to our listeners for joining us today.