EXAMINING THE NEED TO EXPAND ELIGIBILITY UNDER THE RADIATION EXPOSURE COMPENSATION ACT

HEARING

BEFORE THE

SUBCOMMITTEE ON THE CONSTITUTION, CIVIL RIGHTS, AND CIVIL LIBERTIES

OF THE

COMMITTEE ON THE JUDICIARY

U.S. HOUSE OF REPRESENTATIVES

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C O N T E N T S

WEDNESDAY, MARCH 24, 2021

EXAMINING THE NEED TO EXPAND ELIGIBILITY UNDER THE RADIATION EXPOSURE COMPENSATION ACT

Wednesday, March 24, 2021

U.S. HOUSE OF REPRESENTATIVES

SUBCOMMITTEE ON THE CONSTITUTION, CIVIL RIGHTS, AND CIVIL LIBERTIES

COMMITTEE ON THE JUDICIARY

Washington, DC

The Subcommittee met, pursuant to call, at 2:03 p.m., via Webex, Hon. Steve Cohen [Chair of the Subcommittee] presiding.

Present: Representatives Cohen, Ross, Johnson of Georgia, Jackson Lee, Jordan, Johnson of Louisiana, Fischbach, and Owens.

Staff Present: David Greengrass, Senior Counsel; Madeline Strasser, Chief Clerk; Moh Sharma, Member Services and Outreach Advisor; Jordan Dashow, Professional Staff Member; Cierra Fontenot, Staff Assistant; John Williams, Parliamentarian; James Park, Chief Counsel; Will Emmons, Professional Staff Member; Matt Morgan, Counsel; James Lesinski, Minority Counsel; and Kiley Bidelman, Minority Clerk.

Mr. COHEN. The Committee on the Judiciary's Subcommittee on the Constitution, Civil Rights, and Civil Liberties will come to order. Without objection, the Chair is authorized to declare a recess of the Committee at any time.

I welcome everyone to today's hearing on "Examining the Need to Expand Eligibility under the Radiation Exposure Compensation Act." Before we begin, I would like to remind Members that we have established an email address and distribution list dedicated to circulating exhibits, motions, or other written materials that Members may want to submit during this hearing. If you would like to submit materials, please send them to Judiciarydocs—that is Judiciarydocs@mail.house.gov. We will distribute them to the Members and staff as quickly as we can.

I will now recognize myself for an opening statement. The purpose of today's hearing is to examine whether Congress should reauthorize and expand compensation eligibility under the Radiation Exposure Compensation Act, also known as RECA, an acronym. Enacted in 1990, RECA established a program administered by the Department of Justice to pay compensation to certain individuals

who were harmed by the U.S. Government's atmospheric testing of atomic weapons.

RECA also provides for payment to certain uranium mine workers who were harmed as they labored to produce the necessary raw materials for U.S. atomic weapons development. Starting in the 1940s with the development of the atom bomb during World War II and spurred on by the ensuing Cold War with the former Soviet Union, the U.S. Government embarked on a decades-long program of nuclear weapons development. This development program included over 1,000 atomic weapons tests, including aboveground atmospheric testing.

In the Continental United States, this atmospheric testing occurred primarily but not exclusively at the Nevada test site where the Federal Government conducted 100 atmospheric tests during the 1950s and early 1960s. In the same period, the United States also conducted hundreds of underwater and atmospheric atomic tests in various areas of the Pacific Ocean.

Coinciding with this period was an increase in uranium mining. Thousands of U.S. uranium workers labored to produce the raw materials necessary to fuel the U.S. atomic weapons development. During this period, the U.S. Government was the sole purchaser of uranium ore. In fact, private ownership of uranium ore was illegal until 1964 when the Federal Government permitted it for the purpose of fueling nuclear power plants.

Many uranium mines were located on Tribal lands, and many uranium mine workers were drawn from the surrounding Native American communities. Although the U.S. Government and private mining companies they contracted with knew of the dangers that are inherent in uranium mining, they did little to warn these Native American uranium workers or their communities about the dangers inherent in uranium mining. Many Native American communities and Tribal lands still bear the scars of that injustice.

While the U.S. Government stopped purchasing uranium for atomic weapons in 1971, the labor conditions in the uranium mining industry it fostered did not suddenly improve after the Federal Government officially pulled up stakes.

Despite efforts to improve uranium worker safety through increased Federal regulation, uranium mine workers continued to face elevated risk from radon exposure after 1971. The Federal Government in many ways failed to adequately protect or warn people about the potential hazards associated with this atomic weapons development.

Regarding atmospheric testing, the government failed to warn communities downwind from the test sites, both in the continental United States and in the Pacific, including U.S. territories such as Guam, of the dangers from radiation. Similarly, with respect to uranium mining, the Federal Government failed to warn or adequately protect uranium workers and their communities regarding the dangers posed by radon and radioactive particles. Indeed, the government, in many cases, failed to warn or adequately protect its own personnel present at atmospheric testing sites or those who years later were sent by the government to clean up those radioactive testing sites.

Underlying this history is the fact that the U.S. Government was not only in the best position to potentially mitigate the harm its atomic weapons development caused, but it also had a responsibility to do so. Congress passed RECA over 30 years ago with the knowledge that that fact, as well as the fact that while the whole country may have benefited from the purported security resulting from the development of atomic weapons, certain individuals and communities disproportionately bore most of the harms and risks that came with it, yet many individuals affected by the U.S. Government's harms that I described remain ineligible under the RECA program. Many of these individuals are arguably similarly situated to others currently eligible under RECA if they have been denied the chance for compensation and despite the continuing negative impacts of the government's atomic weapons development.

As we consider the question of whether Congress should revise eligibility requirements under RECA, I would encourage the Subcommittee to carefully consider the testimony we gather today as this issue has deeply affected the lives of many, including some of our Witnesses that will be joining us.

I would like to thank our colleagues, one of our colleagues on the Judiciary Committee, Representative Greg Stanton, and our former House colleague, now Senator Ben Ray Luján, for their leadership on this important issue. I would also like to acknowledge leadership of Senator Mike Crapo, who chaired a similar hearing in 2018 before the Senate Judiciary Committee, for his leadership on this issue as well. I thank all our Witnesses for being here. I look forward to their testimony.

At this point, it is my pleasure to recognize the Ranking Member of the Subcommittee, the gentleman from Louisiana, Mr. Johnson, for his opening statement. You need to unmute.

Mr. JOHNSON of Louisiana. Sorry. There we go. I appreciate that.

Mr. Chair, thank you for the time and the hearing. This is a bipartisan concern, and so we treat it as such.

To restate some of the important facts here at the outset, for those who may not be familiar with the whole history of this, as you have indicated, near the end of World War II, the U.S. detonated the first atomic weapon at the Trinity test site near Alamogordo, New Mexico. Between this first test in 1945 and 1963, the U.S. conducted nearly 200 atmospheric or aboveground automatic weapons tests. A majority of these tests took place at the Nevada test site, a government facility located in Nye County down there. Additional atmospheric tests took place at locations in the Pacific Ocean and the south Atlantic Ocean.

From 1942 through 1971, the U.S. also purchased uranium ore and operated mines to extract uranium from locations in the American Southwest and West. This mining of uranium was the primary fuel for atomic weapons during that period. These activities have led to incidences of cancer and other radiation-related illnesses among people who participated in the test, who lived in close proximity to the test, or who mined, milled, or transported the uranium used in the manufacture of the automatic weapons—atomic weapons.

In 1990, Congress passed, as you said, the Radiation Exposure Compensation Act, or RECA, as we call it, to provide partial res-

titution to those individuals who were affected. Administered by the Department of Justice, RECA has paid more than $2.45 billion in compensation to nearly 38,000 claimants over the past three decades. With RECA scheduled to sunset a little more than a year from now and with the number of pending claims dwindling, some here in Congress have proposed extending and expanding RECA.

As we consider these proposals, I think we should keep in mind how and why RECA was structured by Congress. It was designed to provide partial compensation to those people whose health was adversely affected by their participation in or their close proximity to the development and testing of these automatic weapons. These are individuals whose health ailments can be reasonably determined to come from the U.S. Government's activities.

This intent is reflected in the one-time nature of the payments available under RECA and the specific eligibility requirements for compensation. In order to be eligible for compensation under RECA, a claimant must meet specific geographic, temporal, and disease requirements.

As our understanding of the health effects from nuclear testing has improved, of course, Congress has returned to amend RECA. For instance, Congress enacted the Radiation Exposure Compensation Act amendments in the year 2000 to expand the list of qualifying diseases, add additional geographic areas, tweak filing requirements, add additional qualifying occupations in the uranium mining sector, and extend the deadline for filing a claim.

Since the last time that Congress meaningfully amended RECA and commissioned a study on whether to expand the so-called downwinder eligibility area. Downwinders are people who live in areas affected by fallout from atmospheric weapons tests. This report examined a wide range of items previously identified by Congress and made recommendations, such as the application of a probability-based model for eligibility under RECA. As we consider proposals to expand and extend RECA, we should examine the conclusions of that report as well as expert testimony so as to accurately evaluate what steps should be considered by this Congress.

I thank our Witnesses for appearing today, and we look forward to your testimony.

Mr. Chair, before I yield back, I have statements from Senator Crapo of Idaho and one of his constituents, Ms. Tonya Henderson, who heads the Idaho Downwinders Association. I ask consent that these statements be included in the record.

Mr. COHEN. Without objection, so done.

[The information follows:]

MR. JOHNSON OF LOUISIANA FOR THE RECORD

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U.S. SENATOR
IDAHO

CO-CHAIRMAN, SENATE RENEWABLE ENERGY AND ENERGY EFFICIENCY CAUCUS
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March 24, 2021

The Honorable Steve Cohen
Chair
House Judiciary Committee
Subcommittee on the Constitution, Civil Rights, and Civil Liberties
2138 Rayburn House Office Building
Washington, D.C. 20515

The Honorable Mike Johnson
Ranking Member
House Judiciary Committee
Subcommittee on the Constitution, Civil Rights, and Civil Liberties
2138 Rayburn House Office Building
Washington, D.C. 20515

Dear Chairman Cohen and Ranking Member Johnson,

Thank you for holding this important hearing to afford RECA reform the attention that it, and all of those affected, so deserve.

It is beyond time for the federal government to right a past wrong that caused harm countless innocent Americans.

Between 1951 and 1962, the federal government conducted one-hundred atmospheric atomic weapons tests at the Nevada Test Site, roughly sixty-five miles north of Las Vegas.

The Atomic Energy Commission selected the rural Nevada location due to the low population density and "virtually uninhabitable" land downwind from the site. The prevailing winds blew eastward, away from the more densely populated Los Angeles and Las Vegas metropolitan areas.

At various times between 1946 and 1962 the United States conducted sixty-seven nuclear weapons tests in the Marshall Islands, east of Guam.

With the exception of the original World War II Trinity Test in New Mexico, the one-hundred above-ground tests at the Nevada Test Site were the only atmospheric atomic weapons tests conducted in the continental United States.

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These tests, in which atomic weapons detonated at or above ground level, released deadly radioactive material into the atmosphere.

Exposure to radioactive contamination can manifest itself as various forms of cancer, particularly leukemia and thyroid cancer.

In Idaho, much of the fallout stems from a single above-ground test of a 14-kiloton bomb on June 5, 1952. It was the eighth test of a program known as Operation Tumbler-Snapper, and its fallout landed on Idaho in a severe rainstorm.

Researchers have determined that certain elements of the resulting fallout, such as the radioactive isotope Iodine-131 and Strontium-90, settled in states across the West.

Iodine-131, which concentrates in the thyroid gland, has a half-life of about eight days, which is long enough for amounts to be deposited onto pasture and transferred to people through milk and other dairy products.

Sheri Garmon, a friend of mine who grew up in Emmett, Idaho, was less than six months old when a 14-kiloton plutonium bomb code-named "Tumbler-Snapper" detonated at 3:55am. In describing the fallout, she said, "It looked like frost. Nobody ever told us there was any danger."

Nobody warned her or her father, Don, that the white dust that drifted onto their fields was dangerous radioactive fallout that could make its way into their milk supply.

Like many Emmett residents, Sheri grew up on a dairy farm, drinking fresh milk produced by her family's cows.

Sheri graduated as Emmett's high school valedictorian, became a CPA, married and had a daughter.

When she was 30, she was diagnosed with thyroid cancer. Breast cancer followed in 2000. The cancer spread to her bones and liver and she passed away in 2005 at age 53.

Before her death, Sheri used the National Cancer Institute's dose calculator to learn that she had been exposed to an estimated 75 rads of radiation – the equivalent of 10,000 chest X-rays – from drinking raw milk as a child.

Children of her generation, living in rural western towns like Emmett, where the National Cancer Institute study showed residents had received large doses of radioactive Iodine-131, were – and are – at greater risk for developing thyroid cancer because their family cows ingested contaminated grass.

We have lost other Idahoans to cancer, like Theresa Valberg and Sergeant First Class Paul Cooper. J. Preston Truman, another friend of mine and a key advocate for "downwinders" passed away this year due to cancer.

Sergeant Cooper served three tours of duty in Vietnam and put his life on the line for our country.

But, following orders, he participated in military exercises in which he and more than 2,000 other troops marched through radioactive dust near ground zero of a 1957 test, code-named "Smoky", minutes after the explosion, in order to test the group's reactions to nuclear fire.

While battling leukemia in a VA hospital, Sergeant Cooper told a reporter that his cancer was the result of his exposure to radiation from the Smoky test.

Sergeant Cooper died of acute leukemia at the VA Hospital in Boise at the age of forty-four.

Following his death, the Deseret News reported that the Public Health Service had found unexplained clusters of leukemia in the Utah towns of Parowan, Paragonah and Monticello. Those findings had never been published.

Department of Defense and National Institutes of Health data showed an excess of civilian leukemia cases in the counties downwind from the Nevada Test Site.

That was over forty years ago.

In 1990, Congress recognized the need for the federal government to make amends for the harm caused to innocent citizens by nuclear testing, and passed the Radiation Exposure Compensation Act, which provides a one-time payment for individuals suffering from leukemia, thyroid cancer and other radiation-related illnesses connected to the tests.

Administered by the Department of Justice, the RECA program has awarded over $2.4 billion in benefits to more than 37,000 claimants since its inception.

Unfortunately, RECA only provides coverage for victims living in certain counties in Nevada, Utah and Arizona. Idaho, New Mexico, Montana and other nearby states have been left out, along with Guam in the Pacific.

A report produced by the National Academy of Sciences recognized that among the twenty-five counties with the highest per capita dosage of radiation, twenty reside in Idaho and Montana.

Meagher County in Montana and the Idaho counties of Custer, Gem, Blaine and Lemhi had the highest levels of Iodine-131 exposure in the country.

This information underscores the dire need for Congress to extend RECA beyond its July 2022 sunset date and expand the program's coverage to include victims in states across the West.

For that reason, I have – in each of the past several Congresses – introduced a bill to correct the geographic mistake and expand RECA coverage to make eligible the scores of deserving Americans currently awaiting compensation. I plan to do so again in this Congress, and will continue to fight for the rights of those unjustly harmed by the federal government.

The science shows that they should not have to wait any longer for their rightful opportunity to seek redress.

Thank you.

Sincerely,

Mike Crapo
United States Senator

March 24, 2021

Dear Honorable Committee Members,

In 1997 the National Cancer Institute released its Iodine 131 dose reconstruction report. It listed all the Counties in the US and their exposure to Iodine 131. The hardest hit County was Meager County, Montana. Number three is Gem County, Idaho where I was born and raised and have lived for 60 years. The rest of the top five are in Idaho. Why wasn't this report used to fix RECA? I have traced 38 family members that have lived in Gem County that have had cancer. 14 of them have died. I have also collected names that total 1069 people that have had cancer in this County. I stopped counting two years ago, it was too depressing. Those are just the people I know and we only have 17,000 people in the whole County.

Our Government did this to us, it makes me sad for the loss of love and life. The fact that other Counties are compensated for our Government's negligence and our County is not, it makes me mad! It is discrimination, the citizens of those other Counties are valued higher than us, just like when the tests took place. The Atomic Energy Commission waited for the wind to blow north before they detonated the 100 aboveground nuclear bombs, to protect Las Vegas and California. They called those downwind the "low use segment of the population!" There were another 828 underground nuclear tests, and more than half of them leaked into our atmosphere.

We did not sign up to be guinea pigs in these Cold War experiments, but we are dying just the same.

Please respect the victims of testing and compensate them. They deserve justice!

It would have been nice to have presented this in the Zoom meeting March 24th, but apparently there wasn't enough time to let me and other Downwinders speak.

Thank you for your time and consideration of the Amendments to RECA,

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Mr. JOHNSON of Louisiana. Thank you, Mr. Chair. I yield back.

Mr. COHEN. Thank you, Mr. Johnson.

Mr. Nadler is not here, so he won't be giving an opening statement.

I think Mr. Jordan is here. Would he like to give an opening statement?

Mr. JORDAN. Thank you, Mr. Chair. I am fine right now. I look forward to hearing from our Witnesses.

Mr. COHEN. Thank you, Mr. Jordan.

Our Witnesses are present. We welcome our Witnesses and thank them for participating in today's hearing. I will now introduce each of the Witnesses and, after each introduction, will recognize that Witness for his or her oral testimony. Your written statement will be entered into the record in its entirety, and I ask you to summarize your statement in 5 minutes.

Because of the absence of a timing light as we have in the Committee room, I will note orally when 5 minutes have elapsed and bang my gavel. There will be a timer on your screen, so please be mindful of it.

Before proceeding with testimony, I would like to remind everybody that you have a legal obligation to provide truthful testimony and answers to the Subcommittee. Any false statements you make today may subject you to prosecution under section 1001 of title 18 of the United States Code.

Today, we have two Witness panels. On our first panel are two of our colleagues. Per our usual custom, we will not be asking them any questions.

Our first Witness is Senator Ben Ray Luján. Senator Luján represents the State of New Mexico in the United States Senate, having been first elected to that office in 2020. Previously for 12 years, he represented New Mexico's Third Congressional District in the U.S. House of Representatives and served as Assistant Speaker during his tenure in the House. Senator—when he was Representative Luján had a great interest in this issue, and unfortunately, the Committee which did a lot with the other matters, did not get a chance to have a hearing. But he was certainly support of and wanted to have this hearing, and I am pleased that he is here today.

Senator Luján, you are now recognized for 5 minutes.

STATEMENT OF THE HON. BEN RAY LUJÁN

Senator LUJÁN. Thank you, Chair. Before I begin, Mr. Chair, I ask unanimous consent to enter into the record a statement from Senator Orrin Hatch, a sponsor of the original Radiation Exposure Compensation Act amendments.

Mr. COHEN. Without objection, that shall be done.

[The information follows:]

HON. BEN RAY LUJÁN FOR THE RECORD

BEFORE THE HOUSE COMMITTEE ON THE JUDICIARY SUBCOMMITTEE ON THE CONSTITUTION, CIVIL RIGHTS, AND CIVIL LIBERTIES

HEARING
2:00 PM, Wednesday, March 24, 2021

"Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act"

TESTIMONY OF SENATOR ORRIN G. HATCH

Orrin G. Hatch is chairman emeritus of the Orrin G. Hatch Foundation and the former chairman of the Senate Judiciary Committee. A Utah Republican, he served in the U.S. Senate, 1977-2019.

Chairman Cohen, Vice Chair Ross, Ranking Member Johnson, and Members of the Subcommittee, I am grateful for the opportunity to present my views before the Subcommittee as it begins to consider legislative initiatives with respect to the Radiation Exposure Compensation Act program.

On June 28, 2000, I spoke on the floor of the United States Senate regarding the introduction of the Radiation Exposure Compensation Act Amendments of 2000. On that occasion I said:

> "Mr. President, I am pleased that the Congress is approving one of my top Legislative priorities, the Radiation Exposure Compensation Act Amendments of 2000, which will update the compensation program Congress enacted a decade ago (in 1990). The amendments we pass tonight will make certain that more [Americans] who were exposed to radiation during the Cold War can now be granted deserved compensation to recognize the injuries and hardship they and their families have suffered.
>
> Mr. President, our government can never truly make right the unanticipated illness and injury caused by our nation's nuclear testing program. But we should do all we can, and it is my fervent hope these amendments show Congress' commitment to righting a wrong in which the government played such a substantial role.
>
> This legislation is aimed at improving a program which provides a measure of compensation to individuals who have sustained illness due to radiation exposure. These are fellow Americans who have suffered terribly from cancer and other debilitating diseases resulting from exposure to fallout and uranium mining during this narrow period of our history. In meetings with constituents over the past several years, I have heard countless heartrending stories about the devastating effects families have felt due to their exposure to radiation. I recall so vividly one young woman in St. George, Utah, talking about the 'beautiful sky' that her mother called all the children outside to view, thus exposing every family member to radiation. Tragically, many of those family members were eventually diagnosed with cancer.
>
> Through advances in science, we now know so much more about the effects of that radiation than we did in the late 1950s and 1960s. In fact, we know so much more today than we did in 1990 when Congress passed the original compensation program, the Radiation Exposure Compensation Act. Our current state of scientific knowledge allows us to pinpoint with more accuracy which diseases are reasonably believed to be related to radiation exposure, and that is what necessitated the legislation we are considering today." (Congressional Record S6038– June 28,2000)

The Radiation Exposure Compensation Act (the Act) was first passed in 1990. Due to the gathering of additional data and scientific information, the Act was amended in 2000 to include additional geographic areas, to include additional diseases, and to make the filing of claims more streamlined and easier for victims. Additionally, the date of the expiration of the Act was moved to July of 2022. The Act, last amended over 20 years ago, is in urgent need of reauthorization and further amendment.

The Act, as it is currently codified, provides an official apology to Americans exposed to radiation from the United States nuclear weapons development and testing programs. It also provides a one-time payment

designed to give only partial compensation for the wrongs inflicted. These payments can be made to five classifications of exposure victims: uranium miners, uranium ore transporters, uranium mill workers, those who worked on-site in a test involving the atmospheric detonation of a nuclear device, and those who were exposed to radiation by being physically present, during atmospheric nuclear weapons tests, in certain counties located downwind from the Nevada Test Site in Arizona, Nevada, and Utah. Uranium miners, ore transporters, and mill workers who perfect a claim are due a one-time payment of $100,000. An onsite worker who perfects a claim is due $75,000, and a perfected Downwinder claim pays $50,000. It is clear that these one-time payments were never intended as total compensation for all the costs associated with a radiation illness or cancer diagnosis. These costs go well beyond the medical bills for such things as mental health services, lodging near treatment, transportation costs, childcare, job loss, lost income, and caregiver costs. It is only logical to surmise that $50,000 in 2000 does not equate to the same purchase power in 2021.

It is also clear that some scientific data and some public policy developments dictate that other changes need to be made to the Act. The National Cancer institute report, "Radiation Doses and Cancer Risks Resulting from Exposure to Radioactive Fallout from the Trinity Nuclear Test," dated December 20, 2020, acknowledged that there are likely hundreds of cases of thyroid cancer in a number of New Mexico counties due to fallout from the first weapon test of the nuclear age at the Trinity Site in the Tularosa Basin. Other data suggest there may be additional geographic locations that should be included such as, but not limited to Mojave County, Arizona, and the southern part of Clark County, Nevada.

Uranium mining and processing in the United States began in earnest in the early 1940s and peaked in 1980. The United States purchased uranium, for weapons development, construction, and testing from the inception of the Manhattan Project through 1971. The Act currently does not allow a uranium miner, mill worker, or ore transporter to access compensation if their employment occurred after 1971. This deadline fails to account for the fact that the United States assumed responsibility for the regulation of uranium mine safety as far back as 1936 under the Public Contracts Act. In 1969, the US Department of Labor promulgated a regulation that limited uranium mine workers to 4.0 Working Level Months (WLM) per year as the maximum safe exposure. By 1987 it became clear that 4.0 WLM was still too much exposure and the National Institute for Occupational Safety and Health recommended that the proper standard was, in fact, 1 WLM. This dereliction of duty to provide regulation for the safety of uranium miners makes specious the argument that the federal government has responsibility for the health consequences of mining uranium through the end of 1971 only. Congress should extend this date for the appropriate period of time in acknowledgement of the failure of the federal government to protect the health and safety of uranium miners.

Uranium mill workers and uranium ore transporters were subject to most all of the risks that uranium miners were subject to and should receive the same allowances for their time of exposure within the confines of good science related to the minor differences of their occupational exposure.

The Act, as currently codified, also leaves out a class of workers who were instrumental in the search for uranium called core drillers. Core drillers searched for uranium veins by drilling through rock and dirt and bringing core samples to the surface for inspection and testing. On those occasions when the drillers found uranium veins the raised cores were radioactive. The drillers took no precautions to avoid the radioactive cores as there we no standards or best practices to follow in the drilling for uranium. The environment around the drill rigs was dusty and rife with radioactive contamination and the drillers freely breathed and were exposed to the radiation. This small but important cohort of workers should finally receive their due

and take their place both as important workers in the effort to win the Cold War and as exposure victims in the arms race.

When the Radiation Exposure Compensation Act was passed, in 1990, it had true bipartisan support in both Houses of Congress. There were members of Congress from both sides of the aisle and from all over the Country. There were sponsors as liberal as Senator Ted Kennedy (D-Mass.) and as conservative as Congressman Jim Hansen (R-Utah). There were members of Congress from as far away as Rhode Island and Hawaii and as close to the test site as Nevada, Utah, and Arizona. It was truly a bipartisan effort then as it should be now.

The radiation exposure from the United States nuclear weapons development, construction, and testing program affected the famous and the ordinary. Hollywood director Dick Powell, actors Susan Hayward, Agnes Moorehead, Lee Van Cleef, John Hoyt, and John Wayne, as well as former Utah Governor Scott Matheson, were well known victims of radiation exposure. Equally compelling were the ordinary Americans, some partially compensated and many compensated not at all. Native Americans have been particularly affected by this tragedy—due in large part to their proximity to both the needed natural resources and to the Nevada Test Site itself. Large populations of western Native Americans worked in the mines and the mills, and transported ore. The entire populations of some Native American tribes were exposed to radiation downwind from the Nevada Test Site. Most notably among these has been the country's largest Native American Nation—the Navajo.

Over the course of our nation's history, Native Americans have suffered a long string of injustices. Among the most egregious, however, was the federal government's neglect during the Cold War years when hundreds of the Navajo developed severe forms of cancer and respiratory illness as a result of uranium mining and nearby nuclear testing.

As the original Senate sponsor of the Radiation Exposure Compensation Act, this issue is personal to me. Utah's Navajo families are my friends and former constituents, and I watched as many of them passed away from cancer and respiratory illness as a result of working in uranium mines and living downwind of the military's nuclear testing sites during the Cold War. I knew the federal government could never compensate these families for what they had suffered, but I knew we could at least hold the government accountable for its gross negligence. That's why I authored the Act, which provides compensation for individuals who became ill from the radiation exposure caused by the military's work on nuclear weapons development.

For nearly 30 years, this bipartisan legislation has helped provide a small measure of justice for members of the Navajo Nation whose lives were upended by the federal government's carelessness. Even though these events transpired long ago, many Navajo families are still reeling from the effects of radioactive fallout—and the Act is still helping them. But the law expires in 2022 and is in urgent need of reform.

As of March 15, 2021, 37,881 claims have been approved totaling $2.4 billion in compensation. To put this in perspective, this program is designed to compensate exposure victims over a 30-year period with a geographical scope that spans at least 12 western states. By contrast, the 9/11 Victim Compensation Fund is authorized to disburse up to $7.375 billion for a one-time event perpetrated, not by our own government, but by foreign terrorists. The Black Lung Disability Trust Fund, originally designed to pay benefits to coal miners through an excise tax on coal, is facing the need for federal subsidies of up to $15 billion over the next quarter century. Let me be clear: I fully and unequivocally support the beneficiaries of both the 9/11 Victim Compensation Fund and the Black Lung Disability Trust Fund. I believe, however, that the victims of

radiation exposure from US nuclear programs deserve equal support. The harmful effects of these programs should not be shortchanged or conveniently forgotten because the wrongs committed against them are so far in the past.

The passage of time and the remote locations of the country where radiation exposure occurred have obscured the issues and clouded the fact that many Americans paid a disproportionate price for the victory over tyranny in World War II and the victory over communism in the Cold War. Every American alive today owes some debt to those who sacrificed knowingly and, in the case of radiation exposure victims, unknowingly for the cause of freedom. Congress—armed with new information and determined to do right by these fellow citizens—should make haste to reauthorize and amend the Radiation Exposure Compensation Act to make the Act more just, more helpful, and more in line with what has actually been experienced by so many.

– Orrin G. Hatch

Senator LUJÁN. Thank you, Mr. Chair. To you and to all the Members, the Ranking Members, thank you for holding this hearing. And I want to also recognize Chair Nadler for the work they are doing and Mr. Johnson, who are not able to be with us today, for holding today's hearing to discuss the need to expand eligibility under the Radiation Exposure Compensation Act. I also want to thank Chair Nadler for joining me to meet with downwinders and uranium miners last summer. They appreciated your commitment and the conversation.

So, Mr. Chair, while there has been a bit of history shared, I want to make sure that I am emphasizing some of it. Seventy-five years ago, rural New Mexico became ground zero for the detonation of the nuclear bomb at the Trinity test site. Henry, who was 11 years old at the time, he was living in Tularosa, New Mexico, with his family. That morning, he said he heard a large blast and saw a great flash of light. He said, "I got so scared," he wrote, that he thought the world was coming to an end.

Francisco, another Witness of the Trinity test, said there was a large cloud in the shape of a mushroom. We realized later that the backs of cattle had turned White as though they had suddenly aged. The test was a total surprise to us. We were not even informed that the detonation was going to take place even after the test. No one communicated with us in regards to this major occurrence. That atomic bomb, Gloria wrote to me, has caused anguish to so many people in New Mexico. The people from New Mexico have suffered physically, mentally, and financially, and we are all here in hope that you will find a way to help us.

While the Trinity test ushered in the start of the atomic age, it also marked the beginning of sickness and suffering for generations of people who lived and grew up in the Tularosa Basin or worked or lived in uranium mines and worked in those areas. For example, you can still find a high level of contaminants downstream from the Jackpile uranium mine in Laguna Pueblo, New Mexico. This was the world's largest open uranium pit.

As President Jonathan Nez of the Navajo Nation will share with his testimony, the Navajo people continue to suffer from the legacy of uranium mining, 525 abandoned mines, and the largest hazardous waste spill that occurred at the Church Rock site in 1979.

Thousands of New Mexicans who worked in uranium mines faced unsafe and dangerous conditions. So, Mr. Chair, one of the questions I ask is the first bomb that was detonated on American soil in New Mexico, the largest open uranium pit, one of the largest tragedies that occurred with uranium tailings, why are these communities not included in downwind designation?

I invite you to listen to the story of Cipriano Lucero, a uranium miner from Grants, who recently passed away. He wrote: My respiratory protection consisted of a single paper mask per shift. The mask was useless after the first hour or so because it was covered in yellow cake. Most of the rest of the shift, I used a bandana to cover my face, but that stopped little of the yellow cake dust from being inhaled. There was no real protection from overexposure to radiation in the yellow cake area.

To help those Americans who sacrificed so much for our national security, Congress passed the RECA in 1990 and later broadened

the scope in 2000. Unfortunately, RECA currently leaves behind too many New Mexicans and people all across America. This includes downwind communities from the very first nuclear test in New Mexico. It is just not right. This is just one State. From 1945 to 1962, the United States conducted nearly 200 atmospheric nuclear tests in the arsenal that became the cornerstone of our Nation's Cold War. Downwinders in Idaho, Colorado, Montana, Nevada, Utah, and Guam still await justice. The mining and processing of uranium ore, which was essential to the development of weapons, was conducted by tens of thousands of workers from across the country. Far too many of these workers are now sick and dying and were not included in the original designation of RECA.

That is why we all have to come together. These people deserve justice. That is why I have been proud to work on this issue in the House, and I am now proud to work with Senator Crapo in the Senate. It is a matter of fairness. When this legislation is reintroduced in the House, I urge the Committee to Act on it.

Mr. Chair, I will leave you with this. I had one elder Navajo woman who made the journey to Washington, DC, to testify, and she asked Congress one simple question: Are you people waiting for us all to die so the problem goes away?

Remember those words from Gloria. We hope that you will find a way to help us.

Mr. Chair, we came together in a bipartisan fashion, and we passed the Zadroga Act. It was the right thing to do for fellow Americans. We came together, and we passed legislation to protect people from exposure that serve our country, veterans, soldiers, from the burn pit exposure. It was the right thing to do for fellow Americans. We can work on this issue with RECA. Let's work together to make sure we are not leaving our fellow Americans behind one more day. I thank the Committee for their work, I look forward to working with you, and I pray that we can get this done. With that, Mr. Chair, I yield back.

Mr. COHEN. Senator, let me thank you for your passion and your explanation. We had a busy agenda last year, and I had only a cursory perspective of this issue and thought of it as a local issue. It is not a local issue. It is a national shame, and I hope you will forgive me for not finding space to schedule this hearing when you importuned me to do so.

Senator LUJÁN. Mr. Chair, you always fight for people, and you make a difference in their lives. That is very gracious of you. It is not necessary. We are here today, and I know that we can find a bipartisan path forward to get this done. I appreciate your words there, sir.

[The statement of Senator Luján follows:]

Testimony of Senator Ben Ray Luján
Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act
House Committee on Judiciary
Subcommittee on the Constitution, Civil Rights, and Civil Liberties
March 24, 2021

Let me begin by thanking Chairmen Nadler and Cohen and Ranking Members Jordan and Johnson for holding today's hearing to discuss the need to expand eligibility under the Radiation Exposure Compensation Act (RECA).

I also want to thank Chairman Nadler for joining me to meet with downwinders and uranium miners last summer. They appreciated your commitment to correcting this long-standing injustice.

Mr. Chairman, seventy-five years ago, rural New Mexico became ground zero for the detonation of the first nuclear bomb. While the Trinity Test ushered in the start of the atomic age, it also marked the beginning of sickness and suffering for generations of people who lived and grew up in the Tularosa Basin and in other communities that sacrificed for our national security. As they struggle with these chronic and acute health conditions, they also find themselves at higher risk for sickness and death from COVID-19.

Henry was 11 years old when the Trinity test occurred. He was living in Tularosa, New Mexico with his family. That morning he heard a large blast and saw a great flash of light. "I got so scared," he wrote that he thought that the world was "coming to an end."

Francisco also witnessed the Trinity Test. "There was a large cloud in the shape of a mushroom," he wrote. "We realized later that the backs of the cattle had turned white as though they had suddenly aged. This test was a total surprise to us. We were not informed that the detonation was going to take place. Even after the test, no one communicated with us in regards to this major occurrence."

"That atomic bomb," Gloria wrote to me, "has caused anguish to so many people in New Mexico… The people from New Mexico have suffered physically, mentally, and financially. And we are all here in hope that you will find a way to help us."

The Trinity Test downwinders were the first unknowing and unwilling victims of our nation's nuclear efforts. They were not last. In fact, you will hear similar stories from communities all across the country.

From 1945 to 1962, the United States conducted nearly 200 atmospheric nuclear weapons tests while building the arsenal that became the cornerstone of our nation's Cold War security strategy.

The mining and processing of uranium ore was essential to the development of nuclear weapons and was conducted by tens of thousands of workers across the nation until the mid-1970s. The Navajo, Hopi, and Yavapai Apache Indian reservations were particularly affected.

Too often, however, these workers faced unsafe and dangerous working conditions. One uranium miner from Grants, New Mexico wrote the following to me:

"My respiratory protection consisted of a single paper mask per shift and the mask was useless after the first hour or so because it was covered in yellowcake. Most of the rest of the shift I used

a bandana to cover my face but that stopped little of the yellowcake dust from being inhaled directly. There was no real protection from over exposure to radiation in the yellowcake area."

Inevitably, many of those who worked in the uranium mines or lived downwind from a test site got sick due to radiation exposure. Many also died.

To help those Americans who sacrificed so much for our national security, Congress passed the Radiation Exposure Compensation Act (RECA) in 1990 and later broadened the scope of the Act's coverage in 2000. However, we have since learned that many additional individuals who are sick or dying from radiation exposure are unable to receive the compensation they deserve.

These people deserve justice, which is why I have championed the Radiation Exposure Compensation Act Amendments to compensate **all** those exposed to radiation while working in uranium mines or living downwind from atomic weapons tests.

The RECA Amendments would finally make Post-71 miners eligible for RECA, while expanding compensation to downwind communities in New Mexico, Arizona, Colorado, Montana, Nevada, Utah, and Guam.

This bipartisan legislation, which I will reintroduce with Senator Mike Crapo in the Senate, is a matter of fairness and justice. When this legislation is reintroduced in the House, I urge this committee to act on it. And, I urge this committee to act to ensure that the existing Radiation Exposure Compensation Act program does not expire in July 2022.

Mr. Chairman, I have had elder Navajo women trek to Washington, D.C. to ask Congress one simple question: Are you people waiting for us all to die so that the problem goes away?

I also ask that this committee hear Gloria's words again. We "hope that you will find a way to help us."

I ask everyone on this Committee to join me… join me in finding a way to help these Americans who have sacrificed for our national security.

I thank the Committee for inviting me to testify today and I thank the witnesses, including my good friends, the President of the Navajo Nation, Johnathan Nez, and Tina Cordova with the Tularosa Basin Downwinders Consortium. They have been vital advocates in this effort.

Mr. COHEN. Thank you, sir. I appreciate it.

Our next Witness is Representative Greg Stanton. Congressman Stanton represents the Ninth Congressional District of Arizona, having been elected to a second term in 2020. Previously, he served as the mayor of Phoenix, Arizona, for 6 years and as a member of the Phoenix City Council for 9 years.

Congresswoman Stanton, you are recognized for 5 minutes.

STATEMENT OF THE HON. GREG STANTON

Mr. STANTON. Thank you very much, Mr. Chair.

Chair Cohen, Ranking Member Johnson, and distinguished Members of the Subcommittee, I want to say thank you for the opportunity to speak about an important issue that impacts the lives of tens of thousands of people in my home State of Arizona. For far too long, residents across northwestern Arizona have been forgotten and victimized by the Federal Government. In fact, today's hearing is the first time in more than two decades that many Arizonans, known as downwinders, have even had the opportunity to be heard in the House of Representatives. I am hopeful that because of your leadership, your support, today's hearing will be a much-needed turning point in decades-long pursuit of justice for downwinders who have suffered for the sake of our national security.

Let me provide a little background. From 1945 to 1992, as part of our Nation's Cold War deterrence efforts, the Federal Government conducted more than 1,000 atomic weapons development tests. Nearly all of them were detonated at the former Atomic Energy Commission Nevada test site, which is about 160 miles northwest of Kingman, Arizona.

Of the tests done at the Nevada site, 100 were atmospheric tests, which means they were detonated above ground and created far-reaching nuclear fallout. The largest atmospheric test yielded an energy force equivalent to 74,000 metric tons of TNT. To put that in perspective, that is five times greater than the atomic bomb dropped on Hiroshima. Visually, those tests were about 150 times greater than the port explosion we all saw in Beirut last year.

The sheer site of these tests was a marvel. There is a reason I want you to think about the visual here. As you will hear from one of the Witnesses today, families in Arizona would gather together, and they would have bomb parties where they would stand out in their front porches with neighbors or ride on horseback out in their fields to watch the massive orange mushroom clouds in the distance. They had no idea. They were never told that they were being exposed to dangerous, cancer-causing radiation.

As a direct result of the radiation exposure from these tests, thousands of Arizonans have suffered from cancer, entire families have suffered from cancer, and far too many have died. In an attempt to compensate some families who were hurt, Congress did create a program through the Radiation Exposure Compensation Act to provide partial restitution. Affected residents living in two of the closest counties east of the test site, Mohave County, Arizona, and Clark County, Nevada, were not included in the original designated affected area to receive compensation. For these fami-

lies, it is a cruel injustice that ignores the reality that they have lived for decades.

National Cancer Institute research shows that lower Mohave County and lower Clark County have even higher rates of radiation exposure compared to other parts of the country that are already covered by RECA. The Arizona Department of Health Services reports that Mohave County has one of the highest average cancer rates in our State from 1990 to 2001.

As a Member of this Committee, I have worked tirelessly to right this historic wrong and to advocate on behalf of these Arizonans, and my office has heard an outpouring of stories from families and loved ones that highlight the impact nuclear testing has had on their lives. Matt Capalby, a third-generation Mohave County resident, told me his father was a county doctor for nearly 40 years. Growing up there, everyone thought it was normal for adults to be diagnosed with cancer in their 30s and 40s. Danielle Stephens, a lifelong Mohave County resident, shared that 32 members of her extended family have been diagnosed with cancer, and nearly 20 of them have died of cancer before reaching the age of 55.

These are stories of family after family in Mohave County, Arizona. Time is running out for these Americans, and it is long past time that the Federal Government take responsibility for its actions. It is time for Congress to take a hard look at the boundaries created under RECA so that those living in Mohave County and Clark County can finally receive the justice that they deserve.

This is an important issue for Arizona, and so, Mr. Chair, I would also like to ask unanimous consent to submit for the record a statement from Senator Mark Kelly of Arizona in support of these efforts to expand the RECA program.

Today, both sides of the aisle have a shared responsibility to get this right and make no mistake: This is a bipartisan issue. I know there are Members of the minority party in this Congress who care about this issue just as much as I do.

So, thank you again, Chair Cohen and Ranking Member Johnson, for holding this important hearing and allowing me the opportunity to share these stories with the Subcommittee. I yield back.

[The statement of Mr. Stanton follows:]

Statement of Congressman Greg Stanton
House Judiciary Constitution, Civil Rights, and Civil Liberties Subcommittee
Member Testimony
March 24, 2021

Chairman Cohen, Ranking Member Johnson and distinguished members of the subcommittee, thank you for the opportunity to speak about an important issue that impacts the lives of tens of thousands of people in my home state of Arizona.

For far too long residents across northwestern Arizona have been forgotten and victimized by the federal government. In fact, today's hearing is the first time in more than **two decades** that many Arizonans—known as Downwinders—have even had the opportunity to be heard in the House.

I am hopeful that, because of your support and leadership, today's hearing will be a much-needed turning point in the decades-long pursuit of justice for Downwinders who have suffered for the sake of our national security.

Let me provide a little background.

From 1945 to 1992, as a part of our nation's Cold War deterrence efforts, the federal government conducted more than one thousand [1,054] atomic weapons development tests. Nearly all of them were detonated at the former Atomic Energy Commission Nevada Test Site, which is about 160 miles northwest of Kingman, Arizona.

Of the tests at the Nevada site, 100 were atmospheric tests, which means they detonated above ground and created far-reaching nuclear fallout. The largest atmospheric test yielded an energy force equivalent to 74-thousand metric tons of TNT—to put that into perspective, that is **five times greater** than the atomic bomb dropped on Hiroshima. Visually, those tests were about **150 times greater** than the port explosion we all saw in Beirut last year. [Source, Source, Source]

The sheer sight of these tests were a marvel to behold, and there's a reason I want you to think about the visual here: As you will hear from one of the witnesses today, families would gather together or have "bomb parties" where they would stand on their front porches with neighbors or ride on horseback out into their fields and watch the big, orange mushroom clouds in the distance. They had no idea – and they were never told – that they were being exposed to dangerous, cancer-causing radiation.

As a direct result of the radiation exposure from these tests, thousands of Arizonans have suffered from cancer – entire families have suffered from cancer – and far too many have died.

In an attempt to compensate some families who were hurt, Congress created a program through the Radiation Exposure Compensation Act to provide partial restitution.

But affected residents living in two of the closest counties to the east of the test site – Mohave County, Arizona and Clark County, Nevada – were not included in the original designated "affected area" to receive compensation.

For these families, it is a cruel injustice that ignores the reality they have lived with for decades.

National Cancer Institute research shows that lower Mohave County and lower Clark County have even higher rates of radiation exposure compared to other parts of the country already covered under RECA. And the Arizona Department of Health Services reports that Mohave County had one of the highest average cancer rates in the state from 1999 to 2001.

As a member of this committee, I have worked tirelessly to right this historic wrong and to advocate on behalf of these Arizonans. My office heard an outpouring of stories from families and loved ones that highlight the impact nuclear testing has had on their lives.

Matt Capalby, a third-generation Mohave County resident, told me his father was a county doctor for nearly 40 years. Growing up there, everyone thought it was normal for adults to be diagnosed with cancer in their 30s and 40s.

Danielle Stephens, a lifelong Mohave County resident, told us that 32 members of her extended family have been diagnosed with cancer, and that nearly 20 of them died of cancer before reaching 55.

These are the stories of family after family after family in Mohave County.

Time is running out for these Americans. It's long past time for the federal government to take responsibility for its actions. It's time for Congress to take a hard look at the boundaries created under RECA so that those living in Mohave County and Clark County can finally receive justice they deserve.

Thank you again, Chairman Nadler, Chairman Cohen and Ranking Member Johnson for holding this hearing and allowing me the opportunity to share these stories with the subcommittee.

Mr. COHEN. Thank you, Congressman Stanton. I appreciate your bringing this issue to us again this year, and I appreciate Mr. Kelly. Do you have a statement from him to be entered into the record, Senator Kelly?

Mr. STANTON. Yes, I do, Chair Cohen.

Mr. COHEN. Without objection, that should be entered into the record.

[The information follows:]

MR. STANTON FOR THE OFFICIAL RECORD

Statement of Senator Mark Kelly
on the
Oversight Hearing on Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act
by the
House Committee on the Judiciary
Subcommittee on the Constitution, Civil Rights, and Civil Liberties
March 24, 2021

Mr. Chairman, thank you for holding today's hearing on examining the need to expand eligibility under the Radiation Exposure Compensation Act (RECA). The committee's leadership on this issue is appreciated by Arizonans who were exposed to radioactive fallout from nuclear weapons testing but are ineligible for compensation by the Department of Justice (DOJ) under RECA.

In Arizona, many of these victims were born and some still live in Mohave County, which is located along the Arizona-Nevada border southeast of the Nevada Test Site (NTS). The NTS is a facility operated by the Department of Energy where the United States government conducted 100 above-ground nuclear weapons tests during the Cold War. These tests exposed communities in Arizona, Nevada, and Utah to cancer-causing ionized radiation in the form of nuclear fallout. RECA, signed into law in 1990, provides a one-time monetary payment of $50,000 to individuals living or working downwind of the NTS that are diagnosed with certain radiation-related cancers including leukemia, multiple myeloma, and lymphoma.

To receive compensation, RECA requires claimants to prove physical presence in an eligible geographic area from 1945 to 1962. Despite Mohave County's close proximity to the NTS, the RECA statute does not designate the lower half of the county as one of its eligible areas.

Exclusion from RECA is an injustice to Mohave Downwinders. The existing eligibility criteria under RECA is not supported by science or the facts on the ground.

The personal and deeply moving accounts from Mohave Downwinders and their surviving loved ones should be enough to convince any lawmaker to reform RECA eligibility. During the testing period, Mohave County had a population of roughly 5,000 people. Some remember viewing mushroom clouds from mountain overlooks. Others recall being asked to wear radiation monitors as a child while in school. Over the years, Mohave Downwinders have worked hard to compile health records that have revealed an extraordinarily high number of fatal cases of childhood leukemia in the 1950s and 1960s.

The science supporting the case for fixing RECA is equally compelling. Peer-reviewed research by the National Cancer Institute (NCI) and the National Academy of Sciences (NAS) have long indicated a need to modernize RECA's eligibility criteria. In 1997, the NCI published findings that describe the link between thyroid cancer in Downwinder communities and exposure to radioactive particles that entered dairy cow milk through the local livestock food chain. In 2005, NAS published a report to Congress that determined RECA's current list of geographic

areas does not adequately cover populations potentially affected by NTS fallout. Last year, NCI concluded a detailed study on the health effects of the 100-mile long fallout plume of Trinity, the first atomic bomb test, and cited data showing a spike in infant mortality in New Mexico following the blast. For the record, Mohave County is about 110 miles from the NTS where much larger bombs were detonated.

The RECA Trust Fund is set to expire on July 10, 2022. I encourage members of the committee and my colleagues in the Senate to reauthorize the Fund and amend RECA so that Mohave County proper is covered by the compensation program and Downwinders and their descendants can finally receive the compensation they are long overdue.

Mr. STANTON. Thank you.

Mr. COHEN. Thank you, Congressman Stanton.

I want to thank the Witnesses on our first panel, our colleagues.

I now turn to the second panel. The Witnesses on the second panel, please turn on your cameras at this time. I presume we have had enough time.

Our first Witness on the second panel is Jonathan Nez. Mr. Nez is President of the Navajo Nation. He was elected to that position in 2018 and had previously served as vice President of the Navajo Nation. President Nez received his Master of Public Administration and his bachelor's degree from Northern Arizona University.

President Nez, you are now recognized for 5 minutes.

STATEMENT OF JONATHAN NEZ

Mr. NEZ. Chair Cohen, Ranking Member Ross, and Subcommittee Members, I appreciate the opportunity to testify before the Subcommittee on the Radiation Exposure Compensation Act passed by Congress in 1990 and amended in 2000.

My name is Jonathan Nez. I am the President of the Navajo Nation. I am here today to represent Navajo downwinders, uranium workers, and many other Navajo families and descendants who deserve fair and just compensation and healthcare for the risks they took and the sacrifices they made for this country.

My testimony will focus on the Navajo Nation's experience with Federal uranium extraction initiatives that were mentioned earlier by our congressional representatives and our Senator and the need to expand eligibility under RECA and extend the life of the radiation exposure compensation program.

I want to preface my testimony by first sharing who and where the Navajo Nation is located. The Navajo Nation is the largest land-based American Indian Tribe in the country, encompassing over 27,000 square miles that spans Arizona, New Mexico, and Utah, with nearly 350,000 citizens, half of whom reside on the Navajo Nation. With such a broad land base and areas that lie within multijurisdictional boundaries, the Navajo Nation encounters some of the most challenging obstacles when it comes to providing for and meeting the needs of its community, and that was highlighted throughout this pandemic.

The Navajo Nation has a deep, complicated uranium legacy. From 1944 to 1986, approximately 30 million tons of uranium ore was extracted from Navajo lands to support America's nuclear activities, such as the U.S. military's Manhattan Project, World War II, and the Cold War. At that time, the United States Atomic Energy Commission was the sole purchaser of all uranium ore mined in the United States until 1970.

Then, in 1979, an earthen dam was breached in Church Rock, New Mexico, resulting in the largest release of radioactive material in U.S. history. This uranium mill spill released more than 1,100 tons of solid radioactive mill waste and 93 million gallons of acidic radioactive tailings into the Puerco River, sending radioactive waste into several Navajo communities, threatening thousands of local residents. It has been 77 years since the United States opened uranium mining on the Navajo Nation and 42 years since the catastrophic Church Rock spill.

During this time, a uranium mining boom transpired from these activities which led to the creation of hundreds of mines on and around the Navajo Nation. This meant that many of our Navajo people worked in these mines without proper safety measures and without knowledge of the long-term effects that it would have on them and their loved ones.

Once the Cold War ended and the Federal Government no longer needed uranium ore to produce nuclear weapons, all of these mines were abandoned without any reclamation, let alone remediation.

There are approximately 524 abandoned uranium mine sites on the Navajo Nation while the Navajo Nation estimates there could be far, far more. Unfortunately, only 219 of these sites have available funds for cleanup and remediation efforts, leaving a total of 305 sites not being addressed, and that poses severe environmental and health hazards to surrounding areas and people.

Although there is approximately $1.7 billion to clean up the 219 mine sites, it is not enough. The Navajo Nation estimates that it will cost an additional $3.5 billion to address the remaining 305 sites, which does not include the cost of long-term monitoring and maintenance.

Last week, I had an opportunity to meet virtually with advocates and several surviving uranium miners. As you know, Navajo Nation has been hit hard with COVID-19, and we have lost some of those post-1971 mine workers throughout this pandemic. Over 1,200 of our Navajo people have lost their lives here on the Navajo Nation due to this pandemic.

We met with Navajo government officials, including Mr. Duane Johnson, who oversees the Navajo uranium workers program. There, I heard an outcry of the need to expand RECA.

To summarize five key points and proposed changes to RECA, number one, eligibility. Current RECA law only covers pre-1971 uranium workers. Post-1971 are ineligible. The RECA coverage period should be extended to 1990 to provide fair compensation and healthcare for the risks and sacrifices these workers and their families made for this country.

Two, downwinders are ineligible. Coverage under RECA also needs to be expanded to include all downwinders who have suffered from uranium exposure. The Navajo Nation also supports Navajo downwinders suffering the impacts from abandoned uranium mines. RECA does not address the impacts of now elevated levels of radiation in Navajo lands and drinking water sources.

Three, extend RECA's 2022 deadline. The program is currently set to end in 2022 as was mentioned, and this deadline must be extended to provide adequate time for claims to be filed. In addition, a deadline extension is essential for the Navajo Nation because of the unique difficulties experienced by Native individuals in satisfying the documentation requirements of the program; for example, lack of broadband to file claims, verifying employees for companies no longer in operation, and proof of residency since we don't have rural addressing.

Four, expand eligibility to include additional categories of workers and cancers. RECA coverage also should be expanded to include additional categories of uranium mine workers, such as core drillers and Department of Energy remediation workers. Currently,

only underground and surface workers are included. RECA should also cover additional types of cancers, particularly prostate and uterine cancer, as well as lung disease and kidney failure, all of which are a high incidence in the Navajo population.

Five, increase compensation cap to a $200,000 minimum. The original cap of $100,000 per individual must be increased to at least $200,000 to provide any fair measure of compensation as recommended in previous—

Mr. COHEN. Mr. President, your 5 minutes has been up for a while. I have just never stopped a president.

Mr. NEZ. I am sorry. Mr. Chair and Members of the Committee, one final thought. Just thanking the Navajo Uranium Radiation Victims Committee to have worked tirelessly on that with the Senators and the Representative, Phil Harris, Tommy Reed, Harry Desiderio, Mary Kirlie, Leslie Begay, and many others, including our very own Navajo Nation council delegate, Amber Crotty. Thank you again for the opportunity to testify before the Subcommittee, and I am open to answer any questions you may have. Thank you.

[The statement of Mr. Nez follows:]

Written Testimony of Jonathan Nez, President of the Navajo Nation

Prepared for
The House Committee on the Judiciary,
Subcommittee on the Constitution, Civil Rights, and Civil Liberties,
Hearing on "Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act"

March 24, 2021

Dear Chairman Cohen, Ranking Member Johnson, and Subcommittee members, I appreciate the opportunity to testify before this Subcommittee on the Radiation Exposure Compensation Act (RECA), passed by Congress in 1990 and amended in 2000. I am here today to represent Navajo downwinders, uranium workers, and many other Navajo families and descendants who deserve fair compensation and healthcare for the risks they took and the sacrifices they made for this country. My testimony will focus on the Navajo Nation's experience with Federal uranium extraction initiatives and the need to expand eligibility under RECA and extend the life of the Radiation Exposure Compensation Program.

The Navajo Nation is the largest land-based American Indian tribe in the country encompassing over 27,000 square miles that spans Arizona, New Mexico, and Utah with nearly 320,000 enrolled members, half of whom reside on the Navajo Nation. With such a broad land base and areas that lie within multi-jurisdictional boundaries, the Navajo Nation encounters some of the most challenging obstacles when it comes to providing for and meeting the needs of its communities.

The legacy of uranium mining began with Federal efforts to extract uranium from our tribal lands and continues to this day as we work to ensure that the parties who managed the mines are held responsible for cleaning up the mess they left behind. The failure to clean up and restore the contaminated areas i.e., the air, soils, and groundwater, hinders our ability to grow our economy and develop our lands. Therefore, we need to ensure that our lands are remediated back to their original natural state.

I. Legacy of Uranium Mining

Unfortunately, the Navajo people continue to suffer from the legacy of uranium mining on the Navajo Nation and surrounding areas. Uranium mining began on the Navajo Nation in 1944 to support the U.S. Federally-led Manhattan Project. Following World War II, uranium mining on Navajo lands increased due to the Cold War through the Atomic Energy Commission, which purchased all the uranium ore mined in the United States until 1970.[1] These Federal initiatives led to the creation of hundreds of mines, many transfer stations, and mill sites on the Navajo Nation. From 1970 – 1986, uranium mining continued to supply the nuclear power industry. According to the U.S. EPA, approximately 30 million tons of uranium ore were extracted from

[1] Brugee, Doug, Timothy Benally, and Esther Yazzie-Lewis. *The Navajo People and Uranium Mining*, Albuquerque: University of New Mexico Press, 2006.

Navajo lands from 1944 to 1986.[2] Approximately 525 uranium mines are still abandoned today on the Navajo Nation, and not a single one has been cleaned up properly. That said, I'm happy to report that cleanup efforts are underway at some (although fewer than half) of those mine sites. When we say properly, we mean that the Navajo communities will agree that taking mine waste from one side of the road to the other, for example at Red Water Pond at Northeast Church Rock is unacceptable. Our NNEPA have made these comments during the EIS scoping meetings that USEPA has hosted. But that's a topic for another hearing as more funding is necessary to properly cleanup these sites and protect the public health and environment of our Navajo communities.

Unfortunately, there are also four uranium mill processing sites on the Navajo Nation, and another site, immediately adjacent to the Navajo Nation reservation, in Church Rock, NM. On July 16, 1979, that the largest hazardous waste spill in U.S. history occurred at the Church Rock mill site, when the earthen dam to the pond holding the mill's uranium tailings was breached.[3] The spill released over 1,000 tons of radioactive mill waste and 93 million gallons of acidic radioactive tailings solution into the Puerco River and traveled downstream through the Navajo Nation to the community of Sanders, AZ, located nearly 60 miles west of the spill site.[4] The negative effects of this spill are still being felt today by residents in the immediate vicinity, surrounding communities, and downwinders including community members and residents residing along the Puerco River. In fact, many believe that past uranium activities attributes to elevated levels of uranium in the local communities' drinking water.

Navajo people who worked at these mines and mill sites and were not told about the dangers to their health until years after the Federal government was aware of the health impacts. Many of our uranium workers were never informed of the potential harms of radiation exposure, and there are reports of disreputable managers and companies that evaded meaningful regulation from Federal agencies such as the Occupational Safety and Health Administration. When the mines closed, many of the mining companies simply walked away from them and left the abandoned sites as they were. No clean-up efforts ever occurred.

Over time, many Navajo uranium mine and mill workers, ore transporters, core drillers, and many other Navajo uranium industry workers became ill and many died from diseases associated with their work-- in particular from cancer. Cancer is now the second leading cause of disease and death for the Navajo people.[5] There are stories told by our Navajo uranium workers, their families, and other community members about the times before they knew of the grave impacts of uranium exposure. Some common examples include individuals who as children played in abandoned uranium mines or on mill tailing piles, herders who watered their sheep in un-reclaimed open pit uranium mines, elderly women who for many years washed the dust-coated clothing of their uranium miner husbands, and families who obtained their drinking water from a stream that ran through or near a uranium mine, or a shallow livestock well, as it was the only

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[2] Navajo Nation: Cleaning Up Abandoned Uranium Mines (April 12, 2019). https://www.epa.gov/navajo-nation-uranium-cleanup

[3] Community Involvement Plan (2016). https://www.epa.gov/sites/production/files/2017-11/documents/cip_northeast_churchrock_kerr-mcgee_quivira.pdf

[4] *Id.*

[5] Navajo Nation Mortality Report, 2006-2009. http://www.nec.navajo-nsn.gov/Portals/0/Reports/Vital%20Statistics%20Report%202006%20to%202009%20FINAL.pdf.

water source in the community. There are also people who have had to struggle to survive following the deaths of the main breadwinners in their families.

II. Health Impacts

Navajo Birth Cohort Study

In 2010, the first longitudinal study "Navajo Birth Cohort Study (NBCS) to understand the impacts of exposures to uranium and other heavy metals and metalloids on birth outcomes and early developmental delays among Navajo Children. The study has found elevated urine concentrations for uranium, manganese, cadmium, and lead among NBCS pregnant women compared to pregnant and non-pregnant women in National Health and Nutrition Examination Survey (NHANES).[7] Navajo pregnant women with uranium concentrations exceeded the NHANES observations by 2.6 – 3 fold causing continued uranium and toxic metals in the environment as a primary concern. [7] While some Navajo infants are born with uranium in the urine greater than is seen in 95% of adults in the US NHANES studies. [7]

Navajo Uranium Workers Program

The Navajo Uranium Workers Program (NUWP) is a Navajo Generally Funded Program under the Navajo Nation Department of Health within the Executive Branch of the Navajo Nation. NUWP provides information and education about Uranium-related United States government Radiation Exposure Compensation Act (RECA) benefits and processes the enrollment paperwork for eligible clients for Radiation Exposure Compensation Act (RECA) benefits. Currently, our NDOH-NUWP has processed the following client claims between 10/1/2019-12/15/20: 21 RECA Miners/Millers/Former Uranium workers, 46 RECA Downwinders victims, 17 USDOL Part B Clients former uranium workers, 18 USDOL Part E clients former uranium workers have been paid out a total of $6,718,705.05. Our Shiprock office currently has assisted a total of 1,500 clients with their claims.

In determining the actions to take or recommend, NUWP draws on the foundation of U.S. RECA Act and the statues written and described therein. The current RECA Act will expire on July 10, 2022 along with all its components and Federal Trust Fund.

In review of the RECA Act, there are two deadlines that appear to be a discrepancy or in conflict with one another. The two issues were brought before the U.S. Department of Justice and noted the argument appears relevant. However, there are no conditions provided at the U.S. Federal level to accommodate any form of adjustment and therefore, intake processing institutions may have to set their own deadline to avoid future claim disqualifications.

Specifically, from the RECA Act, SEC.3. Trust Fund. (d) Termination, and SEC. 8. Limitations of claims. The Trust Fund will expire on July 10, 2022, the same day "A Claim" could still be filed. The question is if a claim is filed on July 10, 2022 and deemed eligible for compensation later, how would the claimant be compensated when the Trust Fund had expired. Furthermore, we recommend that an extension of RECA will be necessary, to allow many of our Navajo clients to still be allowed to process their claims, since the pandemic has caused a delay of

providing them services as the Executive orders and Public Health orders required the people to shelter in place and stay home.

III. Radiation Exposure Compensation Act (RECA)

The passage of RECA in 1990 (as amended in 2000) acknowledged the sacrifices by uranium workers including the Navajo people who worked in the uranium mines that pepper our lands, by providing compensation. Unfortunately, RECA does not adequately cover the breadth of individuals injured as a result of radiation exposure.

1) *Eligibility: Current RECA law only covers pre-1971 uranium workers; Post-1971 are ineligible*

Under current RECA laws, *only* uranium workers who worked up until 1971 are eligible to receive compensation. Perhaps this date was timed to end when the Federal government stopped being the sole purchaser of uranium, but it must be remembered that, on the Navajo Nation and elsewhere, the United States: (1) conducted the initial uranium exploration, by performing airborne surveys, mapping, and exploratory drilling and developing access roads to uranium sites; (2) increased the number of uranium mines and the supply of uranium ore by purchasing the ore at government-operated ore-buying stations, guaranteeing uranium ore prices, and offering various bonuses for production; (3) expanded the production of concentrated uranium ore by entering into procurement contracts for concentrated uranium, and so also prompted the development of uranium mills; and (4) conducted research into uranium ore sampling, testing, assaying, and processing methods, all of which led to these now-abandoned mines.[6] Besides, post-1971 mine workers suffer the same ailments as those working before 1971, and they need to be treated the same. The RECA coverage period should be extended to 1990 to provide fair compensation and healthcare for the risks and sacrifices these workers and their families made for this country.

2) *Downwinders are ineligible*

Coverage under RECA also needs to be expanded to include all "downwinders" who have suffered from uranium exposure. These areas should include all counties in Arizona, Nevada, and Utah, as well as being expanded to cover Montezuma County in Colorado and San Juan and McKinley Counties in New Mexico. These counties are adjacent to the counties in the Four Corners area that are currently eligible. As of February 2018, the Navajo Nation has had 2,038 downwinder claimants approved by the RECP,[7] and we support full and fair assistance to all downwinders.

We also support Navajo downwinders suffering the impacts from abandoned uranium mines. RECA does not address the impacts of the now elevated levels of radiation in Navajo homes and drinking water sources. For example, water sites ranging from the Colorado River to artesian wells have been contaminated due to downwind tests and uranium mining. Even low-level

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[6] "Summary and Chronology of the Domestic Uranium Program" by Neilsen B. O'Rear, Public Information Officer, Grand Junction Office, U.S. Atomic Energy Commission ("AEC") (May 1966).
[7] Native American Radiation Exposure Compensation System Claims to Date Summary of Claims (by Tribe). February 1, 2018. Department of Justice Civil Division. Page 3.

exposure can cause cancer,[8] and sadly Navajo residents still experience radiation exposure on a daily basis.

3) Extend RECA's 2022 Deadline

The Radiation Exposure Compensation Program under RECA also must have its deadline extended to allow all workers and downwinders injured from uranium exposure to benefit from the program. The program currently is set to end in 2022, and this deadline must be extended to provide adequate time for claims to be filed. In addition, a deadline extension is essential for Navajo Nation because of the unique difficulties experienced by Native individuals in satisfying the documentation requirements of the program. For example, under the current program, uranium workers must verify their employment and provide proof of residency. Often, the company – if it still exists – is not able to verify employment or provide workers with the necessary details, including the location of their job. Proof of residency (which downwinders as well as uranium workers must provide) raises additional problems. First, it can take up to one year to process, during which time the claimant may have passed away. Further, there need to be additional documents that can be used for proof of residency, such as the following: grazing permits, Bureau of Indian Affairs natural resources records, Navajo Nation Office of Vital Records files, census records, state or county records, trading post records, and documentation from religious organizations, traditional practitioners, and other Navajo social and cultural organizations. The pandemic has also caused additional delays and urgency, as the COVID-19 disease ran rapid through our Navajo Communities, those who worked in mines and lived down wind were among the most vulnerable population and many have passed from COVID-19 before compensation.

4) Expand Eligibility to Include Additional Categories of Workers and Cancers

RECA coverage also should be expanded to include additional categories of uranium mine workers, such as core drillers and DOE Remediation workers. Currently, only underground and surface workers are included. RECA should also cover additional types of cancer, particularly prostate and uterine cancer, as well as lung disease and kidney failure, all of which are at a high incidence in the Navajo population.

5) Increase Compensation Cap to a $150,000 Minimum

Finally, the caps on compensation should be increased. For one thing, health care costs continue to increase and there is a greater appreciation now for the true extent of injuries that these uranium miners and their families suffered. The original cap of $100,000 per individual must be increased to at least $200,000 to provide any fair measure of compensation, as recommended in previously proposed legislation.

IV. Conclusion

The disproportionate suffering of the Navajo people as a result of past uranium mining and processing on Navajo lands is well-documented and has been acknowledged by Congressional

[8] GAO Report, Low-Dose Radiation: Interagency Collaboration on Planning Research Could Improve Information on Health Effects, September 2017. https://www.gao.gov/assets/gao-17-546.pdf

leaders of both parties[9] The tragic legacy of uranium mining on the Navajo Nation continues to this day, perhaps to an extent that would not have occurred if it weren't taking place in a rural, American Indian community. However, now Congress has the opportunity to rectify at least some portion of this situation through amendments to RECA. In doing so, moreover, Congress will be fulfilling the goal articulated in Section 1-101 of Executive Order 12898 (Feb. 11, 1994)[10] "by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of [federal] programs, policies, and activities on minority populations and low-income populations in the United States."

In 2005, the Navajo Nation adopted legislation stating "No person shall engage in uranium mining and uranium processing on any sites within Navajo Indian Country." In that legislation, the Navajo Nation Council found a "continuing need for full monetary compensation of former Navajo uranium workers and their family members for their radiation and mining-induced diseases." The Navajo Nation also has adopted legislation conditionally prohibiting transportation of "any equipment, vehicles, persons or materials for the purpose of exploring for or mining, producing, processing, or milling any [uranium or radioactive products] on or under the surface of or adjacent to the Navajo Nation lands, or where such Activities may affect surface or ground waters of the Navajo Nation."

Congress should make sure that all individuals who worked around the mines and who are downwinders are covered fairly in the ways that I've outlined. Because former uranium workers and downwinders' health continues to deteriorate, there is very limited time for Congress to act, this is the right thing to do, and now is the time to act.

I want to thank Secretary of the Interior Debra A. Haaland. Congratulations. We look forward to working with you. We thank former Senator Tom Udall, Senator Ben Ray Lujan, Senator Heinrich, Sen. Crapo, Sen. Booker, and the late Honorable Sen. John McCain for all of their efforts and supporting bills in years prior in attempts to address these urgent needs in Indian Country. We look forward to working with the new 117th Congress on legislation and policies that will protect the public health and environment of our tribal communities.

Thank you.

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[9] See, e.g., Health and Environmental Impacts of Uranium Contamination in the Navajo Nation: Hearing Before the House Comm. on Oversight and Legislative Reform, 110th Cong. (Oct. 23, 2007) (Opening Statements of Rep. Waxman, Chairman, and Rep. Davis, Member, H. Comm. on Oversight & Legis. Reform).

[10] 59 FR 7629; February 16, 1994

Mr. COHEN. You are welcome. Thank you, Mr. President.

Our next Witness is Lilly Adams. Ms. Adams is an independent consultant specializing in nuclear weapons issues. She is the founder and coordinator of the Nuclear Voices Project, which builds connection between nuclear policy organizations and nuclear frontline communities and seeks to amplify issues of nuclear justice. She has done consulting work for the Union of Concerned Scientists and its global security program and is a member of the Board of Directors of the Arms Control Association. Ms. Adams holds a master's degree from the University of California Berkeley in society and environment.

Ms. Adams, you are recognized for 5 minutes.

STATEMENT OF LILLY ADAMS

Ms. ADAMS. Thank you very much, Chair Cohen, Chair Nadler, Ranking Member Johnson, and all Committee Members for the opportunity to testify today. I would like to thank the many individuals who supported this testimony, including many Members of impacted communities, my colleagues at the Union of Concerned Scientists, and a number of other researchers.

The Radiation Exposure Compensation Act is a valuable but limited program that just begins to address the suffering and harm caused by U.S. nuclear weapons testing and uranium mining. Between 1945 and 1963, the U.S. Government conducted more than 200 aboveground nuclear weapons tests. One hundred of the tests were at the Nevada test site, about 65 miles northwest of Las Vegas. This exposed people near the site and across the United States through inhalation of radioactive debris and ingestion of contaminated food, especially milk.

Starting in the 1940s, the United States also greatly expanded uranium mining and processing for the nuclear weapons program in sites across the western United States. Workers were exposed to radiation from gas and dust in the mines and processing sites.

RECA begins to address the legacy of harm caused by testing and mining by offering a governmental apology and providing one-time compensation of $50,000 to $100,000 to individuals with specific diseases presumed to have been caused by radiation exposure. Compensation is available to some nuclear testing downwinders to people onsite during tests, including veterans, and to some uranium workers.

RECA was established in 1990, was minimally expanded in 1992, and again in 2000, but it has not been updated in 20 years. Meanwhile, people have been suffering while waiting for compensation. This program is crucial and should be expanded. The U.S. Government knew the potential for health risks from radiation exposure, was urged to take precautions, but did not take adequate steps to protect or inform U.S. residents or monitor their health.

In the case of nuclear testing, the government often dismissed and suppressed information about contamination and exposure and downplayed the risks of tests to nearby residents, even encouraging people to watch them. Uranium workers were also not told about their deadly working conditions, and the U.S. Government generally did not enforce even simple safety measures, such as adequate mine ventilation, even after receiving explicit recommenda-

tions to do so and even after miners began getting sick and dying at alarming rates.

Without their knowledge or consent, many thousands of people paid the ultimate price, their health and their lives, to allow the United States to produce nuclear weapons.

In 1982, over 1,000 downwinders sued the U.S. Government, seeking compensation for these harms. The Federal court ruled that the government had, indeed, been negligent in monitoring off-site exposures and informing people of the risks. However, the ruling was overturned by the U.S. Government, which asserted it could not be held liable, which, in part, led Congress to finally create RECA.

RECA, in its current form, has many shortcomings. Most urgently, RECA is set to expire in July of 2022. After that, no claims can be made. This is unjust both because cancers caused by this radiation exposure can take decades to appear and because some still do not know they are eligible due to insufficient community outreach and assistance.

Additionally, compensation amounts for RECA have remained unchanged over the last 30 years and are minimal, often not even covering the cost of cancer care. RECA does not cover uranium workers after 1971, even though the U.S. continued to purchase domestically produced uranium and working conditions continued to gravely threaten worker health.

Multiple studies provide strong evidence that the full population of people who are exposed to nuclear testing are not currently covered. As a result, proposals have been put forward to add parts or all of Idaho, Montana, Colorado, New Mexico, Utah, Nevada, Arizona, and Guam to the program. In addition, while RECA currently covers people who were onsite for nuclear tests, it does not cover the veterans and civilians who cleaned up radioactive material left behind by tests and nuclear accidents.

Finally, the list of presumptive diseases and eligible occupations should be reviewed and updated to reflect the latest scientific research.

In summary, RECA is currently falling short. These communities who have suffered decades of painful cancers and other illnesses, often devastating whole families, even whole communities, deserve compensation and care from their government. We have an opportunity to help them.

While I am grateful to be able to provide an overview of these issues, I also urge the Committee to read the testimonies of these community members who have experienced this issue firsthand. Many of their stories are being submitted into the record, and it is so important that they are heard.

I would like to end with a quote from Linda Evers, who worked in a uranium mill in Grants, New Mexico, from 1976 to 1982 and so is currently excluded from RECA, she says: We were told every day that we were working to secure the freedom of every American in this country, and it seems that it is a harsh reality that the country we gave our lives for continues to ignore us now when we need our government to help us.

Thank you.

[The statement of Ms. Adams follows:]

Testimony of Lilly Adams[1]
Independent Consultant Specializing in Nuclear Weapons Issues

Hearing On
"Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act"

Committee on the Judiciary

Subcommittee on the Constitution, Civil Rights, and Civil Liberties

March 24, 2021

[1] My comments today are my own and do not necessarily reflect the views of the organizations I am affiliated with.

I would like to thank Chairman Nadler, Chairman Cohen, Ranking Member Johnson, and all committee members for the opportunity to submit testimony on this issue. I also would like to thank the many individuals who have supported this testimony, including many members of impacted communities, my colleagues at the Union of Concerned Scientists, and researchers and scientists that have contributed invaluable information to this field, including Robert Alvarez, Dr. Arjun Makihiani, and Dr. David Richardson.

The Radiation Exposure Compensation Act (RECA) is a valuable, if limited, program that begins to address the suffering and harm caused to US residents by US nuclear weapons testing and uranium mining and milling. I'm grateful that the committee is taking the time to assess RECA. In this testimony I will provide some basic information about the program, the history that led to its creation, and identify some of the program's limitations.

SECTION 1: Background on RECA, US Nuclear Testing, and Uranium Mining

Between 1945 and 1963 the United States government conducted over 200 atmospheric nuclear weapons tests. One hundred of these were performed at the Nevada Test Site about 65 miles northwest of Las Vegas. Radiation effects from these tests were not limited to the test site, since an atmospheric nuclear weapons explosion creates a cloud of radioactive debris and particles, which is then dispersed by wind.

Starting in the 1940s, the United States government also initiated a large scale program for the acquisition and enrichment of uranium for its nuclear weapons program. The US mined uranium across the Western and Southwestern United States. This material was processed and refined at uranium milling plants for use in nuclear weapons, nuclear propulsion, and nuclear energy.

Both nuclear weapons testing and uranium production activities have left behind a tragic and toxic legacy. RECA attempts to address some of that legacy by providing compensation to individuals with specific diseases that are presumed to have been caused by radiation exposure due to these US government activities. Fallout from nuclear testing poses health risks to people from both internal exposure (inhalation, skin absorption, or ingestion through contaminated food and water), and external exposure (gamma rays emitted by radioactive particles on the ground). Radiation exposure from uranium mining, milling, and other jobs in the uranium industry occurs through inhalation of radon gas and its derivatives, ingestion of radioactive dusts, and external ionizing radiation exposures in the uranium mines and uranium processing facilities.[2] Individuals from three groups who have developed these illnesses can apply for this one-time compensation:

[2] Committee on Uranium Mining in Virginia; Committee on Earth Resources; National Research Council, "Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia." Washington (DC): National Academies Press, (2011 Dec 19, 2011). Chapter 5: Potential Human Health Effects of Uranium Mining, Processing, and Reclamation, https://www.ncbi.nlm.nih.gov/books/NBK201047/.

1. "Onsite participants" of atmospheric nuclear weapons tests, conducted between 1945 and 1963, are eligible for $75,000. These can be either military servicemembers or civilian contractors employed at US nuclear weapons test sites.
2. Downwinders, or individuals who lived downwind of the Nevada Test Site from 1951 to 1958, or during July of 1962, are eligible for $50,000.
3. Uranium miners, millers, and ore transporters who worked in the uranium industry from 1942 to 1971 are eligible for $100,000.

RECA also provides funding for local health centers and nonprofit organizations to conduct cancer screenings and support individuals in filing RECA claims.

RECA was established in 1990 and minimally expanded in 1992 and again in 2000. While Congress has considered a number of adjustments and has commissioned studies since then, no substantive changes have been made in 20 years. As of March 2021, RECA has paid out roughly $2.44 billion to nearly 38,000 individuals.[3] This amount pales in comparison to broader nuclear weapons spending, which is estimated to be at least $1.2 trillion over the same period of time, between 1990 and 2021.[4] This means that so far RECA has roughly cost less than one quarter of one percent, or 0.2%, of the cost of our nuclear weapons arsenal in the same period of time.

SECTION 2: Remediating Harm

This program is crucial because the US government put people in harm's way without informing them of the risks, and therefore has a responsibility to help them. While the potential for negative health impacts was known, the US government chose not to take adequate precautions to protect or inform US residents or monitor their health. Instead, the government repeatedly chose to ignore, suppress, and dismiss the available information to avoid casting a negative light on nuclear weapons development. Dr. Arjun Makhijani of the Institute for Energy and Environmental Research states: "It is a remarkable fact of nuclear weapons history and radiation risk that every nuclear-weapon state has first of all harmed its own people in the name of national security."[5]

Before testing began at the Nevada Test Site, the US Atomic Energy Commission (AEC) knew from previous tests and modeling that testing in Nevada could put nearby communities at risk

[3] "AWARDS TO DATE 03/18/2021" Radiation Exposure Compensation Act, The United States Department of Justice, Updated March 18, 2021, https://www.justice.gov/civil/awards-date-03182021.
[4] Stephen I. Schwartz, *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940,* (Brookings Institution Press, June 1, 1998). Updated through personal communication with the author to extend cost estimates through 1990. https://www.brookings.edu/the-hidden-costs-of-our-nuclear-arsenal-overview-of-project-findings/.
[5] Arjun Makhijani, "A Readiness to Harm: The Health Effects of Nuclear Weapons Complexes," *Arms Control Today, Corrected online August 29, 2008,* https://www.armscontrol.org/act/2005-07/features/readiness-harm-health-effects-nuclear-weapons-complexes.

and spread radiation further across the country, depending on weather patterns.[6] Early days of testing confirmed this: high levels of radiation were discovered as far away as Indiana[7] and New York[8], and the government became aware of reports that milk supplies from cows and goats were contaminated with Iodine-131,[9] which could pose particular risk to children.[10] The AEC did not systematically monitor milk supplies for fear that it would raise public concern, nor did it systematically monitor exposure in other forms.[11]

The AEC did not adequately warn nearby residents of the risks of testing. Instead, they distributed pamphlets assuring people that they were "in a very real sense active participants in the Nation's atomic test program." And while they may have been "inconvenienced by our test operations" and "at times... exposed to potential risk from flash, blast, or fall-out," they were assured that no tests would be performed "unless there is adequate assurance of public safety" and that there was no risk outside of the testing area.[12]

The US government needed an enormous supply of uranium fuel for its nuclear weapons program. Before mining began in the United States, the government was aware of the link between lung cancer and uranium mining.[13] Throughout the 1950s, the US Public Health Service (PHS) studied conditions in uranium mines and the health of uranium miners. Concerned over high radiation levels, the PHS recommended adopting exposure limits and standards, and safety protocols such as proper ventilation.[14] Again, the AEC chose not to enforce these safety standards. Individual workers were also not informed that their illnesses could be work-related.[15]

Due to this lack of informed consent, US uranium workers were included in a 1994 study requested by President Bill Clinton, the results of which were reported to a Cabinet-level group charged with investigating reports of possibly unethical human radiation experiments funded by

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[6] Raye Ringholz, Uranium Frenzy: Saga of the Nuclear West, (Logan, Utah: Utah State University Press, 2002).
[7] J. Newell Stannard, *Radioactivity and Health: A History,* DOE/RL/01830-T59 (DE88013791) Distribution Category UC-408 (Battelle Memorial Institute, Office of Scientific and Technical Information, October, 1988) Vol. 2, pp. 885-86.
[8] Robert J. List, *The transport of atomic debris from Operation Upshot-Knothole,* NYO-4602, (Washington: US AEC), June 25, 1954, p. 80.
[9] Pat Ortmeyer and Arjun Makhijani, "Let them Drink Milk," Institute for Energy and Environmental Research, *October 1997, Updated April 15, 2009, https://www.ieer.org/latest/iodnart.html.*
[10] National Cancer Institute, "Get the Facts about Exposure to I-131 Radiation." https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/i-131.
[11] Allen v United States, 588 F. Supp 247, 377-382 (D. Utah 1984), https://law.justia.com/cases/federal/district-courts/FSupp/588/247/1679598/.
[12] United States Atomic Energy Commission, *Atomic Test Effects In The Nevada Test Site Region,* (January 1955), http://www.fourmilab.ch/etexts/www/atomic_tests_nevada/.
[13] Gary E. Madsen and Susan E. Dawson, "Unfinished business: Radiation Exposure Compensation Act (RECA) for post-1971 U.S. uranium underground miners," Journal Of Health And Social Policy, 19 no. 2, (2005), https://pubmed.ncbi.nlm.nih.gov/15855079.
[14] Advisory Committee on Human Radiation Experiments - Final Report to the Human Radiation Interagency Working Group, Chapter 12: The Uranium Miners, October 1995, https://bioethicsarchive.georgetown.edu/achre/final/summary.html.
[15] *ibid*

the government.[16] The report concluded that, “As a consequence of exposure to radon and its daughter products in underground uranium mines, at least several hundred miners died of lung cancer and surviving miners remain at elevated risk. These men, who were the subject of government study as they mined uranium for use in weapons manufacturing, were subject to radon exposures well in excess of levels known to be hazardous. The government failed to act to require the reduction of the hazard by ventilating the mines, and it failed to adequately warn the miners of the hazard to which they were being exposed.”[17]

As the primary purchaser of uranium and the main reason for the industry’s existence, the federal government had a clear responsibility for the well-being of uranium workers.

Congress held hearings on these issues as early as 1959, with multiple hearings in the late 1970’s and early 1980’s.[18,19] In 1982, 1,192 downwinders of the Nevada Test Site sued the US government for negligent release of radiation, failure to adequately monitor fallout released offsite, and failure to inform downwinder plaintiffs of danger. In his ruling in 1984, Judge Bruce S. Jenkins concluded that the government was negligent in monitoring off site exposure and informing nearby residents of the risks. Jenkins found that the AEC’s public statements about the risks of fallout, “demonstrate that responsible persons at the operational level of continental nuclear testing neglected an important, basic idea: *there is nothing wrong with telling American people the truth*.”[20]

However, the ruling was overturned in 1987, with the reasoning that the “federal government could not be held liable under the Federal Tort Claims Act.” Chief Judge Monroe McKay stated in the opinion as part of the ruling: “While we have great sympathy for the individual cancer victims who have borne alone the costs of the A.E.C.'s choices, their plight is a matter for Congress."[21]

Legislation had been introduced since 1979 to enact a program like RECA, but the reversal of Judge Jenkins' decision seemed to spur Congress to finally take action, and RECA was passed in 1990.[22] It is worth noting that in his ruling, Judge Jenkins awarded plaintiffs between $100,000 to $625,000.[23]

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[16] *ibid*
[17] *ibid*
[18] *Health Impact of Low-Level Radiation: Joint Hearing before the Subcommittee on Health and Scientific Research of the Senate Committee on Labor and Human Resources and the Senate Committee on the Judiciary*, 96th Cong., 1st Sess. (1979).
[19] Molly Ivins, “50's Uranium Miners Tell of Disease and Fight for Aid,” *New York Times,* Sept. 1, 1979, https://www.nytimes.com/1979/09/01/archives/50s-uranium-miners-tell-of-disease-and-fight-for-aid-responsibility.html.
[20] Allen v United States, 405. https://law.justia.com/cases/federal/district-courts/FSupp/588/247/1679598/.
[21] AP, “Negligence Ruling On U.S. Atom Tests Overturned,” *New York Times*, April 22, 1987, https://www.nytimes.com/1987/04/22/us/negligence-ruling-on-us-atom-tests-overturned.html.
[22] Trisha Pritikin, *The Hanford Plaintiffs: Voices From the Fight For Atomic Justice,* (University Press of Kansas, 2020), 264-5.
[23] AP, “Negligence Ruling On U.S. Atom Tests Overturned,” *New York Times*, April 22, 1987, https://www.nytimes.com/1987/04/22/us/negligence-ruling-on-us-atom-tests-overturned.html.

SECTION 3: Shortcomings Of the Existing Program

As noted earlier, RECA has always been a limited program. Some of the proposals for expanding the program include:

- Extending the program past the current July 2022 sunset date
- Increasing the amount awarded to claimants
- Expanding eligibility of downwind areas to include broader geographic areas, and to include specific populations such as those downwind of the Trinity Test site, those in Guam, and US veterans engaged in nuclear clean-up efforts
- Expanding coverage of uranium workers to those employed after 1971
- Revising the list of compensable diseases in light of contemporary scientific evidence

I highly recommend that in assessing these proposals, the committee make every effort to hear directly from those most impacted by these issues. While I am grateful to be able to provide an overview of these issues, it is of the utmost importance to also hear the experiences of these community members first-hand, especially those who were not able to be heard at the hearing today.

July 2022 sunset and access to RECA

Perhaps the most urgent limitation of RECA is that it is set to sunset in July 2022. This would likely exclude people who would otherwise be eligible from getting compensation. Because some of the compensable illnesses can take decades to manifest, this could include those who have been more recently diagnosed with a compensable illness but have not yet been able to go through the compensation process. Additionally, some exposed individuals may not have yet been diagnosed with a compensable illness, but may in the near future, and if RECA is allowed to expire they would never be able to apply.

In some cases, exposed communities or individuals may still be unaware that compensation is available. Communities have reported issues around communication, education, and awareness of RECA: who is eligible, and how to apply. Claimants also report that the process of applying can be incredibly challenging, often taking years to compile the necessary documentation and complete the process of applying. This is an even higher barrier for Indigenous claimants who often may not have the documentation necessary to file claims, such as birth certificates, hospital records, and more, because of cultural and institutional differences. Because of this, there have also been recommendations to expand the use of affidavits to establish certain eligibility criteria.[24]

[24] Other Issues Of Public Concern Regarding Eligibility For Compensation: Chapter 7. National Research Council. 2005. *Assessment Of The Scientific Information For The Radiation Exposure Screening And Education Program*. Washington, DC: The National Academies Press, https://www.nap.edu/read/11279/chapter/9?term=affidavit#203.

Atomic Veterans, those who worked on the nuclear test program, were sworn to secrecy until 1996, when veterans were released from their oath of secrecy.[25] Every year, the National Association of Atomic Veterans finds new members who have not realized that they are now able to speak about their experience onsite for tests, and are also unaware that they are eligible for RECA compensation.

RECA also offers survivors benefits, so even for those that have passed away while waiting for compensation, an extended program could still provide much-needed support for surviving family members. This is an important benefit to maintain.

Increasing payment amounts

The compensation provided by RECA is already very limited. Another way to improve the program would be to raise the amount of money paid to claimants. The amount has been unchanged since 1990, despite inflation. Even at that time, $50,000 to $100,000 often barely covers the cost of cancer care, and in many cases does not even meet that low bar. In a broader sense, RECA is also a very limited program compared to other compensation programs like the EEOICPA, which offers medical benefits in addition to one-time compensation.

For many of the individuals seeking compensation, this money is sorely needed. People in these communities have shared stories of RECA compensation being the difference between losing or keeping their homes, bankruptcy and financial stability, and because of the possibility of using compensation for medical bills, the difference between living and dying. In some cases, medical care is already extremely hard to access, especially for claimants in rural areas. People have held bake sales to raise the gas money needed to drive to the hospital for cancer care. RECA can help offset these costs.

Post '71 Uranium Workers

RECA currently limits eligibility to uranium workers employed before 1972. There are two main reasons that have been put forward for this.

The first is that after 1971, the private uranium industry grew and the US government stopped being the main purchaser of domestic uranium. However, the federal government nonetheless continued to purchase and enrich uranium after 1971. Uranium workers employed after 1971 were also told by their employers that they "were doing their part for the Cold War effort...The uranium industry used every available tool to get the workers to produce yellowcake as fast as they could…"[26] Linda Evers, a post-71 Uranium Workers from Grants, NM shares: "We were told every day that we were working to secure the freedom of every American in this country, and it

[25] Veterans Administration, "Are YOU An Atomic Veteran?" (Brochure, Washington DC, 2012), https://www.publichealth.va.gov/docs/radiation/atomic-veteran-brochure.pdf.
[26] Post '71 Uranium Workers Committee, Written Testimony, 2018, https://nuclear-voices.org/2020/01/18/post71/#resources-post71.

seems that it is a harsh reality that the country we gave our lives for continues to ignore us now when we need our government to help us."[27]

The second reason put forward for the cut-off date is that in 1971, the government passed a stricter exposure standard from uranium mines, which was intended to protect workers. In reality, this standard was not enforced, changes in ventilation and other measures to reduce exposure were only slowly implemented, and miners continued to be exposed to unsafe levels of radon and other hazards. Mining companies also often manipulated data to artificially lower radiation records, or simply did not monitor radiation levels.[28]

Additional research since RECA's creation has also shown that the new exposure standard was still too high: "Since 1971, with the creation of the [new] federal standard, strong scientific evidence has indicated that this standard was not stringent enough to protect the health of the miners."[29] In 1987, for example, the National Institute for Occupational Safety and Health (NIOSH) recommended that annual radon decay products exposures to workers in underground mines should not exceed 1 Working Level Months (a four-fold reduction from the 1971 federal standard).[30]

The US government essentially established this industry for the sole purpose of creating nuclear weapons. The ongoing culture of minimal or nonexistent protection for workers that continued through the 1970s and 80s was in part a product of decades of government neglect and a dismissal of scientific evidence of risk. The question of who purchased the uranium they were mining and processing is immaterial to the workers. They experienced the same unsafe work practices, and now experience the same illnesses.

Susan Dawson and Gary Madsen, formerly at the University of Utah, conclude: "The RECA legislation date of eligibility was based entirely on the federal government's uranium procurement program, rather than on scientific evidence of the relationship between exposures and health outcomes….We argue that the federal government should include [Post '71 workers] in RECA since it did not develop more stringent standards as suggested by its own health and safety agencies."[31]

It has also been proposed that uranium core drillers and remediation workers be added to the list of occupations eligible for compensation.

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[27] Linda Evers, Personal Written Testimony, 2018, https://nuclear-voices.org/2020/01/18/post71/#resources-post71.
[28] Madsen and Dawson, "Unfinished business."
[29] ibid
[30] National Institute for Occupational Safety and Health, "A recommended standard for occupational exposure to radon progeny in underground mines."; (US Department of Health and Human Services, 1987), 99.
[31] Gary E. Madsen and Susan E. Dawson, "Unfinished business: Radiation Exposure Compensation Act (RECA) for post-1971 U.S. uranium underground miners," Journal Of Health And Social Policy, 19 no. 2, (2005), https://pubmed.ncbi.nlm.nih.gov/15855079.

Additional downwind areas

At the beginning of RECA, the demarcation of downwind eligibility areas was proposed as the area marked by drawing a square around the Nevada Test Site, a designation that disregards what we know about how fallout is dispersed.[32] The current designation does a slightly better job by generally including counties near the test site. But it still excludes some of the counties closest to the test site, such as in Nevada, Arizona, and Utah, and cuts off compensation at certain county lines, despite the fact that fallout does not simply stop at county lines.

Recent peer-reviewed scientific literature have produced a wide range of estimates of fatal cancers associated with the US atmospheric nuclear weapons testing program. This uncertainty underscores the challenges of accurately reconstructing radiation doses decades after testing began, especially when the existing data are so lacking. This follows, in part, from inadequate monitoring of radiation exposures at the time. For example, a National Academies of Science report on this topic acknowledges that "Among the 3000 plus counties in the continental United States, fallout monitoring in areas other than a limited region in Nevada and its neighboring states occurred at never more than 95 stations through the years of aboveground US nuclear-weapons testing."[33]

Without sufficient data, scientists have to leverage assumptions in order to estimate radiation exposures and associated cancers, and the assumptions they choose result in the vastly different results that we see reported in these studies. But what they all demonstrate is that the scope of harm from testing is extensive. It is very possible that government studies to date have underestimated exposure.

Given this, it is clear that RECA as it stands does not cover the full population of people who were exposed. I recommend further exploration of the following key groups as possibilities for expansion and inclusion in downwind eligibility areas:

1) Broader geographic areas

A 1997 study by the National Institutes of Health's National Cancer Institute (NCI) examining Iodine-131 in fallout provided evidence that many of the most exposed US counties are outside of the current RECA eligibility area, including in states like Utah, Idaho, Montana, and North and South Dakota.[34] These regions should be further examined.

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[32] Congressional Research Service, "The Radiation Exposure Compensation Act (RECA): Compensation Related to Exposure to Radiation from Atomic Weapons Testing and Uranium Mining," (Updated January 13, 2021), 10. https://crsreports.congress.gov/product/pdf/R/R43956.

[33] "Exposure from Global Fallout: Chapter 6," National Research Council. 2005. *Assessment Of The Scientific Information For The Radiation Exposure Screening And Education Program*. Washington, DC: The National Academies Press, https://www.nap.edu/read/11279/chapter/8.

[34] National Cancer Institute, "*Estimated Exposures and Thyroid Doses Received by the American People from Iodine-131 in Fallout Following Nevada Atmospheric Nuclear Bomb Tests,"* (October 1997), https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/i-131.

1) People living downwind of the Trinity Test site.

In 1945, the United States tested its first ever nuclear weapon, conducting the Trinity Test in New Mexico. The US government claimed that the Trinity site was remote and uninhabited, but census data shows that there were tens of thousands of people living within a 50-mile radius of the site. The test produced fallout that fell for days and contaminated drinking water, crops, and livestock.[35] It is now known that exposure rates in public areas around the test were many times higher than currently allowed.[36] A recent NCI report links the Trinity test alone to up 1000 cancer cases,[37] and independent experts and local advocates have raised concerns that even this number greatly underestimates exposure and does not take into account important data. Infant mortality rates also spiked sharply in the months following the Trinity test, after a steady decline over the previous several years.[38]

2) People in Guam downwind from Pacific test sites.

In 2004, residents, advocates, and Congressional leaders in Guam raised the concern of radiation exposure in Guam due to testing at the Pacific Proving Grounds. In 2005 the National Academies of Science concluded: "As a result of its analysis, the committee concludes that Guam did receive measurable fallout from atmospheric testing of nuclear weapons in the Pacific. Residents of Guam during that period [1946-1962] should be eligible for compensation under RECA in a way similar to that of persons considered to be downwinders."[39]

3) US Veterans involved in clean-up activities

RECA eligibility for veterans has so far not been extended to those who were charged with cleaning up nuclear waste from tests and/or accidents. One such group is the roughly 1600 US veterans tasked with cleaning up plutonium after a nuclear accident in Palomares, Spain.[40]

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[35] Tularosa Basin Downwinders Consortium, "*Unknowing, Unwilling, and Uncompensated: The Effects of the Trinity Test on New Mexicans and the Potential Benefits of Radiation Exposure Compensation Act (RECA) Amendments*." Feb. 2017, https://2da8c03d-74f5-4bef-aa16-a6b9c4cb1631.filesusr.com/ugd/2b2028_8e221b260de7468bbcb67cbddc498dbe.pdf.

[36] Thomas Widner, Final Report of the Los Alamos Document Retrieval and Assessment (LAHDRA) Project, Centers for Disease Control and Prevention, November 2010, https://wwwn.cdc.gov/LAHDRA/Content/pubs/Final%20LAHDRA%20Report%202010.pdf

[37] National Cancer Institute, "*Study to Estimate Radiation Doses and Cancer Risks Resulting from Exposure to Radioactive Fallout from the Trinity Nuclear Test*," (Updated: December 29, 2020), https://dceg.cancer.gov/research/how-we-study/exposure-assessment/trinity.

[38] Kathleen M. Tucker and Robert Alvarez, "Trinity: "The most significant hazard of the entire Manhattan Project," *The Bulletin of the Atomic Scientists,* July 15, 2019, https://thebulletin.org/2019/07/trinity-the-most-significant-hazard-of-the-entire-manhattan-project/.

[39] "Additional Populations Environmentally At Risk For Radiation Exposure: Chapter 7," National Research Council. 2005. *Assessment Of The Scientific Information For The Radiation Exposure Screening And Education Program*. Washington, DC: The National Academies Press, https://www.nap.edu/read/11279/chapter/9?term=guam#199.

[40] Jan Beyea and Frank N. von Hippel, "History of Dose, Risk, and Compensation Assessments for US Veterans of the 1966 Plutonium Cleanup in Palomares, Spain," *Health Physics,* 117, no.6 (Dec 2019): 625–636.

Independent studies have shown previous estimates of exposure were greatly underestimated and that veterans were exposed to dangerous levels of plutonium, especially through inhalation, which would have likely led to adverse health outcomes and therefore warrant compensation. Another population is the over 8000 servicemembers and civilians tasked with cleaning up Enewetak Atoll in the Marshall Islands and building Runit Dome, a waste depository for material and soil that was highly contaminated with plutonium and other deadly radioactive material. The men involved report that almost no protective safety gear was worn during the mission, that often when high exposure readings were registered, they were not reported, that film-badges consistently failed because of the humidity, and that other safety precautions, though promised, were not taken. Many of the men involved in the mission now report cancers and other illnesses they attribute to radiation, and many have passed away.[41]

Presumptive Diseases versus Probability of Causation

Because of this uncertainty and the challenge of proving causation of cancer, RECA uses a presumptive model, only requiring claimants to demonstrate residence in a certain area and presence of a compensable disease. It has been suggested that RECA could instead use a "probability of causation/assigned share (PC/AS)" model, in a similar way to programs like the Energy Employees Occupational Illness Compensation Program Act (EEOICPA).[42] It is my belief that such a model is inappropriate and unjust in this context. When such calculations are used in decision-making in EEOICPA, we have much more specific data on worker exposures, often based on personal radiation monitoring badges and bioassay data, which makes such a model feasible. This is not true for civilian downwind exposures. Even under the EEOICPA, when such data are lacking, a list of presumptive cancers is used, similar to RECA. A PC/AS model is not appropriate when little data are available on individual exposures. In addition, causation models have been found to be very expensive to administer, due to the high costs of carrying out dose reconstruction for individuals.[43]

RECA has always operated within the limitations of the data that we have, and this was acknowledged by President George H.W. Bush when he signed RECA into law: "The bill provides compassionate payments to persons with specified diseases who fear that their health was harmed because of fallout from atmospheric atomic testing at the Nevada test site, regardless of whether causation can be scientifically established."[44] The presumption model used is an important element of RECA that recognizes the failings of the government to collect the data needed for a causation model. While requirements for eligibility may need to be updated and adjusted, and even expanded, a causation model should not be adopted.

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[41] Dave Phillips, "Troops Who Cleaned Up Radioactive Islands Can't Get Medical Care," *New York Times*, Jan. 28, 2017, https://www.nytimes.com/2017/01/28/us/troops-radioactive-islands-medical-care.html.
[42] "Probability Of Causation: Chapter 5," National Research Council. 2005. *Assessment Of The Scientific Information For The Radiation Exposure Screening And Education Program.* Washington, DC: The National Academies Press.
[43] Government Accountability Office, "Additional Independent Oversight and Transparency Would Improve Program's Credibility" (March 2010), 22-24, https://www.gao.gov/assets/gao-10-302.pdf.
[44] George H.W. Bush, "Statement on Signing the Radiation Exposure Compensation Act," The American Presidency Project, (October 15, 1990), https://www.presidency.ucsb.edu/node/265083.

Finally, as RECA is updated, the list of presumptive diseases it covers should be reviewed and updated to reflect scientific evidence that has accumulated since the original legislation was passed.

RECA is a program based on a model of compassionate compensation. The government knew that atmospheric nuclear weapons testing and uranium production carried serious health risks, but chose not to adequately protect or inform those in harm's way. This has caused decades of suffering and death for many in these communities. RECA has been an important step in righting this wrong, but it is extremely limited and has moved too slowly, as untold thousands have died waiting for compensation and recognition. Congress should extend and expand the program to ensure it achieves its purpose.

Mr. COHEN. Thank you, Ms. Adams. I appreciate your life's work and your testimony.

Our next Witness is Jean Bishop. Ms. Bishop is a member of the Mohave County, Arizona, Board of Supervisors, where she represents the supervisor of District 4. She has held this position since the year 2014, plus a number of other public service positions throughout her career, including as deputy sheriff and sergeant of the Mohave County Sheriff's Office, a commander of the Mohave County Air Search Squadron, and a captain in the Chloride Volunteer Fire Department. Ms. Bishop holds a degree in applied science from Mohave Community College as well as a number of other professional and technical certifications.

Ms. Bishop, you are recognized for 5 minutes.

STATEMENT OF JEAN BISHOP

Ms. BISHOP. Thank you, Mr. Chair, and Members of the Subcommittee, and thank you for the opportunity to provide this testimony this morning.

As you noted, my name is Jean Bishop, and I am the Supervisor of District 4, Mohave County Board of Supervisors, here in Arizona. My testimony is unique in that my statements are on behalf of the citizens of our county and also individually, as both my family and I have been impacted by the nuclear testing conducted at the Nevada proving grounds.

For years, the Arizona congressional delegation has supported legislation that would amend the RECA to recognize the many Mohave County residents that worked and lived downwind from the nuclear testing sites and were adversely affected by the radiation exposure that was generated by this ground nuclear weapons testing that occurred outside of Las Vegas, Nevada.

In addition, the Board of Supervisors has adopted four different resolutions supporting Federal legislation and requested amendments to be made to the radiation exposure screening and education program. With the pending expiration and hopefully renewal of RECA, now would be the perfect time to amend the boundaries of the covered areas and include all of Mohave County, which, coincidentally, is a neighboring county located to the east of Las Vegas, Nevada.

I wanted to tell you a little bit about my personal story, which begins when I was just a baby. Atomic explosions filled the sky near my family home outside of Las Vegas, Nevada. It was in the early 1950s when my family lived downwind from the government nuclear test sites and later moved to Mohave County.

Between 1951, which was my birth year, and 1963, the United States Government, through the Atomic Energy Commission, detonated hundreds of these nuclear bombs near our home in the Nevada desert. Over and over, my parents were told that the testing was safe as our family stood on the front porch and watched in horror as the sky filled with dust.

At the time, we were encouraged to celebrate the advances of our government, and we did. Unfortunately, we were blind for the fact that radioactive fallout would kill and sicken numerous members of our family. Regrettably, the radioactive fallout not only impacted

our family but families for hundreds of miles surrounding the test site.

My immediate family members that were impacted include my oldest sister, Judy. She died of a brain cancer in 1968. I was diagnosed with breast cancer in 2013, and during my treatment a year later, my sister was diagnosed with breast cancer in 2014. Then my husband was diagnosed with prostate cancer, and that was in 1998. At last count, 32 people of my husband's family have died from various types of cancer. Currently, his younger sister, who was mentioned earlier by Congressman Stanton, Danielle Stevens, is in her final days fighting Stage 4 colon cancer.

My husband worked on the family cattle ranch during the testing period, and they all watched the clouds move from the test site downwind across the sparsely populated areas as they would ride their horses up on the mountaintops to watch. Everyone on the ranch was given radiation detectors by the government to wear on their clothes while they are out doing their cowboy duties. This was to measure radioactivity. So, the government knew that there was radioactivity being spread downwind. The cowboys and the ranchers thought they were being patriotic and helping their country. Unfortunately, they were never provided the results of those measurements.

So, Congress created this RECA act. It is a program that would provide partial restitution to individuals who developed illnesses after this radiation exposure. I am certain that the Committee Members are aware that the Act still doesn't include part of Clark County immediately adjacent to the testing site and the southern part of Mohave County, which is directly downwind, even though the cancer rates here are much higher. RECA has included counties that are further east and southeast to both Mohave and Clark Counties. So, you will see behind me is a map that kind of points out the areas that RECA covers, and I see that I am running out of town—out of time. So, my question to the Committee is, how could this radiation fallout be so precise to miss portions of Clark County and Mohave County, yet previous determinations found that counties located further east were more substantially impacted by the nuclear testing?

Mr. Chair and Subcommittee Members, I respectfully request that you extend RECA and expand the coverage area to include Clark County and Mohave County. Thank you for your time, and I yield.

[The statement of Ms. Bishop follows:]

Written Statement of Jean Bishop, Supervisor District 4, Mohave County Board of Supervisors

United States House of Representatives Committee on the Judiciary
Subcommittee on the Constitution, Civil Rights, and Civil Liberties
Legislative Hearing on Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act

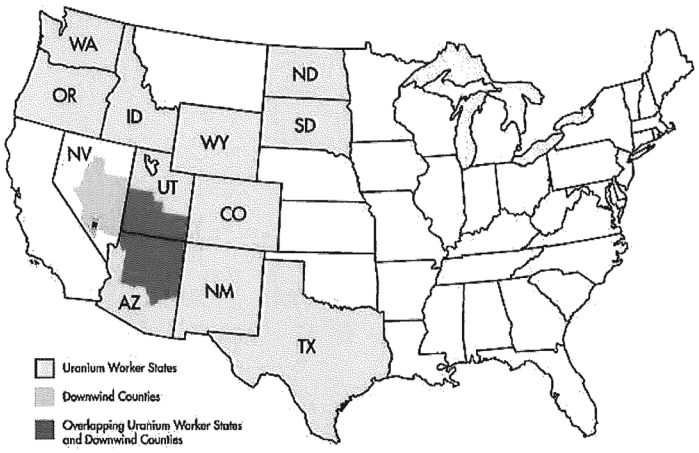
March 24, 2021 – 2:00 P.M.

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to provide this testimony. I am Jean Bishop, Supervisor District 4 of the Mohave County Board of Supervisors for Mohave County, Arizona. My testimony is unique in that my statements are on behalf of the citizens of Mohave County and also individually as both my family and I have been impacted by the nuclear testing conducted at the Nevada Proving Grounds.

For years the Arizona Congressional Delegation has supported legislation that would amend the Radiation Exposure Compensation Act (RECA) to recognize the many Mohave County residents that worked and lived downwind from nuclear testing sites and were adversely affected by the radiation exposure generated by the above ground nuclear weapons testing that occurred in Las Vegas, Nevada. In addition, the Mohave County Board of Supervisors has adopted 5 different resolutions supporting federal legislation and requesting amendments to the radiation exposure screening and education program. Copies of the resolutions and a certification from the County's Clerk of the Board have been included as part of my packet.

With the pending expiration, and hopefully renewal, of RECA now would be the perfect time to amend the boundaries of the covered area and include all of Mohave County which, coincidentally, is a neighboring County located to the east of Las Vegas, Nevada. Please note that Arizona Counties further east and southeast of the testing site were included in the RECA Covered Areas when a portion of adjacent Mohave County was overlooked. As a point of reference please review the following map https://www.justice.gov/civil/common/reca supporting this statement:

RECA COVERED AREAS



In 2005, Arizona Governor Janet Napolitano commissioned a study from the Arizona Radiation Regulatory Agency Regarding the Exposure of Citizens in Mohave County to Fallout from the Testing of Nuclear Weapons at the Nevada Test Site (Study)[1]. Communications from the Governor to Speaker James P. Weiers noted that "***an inequity for a county that experienced greater exposures from the radioactive iodine that was released by the prior nuclear testing than other areas that were compensated by the RECA such as Gila and Yavapai Counties*** [emphasis added]." Additional findings concluded that the Rads per individual to the thyroid in Mohave County were in some cases three times higher than those found in other Arizona counties that are in the RECA Covered Area. Finally, the report determined:

> "Clearly, since Congress has made the decision that compassionate payments are appropriate for certain areas of Arizona, it is an inequity to not provide the same payments in areas with the same or higher risk (i.e. exposure) as those that are being compensated. In the case of Mohave County, the entire County should be included for compassionate payments under the provisions of the Radiation Exposure Compensation Act."

A copy of the Study and communication form Governor Napolitano are included as part of my packet.

Personal Perspective

I was just a baby when atomic explosions filled the sky near my family home outside of Las Vegas, Nevada. It was in the early 50's when my family lived downwind from the government nuclear test sites and then later moved to Mohave County. A personal letter to the Committee is included as part of my packet of information.

Between 1951, my birth year, and 1963 the United States Government through the Atomic Energy Commission detonated hundreds of nuclear bombs near our home in the Nevada desert. It was a matter of National Security as the United States just ended WWI by dropping 2 bombs on Japan. The U.S. and U.S.S.R. had just entered into the cold war and began a race to create the biggest nuclear bomb, but this race was also a matter of unacknowledged risk at the expense of the public. Over and over my parents were told the testing was safe as our family stood on the front porch and watched in horror as the sky was filled with dust. While, at the time, we were encouraged to celebrate the advances of our government finding methods to protect U.S. citizens; unfortunately, we were blind to the fact that the radioactive fallout would kill and sicken numerous members of our family. Regrettably the radioactive fallout not only impacted our family but families for hundreds of miles surrounding the test site.

My immediate family members that were impacted include: oldest sister Judy died of brain cancer in 1968, I was diagnosed with breast cancer in 2013; my sister was diagnosed with breast cancer in 2014 and my husband was diagnosed with prostate cancer in 1998. At last count 32 people of my husband's family have died from various types of cancer. Currently his younger sister is in her final days fighting stage 4 colon cancer

My husband worked on the family's cattle ranch during the testing period and watched the clouds move from the test site, downwind and across the sparsely populated areas. Everyone on the ranch was given radiation detectors by the government to wear on their clothes to measure radioactivity. They thought they were being patriotic and helping their country; unfortunately, they were never provided with the results of those measurements.

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[1] Arizona State Library, azmemory.azlibrary.gov; Arizona Radiation Regulatory Agency: *Report to Governor Janet Napolitano Regarding the Exposure of Citizens in Mohave County to Fallout From the Testing of Nuclear Weapons at the Nevada Test Site*. March 10, 2005.

Congress created a Radiation Exposure Compensation Act (RECA), a program that would provide partial restitution to individuals who developed illnesses after this radiation exposure. I am certain committee members are aware that the act STILL does not include part of Clark County, immediately adjacent to the testing site, and the southern part of Mohave County which is directly downwind, even though the cancer rates are much higher in these areas. RECA has also included Counties that are further east and southeast of both Mohave and Clark Counties.

Honorable Chairman and Subcommittee Members for emphasis, on my next point, I requested my staff to take the RECA covered map from the Department of Justice's web site to show you what, I believe, will demonstrate the illogical determination to deny parts of Mohave and Clark Counties from RECA coverage.

- If we can all focus on the states of Nevada, Utah and Arizona, the testing site is designated by the yellow square in Nevada.
- The light blue color designates the designated Downwind Counties
- The green color designates Overlapping Uranium Worker States and Downwind Counties
- The southeastern corner of Nevada is not covered even though it is closer in distance to the testing site than a large portion of the covered areas.
- Let's focus now on the northwestern border of Arizona – this is where Mohave County lies and while the northern part of the County is covered the majority of the County is not.

My question to the committee is - How could have this radioactive fallout been so precise to miss portions of both Clark County, Nevada, and Mohave County, Arizona, two neighboring counties, yet previous determinations found that counties located further east in Arizona were more substantially impacted by the nuclear testing.

In conclusion, I would like to take a moment to liken a current time event, namely the Coronavirus Pandemic and the nuclear testing that occurred at the Nevada test site. The velocity of a sneeze according to a study conducted by Lydia "Bourouiba, a fluid dynamics scientist at MIT" found that "a fine mist of mucus and saliva can burst from a person's mouth at nearly a hundred miles an hour and travel as far as 27 feet[2]. Comparatively let's talk about the velocity of the extensive nuclear testing that occurred in the State of Nevada - tests that ranged from 1-49-kiltons of atmospheric tests and generated fire balls, mushroom clouds and even leveled structures. According to previous determinations the radioactive fallout from these tests traveled hundreds of miles extending to the eastern border of Arizona but missed part of the two neighboring Counties - Clark County, Nevada, and Mohave County, Arizona.

Mr. Chairman and Subcommittee Members I respectfully request that you extend RECA and expand the covered area to include all of Clark County and Mohave County.

[2] Gibbens, Sarah. National Geographics. *See how a sneeze can launch germs much farther than 6 feet.* April 17, 2020.

MOHAVE COUNTY BOARD of SUPERVISORS

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District 1	District 2	District 3	District 4	District 5
Travis Lingenfelter	Hildy Angius	Buster D. Johnson	Jean Bishop	Ron Gould
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County Administrator/County Engineer
Sam Elters
Telephone (928) 753-0729

Clerk of the Board
Ginny Anderson
Telephone (928) 753-0731

CERTIFICATION

I, Ginny Anderson, Clerk of the Board of Supervisors of Mohave County, hereby certify that the attached Mohave County Board of Supervisors Resolution Nos 2015-014, 2015-145, 2016-146, 2016-043, and 2019-010 are a full, true and correct copy of the original on file in my, Mohave County, Arizona, as approved by the Mohave County Board of Supervisors.

Ginny Anderson

Ginny Anderson, Clerk of the Board

3/19/2021
Date

RESOLUTION NO. 2015-014

A RESOLUTION RECOGNIZING JANUARY 27, 2015 AS A NATIONAL DAY OF REMEMBRANCE FOR AMERICAN DOWNWINDERS AND STRONGLY URGING AN AMENDMENT TO THE RADIATION EXPOSURE SCREEENING AND EDUCATION PROGRAM (RECA) THAT PROVIDES FOR THE ADDITION OF MOHAVE COUNTY AS A COVERED AREA

WHEREAS, the Board of Supervisors met in Regular Session this 20th day of January 2015; and

WHEREAS, Mohave County hereby recognizes January 27, 2015 as a National Day of Remembrance for American Downwinders; and

WHEREAS, on January 27, 1951, the first of years of nuclear weapons tests was conducted at a site known as the Nevada Proving Grounds, located approximately 65 miles northwest of Las Vegas, Nevada; and

WHEREAS, the Atomic Energy Commission assured people living near test sites that testing would not occur without adequate assurance of public safety; and

WHEREAS, many Mohave County residents worked and lived downwind from nuclear testing sites and were adversely affected by the radiation exposure generated by the above ground nuclear weapons testing that occurred in Nevada; and

WHEREAS, with the implementation and subsequent amendments to RECA many parts of Mohave County were overlooked in determination of covered areas when counties further east and southeast were deemed eligible; and

WHEREAS, findings of Arizona's Radiation Regulatory Agency concluded that the Rads per individual to the thyroid in Mohave County were in some cases three times higher than those found in other Arizona counties that are covered areas; and

NOW, THEREFORE, BE IT RESOLVED that the County of Mohave does hereby urge our Congressional Delegation to develop legislation that would amend the Radiation Exposure Screening and Education Program to provide for the addition of all of Mohave County as a covered area.

PASSED, APPROVED and ADOPTED this 20th day of January, 2015.

MOHAVE COUNTY BOARD OF SUPERVISORS

Steven [illegible]

ATTEST:

Ginny Anderson

Ginny Anderson, Clerk of the Board

BOARD OF SUPERVISORS MOHAVE CO. ARIZONA DITAT DEUS

RESOLUTION NO. 2015-145

A RESOLUTION IN SUPPORT OF CONGRESSMAN GOSAR'S BIPARTISAN BILL TO ENSURE JUSTICE FOR DOWNWINDERS EXPOSED TO GOVERNMENT RADIATION TESTING.

WHEREAS, the Board of Supervisors met in Regular Session this 8th day of September, 2015, and;

WHEREAS, on January 27, 1951, the first of years of nuclear weapons tests was conducted at a site known as the Nevada Proving Grounds, located approximately 65 miles northwest of Las Vegas; and

WHEREAS, the Atomic Energy Commission assured people living near test sites that testing would not occur without adequate assurance of public safety; and

WHEREAS, many Mohave County residents worked and lived downwind from nuclear testing sites and were adversely affected by the radiation exposure generated by the above ground nuclear weapons testing that occurred in Nevada; and

WHEREAS, with the implementation and subsequent amendments to RECA many parts of Mohave County were overlooked in the determination of covered areas when counties further east and southeast were deemed eligible; and

WHEREAS, findings of Arizona's Radiation Regulatory Agency concluded that the Rads per individual to the thyroid in Mohave County were in some cases three times higher than those found in other Arizona counties that were covered areas; and

NOW, THEREFORE, BE IT RESOLVED, that the Mohave County Board of Supervisors does hereby urge our Congressional Delegation to pass Congressman Gosar's Bill H.R. 3345

PASSED, APPROVED and ADOPTED this 8th day of September, 2015

MOHAVE COUNTY BOARD OF SUPERVISORS

Steven C. Moss, Chairman

ARREST:

Ginny Anderson, Clerk of the Board

BOARD OF SUPERVISORS MOHAVE CO. ARIZONA DITAT DEUS

RESOLUTION NO. 2016-043

A RESOLUTION REQUESTING SUPPORT OF CONGRESSMAN GOSAR'S BIPARTISAN BILL H.R. 3345 TO ENSURE JUSTICE FOR DOWNWINDERS EXPOSED TO GOVERNMENT RADIATION TESTING.

WHEREAS, the Board of Supervisors met in Regular Session this 4th day of April, 2016, and;

WHEREAS, on January 27, 1951, the first of years of nuclear weapons tests was conducted at a site known as the Nevada Proving Grounds, located approximately 65 miles northwest of Las Vegas; and

WHEREAS, the Atomic Energy Commission assured people living near test sites that testing would not occur without adequate assurance of public safety; and

WHEREAS, many Mohave County residents worked and lived downwind from nuclear testing sites and were adversely affected by the radiation exposure generated by the above ground nuclear weapons testing that occurred in Nevada; and

WHEREAS, with the implementation and subsequent amendments to RECA many parts of Mohave County were overlooked in the determination of covered areas when counties further east and southeast were deemed eligible; and

WHEREAS, findings of Arizona's Radiation Regulatory Agency concluded that the Rads per individual to the thyroid in Mohave County were in some cases three times higher than those found in other Arizona counties that were covered areas; and

NOW, THEREFORE, BE IT RESOLVED, that the Mohave County Board of Supervisors does hereby urge Congressman David Schweikert, Congressman Matt Salmon and Congresswoman Martha McSally to sign onto Congressman Gosar's Bill H.R. 3345 to amend the Radiation Exposure Compensation Act expanding the eligibility boundaries to ensure justice for Downwinders exposed to government radiation testing.

PASSED, APPROVED and ADOPTED this 4th day of April, 2016.

MOHAVE COUNTY BOARD OF SUPERVISORS

Jean Bishop, Chairman

ATTEST:

Ginny Anderson, Clerk of the Board

BOARD OF SUPERVISORS MOHAVE CO. DITAT DEUS ARIZONA

RESOLUTION NO. 2016- 146

WHEREAS, the Board of Supervisors of Mohave County met in regular session on this 7th day of November, 2016, and

WHEREAS, in compliance with Arizona Revised Statutes 48-1012 (E), the Board of Supervisors, by resolution, cancels the November 15, 2016 election for the office of Board of Directors of the Golden Shores Water Conservation District and appoint those persons to office who legally filed nomination papers in the time prescribed by statute.

Golden Shores Water Conservation District:

Imogene Snyder

PASSED, APPROVED AND ADOPTED this 7th day of November, 2016.

MOHAVE COUNTY BOARD OF SUPERVISORS

Jean Bishop, Chairman

ATTEST:

Ginny Anderson, Clerk of the Board

BOARD OF SUPERVISORS MOHAVE CO. DITAT DEUS ARIZONA

RESOLUTION NO. 2019-010

A RESOLUTION RECOGNIZING JANUARY 27, 2019 AS A NATIONAL DAY OF REMBERENCE FOR AMERICAN DOWNWINDERS AND STRONGLY URGING AN AMENDMENT TO THE RADIATION EXPOSURE SCREENING AND EDUCATION PROGRAM (RECA) THAT PROVIDES FOR THE ADDITION OF MOHAVE COUNTY AS A COVERED AREA.

WHEREAS, the Board of Supervisors met in Regular Session this 22nd day of January 2019; and

WHEREAS, Mohave County hereby recognizes January 27, 2019 as a National Day of Remembrance for American Downwinders; and

WHEREAS, on January 27, 1951, the first of years of nuclear weapons tests was conducted at a site known as the Nevada Proving Grounds, located approximately 65 miles northwest of Las Vegas, Nevada; and

WHEREAS, the Atomic Energy Commission assured people living near test sites that testing would not occur without adequate assurance of public safety; and

WHEREAS, many Mohave County residents worked and lived downwind from nuclear testing sites and were adversely affected by radiation exposure generated by the above ground nuclear weapons testing that occurred in Nevada; and

WHEREAS, with the implementation and subsequent amendments to RECA many parts of Mohave County were overlooked in determination of covered areas when counties further east and southeast were deemed eligible; and

WHEREAS, findings of Arizona's Radiation Regulatory Agency concluded that the Rads per individual to the thyroid in Mohave County were in some cases three times higher than those found in other Arizona counties that are covered areas; and

NOW, THEREFORE, BE IT RESOLVED that the County of Mohave does hereby urge our Congressional Delegation to develop legislation that would amend the Radiation Exposure Screening and Education Program to provide for the addition of all of Mohave County as a covered area.

PASSED, APPROVED and ADOPTED this 22nd day of January, 2019.

MOHAVE COUNTY BOARD OF SUPERVISORS

Hildy Angius, Chairman

ATTEST:

Ginny Anderson, Clerk of the Board

BOARD OF SUPERVISORS MOHAVE CO. DITAT DEUS ARIZONA

STATE OF ARIZONA

JANET NAPOLITANO
GOVERNOR

OFFICE OF THE GOVERNOR
1700 WEST WASHINGTON STREET, PHOENIX, AZ 85007

MAIN PHONE: 602-542-4331
FACSIMILE: 602-542-7601

April 13, 2005

The Honorable James P. Weiers
Speaker of the House
Arizona State Legislature
1700 West Washington
Phoenix, AZ 85007

Dear Speaker Weiers:

Attached is a report from the Arizona Radiation Regulatory Agency Director regarding the Radiation Exposure Compensation Act (RECA) and its application to **Mohave County, Arizona**. As presently written, the RECA does not apply to the portions of Mohave County south of the Colorado River. This creates an inequity for a county that experienced greater exposures from the radioactive iodine that was released by the prior nuclear testing than other areas that were compensated by the RECA such as Gila and Yavapai Counties. Therefore I have asked the Arizona Congressional Delegation to support the inclusion of all of Mohave County Arizona in the RECA. I invite you to join me in this effort.

In addition, many of the Mohave County citizens are concerned that the Nevada Test Site will again be utilized for nuclear weapon testing. They believe they have borne the brunt of the risks of the testing of nuclear weapons and do not believe they should again be exposed to those risks.

I thank you for your attention to these issues that affect our constituents.

Yours very truly,

Janet Napolitano
Governor

ARIZONA RADIATION REGULATORY AGENCY

Janet Napolitano
Governor

Aubrey V. Godwin
Director

4814 South 40th Street Phoenix, Arizona 85040-2940 (602) 255-4845
Fax (602) 437-0705

March 10, 2005

Honorable Janet Napolitano
Governor
State of Arizona
1700 West Washington Street
Phoenix, AZ 85007

Dear Governor Napolitano;

Transmitted herewith is a copy of my report on the current situation in Mohave County regarding the radiation exposure and compassionate payments by the Federal Government. As you will note from the report, the lower portion of Mohave County is not eligible for the compassionate payments even though the persons living in this area were exposed to higher levels of radioactive iodine than the persons living in Gila County who can receive compassionate payments.

I respectively suggest that copies of this report be made available to the Arizona Congressional Delegation, the U. S. Senators from California, the Mohave County Legislative Delegation, and the Mohave County Supervisors. In addition, I suggest copies be made available to the following non-elected officials or individuals, the National Academy of Science, the U.S. Attorney General and all those who testified at the hearing.

Also submitted with this report as additional information are the attendance registration list, a DVD copy of the comments offered by the citizens and a memorial book prepared for you by the Downwinders.

In view of the concerns of the local citizens, I suggest we encourage the passage of a Memorial by the Arizona Legislature asking Congress not to authorize the restart of testing of nuclear weapons at the Nevada Test Site. Several individuals expressed concern that such testing may be reinstituted at the site and such activity might release still more radioactive material onto their homes.

Sincerely

Aubrey V. Godwin, M.S., C.H.P.
Director

Enc.
AVG:avg

REPORT TO GOVERNOR JANET NAPOLITANO REGARDING THE EXPOSURE OF CITIZENS IN MOHAVE COUNTY TO FALLOUT FROM THE TESTING OF NUCLEAR WEAPONS AT THE NEVADA TEST SITE

PURPOSE . This report is to advise the Governor and other appropriate elected or appointed officials of the current radiation exposure situation in Mohave County Arizona. Of primary interest is how the Radiation Exposure Compensation Act (RECA) considers the exposures of Mohave County citizens. Included as a part of this report are the comments of concerned citizens of Arizona and California made at the "Director's Hearing" on February 4, 2005.

OBJECTIVES. This report indicates that within the State of Arizona there is an inequitable treatment of the Mohave citizenry regarding their exposure to weapons testing fallout as shown by the U.S. Governments own exposure calculations.

BACKGROUND INFORMATION. The following is a copy of the information prepared by the U. S. Department of Justice on the RECA. See http://www.usdoj.gov/civil/torts/reca/about.htm.

"On October 5, 1990, Congress passed the Radiation Exposure Compensation Act ("RECA" or "the Act"), 42 U.S.C. § 2210 note, providing for compassionate payments to individuals who contracted certain cancers and other serious diseases as a result of their exposure to radiation released during above-ground nuclear weapons tests or as a result of their exposure to radiation during employment in underground uranium mines. The 1990 Act provided fixed payments in the following amounts: $50,000 to individuals residing or working "downwind" of The Nevada Test Site; $75,000 for workers participating in above-ground nuclear weapons tests; and $100,000 for uranium miners. Implementing regulations were issued by the Department of Justice and published in the Federal Register on April 10, 1992, establishing procedures to resolve claims in a reliable, objective, and non-adversarial manner, with little administrative cost to the United States or to the person filing the claim. Revisions to the regulations, published in the Federal Register on March 22, 1999, served to greater assist claimants in establishing entitlement to an award.

On July 10, 2000, Pub. L. 106-245, the Radiation Exposure Compensation Act Amendments of 2000 ("the 2000 Amendments") was passed. Introduced by Senator Hatch on August 5, 1999, the Amendments were one of many bills introduced in the 106th Congress with the intent to amend the existing law. Most significantly, the 2000 Amendments added two new claimant categories (uranium mill workers and ore transporters), provided additional compensable illnesses, lowered the radiation exposure threshold for uranium miners, included above-ground miners within the definition of "uranium miner," modified medical documentation requirements, and removed certain lifestyle restrictions. It also added additional geographic areas to the downwinder claimant category. On November 2, 2002, the President signed the "21st Century Department of Justice Appropriation Authorization Act" (P.L. 107-273). Contained in the law were several provisions relating to RECA. While most of these amendments are "technical" in nature, some affect eligibility criteria and revise claims adjudication procedures. The following points describe the major impact of the "technical amendments":

- the "technical amendments" reinserted a previously covered geographical area for downwinder claimants that had erroneously been removed by the 2000 Amendments;
- clarifies requirement that lung cancer must be "primary" for all claimant categories;
- uranium miners provided the option of establishing exposure to 40 working level months of radiation or establishing employment in a mine for one year;
- all uranium workers diagnosed with lung cancer no longer required to submit evidence of a non-malignant respiratory disease; (Seemingly a draftsmanship error in the 2000 Amendments, the "technical amendments" eliminated the requirement that in cases where the claimant is living, a claimant with lung cancer must submit the medical documentation required for proof of a "non-malignant respiratory disease." This requirement had the unintended effect of precluding most lung cancer claimants -- who may not suffer from a non-malignant respiratory disease -- from establishing eligibility for compensation.)

RECA Claimant Categories

Uranium Miners. A payment of $100,000 is available to eligible individuals employed in aboveground or underground uranium mines located in Colorado, New Mexico, Arizona, Wyoming, South Dakota, Washington, Utah, Idaho, North Dakota, Oregon, and Texas at any time during the period beginning on January 1, 1942, and ending on December 31, 1971. Additional mining states may be included for compensation upon application.

A. **Exposure.** The claimant must have been exposed to 40 or more working level months (WLMs) of radiation while employed in a uranium mine or worked for at least one year in a uranium mine during the relevant time period.
B. **Disease.** Compensable diseases include primary lung cancer and certain nonmalignant respiratory diseases.

Uranium Mill Workers. A payment of $100,000 is available to eligible individuals employed in uranium mills located in Colorado, New Mexico, Arizona, Wyoming, South Dakota, Washington, Utah, Idaho, North Dakota, Oregon, and Texas at any time during the period beginning on January 1, 1942, and ending on December 31, 1971.

A. **Exposure.** The claimant must have worked in a uranium mill for at least one year during the relevant time period.
B. **Disease.** Compensable diseases include primary lung cancer, certain nonmalignant respiratory diseases, renal cancer, and other chronic renal disease including nephritis and kidney tubal tissue injury.

Ore Transporters. A payment of $100,000 is available to eligible individuals employed in the transport of uranium ore or vanadium-uranium ore from mines or mills located in Colorado, New Mexico, Arizona, Wyoming, South Dakota, Washington, Utah, Idaho, North Dakota, Oregon, and Texas at any time during the period beginning on January 1, 1942, and ending on December 31, 1971.

A. **Exposure.** The claimant must have transported ore for at least one year during the relevant time period.
B. **Disease.** Compensable diseases include primary lung cancer, certain nonmalignant respiratory diseases, renal cancer, and other chronic renal disease including nephritis and kidney tubal tissue injury.

Downwinders. A payment of $50,000 is available to an eligible individual who was physically present in one of the affected areas downwind of the Nevada Test Site during a period of atmospheric nuclear testing, and later contracted a specified compensable disease.

A. **Exposure.** The claimant must have lived or worked downwind of atmospheric nuclear tests in certain counties in Utah, Nevada and Arizona for a period of at least two years during the period beginning on January 21, 1951, and ending on October 31, 1958, or, for the period beginning on June 30, 1962, and ending on July 31, 1962. The designated affected areas are: in the State of Utah, the counties of Beaver, Garfield, Iron, Kane, Millard, Piute, San Juan, Sevier, Washington, and Wayne; in the State of Nevada, the counties of Eureka, Lander, Lincoln, Nye, White Pine, and that portion of Clark County that consists of townships 13 through 16 at ranges 63 through 71; and in the State of Arizona, the counties of Apache, Coconino, Gila, Navajo, Yavapai, and that part of Arizona that is north of the Grand Canyon.
B. **Disease.** After such period of physical presence, the claimant must have contracted one of the following specified diseases: leukemia (other than chronic lymphocytic leukemia), multiple myeloma, lymphomas (other than Hodgkin's disease), and primary cancer of the thyroid, male or female breast, esophagus, stomach, pharynx, small intestine, pancreas, bile ducts, gall bladder, salivary gland, urinary bladder, brain, colon, ovary, or liver (except if cirrhosis or hepatitis B is indicated), or lung.

Onsite Participants. A payment of $75,000 is available to eligible individuals who participated onsite in a test involving the atmospheric detonation of a nuclear device, and later developed a specified compensable disease.

A. **Exposure.** The claimant must have been present "onsite" above or within the official boundaries of the Nevada, Pacific, Trinity, or South Atlantic Test Sites at any time during a period of atmospheric nuclear testing and must have "participated" during that time in the atmospheric detonation of a nuclear device.

Disease. After the onsite participation, the claimant contracted one of the following specified diseases: leukemia (other than chronic lymphocytic leukemia), lung cancer, multiple myeloma, lymphomas (other than Hodgkin's disease), and primary cancer of the thyroid, male or female breast, esophagus, stomach, pharynx, small intestine, pancreas, bile ducts, gall bladder, salivary gland, urinary bladder, brain, colon, ovary, or liver (except if cirrhosis or hepatitis B is indicated), or lung."

ADDITIONAL BACKGROUND INFORMATION. The U.S. Atomic Energy Commission attempted to limit the tests to weather conditions that would not carry the major fallout cloud into either California or the Las Vegas area. As noted in the

testimony given in the hearing, they were only partially successful. In most cases the major portion of the radioactive material was lifted quite high, greater than 20,000 feet, where it was carried to the northeast of the Nevada Test Site. These materials ultimately fell out or were rained out thousands of miles from the tests, see the national map at the end of the Appendix. But, clearly detectable radiation was released into Arizona as shown by the Governments' own data reproduced in the Appendix.

Cancer data from the State of Arizona needs extensive refinement to be of any value. When comparing the specific cancer mortality data with the reported exposures there is no correlation, probably due to the other contributing factors which also cause these same cancers. Selected mortality data may appear to give a correlation but that does not meet the scientific test of validity. A correlation of the cancer mortality data to the radiation exposures may exist if the other contributors are removed from the data. Some of the interferences are; the high levels of uranium in the ground waters in some areas of Mohave County, the uses of pesticides on the cotton fields, and chemical exposures in the workplace.

CITIZENS COMMENTS. On February 4, 2005, Robert H. Cope, at the direction of the Arizona Radiation Regulatory Agency Director, conducted a public meeting or hearing to receive the comments of the Mohave County citizens regarding the current division of the County in the compassionate payments to sickened individuals. A total of 50 individual offered comments.

These commenters were supportive of program changes to include all of Mohave County in the RECA compassionate payment program. They were at a loss to know why the County was divided in the first place. The data attached as Appendix, demonstrates that the presently not included areas of Mohave County have higher exposure than two counties, Gila and Yavapai, which are included. This is clearly an inequity to the citizens of Mohave County. Further, many indicate opposition to the idea that nuclear weapon testing should be resumed at the Nevada Test Site.

Several commenters also asked that consideration be give to expanding the list of diseases to include other cancers they suspect may also be caused by radiation exposure. The one theme that permeated the comments of all that participated in the hearing, was the human pain and suffering caused by cancer. In these cases, most believed the cancers were caused by the radiation exposures from the fallout. Vivid descriptions of family members shattered lives after contracting cancer, the difficulties with insurance coverage, the lack of local treatment facilities and the agony of watching a loved one slowly waste away and die are not translatable to a formal report.

One commenter stated, " The government wouldn't hurt us.." was the way most viewed the situation at the time they were exposed. Nevertheless, several commenters indicated they were asked to wear radiation detection equipment or had radiation measurements made of them or their surroundings during these weapon tests. This implies that the Government had some idea that the fallout may have adverse consequences on the

population. Several told of watching the beautiful colors associated with the tests, hearing the rumble of the blast some twenty minutes later and then watch and in some cases playing in the dust that would fall.

POLICY ISSUES. The Radiation Exposure Compensation Act is a balancing of several competing principles.

1. Concern for the citizenry's health and well being
2. How to equate the damages when the damage is a statistical calculation and there is no way to say this disease was specifically caused by this action, but only the risk of having the disease was increased by some degree.
3. Should all who had the increased risk be compensated or only those who became ill.
4. Total money available to pay compensation. The problem is national, all states have an increase in radiation exposure due to these tests.
5. The exposures, at the time were viewed as justified to save our way of life. How does this compare to those who were injured or killed in battle or in making ammunition.

Clearly, since Congress has made the decision that compassionate payments are appropriate for certain areas of Arizona, it is an inequity to not provide the same payments in areas with the same or higher risk (i.e. exposure) as those that are being compensated. In the case of Mohave County, the entire County should be included for compassionate payments under the provisions of the Radiation Exposure Compensation Act.

In addition, a review of the diseases covered by the Radiation Compensation Act should be included since there appears to be some possibility that there is an increase in other forms of cancer in the area.

Further, in light of this experience, the local citizens are adamant that no additional nuclear weapon testing should take place at the Nevada Test Site.

APPENDIX

Reported iodine exposures in Arizona

The National Institutes of Health, National Cancer Institute made estimates of the per capita exposure to the thyroid for each county in the continuous United States. For Arizona the reported data in rads follows.

County	Geometric mean	Standard deviation	Effected population
Apache*	2.0	1.9	28,902
Cochise	0.2	1.7	41,498
Coconino 1*	3.7	2.3	611
Coconino 2*	3.6	2.3	10,346
Coconino 3*	0.6	1.9	20,586
Gila*	0.2	1.7	24,837
Graham	0.2	1.7	13,438
Greenlee	0.2	1.7	12,256
Maricopa	0.2	1.8	472,764
Mohave 1*	3.3	2.0	227
Mohave 2*	4.7	2.1	227
Mohave 3	0.6	1.9	6,291
Mohave 4	0.7	1.9	1,441
Navajo*	1.2	2.0	33,084
Pima	0.3	1.9	194,103
Pinal	0.2	1.8	51,473
Santa Cruz	0.3	1.8	9,968

Yavapai*	0.2	1.8	26,658
Yuma	0.2	2.1	35,756

*Counties or portions of county eligible for Downwinders compensation

Quoted below is the full executive summary of the study which presented the above data. The full report may be found at http://rex.nci.nih.gov/massmedia/Fallout/contents.html

"National Cancer Institute
Study Estimating Thyroid Doses of I-131 Received by Americans From Nevada Atmospheric Nuclear Bomb Test

Background

Public Law 97-414, in part, directs the Secretary of Health and Human Services to "conduct scientific research and prepare analyses necessary to develop valid and credible methods to estimate the thyroid doses of Iodine-131 (131I) that are received by individuals from nuclear bomb fallout (and) to develop valid and credible assessments of the exposure to Iodine-131 that the American people received from the Nevada atmospheric nuclear bomb tests."

The National Cancer Institute was asked to respond to this mandate, and the present report was prepared for that purpose. The full study report, to be available as soon as possible, provides estimates of human exposure to and thyroid radiation doses from iodine-131 resulting from individual nuclear tests conducted at the Nevada Test Site (NTS).

Ninety nuclear tests released almost 99% of the total iodine-131 entering the atmosphere from the bomb tests conducted at the NTS. These ninety tests released about 150 million curies of iodine-131, mainly in the years 1952, 1953, 1955, and 1957. Some radioiodine was deposited everywhere in the United States, with the highest deposits immediately downwind of the NTS. The lowest deposits were on the west coast, upwind of the NTS. In the eastern part of the country, most of the deposited iodine-131 was associated with rain, while in the more arid west, dry deposition (where particles settle on the ground) prevailed. Because iodine-131 decays with an 8-day half-life, exposure to the released iodine-131 occurred primarily during the first two months following a test.

Estimating Exposure

Historical measurements of the amounts of radioactivity deposited and of a daily rainfall were used as the basis for the dose calculations whenever feasible. These historical measurements consisted of a simple collection of daily fallout on sticky paper (i.e., gummed film) made at the time of and during several days following most of the tests. The number and location of the monitoring stations across the United States varied with time but never exceeded 100. The collected fallout was measured daily for the amount of gross beta radioactivity present. The monitoring system was intended to determine where and when fallout occurred, but did not measure specific radionuclides. In other words, the system did not measure individually the amounts of different kinds of radioactivity, such as iodine-131, strontium-90, and cesium-137.

Reanalyses of these data together with the use of mathematical modeling, and the incorporation of precipitation data for each county during the time fallout clouds were over the United States, permitted estimates of iodine-131 deposition in each county for each day following each test. This reanalysis included: 1) the assessment of the collection efficiency of the gummed film for fallout collection; 2) the assessment of the efficiency of the radioactivity counting equipment, which varied from test series to test series; 3) accounting for the loss of volatile radionuclides during sample processing at the time of the original measurements; and 4) the use of more recently declassified and published characterization of the distribution and quantity of radionuclides in the fallout cloud produced by each test.

Measurements of the amount of radioactivity deposited were not available for 3 tests conducted in 1951, and for 6 tests conducted between 1962 and 1970. The latter six tests are thought to have led possibly to significant depositions of iodine-131 in the U.S. For these nine tests, atmospheric dispersion and deposition models were used to estimate the amount of iodine-131 deposited by county.

Regional data on consumption of pasture grasses by cows and on the transfer to milk of iodine-131 deposited on pasture grasses were used to estimate concentrations of iodine-131 in milk fresh from cows. These concentrations, together with milk distribution patterns in the 1950s, were used to estimate local concentrations of iodine-131 in the cows' milk available for human consumption throughout the country. (Milk consumed immediately after milking a family cow would have a higher concentration if iodine-131 than does milk processed and then consumed days after a cow was milked.) Finally, milk consumption rates, based upon diet surveys, were used to estimate the amounts of iodine-131 ingested by age group and by gender. The transfer of iodine-131 to people through the other exposure routes was similarly analyzed.

The overall average thyroid dose to the approximately 160 million people in the country during the 1950s was 2 rads. The uncertainty in this per capita dose is estimated to be a factor of 2, that is, the per capita dose may have been as small as 1 rad or as large as 4 rads, but 2 rads is the best estimate. The study also demonstrated that there were large variations in the thyroid dose received by subcategories of individuals. The primary factors contributing to this variation are county of residence, age at the time of exposure, and milk consumption patterns.

Scope of Study

The legislation called for the development of methods to estimate iodine-131 exposure to the American people, to assess thyroid doses from iodine-131 received by individuals across the country from the Nevada tests, and to assess the risk for thyroid cancer from these exposures. This study fulfills the first two of these requirements; other studies have and are fulfilling the third. The complete study report includes estimates of the cumulative average iodine-131 dose, by age and sex, to the thyroid for representative persons in each county after each test during the period when the nuclear tests were conducted in Nevada. Estimates of thyroid doses have been made for persons by age, sex, and source and quantity of milk consumed because milk was the source of most of the iodine-131 exposure for most people. Uncertainty is associated with the dose estimates developed by the study because the estimates are based on a small number of radiation

measurements made at the time of the tests and the study authors had to rely heavily on mathematical models to develop the estimates.

Estimating Individual Exposures

Geography

The importance of geographical location can be seen in Figure 1, which shows the overall per capita doses by county. In general, the highest per capita thyroid doses, in the range of 9 to 16 rads, were obtained in counties of western states located east and north of the NTS, such as Colorado, Idaho, Montana, South Dakota, and Utah. In many counties on or near the west coast, the border with Mexico, and parts of Texas and Florida, the per capita thyroid doses were lowest, in the range of less than 0.1 to 0.5 rad. By comparison, the average individual in the United States receives a thyroid dose of about 0.1 rad each year from exposure to cosmic rays and naturally occurring radioactivity, with relatively large variations from one location to another.

The counties with the highest estimated average doses are listed in Table 1. Individuals living in these five western counties were estimated to have a cumulative average dose of 12 to 16 rads. These were Meagher County, Montana, and Custer, Gem, Blaine, and Lemhi Counties in Idaho. The table lists another 20 counties, mostly in Montana, where cumulative individual doses were estimated to be in the range of 9 to 12 rads.

It should be noted that the exposure ranges for the counties in Table 2 and other ranges merge into one another, especially considering the uncertainties associated with all of these estimates. There are no sharp dividing lines between these ranges.

Age

The thyroid doses to individuals at a particular location were strongly dependent upon age at the time of exposure. Thyroid dose estimates for young children are uniformly higher than those for adults, assuming that individuals in particular geographic areas consumed milk from the same source at average rates for their age group. For any particular test, the thyroid doses for children between 3 months and 5 years of age exceeded the average per capita thyroid dose following that test by a factor of about 3 to 7 because of greater milk consumption and their smaller thyroid.

The date of birth and geographic residence of individuals also are strong determinants of the cumulative dose received from all tests. The variation in cumulative thyroid doses to individuals born at different times, each of whom lived in a single county and consumed cows' milk from local sources at average rates, is illustrated in Table 2. This can be considered a dose table for six typical families located in the identified counties throughout the testing period. The factors affecting the doses to parents are approximately independent of birth dates up to 1930; doses to adult men and women born prior to this time were nearly the same. Thyroid doses to children born about six months prior to three major test series (1952, 1953, and 1957) were substantially higher in general than the adult doses. The thyroid doses to teenagers would have been intermediate between those to small children and to adults. The last column shows doses to children born in 1958, which is the year when the last test series (but not the last individual tests) in the atmosphere took place at the NTS. Cumulative thyroid doses to most of the children born in later years are estimated to be less than 0.1 rad.

Diet, Particularly Milk Consumption

For most people, the major exposure route was the ingestion of cows' milk contaminated as the result of iodine-131 deposited on pasture grasses; other exposure routes such as the inhalation of contaminated air and the ingestion of contaminated leafy vegetables, goats' milk, cottage cheese, and eggs also were considered. For individuals within a particular age range, milk consumption can vary substantially. For example, surveys have shown that 10% to 20% of children between ages 1 and 5 do not consume cows' milk. Their doses were only about one tenth of those received by children who consumed fresh cows' milk at average rates for their age. Conversely, the milk consumption of 5% to 10% of individuals in the same age range was two to three times greater than the average and their thyroid doses were therefore proportionally larger. The type of milk consumed also is important. It is estimated that at that time about 20,000 individuals in the U.S. population consumed goats' milk. Thyroid doses to those individuals could have been 10 to 20 times greater than those to other residents of the same county who were the same age and sex and drank the same amount of cows' milk. Goats' milk concentrates iodine-131 more than cows' milk.

The foregoing examples illustrate that the thyroid dose received by any particular individual depends on his/her source of milk and dietary habits and thus may differ considerably from the group dose estimates. Furthermore, the person's total thyroid dose from all tests depends upon place of residence and age at the time of each test. Because of the very large number of variations in residence location, age, and dietary habits, it is not feasible to provide estimates of cumulative doses for individuals. However, detailed information is provided in the full report so that individual cumulative doses can be estimated based upon personal residence and dietary history.

Uncertainties and Model Validation

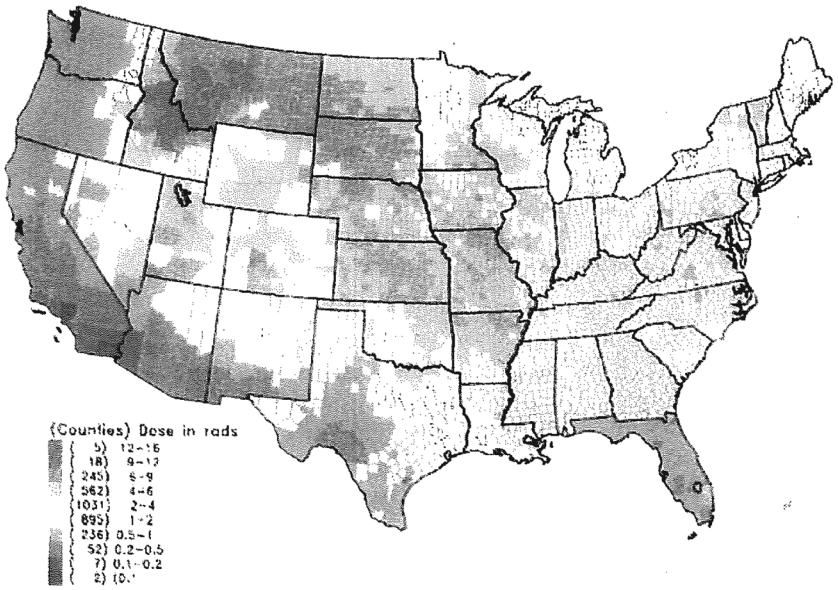
There are large uncertainties in the estimated thyroid doses given in the report because it is impossible to know all the information needed to determine exact doses. These uncertainties were assessed in two ways. First, calculated concentrations of iodine-131 were compared with the few historical measurements of iodine-131 in people and the environment that are available. Second, the uncertainties in the historical daily deposition data and in each of the factors used to estimate the transfer of iodine-131 to people's thyroids through the various exposure routes yielded an estimate of the total uncertainty. The uncertainty in the thyroid dose estimated for an individual is greater than the uncertainty in the overall average thyroid dose to the entire United States population. In general, the uncertainty of the thyroid dose from NTS iodine-131 for representative individuals is about a factor of 3, e.g., if the thyroid dose estimate for an individual is 3 rads, it will likely lie between 1 and 9 rads.

The results obtained from the mathematical models used in this study were compared with any data collected at the time of the tests in order to compare the findings of the modeling with those of the actual data collection. The comparisons also provide an estimate of the uncertainty attached to the calculated doses. As a result of these comparisons, a relatively good agreement was found between actual data and predictions made by the mathematical models. For example, independent analysis of urine samples volunteered by soldiers at Army bases throughout the United States following one of the test series showed iodine-131 dose levels consistent with doses predicted. However, it should be noted that the comparison between measured and predicted values required the

use of several assumptions, and there is no guarantee that the samples measured were representative of county averages.

Information To Be Included in the Full Report
Thyroid dose estimates are given for representative individuals in specified age groups residing in each county of the contiguous United States. The report also contains extensive tables of information organized by test and by county so that individual radiation doses to the thyroid from iodine-131 can be estimated based upon personal residence and dietary histories. Thyroid doses from iodine-131 were estimated for 13 age categories, including the fetus, with adults subdivided by gender, in 3,071 counties of the contiguous United States, and for all periods of exposure. There are four consumption scenarios calculated for each category. The report's maps, tables, and formulas will allow local governments and other organizations to calculate dose estimates for individuals falling in these categories in their geographic region."

Per capita thyroid doses resulting from all exposures routes from all tests



MOHAVE COUNTY BOARD of SUPERVISORS

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Chairman Jean Bishop
Mohave County Supervisor District 4

Honorable

I was just a baby when atomic explosions filled the sky near my family home outside of Las Vegas, Nevada. It was in the early 50's when my family lived downwind from the government nuclear test sites and then later moved to Mohave County.

Between 1951 (my birth year) and 1963 the United States Government through the Atomic Energy Commission detonated hundreds of nuclear bombs near our home in the Nevada desert. It was a matter of National Security as the United States had just ended WWII by dropping 2 bombs on Japan. The U.S. and U.S.S.R. had just entered into the cold war and began a race to create the biggest nuclear bomb, but this race was also a matter of unacknowledged risk at the expense of the public. Over and over my parents were told the testing was safe as our family stood on the front porch and watched with pride. It was a fun patriotic time, a time to celebrate the advances of our country in order to protect our citizens. This is no longer a celebration; it is a devastating loss to tens of thousands of people.

Congress created a Radiation Exposure Compensation Act (RECA), a program that would provide partial restitution to individuals who developed illnesses after this radiation exposure but as you know, the act STILL does not include part of Clark County where the testing was located and the southern part of Mohave County which is directly downwind, even though the cancer rates are much higher in these areas. Mohave Downwinders have been hopeful that they would be included for decades. How sad it is that parts of Mohave County and Clark County have STILL not been included in the RECA. Radiation does not pick and choose where it lands and it did land in these counties!

Many of us have been touched by the aftermath of the government's choice to test nuclear weapons. Anyone who has lived in these counties for any length of time either knows someone who has battled cancer like myself or knows someone who has lost their life to cancer like many of my family and close friends.

As a Downwinder victim and a recent cancer survivor, I can testify that the amount of money for a Downwinder claim will never be able to make up for the loss of a family member but it can certainly help with the medical bill and other expenses associated with cancer which can be far worse than the disease itself.

It is my sincere hope that the Mohave County citizens can once again celebrate when a wrong has been made right. We appreciate the efforts you will seek for compensation and recognition for Mohave County residents suffering from weapons testing radiation.

Best Regards,

Chairman Jean Bishop
Mohave County Supervisor
District 4

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I have lived in Mohave County the majority of my life. My professional career has been spent serving the citizens of Mohave County in both law enforcement for over 30 years and now as an elected County Supervisor in District-4.

As a County Supervisor, I currently serve on the following committees and boards:

- County Supervisors, executive board, 1st V-President
- County Supervisors Association, past LPC Member
- County Supervisors Association, past Chair Medium Caucus
- Mohave County Board of Health, President
- Kingman Food Bank, Director
- Mohave County Housing Authority
- Mohave/La Paz Local Workforce Investment Board
- WACOG Senior Site Council member
- Regional Council on Aging Members and Alternatives
- Mohave/La Paz Local Workforce Investment Area Youth Council
- Fill the Gap Committee member

Mr. COHEN. Thank you, Supervisor Bishop.

Our next Witness is Scott Szymendera. He is an analyst in disability policy with the Congressional Research Service, a position he has held since 2005. He has testified on at least five prior occasions before various congressional committees, including the 2014 field hearing entitled "The Forgotten Downwinders: Amending the Radiation Exposure Compensation Act to Remedy an Injustice."

Mr. Szymendera received his Ph.D. and M.A. in political science from Michigan State University and his B.A. from the University of Maryland in College Park.

You are now recognized for 5 minutes, sir.

STATEMENT OF SCOTT D. SZYMENDERA

Mr. SZYMENDERA. Thank you. Chair Cohen, Vice-Chair Ross, Ranking Members Jordan and Johnson, and Members of the Subcommittee, my name is Scott Szymendera, and I am an analyst at the Congressional Research Service. Thank you for inviting CRS to testify today at today's hearing on the Radiation Exposure Compensation Act, or RECA, and possible expansions of RECA eligibility. A longer statement has been submitted for the record.

Since its enactment in 1990, RECA has paid out nearly $2.5 billion in benefits on more than 37,000 claims filed by and on behalf of onsite participants, downwinders, and uranium workers currently covered by the act. Pursuant to the 2000 RECA amendments, the RECA program is scheduled to sunset on July 10, 2022, and absent congressional action to reauthorize the program, no new claims for benefits will be accepted by the Department of Justice after that date. The Fiscal Year 2021 William M. "Mac" Thornberry National Defense Authorization Act included a provision expressing the sense of Congress that the RECA program should continue beyond its 2022 sunset date.

On July 16, 1945, the United States detonated the first atomic bomb at the Trinity at the time site near Alamogordo, New Mexico, ushering in an era of extensive development and testing of atomic weapons that would last until 1992. During this period, the United States conducted 1,054 atomic weapons tests, including 100 atmospheric tests at the Nevada test site. The largest atomic weapons tests were conducted at various locations in the Pacific Ocean region, including Bikini Atoll and Enewetak Atoll in the Marshall Islands.

Attempts to use the courts to recover damages from atomic weapons testing from the Federal Government and its contractors were unsuccessful due to the sovereign immunity of the United States and congressional action to immunize contractors. The first legislation to provide benefits to Americans affected by atomic weapons testing was introduced in 1979, and these efforts culminated in 1990 with the passage of the Radiation Exposure Compensation Act. RECA pays benefits to onsite participants and downwinders with cancer specified in the act. Onsite participants are persons who physically participated in an atmospheric weapons test or who engaged in certain cleanup and decontamination work after a test. Onsite participants are eligible for one-time payments of $75,000. Downwinders are persons who lived in designated areas in Arizona, Nevada, and Utah during atmospheric testing at the Nevada test

site. Downwinders are eligible for one-time payments of $50,000. RECA also pays $100,000 to uranium miners, millers, and ore transporters with specified diseases linked to work performed before 1972. Each onsite participant, downwinder, or uranium worker is eligible for one benefit, which may be paid to them directly or to their survivors after their deaths.

As RECA nears its 2022 sunset date, there are several areas of possible eligibility expansion that may be considered by Congress and that have been the subject of legislation in the 116th and 117th Congresses. An expansion of eligibility for onsite participants could include eligibility for the approximately 8,000 service-members and civilians who participated in the cleanup of Enewetak Atoll between 1977 and 1980.

The geographic eligibility area for downwinders related to the Nevada tests could be expanded to include areas such as the southern portions of Clark County, Nevada, and Mohave County, Arizona, that are not currently part of the downwinder area. New downwinder areas could be created in New Mexico and Guam for persons affected by the Trinity tests and tests in the Pacific.

The eligibility of uranium workers could be expanded to cover work performed after 1971 when the Federal Government's purchasing of uranium for the atomic weapons program ended and uranium mining and processing was largely conducted for commercial customers. More detail on each of these expansion proposals, including possible opposition to these proposals based on the congressionally mandated report by the National Research Council and the legislative intent of the RECA legislation, is covered in more detail in my written testimony.

This concludes my testimony. I would be happy to answer any questions from the Subcommittee.

[The statement of Mr. Szymendera follows:]

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TESTIMONY

Statement of

Scott D. Szymendera
Analyst in Disability Policy

Before

Committee on the Judiciary
Subcommittee on the Constitution, Civil Rights, and Civil Liberties
U.S. House of Representatives

Hearing on

"Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act"

March 24, 2021

Congressional Research Service
7-5700
www.crs.gov

Chairman Cohen, Vice Chair Ross, Ranking Member Johnson, and Members of the Subcommittee, my name is Scott Szymendera and I am an analyst at the Congressional Research Service (CRS). Thank you for inviting CRS to testify at today's hearing on the Radiation Exposure Compensation Act (RECA) and possible expansions of RECA eligibility for onsite participants (persons who participated in an atmospheric atomic weapons test, including those involved in certain decontamination and cleanup activities), downwinders (persons who were present in specified geographic areas near the site of atmospheric atomic weapons testing in Nevada), and uranium workers (uranium miners, millers, and ore transporters). My testimony will provide a history of the RECA legislation, an overview of the RECA program, and a discussion of potential expansions of eligibility for onsite participants, downwinders, and uranium workers.

The intent of RECA is to provide partial compensation to persons with cancers likely related to America's atomic weapons testing program, and persons with certain health conditions likely related to their work in the mining, milling, and transportation of uranium for the nation's atomic weapons program. Since its enactment in 1990, RECA has paid out nearly $2.5 billion in benefits to more than 37,000 claims filed by and on behalf of onsite participants, downwinders, and uranium workers currently covered by the act.[1] The largest category of approved RECA claims is from downwinders, with these claims making up 63% of all approved claims.

Pursuant to the 2000 RECA amendments, the RECA program is scheduled to sunset on July 10, 2022, and absent congressional action to reauthorize the program, no new claims for benefits will be accepted by the Department of Justice after that date.[2] The FY2021 William M. (Mac) Thornberry National Defense Authorization Act included a provision expressing the sense of Congress that the federal government should continue to recognize and compensate individuals affected by exposure to radiation during atmospheric atomic weapons testing or by work in the uranium industry during the Cold War beyond the scheduled RECA sunset date in 2022.[3]

Atomic Weapons Testing at the Nevada Test Site

On July 16, 1945, the United States detonated the first atomic bomb at the Trinity Test Site near Alamogordo, New Mexico. This atomic weapons test, which was followed by the two offensive uses of atomic weapons at Hiroshima and Nagasaki, Japan, ushered in an era of extensive development and testing of atomic weapons that would last until 1992. During this period, the United States, under the auspices of the Atomic Energy Commission (AEC) and later the Department of Energy (DOE), conducted 1,054 atomic weapons tests.[4] The majority (928) of these tests were conducted at the Nevada Test Site (NTS), a 1,375 square-mile federal reservation located approximately 65 miles north of Las Vegas in Nye County, Nevada.[5] Of the 928 tests conducted at NTS, 828 were underground tests and 100 were atmospheric tests in which the atomic weapons exploded at or above ground level resulting in radioactive

[1] Department of Justice, *Radiation Exposure Compensation System: Claims to Date Summary of All Claims Received by 3/17/2021*, March 17, 2021, https://www.justice.gov/civil/awards-date-03172021.

[2] Section 3(g) of the Radiation Exposure Compensation Act Amendments of 2000, P.L. 106-245. Prior to the enactment of this amendment, the RECA program was scheduled to sunset on October 15, 2010, the date that was 20 years after the date of enactment of the original Radiation Exposure Compensation Act, P.L. 101-426 (October 15, 1990).

[3] Section 3147 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, P.L. 116-283.

[4] Twenty-four of these tests were jointly conducted with the United Kingdom.

[5] The NTS is now referred to as the Nevada National Security Site and is administered by the Department of Energy, National Nuclear Security Administration. For additional information on the history and characteristics of the NTS, see Terrance R. Fehner and F.G. Gosling, *Origins of the Nevada Test Site*, Department of Energy, DOE/MA-0518, December 2000.

material being released into the atmosphere.[6] These 100 atmospheric tests were the only atmospheric atomic weapons tests conducted in the continental United States, Alaska, or Hawaii. **Table 1** provides a summary of U.S. atomic weapons tests by location.

Table 1. United States Atomic Weapons Tests

Location	Number of Tests
South Atlantic Ocean Area	**3**
Pacific Ocean Area	**106**
United States other than Nevada Test Site (NTS)	**17**
Alamogordo, NM (Trinity Test Site)	1
Amchitka, AK	3
Carlsbad, NM	1
Central NV	1
Fallon, NV	1
Farmington, NM	1
Grand Valley, CO	1
Hattiesburg, MS	2
Nellis Air Force Range, NV	5
Rifle, CO	1
Nevada Test Site (NTS)	**928**
Total	**1,054**

Source: Department of Energy, *United States Nuclear Tests: July 1945 through September 1992*, DOE/NV-209-REV 15, December 2000, p. xiii.

Note: Includes 24 joint United States-United Kingdom tests conducted at NTS.

Atmospheric atomic weapons tests at NTS were conducted between January 27, 1951 and October 30, 1958, and again between July 7, 1962 and July 17, 1962. The largest atmospheric test at NTS in terms of energy yield was the Hood Test conducted on July 5, 1957, which had an energy yield equivalent to 74,000 tons (74 kilotons or kt) of Trinitrotoluene (TNT).[7]

The Path to RECA

There were mixed opinions among residents of the areas near NTS about the unique role their part of the country was playing in the Cold War. Some embraced the nearby testing, such as the Las Vegas casinos which advertised views of the tests from their properties, and Clark County, Nevada, which incorporated a mushroom cloud into its official seal. Others, however, expressed concern over potential health and

[6] In some underground tests, radioactive material escaped from underground through a process known as venting, thus releasing some radioactive material into the atmosphere.

[7] For comparison purposes, the first atomic bomb ever detonated had a yield of 21 kt; the atomic bombs dropped on Hiroshima and Nagasaki had yields of 15 kt and 21 kt, respectively; and the largest atmospheric test conducted by the United States, the Bravo Test at Bikini Atoll in the Marshall Islands on February 28, 1954, had a yield of 15 million tons (15 megatons or Mt).

property damage caused by the detonations. The AEC paid small amounts of compensation to area residents who suffered damages to property and loss of livestock.[8]

Throughout the 1970s, groups representing downwinders, NTS workers, veterans, and uranium workers gained political strength, aided by growing scientific evidence of the negative health effects of exposure to ionizing radiation,[9] changing views in society on nuclear weapons,[10] and congressional hearings held in 1978 and 1979 on the possible health effects of atomic weapons testing.[11]

The Forgotten Guinea Pigs Report

The 1979 congressional hearings led to a report from the House Committee on Foreign and Interstate Commerce, Subcommittee on Oversight and Investigations, titled *The Forgotten Guinea Pigs*.[12] This report is notable for its conclusions regarding the impact of atomic testing at NTS on downwinders. The report concludes that the AEC failed to warn downwind residents of the dangers of testing at NTS, failed to properly monitor radiation exposure from NTS testing, and failed to properly study the health effects of NTS testing on downwinders. The report also states that:

> ...exposure to radioactive fallout emitted during the atmospheric nuclear test operations was, more likely than not, responsible for the serious adverse health effects suffered by the downwind residents.[13]

The report also recommends that Congress devise a compensation program for downwinders and provides detailed recommendations on how such a program should determine eligibility for compensation. The report recommended that a compensation program be based on the geographical location of persons affected by the testing.

Legal Activities

Among the first groups of downwinders to seek to use the courts to secure a remedy for damages allegedly sustained as a result of atmospheric testing at NTS were a group of Utah sheepherders. In 1956, they alleged that over 4,000 of their sheep were killed as a result of exposure to radioactive fallout from the 11 atmospheric tests conducted at NTS as part of Operation Upshot-Knothole between March 17, 1953, and June 4, 1953. The United States District Court for the District of Utah initially permitted the

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[8] A. Costadina Titus, *Bombs in the Backyard: Atomic Testing and American Politics* (Reno, NV: University of Nevada Press, 2001), p. 99.

[9] See, for example, S. G. Machado et al., "Cancer Mortality and Radioactive Fallout in Southeastern Utah," *American Journal of Epidemiology*, vol. 127 (1987), pp. 44-61. Machado et al. found a statistically significant increase in leukemia deaths among adults and children living downwind from NTS in southwestern Utah.

[10] Comprehensive histories of the development of the downwinder groups can be found in A. Constadina Titus, "Governmental Responsibility for Victims of Atomic Testing: A Chronicle of the Politics of Compensation," *Journal of Health Politics, Policy, and Law*, vol. 8, no. 2 (Summer 1983), pp. 277-292; and A. Costadina Titus, *Bombs in the Backyard: Atomic Testing and American Politics* (Reno, NV: University of Nevada Press, 2001).

[11] U.S. Congress, House Committee on Interstate and Foreign Commerce, Subcommittee on Health and the Environment, *Effect of Radiation on Human Health: Health Effects of Ionizing Radiation*, 95th Cong., 2 sess., January 24-26, 1978, Serial No. 95-179 (Washington: GPO, 1979); and U.S. Congress, House Committee on Interstate and Foreign Commerce, Subcommittee on Oversight and Investigations, *Low-Level Radiation Effects on Health*, 96th Cong., 1 sess., April 23, May 24, and August 1, 1979, Serial No. 96-129 (Washington: GPO, 1979).

[12] U.S. Congress, House Committee on Interstate and Foreign Commerce, Subcommittee on Oversight and Investigations, *"The Forgotten Guinea Pigs: A Report on Health Effects of Low-Level Radiation Sustained as a Result of the Nuclear Weapons Testing Program Conducted by the United States Government,"* 96th Cong., 2 sess., August 1980, Committee Print 96-IFC-58 (Washington: GPO, 1980).

[13] Ibid, p. 22.

sheepherders' claims to proceed despite objections from the government that such suits were barred by the Federal Tort Claims Act (FTCA) because they involved the discretionary functions of the federal government.[14] While the court allowed the *Bulloch* suit to proceed, it ultimately ruled against the plaintiffs on the grounds that the "great weight of the evidence" demonstrated that:

> the maximum radioactive doses to which the Bulloch sheep could have been subjected, whether as a result of direct fallout, residuals therefrom, ingestion of plants or water, or through other means, was substantially less than would have caused damage; that the expected and actual fallout in the areas in which the sheep were, or in which they could reasonably have been expected to be, was well within the permissible maximums for human or animal body tolerance; that there was no contamination of air, water or earth not consistent with benign conditions in the areas where the Bulloch sheep were located; that the signs and symptoms detected upon an examination of the sheep were not effects of radiation; and that since there was no substantial danger of damage to the sheep in question, and none occurred as a result of the Upshot-Knothole series, no negligence on the part of the Government has been established within the issues of the case.[15]

The Federal Tort Claims Act

The Federal Tort Claims Act (FTCA) is the statute which authorizes certain civil lawsuits against the United States government.[16] Absent the provisions of the FTCA, the government enjoys sovereign immunity and thus "the United States cannot be sued without its consent."[17] The FTCA is an express waiver of the government's sovereign immunity and provides both the circumstances under which the federal government can be sued, and the exceptions which prohibit suit against the government. One such exception to the FTCA is the discretionary function exception. It provides that the provisions of the FTCA do not apply to:

> [a]ny claim based upon an act or omission of an employee of the Government, exercising due care, in the execution of a statute or regulation, whether or not such statute or regulation be valid, or based upon the exercise or performance or the failure to exercise or perform a discretionary function or duty on the part of a federal agency or an employee of the Government, whether or not the discretion involved be abused.[18]

Although the court in *Bulloch* ultimately ruled against the plaintiffs for reasons not related to the FTCA's discretionary function exception, downwinders and other civilians in future cases often found their path to recovery in the courts blocked by this clause of the FTCA.[19] In both *Allen v. United States,* 816 F.2d 1417 (10th Cir. 1987) and *In re Consolidated United States Atmospheric Testing Litigation*, 820 F.2d 982 (9th Cir. 1987), the federal courts of appeals ruled that the discretionary function exception of the FTCA barred the claims by civilians against the federal government for damages resulting from atomic weapons testing. As stated by a judge concurring in the *Allen* decision:

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[14] Bulloch v. United States, 133 F. Supp. 885 (1955) (rejecting the government's motion to dismiss the suit). The FTCA is codified at 28 U.S.C. §§1346(b), 2671-2680.

[15] Bulloch v. United States, 145 F. Supp. 824 (1956). In its report *The Forgotten Guinea Pigs,* the House Committee on Foreign and Interstate Commerce, Subcommittee on Oversight and Investigations concluded that the loss of the Utah sheep was "more likely than not" caused by radioactive fallout from the Operation Upshot-Knothole tests.

[16] For additional information on the FTCA see CRS Report R45732, *The Federal Tort Claims Act (FTCA): A Legal Overview*.

[17] Federal Housing Administration v. Burr, 309 U.S. 242, 244 (1940).

[18] 28 U.S.C. §2680(a).

[19] Members of the armed forces who participated in atomic weapons testing were also barred from bringing claims against the federal government under the *Feres* doctrine which prohibits members of the military from recovering damages from the United States [Feres v. United States, 340 U.S. 135 (1950)].

> ...while we have great sympathy for the individual cancer victims who have borne alone the costs of the AEC's choices, their plight is a matter for Congress. Only Congress has the constitutional power to decide whether all costs of government activity will be borne by all the beneficiaries or will continue to be unfairly apportioned, as in this case.[20]

The Warner Amendment

One possible way around the immunity offered the federal government by the discretionary function exception of the FTCA was for downwinders and others to bring suit against the federal contractors who played various roles in the testing at NTS. However, this remedy was removed by Congress with the enactment of Section 1631 of the Department of Defense Authorization Act of 1985, P.L. 98-525, commonly known as the Warner Amendment after its sponsor, Senator John Warner. The Warner Amendment provides that a lawsuit under the FTCA is the sole remedy for injuries due to exposure to radiation from atomic weapons tests thus providing immunity to any contractors involved in the atomic testing program. In addition, the Warner Amendment provides that for the purposes of any lawsuit, the employees of a contractor are to be considered federal employees.

The intent of the Warner Amendment was to protect atomic weapons testing contractors from lawsuits because they were acting as "de facto instruments of the United States government in carrying out a governmental purpose" and to protect the federal government from the costs of paying judgments against the contractors, since under the provisions of the atomic weapons contracts, the contractors were indemnified by the federal government against any legal judgments.[21]

Because downwinder lawsuits against the federal government were already prohibited under the FTCA, the effect of the Warner Amendment was to remove any avenue downwinders or other civilians may have had to receive any remedy in the courts for injuries that they alleged were caused by the atomic testing program. As stated by the House Committee on the Judiciary in its report to accompany H.R. 1338, legislation to permit suits against atomic weapons testing contractors, "the real effect of the Warner Amendment is to leave the harmed individuals with no remedy at all."[22]

The First Federal Compensation Programs

Before the enactment of RECA in 1990, Congress had created two compensation systems for groups of people harmed by the atomic testing program, residents of the Marshall Islands and military veterans.

Compensation for Residents of the Marshall Islands

The largest atomic test conducted by the United States was the Bravo Test at Bikini Atoll in the Marshall Islands on February 28, 1954, which had a yield of 15 Mt. This test, along with other tests in the Marshall Islands, caused widespread environmental damage to the islands and surrounding waters and resulted in high levels of radioactive fallout landing on residents of nearby islands. Some of the Marshall Islands were completely vaporized by the Bravo Test while other parts of the Marshall Islands, including Bikini

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[20] Allen, 816 F.2d at 1427. The Supreme Court declined to review either the court of appeals decision in *In re Consolidated* [*cert. denied*, 485 U.S. 905 (1988)] or *Allen* [*cert. denied*, 484 U.S. 1004 (1988)]. The district court ruled in a similar case, *Begay v. United States*, 591 F. Supp. 991 (1984), that the discretionary function exemption of the FTCA barred a claim brought by a uranium miner against the federal government for damages resulting from his work.

[21] U.S. Congress, Senate Committee on Armed Services, *Omnibus Defense Authorization Act, 1985*, report to accompany S. 2723, 98th Cong., 2nd sess., May 31, 1984, S. Rept. 98-500 (Washington: GPO, 1984), pp. 376-377.

[22] U.S. Congress, House Committee on the Judiciary, *Amending Title 28, United States Code, to Allow Suits Against the United States for Acts or Omissions of Contractors in Carrying Out the Atomic Weapons Testing Program, and to Substitute the United States as the Party Defendant in Suits Brought Against Such Contractors*, report to accompany H.R. 1338, 99th Cong., 2nd sess., April 29, 1986, H. Rept. 99-567 (Washington: GPO, 1986), p. 3.

and Enewetak Atolls, remain largely uninhabitable to this day because of atomic testing. At the time of the atomic testing, the United States had complete administrative control over the Marshall Islands as trustee for the United Nations Trust Territory of the Pacific Islands.

In the years following the Marshall Islands tests, the federal government provided intermittent payments and other forms of compensation and assistance to residents of the Marshall Islands. These payments were made in the absence of a formal compensation program. In 1986, the Marshall Islands was granted its independence from the United States and became a sovereign nation with economic and security ties to the United States. Section 177 of the Compact of Free Association between the United States and the Marshall Islands created a Nuclear Claims Fund (NCF) to be financed by the United States to pay claims to persons who suffered injuries or property damage from the atomic weapons tests.[23] A Nuclear Claims Tribunal (NCT) was established to disburse benefits from the NCF.

Disability Compensation for Atomic Veterans

In 1984 Congress passed the Veterans' Dioxin and Radiation Exposure Compensation Standards Act of 1984, P.L. 98-542, establishing the first program to provide disability compensation to veterans who were exposed to ionizing radiation while participating in atmospheric atomic testing or while serving in the occupation of Hiroshima and Nagasaki, Japan at the end of World War II. Under the 1984 law, a veteran may qualify for disability compensation from the Department of Veterans Affairs (VA) if it is determined by the VA that the veteran's disability is "at least as likely as not" to have been caused by an exposure to radiation while in service.[24] This determination is made based on the estimated dose of radiation the veteran received while in service, provided by either the Defense Threat Reduction Agency (DTRA) or another credible source. Using this estimated dose and radio-epidemiological formulas established by the National Cancer Institute (NCI), it is possible to estimate the probability that a given veteran's medical condition was caused by his or her estimated dose of radiation. If this probability of causation is 50% or greater, benefits are awarded based on the level of disability.

Radiation-Exposed Veterans Compensation Act (REVCA)

Veterans expressed concerns about the difficulty in receiving compensation under the 1984 law, Congress in 1988 enacted the Radiation-Exposed Veterans' Compensation Act (REVCA), P.L. 100-321. Under REVCA, any veteran who participated in a specified radiation-risk activity and has one of the specified cancers is presumed to have a service-connected condition and is eligible for disability compensation. The original REVCA legislation included three radiation-risk activities and 13 specified cancers. Amendments to REVCA in 1992[25] and 1999[26] added three cancers to the presumptive eligibility list. Regulatory changes by the VA in 2002 added five cancers to the presumptive eligibility list and added two activities to the list of radiation-risk activities.[27] An amendment to REVCA in 2004 designated that any service that

[23] Approval of the Compact of Free Association between the United States and the Marshall Islands was provided by enactment of the Compact of Free Association Act of 1985, P.L. 99-239.

[24] For additional information on disability compensation for veterans see CRS Report R44837, *Benefits for Service-Disabled Veterans*.

[25] Veterans' Radiation Exposure Amendments of 1992, P.L. 102-578.

[26] Veterans Millennium Health Care and Benefits Act, P.L. 106-117.

[27] Department of Veterans Affairs, "Diseases Specific to Radiation-Exposed Veterans," 67 *Federal Register* 3612, January 25, 2002. The five cancers added by this regulation were later added by law with the enactment of the Veterans Benefit Improvement Act of 2004, P.L. 108-454.

would be part of the Energy Employees Occupational Illness Compensation Program Act (EEOICPA) Special Exposure Cohort (SEC) is considered a radiation-risk activity.[28]

The Radiation Exposure Compensation Act

Legislative History of Eligibility Provisions

The first bills to provide compensation to civilian downwinders affected by atmospheric testing at NTS were introduced in 1979. In the House of Representatives, H.R. 4766, introduced by Representative K. Gunn McKay of Utah, would have made the United States liable for damages caused by atmospheric atomic testing at NTS to downwinders with cancer, onsite participants, and sheep herds damaged by atmospheric tests in 1953. Coverage under this bill would have been provided to downwinders with leukemia, thyroid cancer, bone cancer, or any other cancer that occurred more often in the affected area than would otherwise be expected as determined by the Secretary of Health, Education, and Welfare.

Also in 1979, in the Senate, S. 1865 would have also made the United States liable for damages to downwinders, onsite participants, and affected sheep herds, as well as uranium miners. The bill would have created a federal advisory board with the authority to add to the list of specified cancers. In addition, the bill would have given the Secretary of Health, Education, and Welfare the authority to add to the list of affected areas. The 1979 House and Senate bills were not enacted into law.

Proposed Hatch Amendment to the Marshall Islands Compact

In 1985, Senator Orrin Hatch of Utah introduced an amendment to P.L. 99-239, the legislation that approved the Compact of Free Association between the United States and the Marshall Islands. This amendment would have created a compensation system, similar to that created for residents of the Marshall Islands, for NTS downwinders with cancer, uranium miners, or persons who suffered livestock damage due to exposure to ionizing radiation from NTS. This amendment was not in the final legislation that became law.

The Radiation Exposure Compensation Act of 1990

On October 15, 1990, President George H.W. Bush signed the Radiation Exposure Compensation Act, P.L. 101-426, into law. The RECA act began with the following findings:

> (1) fallout emitted during the Government's above-ground nuclear tests in Nevada exposed individuals who lived in the downwind affected area in Nevada, Utah, and Arizona to radiation that is presumed to have generated an excess of cancers among these individuals;
>
> (2) the health of the individuals who were unwitting participants in these tests was put at risk to serve the national security interests of the United States;
>
> (3) radiation released in underground uranium mines that were providing uranium for the primary use and benefit of the nuclear weapons program of the United States Government exposed miners to large doses of radiation and other airborne hazards in the mine environment that together are presumed to have produced an increased incidence of lung cancer and respiratory diseases among these miners;
>
> (4) the United States should recognize and assume responsibility for the harm done to these individuals; and

[28] P.L. 108-454. For additional information on EEOICPA, see CRS Report R46476, *The Energy Employees Occupational Illness Compensation Program Act (EEOICPA)*.

> (5) the Congress recognizes that the lives and health of uranium miners and of innocent individuals who lived downwind from the Nevada tests were involuntarily subjected to increased risk of injury and disease to serve the national security interests of the United States.

The act also provided an apology from Congress on behalf of the United States to downwinders, onsite participants, and uranium miners and their respective families "for the hardships they have endured."

Onsite Participant and Downwinder Provisions

The original RECA act provided one-time cash payments, to be administered by the Department of Justice (DOJ), to onsite participants, downwinders, and uranium miners, or their eligible survivors. Onsite participants and downwinders were eligible for $50,000 payments. To be eligible for benefits, onsite participants and downwinders were required to have one of the following types of cancer:

- leukemia, other than chronic lymphocytic leukemia, provided onset was between two and 20 years after first exposure to fallout;
- any of the following cancers provided onset was at least five years after exposure to fallout:
  - multiple myeloma;
  - lymphomas other than Hodgkin's disease;
  - thyroid, provided initial exposure to fallout occurred before age 20;
  - female breast, provided initial exposure to fallout occurred before age 40;
  - esophagus, provided low alcohol consumption and not a heavy smoker;
  - stomach, provided initial exposure before age 20;
  - pharynx, provided not a heavy smoker;
  - small intestine;
  - pancreas, provided not a heavy smoker and low coffee consumption;
  - bile ducts;
  - gall bladder; and
  - liver, except if cirrhosis or hepatitis B indicated.

This list of cancers provided by the original RECA act was the same as those provided in the 1988 REVCA legislation. However, for each cancer, the REVCA legislation does not include the qualifying behavioral factors such as alcohol consumption.

To qualify for benefits as a downwinder, a person had to have one of the listed cancers and have been physically present for two years (one year if claiming benefits based on leukemia with initial exposure to fallout occurring before age 21) during the period between January 21, 1951 and October 31, 1958, or during the entire period between June 30, 1962, and July 31, 1962, in one of the following counties or areas:

- In Arizona the area north of the Grand Canyon and west of the Colorado River;
- In Nevada the counties of Eureka, Lander, Lincoln, Nye, and White Pine and the area of Clark County that consists of townships 13 through 16 at ranges 63 through 71;[29] and

[29] This is a small area in the northern part of Clark County.

- In Utah the counties of Beaver, Washington, Garfield, Iron, Kane, Millard, Piute, and Sevier.

The downwinder area in the original RECA act is larger than was first proposed in the 1979 bill in the House but smaller than what was proposed in the 1979 bill in the Senate. Regulations implementing the original RECA act were published by the Department of Justice on April 10, 1992.[30]

Uranium Worker Provisions

The original RECA act provided compensation of $100,000 to eligible uranium miners who worked in uranium mines in Arizona, Colorado, New Mexico, Utah, or Wyoming during the period from January 1, 1947 through December 31, 1971. To be eligible for compensation, uranium miners had to satisfy the conditions of one of the following categories, based on work history, smoking history, and disease:

- If a nonsmoker, exposed to at least 200 working-level months (WLM) of radiation, and developed lung cancer or a specified nonmalignant respiratory disease after exposure;[31]
- If a smoker, exposed to at least 300 WLM of radiation, and developed lung cancer or a specified nonmalignant respiratory disease after exposure and before age 45; or
- If a smoker, exposed to at least 500 WLM of radiation, and developed lung cancer or a nonmalignant respiratory disease after exposure and at any age.

The nonmalignant respiratory diseases specified in the act and eligible for compensation were:

- For miners at all mines:
  - Fibrosis of the lung, pulmonary fibrosis, and corpulmonale related to fibrosis of the lung;[32] and
- For miners at mines on Indian Reservations:
  - All of the diseases specified for miners at all mines, and moderate or severe silicosis or pneumoconiosis.

The Radiation Exposure Compensation Act Amendments of 2000

The original RECA act was amended by Congress in 2000 with the enactment of the Radiation Exposure Compensation Act Amendments of 2000, P.L. 106-697. These amendments made significant changes to the eligibility requirements for downwinders, onsite participants, and uranium workers.

Changes to Eligibility for Onsite Participants and Downwinders

The 2000 amendments removed from the list of cancers eligible for compensation for onsite participants and downwinders many of the qualifying statements based on a person's behavior. For example, under the original act a person was eligible if he or she had primary cancer of the pancreas only if he or she was not a heavy smoker or coffee drinker; under the amendments in 2000, the references to smoking and coffee were removed so that a person's behavior was not a factor in his or her determination of eligibility.

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[30] Department of Justice, "Radiation Exposure Compensation Act," 57 *Federal Register* 12428, April 10, 1992.

[31] Radiation exposure in mines is largely caused by the inhalation of radon gas and the short-lived solid decay products of radon. In the RECA statute, these decay products are referred to as "short half-life daughters of radon." A WLM is defined in the RECA statute as one working level of radiation exposure every work day for a month, or an equivalent exposure over a greater or lesser period of time. One working level of radiation exposure is defined as the concentration of decay products of radon that will release 130,000 megaelectron volts (MeV) of alpha energy per liter of air.

[32] Corpulmonale, commonly spelled cor pulmonale, is an enlargement of the right ventricle of the heart secondary to a lung disorder that causes high blood pressure in the pulmonary artery.

In addition, the downwinder area was expanded with the addition of San Juan and Wayne Counties in Utah. In Arizona, the downwinder area was changed from the area north of the Grand Canyon and West of the Colorado River to the areas comprising the counties of Apache, Coconino, Gila, Navajo, and Yavapai. In making this change, the northern area of Mohave County, located north of the Grand Canyon, which had been part of the original RECA downwinder area, was removed from the downwinder area as Mohave County is not listed in the amendments in 2000.

Changes to Eligibility for Uranium Workers

The 2000 amendments expanded RECA eligibility for uranium workers. The amendments granted eligibility to certain uranium millers and ore transporters in addition to uranium miners. The list of eligible states for uranium worker eligibility was expanded to include Idaho, North Dakota, Oregon, South Dakota, and Texas, and the Attorney General was given the authority to add states to this list. In addition, the threshold for eligibility of miners was reduced to 40 WLM or one year of mine work, with no eligibility categories related to smoking behavior. Pursuant to the 2000 amendments, all uranium workers, regardless of whether or not they worked on Indian Reservations, could become eligible based on silicosis and pneumoconiosis and uranium millers and ore transporters could become eligible based on renal cancer or other chronic renal diseases.

The 21st Century Department of Justice Appropriations Authorization Act

The 2000 RECA amendments removed the northern part of Mohave County, Arizona from the downwinder eligibility area. This area of Mohave County was added back to the eligibility area in 2002 with the enactment of Section 11007 of the 21st Century Department of Justice Appropriations Authorization Act, P.L. 107-273. This provision, listed as a "technical amendment" in the legislation, returned the area in Arizona north of the Grand Canyon to the RECA downwinder eligibility area. The only area in Arizona affected by this change was the northern portion of Mohave County.

RECA Today: Eligibility and Benefits

The RECA program is administered by the Civil Division of the Department of Justice (DOJ) and is codified in statute at 42 U.S.C. § 2210 note with implementing regulations at 28 C.F.R. §§ 79.1-79.75.[33] RECA pays one-time compensation of $75,000 to eligible onsite participants or their eligible survivors, $50,000 to eligible downwinders or their eligible survivors, and $100,000 to eligible uranium miners, millers, and ore transporters or their eligible survivors. Decisions on eligibility and benefits are made by the DOJ and can be appealed in the federal courts.

The RECA statute requires that claimants submit "written documentation" of their illnesses to qualify for benefits, and the RECA regulations provide detailed requirements on the types of documents that must be submitted. Section 6(d)(5) of the RECA statute requires that in cases submitted by Native Americans, the application and payment procedures established by DOJ must "take into consideration and incorporate, to the fullest extent feasible, Native American law, tradition, and custom."

Application decisions for RECA benefits are made by an assistant director within the Constitutional and Specialized Torts Section, Torts Branch, of the DOJ Civil Division. Decisions must be made within 12 months of the receipt of a completed application and all supporting materials. If no decision is made within 12 months, the application is automatically approved for benefits.

[33] The RECA program website is at: http://www.justice.gov/civil/common/reca.html.

RECA Eligibility

Onsite Participants

To be eligible for RECA benefits, an onsite participant must meet exposure and disease requirements.

Exposure Requirements

A person may be eligible for RECA benefits if he or she was present onsite and participated in an atmospheric atomic weapons test conducted by the United States and meets the specific geographic and participation requirements provided in the RECA regulations.

Geographic Requirements

A person must have been within or above one of the following geographic areas during a period of atmospheric atomic weapons testing,[34] including for up to six months after the period of testing ended:

- NTS;
- the Pacific Test Sites (Bikini Atoll, Enewetak Atoll, Johnston Island, Christmas Island, the test site for the shot during Operation Wigwam, the test site for Shot Yucca during Operation Hardtack I, and the test sites for Shot Frigate Bird and Shot Swordfish during Operation Dominic I) and the official zone around each site from which non-test affiliated ships were excluded for security and safety purposes;
- Trinity Test Site;
- the South Atlantic Test Site for Operation Argus and the official zone around the site from which non-test affiliated ships were excluded for security and safety purposes;
- any designated location within a naval shipyard, air force base, or other official government installation where ships, aircraft, or other equipment used in an atmospheric nuclear detonation were decontaminated; or
- any designated location used for the purpose of monitoring fallout from an atmospheric nuclear test conducted at NTS.[35]

Participation Requirements

A person must have held one of the following occupations and performed one of the following activities while onsite during a period of atmospheric atomic weapons testing, including for up to six months after the period of testing ended:

Required Occupations

- member of the Armed Forces;
- civilian employee or contract employee of the Manhattan Engineer District, the Armed Forces Special Weapons Project, the Defense Atomic Support Agency, the Defense Nuclear Agency, or the Department of Defense or its components or agencies or predecessor components or agencies;
- employee or contract employee of the AEC, the Energy Research and Development Administration, or the DOE;

[34] The dates for each period of atmospheric atomic weapons testing are provided at 28 C.F.R. §79.31(d)(1).

[35] 28 C.F.R. §79.11(f).

- member of the Federal Civil Defense Administration or the Office of Civil and Defense Mobilization; or
- member of the U.S. Public Health Service;[36] and

Required Activities

- performed duties within the identified operational area around each atmospheric detonation of a nuclear device;
- participated in the decontamination of any ships, planes, or equipment used during the atmospheric detonation of a nuclear device;
- performed duties as a cloud tracker or cloud sampler;
- served as a member of the garrison or maintenance forces on the atoll of Enewetak between June 21, 1951, and July 1, 1952; between August 7, 1956, and August 7, 1957; or between November 1, 1958, and April 30, 1959; or
- performed duties as a member of a mobile radiological safety team monitoring the pattern of fallout from an atmospheric detonation of a nuclear device.[37]

Disease Requirements

An onsite participant must have contracted one of the types of cancers listed in **Table 2** after exposure to ionizing radiation from his or her participation in an atmospheric atomic weapons test.

Downwinders

To be eligible for RECA benefits as a downwinder, a person must meet specified exposure and disease requirements based on his or her physical presence near NTS, rather than through his or her participation in an atomic weapons test.

Exposure Requirements

A downwinder must have been physically present for a period of at least 24 consecutive months between January 21, 1951, and October 31, 1958; or for the entire period between June 30, 1962, and July 31, 1962, in one of the counties or geographic areas listed in **Table 3** and provided in the map in the **Appendix**.[38]

Disease Requirements

A downwinder must have contracted one of the types of cancers listed in **Table 2** after exposure to ionizing radiation from an atmospheric atomic weapons test at NTS.

[36] 28 C.F.R. §79.11(g)(1).

[37] 28 C.F.R. §79.11(g)(2).

[38] The RECA regulations at 28 C.F.R. §79.23 provide that a person who resided or was employed full-time in the downwinder eligibility area is presumed to have been physically present in the area for the duration of his or her residence or employment.

Table 2. Specified Cancers for Eligibility as Onsite Participants and Downwinders

(all cancers must be primary cancers)

Onset of the disease was at least two years after first exposure to fallout		
Leukemia (other than chronic lymphocytic leukemia) if exposure to fallout was after age 20		
Onset of the disease was at least five years after first exposure to fallout		
Multiple Myeloma	Multiple Myeloma	Multiple Myeloma
Brain Cancer	Brain Cancer	Brain Cancer
Esophageal Cancer	Esophageal Cancer	Esophageal Cancer
Ovarian Cancer	Ovarian Cancer	Ovarian Cancer
Salivary Gland Cancer	Salivary Gland Cancer	Salivary Gland Cancer
Thyroid Cancer	Thyroid Cancer	Thyroid Cancer

Source: 42 U.S.C. §2210 note.

Table 3. Downwinder Eligibility Areas

Arizona	Nevada	Utah
Apache County	Eureka County	Beaver County
Coconino County	Lander County	Garfield County
Gila County	Lincoln County	Iron County
Navajo County	Nye County	Kane County
Yavapai County	White Pine County	Millard County
Mohave County north of the Grand Canyon	Clark County townships 13 through 16 at ranges 63 through 71	Paiute County
		San Juan County
		Sevier County
		Washington County
		Wayne County

Source: 42 U.S.C. §2210 note.

Uranium Workers

Miners

To qualify for RECA benefits, a uranium miner must meet specific exposure and disease requirements.

Exposure Requirements

A uranium miner must have worked in an above-ground or underground uranium mine for at least one year during the period between January 1, 1942, and December 31, 1971, or must have been exposed to at least 40 working-level months (WLM) of radiation during this period, in one of the states listed in **Table 4**.[39]

[39] Any state may apply for uranium worker eligibility state status. If determined by the Department of Justice (DOJ) that a

Table 4. Uranium Worker Eligibility States

Arizona	Colorado	Idaho	New Mexico
North Dakota	Oregon	South Dakota	Texas
Utah	Washington	Wyoming	

Source: 42 U.S.C. §2210 note.

Notes: Any additional state may apply for inclusion in this list and will be included if it is determined by DOJ that a uranium mine was operating in the state at any time during the period from January 1, 1942, to December 31, 1971. No state has ever been added to the list of eligible states through this process.

Disease Requirements

A uranium miner must have developed lung cancer or one of the following nonmalignant respiratory diseases after exposure to radiation:

- fibrosis of the lung;
- pulmonary fibrosis;
- corpulmonale related to fibrosis of the lung;
- silicosis; or
- pneumoconiosis.

Millers and Ore Transporters

Uranium millers and ore transporters may qualify for RECA benefits if they meet specific exposure and disease requirements.[40]

Exposure Requirements

A uranium miller must have been employed in a uranium mill in one of the states listed in **Table 4** for at least one year during the period from January 1, 1941, to December 31, 1971.

An ore transporter must have worked transporting uranium ore or vanadium-uranium ore from a uranium mine or mill in one of the states listed in **Table 4** for at least one year during the period from January 1, 1941, to December 31, 1971.

Disease Requirements

A uranium miller or ore transporter must have developed one of the following conditions after exposure to radiation:

- primary lung cancer;
- primary renal cancer;
- a chronic renal disease, such as nephritis or kidney tubal tissue injury; or
- a nonmalignant respiratory disease, specifically
  - fibrosis of the lung;

uranium mine was operating in the state at any time during the period from January 1, 1942, to December 31, 1971, that state will be added to the list. However, no state has ever been added to the list of eligible states.

[40] Uranium milling is the process of extracting or leaching uranium from the mined ore and then concentrating the extracted uranium into a solid form of uranium dioxide commonly referred to as yellowcake.

- pulmonary fibrosis;
- corpulmonale related to fibrosis of the lung;
- silicosis; or
- pneumoconiosis.

RECA Benefits

Compensation Payments

The following benefits are available under the RECA program:

- $75,000—*Onsite participants* (persons who were present at a test site during an atmospheric atomic weapons test);
- $50,000—*Downwinders* (persons who were present in certain areas north and west of NTS during periods of atmospheric atomic weapons testing); and
- $100,000—*Uranium Workers* (uranium miners, uranium millers, and uranium ore transporters).

All benefits are one-time lump sum payments and are not adjusted to reflect changes in wages or the cost of living. Benefits are not subject to the federal income tax[41] but are offset by any payments received from any lawsuit or settlement, or by any disability compensation or Dependency and Indemnity Compensation (DIC) payments from the Department of Veterans Affairs (VA) for any illnesses or injuries due to exposure to radiation from atomic weapons testing or work in the uranium industry covered by RECA.[42] For onsite participants with claims based on diseases other than leukemia, RECA benefits are offset by the actuarial present value of prior payments.[43] For all other beneficiaries, including onsite participants with claims based on leukemia with radiation exposure prior to age 21, RECA benefits are offset by the actual value of prior payments. A veteran who has received RECA benefits prior to the receipt of disability compensation benefits from the VA under the presumptive eligibility provisions of the REVCA, is required to have his or her VA benefits reduced by the amount of his or her RECA benefits.[44]

No medical or other benefits are provided by the RECA program. However, uranium workers eligible for RECA are automatically eligible for an additional $50,000 in compensation and for medical benefits that pay for all medical costs associated with their covered illnesses under Part B of the Energy Employees Occupational Illness Compensation Program Act (EEOICPA).[45]

Survivors' Benefits

Each onsite participant, downwinder, or uranium worker who qualifies for RECA is entitled to one benefit payment on his or her behalf. If the claimant is living, the benefit is paid to him or her directly. If the claimant is deceased, then the benefit is paid to the following survivors according to order of precedence:

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[41] 26 U.S.C. §104(a)(2).

[42] Section 6(c)(2) of the Radiation Exposure Compensation Act (42 U.S.C. §2210 note).

[43] The actuarial present value of prior payments is calculated in accordance with 28 C.F.R. §79.75(e) and Appendix C to Part 79 of Title 28 of the C.F.R.

[44] 38 U.S.C. §1112(c)(4).

[45] 42 U.S.C. §7384u. Onsite participants and downwinders are not automatically eligible for the Energy Employees Occupational Illness Compensation Program Act (EEOICPA) and can only receive EEOICPA Part B benefits by establishing eligibility through work in the development, not testing, of atomic weapons.

1. spouse, provided the spouse was married to the claimant for at least one year before the claimant's death;
2. children, in equal shares;
3. parents, in equal shares;
4. grandchildren, in equal shares; and
5. grandparents, in equal shares.[46]

Only the survivors listed above are eligible for RECA benefits, and if there are no such survivors to a claimant, no benefit is paid on that claim.

Possible Expansions of RECA Eligibility

Expansion of Eligibility for Onsite Participants

Eligibility of Enewetak Cleanup Workers

Between 1948 and 1958, the federal government conducted 41 atmospheric and two underwater atomic weapons tests at Enewetak Atoll in the Marshall Islands.[47] Included in these tests was the atmospheric Mike Test, part of Operation Ivy, on November 1, 1952. This was the first full-scale test of a fusion weapon by the United States and resulted in a yield of 10.4 Mt.[48] Beginning in 1972, the federal government began to prepare for the cleanup of radiological material at Enewetak, with onsite cleanup activities involving members of the American military and American civilians beginning on May 3, 1977, and lasting until the final American personnel left Enewetak on May 13, 1980.[49] More than 100,000 cubic yards of radiological material, including contaminated soil and debris, from throughout Enewetak was moved to Runit Island and placed in a 374-foot diameter and 24.3-foot high cement containment dome built over the crater made by the 1958 Cactus Test.[50] A total of 7,984 persons participated in the federal government's cleanup efforts at Enewetak, including 5,617 members of the military and 2,367 civilians.[51]

Under current RECA program regulations, persons who participated in the cleanup of Enewetak Atoll are not considered onsite participants and thus are not eligible for RECA benefits. The RECA regulations limit eligibility of post-test cleanup workers to those in the following categories:

- performed duties in the operational area of a test during the test and during the six-month period after a test;[52]
- participated in the decontamination of ships, planes, or equipment used in an atmospheric test;[53] and

[46] Section 6(c)(4) of the Radiation Exposure Compensation Act (42 U.S.C. §2210 note).

[47] Department of Energy, *United States Nuclear Tests: July 1945 through September 1992*, DOE/NV-209-REV15, December 2000.

[48] For additional information on atomic weapons testing at Enewetak Atoll, see Defense Nuclear Agency, *The Radiological Cleanup of Enewetak Atoll*, Washington, DC, 1981.

[49] Defense Nuclear Agency, The Radiological Cleanup of Enewetak Atoll, Washington, DC, 1981; and Defense Threat Reduction Agency, *The Radiological Cleanup of Enewetak Atoll*, Fact Sheet, Fort Belvoir, VA, March 2018.

[50] Department of Energy, *Report on the Status of the Runit Dome in the Marshall Islands*, Report to Congress, June 2020, p. 2.

[51] Defense Nuclear Agency, *The Radiological Cleanup of Enewetak Atoll*, Washington, DC, 1981, pp. 645-646.

[52] 29 C.F.R. §§79.11(g)(2)(i) and (h).

[53] 29 C.F.R. §79.11(g)(2)(ii).

- served as a member of the garrison or maintenance forces on Enewetak between June 21, 1951, and July 1, 1952; between August 7, 1956, and August 7, 1957; or between November 1, 1958, and April 30, 1959.[54]

Persons who participated in the cleanup of Enewetak Atoll between 1977 and 1980 do not fall into any of these eligibility categories because they were in Enewetak after the six-month post-testing period and outside of the periods specified in the regulations and were involved in debris and soil cleanup rather than the decontamination of ships, aircraft, or equipment.

Legislation (H.R. 1585 and S. 565) has been introduced in the 117th Congress to make military service during the Enewetak cleanup a radiation-risk activity for the purposes of presumptive eligibility for veteran's disability compensation under REVCA. While this legislation would not change RECA eligibility for civilians involved in the Enewetak cleanup, it would create a precedent of federal eligibility for benefits based on exposure to radiation during this cleanup period. Section 4(d) of the Radiation Exposure Compensation Amendments of 2019, H.R. 3783 in the 116th Congress, would have amended the RECA statute to provide that persons who participated in the cleanup of Enewetak Atoll between 1977 and 1980 were onsite participants for the purposes of RECA eligibility.

Advocates for this legislation, such as the National Association of Atomic Veterans, cite high numbers of cancers, other diseases, and premature deaths among former Enewetak cleanup workers as evidence of the radiation risk faced by these workers and need for them to be compensated.[55] Including Enewetak cleanup workers in the RECA definition of onsite participants would create parity between these workers and the cleanup and decontamination workers that are currently covered by RECA: those that performed cleanup activities onsite in the six months after a test and those that were involved in the decontamination of ships, aircraft, and equipment used in atomic weapons tests.

If RECA eligibility were extended to Enewetak cleanup workers, questions could be raised about eligibility for other persons who worked at test sites long after periods of atmospheric testing. The NTS, for example, continued to conduct underground atomic weapons tests until September 23, 1992, and workers who participated in those tests or post-test cleanup efforts may have been exposed to radiation from venting events during the underground tests or during cleanup of equipment and debris. Today, there are still federal employees and contractors working in a variety of roles at NTS, which has been renamed the Nevada National Security Site, and an extension of eligibility for Enewetak cleanup workers could raise questions about the eligibility of these present-day workers at the Nevada site.

Expansion of Eligibility for Downwinders

Under current law, to qualify for RECA benefits as a downwinder, a person must have been present in one of the designated counties in Arizona, Nevada, or Utah during a period of atmospheric testing at NTS. New downwinder eligibility areas cannot be added to the program through regulation or executive action. Thus, residents of other areas during testing, including some areas closer to NTS than the designated downwinder areas, areas near the Trinity test site in New Mexico, or residents of Guam and the Commonwealth of the Northern Mariana Islands who may have been affected by fallout from atomic weapons testing in the Pacific Ocean area, are not eligible for benefits.

[54] 29 C.F.R. §79.11(g)(iv).

[55] Claudia Grislaes, "Conspiracy of Silence: After Atomic Blasts, a Dangerous Cleanup Scarred Troops for Life," *Stars and Stripes*, June 18, 2019, https://www.stripes.com/news/conspiracy-of-silence-after-atomic-blasts-a-dangerous-cleanup-scarred-troops-for-life-1.586563.

Expansion of the NTS Downwinder Area

The two versions of the Downwinders Parity Act of 2021 introduced in the 117th Congress, H.R. 538 and H.R. 612, would expand the RECA downwinder area to include all of Clark County, Nevada, and Mohave County, Arizona. Under current law, only parts of these counties are included in the downwinder eligibility area, making these the only two counties that are only partially included in the eligibility area. In past Congresses, legislation has been introduced to include areas in states other than Arizona, Nevada, and Utah in the downwinder eligibility area. For example, in the 116th Congress, Section 4(g) of H.R. 3783 would have expanded the downwinder areas for tests conducted at NTS to include the entirety of the states of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, and Utah.

History of the NTS Downwinder Area Provision

The first bills to provide compensation to civilian downwinders affected by atmospheric testing at NTS were introduced during the 96th Congress in 1979. In the House of Representatives, H.R. 4766 would have made the United States liable for damages caused by atmospheric atomic testing at NTS to downwinders with cancer, onsite participants, and sheep herds damaged by atmospheric tests in 1953. Coverage under this bill would have been provided to downwinders with leukemia, thyroid cancer, bone cancer, or any other cancer that occurred more often in the affected area than would be expected as determined by the Secretary of Health, Education, and Welfare.

The affected area for downwinder eligibility in H.R. 4766 was a rectangular area around NTS from 112 degrees to 117.5 degrees longitude and from 36.5 degrees to 39 degrees latitude. In addition to areas in Nevada, Utah, and a small part of Inyo County, California, this area includes the northern portions of Mohave and Coconino Counties in Arizona, but does not extend south as far as the Colorado River. The boundaries as proposed by H.R. 4766 in 1979 are provided in the map in the **Appendix**.

A companion bill in the Senate (S. 1865) also would have made the United States liable for damages to downwinders, onsite participants, and affected sheep herds, as well as uranium miners. The affected area for downwinder eligibility was expressed in terms of counties and other geographic features and included the following areas:

- in Arizona, the area north of the Grand Canyon and west of the Colorado River;
- in Nevada, the counties of Eureka, Lander, Lincoln, Nye, and White Pine; and
- in Utah, the counties of Beaver, Carbon, Duchesne, Emery, Garfield, Grand, Iron, Kane, Juab, Millard, Piute, San Juan, Sanpete, Sevier, Uintah, Washington, and Wayne.

In addition, the bill would have given the Secretary of Health, Education, and Welfare the authority to add to the list of covered downwinder areas.

Eligibility Areas in the Original RECA Statute and the 2000 Amendments

The original RECA statute included a smaller downwinder eligibility area than is currently covered by the program. Initially, only residents of the following areas were covered by RECA:

- in Arizona, the area north of the Grand Canyon and west of the Colorado River;
- in Nevada, the counties of Eureka, Lander, Lincoln, Nye, and White Pine and Clark County townships 13 through 16 at ranges 63 through 71; and
- in Utah, the counties of Beaver, Garfield, Iron, Kane, Millard, Piute, and Sevier.

The current downwinder eligibility area was established with the enactment of the 2000 RECA amendments, which added geographical areas in Arizona and Utah and created the current area described

in **Table 3**.[56] The initial and current RECA downwinder eligibility areas are provided in the map in the **Appendix**.

Issues Related to the Possible Expansion of the NTS Downwinder Area

The decision on whether and how to expand the RECA downwinder area is ultimately a political one that may be made by Congress. A congressionally-mandated review of RECA by the National Research Council (NRC) in 2002 did not find scientific evidence to support expanding the downwinder eligibility area solely by adding additional geographic areas. Rather, the NRC recommended a new probability of causation model be used to determine RECA eligibility. However, experience with other programs that provide benefits to persons affected by ionizing radiation has shown this model to be difficult to administer effectively and efficiently.

National Research Council Review of RECA

In response to a mandate from Congress contained in the House report to accompany the 2002 Supplemental Appropriations Act for Further Recovery From and Response To Terrorist Attacks on the United States, P.L. 107-206, the Department of Health and Human Services (HHS), Health Resources and Services Administration (HRSA) asked the National Research Council (NRC) Board on Radiation Effects Research to study scientific evidence related to the health effects of radiation exposure and make several recommendations to Congress including whether or not the RECA downwinder area should be expanded.[57] The NRC issued its final report on this study in 2005.[58]

In the executive summary to its report, the NRC states:

> The scientific evidence indicates that in most cases it is unlikely that exposure to radiation from fallout was a substantial contributing cause to developing cancer. Moreover, scientifically based changes that Congress may make in the eligibility criteria for compensation in response to this report are likely to result in few successful claims. The committee is aware that such conclusion may be disappointing, but they have been reached in accordance with the committee's charge to base its conclusions on the results of best available scientific information.[59]

In its report, the NRC concluded that any decisions on additional eligibility for downwinders should not be made solely on the basis of geographic area. Citing, among other studies, county-level estimates of thyroid doses of Iodine 131 (^{131}I)[60] resulting from all atmospheric tests at NTS prepared by the NCI, the NRC concluded that factors other than geography, including age at the time of exposure and certain behaviors, are also correlated with a person's dose of ionizing radiation from atomic testing fallout.[61]

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[56] The 2000 RECA amendments inadvertently excluded the portion of Mohave County, Arizona, that is north of the Grand Canyon that had been included in the original RECA legislation. This portion of Mohave County was added back to the downwinder eligibility area by Section 11007 of the 21st Century Department of Justice Appropriations Authorization Act (P.L. 107-273).

[57] U.S. Congress, House Committee on Appropriations, *Making Supplemental Appropriations for Further Recovery From and Response to Terrorist Attacks on the United States for the Fiscal Year Ending September 30, 2002, and for Other Purposes*, report to accompany H.R. 4775, 107th Cong., 2nd sess., May 20, 2002, H. Rept. 107-480, p. 38.

[58] National Research Council, Committee to Assess the Scientific Information for the Radiation Exposure Screening and Education Program, *Assessment of the Scientific Information for the Radiation Exposure Screening and Education Program*, National Academies Press, 2005.

[59] Ibid, p. 4.

[60] Iodine 131 is a radioactive isotope of the element Iodine.

[61] National Cancer Institute, *Estimated Exposures and Thyroid Doses Received by the American People from Iodine-131 in Fallout Following Nevada Atmospheric Nuclear Bomb Tests*, October 1997. Additional information on this study including detailed county-level data and an online calculator to estimate ^{131}I doses is online at: http://www.cancer.gov/cancertopics/causes/i131.

In addition, building on the work done by the NCI, the NRC report shows that, at least in the case of ^{131}I, atmospheric tests at NTS did not always produce the highest levels of fallout in the downwinder states of Arizona, Nevada, and Utah due to the specific composition of the fallout and atmospheric conditions during and after detonation. For example, because a common pathway of ^{131}I into the human thyroid gland, where it can cause thyroid cancer, is through the consumption of milk from cows or goats which have ingested vegetation coated with ^{131}I from atomic fallout, any estimates of human doses of ^{131}I absorbed after a release of ionizing radiation must take into account the type and quantity of milk that a person drank in the period after the release. The data showing a lack of clear patterns of fallout limited to states near NTS, and the behavioral factors cited by the NRC in its discussion of the impact of ^{131}I demonstrate the limitations of the current model of downwinder eligibility based solely on geography.

The Probability of Causation Model

To be equitable, the NRC report recommended that the RECA program use a model of probability of causation to evaluate individual claims for benefits instead of basing downwinder eligibility solely on geography. Under this model, each applicant's individual absorbed dose of radionuclides would be estimated using geographic, demographic, and behavioral factors and every person in the country would be eligible to apply for benefits. This estimated dose would then be used to calculate, using established radio-epidemiology formulas developed by NCI, the probability that the individual's specific type of cancer was caused by his or her exposure to ionizing radiation. Congress would then have to set some threshold at which to award benefits or perhaps award varying levels of benefits based on a sliding scale of probabilities. This model has never been part of the RECA program or its amendments to expand the downwinder area.

Probability of Causation in Practice: Veterans and EEOICPA

Two existing programs that provide compensation based on exposure to ionizing radiation use the probability of causation model recommended by the NRC to make eligibility decisions. Under the Veterans' Dioxin and Radiation Exposure Compensation Standards Act of 1984, veterans who do not have one of the specified cancers listed under REVCA may be awarded disability compensation if it is determined that the probability that their disease was caused by their exposure to ionizing radiation is 50% or greater. For each veteran who applies for benefits, his or her individual dose of absorbed radiation is estimated through a process referred to as dose reconstruction using available records, dosimetry badge data, or other information. This estimated absorbed dose, along with the established radio-epidemiology formulas established by the NCI, allows the VA to estimate the probability of causation for each veteran.

Under Part B of EEOICPA, former atomic weapons industry workers may receive compensation for cancer through two pathways. If their former worksite has been added to the EEOICPA Special Exposure Cohort (SEC), then they need only show that they have one of the specified cancers to be eligible for benefits. However, if their worksite is not part of the SEC, then they must apply for benefits individually. Individual applicants have their total absorbed doses of ionizing radiation estimated through dose reconstruction and the probability of causation estimated using the NCI radio-epidemiological formulas. As in the case of veterans, workers under EEOICPA are eligible for benefits if their probability of causation is 50% or greater.

Challenges Involved in Probability of Causation

While the probability of causation can provide an estimate of the likelihood that a person's cancer is linked to their exposure to ionizing radiation, experience with the veterans and EEOICPA programs has brought to light several challenges faced when using this as a model for compensation.

First, the probability of causation model relies on accurate dose reconstruction, which is a process fraught with uncertainty because of the limited exposure data that is often available. Using the example of ^{131}I

exposure, for an accurate dose estimation a person would have to accurately provide information on the type of milk that they drank (cow or goat), the source of that milk (fresh or store-bought), and the quantity of milk that they regularly consumed over 60 years ago. Dose reconstruction models generally use the upper limit of the range of possible doses in order to give the exposed individual the benefit of the doubt. In a 2003 report, the NRC concluded that despite this general approach, certain aspects of the dose reconstruction process can still lead to underestimates of exposure. However, the NRC further concluded that adopting its recommendations to revise dose reconstruction would not have a significant impact on the number of successful claims for compensation.[62]

Second, moving from a model based on presumptive eligibility based on geography to one based on individual probability of causation would be to move the RECA program in a direction opposite of the development of the veterans and EEOICPA programs. In the case of veterans, difficulties with the probability of causation model were one of the factors which led Congress to create the presumptive eligibility model under REVCA. While Congress in 2000 created Part B of EEOICPA with a probability of causation model, it also offered an alternative pathway, the SEC, based on presumptive eligibility and even mandated that workers at the Paducah, Kentucky; Portsmouth, Ohio; and Oak Ridge, Tennessee gaseous diffusion plants; and the Amchitka Island, Alaska underground test site be included in the SEC. For all other workers, Congress created a process by which a federal advisory panel and the Secretary of Health and Human Services can add groups of workers to the SEC. To date, 128 additional groups of workers and worksites have been added to the EEOICPASEC[63] and more than 70% of the cases that have been awarded benefits under Part B of EEOICPA have been awarded through the SEC process and not the probability of causation pathway.[64]

Third, moving from the current geographical model to one based on probability of causation would increase the administrative complexity and costs of the RECA program as DOJ would now have to gather additional information on each claimant before making an eligibility decision. Providing the necessary information for dose estimation and the probability of causation model to work might also place additional burdens on claimants and their families. While the NCI has produced county-level estimates of absorbed thyroid doses of ^{131}I from NTS atmospheric tests, ^{131}I is just one of many, perhaps as many as 200, radionuclides produced and released with the detonation of an atomic weapon and the thyroid is one of several body systems that may be affected by internal or external exposure to ionizing radiation.[65] For a probability of causation to be accurate, additional dose estimations would have to be made which would require time and money.[66]

Fourth, moving away from the existing downwinder eligibility system after more than 30 years of the program and replacing it with what the NRC predicts will be a model less likely to award benefits would raise questions of equity between those who applied under the old and new systems. While some delays in applications may be the fault of the applicant, in some cases the long latency period of cancer might result in a person not being diagnosed with a covered cancer until the program has moved to more restrictive rules. Unless Congress were to mandate that existing beneficiaries be re-evaluated under the new model,

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[62] National Research Council, *A Review of the Dose Reconstruction Program of the Defense Threat Reduction Agency*, The National Academies Press, 2003.

[63] The complete list of approved, denied, and pending SEC petitions is available online from the National Institute for Occupational Safety and Health (NIOSH) at: https://www.cdc.gov/niosh/ocas/secstatusTable.html.

[64] Data for the EEOICPA program is available online form the Department of Labor at: http://www.dol.gov/owcp/energy/regs/compliance/weeklystats.htm#1.

[65] Institute of Medicine and National Research Council, *Exposure of the American People to Iodine-131 from Nevada Nuclear-Bomb Tests: Review of the National Cancer Institute Report and Public Health Implications*, The National Academies Press, 1999, p. 21.

[66] The NCI ^{131}I dose estimates took over 10 years to prepare.

this could create a system of winners and losers based solely on when one was first diagnosed with cancer.

Creation of a Downwinder Area for the Trinity Test Site

The first detonation of an atomic weapon took place on July 16, 1945, at the Trinity Test Site near Alamogordo, New Mexico. This atmospheric test had a yield of 21 kt. There are no provisions in the RECA statute for any benefits to be paid to any persons who lived near the Trinity Test Site during this detonation. Sections 4(c) and (g) of H.R. 3783 in the 116th Congress would have created a new downwinder area, consisting of the entirety of the state of New Mexico, for the Trinity Test Site. Any person who was present in the state of New Mexico for at least one year during the period beginning on June 30, 1945, and ending on July 31, 1962, would be considered a downwinder.

Issues Related to the Possible Creation of a Downwinder Area for the Trinity Test Site

Any creation of a geographic downwinder area for the Trinity Test Site would be contrary to the recommendations of the NRC in its 2005 report on RECA. However, as discussed in relation to expanding the NTS downwinder area, the NRC's recommendation to shift RECA from a geographic presumption model to a probability of causation model would create its own set of challenges.

If Congress were to decide to create a downwinder area for the Trinity Test Site, it would have to consider that there was one test, with a yield of 21 kt, at that site, compared to 100 atmospheric tests at NTS. The eligibility periods for presence in the NTS downwinder area all but assure that persons would have been present for more than one atmospheric test. Congress would have to determine if the radiation risk to the human health of persons in New Mexico during the period of the Trinity Test is sufficiently large to justify their inclusion in the RECA program as downwinders.

Creation of a Downwinder Site for the Pacific Tests

The United States conducted 106 atomic weapons tests at various sites in the Pacific Ocean, including the largest-ever American detonation of an atomic weapon, the Bravo Test, part of Operation Castle, on February 28, 1954, on Bikini Atoll in the Marshall Islands. The Bravo Test resulted in a yield of 15 Mt. Despite the amount of atomic testing in the Pacific, there are no downwinder areas associated with these tests. Section 4(c) and (g) of H.R. 3783 in the 116th Congress would have created a downwinder area consisting of the entirety of the U.S. territory of Guam for tests conducted in the Pacific.[67]

Issues Related to the Possible Creation of a Downwinder Site for the Pacific Tests

Similar to any discussion of using geography alone to expand the RECA downwinder area, the creation of a new downwinder area for the Pacific tests would be contrary to the conclusions of the NRC in its 2005 report on RECA. The NRC devoted an appendix of its report to the issue of fallout on Guam following Pacific tests and issued this conclusion regarding the expansion of the RECA downwinder area to Guam:

> As a result of its analysis, the committee concludes that Guam did receive measurable fallout from atmospheric testing of nuclear weapons in the Pacific. Residents of Guam during that period should

[67] The U.S. territory of the Commonwealth of the Northern Mariana Islands (CNMI) is not included in this legislation, despite its location just to the north of Guam. The inclusion of CNMI could be considered as part of an expansion of the RECA downwinder area to include areas affected by the Pacific tests.

be eligible for compensation under RECA in a way similar to that of persons considered to be downwinders.[68]

Taken on its own, this conclusion might appear to support the creation of a downwinder site for the Pacific tests and this conclusion from the NRC was included in the "findings" section of H.R. 1630 in the 111th Congress, a bill to include Guam in the RECA downwinder area. However, it is important to view this conclusion in the context of the entire NRC report, which specifically rejects using geography alone for determining downwinder benefit eligibility and instead proposes new scientific criteria for determining RECA eligibility. Taken in this context, the NRC statement regarding the residents of Guam is not recommending the inclusion of Guam in the RECA downwinder area, but rather is recommending that Guam residents be subject to the same probability of causation model advocated by the NRC report for all residents of the United States and its territories.[69]

Additional Evidence on Radiation Exposure in Guam and Health Effects of Nuclear Testing in the Pacific

In an appendix to its 2005 report, the NRC evaluated evidence of radioactive fallout in Guam, cancer incidence in Guam compared to the rest of the United States, and a study of the radionuclide levels in the plants, animals, and soil in Guam.

The NRC report examined fallout data taken from aerial surveys of Guam after the 10.4 Mt Mike test at Enewetak Atoll. The NRC concluded that while there was a spike in the levels of external gamma radiation in Guam after the test, Guam residents' effective radiation dose from the Mike test was less than 20% of the naturally occurring background annual effective dose for the continental United States and 50% of the background dose for Guam.[70]

Fallout data from the Operation Castle tests conducted between 1954 and 1958 in Bikini Atoll in the Marshall Islands were collected using gummed-film stations to measure levels of strontium-90 (^{90}Sr). Using these data, the NRC report concluded that "the fallout level in Guam during that period was similar to that in other parts of the U.S. and its territories."[71]

The NRC report compared the incidence of cancer in Guam for the period between 1990 and 1995 and for 1999 with the cancer incidence in the entire United States for the period between 1995 and 1999. For all types of cancer combined, the incidence rate in Guam for both males and females was less than the rate in the entire United States as were the incidences of breast, lung, and colon cancer.[72]

The NRC report also cited the findings of an extensive radiologic monitoring program conducted in the 1970s by the University of Washington Laboratory of Radiation Ecology and the Brookhaven National Laboratory that looked at radionuclide levels in plants, animals, and soil in several areas of Micronesia, including Guam.[73] The study concluded that the estimated annual effective dose from residual fallout on

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[68] National Research Council, Committee to Assess the Scientific Information for the Radiation Exposure Screening and Education Program, *Assessment of the Scientific Information for the Radiation Exposure Screening and Education Program*, The National Academies Press, 2005, p. 200.

[69] This interpretation of the NRC report's findings was confirmed by Thomas Borak, who served on the NRC Committee to Assess the Scientific Information for the Radiation Exposure Screening and Education Program, which authored the report, in personal conversation with Scott Szymendera of CRS on February 26, 2010.

[70] National Research Council, Committee to Assess the Scientific Information for the Radiation Exposure Screening and Education Program, *Assessment of the Scientific Information for the Radiation Exposure Screening and Education Program*, The National Academies Press, 2005, pp. 359-361.

[71] Ibid, p. 362.

[72] Ibid, p. 363.

[73] Victor A. Nelson, *Radiological Survey of Plants, Animals, and Soil in Micronesia*, Department of Energy, Nevada Operations

Guam due to atmospheric nuclear weapons tests was only a small fraction of the dose that residents receive from natural sources of radiation.[74]

Expansion of Eligibility for Uranium Workers

Under current law, RECA benefits for uranium miners, millers, and ore transporters are only available if the worker was exposed to radiation during uranium work before 1972.

Eligibility of Post-1971 Uranium Workers

In the original RECA legislation, the December 31, 1971, cutoff date for uranium worker eligibility was selected because the federal government's procurement of uranium for atomic weapons ended in 1971. Beginning in 1964 with the enactment of the Private Ownership of Special Nuclear Materials Act, P.L. 88-489, private ownership of uranium for fuel for nuclear power plants has been legal, creating an additional market for mined and milled uranium and ensuring that mining, milling, and transporting of uranium continued after the cutoff date for RECA eligibility.

Section 5(a) of H.R. 3783 in the 116th Congress would have provided for the eligibility of RECA benefits for uranium workers for work through December 31, 1990.

Issues Related to the Expansion of the Uranium Worker Eligibility Period

Advocates for extending RECA eligibility for uranium work after 1971 argue that despite improved safety regulations enacted since 1971, including the enactment in 1977 of the Mine Safety and Health Act, P.L. 91-173, uranium workers, especially miners, remain at elevated risk for radon-induced diseases.[75] For example, the current Mine Safety and Health Administration (MSHA) annual exposure limit for radiation of 4 WLM[76] is higher than the annual exposure limit of 1 WLM recommended by the National Institute for Occupational Safety and Health (NIOSH), meaning that current uranium miners can be exposed to higher than recommended levels of radon while still being in compliance with federal safety standards.[77]

Intent of RECA

The RECA program's intent, as expressed in Section 2 of the original RECA legislation, is to make "partial restitution" to persons who were affected by fallout from atomic weapons tests and uranium miners who were working in mines "that were providing uranium for the primary use and benefit of the nuclear weapons program of the United States Government," in recognition that the "lives and health of uranium miners and of individuals who were exposed to radiation were subjected to increased risk of injury and disease to serve the national security interests of the United States."

An expansion of RECA to cover post-1971 uranium activities would largely cover workers in the commercial uranium sector, which would expand the program beyond its original statutory intent. In addition, illnesses contracted during uranium mining, milling, and ore transporting for commercial clients,

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Office, Contract No. EY-76-08-0269, Seattle, WA, January 1979.

[74] National Research Council, Committee to Assess the Scientific Information for the Radiation Exposure Screening and Education Program, *Assessment of the Scientific Information for the Radiation Exposure Screening and Education Program*, The National Academies Press, 2005, p. 365.

[75] See, for example, Gary E. Madsen and Susan E. Dawson, "Unfinished Business: Radiation Exposure Compensation Act (RECA) for Post-1971 U.S. Uranium Underground Miners," *Journal of Health and Social Policy*, vol. 19, no. 4 (2004), pp. 45-59.

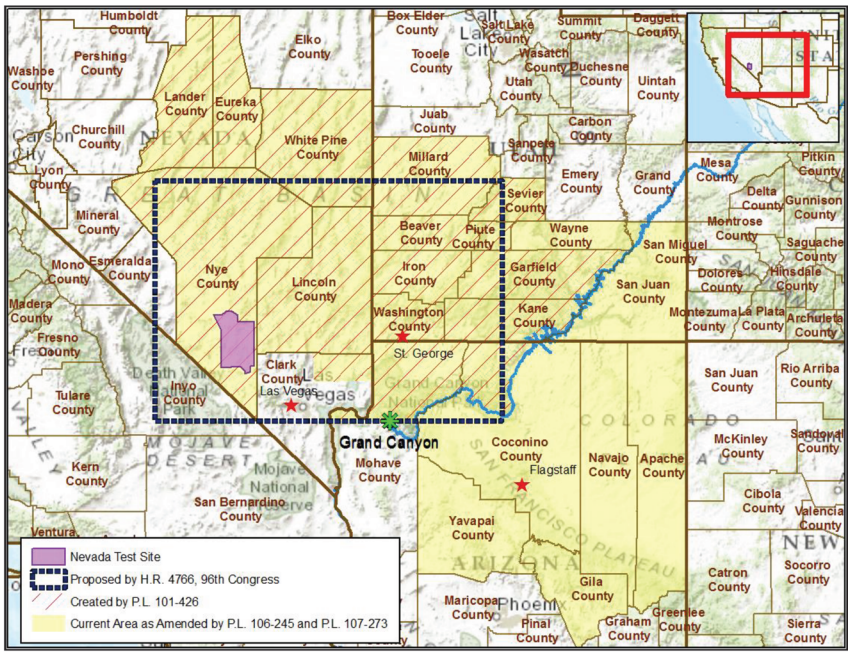
[76] 30 C.F.R. §57.5038.

[77] National Institute for Occupational Safety and Health, *A Recommended Standard for Occupational Exposure to Radon Progeny in Underground Mines*, October 1987.

rather than the federal government, would likely be covered by existing state workers' compensation systems, which are the traditional means of providing medical benefits and compensation in cases of commercial workplace injuries, illnesses, or deaths.

Appendix

Figure 1. RECA Downwinder Area



Source: Congressional Research Service (CRS).

Mr. COHEN. Thank you for your faithful Federal employment and your testimony today.

Our final Witness is Tina Cordova. In 2005, she cofounded the Tularosa Basin downwinders Consortium. The consortium's mission is to bring attention to the negative health effects suffered by the victims of the first nuclear blast on Earth that took place at the Trinity site in south-central New Mexico and to pass amendments to the Radiation Exposure Compensation Act to bring healthcare coverage and compensation to the people of New Mexico who have suffered with the health effects of overexposure to radiation since 1945. She is a cancer survivor, having been diagnosed with thyroid cancer when she was 39 years of age. Ms. Cordova holds a Master of Science and a bachelor of science degree from New Mexico Highlands University. She majored in biology and minored in chemistry.

Ms. Cordova, you are recognized for 5 minutes.

STATEMENT OF TINA CORDOVA

Ms. CORDOVA. Chair Cohen, Ranking Members Jordan and Johnson, Members of the Subcommittee, and Representative Stanton, it is an honor and a privilege to provide this testimony on behalf of the many people I represent, not only in New Mexico but across the United States and the Pacific Islands, like my sisters and brothers in Idaho and Guam. Thank you for inviting me to participate.

I want to especially acknowledge our champion, Senator Luján. I firmly believe this hearing is a result of your dogged persistence and dedication to this issue. You told us that you would stand with us, and you have lived up to your word, sir, and we honor you.

My name is Tina Cordova. I am a Native New Mexican, a downwinder, and a cancer survivor. I am also a community organizer and a cofounder of the Tularosa Basin Downwinders Consortium, or TBDC, for short. We have been working for 16 years to bring attention to the negative health effects suffered by the people of New Mexico as a result of their overexposure to radiation from the first atomic bomb test that took place at the Trinity site at New Mexico on July 16, 1945.

The Trinity test was the culmination of the top-secret Manhattan Project. Most people know the history of the project and the test, but few people know anything of the ensuing destruction of human health that took place after the test. It is our hope that, through this testimony and the written testimony already submitted, each of you will become more informed of the toll this took on the American citizens that lived in close proximity to the test site. Our ultimate goal is for the U.S. Congress to acknowledge the sacrifice and suffering of their fellow Americans and extend healthcare coverage and compensation to the people of New Mexico and other downwinders through amendments to the Radiation Exposure Compensation Act.

The U.S. Government has always described the area around the Trinity site as remote and uninhabited. We know from Census data that there were an estimated 40,000 men, women, and children living in a 50-mile radius to the test site. There were ranching families that lived as close as 12 miles.

The bomb at Trinity had some unique qualities that produced significant fallout. It was the only bomb ever tested on a platform

100 feet off the ground, and it was highly inefficient. A full 10 pounds of plutonium with a half-life of 24,000 years went up in a fire ball that exceeded the atmosphere and penetrated the stratosphere.

For days, a radioactive ash fell from the sky and settled on everything, the soil and the water and the air on the plants and on the skin of every living thing. It was a public health disaster of grand proportions. People also lived off the land. They had no running water, and they used cisterns to collect rainwater for drinking, cooking, *et cetera*. They depended on the Earth, the soil, the water to produce all the food they ate. They had gardens and orchards, and they raised animals for food. We were never warned before or after the test about the dangers of the bomb.

It is patently false that those in charge of the test didn't know that people living in the small communities around the test site would be harmed. They did, but they chose secrecy and then denial over the well-being of American citizens, and it cost those citizens their lives, their futures, and their economic security. Most people affected were Hispanos, indigenous people of color, including those living on the Mescalero Apache Reservation, 40 miles east of the test site.

The most difficult truth we must all face is the fact we had casualties from the Trinity test, and they were our babies. There was a sharp rise in infant mortality after the Trinity test. Babies in New Mexico were dying at an alarming rate. When we were losing our babies, and it was reported to the government, we were refused assistance. This is unconscionable and actually a total outrage.

The test was the beginning of the end for so many people, people like my own father, who was a 4-year-old child living in Tularosa, a village about 40 miles south of the Trinity site. As a result of his overexposure, he paid the ultimate price for simply being a child raised in a downwind community. My father, Anastacio Cordova, died after suffering for more than 8 years with three different cancers for which he had no risk factors. He didn't smoke, drink, use chewing tobacco, or have any viruses. Yet he developed two distinctly different rare oral cancers along with prostate cancer.

My father was a strong man in mind and body. He grew up that way, always living in the shadow of his own father who was killed in Germany during World War II. As a result of my father's first cancer, he had to have part of his tongue removed at the base of his throat. He had a feeding tube for over 18 months because he couldn't swallow. My father, who had the most amazing voice, couldn't sing any more or whistle which is what he did as he went about his days. He recovered only to develop prostate cancer and then, after 8 years, another cancerous lesion on the front of his tongue. We couldn't believe it after all he had been through.

My father fought the good fight, but he lost his battle to cancer. I will never forget the day he told me he was ready to die. He couldn't speak anymore, and he mouthed the words. I was with my dad that March evening when he took his last breath. It forever changed me. I am not the same person. I often weep as I think about it.

As I deliver this testimony, I am currently assisting my dad's older sister, who is 81 years old, prepare for breast cancer surgery

and follow-up treatment. Cancer and the horrific treatment associated with it is well known to her. Unfortunately, she lost her husband and her brother, my dad, within a few months of each other to cancer.

There is no doubt my father and his sister were overexposed to high levels of radiation from the Trinity test. It also damaged and altered their DNA. Those genetics were passed on to me, and it may be why I developed thyroid cancer when I was 39, or it may be because I and all the people of New Mexico were exposed to radiation as a result of the testing that took place at the Nevada test site well documented through the summer of 1962.

Living in rural New Mexico, we can never get treatment at home because there are no medical facilities in the small towns where we live. New Mexico has the highest per capita use of Medicaid to access healthcare coverage of any State in the United States. We know from surveying downwinders that many of them use Medicaid.

Mr. COHEN. Ms. Cordova, Ms. Cordova, your time is way over. If I may ask some questions—

Ms. CORDOVA. Can I just close? Can I just close, sir?

The late, great Congressman John Lewis, a treasured colleague of yours, once said: When you see something that is not right, not fair, not just, you have to speak up. You have to say something. You have to do something.

We totally agree with Congresswoman Lewis. We firmly believe there is a moral and ethical imperative to right this wrong. We believe that, after carrying this burden for over 75 years, we should be granted the same treatment as other downwinders received through RECA.

There is a path to healing for us and for all the downwinders left out. It starts with the recognition of our service and our sacrifice to our great Nation and is complete only when we are afforded the exact same care and coverage as other downwinders. Not one dime more, not one dime less. Thank you, sir.

[The statement of Ms. Cordova follows:]

In Pursuit of Justice for All Those Who Were Damaged

Date:	March 22, 2021
To:	The Committee on the Judiciary Subcommittee on the Constitution, Civil Rights, and Civil Liberties U.S. House of Representatives
From:	Tina Cordova Co-Founder Tularosa Basin Downwinders Consortium (TBDC)
Re:	Hearing Scheduled for March 24, 2021 2:00 PM EST Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act Written Testimony along with Attachments

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March 22, 2021

The Honorable Jerrold Nadler
Chairman
House Committee on the Judiciary
Washington, DC 20515

The Honorable Steve Cohen
Chair
Subcommittee on the Constitution, Civil Rights, and Civil Liberties

The Honorable Mike Johnson
Ranking Member
Subcommittee on the Constitution, Civil Rights, and Civil Liberties

Re: Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act

Good Afternoon Chairman Nadler, Chair Cohen, Ranking Member Johnson and Members of the Subcommittee on the Constitution, Civil Rights, and Civil Liberties,

It is an honor and a privilege to provide this testimony on behalf of the many people I represent. Thank you for inviting me to participate. I want to acknowledge that I also feel very honored to be a part of this distinguished panel to offer testimony on behalf of all the Downwinders of New Mexico.

My name is Tina Cordova. I'm a native New Mexican, a small business owner of 31 years, a Downwinder and a cancer survivor. I'm also a community organizer and the Co-Founder of the Tularosa Basin Downwinders Consortium (TBDC) that has been working for 16 years to bring attention to the negative health effects suffered by the people of New Mexico as a result of their

overexposure to radiation from the first atomic bomb test that took place at the Trinity Site in south central New Mexico, on July 16, 1945.

The test of the "Gadget", as it was referred to, was the culmination of the top-secret Manhattan Project. And while most people know some of the History of the Project and the Test most people know nothing of the ensuing destruction of human health and the environment that took place subsequent to the test.

It is the hope of the TBDC that through this written testimony we submit and via the oral testimony I will deliver in the committee hearing, that each of you will become more informed of the toll the test took on the American Citizens that lived in close proximity to the test site. Our ultimate goal is for the U.S. Congress to acknowledge the sacrifice and suffering of their fellow Americans and extend health care coverage and compensation to the people of New Mexico, through Amendments to the Radiation Exposure Compensation Act (RECA), while noting that New Mexico has played a pivotal role in this country's national security as home to the Manhattan Project, two national laboratories, Los Alamos and Sandia, and many other large government installations, such as Cannon, Holloman, and Kirtland Air Force Bases, and White Sands Missile Range. **Please be aware that the current RECA bill will sunset in 2022 and the need to Amend the bill is eminent.**

On July 16, 1945, the first nuclear device was detonated as mentioned earlier in the Tularosa Basin of New Mexico at the Trinity site. The government has always characterized the area as remote and uninhabited, but we know from the US census data that there were an estimated 40 thousand people, men, women and children living in a 50-mile radius to the test site. We've identified ranching families that lived as close as 12 miles to the test site. A few of these people are alive today to tell the stories of how one by one their loved ones have lost their lives to cancer and other diseases.

It was written by Ferenc Morton Szasz in his book "*The Day the Sun Rose Twice*" that five days after the Trinity test, Stafford Warren wrote a letter to General Groves, warning that the Tularosa Basin also referred to as the Jornada del Muerto region of New Mexico was too populated for further use in nuclear explosion tests. He urged that any future tests be located in an area with a radius of at least 150 miles with out inhabitants. If you draw a 150 mile radius around the Trinity site it encompasses Albuquerque to the North and El Paso to the South. This meant that hundreds of thousands of people were likely overexposed to radiation as a result of the Trinity test.

The atomic bomb at Trinity had some unique qualities that produced significant fallout. It was the first nuclear device to ever be tested. Because the scientists working on the project had to make certain the test was a success, the bomb was packed with 13 pounds of weapons grade plutonium. Only three pounds fissioned. The remaining ten pounds of unfissioned plutonium was joined with the soil, the sand, and the animal and plant life in the area and incinerated. The mushroom cloud rose over seven miles beyond the atmosphere, penetrating the stratosphere. Plutonium the most toxic substance known to humankind has a half-life of 24,000 years meaning it will remain radioactive for 240,000 years. You only have to ingest, absorb or inhale one particle of plutonium and it remains in the body throughout life giving off radiation and damaging cells, tissue and organs. A green glass-like substance called Trinitite was produced at

the site when the sand in the soil melted from the heat of the blast and was joined with the plutonium. The only place in the world you'll find Trinitite is in the desert of New Mexico.

The Gadget was also the only bomb ever detonated on a platform, a mere 100 feet off the ground. The scientists working on the Project realized the bomb at Trinity produced mass fallout and less destruction. To produce massive destruction and far less fallout, the bombs dropped by airplanes on Hiroshima and Nagasaki were detonated at a height of 1,600 to 1,800 feet. The Trinity blast literally had nowhere to go once it impacted the earth and is the reason radioactive material was so widely dispersed across the Tularosa Basin in every direction.

According to written and oral firsthand accounts from people, an ash fell from the sky for days. This radioactive fallout settled on everything. On the soil, in the water, in the air, on the plants, and on the skin of every living thing, both human and animal. It was a public health and an environmental disaster of grand proportions. July is one of the months historically referred to as the "monsoon season" in New Mexico because it is when we receive most of our annual scant rainfall. It is also when we have massive thunder, lightning, rain and wind storms. The test was delayed the morning of July 16th to allow a substantial storm to subside. Once the storm broke the bomb was detonated and later in the day another significant storm battered the desert and brought down the largest particles of the radioactive fallout.

To fully understand how the fallout negatively impacted human health, it is important to understand what life was like in rural New Mexico in 1945. People lived very organic lifestyles. They had no running water and used cisterns, holding ponds, or ditches to collect water for drinking, cooking, bathing, cleaning and doing laundry. They depended on the earth, the soil, the water to produce all the food they ate. They had gardens and orchards and raised cows, pigs, chickens, sheep, goats, and the like for food. They hunted wild game when it was necessary. One man told me, "We didn't have much, but we had all we needed, and it was all destroyed after the bomb."

Growing up in Tularosa, I thought I lived in Utopia. During the summer months my brothers, my sister, my cousins and all the other children we knew spent our days playing in the acequias (irrigation ditches), eating fresh fruit and nuts from the trees in the orchards and drinking fresh milk from the local dairy. We had no way of knowing we were poisoning ourselves. Our parents had no clue either. No one warned us before or after the test. In July our Moms would have been canning as many fresh fruits and vegetables as they could for the upcoming winter and that fateful July would have been no different. We were not wealthy by any means but we were blessed to have everything we needed to take care of ourselves and each other and we lived beautiful, full lives.

The historical false narrative that General Groves who ran the Manhattan Project, the physicists, the meteorologists and the physicians assigned to the Project had no idea what exposure to radiation meant is disingenuous at best. It is also patently false that they didn't know the people living in the many small communities surrounding the Trinity Test site would be harmed and to what extent. A book published by James Nolan in 2020, entitled, "*Atomic Doctors: Conscience and Complicity at the Dawn of the Nuclear Age,*" speaks to exactly how much they knew and how much was kept from public knowledge in an effort to maintain secrecy. The U.S. Government chose secrecy over the wellbeing of American Citizens and it cost those citizens their lives, their futures and their economic security. Most of the people affected were Hispanos,

indigenous people of color including those living on the Mescalero Apache Reservation which lies about 40 miles east of the test site.

General Groves eventually gave into pressure from the meteorologists and the physicians working to prepare for the test and developed an evacuation plan for a small number of people. He believed that any large-scale evacuation would have brought attention to the top-secret test. He gave no consideration to people like Barbara Kent from El Paso, Texas, who was 13 at the time and attending a dance camp in the mountains east of the Trinity test site in the small town of Ruidoso, New Mexico. Barbara and the 10 or so other girls in camp were shaken out of bed before dawn the morning of the blast. Eventually they settled back into bed and later in the day put their swim suits on and made their way to the creek. While playing in the water that day, they experienced what Barbara describes as snow falling in July except it wasn't cold like snow normally is, it was warm. They caught the snow (ash) on their tongues and rubbed it all over their faces and bodies. The girls grew up to be women who all died of cancer at a young age except Barbara, but she was not spared. Barbara has had numerous cancers, miscarriages and her daughters have had cancer as well. She tells of how a swath of her hair along her face turned gray that day never to be restored to its original color. If only General Groves had chosen to evacuate those towns. Innocent children like Barbara would have been spared. (See the attached photo of Barbara with her friends at the dance camp in Ruidoso).

Dr. Louis Hempelmann, the physician who served as the Manhattan Project Medical Director, stated afterwards, and I quote:

> "A few people were probably overexposed, but they couldn't prove it and we couldn't prove it so we just assumed we got away with it."

Part of the history of Trinity is that there was a time following the detonation when people were allowed to freely go in and out of the site without obstruction. Children were taken there on field trips, ate their lunches there, and then packed their pockets with the radioactive Trinitite I mentioned before. They stored shards of Trinitite in cigar boxes under their beds along with other childhood treasurers. People picnicked at the site and some ranchers have told me they hunted wild game there all the time.

New Mexicans were the first people in the world to be overexposed to radiation as a result of a nuclear test. New Mexico has a vast beautiful landscape full of natural resources but it was long ago declared a "sacrifice zone". And the People of New Mexico, were reduced to collateral damage that resulted from the extraction of uranium, the research, and development and testing of the first atomic bomb and the unfettered disposal of nuclear waste. There are over 500 abandoned uranium mines across the Navajo Nation and the Laguna and Acoma Pueblos. Thirty million tons of uranium was extracted out of those mines. The abandoned mines have piles of tailings around them which are rich in toxic substances. When it rains or snows and the moisture washes over the tailings it leaches out these toxic substances that are now part of the environment forever. Those living in the area are also Downwinders. These people, men, women and children live every day of their lives exposed to radiation that will over time rob them of their lives and their futures.

As for the Downwinders of the Trinity test, few knew what had taken place when the bomb was detonated. It produced more heat and light than the sun and was more powerful than the bomb at

Nagasaki. The blast took place before dawn and most people alive at the time have told me they thought it was the end of the world. So many have said they were alone with their Mothers because their Fathers were serving in the Pacific. Just after the detonation their Mothers gathered them up and made them pray the rosary until the time they felt settled. Imagine not knowing what you had just experienced but knowing it was bigger than anything you could imagine. (Please see the attached written family history of Genoveva Purcell and the family history/affidavit of Edna K. Hinkle as just two of the many recorded histories to better understand existence as a Downwinder).

While it was not the end of the world, it was the beginning of the end for so many people, people like my own Father who was a four-year-old child living in Tularosa. The little village is about 40 miles south of the Trinity site, the way the crows fly. Like his neighbors, he and his family lived a simple but full life in rural New Mexico. As a result of his overexposure, he paid the ultimate price for simply being a child raised in a downwind community.

My Father, Anastacio Cordova, died after suffering for more than eight years with three different cancers for which he had no risk factors. He didn't smoke, drink, use chewing tobacco, or have any viruses, yet he developed two distinctly different and rare oral cancers along with prostate cancer – which are compensable under RECA. The doctors told us, "This just doesn't happen. We just don't see this."

My Father was a strong man in mind and body. He grew up that way always living in the shadow of his own Father who was killed in Germany during WWII in December, 1944, the year prior to the fateful year of the Trinity test. My Grandfather is buried in Belgium a place my Father never got to visit. We were planning that trip when my Father was diagnosed with his first cancer. He had to have part of his tongue removed at the base of his throat. He had a feeding tube for over 18 months because he couldn't swallow. My Father who had the most amazing voice couldn't sing any more or whistle which is what he did as he went about his days. He lost a significant amount of weight but not his will to live.

My Father did finally recover from this first cancer and he secured a job driving a school bus for disabled children. I knew when he took the job it was about him healing himself, and he did. It didn't last long. Soon he had prostate cancer which truly was a walk in the park compared to the traumatic treatment for oral cancer. Then one day he told me he had a sore on the front part of his tongue. I couldn't believe it. After all he had been through! After all we had all been through! We all hoped and prayed it wasn't cancer but in the end it was. It wasn't a metastasis either. It came on eight years after his first oral cancer and when examined under a microscope the two cancers were different.

My Father fought the good fight, but he knew what was in store. He did all he could to survive but the exceedingly high levels of chemotherapy took away any strength he had left. He again relied on a feeding tube for nourishment and when he finally gave into the idea of dying, he weighed all of 125 pounds. I will never forget the day he told me he was ready to die. He couldn't speak anymore but he mouthed the words. In many ways it was a relief because I couldn't bear to watch his suffering any longer. I had pledged that as long as he wanted to fight, I would be there for him day in and day out. I knew his days were short then because he had been living on his own will for so long. I was with my Dad when he took his last breath. It forever changed me. I am not the same person, and I weep as I write about it.

My family's tragic story with cancer doesn't end with my Dad's death. I am currently assisting my Dad's older sister who is 81 years old prepare for breast cancer surgery and follow up treatment for the rare and aggressive breast cancer she has just recently been diagnosed with. It breaks my heart to even think of what lies ahead of her. Cancer and the horrific treatment associated with it are well known to her. Unfortunately, she lost her husband and her brother my Dad within a few months of each other.

There is no doubt my Father was overexposed to high levels of radiation from the Trinity test as a child. My father drank gallons of fresh milk, not glasses. The radiation in the milk likely settled in the glands of his neck irradiating the tissues in the surrounding area. It also damaged the cells in his reproductive organs and altered his DNA. Those genetics were passed on to me, and it may be why I developed thyroid cancer when I was 39.

Or it may be because I was exposed to radiation as a result of the testing that took place at the Nevada Test Site (NTS). Dr. Arjun Makhijani, President of the Institute for Energy and Environmental Research (IEER) brought to our attention that when nuclear bombs were tested above ground at the Nevada test site, monitors were in place in New Mexico that indicated fallout traveled to all parts of New Mexico. The fallout didn't end at the New Mexico border as is sometimes depicted in maps used by the government. https://www.justice.gov/civil/common/reca (Scroll down to see the map of the western U.S. depicting areas covered by RECA.)

Dr. Fontaine, a doctor with the New Mexico Cancer Center recently recounted to me that at the clinic she occasionally works at in Gallup, New Mexico, they sometimes see patients who come there for cancer treatment from Arizona. Some of these patients qualify for assistance through RECA. She says the people from Arizona utilizing RECA receive all they need for treatment while the people in New Mexico living just a few short miles across the border are left to fend for themselves.

It is important to note that exposure to radiation is cumulative and while many people in New Mexico received a high dose of radiation from the Trinity test, New Mexicans also continued to receive chronic doses from the fallout produced at the Nevada test site well into the summer of 1962. A compiled sample of this data is included here as an attachment for reference purposes and is chronicled in the book entitled *Under the Cloud: The Decades of Nuclear Testing,* by Richard L. Miller. Either way, through our exposure we continue to pass on the damaged DNA to our children and our children's children from one generation to another never to be the same. I am the fourth generation in my family to have cancer since 1945. We've documented families that now have six consecutive generations with cancer.

As a result, we experience a cycle of poverty associated with the exceedingly high cost of taking care of our health when we get sick. Living in rural New Mexico, we can never get treatment at home because there are no medical facilities in the small towns and villages where we live. Since 1990, the RECA program has resulted in the establishment of medical clinics and screening and treatment facilities in other downwind communities. The proposed amendments (2019-2020) would generate similar results where New Mexicans would be able to receive care.

People tell me stories of how they hold bake sales to buy pain medications or how they have to sell cattle to pay for their chemotherapy. How a wife has to go door to door in her Pueblo community to try to raise money for fuel to get her husband to and from his treatments in Albuquerque. When a family must spend all they have to obtain the medical care they need to survive cancer, they have nothing left to pass on but the damaged genetic legacy. There is no opportunity to develop generational wealth. New Mexico has the highest per capita use of Medicaid to access health care coverage of any State in the union. We know from surveying Downwinders that many of them use Medicaid to cover their catastrophic health care costs. It is their only option when they are too sick to continue to work and be part of any employment based health care program. Imagine the economic burden to families, communities and the State of New Mexico.

It was through the tireless efforts of Department of the Interior Secretary Stewart Udall that RECA was established in 1990. The entire Udall family including former Senator Tom Udall, dedicated themselves to the passage of the original Act. Secretary Udall possessed the moral compass to well understand the damage that was done to human health as our government sought to develop and test nuclear devices.
In a 1992 article published in the *New York Times,* attached to my testimony, Secretary Stewart Udall, stated the following:

> "There is nothing comparable in our history to the deceit and the lying that took place as a matter of official Government policy in order to protect this industry. Nothing was going to stop them and they were willing to kill our own people."

Maybe the most difficult truth for the people of New Mexico to grasp is the fact that we had casualties from the Trinity test and they were our babies. Robert Alvarez and Kathleen M. Tucker authored an article published in the July, 2019; issue of the *Bulletin of Atomic Scientists* entitled *The Most Significant Hazard of the Entire Manhattan Project* that brings attention to the sharp rise in infant mortality recorded after the Trinity test. This spike was seen after there had been a steady multi-year decline in infant mortality. Babies in New Mexico were dying at an alarming rate. When the government was asked about the data the Manhattan Project and its successors again refused to admit they had overexposed the people in New Mexico to high levels of ionizing radiation. When we were losing our babies and it was reported to the government, we remained unaided and were refused assistance. This is unconscionable and an outrage! The Tucker/Alvarez article is included here as an attachment.

Dr. Joseph J. Shonka, Ph.D., a health physicist and nuclear engineer delivered a lecture entitled *The First Dirty Bomb, Trinity*, at a scientific symposium in Denver in 2019. Dr. Shonka worked extensively on the decade-long Los Alamos Historical Document Retrieval and Assessment (LAHDRA) Project, an investigation of the Centers for Disease Control and Prevention. His work on LAHDRA focused on Trinity and he is considered to be a foremost expert on all things relative to Trinity. His lecture focused on the extensive fallout produced by the Trinity bomb and the subsequent negative consequences to human health. Dr. Shonka is currently exploring further the infant mortality rate. He believes the fallout from the Trinity test produced negative human health effects and that RECA should be amended to include the Downwinders of New Mexico. A letter from Dr. Shonka is attached to this testimony stating his position.

Recently my 16-year-old Grandson Marcus Montoya pointed out to me that radiation is an indiscriminate silent killer. He is concerned about what this means for his health and his future. He is right. Radiation kills the young and the old, it kills men and women, it kills rich and poor and it is bipartisan. It kills both Democrats and Republicans alike. New Mexico Downwinders are hoping and praying that after more than 75 years, members of the U.S. House of Representatives will hear us with open ears, open hearts, and open minds. We ask that you put yourself in our shoes and consider what it's like to walk with us just one day. Imagine what it's like to attend a funeral of a family member, a chemo infusion, or receive the horrible news that the cancer you've been fighting is back. Can you imagine telling your children that you're dying, and all you can wonder is: **Did I pass on my damaged genes to my children and grandchildren?**

No other state in the United States sacrificed more than New Mexico for our national security during World War II. **Along with sacrificing as Downwinders of the Trinity site test, New Mexico also had both the highest military volunteer rate and the highest casualty rate out of all the forty-eight states which were part of the Union during WWII.** And yet New Mexico continues to fight to be acknowledged and compensated for that sacrifice even as people continue to suffer and die as a result of that sacrifice. We are the ultimate patriots and we've given all we have to the fight. We bury our loved ones on a regular basis. We have nothing left to give!

The late, great Congressman John Lewis, a treasured colleague of yours once said:

> "When you see something that is not right, not fair, not just, you have to speak up. You have to say something, you have to do something"

We at the TBDC totally agree with Congressman Lewis. We firmly believe there is a moral and ethical imperative to right this wrong. We believe that after carrying this burden for over 75 years we should be granted the same treatment as other Downwinders have received since RECA was first established in 1990, over 31 years ago. After all, RECA recognizes the responsibility of the U.S. Government to apologize and provide health care and monetary compensation to individuals who contracted certain cancers and other serious diseases following their exposure to radiation during atmospheric nuclear weapons test. Downwinders and uranium workers covered by RECA have received more than $2.4 billion in approved claims. While this is a significant amount of money, and would be meaningful to the people of New Mexico what we covet most is the health care coverage comparable to what is included in the Energy Employees Occupational Illness Compensation Program Act (EEOICPA) afforded by RECA. There is a path to healing for the Downwinders of New Mexico whose lives and lands were taken advantage of and exploited during the Manhattan Project and beyond. It starts with the recognition of our service and our sacrifice to our great Nation and is complete only when we are afforded the exact same care and coverage as other Downwinders. **Not one dime more. Not one dime less.**

You now know the forgotten and untold history of the Manhattan Project and the Trinity test. You now know that American citizens were poisoned in the process. Saying nothing, doing nothing, remaining complacent renders you complicit, with the authority to remedy the situation.

Thank you, and I stand for questions.

Enclosures:

1992 New York Times article entitled *Santa Fe Portrait: A Longtime Pillar of the Government Now Aids Those Hurt by Its Bombs.*

Sample of Data from *Under the Cloud: The Decades of Nuclear Testing*, by Richard L. Miller.

July 2019 *Bulletin of Atomic Scientists* article entitled *The Most Significant Hazard of the Entire Manhattan Project.*

Dr. Joseph J. Shonka, Ph.D., Letter to Chairman Nadler and Members of the Judiciary Committee

Written Family History of the Trinity test provided by Genoveva Purcell

Written Family History of the Trinity test provided by Edna Hinkle

1945 Photo Ruidoso, New Mexico, of Barbara Kent with her friends at dance camp

AFFIDAVIT

The State of New Mexico

County of Otero

I, Edna Kay Hinkle (name) of Otero (county), New Mexico (state),

MAKE OATH AND SAY THAT:

See pages 2, 3, and 4,5

STATE OF New Mexico

COUNTY OF Otero

Edna K. Hinkle
(Signature of person making the statement)

SUBSCRIBED TO AND SWORN TO BEFORE ME,

on the 17th day of October, 2020

Signature: Andrea L Carrillo (Seal)
Notary Public

My Commission expires: 01/25/2024

OFFICIAL SEAL
ANDREA L. CARRILLO
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires:

Richard (Dick) and Genevra Wood Gililland were White Sands Missile Range Ranchers, who were living west of Salinas Peak, twenty seven miles from where the atomic bomb was tested. They had a rainwater cistern that caught the rainwater when it ran off the house, and then the excess rain water ran into a dirt tank. They used out of that dirt tank when the cistern went dry. They used this rainwater for drinking water and to cook with.

The well water across the canyon was too rank to drink. They had no electricity, so that means no pressure pumps or pressure tanks. The well water was pumped out of the ground by the windmill when the wind blew, into an open storage tank. That water sat in the tanks exposed to the radiation.

They had six children: Alice, Sam, Dixie, Lola, Pete, and Jess. Nineteen of Dick and Genevra's immediate family members have been affected by cancer.
Jess and Pete were asleep on the front porch when this bomb went off, and woke them up. They saw the mushroom twenty seven miles away. The government didn't even bother to tell them to get out of the area beforehand. Jess said the government never told them what the mushroom was.
Sam's daughter Cleo had stomach cancer when she was 12.
Sam's daughter-in-law Carol Ann died from colon, liver, and lung cancer.
Alice and her husband Clay Smith had spring water that ran into an open metal tank for their drinking water. Alice had breast cancer when she was in her early 80s, her husband Clay died of colon cancer at the age of 66. Her daughter Lucy died from breast cancer at 42. Her son Richard got prostrate cancer when he was 56 and died from it when he was 73. Her granddaughter Cheryl died from cancer.
Dixie and her husband Roy Tucker had spring water that ran into an open tank for their drinking water. Roy died from pancreatic cancer. Her son-in-law Tony Beanblossom died from colon cancer

when he was 67. Her daughter-in-law Karen Beanblossom Tucker died of breast cancer.
Lola has had skin cancer. Her husband Hansel Tucker beat colon cancer when he was 52. Both of her sons have been fighting prostrate cancer.
Pete had cancer when he died at the age of 79. His wife Wilma was 66 when she died from pancreatic cancer.
Jess had cancer just below his eye. His wife Louise had thyroid cancer at the age of 83. His daughter Edna Kay Hinkle beat breast cancer at 59. She has had twenty one skin cancers and probably hundreds of potential skins cancers cut or burnt off. His daughter Judy beat breast cancer when she was 49.
They all drank out of open tanks, either rainwater or spring water. Open tanks, meaning no tops, no lids on the tanks.

Jess and Louise Gililland, his brother, Pete Gililland, and his wife, Wilma Gililland walked around at the Trinity site after the bomb was detonated. They picked up the melted sand, and took it home, not knowing it was full of radiation. Back in those days they had a fence around the Trinity site, but the gate was open. Their children were clearly affected by it. Wilma was pregnant at the time with Shirley Ann Gililland. Shirley was born without any eyes.

Genevra's brother John Wood lived on the ranch to the south of her. He had a rain water cistern for his drinking water. The closest well was ¼ of a mile from the house. He died of Leukemia. His son Howard and his daughter Bonnie both died of cancer.
Genevra's brother Pete Wood's ranch was to the south of John Wood's ranch. Peter had well water, but it pumped into an over head tank. Pete's son-in-law Harvey Hinkle died from lyposarcoma cancer, his son Eldon Hinkle died from esophageal cancer.
Genevra's sister-in-law Annie Wood, who lived on the ranch to the north of Genevra had a spring that ran into a open rock tank. She

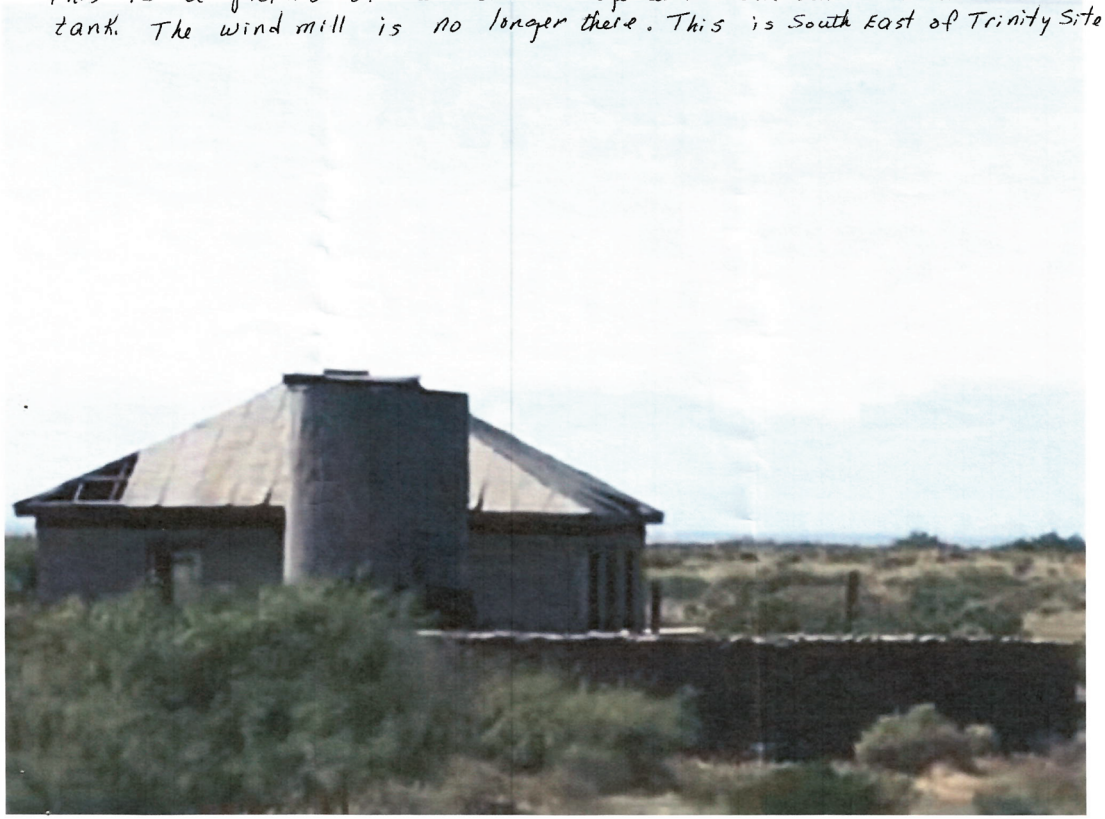
died of esophageal cancer. She was closer to the Trinity site than Dick's ranch.

That makes a total of 25 cancer victims in my family.
My oldest daughter, Jackie Freeman says it's not a matter of if you get cancer; it's a matter of when in our family.
Alice Smith's daughter Viola told her Dr. She hadn't been born yet when the bomb went off, so she doesn't have to worry about cancer. He told her the radiation altered our DNA so we are more susceptible to cancer.

Thank you very much for your time and help!
Edna Kay Gililland Hinkle
I live in Tularosa, New Mexico,
But my grandparent's ranch was 27 miles from Trinity Site when the atomic bomb went off.

4

This is a picture of the water storage tanks. One rock tank and one metal tank. The wind mill is no longer there. This is South East of Trinity Site.



Consent form for New Mexico Downwinders

I consent to sharing my story with the Tularosa Basin Downwinders Consortium, with my full understanding and permission for them to use my story and identity in their advocacy efforts, which may include (but are not limited to) research, news stories, articles, etc.

Print Name Edna K. HinKle

Sign Name Edna K. HinKle

Date 10-7-2020

Genoveva Peralta Purcella
8016 Constitution Road
Las Cruces, NM 88007

September 7, 2016

On July 16, 1945 my sisters Elena (Helen), Adelaida (Addie), and Natividad (Tive) came home to the family ranch located 5 miles west of Capitan and one mile north of US 380. After graduating from Capitan High School, they re-located to Alburquerque (as it was spelled then) to go to college and work. That July day, they were helping their mother (who was one month pregnant with me; I was born on March 13, 1946) in the ranch house, when they heard a loud explosion that shook the house, and broke windows. They huddled in fear in a corner with our mother Francesquita (Frances), unaware of what was happening. Mother thought the world was ending!

Dad (Demecio) was outside in the corral tending to the cows. When the explosion happened the sky turned dark and the ground shook! After the initial shock, he immediately ran inside to see if everyone was safe. He entered the house, dusting himself off as walked inside. He was covered in a white powder from the explosion. He found that his family was safe, but very frightened. He walked outside to check on his cows and all of his red cows were covered in a white powder, as was the entire ground! The white "snow" was everywhere. It entered every crevice of the entire landscape. It entered every crevice of my family's home and future.

My father Demecio, suffered with cancer for three years. He had skin cancer and his skin was literally cracking open. He had cancer in his eyes and his stomach. He developed Hodgkin's disease now called Hodgkin's Lymphoma (a cancer of the lymphatic system), and he was in and out of the hospital in Albuquerque. My father passed away due to complications of Hodgkin's Lymphoma on April 18, 1962. By this time, I was a young teenage sophomore in high school. The death and suffering my father endured was devastating for me. He was my idol.

Of my ten siblings raised on the ranch (some of them born on the ranch), seven of them have endured the disease of cancer and four of my siblings have been lost to various types of cancer. My sister Adelaida Peralta (only 33 years of age), endured cancer then died on January 28, 1958 of complications due to metastasized cancer. She left behind her two young children to be raised by my mother, Francesquita Silva Peralta. My mother was not without her own cancer diagnosis.

I am currently the only surviving family member of my nuclear family and I have also had my war with cancer. Due to advances in modern medicine, I am hoping every day for a cure! Many of my family members, including my sons and their families still live on this land. I pray that my daughter, two sons and their children, can live cancer-free lives.

One by one as the years have passed, I have been witness to all my adult siblings and some of their children being diagnosed with one form of cancer or another. Those who have succumbed to the disease left behind families and their own struggles with cancer legacies.

In honor of my immediate family, I will list each member who has been afflicted with and/or lost to various cancers.

- Adelaida Peralta Martinez, my sister, passed away in 1958. She was 33 years of age. The death was a direct result of cancer.
- Demecio Peralta, my father, passed away in 1962. He was 43 years of age. He had Hodgkin's Lymphoma. The death was a direct result of cancer.
- Dorotea Peralta Chavez, my sister, passed away in 2004. She was 69 years of age. The death was a direct result of cancer.
- Juan Peralta, my brother, passed away in 2004. He was 75 years of age. The death was a direct result of cancer.
- Mike Peralta, my brother, passed away in 2001. He was 58 years of age. The death was a direct result of cancer.
    - Francesquita Silva Peralta, my mother, was 63 years of age when she was diagnosed with cancer. She was cancer-free after treatment and passed away at age 92.
    - Natividad Peralta Heberling, my oldest sister, was diagnosed with more than one form cancer in 1999 at age 79. She was cancer-free after treatment and passed away at age 93.
    - Elena Peralta Quintana, my sister, was diagnosed with cancer in 1972 at age 50 and again in 1980 age 58. She was cancer-free after treatment and passed away at age 92.
    - I, Genoveva Peralta Purcella, am the sole surviving member of my nuclear family. At the age of 30, as the mother of three young children, I was diagnosed with breast cancer. I have been cancer-free for over 40 years!

I feel the same way that I assume everyone who was exposed to the fallout from the Trinity site nuclear bomb testing feels, which is that the United States government and the U.S. military did us an injustice! If we had been made aware in advance of the Trinity site nuclear bomb testing, and had been educated on any repercussions related to the fallout and the radiation exposure, my family would likely have been spared the undue suffering and loss that resulted from this government testing. We wouldn't have eaten the meat of the cows; we wouldn't have ingested the water from our wells. We had a large garden on which we subsisted, and we ate all of those vegetables that were exposed to radiation! My dad's favorite horse died shortly after my dad died. The horse's fur changed color, grew long and he lost so much weight that he simply disintegrated. It is disheartening and despicable, that my family and their surrounding neighbors were not located, and told via letter, radio, or any form of notice, that we should vacate the area or stay indoors, or seek shelter underground. Anything would have been better than nothing we received.

As executor of the estate of my family ranch in which my two sons and their families currently reside, I am submitting these testimonials for both my father Demecio Peralta, and my mother, Francesquita Silva Peralta, and myself, Genoveva Peralta Purcella.

Sincerely,

GP Purcella

Genoveva Peralta Purcella

(575) 640-0246

Bulletin of the Atomic Scientists

Trinity: "The most significant hazard of the entire Manhattan Project"

By Kathleen M. Tucker, Robert Alvarez, July 15, 2019

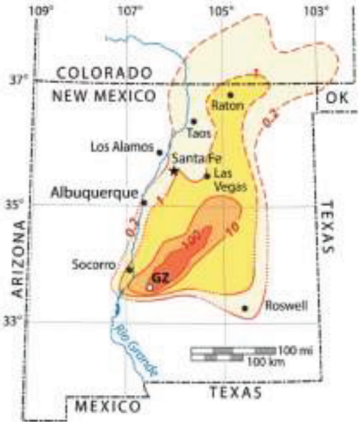
For the past several years, the controversy over radioactive fallout from the world's first atomic bomb explosion in Alamogordo, New Mexico on July 16, 1945—code-named Trinity—has intensified. Evidence collected by the New Mexico health department but ignored for some 70 years shows an unusually high rate of infant mortality in New Mexico counties downwind from the explosion and raises a serious question whether or not the first victims of the first atomic explosion might have been American children. Even though the first scientifically credible warnings about the hazards of radioactive fallout from a nuclear explosion had been made by 1940, historical records indicate a fallout team was not established until less than a month before the Trinity test, a hasty effort motivated primarily by concern over legal liability.

In October 1947, a local health care provider raised an alarm about infant deaths downwind of the Trinity test, bringing it to the attention of radiation safety experts working for the US nuclear weapons program. Their response misrepresented New Mexico's then-unpublished data on health effects. Federal and New Mexico data indicate that between 1940 and 1960, infant death rates in the area downwind of the test site steadily declined—except for 1945, when the rate sharply increased, especially in the three months following the Trinity blast. The 21 kiloton explosion occurred on a tower 100 feet from the ground and has been likened to a "dirty bomb" that cast large amounts of heavily contaminated soil and debris—containing 80 percent of the bomb's plutonium—over thousands of square-miles. (See Figure 1.)

After a nearly half a century of denial, the US Department of Energy concluded in 2006, "the Trinity test also posed the most significant hazard of the entire Manhattan Project."[1] Four years later the US Centers for Disease Control gave weight to this assessment by concluding:

"New Mexico residents were neither warned before the 1945 Trinity blast, informed of health hazards afterward, nor evacuated before, during, or after the test. Exposure rates in public areas from the world's first nuclear explosion were measured at levels 10,000-times higher than currently allowed."[2]

Figure 1.



Estimated exposure rate in milliroentgens per hour (mR h^{-1}) 12 hours after detonation; GZ = ground zero of Trinity. Source: Centers for Disease Control (2010).

Meanwhile the National Cancer Institute is conducting a study to model the dispersion and dose reconstruction for people who may have been exposed to fallout from the Trinity explosion. Regardless of the outcome of this study, it is clear the public was put in harm's way because of US government negligence in conducting and its participation in a coverup of the results of an exceedingly dangerous experiment.

Infant mortality concerns raised about Trinity. In October 1947, the first concerns over a rise in infant mortality along the fallout path of the Trinity explosion were raised in a letter to Stafford Warren, a medical radiologist and radiation safety chief of the Manhattan Project and the Trinity test in particular. "As I recall, in August 1945, the month after the first bomb was tested in New Mexico, there were about 35 infant deaths here…" Kathryn S. Behnke, a health care provider from Roswell, New Mexico, wrote. "I understand the rate at Alamogordo, nearer the site of the test, was even higher than Roswell."[3]

On December 4, 1947, Warren's medical assistant, Fred A. Bryan, replied to Ms. Behnke, writing that "we can find no pertinent data concerning infant deaths; in fact there is no report as to the number of or specific cause or dates and, as far as Alamogordo is concerned."[4] Bryan also wrote that he "wanted to assure you that the safety and health of the people at large is not in any way endangered."[5]

Bryan failed to mention that he did not bother to examine New Mexico's vital statistics. About a month after Bryan's reassured Behnke of no evidence of harm, a state health official sent the actual unpublished data on infant deaths collected by the state to Los Alamos. [6] Soon thereafter, in a letter dated, January 22, 1948 to Bryan, Wright Langham, biomedical group leader at the Los Alamos National Laboratory (LANL), forwarded hand-written sheets from the state of "the records of infant births and deaths during 1945-1947." Langham added: "I am sure what I am sending you will not be of much help." The New Mexico Health Department data indicated that the infant death rate increased by 38 percent in 1945 compared to 1946 and was 57 percent higher than in 1947.[7]

Finding the facts. More than 70 years later, we examined the vital statistics collected by the US government and the state of New Mexico in the 1940s to determine if area health patterns changed after the first atomic explosion. The data eventually provided to Los Alamos and Bryan in January 1948 indicated a sharp rise in infant deaths following the Trinity explosion. Later, between 1940 and 1960, infant mortality in New Mexico showed steady and deep annual declines—except for 1945, when it shot up.[8] The infant mortality rate in New Mexico in 1945 was 100.8 per 1,000 live births; the rate for 1944 was 89.1, and for 1946 it was 78.2.[9] (See Figure 2.) The unpublished data sent to Los Alamos indicated an infant death rate nearly 34 percent higher in 1945 than subsequently made public.

Figure 2

Month-by-month data for the years 1943 to 1948 revealed the highest infant mortality rates in late summer, following the Trinity blast, with a significant peak in September 1945. Infant mortality for the months August, September, and October after the explosion indicated that New Mexican infants had a 56 percent increased risk of dying, with less than a 0.0001 percent chance that this was due to natural fluctuation.[10]

In 1945, infant death rates increased on average by 21 percent (with a statistical error range of plus or minus six percent that applies to all the rates listed in this paragraph) in counties where fallout was measured by Manhattan Project personnel. Rates in these counties dropped by an average of 31 percent in 1946. The infant death rate in Roswell, where Ms. Behnke first alerted Warren of the problem, climbed by 52 percent in 1945, after falling by 27 percent between 1943 and 1944. The rate then dropped in Roswell by 56 percent in 1946. Rates in the downwind counties where fallout was measured dropped by an average of 31 percent (plus or minus eight percent) percent in 1946

We found no extraordinary metrological conditions, such as heat or heavy rains and floods, that may have competed with radioactive fallout as a factor in the increase in newborn deaths after Trinity. According to the CDC in 2010, risks to newborns were especially heightened as "residents reported that fallout 'snowed down' for days after the blast, most had dairy cows and most collected rain water off their roofs for drinking."[11]

The Trinity Test was conducted on July 16, 1945. The rate of infant mortality began rising in July. The month of August showed an infant mortality rate of 152.3 per 1,000 live births. In September, the rate was 187.8, and in October 123.1. Infant mortality change rates for August, September, and October show a dramatic increase in 1945 when compared to the same three months for the years 1943, 1944, 1946, 1947 and 1948 (see figure 3)

Figure 3

Ionizing radiation is especially damaging to dividing cells, so the developing infant, both before and after birth, is susceptible to radiation damage, as Alice Stewart, an epidemiologist who first demonstrated the link between X-rays of pregnant women and disease in their children,[12] first warned in 1956.[13]This damage may be seen years later with the development of leukemia and other cancers in children exposed in utero to ionizing radiation, as Stewart and others confirmed in subsequent studies.[14] By 1958, the United Nations Scientific Committee on the Effects of Atomic Radiation recognized that, in the short term, radiation damage can be reflected in fetal and infant deaths.[15]

Fallout protection was not a priority for the Trinity explosion. The Trinity test was top secret to all but a few scientists and military officials. No warnings were issued to citizens about off- site fallout dangers, although off-site measurements done with a paucity of instruments and people indicated that radiation spread well beyond the test site boundaries. [16]

The Trinity bomb was detonated atop a 100-foot steel tower. With an estimated explosive yield of 21,000 tons of TNT, the fireball vaporized the tower and shot hundreds of tons of irradiated soil to a height of 50,000 to 70,000 feet, spreading radioactive fallout over a very large area. Fallout measurements taken shortly after the explosion were very limited and primitive instruments were used; the data suggest no measurements regarding inhalation or ingestion of radionuclides were taken.

Joseph Shonka, a principal researcher for the study of the Trinity shot for the Centers for Disease Control, recently concluded that the Trinity fallout "was similar to what might occur with a dirty bomb. A fraction of the plutonium [~20%] was used in the explosion [and] … the fireball contacted the soil. Because of the low altitude, fallout exhibited a 'skip distance' with little fallout near the test site. Although there were plans for evacuation, radio communication was lost as the survey teams traveled out to follow the overhead plume. Thus, the command center was unsure of whether that the criteria had been met … and failed to order the evacuation."[17]

Scientists had stressed the importance of protection from radioactive fallout following a nuclear weapon explosion, five years before the Trinity test. "Owing to the spread of radioactive substances with the wind, the bomb could probably not be used without killing large numbers of civilians, and this may make it unsuitable as a weapon for use by this country," warned Manhattan Project physicists Otto Frisch and Rudolf Peierls in their important memorandum of March 1940, which accelerated production of the first atomic weapons. "[I]t would be very important to have an organization which determines the exact extent of the danger area, by means of ionization measurements, so that people can be warned from entering it."[18]

As preparations were being made to test the first nuclear weapon, warnings by Frisch and Peierls about fallout hazards were lost on the leadership of the Manhattan Project. Were it not for two physicists at Los Alamos who warned in a June 1945 memorandum that "radiation effects might cause considerable damage in addition to the blast damage ordinarily considered,"[19] little would have been done. Later Joseph O. Hirschfelder, one

of the concerned scientists, recalled that “very few people believed us when we predicted radioactive fallout from the atom bomb. On the other hand, they did not ignore this possibility.”[20]

On first being warned by Los Alamos scientists, Gen. Leslie Groves, the Manhattan Project director, dismissed concerns about fallout as being alarmist. But Warren convinced Groves of the potential risk of legal liabilities, and Groves grudgingly agreed to assemble a team at the last minute to track fallout from the test.[21]

A lot was at stake. First, there was the enormous expense involved; the Trinity device cost approximately 15 percent of what the United States spent on all conventional bombs and other explosives during World War II.[22] Then again, there was great pressure to test the Trinity device before July 17, 1945, when the three heads of government of the United States, the Soviet Union and Great Britain were to meet in Potsdam, a German suburb of Berlin, to address the end-stage of World War II and post-war policies. Compared to the political imperative of Potsdam, the hazards of radioactive fallout took a back seat.

But five days after the explosion, Warren reported to Groves that “a very serious hazard” existed over a 2,700 square mile area downwind from the test that had received high radiation doses.[23] Tissue-destructive effects from fallout were observed in livestock in areas that were incorrectly assumed to be uninhabited by people.[24] After realizing the magnitude of the problem, Warren advised Groves that the fallout danger zone, originally set at a 15-mile radius, was too small by at least an order of magnitude and that “there is still a tremendous quantity of radioactive dust floating in the air.”[25]

After more than 70 years, radiation exposures from inhalation and ingestion of water and food contaminated by Trinity test fallout were never assessed,[26]and it may prove to be difficult, if not impossible, to reconstruct doses from internal exposures, given the deaths of residents living in the vicinities from the passage of time and the major changes in lifestyles and dietary habits that have occurred since 1945. Fallout maps of the Trinity test have been made, but they contain strong elements of speculation because of the paucity of radiological monitoring at the time.

The National Cancer Institute is near completion of a fallout dispersion study of the Trinity explosion. Regardless of the outcome of this study, it is clear the public was endangered because of US government negligence in conducting a highly dangerous experiment, as was the case for the downwinders living near the Nevada Test Site, where above-ground nuclear tests were conducted. Because of passage of the Radiation Exposure Compensation Act in 1990, 22,220 “downwinders” exposed to fallout from open air nuclear weapons tests near the Nevada Test Site received an official apology from the US Government for sending them in harm’s way through deception. Through 2015, they had also received nearly $2 billion in financial compensation.[27]

But the people downwind of the 1945 explosion in New Mexico have been denied official recognition, even though the Trinity shot was considered one of the dirtiest of American nuclear tests, with a significant absence of safeguards to protect people from dense

radioactive fallout. Safety took a back seat to making sure the first atomic bombs would meet their enormously destructive potential. Alvin Weinberg, director of Oak Ridge National Laboratory during and after the Manhattan Project captured the prevalent mindset in his memoir by saying that “all else, including safety, was secondary.”[28]

Several years ago, residents of central and southern New Mexico organized to fight for compensation. Known as the Tularosa Basin Downwinders, they have made a compelling case that cancers and other diseases are due to the Trinity blast and subsequent radioactive fallout from open air atomic bomb tests in Nevada.

Indeed, coming to terms with the legacy of the Trinity explosion through radiation dose reconstruction is further complicated by the fallout that drifted from the Nevada tests into New Mexico. As indicated by the Centers for Disease Control in 2005, northern and central New Mexico were among the areas where significant amounts of fallout were deposited from the Nevada open air atomic tests.[29] Even so, the strong correlation of increased infant deaths in the months following the Trinity explosion cannot be ignored.

We should remember that compensation for people near the Nevada test site was not exclusively based on abstract modeling of radiation doses. Rather, downwinders were also compensated because the burden of proof fell unfairly on them. They were victims not just of willful negligence, but also the government’s purposeful deception and suppression of evidence about the high-hazard activity that the US nuclear weapons program constituted. The current body of historical evidence of harm, negligence, and deception—especially the evidence of increased infant death following the first nuclear explosion—should be more than enough for long overdue justice for the people in New Mexico who were downwind of Trinity.

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Keywords: Trinity test
Topics: Analysis, Nuclear Risk, Nuclear Weapons

March 21, 2021
The Honorable Jerrold Nadler
Chairman
House Committee on the Judiciary
Washington, DC 20515

Dear Mr. Chairman Nadler:

I am writing to request that your committee consider the issue of the radiation exposure of residents of New Mexico from activities of the Manhattan Engineering District (MED) and the Atomic Energy Commission (AEC) dating back more than three quarters of a century.

On Oct. 15, 1990, Congress passed the Radiation Exposure Compensation Act (RECA). RECA is scheduled to sunset in 2022. In order to properly address the radiation exposure of New Mexico residents from all exposures from the MED and AEC activities, and to consider adding residents of New Mexico to RECA, your committee should consider amending RECA to extend the sunset provision. The justification for this urgently needed action is based on consideration of the incomplete and faulty studies that have been performed to date which are described below.

RECA did not include New Mexico in the "downwinders" category based on studies by the National Cancer Institute on fallout (NCI, 1997). That report did not consider the Trinity Test nor any other MED and AEC releases of radioactive material in New Mexico. In 2005, at the request of Congress, the National Academies reported on whether additional claimants should be added to RECA (NAP, 2005). In that report to Congress, nearly 50 prominent scientists, including National Research Council (NRC) committee members, NRC staff and reviewers were involved with the three year long development of that report. They asserted that no additional claimants should be considered for addition to RECA based on that NCI report of 1997, noting on page 124 that the highest exposed individual received 210 milligray (mGy) to their thyroid organ throughout the entire atmospheric testing era. That thyroid dose is equivalent to a whole body dose of 8.4 millisieverts (mSv). An exposure that low to the highest exposed individual would result in few excess cancers to the entire population. When Congress has periodically asked the Congressional Research Service if other categories of claimants should be added to RECA, their report (e.g. CRS, 2019) references the NAP study to advise that no added categories are needed. That information, relying on the 1997 NCI report, is incorrect.

The Los Alamos Document Retrieval and Assessment Project by CDC, published in 2010, summarized all available information dealing with offsite impacts of the Los Alamos National Laboratory. Chapter 10 deals with Trinity, and reports that releases from Trinity alone were estimated by MED scientific staff to have caused exposures that exceeded 1,000 mSv from external radiation alone, more than 100 times larger than the assumed exposures that Congress has been provided by advisory groups. That exposure along with internal dose from fallout approaches the highest exposure asserted for survivors of the bombings of Hiroshima and Nagasaki.

The following table compares the partial external dose alone from short lived radioactivity to Trinity downwinders with the complete internal and external dose received over 30 years by offsite civilian populations from other noteworthy events. The data from Hiroshima and Nagasaki is taken from the Japanese Radiation Effects Research Foundation (RERF). The Trinity data is taken from a report in 2008 by NCI provided to Senator Bingaman. The World Health Organization (WHO) data is summarized for Chernobyl and Fukushima. Thousands of downwinders from Trinity received as much dose from fallout as survivors in Japan did from the nuclear weapons. Unlike data for all other categories listed, this table does not include internal dose from Trinity or any other MED releases and, as such, is not a complete assessment of the numbers of New Mexicans

that were impacted by MED and AEC releases nor their exposures to those releases. The lowest dose range (0 to 50 mSv) has many individuals whose partial exposure exceeded the maximum exposure to residents of Utah.

		Dose (mSv)						
Subjects	Total	0-50	50-100	100-200	200-500	500-1,000	1,000-2,000	>2,000
# of Japanese	86,572	37,458	31,650	5,732	6,332	3,299	1,613	488
# of Trinity	376,958	372,024	1,070	2,856	789		200	19
Trinity workers	700	most	few					
Chernobyl Evacuees	116,000	most	few					
Fukushima	81,000	81,000						

The table above only includes individuals to short-lived fallout alone, and does not include other downwinders and their exposures in New Mexico due to releases from:

1. the 100 Ton Test at the Trinity site
2. Radioactive Lanthanum (RaLa) releases from operations at the Los Alamos site
3. Plutonium releases from Los Alamos
4. exposures from weapons tests at the Nevada Test Site (NTS)
5. exposures to New Mexico residents who worked in uranium mines until 1971 (previously included as a category in RECA)
6. releases over the years from other accidents and operations at the Los Alamos site.

The 2020 NCI report of last fall incorrectly asserts that the Trinity nuclear test of 1945 resulted in a much lower dose from fallout to the surrounding population than experienced by the Japanese survivors who were exposed to the weapons in Japan. (NCI, 2020) There are many issues with that 2020 report that resulted in that erroneous conclusion.

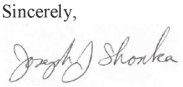
Following the Trinity Nuclear Test, Oppenheimer and Groves asserted that conditions for the test should never be repeated, and that a test site at least ten times farther from civilian populations was needed, along with a much taller (300 feet versus 100 feet) tower to limit fallout exposure to civilians. These criteria were used at the Nevada Test Site, the primary source of exposure to Utah. The MED had two primary concerns in the days following Trinity, secrecy and liability. The need for secrecy was primarily to avoid alerting Japan about the new weapon to ensure the maximum impact to hasten the end of the war. The overwhelming need to keep the atom bomb secret from Japan evaporated 16 days later with the bombing of Hiroshima. This left as their only primary concern to avoid incurring liability.

In order to avoid liability, a false narrative was created that Trinity was a test conducted on unoccupied government land. This frequently repeated statement, ignores the impact to uninvolved civilians an hour after the test who were on land not controlled by the US. If one made the same statement about Chernobyl, it would be correct but laughable. Trinity was a successful test, but was also the first and worst nuclear accident in history. Scientists were unprepared for the scale and extent of the offsite releases. As reported in Barton Hacker's book "The Dragons Tail", (a history written with support of DOE), the overwhelming concerns for avoiding liability resulted in all radiation release data from Trinity, including the logbooks from radiation protection personnel, were retained in Oppenheimer's office and classified to prevent their inadvertent release. With few exceptions, those documents, logbooks, reports and analyses have never been released by DOE. However, in December, 2020, after release of the 2020 NCI study, LANL discovered a small collection (~1 box) of documents dealing with Trinity releases that apparently were used by Hacker in writing his book. I was told that LANL is working to release that limited information.

Downwind residents in New Mexico have not been provided an accurate accounting for their exposures from MED and AEC operations, and have not been well served by science. The false narrative created by the MED and maintained by the AEC was so successful that no residents of New Mexico were aware of their exposures and none elected to participate in the class action lawsuit that resulted in the creation of the RECA itself.

To be fair law, stakeholders and Congress should have access to all information, and both should have access to impartial experts. RECA should be amended to include all impacted individuals from New Mexico who have been denied information about their exposures and denied equal treatment as provided to residents of Utah.

Sincerely,



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Dr. Joseph Shonka is a Health Physicist who worked on the CDC's Los Alamos Historical Document Retrieval and Assessment Project (LAHDRA) from 2000 to 2010. He also worked on dose reconstructions for other MED sites conducted by CDC.

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Santa Fe Portrait; A Longtime Pillar of the Government Now Aids Those Hurt by Its BombsSanta Fe Portrait; A Longtime Pillar of the Government Now Aids Those Hurt by Its Bombs

By Keith Schneider

- June 9, 1993

Santa Fe Portrait

A Longtime Pillar of the Government Now Aids Those Hurt by Its Bombs

Stewart Udall won recognition for the victims of atomic tests.

People were 'fed a steady diet of lies by the Government.'

Costly Relic, Unit Waits, Ready for Nuclear Tests

CLINTON SCOLDED ON BUSH RECORDS

Image
Credit The New York Times Archives

East of the Nevada Test Site, where the Government conducted atmospheric tests of atomic bombs, the town of Alamo, Nev., rises in the desert. In August 1978, at the urging of a cousin, Stewart L. Udall went to Alamo and listened to mothers tell of the dust and radiation from the blasts that settled over the town in the 1950's and of the children they had lost to leukemia.

"Until then, there were a lot of people in that country who suspected a link, but they kept it to themselves," said Mr. Udall, who once was Secretary of the Interior for Presidents John F. Kennedy and Lyndon B. Johnson. "They had been fed a steady diet of lies by the Government that there was no danger. That was my first trip to investigate, and I felt there was more to it, that it would be difficult and that we would be breaking new ground."

It also nearly broke the spirit of an elder statesman of the Southwest and the Democratic Party, a man who wears his hair in unruly silvery waves these days and is almost never seen in anything other than cotton work pants and white sneakers. On a bright spring afternoon in his new adobe home overlooking Santa Fe and the Jemez mountains, Mr. Udall says he is happier than he has been in years as he finishes what may be his greatest work of a life full of achievements. Apology and a Promise

Almost three years ago, the Government passed the Radiation Exposure Compensation Act, a law that was a both a formal apology and a promise to compensate thousands of Americans who were injured or killed by the development and testing of atomic bombs. Hundreds of those people turned to Mr. Udall for help in the late 1970's, and he agreed to represent them as a public interest lawyer. They are finally receiving recognition for their suffering from the Government, though at a pace he calls unnecessarily slow and cumbersome.

From a study decorated with the pictures of the Kennedy brothers, Robert Frost, William O. Douglas and other men of history who were his close friends, Mr. Udall is using his considerable stature and influence to change the system. He has appealed to the Clinton Administration to make the law as compassionate as it was intended to be. And he is beginning to get help from Congress.

In early May, Representative George Miller, a Democrat of California and chairman of the House Natural Resources Committee, asked Attorney General Janet Reno for an

accounting of the compensation program and ways it could be improved. Recently, two Democratic lawmakers from New Mexico, Senator Jeff Bingaman and Representative Bill Richardson, began looking into problems in the program at the Navajo reservation in Shiprock.

The compensation law, which Mr. Udall helped to write and push through Congress, came 12 years after he began to uncover and prove one of the terrible secrets of American democracy: in the name of safeguarding the nation from the Soviets, the United States had knowingly exposed millions of its own citizens to harmful levels of atomic radiation. Signs of Fatigue

The hours of research and the miles of travel are beginning to show in a walk that is stiffening, fatigue that creeps up on him at odd times of the day, and the anger that flares in his eyes when he describes the Government's behavior.

"There is nothing comparable in our history to the deceit and the lying that took place as a matter of official Government policy in order to protect this industry," said Mr. Udall. "Nothing was going to stop them and they were willing to kill our own people."

Mr. Udall developed the evidence for such statements in pursuing three lawsuits he filed filed against the Government. The suits began to undermine the prevailing view that the American nuclear arms industry was safe. The point was made even stronger after Congressional investigations by Senator John Glenn, Representative Mike Synar, and other lawmakers in the 1980's. In 1988 nuclear weapons plants in six states, the heart of the industry, were shut amid protests by citizens and questions about the industry's safety and management that were raised by the Government's own nuclear engineers.

It will be left to historians to decide whether the collapse of the nuclear weapons industry played a role in ending the cold war and in decisions to begin disarming the American atomic arsenal. But some experts contend that an important part of that story begins with Mr. Udall. Byproduct of Arms Race

"He got America to recognize that there was a tragic human face associated with the arms race," said Robert Alvarez, an investigator on Senator Glenn's Committee on Governmental Affairs and co-author of "Killing Our Own" (Dell, 1982) a history of the nation's experience with the atom. "Stewart forced the atomic weapons industry to begin to fall under democratic control. And when it did, it led to further revelations that unraveled the consensus that had allowed the Government to operate without anybody questioning them."

Stewart L. Udall was born in 1920 in St. Johns, Ariz., the oldest son of six children raised by Louise Udall and her husband, Levi, a Mormon and self-educated lawyer who ended

his career as Chief Justice of the Arizona Supreme Court. Mr. Udall and his younger brother Morris, a future Congressman and 1976 Presidential candidate, followed in their father's footsteps, opening a law practice together in Tucson in 1949.

The older brother won the first of his three terms in Congress as a Democrat from Arizona in 1954. His seat was taken by Mo Udall in 1961, when he was named by President Kennedy to become Secretary of the Interior, a job he commanded as only one man before him had, Harold L. Ickes, who served during the Depression, and none since.

From 1961 to 1968, Mr. Udall wrote or helped to write four landmark conservation laws, among them the 1964 Wilderness Act, which permanently safeguards tens of millions of acres of forest from logging, mining, and road-building. He established four national parks, 56 wildlife refuges, 8 national seashores and lakeshores, 9 national recreations areas and 22 national historic sites. Cold War History

Yet Mr. Alvarez and other nuclear experts who have followed his career say Mr. Udall's greatest work may have come after he left Washington, when he challenged the Government's nuclear warriors.

When the last lawsuit was concluded, Mr. Udall moved to Santa Fe two years ago to live next-door to his son Tom, who was elected New Mexico's Attorney General. Each morning Mr. Udall awakens early, pads into his study, and reckons with the country's cold war experience and his role in it in a book he is finishing, his fourth.

"The atomic weapons race and the secrecy surrounding it crushed American democracy," Mr. Udall said in a interview. "It induced us to conduct Government according to lies. It distorted justice. It undermined American morality. Until the cold war, our country stood for something. Lincoln was the great exemplar. We stood for moral leadership in the world."

Until 1978, Mr. Udall said he had known little about the behavior of the officials inside the Atomic Energy Commission and its successor, the Department of Energy.

Then came the plea for help from his cousin in Alamo. Over the next decade, Mr. Udall, a team of other lawyers, and four of his six children investigated and litigated the three lawsuits asserting that Americans had been harmed by the Government's negligent management of the nuclear-arms industry.

The first suit was brought by thousands of men, women and children in the Southwest who said they had been harmed by radioactive fallout from the atmospheric testing of atomic bombs in the 1950's and early 1960's. The second was brought by families of Navajo men who had mined uranium for the Government and were disabled or killed by

lung cancer caused by radiation in the mines. A third suit, still pending, was brought by workers at the Nevada Test Site. Power of Government

Ultimately, the first two lawsuits failed because the Federal Tort Claims Act of 1946 gives officials broad discretion to carry out programs, whether or not they cause injuries. When the Supreme Court declined to hear the cases in the late 1980's, Mr. Udall said he was crushed.

In the spring of 1988, Navajo leaders asked Mr. Udall to come to the reservation in northern Arizona to explain what happened. Mr. Udall said he could not face them. "They believed in me," he said slowly, the memory evident in the hardened corners of his mouth. "They believed in our system of justice. I had told them the courts would listen. It was almost as though I had lied about our system of justice. That if you were patient and persistent, there would be justice at the end. At that point I thought we had reached the end."

For months, Lee Udall said, her husband, normally a tower of energy and moral fire, moped around their house in Phoenix. Mr. Udall said he had been broken in spirit and in finances.

He even refused an appeal by a friend, former Representative Wayne Owens, Democrat of Utah, who called him in the summer of 1988 for help in writing a bill to compensate the victims. Mr. Udall told Mr. Owens he was too broke to pay for a plane ticket to Washington and too discouraged to be much help. "I thought it was another lost cause," Mr. Udall said.

But Mr. Owens, who lost the election for a Senate seat last year, persisted. In 1989, Mr. Udall made the first of a number of trips to Washington to write the legislation and lobby for its passage. He helped build the coalition of western Republicans in the Senate, led by Orrin G. Hatch of Utah, Pete G. Domenici of New Mexico, and Alan K. Simpson of Wyoming, who were needed to persuade President George Bush to sign the law on Oct. 15, 1990.

Justice Department officials, who administer the program, point out that by fighting for his clients Mr. Udall will receive legal fees provided by the compensation law.

Mr. Udall acknowledges that he, his family and several lawyers who helped with the lawsuits have received $570,000 in fees from 57 victorious clients and that they stand to gain $1 million or more in fees. But he noted that the payments come after 14 years of work, and he said he had spent at least $200,000 of his own money investigating and litigating the cases.

"If the pot gets sweet at the end that's fine," he said. "Whatever I get I will have earned. That is a fact. But that has not been my permanent concern. I have a personal commitment to my clients. You start a job. You finish it."

As for the compensation legislation, Mr. Udall says it is a statement that only the United States is capable of making. "It shows the country is resilient," he said. "It shows a willingness to admit mistakes. We still have the ability to let our children see our triumphs and how we betrayed our ideals."

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Under the Cloud - The Decades of Nuclear Testing By Richard L. Miller (1986)	Page No.	Date of Test	Yield	Fallout in NM? Y or N	* disintegrations/minute/feet squared
Group 1					
Title Pg.					
App. C Maps of Fallout Trajectories	444				
Ranger: Able	445	Jan. 27, 1951	1 kt	N	
Ranger: Baker	445	Jan. 28, 1951	8 kt	N	
Ranger: Easy	445	Feb. 1, 1951	8 kt	Y, SW corner	
Ranger: Baker-2	446	Feb. 2, 1951	8 kt	Y, not NE corner	
Ranger: Fox	446	Feb. 6, 1951	22 kt	Y, SW corner	
Buster: Able	446	Oct. 22, 1951	less than 0.1 kt	N	
Buster: Baker	447	Oct. 28, 1951	3.5 kt	Y, NE corner	
Buster: Charlie	447	Oct. 30, 1951	14 kt	Y, NW & SE corners	
Buster: Dog	447	Nov. 1, 1951	21 kt	Y, SW corner	
Buster: Easy	448	Nov. 5, 1951	31 kt	Y, SW corner	
Jangle: Sugar	448	Nov. 19, 1951	1.2 kt	N	
Jangle: Uncle	448	Nov. 29, 1951	1.2 kt	N	
Tumbler-Snapper: Able	449	1-Apr-52	1 kt	Y, NE corner	
Tumbler-Snapper: Charlie	449	Apr. 22, 1952	31 kt	Y, upper 1/3 of NM	
Tumbler-Snapper: Dog	449	5/1/1952	19 kt	N	
Tumbler-Snapper: Easy	450	7-May-52	12 kt	N	
Tumbler-Snapper: Fox	450	25-May-52	11 kt	N	
Tumbler-Snapper: George	450	1-Jun-52	15 kt	N	
Tumbler-Snapper: How	451	5-Jun-52	14 kt	N	
Upshot-Knothole: Annie	451	17-Mar-53	16 kt	Y, NE corner (tiny)	
Upshot-Knothole: Nancy	451	24-Mar-53	24 kt	Y, not NE corner	
Upshot-Knothole: Ruth	452	31-Mar-53	0.2 kt	Y, SW corner	
Upshot-Knothole: Dixie	452	6-Apr-53	11 kt	Y, thru middle of state	
Upshot-Knothole: Ray	452	11-Apr-53	0.2 kt	Y, thru middle of state	
Upshot-Knothole: Badger	453	18-Apr-53	23 kt	Y, thru middle of state	
HOT SPOTS: Over 30,000 d/m/ft2*	453	18-Apr-53		Y, lower NE area	
UK: Badger: HOT SPOTS over 30,000 d/m/ft2	453	19-Apr-53		Y, thru wide middle of state	

Under the Cloud - The Decades of Nuclear Testing By Richard L. Miller (1986)	Page No.	Date of Test	Yield	Fallout in NM? Y or N
Group 2				
UK: Badger: HOT SPOTS over 30,000 d/m/ft2	454	April 20, 1953-April 21, 1953		Y, NM-TX border
Upshot-Knothole: Simon	454	25-Apr-53	43 kt	Y, throughout state
Upshot-Knothole: Encore	454	8-May-53	27 kt	N
Upshot-Knothole: Harry	455	19-May-53	32 kt	Y, SW corner
Upshot-Knothole: Grable	455	25-May-53	15 kt	N
Upshot-Knothole: Climax	455	4-Jun-53	61 kt	Y, NW corner
Teapot: Wasp	456	Feb. 18, 1955	1 kt	Y, middle of state, NE corner 2 times
Teapot: Moth	456	Feb. 22, 1955	2 kt	Y, lower half of state
Teapot: Tesla	456	1-Mar-55	7 kt	Y, northern border
Teapot: Turk	457	7-Mar-55	43 kt	Y, northern border & NE corner
Teapot: Hornet	457	12-Mar-55	4 kt	Y, middle of state
Teapot: Bee	457	22-Mar-55	8 kt	Y, lower 3/4 of state
Teapot: Ess	458	23-Mar-55	1 kt	Y, thru middle of state
Teapot: Apple-1	458	29-Mar-55	14 kt	Y, NW corner to SE corner
Teapot: Wasp Prime	458	29-Mar-55	3 kt	Y, NW corner to nearly SE corner
Teapot: Ha	459	6-Apr-55	3 kt	Y, NW corner to nearly SE corner
Teapot: Post	459	9-Apr-55	2 kt	Y, across northern border
Teapot: Met	459	15-Apr-55	22 kt	N
Teapot: Apple-2	460	5-May-55	29 kt	N
Teapot: Zucchini	460	15-May-55	28 kt	Y, across southern border
Plumbbob: Boltzmann	460	28-May-57	12 kt	Y, across SW corner
Plumbbob: Franklin	461	2-Jun-57	140 tons	N
Plumbbob: Wilson	461	18-Jun-57	10 kt	N
Plumbbob: Priscilla	461	24-Jun-57	37 kt	Y, NW corner to SE corner
Plumbbob: Hood	462	5-Jul-57	74 kt	Y, plume circled state
Plumbbob: Diablo	462	15-Jul-57	11 kt	N
Plumbbob: John	462	19-Jul-57	2 kt	N
Plumbbob: Kepler	463	24-Jul-57	10 kt	N
Plumbbob: Owens	463	15-Jul-57	9.7 kt	N
Plumbbob: Stokes	463	7-Aug-57	19 kt	N

* disintegrations/minute/feet squared

Under the Cloud - The Decades of Nuclear Testing By Richard L. Miller (1986)	Page No.	Date of Test	Yield	Fallout in NM? Y or N	* disintegrations/minute/feet squared
Group 3					
Plumbbob: Shasta	464	18-Aug-57	17 kt	Y, SE corner	
Plumbbob: Doppler	464	23-Aug-57	11 kt	N	
Plumbbob: Franklin Prime	464	30-Aug-57	4.7 kt	N	
Plumbbob: Smoky	465	31-Aug-57	44 kt	N	
Plumbbob: Galileo	465	2-Sep-57	11 kt	Y, northern border, NE corner	
Plumbbob: Coulomb B	465	6-Sep-57	0.3 kt	Y, NW corner to SE corner	
Plumbbob: Wheeler	466	6-Sep-57	197 tons	Y, NW corner to SE corner; NE corner	
Plumbbob: LaPlace	466	8-Sep-57	1 kt	Y, lower 2/3 of state	
Plumbbob: Fizeau	466	14-Sep-57	11 kt	Y, NW & SW corners, northern border	
Plumbbob: Newton	467	16-Sep-57	12 kt	N	
Plumbbob: Whitney	467	23-Sep-57	19 kt	N	
Plumbbob: Charleston	467	28-Sep-57	12 kt	N	
Plumbbob: Morgan	468	7-Oct-57	8 kt	Y, NW corner	
Nougat: Antler	468	15-Sep-61	2.6 kt	N	
Plowshare Gnome [in SE NM]	468	10-Dec-61	3 kt	Y, eastern 1/3 of state	
Nougat: Danny Boy	469	5-Mar-62	0.43 kt	N	
Nougat: Platte	469	14-Apr-62	1.85 kt	Y, NW corner to half of eastern border	
Tumbler-Snapper: Baker	469	15-Apr-52	1 kt	N	
Nougat: Eel	470	19-May-62	low yield	Y, SW to upper half of northern border	
Storax: Sedan	470	6-Jul-62	104 kt	N	
Nougat: Des Moines	470	13-Jun-62		N	
Storax: Little Feller II	471	7-Jul-62		N	
Storax: Johnnie Box	471	11-Jul-62	0.5 kt	N	
Storax: Small Boy	471	14-Jul-62	low yield	N	
Storax: Little Feller I	472	17-Jul-62	low yield	N	

Mr. COHEN. Thank you, Ms. Cordova. Thank you.

We will now proceed under the 5-minute Rule with questions. I will begin by recognizing myself for 5 minutes.

Ms. Cordova, it is surprising to me that, even though New Mexico was the birthplace of the atomic bomb and the first nuclear weapons test occurred there, New Mexico downwinders are currently ineligible for compensation under RECA, despite what seems like the obvious connection between the government's nuclear test and exposure to radiation. How has your community been impacted by the government's nuclear activities, and how is this similar to the circumstances of those already eligible for RECA?

Ms. CORDOVA. Well, sir, the thing that has to be first recognized is that it was the first test ever conducted and because of that there were a lot of unknowns, but the thing that they did know is that people would be affected, and they did nothing to actually remove us or relocate us during the test procedure. We have been highly overexposed.

Exposure to radiation is a factor of distance and time, and we had people living as close as 12 miles to the test site, 20 miles, 25 miles, 30 miles, and so our exposure was very, very high. We don't have medical facilities in all those little towns, so people have to leave from where they live to get taken care of.

Just, like I said, we have the highest use of Medicaid of any State in the union, 47 percent of the people in New Mexico use Medicaid to access healthcare. I know because we have surveyed Downwinders in many of those communities that people utilize Medicaid to access healthcare coverage and I know that uranium miners do as well.

So, I guess, my answer to your question is, we have suffered greatly. We have high instance of cancer and other diseases associated with radiation exposure and we often times get diagnosed much later in the disease process because we don't have access to healthcare coverage, and what that means is our prognosis is reduced.

The other thing I want to point out that we brought up early on during the pandemic is that when you are a Downwinder or a uranium miner and you have been exposed and you have underlying conditions, you don't fair very well inside of a pandemic like what we have been experiencing.

President Nez mentioned earlier the deaths on the Navajo reservation and the number of uranium miners that have died. I know it is because of their underlying conditions. I know it is because their immune systems are compromised. I know it is because they have all sorts of underlying problems. So, we don't fair very well also inside of the pandemic. I hope that answers the questions that you asked.

Mr. COHEN. Thank you, Ms. Cordova.

President Nez, Navajo and other Native American communities have been particularly impacted in various ways by the Government's nuclear activities, whether directly or indirectly, including with respect to nuclear testing and uranium mine.

How is the uranium mining industry, which is fostered by the U.S. Government impact not only the individuals work the uranium industry, but also their communities and do you think as

there was a large number of Native American communities affected by these blasts that there was discrimination and basically racial neglect inequities as the cause for RECA not extending to so many people in the Navajo Nation.

Mr. NEZ. Thank you for that question, Chair, and Members of the Committee.

Let me just piggyback off the first question with Ms. Cordova. Navajo's and many Indian tribes throughout the country are Downwinders in two ways. Navajo, the blast, the testing, downwind, we get a lot of wind in the southwest as you know. The other is the open uranium mines that are all scattered throughout our Nation. The winds pick up the radiation and takes it eastbound, the direction of the wind.

So, it doesn't just hit Navajos, it hits non-Navajo people along the way and with the—I believe that now is the time, Chair, to change some, including RECA, but also some of the regulations in the policies that oversee Tribal Nations. There is just so much bureaucracy, and I will share with you and the Committee a White paper that the Navajo Nation has developed. We learned some items during the CARES Act distribution of those barriers to improve the quality of life for our Navajo people, and one of those is building healthcare facilities.

Did you know, Chair and Members of the Committee, there is only one and it is a small facility, one cancer treatment facility in all Indian country, in Tuba City, Arizona, the Navajo Nation. I just wanted to end my comments with that, and I think there is going to be an opportunity here for more economic and community development, especially with the—and I appreciate the Committee and the Congress for approving the American recovery—American Rescue Plan Act and also the discussion about infrastructure because we need infrastructure here on Navajo.

So, thank you, Chair and Members of the Committee.

Mr. COHEN. Let me do ask you—you didn't answer the question and maybe you didn't want to answer you the question and maybe it is just a foolish question, but do you think there any racism concerning Native Americans? There has been neglect for hundreds of years, and there has been all kinds of—we took your land. That was where we started, and it is a bad place to start. Do you think that was part of why this hasn't been as fair as it should be?

Mr. NEZ. Well, look at it this way, Chair and Members of the Committee, in the most powerful country in the world, 30–40 percent of our Navajo people don't have running water. So, there is a problem here in this country. I appreciate the national media attention to educate the U.S. citizenry and also to educate Members of Congress.

So, yeah, there is some racism if you want to call it that, some inequalities based toward people of color. Of course, I think because I see it every day here in Indian country. Thank you.

Mr. COHEN. Thank you, Mr. President. I can see why you are Mr. President.

I have taken up my 5 minutes.

Mr. Johnson, are you available for questioning?

Mr. JOHNSON of Louisiana. I am, Mr. Chair.

Mr. COHEN. You are recognized for 5 minutes, sir.

Mr. JOHNSON of Louisiana. Thank you. I had a couple of questions for Mr. Szymendera, but before I do that, I just wanted to reset the table. There has a been a lot of facts and figures that have been shared here in the last hour or so.

So, Mr. Szymendera, just at the outset, can you briefly describe just for us to reset the three main groups that are eligible for compensation under RECA?

Mr. SZYMENDERA. Certainly, Congressman. The three main groups are on-site participants. These are people who were physically present at one of the atmospheric tests. It could have been at Trinity, New Mexico; at Nevada test site; or at one of the locations in the Pacific. They were onsite during the test, or they were onsite in the 6 months after the test performing cleanup work or performing decontamination work on equipment or in the Pacific on the naval ships that were involved. So, that is on-site participants. That is $75,000 one-time payment.

Downwinders are people who lived in the designated areas adjacent to or near the Nevada test site during periods of atmospheric testing either for 1 or 2 years in the 1950s or for the entire duration of testing in the summer of 1962. The Downwinders are eligible for $50,000.

The final category are uranium miners, millers, and ore transporters who worked before 1972 and who have specified diseases. The uranium workers are eligible for $100,000. In addition, there is a separate law called EEOICPA, the Energy Employees Occupational Illness Compensation Program Act that is administered by the Department of Labor. Under EEOICPA, the uranium workers, only the uranium workers, are eligible for additional benefits and medical benefits, but those are not provided by RECA; those are provided through EEOICPA.

So, those are your three categories and an overview of the benefits available.

Mr. JOHNSON of Louisiana. Very good. So, you mentioned the uranium workers. Now, let me ask about the other category, the on-site weapons test participants. Are there other Federal agencies that they are eligible to receive benefits from or other Federal laws?

Mr. SZYMENDERA. If they participate in the test while serving in the military, they are eligible perhaps for benefits from the Department of Veterans Affairs under the Radiation-Exposed Veterans Compensation Act, or REVCA, and there is an offset so that they cannot receive the full amount of both RECA and veterans' benefits. There is an offset there. Generally, no. For on-site participants, the only Federal compensation would be through RECA. That other law that I mentioned EEOICPA, while it does cover some of the same areas, for example, the Nevada test site is also an EEOICPA site, that is for those involved in the development, not the testing. So, the actual building/manufacturing of the weapons.

Mr. JOHNSON of Louisiana. Is an EEOICPA recipient, uranium workers, is that an offset also with RECA? How do they interact?

Mr. SZYMENDERA. No, it is not an offset, quite frankly. It is an addition. They receive an additional benefit under EEOICPA and they receive health benefits for the covered health condition. It is

important to understand that RECA is a one-time cash payment, no healthcare benefits. EEOICPA healthcare benefits extended to the uranium workers.

Mr. JOHNSON of Louisiana. Okay. I am out of time, or real close to it. Real quick question, do you have—

Mr. COHEN. You have a minute to go.

Mr. JOHNSON of Louisiana. Thank you. Do you have a rough estimate of the number of individuals who are eligible for RECA compensation who haven't yet received it?

Mr. SZYMENDERA. I don't have that information. I think that is a factor of outreach efforts. Remember, many of the claimants now and certainly the Department of Justice would be the best source of this data, we are now dealing with in many cases claimants who are children or even grandchildren of Downwinders, on-site participants, or uranium workers.

Many of them may live outside of the southwest at this point. They may not have even heard of this program or they may have only just heard of it. There is a process by which you have to apply gathering evidence which can take time. An estimate of how many are sort of still out there that haven't been reached, I think that would best come from the Department of Justice as the program administrator.

Mr. JOHNSON of Louisiana. Is it fair to say—and I know I am near out of time now, but is it fair to say that some of the ailments and diseases that come from this would be passed through the blood stream; in other words, their genetics, so that even a grandchild might have a valid claim or is that a disputed fact?

Mr. SZYMENDERA. Well, certainly second generation or even third generation factors there certainly have been scientific research on that, but that is not part of RECA eligibility at all. A grandchild is only applying on behalf of the grandparent.

Mr. JOHNSON of Louisiana. Okay. Got it.

Thank you for the clarification.

I yield back.

Mr. COHEN. Thank you, Mr. Johnson.

Ms. Ross, the Vice Chair of the Committee is recognized for 5 minutes.

Ms. ROSS. Thank you very much, Mr. Chair, and thank you so much to our colleagues for bringing this important issue to our attention and to Chair for holding the hearing.

My question doesn't necessarily go to the nitty-gritty of who is eligible right now, but it goes to the long-term lasting effects of this program and the health consequences.

So, first, Ms. Cordova, I wanted to know how have the adverse health effects caused by the testing created further economic problems in your area?

Ms. CORDOVA. Thank you very much, Congresswoman Ross, for the question. I mentioned earlier that we don't have healthcare facilities in the small towns where we live and New Mexico is very rural, and because of that, we don't get diagnosed or treated in the places where we live.

What that means is, we have to travel great distances for our care, sometimes out of State. Families have told me that they spend everything that they have to take care of their health and,

honestly, I have had people tell me I maxed out my credit cards, I took out my retirement, I have no assets left.

My children are sending me credit cards, so I can buy gas to get to El Paso for treatment and most days I wish I would just die so I am not a burden to my family any longer. We don't have the opportunity to accumulate any kind of generational wealth.

As I said before, 47 percent of the people in New Mexico depend on Medicaid to access healthcare coverage. A great number of them are Downwinders. We have collected over a thousand health surveys from people so that we can document these stories since our government's never done that. It is amazing how many of them rely on Medicaid. They have no options. They have exhausted their options.

So, if you have nothing to pass on, we get locked into a cycle of poverty that just continues. This compensation would help in many ways. We are especially in favor of extending healthcare coverage because we think that is more important even than the one-time payout. Imagine if you have multiple members of one family sick at the same time and it happens all the time with us, this becomes an enormous financial burden.

It has been a financial burden to families, to communities, and to our State, quite honestly.

Ms. ROSS. Okay. Thank you very much.

Does anybody else want to address this issue from the perspective of either their tribe or their area, the ongoing economic strive caused by the health effects?

If not, Mr. Chair, I yield back.

Mr. COHEN. Thank you, Ms. Ross.

Is there anybody on the Republican side seeking time? If not, Mr. Hank Johnson, is recognized for 5 minutes.

Mr. JOHNSON of Georgia. Thank you, Mr. Chair, and thank you for holding this very important hearing. The birth of this Nation began with the ideal that all people were endowed with certain inalienable rights, those being life, liberty, and the pursuit of happiness, but since then we have fallen short of this promise more times than I care to admit.

Some of us, including indigenous people, were not considered to be people at all. Similarly, many people who live or lived in areas adversely impacted by our country's testing of nuclear weapons have been treated less than humanely and have suffered great sickness and death due to their unknowing exposure to radiation caused by the testing of nuclear weapons by our government.

Nuclear weapons have been an important component of U.S. national security ever since they were developed back during the World War II. Members of certain areas, residents of certain areas have borne the brunt of the U.S. reliance on nuclear weapons because those nuclear weapons had to be tested and they were in the areas where the radiation impacted their lives, the covered areas, if you will.

So, our capacity as Americans to hold ourselves accountable and reflect is what allows us to make progress and the Radiation Exposure Compensation Act was a step towards accountability.

It was an acknowledgement that we, as a country, have fallen short and we took actions to help those who have been harmed,

those who were impacted adversely, no-fault of their own and unwittingly and unknowingly to nuclear fallout. Radiation has hurt, sickened, and killed them.

Ms. Adams, as far as Downwinders are concerned under the original RECA legislation, are there any people in your community who were left out, and if so, why as being eligible for compensation under RECA.

Ms. ADAMS. Thank you very much for the question. I can try to give an overview of some of the communities that have been left out who would fall under the Downwinder category. So, first, there are counties as Ms. Bishop said earlier in Arizona and Nevada that are very close to the test site that are not currently included. Then other studies have shown since RECA was created, notably by the—started by the National Cancer Institute that showed that exposure levels in counties far beyond the test site in States not just those closest to the test site, but as far as places like Idaho and Montana received as high or even higher levels of radiation exposure.

So, there have been proposals as well to include those kinds of areas that were not originally recognized to have received that kind of fallout. Some of the other communities that have been mentioned in terms of Downwinder eligibility areas include Guam, which has been noted to be exposed from radiation from the Pacific—testing on Pacific Islands and, of course, as Ms. Cordova has stated in New Mexico, which they have said has been exposed both in the Trinity test and from testing at the Nevada test site. Go ahead.

Mr. JOHNSON of Georgia. Excuse me for interrupting. How many people would be covered if the coverage area were expanded?

Ms. ADAMS. I don't have that information offhand. That is a hard number to pinpoint. I will say all of those are separate proposals and they would all need to be addressed to figure out just what the different populations would be, but I don't have that information on hand. I can try to follow-up though and get that information to your office.

Mr. JOHNSON of Georgia. Would you say it would be 10,000 or less than 10,000?

Ms. ADAMS. It is very hard to pinpoint—so far the number of Downwinders who have applied is around 25,000 in the States that are there, but it would be—I am sorry I can't provide a more precise number, but it would be very hard to pinpoint exactly.

Mr. COHEN. Thank you, Mr. Johnson.

Mr. JOHNSON of Georgia. Okay. I heard a figure, Mr. Chair, if I could. I heard the figure $2.5 billion in claims have been paid out thus far to 37,000 claimants, $2.5 billion.

The cost of maintaining our nuclear weapons over the next 10 years will be $494 billion, almost $50 billion a year. So, $50 billion a year to take care of our nuclear weapons and over the time that this Act has been in place, we have spent $2.5 billion to compensate folks who have been adversely impacted by radiation.

That is just a pittance, and it is pathetic that our values are more towards protecting and taking care of our weapons than we are with taking care of the people who were adversely impacted by the testing of those weapons.

With that, I will yield back. Thank you, Mr. Chair.

Mr. COHEN. You are welcome, Mr. Johnson.

Ms. Fischbach, I owe you an apology. I didn't realize you were there and if I would have, I would have recognized you then, but there is a legal term, nunc pro tunc. So, now for them. You are recognized for 5 minutes.

Ms. FISCHBACH. Well, and Mr. Chair, thank you. If you hadn't pointed it out, I wouldn't have even realized you skipped me. I don't have any questions at this time, so I yield back. Thank you.

Mr. COHEN. Well, beat that one. Thank you. Who is next? I believe Ms. Sheila Jackson Lee, are you here?

Ms. JACKSON LEE. I am.

Mr. COHEN. Ms. Jackson Lee is recognized for 5 minutes.

Ms. JACKSON LEE. Thank you so very much, Mr. Chair. Let me thank all the Witnesses as well that have been here and let me begin point-blank as I listen to Mr. Johnson's question, Mr. Johnson from Louisiana, I am glad that he had the annunciation of the various individuals that were eligible for compensation, and it seems to be rather narrow.

President Nez, if I am pronouncing your name correctly, tell me what it means in your community to have eligibility limited to on-site participants, Downwinders in certain designated areas in certain years, uranium miners and millers, and then opportunities for compensation from the Department of Labor, but what does it mean to your community? What do we need to do in terms of marginalizing the RECA response?

Mr. NEZ. Thank you, Chair, and thank you, Representative Lee, and Committee Members. That is an excellent question. Our recommendations for updating RECA that I mentioned during the onset in my initial testimony indicates that there needs to be some changes.

Here on the Navajo Nation, we don't have the best—well, I guess, in any rural community throughout the United States do not have the best internet connection and also here on the Navajo Nation, we don't have street address like others have throughout the country. People get their mail from the P.O. boxes and sometimes multigenerational people utilize one box.

So, it is very difficult to have our Navajo uranium workers or Downwinders, those that are wanting compensation to apply for this just compensation, this fair compensation. So those are the reasons why we are asking for some changes to the law to update it. I wanted to go real quick—

Ms. JACKSON LEE. If you would, Mr. Nez, I have other questions. Can you hear me?

Mr. NEZ. Oh, I am sorry. Go ahead.

Ms. JACKSON LEE. If you would summarize, I would appreciate it. I want to hear your answer.

Mr. NEZ. Right. Right. Here on the Navajo Nation, equivalent to the size of West Virginia, 27,000 square miles we only have a little bit over 10 healthcare facilities. A lot of those healthcare facilities do not have specialization for cancer treatment.

Just as Ms. Cordova said, they have to go to Albuquerque, they have to go to Phoenix, and that takes a lot, wear and tear on a ve-

hicle, also getting gas, and spending time to get away from their families. Sometimes they have to get admitted.

Ms. JACKSON LEE. Thank you.

Mr. NEZ. We have to deal with that in rural communities throughout the country. Thank you.

Ms. JACKSON LEE. Well, let me—thank you, let me thank you, and I thank your Congressman Stanton for this focus on the Downwinders. Let me quickly go to Ms. Cordova and Ms. Adams and anyone else that wants to provide in this period of time that I have, so if you all will just follow back-to-back.

I happen to be supportive of a review of RECA for the expanded Downwinders in Arizona and New Mexico. It reaffirms that there should be compensation, reparations, if you will, to restore peoples' lives who have been ignored, violated, and seen death in their life.

So, I would ask your response directly as of what would be an improvement in RECA. Ms. Cordova, sorry for the loss of your dad and experience that you have had. All of us know how our moms and dads are no matter what age we happen to be and so if you give us what an expansion or improvement would be like in your mind and the same thing with Ms. Adams, if you would give a sense of the improvement, and Ms. Bishop.

Ms. Cordova, would you? Thank you.

Ms. CORDOVA. Thank you. Thank you, Representative Lee. The improvements that we think need to be made without a doubt for the New Mexico Downwinders, specifically, is that we have to have a qualification period that is meaningful.

It has to begin in 1945 and extend through the summer of 1962 because we were downwind of the Trinity site in 1945 and then we were continuously exposed to radiation from the Nevada test site through the summer of 1962. That qualification period has to be substantial and significant, or it will not, it will not benefit people here.

We have to prove that we lived here during that time frame and 75 years later it is almost an impossibility. Consideration must be given to that. For 31 years, we have been left out. Consideration must be given to that.

The second thing is, we need to increase the one-time payment. Fifty thousand dollars is woefully inadequate. Doesn't even cover one year of co-payments, the cost of treatment, gas, lodging, food, time away from your family, *et cetera*.

Last, we need to consider adding healthcare coverage. The healthcare coverage is the most important component to this. If people are using Medicaid, it makes no sense. We should put them on a program like the EEOICPA program that was referenced before and give Downwinders and uranium miners healthcare coverage just equal. Equal. Thank you.

Mr. COHEN. Thank you, Ms. Cordova. Thank you, Congresswoman Jackson Lee.

Next, we recognize Congressman Burgess Owens of Utah.

Mr. OWENS. Thank you. Can you see me okay? Thank you, Chair Cohen and Ranking Member Johnson for holding this hearing today.

I also want to thank President Nez of the Navajo Nation and other Witnesses for your participation.

Radiation exposure caused by the United States atomic weapon development programs is a very important issue here in Utah. There are thousands of so-called Downwinders who lives are lost or changed forever. Several years ago, J. Willard Marriott Library at the University of Utah, created a Downwinders of Utah archive where the histories of hundreds of Utahns who were affected by our Government's atomic and radiation testing. Their opinion is one of those Downwinders who was born in Cedar City, Utah, 1953. The same year the Dirty Harry bomb was tested at a nearby Nevada test site. Listen to Sarah's description of growing up in Cedar City.

We knew we could die any day from about 5th grade. Our parent teacher's daughter Cybil Johnson died of leukemia. A steady stream of deaths followed. My grandfather, Paul Hoppen (ph), had been out herding cattle near Enterprise, Utah, when Dirty Harry went off. He got leukemia and died. My aunt, Mary Nelson, died of breast cancer. My cousin, Jeff Hoppen (ph), had a bone marrow transplant from his brother and later died. A high school classmate died from a brain tumor.

My cousin got breast cancer and two other cousins' daughters. They have survived so far thanks to better treatments. My brother got an upper intestinal cancer which killed him. My mother had continuing health problems, including downward problems which may have been caused by the fallout. Countless neighbors and friends have died from cancer, end quote.

They are responsibility for Sarah and every single Downwinder victim of radiation exposure and their families to reauthorize RECA, the Radiation Exposure Compensation Act.

I hope we can work together in a bipartisan, fair, responsible matter to right the wrongs that destroyed so many lives and families in Utah and the western States. These problems caused by the Federal Government and one that we must work to solve. We cannot walk away from RECA.

I have a question for President Nez. Other than the Navajo Nation is located in southern Utah, each of the outstanding and possibly still unresolved cases of radiation exposure of the Navajo people in the Utah, specifically [inaudible]?

Mr. NEZ. I am sorry, Representative Owens, Chair, I didn't catch that last part of your question. My apologies.

Mr. OWENS. Oh, no problem. Part of the Navajo Nation is located in southern Utah?

Mr. NEZ. Yes.

Mr. OWENS. Can you speak to outstanding causes of radiation exposure to Navajo people, Utah specifically?

Mr. NEZ. Right. We have many uranium mines there in the southern part of Utah within the Navajo Nation that have been cleaned, cleaned up. Just for one uranium mine to be cleaned up, it is into the tens of millions of dollars.

If there are 500 plus uranium mines, do the math. We are talking about into the billions. So, a lot of the folks worked in these mines in that area. You got Mexican Hat there, Halchita, who has a uranium storage site. You got one uranium mine in Gouldings in Monument Valley that just got cleaned up.

So, the question about the contributions that Native Americans/Navajos have had to this country in World War II, I really, Representative Owens, I have to remind our folks that the Navajo Nation in two ways contributed to helping win the war.

One is the uranium that was extracted from our lands and today we are still getting that cleaned up. The compensation needing to happen to those folks living near and around those sites.

The other is our language. We all know about the Navajo cotalkers. Native Americans, high percentage of any group to serve in the military. So, what we are seeing today, too, as well is to remind our lawmakers, our friends in Washington, DC, about that treaty relationship and that trust obligation.

Thank you, Representative Owens and Chair.

Mr. OWENS. Thank you.

Ms. Cordova, if Congress extends RECA by 20 years, do you anticipate that would be sufficient time to identify and compensate the remaining victims?

Ms. CORDOVA. Thank you very much for the question, Representative Burgess. Yes, I absolutely do think that that would be an adequate time. We have already been serving our people. We are already documenting who they are and where they are, and we have worked extensively in communities, we have received grant money that we utilized towards identifying Downwinders in our communities and we will work very hard to make sure that 20 years is adequate time.

I want to say to you that our hearts go out to the people of Utah who were actually targeted as part of the testing. The winds blew in that direction and took that fallout to Utah.

Thank you, sir, for your interest in this issue.

Mr. OWENS. Thank you. Chair, I am having trouble seeing the clock. How much time do I have? Do I have time for one more question?

Mr. COHEN. Well, we are in overtime, but I will give you overtime.

Mr. OWENS. Okay. I relate to that one. Thank you so much.

This is for Mr. Szymendera. If Congress fails to reauthorize RECA, are there victims of the radiation exposure who will not be compensated?

Mr. SZYMENDERA. Most likely, yes. The deadline will be in 2022 and that will be it. Anyone who does not have their application in by that date will have no recourse for compensation.

Mr. OWENS. Thank you.

I yield back my time. Thank you so much.

Mr. COHEN. Thank you, Representative Owens. Thank you to all our Witnesses. We have had a great panel and we have learned a lot about this issue and the importance it is to the people who served America and America has not been serving. Senator Luján and then earlier Senator Crapo and Senator Hatch and Congressman Stanton have all been stalwart leaders, and I thank them for their efforts here.

I want to thank all our Witnesses appearing today.

Without objection, all Members will have 5 legislative days to submit additional written questions for the Witnesses or additional materials for the records.

With that, the hearing is hereby closed. Adjourned.
[Whereupon, at 3:37 p.m., the Subcommittee was adjourned.]

APPENDIX

A NON-PROFIT CORPORATION
P.O. BOX 315339 Tamuning, Guam 96931
Telephone: (671) 688-7277

U.S. House Judiciary Oversight
Subcommittee: Constitution, Civil Rights, and Civil Liberties
March 24, 2021
Testimony by: Mr. Robert N. Celestial

Ref: Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act (RECA)

Greetings and Thank you Chairman Steve Cohen, Ranking Member Rep. Mike Johnson and honorable committee members. My name is Robert N. Celestial Sgt., U.S. Army Retired (DAV) Enewetak Cleanup Veteran. I am from the Island of Guam U.S.A. and I especially want to thank Senator Mike Crapo (ID), Senator Ben Ray Lujan (NM) and all House staff members. The people of Guam were exposed to nuclear fallout from the Pacific Nuclear Testing in the Marshall Islands from 1946 to 1962 when 66 Nuclear and Hydrogen bombs were detonated. It was without their knowledge and consent that throughout those years they were exposed to ionizing radiation such as Iodine 131, Strontium 90, and Cesium 137.

This information was kept secret until 1994 when the Advisory Committee for the Human Radiation Experiments information was published, and declassified documents were stored in the Department of Energy HREX website.

On July 10, 2000, Congress passed Public Law 106-245 Radiation Exposure Compensation Act Amendments (RECA) and In September 2002, in response to a congressional mandate (PL 107-206), the Health Resources and Services Administration (HRSA) asked the National Research of Council's Board on Radiation Effects Research to convene a committee. Under congressional mandate, HRSA charged the committee to consider the issues and make recommendations, regarding three mandates one of which being Item C ***"whether other groups of people or additional geographic areas should be***

covered under the Radiation Exposure Compensation Act (RECA) Program (2005 National Research Council).”

In 2004, I was invited by Dr. Isaf Al Nabulsi Senior Director for the Board of Radiation Effects Research (BRER) Committee to present oral and written testimony here in Washington D.C. at the National Academy of Science Building. I presented evidence and oral testimony before Dr. Preston, Dr. Evan Douple and other scientists on the BRER committee. I also included sworn statements from Navy Lt. Bert Schreiber who was the Chemical, Biological, Radiological Officer on Guam in 1952. He testified that “the Geiger counters were off the scale” in November 1952. On October 31, 1952 the first thermonuclear device, with code name Mike, was detonated in the Marshall Islands. It had a total yield of 10.4 Megatons. On November 3, 1952 radiation was detected on Guam. In 2005, the National Research Council published their final report *Assessment of the Scientific Information for the Radiation Exposure Screening and Education Program.* The reported stated “the committee initiated an independent assessment of the radiological consequences to the weapons test in the Pacific to people living on Guam (National Research Council of the National Academies, pg. 200).” Further, the National Research Council of the National Academies report concluded (2005)

> “***As a result of its analysis, the committee concludes that Guam did receive measurable fallout from atmospheric testing of nuclear weapons in the Pacific. Residents of Guam during that period should be eligible for compensation under RECA in a way similar to that of persons considered to be downwinder (pg. 200).”***

Chairman Cohen and Committee members, I ask not only for your support but for your approval for the expansion of eligibility under the Radiation Exposure Compensation Act so that not only the people of Guam be included in RECA as downwinders and everyone that has been affected by their exposure to radiation and uranium mining. We are greatly thankful and may God bless.

Robert N. Celestial
Pacific Association for Radiation Survivors (PARS), President
P.O. BOX 315339
Tamuning, Guam 96931
Phone: 671-688-7277 (PARS)

ANWAG
Alliance of Nuclear Worker Advocacy Groups

March 22, 2021

The Honorable Steve Cohen,
Chair
House Committee on the Judiciary
Subcommittee on the Constitution, Civil Rights and Civil Liberties
2138 Rayburn House Office Building
Washington, DC 20515

Subject: Radiation Exposure Compensation Act Amendments of 2021

Dear Congressman Cohen,

The Alliance of Nuclear Worker Advocacy Groups (ANWAG) respectfully submits this statement in support of passing the Radiation Exposure Compensation Amendment Act of 2021 (RECA) for your consideration. ANWAG is a grassroots organization who advocate for the Department of Energy's nuclear weapons workers and uranium mining industry workers who developed illnesses which arose from their exposure to radiation and other toxic substances.

In 1990, RECA pioneered the path for the United States government to accept responsibility to its citizens who were harmed without their knowledge and consent. The statute provides medical screening and financial compensation to individuals who developed certain diseases that arose from their exposure to radiation through their work in the uranium mining industry and from living downwind from the above ground atomic tests. RECA is used as the base legislation to compensate Department of Energy (DOE) nuclear weapons workers under the Energy Employees Occupational Illness Compensation Program Act of 2000, as amended.

One of the most important reforms contained in the amendments is to extend eligibility for uranium employees who worked after December 31, 1971.

While DOE halted the purchase of domestic uranium for its nuclear weapons in 1971, the uranium workers still toiled in the dangerous environment by providing the uranium to be used in the US nuclear power plants. The last uranium mine, located New Mexico, closed in 1989.

The dangers of exposure did not magically disappear on January 1, 1972. The Federal Mine Safety and Health Act was not enacted until 1977. The Department of Labor's Mine Safety and Health Administration took on the responsibility of inspecting the uranium mines. However, as

reported in 2016 by the *In These Times* [1]magazine, were inadequate and did not protect the miners.

The post-71 uranium workers experienced similar working conditions and subsequent adverse health effects as the workers who provided the uranium for the Cold War effort do. It is important to note that the post-71 miners' contribution to the power grid is as valuable to the United States government and citizens as those who mined to help defend the United States during the Cold War.

ANWAG supports the other reforms included in the legislation including expanding the coverage for downwinders. We also respectfully request that this reform legislation strike "(other than chronic lymphocytic leukemia), (CLL), from RECA Section 4(b)(2). The current science now accepts that CLL is a radiogenic cancer. The National Institute for Occupational Safety and Health has developed methodology to reconstruct dose under EEOICPA[2]. However, since RECA still excludes CLL, DOE nuclear weapons workers are not eligible to be included in a class designated as a Special Exposure Cohort if they have that disease, thus denying those claimants the medical and financial benefits afforded to others in the class.

We thank you for this opportunity to submit our comments for the record. ANWAG hopes that the Committee will recommend further debate in the House and that these workers and those individuals who were in the path of the radioactive cloud from the atomic tests will receive their just compensation.

Sincerely,

Terrie Barrie

Terrie Barrie
For ANWAG members
175 Lewis Lane
Craig, CO 81625
970-824-2260
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ANWAG News (eecap.org)

[1] Uranium Mine and Mill Workers are Dying, and Nobody Will Take Responsibility - In These Times
[2] CLL FRN.pdf (cdc.gov)

Cold War Patriots Statement in support of expanded RECA eligibility and program extension

Cold War Patriots (CWP), is a community resource organization that is the nation's strongest and most sustained voice advocating for nuclear weapons and uranium worker benefits and has been fighting for our members' rights for over a decade. We are urging this Congress and the Biden Administration to enact urgently needed amendments to the Radiation Exposure Compensation Act (RECA), which expires in 2022.

These new amendments to expand and extend RECA are an opportunity for our nation to substantially address the unmet needs of thousands of Americans suffering from radiation-related illnesses. By neglecting to act now, the Congress and the administration will leave thousands of sick and dying workers and their families at risk.

Over the years Cold War Patriots has held hundreds of town hall and other community meetings nationwide to successfully connect sick workers and their families to the benefits enacted by Federal law to address their radiation and national security work-related illnesses. Yet we have also directly seen the ongoing suffering of thousands of others; "Post 71" uranium miners and workers stricken with debilitating or fatal illnesses, unsuspecting "downwinders" affected by the radioactive fallout from one hundred above ground tests conducted at the Nevada Test Site, as well as those downwind from New Mexico's Trinity site and the Pacific Proving Grounds in the Marshall Islands.

Cold War Patriots and its founding organization, Professional Case Management, wholeheartedly support passage of amendments for the expansion of RECA for many thousands of our stricken Americans, to receive the justice, compassionate medical care, and compensation they deserve.

About Cold War Patriots (CWP)
Cold War Patriots (CWP) is a division of Professional Case Management (PCM), which provides specialized in-home healthcare services to nuclear weapons and uranium workers. CWP is a community resource and advocacy organization and the nation's strongest and most sustained voice to advocate for worker benefits. CWP helps nuclear weapons and uranium workers get the recognition, compensation and care they have earned. CWP, the first national organization to connect workers with benefits, does this work for free on behalf of its members. Visit www.coldwarpatriots.org or call 888-903-8989 for more information.

# # #

March, 23, 2021

To the U.S. House of Representatives Judiciary Committee/ Constitution, Civil Rights, and Civil Liberties

Dear Committee Members,

I am a lifelong resident of Salt Lake City. I am also a downwinder, a long-time advocate and a journalist and playwright who has written extensively about the effects of radioactive fallout. Like so many Utahns who lived under the clouds of fallout during the years of above ground nuclear testing, I developed cancer. I have counted 54 people in my childhood neighborhood in Salt Lake City– including 4 members of my own family – who have developed various cancers or autoimmune diseases. I have been radiated, sliced and scooped out. Luckily, I am a survivor, despite losing my thyroid to cancer in my early 20s and later my ability to have a child. My older sister died in her 40s, leaving three children behind. Another sister is battling a rare cancer and my youngest sister has autoimmune disorders. The genetic damage they suffered is now surfacing in their children – a 32- year-old niece with breast cancer, two other nieces with debilitating immune disorders.

Government studies have shown for years how far the winds spread fallout beyond the red rocks of Southern Utah. The attached map, based on government data, traces where fallout went. Yet, only 10 counties in Southern Utah are currently covered under the Radiation Exposure Compensation Act. People like me, my sisters, my neighbors and thousands of other northern Utahns as well as downwinders in Idaho, Montana, New Mexico, and Colorado are not included.

We are still living with the effects of fallout. We are still losing neighbors, friends and family members. People are still getting sick, other health complications are surfacing, our cancers are returning, our immune systems compromised. We are still struggling to pay medical bills, still coping with the devastating loss of loved ones. Last month, we lost Preston J. Truman, a man who fought for decades to expand compensation, to his second bout of cancer. Time for justice is literally running out, as compensation itself is set to expire in July of 2022.

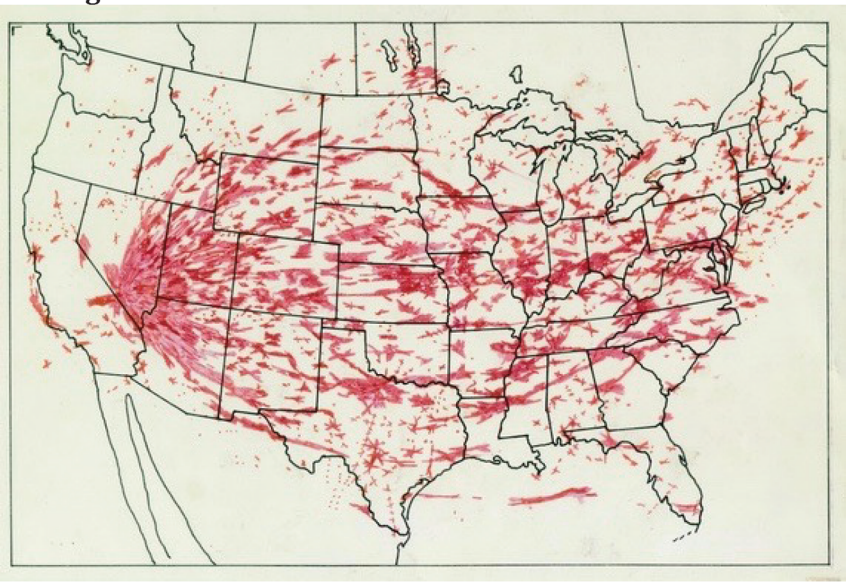
There is no question that four decades of nuclear weapons testing had devastating health consequences for Americans. Our government knew from the beginning that those tests harmed people and it lied to us. We were the expendable casualties of the Cold War. Congress now has the opportunity – and responsibility -- to take care of the unwitting veterans of a war we never enlisted in. Downwinders have waited too long for justice. Too many have already died. I urge you to support the expansion of RECA to include more downwinders in western states who were the collateral damage of radioactive fallout.

I invite you to listen to the brief remarks I made at the conference, "Still Here: 75 Years of Shared Nuclear Legacy."
https://youtu.be/TlgV6mpHXDw
They provide background which I believe is important to share with you. Thank you.

Sincerely,

Mary Dickson
[redacted]

Areas Crossed by Three or More Nuclear Clouds from Atmospheric Testing 1951-1962.



From **Under the Cloud: The Decades of Nuclear Testing** by Richard R. Miller, based on data from the Atomic Energy Commission, Nuclear Defense Agency and the U.S. Weather Service.

SENATE COMMITTEE ON INDIAN AFFAIRS

Wilfred Herrera
Governor
Pueblo of Laguna

Presented by Ryan Riley, Pueblo Council Member

Testimony
Oversight Field Hearing on "America's Nuclear Past: Examining the Effects of Radiation in Indian Country"

October 7, 2019

Good morning. The Pueblo of Laguna extends it gratitude to Vice Chairman Udall for chairing this hearing, to Representatives Lujan and Haaland for your interest and attendance, to Chairman Hoeven and the Committee, and to the Committee staff who made the journey here. The Pueblo deeply appreciates the opportunity to testify on the Effects of Radiation in Indian Country, a subject of great, longstanding, and ongoing concern to the Pueblo of Laguna.

This statement is submitted by the Pueblo of Laguna ("Pueblo" or "Laguna") to apprise the Committee of the impact of radiation exposure on the Pueblo's tribal lands. The needs of Pueblo members and families afflicted by mine-related diseases must be addressed. Further, the Pueblo's lands, contaminated by past uranium mining, must be remediated as required under federal statute.

The Pueblo

The Pueblo of Laguna is a federally recognized Indian tribe located 45 miles west of Albuquerque, New Mexico. The Pueblo has approximately 8,200 members who are affiliated with six different villages. The Pueblo's lands consist of more than a half million acres in Cibola, Sandoval, and Bernalillo counties. Those lands contain the site of what was once the world's largest open pit uranium mine: the Jackpile-Paguate Mine.

Summary

In an effort to develop nuclear capability for military purposes at the end of World War II and throughout the Cold War, the United States promoted and encouraged uranium exploration and mining. The Pueblo of Laguna was a very early focus given its location in the Grants Mineral Belt, which stretches from the Pueblo to east of Gallup and has especially rich uranium deposits. During this period, the United States exercised extensive control over the domestic uranium industry, including exploration, production, processing, and marketing. For example, the United States set the price for uranium and established itself as the sole purchaser of uranium ore until the late 1960s. The rapid development of uranium mining in the Southwest during the Cold War left a long legacy

of contamination. That price, paid for our national defense, was and is borne significantly by American Indian tribes.

Beginning in 1952, Anaconda Mining Company entered into BIA-approved leases to mine uranium on the Laguna Reservation. Under the federal government's oversight, Anaconda mined 24 million tons of uranium-bearing ore from Laguna tribal lands over a 30-year span, during a time when environmental controls were unsophisticated and undeveloped.

Mining ended on the Pueblo's lands in 1982, and the mining company left. Despite Anaconda's resistance, the Bureau of Indian Affairs required reclamation of the mine after its closure. But, lacking federal standards that would adequately address a uranium mine cleanup, BIA and BLM developed a reclamation plan intended primarily to restore the site back to its natural state, or as close to it as practicable. That limited reclamation was completed in 1995, but the Pueblo's members are still suffering profound health effects from past exposure and ongoing contamination.

To understand the horrible and lasting effects radiation and other uranium-related contamination have had for decades, and continue to have, on the Pueblo and its members, it is important to understand the history of the mine. That history spans almost seventy years, from the early 1950s when mining began through the mine's closure in 1982, followed by reclamation, post-reclamation, and finally the CERCLA remediation period beginning under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") in 2013 and still in its early stages.

Mining at Laguna

Consistent with the United States' aggressive promotion of uranium mining, in May 1952, the Anaconda Mining Company (later Atlantic Richfield or ARCO) entered into a lease with the Pueblo, approved by the Secretary of the Interior, to mine uranium on 4,988 acres of Laguna land near the Village of Paguate. Additional BIA-approved leases were signed in 1963 and 1976 bringing the total to almost 8,000 acres. As a result, Anaconda operated what was then the world's largest open pit uranium mine at the Pueblo from 1953 until 1982. The vast majority of uranium produced on Indian land between 1950 and 1968 was purchased by the U.S. Atomic Energy Commission.

Anaconda utilized three open pit mines and nine underground mines at Laguna to produce 24 million tons of uranium-bearing ore. More than 400 million tons of earth had to be moved to obtain that ore. The pit located next to the Village of Paguate was the deepest at 625 feet. Mining conducted from the underground mines primarily began in the 1970's. The mine employed as many as 800 tribal members, the majority of the Laguna workforce.

Anaconda closed the mine on March 1, 1982, after the United States had the stockpile of uranium it needed for military purposes, international competition increased, and concerns about the nuclear power industry were growing.

The 1980s

Despite requirements in the mining leases and federal mining regulations, Anaconda resisted its responsibility to reclaim the mine after its closure, even threatening litigation. As a result, the site lay dormant for seven years before efforts to reclaim the mine began. More than 2,000 acres of land and several pits needed to be reclaimed. Some pits were filled with contaminated water that had seeped up over the years. During that time, stockpiled waste blew into surrounding areas, including the Paguate Village, located just 30 yards from the mine. In addition, rain water washed waste from the mine into surface water tributaries.

A draft environmental impact statement recommended reclaiming the mine because the site was a public health and safety hazard, noting that more serious hazards would develop if the site was not reclaimed.

Reclamation would eventually begin only after Anaconda, the United States, and the Pueblo reached an agreement in 1986, approved by the Secretary of Interior, by which the Pueblo would perform the limited reclamation work under a contract with Bureau of Indian Affairs ("BIA") funded by Anaconda (now Atlantic Richfield).

Reclamation

There were no standards for reclaiming a closed uranium mine in place at that time. CERCLA was in its infancy and was not even mentioned in the almost 1,000-page environmental impact statement prepared by BIA and BLM. Accordingly, the reclamation was conducted with BIA and BLM oversight according to a Record of Decision and Management Plan developed by BIA in cooperation with other federal agencies and according to regulations under which BIA and BLM controlled mining and reclamation on tribal lands. The limited reclamation work by the Pueblo's newly created tribal corporation, Laguna Construction Co., began in 1989 under a Public Law 638 contract between the Pueblo and the BIA.

As the Pueblo's trustee, the BIA is responsible for monitoring the site and its ongoing health and environmental impacts, and much remains to be done to mitigate the health and environmental impacts. Even then, nothing can erase the scar in the land, bring back the lives that have been lost, restore broken families, or heal the terminally ill.

EPA Designation of the Jackpile-Paguate Mine as a Superfund Site

EPA listed the Jackpile Site on the National Priority List ("NPL") by publication in the Federal Register on December 12, 2013, thereby making it a Superfund site. In summary, the results from EPA's preliminary site investigation showed that despite the surface reclamation of the mine areas, releases of hazardous materials from the site are still occurring and elevated levels of isotopic uranium have been detected in the surface waters of Rio Paguate, Paguate Reservoir, and downstream in the Rio San Jose. Surface water is used for fishing, livestock and wildlife consumption, and traditional/cultural activities.

The first major step in the CERCLA process, the Remedial Investigation/Feasibility Study, is underway to identify the options for the ultimate CERCLA cleanup. But forty years after the mine's closure is forty years too long.

Radiation Impacts at Laguna

Given this tortured history and the hazardous materials inherent in uranium mining, it was perhaps inevitable that members of the Pueblo would suffer from serious, all-too-often fatal, diseases.

The Village of Paguate, situated on the edge of the largest open pit in the mining area, was significantly affected by the mining activity. In the village, often-daily blasting caused old stone and mud houses to crack apart. Paguate residents recall dust that seemed to linger for hours after a blast before settling on their homes, crops, and clothes.

Little is yet understood about the stability of the radioactive pollutants and additional risks, including their migration into local groundwater supplies or into the atmosphere. Of the 24 million tons of ore mined from the Jackpile-Paguate Mine, approximately 23.7 million tons were left as waste, which is still dangerous because of radioactive elements it contains. In addition, water that flows through the site, including the Rio Moquino and the Rio Paguate, is contaminated from radioactive elements. Communities and families lost their water wells because of unsafe levels of radiation. Because water is so scarce in our arid part of New Mexico, the contamination of our water resources is particularly devastating to our people and to the entire region.

Miners and mill workers were largely unaware of the dangers of radiation exposure. Even as the understanding of those dangers grew, the Federal Government failed to protect uranium workers and their families from the hazards of exposure to radioactive materials. Radiation exposure can cause disease that may not show up for 10-40 years, and recall that Pueblo members worked actively on reclamation efforts as recently as 1995.

Former mining and reclamation employees, as well as Pueblo members living in Paguate and downwind or downstream continue to report growing numbers of mining- and cancer-related illnesses. Many Laguna members have died, and many more suffer from disease linked to radiation exposure attributed to uranium mining. The United States is indebted to those Pueblo members who sacrificed their health and even their lives to provide uranium for America's Cold War nuclear arsenal.

We asked the Southwest Research and Information Center ("SRIC"), an organization with significant expertise in uranium impacts, to help us prepare for this hearing by cataloging and analyzing available research on the health impacts of uranium, particularly on Laguna members. We hope to supplement this written testimony with a written report from the SRIC, but from the preliminary memorandum already provided to the Pueblo, at least four conclusions can be highlighted.

First, the health impacts on Pueblo members specifically are profound. For example, a startling 88 percent of 402 Pueblo home health patients who worked at the mine site after 1971 have been diagnosed with pulmonary fibrosis, a RECA-compensable disease. That

number alone is staggering and confirms what the Pueblo has known for decades: mining has had a devastating and ongoing effect on our community.

Second, at least three studies on uranium mine workers show that there is little to no difference in the health effects on workers who were in the industry before and after 1971, the current RECA cutoff and when safety conditions supposedly improved. For example, a recent 2017 study conducted in our area showed that 66 percent of mine workers employed after 1971 had abnormal chest X-rays indicative of pneumoconiosis, a RECA-listed lung disease. That is only two percent less that the pre-1971 workers in the same study. In a survey of some 1,300 post-1971 mine workers in our region only a decade ago, more than 70 percent reported "uranium-related medical conditions" as defined by federal agencies, but only nine percent of those illnesses would have been compensable under RECA because of the restrictive list of covered conditions. RECA must be amended, not only with respect to the time period, but also with respect to the scope of conditions covered.

Third, the focus on mine workers is too narrow. The same regional survey found that 40 percent of women living with mine workers reported a wide range of adverse effects on their reproductive health, including miscarriages, stillbirths and children with birth defects, primarily because they were the ones who washed the contaminated work clothes worn by mine workers. And the risks of exposure to non-mine workers are ongoing. Seventy-two percent of Paguate homes tested over a three-month period in 2011 had excessive radon levels, with a cancer risk equivalent to smoking between a pack and two packs of cigarettes a day, and often more.

Fourth, more research is nevertheless necessary. No comprehensive and focused study has been done on the health effects at the Pueblo. At a listening session in Paguate last month conducted by the University of New Mexico METALS Superfund Research Center, Village residents expressed a wide range of concerns about chronic health problems. Primary concerns included lung cancer and other cancers; respiratory diseases, asthma, and other breathing problems; potential health effects of ingesting crops grown in contaminated soils or meat from livestock and game exposed to mine wastes; and hypertension and cardiovascular disease. Pueblo members stand ready to volunteer for community-based health studies and medical screening programs, and to implement interventions to lessen the effects of exposure. There was strong demand for programs that include the generations that have followed the uranium workers of the 1950s through the 1980s.

In short, the health effects and environmental dangers are real, they are ongoing and multigenerational, and they are not confined to mine workers. We at the Pueblo have known this for decades. If the United States needs still more data to understand and believe the endemic health and environmental damage its nuclear program has unleashed, then please fund the research.

Radiation Exposure Compensation Act (RECA)

The Pueblo has worked with the New Mexico Congressional delegation to amend the Radiation Exposure Compensation Act to cover former uranium workers beyond the

1971 cutoff period. Again, the Jackpile-Paguate Mine did not close until 1982, ten years after the cutoff date under RECA, and many Pueblo members worked on the reclamation project, which continued until 1995. As shown above, post-1971 mine workers suffer the same health effects at virtually the same rates as pre-1971 workers. They should be afforded the same benefits under RECA. The Pueblo therefore is grateful that S.947, the Radiation Exposure Compensation Act Amendments of 2019, would extend coverage through 1990.

While the Pueblo strongly supports the legislation, it should also be apparent from this testimony that it does not go far enough. What of the ill Pueblo members who worked on the reclamation project, which continued until 1995? What of the Pueblo women and children in Paguate who have died or are ill because they lived within a stone's throw of the largest uranium mine pit in the world? What of the Pueblo members of all ages and genders who have been exposed through other pathways? Justice does not end with the current RECA amendments.

Conclusion

The Pueblo deeply appreciates the Committee's attention to this issue and the opportunity to testify, and hopes that finally real progress can be made. Sadly, not a whole lot has changed since, for example, our testimony in support of amendments to the Surface Mining Control and Reclamation Act seven years ago. The Pueblo is encouraged by the preliminary steps that have been taken toward remediation of the Jackpile-Paguate uranium mine under CERCLA and appreciates the cooperation of its federal trustee in facilitating the CERCLA process. The Pueblo is hopeful that RECA will be expanded, but much more remains to be done, and it must be done.

Thank you for allowing the Pueblo to testify before this Committee. If you have any questions, please do not hesitate to contact me.

My name is Linda Evers and I am 59 years old, my birthday is May 25, 1958. I began my work in uranium in 1976, after I graduated from high school at 18 years old, and my last year was in 1982. I live in Grants, New Mexico in the middle of what is considered the Grants Mineral Belt.

I started on the labor gang on the surface in the mill with the Kerr McGee Corporation. This job is exactly as it sounds, we worked all over the mill site in different areas, wherever extra help was needed, but mostly, it entailed shoveling a lot of ore. However, there were other specific jobs that the labor gang performed such as checking the daily tailings pond levels. This required two of us to board a tiny, flat bottom boat and paddle to the center of the pond and record the level off a measuring device mounted in the middle of the tailings pond. Although it was mostly an uneventful chore, one windy day the boat was caught up in a gust of wind and dumped the two of us into the pond. We swam to shore and drove back to the foreman's office where he instructed us to shower off, in the cold water only locker room, and return to our job. There was no medical attention administered or any concern for radiation over exposure for us workers at all, the main worry seemed to be the loss of the boat.

During shut-down later that same summer, I was assigned to scrape the inside of the acid tanks as they build up a crusty layer of gunk on the inside during the process of making the acid. Acid was produced on-site as part of the leaching process to separate yellowcake from the ore. I was not provided any special equipment for this job, I just had my regular equipment of steel-toed boots, hard hat, safety glasses and leather gloves. I was instructed to scrape on the inside of the tank until it was smooth again. It was August, the black tank was in full sunlight, and there was one hole on each end of the tank to crawl in and out of. I had been working and sweating for about an hour when I crawled out to get some fresh air and stand up straight for a minute. I was

chewed out for not doing the job as directed, written up within an hour, and threatened with job loss if I couldn't do the work. The rest of the day I just stuck my head out of the hole at the end of the tank to breath fresh air so I wouldn't get fired. I had to do that job for a week before they changed out the workers, and a month later they decided that a new tank was needed anyway. I had to replace my work clothes after that job because they just rotted away.

Over the winter I was assigned to the yellowcake area to help with the cleaning. One job required a crane lift to remove yellowcake filters from the filter tank and clean them off into a holding tank. The operator I was working with didn't seem to get the clamps positioned properly and as I was guiding the filter as he ran the lift, the filter dropped and crushed my toes under the steel of my steel-toed boots. I was not taken to the doctor because the foreman did not want an "on the job accident" on his record. He cut my boot off, iced my foot, and after I clocked out then the foreman drove me into town to the hospital. The company paid for the hospital bill, but I had to clock in the next day and help the foreman with his paperwork, so we didn't have a "lost time accident" on the record either. I had 2 broken toes and one smashed toe.

Soon after that incident, I was assigned to the crusher department as a third-class operator. The crusher began the process of yellowcake production. I worked in the beginning of this process by running the raw ore through the primary jaw crusher. Ore from the mines first went through the primary jaw crusher where it was reduced to 4" or less in diameter, then on conveyor belts it was moved to the secondary impact crushers where it was reduced to less than one inch. Throughout the conveyor belt system there were several stations for workers to pick trash out of the ore and a giant magnet at the end that had to be dumped regularly. The ore then could be conveyed to the rod mill where water and chemicals were added to begin the process of leaching the yellowcake from the ore. This is a very dusty job, there was one small fan that most of the

time didn't work, and when it did, it pulled air in from the outside, basically, making a small, continual dust devil in the room. We were allowed one paper mask that was useless after an hour or so because it was plugged with dirt, so I used a bandana that wasn't much better.

In August of 1978 I informed my foreman that I was pregnant, and he sent me to human resources to find out what needed to be done. I filled out paperwork for time off in May when the baby was due and was told that I could continue working since there were no complications with the pregnancy. With the baby and me healthy, they expected me to do my assigned job until the baby came. My son was born with a birth defect that, according to the doctor that did the surgery to fix him, was caused by over exposure to radiation. When I questioned my primary doctor about that comment made by the surgeon, he explained that could not have possibly been the problem as the defect was a common one in a percentage of all pregnancies. It should be noted that my primary doctor was also the uranium company's doctor. I returned to work after 6 weeks and in the summer of 1981 informed the foreman again of my second pregnancy with the same results. My daughter was born with defects that could not be repaired with a simple surgery. She had to have 5 surgeries before she was 4 years old to build the hips she was born without. The professional medical people that were responsible for her surgeries and recovery convinced me that over exposure to radiation was the cause of her birth defect and I quit working in uranium that day.

Fast forward to 1993 when I was 35 years old. While living and working in Kansas City, Kansas, I dislocated my right thumb at work and went to a hand specialist in Olathe, Kansas because he was reported to be the best doctor with hands. He was reviewing the X-rays with me and discussing the options for repair when he asked me out of the blue when had I been over exposed to radiation. This question took me by surprise because I had not been in radiation since 1982.

He said that I had no joint to repair that the thumb joint had worn out until it was completely gone, there was no joint to relocate. Further research showed that my bones were deteriorated to a degree that was mostly seen only in elderly people. The surgeon had not seen that rate of deterioration in a person so young without some sort of cause. After months of testing the results showed that my bone deterioration was directly correlated to my over exposure to radiation while working in the uranium industry in New Mexico. The doctors also discovered that I had arthritis conditions, regular, osteoarthritis, and rheumatoid arthritis. I became disabled due to these and other illnesses and diseases at 35 years old.

As I age, many other issues have manifested. I have pulmonary fibrosis, many joints have had to be fused or replaced, while many more joints, such as my hips, are failing. I have severe obstructive sleep apnea, and I'm losing my eyesight and hearing at a rapid rate. I have cancerous growths removed every 2-3 years from my skin everywhere on my body, sometimes they need removed from inside my body as well. I have several different types of skin rashes that cause my skin to break open and bleed on a regular basis. The rashes form as numerous small blisters, itch and then break open, and finally, my skin turns hard and peels off in large chunks. This happens to my hands 4-5 times a year. The rashes on my body and legs differ from each other and are just as painful.

My story is only one of many horror stories from uranium workers around the country. I ask that you support the RECA Amendments, (Radiation Exposure Compensation Act), to help get justice for the Post '71 uranium workers that have been ignored for so many years. Support Senate Bill #197 and House Bill #2049.

Thank you,

Linda Evers

Linda Evers

TO WHOM IT MAY CONCERN:

My name is Larry J King. I was born and lived all my life in the Navajo community of Church Rock, NM, which is located a few miles northeast of Gallup, NM.

From October 3, 1975 to April 2, 1983, I worked for United Nuclear Corporation (UNC) as a surface laborer, underground mine surveyor and mill worker. I live about four miles SE of UNC, and about 1000-ft across from an abandoned mine once owned by UNC, then purchased by HRI and recently sold to the Laramide Mining Co. The Puerco Wash also abuts my grazing permitted area on the east and south side, with the abandoned mine on the west side. The biggest spill of radioactive waste from UNC in US history on July 16, 1979, happened in the Puerco Wash. Along with my two sisters and their families, we have been living all our lives sandwiched between poisons left behind from the past mining operations.

As a surface laborer (l yr.), I worked repairing and maintaining over 700 underground miner lamps, and I did janitorial work in the common area where underground workers changed from their street clothes to underground work attire and vice versa and showered. I swept and mopped the floors. As underground ore prober (1 yr.), I worked along with underground miners by flagging newly blasted ore piles based on ore grade. I took ore samples to surface laboratory for analysis. for As underground miner surveyor (4.5 yr.), I worked alongside with miners in surveying underground tunnel expansions made by miners, placed reference markers as guidance for miners towards ore bodies, and gathered all work information done by miners in previous 2 weeks, so payroll staff can calculate wages to the

miners. These jobs frequently required me to enter unventilated areas, huge domes with sounds of ceiling sluffing off to guesstimate ore volume pulled out by miners, and other numerous jobs that exposed me daily to diesel exhaust, ore dust clouds, contaminated mine water, to name a few. Finally, as a mill worker (1 yr.), I performed monthly monitors of the UNC Mill Tailings pond monitoring wells and took water samples. The UNC Mill unlined tailings ponds had created a contaminated plume beneath the ponds that required monitoring.

As a former underground and surface mine worker for UNC, I worry about my health daily. I am not and never have been a smoker, but in the past several years, I have developed breathing difficulties. My doctors cannot find anything specifically wrong with me, but they have alluded to asthma and high blood pressure. I will also mention that as a kid, I played on the big piles of ore and mine waste across the road from our home, unaware of the dangers.

On behalf of my community and the Post '71 workers, I beg the U.S. Congress to support the Post '71 uranium workers by reintroducing the RECA Amendments before Congress. It is past time to show these workers that their sacrifices for their home and country have not been forgotten. The RECA Amendments will provide compensation for workers like me that contributed to the Cold War effort with my health and life.

Thank you very much.

Larry J King

[redacted]

[redacted]

Format: Abstract

Radiat Res. 1997 May;147(5):579-84.

Unexpected rates of chromosomal instabilities and alterations of hormone levels in Namibian uranium miners.

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Abstract

A common problem in determining the health consequences of radiation exposure is factoring out other carcinogenic influences. The conditions in Namibia provide a test case for distinguishing the effects of long-term low-dose exposure to uranium from the other environmental factors because of good air quality and the lack of other industries with negative health effects. Present records indicate a much higher prevalence of cancer among male workers in the open-pit uranium mine in Namibia compared with the general population. The objective of the present study was to determine whether long-term exposure to low doses of uranium increases the risk of a biological radiation damage which would lead to malignant diseases and to derive a dose-response model for these miners. To investigate this risk, we measured uranium excretion in urine, neutrophil counts and the serum level of FSH, LH and testosterone and analyzed chromosome aberrations in whole blood cells using fluorescence in situ hybridization. A representative cohort of 75 non-smoking, HIV-negative miners was compared to a control group of 31 individuals with no occupational history in mining. A sixfold increase in uranium excretion among the miners compared to the controls was recorded ($P < 0.001$). Furthermore, we determined a significant reduction in testosterone levels ($P < 0.008$) and neutrophil count ($P < 0.004$) in miners compared to the unexposed controls. A threefold increase in chromosome aberrations in the miners compared to the nonexposed controls was recorded ($P < 0.0001$). Most remarkably, cells with multiple aberrations such as "rogue" cells were observed for the first time in miners; these cells had previously been found only after short-term high-dose radiation exposure, e.g. from the Hiroshima atomic bomb or the Chernobyl accident. We conclude that the miners exposed to uranium are at an increased risk to acquire various degrees of genetic damage, and that the damage may be associated with an increased risk for malignant transformation. As expected, the chronic radiation injury of the hematopoietic system resulted in low neutrophil counts. Also, low hormone levels probably reflect damage to the gonadal endocrine system.

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An Innovative Approach to Enhancing Access to Medical Screening for Miners using a Mobile Clinic with Telemedicine Capability

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COMMENTARY

An Innovative Approach to Enhancing Access to Medical Screening for Miners using a Mobile Clinic with Telemedicine Capability

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Abstract: Inadequate access to medical care in underserved and geographically isolated rural communities may limit the delivery of quality screening care to miners. Use of mobile screening clinics, manned by a physician assistant or nurse practitioner, is one way to improve their access. Miners demonstrate a high level of satisfaction with services provided by the mobile screening clinic. The addition of telemedicine to mobile screening clinics allows miners to have access to university-based specialist care and provides an opportunity to specialists to tele-mentor other providers. Although inadequately studied, limited data suggest that miners accept telemedicine consultation. We expect that the innovative use of mobile screening clinics with telemedicine technology might allow efficient utilization of resources to meet the medical screening needs of a large number of miners in geographically remote locations in the United States.

Key words: Miners, screening, mobile clinic, spirometry, telemedicine.

About 250,000 employees worked in various mines in the United States in 2013 alone, of which coal miners were the largest group.[1] While pneumoconiosis, or dust-related lung disease, has always been a health problem among miners, its prevalence has recently increased.[2] The 2005 to 2009 data from the National Institute of Occupational Safety and Health (NIOSH) surveillance program reported a 7% prevalence of radiographic pneumoconiosis nationwide for coal miners with more than 25 years' tenure, nearly double that of the nadir 20 years ago (1995 to 1999).[2] The prevalence of progressive massive fibrosis was 1.1%, almost three times its nadir 20 years ago.[2] Given

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this increasing prevalence, miners need screening, early diagnosis, and treatment, as well as rehabilitation and compensation for their chronic respiratory and other diseases.

Miners in the United States constitute an underserved, isolated, and medically vulnerable rural population. This is particularly relevant in New Mexico, which has disproportionately high rates of inadequate health insurance and poverty and its rural hospitals serve large-sized remote geographic areas with long driving distances that further limit access to medical care.[3,4] Most parts of New Mexico are designated health professional shortage areas (HPSA) and health care underserved areas (HCUA), and face a shortage of specialists such as pulmonologists, with resulting problems in health care access and delivery. In addition, rural mining communities have a disproportionately high prevalence of chronic co-morbidities (such as cardiovascular disease and obesity[5,6]) and co-exposures (such as cigarette smoke[7]), which makes the care of chronic respiratory diseases in miners especially challenging.

In addition to traditional fixed screening clinics, mobile screening clinics are being increasingly used by the NIOSH to break the barrier of geographical access by reaching small mining communities in remote areas.[8] Accordingly, Miners' Colfax Medical Center (MCMC) at Raton, New Mexico, and the University of New Mexico at Albuquerque, New Mexico have jointly developed a unique mobile screening program with telemedicine capability. The mobile screening clinic travels to 20 sites in New Mexico, almost all rural, conducting three-day clinics in communities with high concentration of miners since 1989 (Figure 1). The screening sites were recently extended beyond

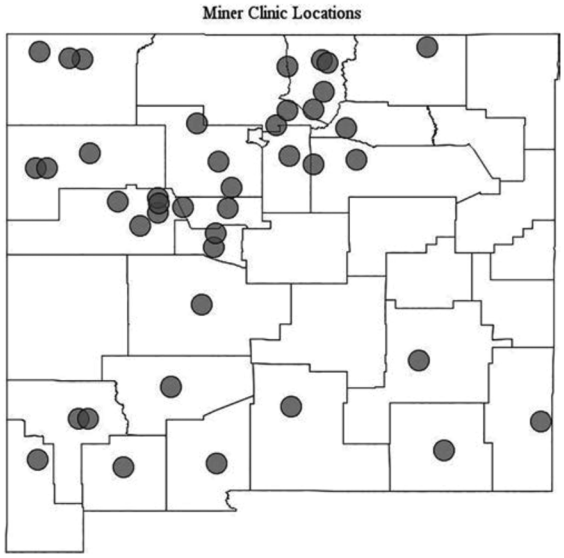

Figure 1. Locations for mobile screening clinics attended by miners in the state of New Mexico, 1989–2014.[a]

[a]Boundaries represent state and county borders.

New Mexico to Kemmerer, Wyoming, confirming the portability of this approach to other rural regions in the United States.

At these mobile screening clinics, miners are assessed for respiratory, hearing, and musculoskeletal disorders associated with mining-related exposures. Assessment also includes risk factors and common health conditions such as cardiovascular disease, obesity, cancer, diabetes mellitus, hypertension, and obstructive sleep apnea, and common exposures such as tobacco use, wood smoke, alcohol use, and illicit drug use. Although our project focuses on pulmonary diseases, we also screen for non-pulmonary chronic diseases for the following reasons. Non-malignant pulmonary diseases are a known risk factor for cardiovascular disease and lung cancer;[9–11] mining exposure is a risk factor for hypertension and hearing loss;[12] select mine workers and patients with lung diseases have a disproportionately high prevalence of metabolic syndrome;[5,13] and our mining communities specifically request programs that additionally target extra-pulmonary diseases.[14]

Pre-clinic Advertising

Prior advertising to announce the upcoming clinic is conducted in the target rural community through print media and radio, as well as by working with community leaders and mine safety officers. Patients are also able to self-refer for screening evaluations. Patients who were previously screened in the mobile screening clinic are also contacted by mail by the clinic coordinator for re-screening every three years to participate in the program. Clinic attendees report that their primary source of information about the upcoming clinic is through a relative or a friend in their community, suggesting that traditional routes of communication remain strong in rural communities (Table 1). Community newspapers and flyers are less helpful. It is currently not known whether cellular text messaging or social media advertising would be an effective way to inform rural communities about upcoming clinics, in addition to traditional modes of communication.

Clinic Structure

The mobile screening clinic is held in a specially outfitted trailer which is 53 feet long with a diesel generator to supply power (Photograph 1). The clinic consists of five separate areas, including a patient reception area, a dedicated digital chest x-ray unit, sound-proof audiometry booth, spirometry room, and an examination room equipped with monitors and viewing boxes to review digital and analytic chest radiographs respectively and a stationary bicycle to measure exercise desaturation (Photograph 2). The staffing model in the mobile screening clinic consists of a physician assistant or a nurse practitioner, a radiology/audiometry technician, and a medical assistant/nursing technician who is certified by the NIOSH for spirometry. In heavily attended clinics, a program manager also attends the clinic to coordinate flow of patients and provide benefits counseling. Use of phlebotomy for metabolic screening is currently being piloted.

Before the screening appointment, patients complete a comprehensive occupational and clinical history intake form. The intake form is currently mailed in paper format to

Table 1.

MAIN SOURCE OF INFORMATION ABOUT THE RURAL MOBILE SCREENING CLINIC, AS REPORTED BY THE CLINIC ATTENDEES

Source of Information	Percent
Friend/Relative	50%
Community Newspapers	30%
Community flyers	10%
Other	10%

Photo 1. The mobile screening clinic is run in a specially fitted trailer that is 53 feet long.

the patients prior to the clinic visit but electronic data capture through secure websites is currently being tested. The screening visit includes a vital sign assessment, prebronchodilator spirometry, audiometry, and a standard posterior-anterior chest radiograph. A complete history and physical examination is performed by a physician assistant or nurse practitioner who develops a treatment and care plan for the patient depending on the primary diagnosis. All patients are provided with comprehensive educational information on their disease with tips on self-management. If necessary, the patient is referred to their primary care provider for follow-up care. It takes approximately one hour for each patient to complete their screening visit. Coordination of follow-up care is done telephonically by a registered nurse case manager, physically located at Raton, N.M., with a follow-up call three months following the screening visit.

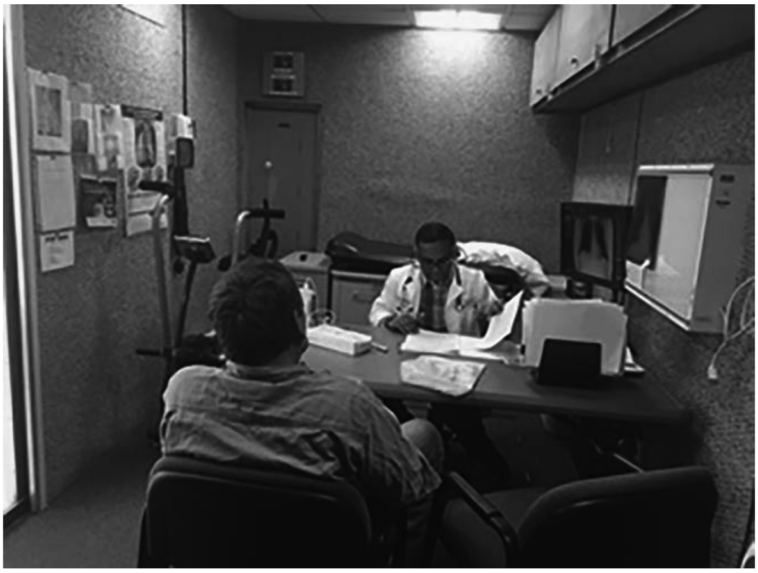

Photo 2. The examination room within the mobile screening clinic is equipped with an X-ray viewing box, computer screen, and a stationary exercise bicycle.

The mobile screening clinic has an advanced digital communication system for telemedicine, comprised of several machines that are networked together using a ground control satellite. This system has a portable satellite dish that is assembled each morning at the roof of the trailer and disassembled at the end of each day and brought back into the trailer. The digital chest radiographs are transferred from the Konica® Computerized Radiology (CR) machine to a laptop using the "Merge" E-film software. The images are then sent in a DICOM (Digital Imaging and Communications in Medicine) format, via the satellite connection, to the Picture Archiving and Communication System (PACS) system CoActive® at the MCMC Hospital for storage. All of the miners' paperwork, which includes questionnaire, spirometry, audiometry, and clinical provider notes are digitized and similarly sent, via the satellite connection, to the MCMC Centriq® medical records system for storage. Through the satellite connection, the mobile screening clinic can also access the MCMC Centriq® electronic medical records system to obtain data on prior inpatient or outpatient visits. Secure and synchronous videoconferencing is established between specialist site and screening clinic, by using ZOOM® technology over the satellite connection to the Internet.

Those miners who have abnormal test results *and* are deemed by the screening provider to require specialist consultation are requested to return for a telemedicine clinic appointment the same afternoon (n = 15 since start of telemedicine services in 2015). The mobile screening clinic currently offers specialist pulmonary consultations at the University of New Mexico Health Sciences Center at Albuquerque, New Mexico.

The telemedicine clinic allows the specialist and the miner to be able to reconfirm key aspects of history, answer questions, jointly review test results, particularly spirometry and chest radiograph (the latter using the International Labor Organization Classification of Radiographs of Pneumoconiosis by a NIOSH certified B reader), and prepare a joint management plan. In addition, the telemedicine clinic appointment allows an opportunity for the university-based specialist to tele-mentor the non-specialist screening provider in the management of mining-related diseases.

Patient Characteristics

Table 2 provides summary data on demographic characteristics, mining exposure, smoking and use of alcohol, in 6,685 miners who were screened by this program over approximately 10,000 visits since 1989. The table demonstrates that this program focuses on minority populations, particularly Hispanic and American Indian former uranium miners. Contrary to popular perception, 47% of miners in this population never smoked. On the other hand, ever or past year alcohol consumption was frequently reported. Table 3 demonstrates that miners show a high prevalence of primary care illnesses such as hypertension (39%), and diabetes mellitus (16%), compared with the State of New Mexico age-adjusted prevalence rates of 27% and 10%, respectively.[4] Among spirometric abnormalities, obstruction is more prevalent than either restriction or mixed obstruction and restriction.

Patient Satisfaction

In a convenience sample of miners who participated in the mobile screening clinics between July 2014–December 2015 and returned their patient satisfaction surveys by mail (n = 278/451 or 62% response rate), 92% (n = 255) rated their experience as very good, 8% (n = 23) rated it as good, and 0% rated it as poor. Results summarized in Table 4 demonstrate that all patients reported that they would recommend the mobile screening clinic to their family and friends. Qualitative data obtained from these surveys included the following comments. "They were able to explain my test results to me so that I understood." "I like visiting with the old retired coal miners and seeing them again." "I like that when I talk about what work I do at the mine they understand what I'm talking about." Another measure of patient satisfaction is the loyalty to the mobile clinic screening program, as measured by the proportion of individuals who are returning users versus new users. Even though communities are sampled every three years, our program has a substantial proportion of returning users at repeat clinics (Table 5), demonstrating a good level of patient loyalty. There are currently limited outcome data available for the use of telemedicine in mobile screening clinics for miners. Miners participating in the telemedicine clinic (n = 15) however report a high level of satisfaction, stating that they felt they were receiving care that was not available within their own communities because of lack of access to specialist services. Although the mobile screening clinic primarily deals with patients that may not be technologically savvy, our surveys showed that they were comfortable with the tele-medicine consultation process.

Table 2.

SUMMARY OF CHARACTERISTICS OF SCREENED MINERS (N = 6,685)

Characteristics	%
Male sex %	96.5
Race/ Ethnicity	
Non-Hispanic white	27.5
Hispanic	36.6
Black	0.5
American Indian	33.2
Other	0.0
Age Group (in years)	
<40	14.3
40–59	43.7
60–74	33.5
≥75	8.2
Unknown	0.3
Current Miner	24.1
Past/Current Miner type	
Coal, not uranium	16.4
Uranium, not coal	49.6
Mixed Coal and Uranium	6.6
Other	27.4
Mining Location	
Above Ground	28.5
Below Ground	51.1
Both Above Ground and Below Ground	20.4
Total Mining Years, Median inter-quartile range	12.0 (5.0, 22.0)
Smoker	
Never	46.8
Former	34.6
Current	18.6
Total smoking years, Median inter-quartile range	24.0 (12.0, 36.0)
Ever Consumed Alcohol	88.0
Average Alcohol Consumption, Past Year	
Daily	11.7
2–3 times a week	18.7
Once a week	22.8
2–3 times a month	12.4
Once a month	12.1
Less than once a month	22.3

Table 3.

PREVALENCE OF COMORBIDITIES AMONG SCREENED MINERS (N = 6,685)

Comorbidities	%
Current Lung Disease, Spirometrically diagnosed	
No Lung Disease	72.8
Restrictive	8.0
Obstructive	15.1
Mixed Restrictive and Obstructive	4.0
Self-Reported Ever-asthma	8.1
Self-Reported Ever-COPD	10.9
Self-Reported Ever- diabetes	16.0
Self-Reported Ever- hypertension	38.6

Table 4.

SUMMARY OF PATIENT RESPONSES FROM A CONVENIENCE SAMPLE OF MINERS WHO PARTICIPATED IN THE MOBILE SCREENING CLINICS BETWEEN JULY 2014–DECEMBER 2015 AND RETURNED THEIR PATIENT SATISFACTION SURVEYS BY MAIL (N = 278/451 OR 62% RESPONSE RATE)

Questionnaire item	Yes	No
Were your questions and needs addressed?	100%	0%
Were you treated in a respectful and, private and professional manner?	100%	0%
Would you recommend us to your family and friends?	100%	0%

Table 5.

THE PROPORTION OF RETURNING AND NEW PATIENTS FROM A CONVENIENCE SAMPLE OF THE LAST FOUR MOBILE SCREENING CLINICS (HELD IN 2015–2016)

Clinic Site	# of patients screened	Returning patients	New patients
Dancing Eagle, NM	56	11 (20%)	45 (80%)
Santa Fe, NM	24	12 (50%)	12 (50%)
Raton, NM	16	13 (81%)	3 (19%)
Kirkland, NM	23	17 (74%)	6 (26%)
Total	119	53 (45%)	66 (55%)

Patient Insurance Characteristics

Our screening service is billable to patients' insurance plans. In the event that insurance plans do not reimburse for the services or if the patient is uninsured, the patient is not charged for the visit and the balance is written off. Contrary to popular perception, most screened miners in our program are insured (45% have commercial insurance, 5% have Blue Cross/Blue Shield plan, 18% have Medicare, 27% have Indian Health Services, 2% have Medicaid, and 2% have Veterans Administration coverage, Figure 2). Despite reports of recent mine closures, uninsured miners in the State of New Mexico are rare, as compared to an uninsured rate of 20% for the general population in the state.[4] Despite having insurance, slightly more than half of the miners screened report that they have a primary care provider. All screened miners are followed up telephonically by a registered nurse case manager approximately three months after the initial screening. The program has no additional funds or mechanisms to guarantee follow-up either with the providers serving in the program or outside. Despite recommendations, many miners do not follow up with post-screening recommended medical care. This is particularly problematic among current miners. Mobile screening clinics for miners therefore need to be coupled with a robust post-screening case management. Additionally, our data suggest that geographical access to health care may be a greater challenge for post-screening medical care than financial access among miners.

Conclusion

Geographic access to quality screening care to miners may be enhanced by the use of mobile screening clinics, manned by a physician assistant or nurse practitioner. While miners demonstrate a high level of satisfaction to services provided by our mobile

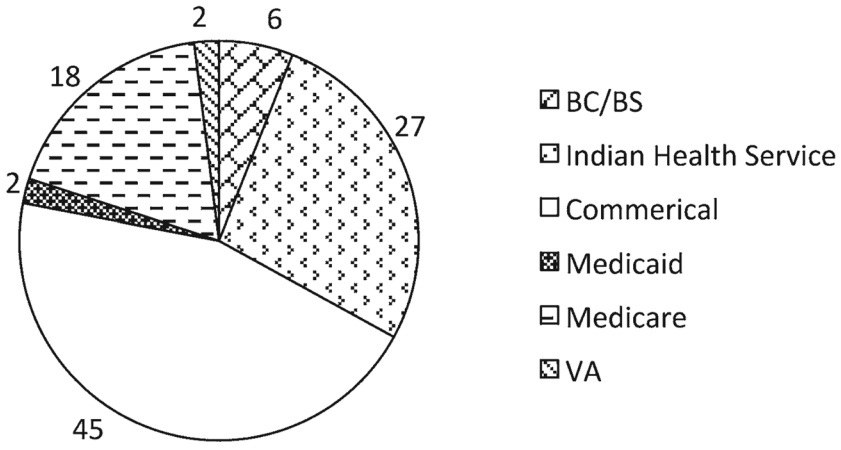

Figure 2. Payor source for miners seen in the mobile screening clinic

screening clinic in their communities, it is currently unclear whether the quality of care and patient satisfaction differs between mobile clinics and traditional fixed clinic settings. Although the addition of telemedicine technology to mobile screening clinics allows miners to have access to specialist care and provides an opportunity to specialists to tele-mentor non-specialist providers, the real world effectiveness of telemedicine and tele-mentoring in this scenario needs to be carefully examined. Although our program is currently supported by federal funds, it is sustainable beyond the period of federal funding due to low uninsured rates of participants, coverage by most insurance plans for screening services, and coverage by the state Medicaid program for telemedicine services. We expect that the innovative use of mobile clinics with telemedicine capability to allow an efficient utilization of resources to meet the medical screening needs of a large number of miners in geographically remote locations in the United States.

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Uranium Workers Demonstrate Lower Lobe Predominant Irregular Pneumoconiotic Opacities on Chest Radiographs

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ORIGINAL PAPER

Uranium Workers Demonstrate Lower Lobe Predominant Irregular Pneumoconiotic Opacities on Chest Radiographs

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Abstract: **Background**. There is a paucity of literature on the chest radiographic findings in uranium workers. **Objective**. To characterize the chest radiographic findings of pneumoconiosis in a New Mexican cohort of uranium workers. **Methods**. The most recent results from chest radiographs were abstracted in this cross-sectional study. **Results**. Radiographs showed small pneumoconiotic opacities of profusion score of ≥ 1/0 in 155/429 (36.1%) uranium workers. The most common shape/size of the primary and secondary opacities was s (90.3%) and t (83.7%) types, respectively. Lower lung zones were the most affected. American Indians were the population group at greatest odds for having profusion score ≥ 1/0 (O.R. 2.65, 95% C.I. 1.61, 4.36). **Conclusions**. Uranium workers' pneumoconiosis is associated with predominantly lower lobe, irregular, and small opacities. Clinical providers and policymakers must consider uranium workers' pneumoconiosis in the differential diagnosis for lower lobe-predominant interstitial lung disease, in the appropriate exposure setting.

Key words: Chest radiographic appearance, uranium workers' pneumoconiosis, profusion score, American Indians.

The uranium industry in the Colorado Plateau of the American Southwest was responsible for the majority of the U.S. uranium production during the Cold War. Many of the earliest mines in this area, known as *dog holes*, were infamous for their lack of ventilation and poor working conditions.[1] Although most uranium mines were shut down by the late 1980s in the U.S., uranium mining continues worldwide with

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documented production in Canada, South Africa and other African countries, and Australia.[2] The uranium industry in the Colorado Plateau has had an adverse health impact on workers, particularly American Indians.[1,3] Elevated standardized mortality ratios were found in Navajo uranium miners for both lung cancer and nonmalignant respiratory diseases.[4] While uranium workers are well studied for their risk of lung cancer development, nonmalignant diseases have not been adequately studied.

There is a paucity of literature on the chest radiographic findings in uranium workers. A prior small survey of underground uranium miners at Ambrosia Lake, New Mexico published in 1984 by Samet *et al.* reported upper lobe rounded opacities, compatible with silicosis, on 12 of 143 (8.4%) participants with chest radiographs available for interpretation, with ≥ 1/0 profusion score for small pneumoconiotic opacities.[5] Our objective was to characterize the most recent radiographic patterns of pneumoconiosis on chest radiographs in a larger population of New Mexican uranium workers, after a longer length of time between uranium work exposure and evaluation, using the database from the University of New Mexico Radiation Exposure Screening and Education Program (RESEP), funded by the Health Resources and Services Administration (HRSA).

Methods

As part of the New Mexico RESEP program, annual surveillance of workers in the surface and underground uranium mines, mills, and transport industry in the state of New Mexico who worked for at least one year between the years of 1952 and 1971, is performed at the Uranium Workers' Clinics at the University of New Mexico, Albuquerque, and the Acoma-Conocito-Laguna Hospital at the Pueblo of Acoma, New Mexico. Uranium workers in the surrounding communities are invited to attend these clinics. The surveillance visit involves a detailed standard questionnaire, physical examination, prebronchodilator spirometry, and posteroanterior chest radiograph. The questionnaire used is based on the American Thoracic Society—Division of Lung Disease (ATS-DLD) questionnaire.[6] Race/ethnicity, smoking status, and mining exposure are self-reported. The chest radiograph is interpreted using the International Labor Organization's (ILO) International Classification of Radiographs of Pneumoconiosis (commonly called B-reads) revised 2000 edition of standard radiographs and the 2011 edition of digital radiographs (derived from the 2000 standard radiographs).[7] All radiographs are read by a licensed physician certified by the National Institute for Occupational Safety and Health (NIOSH) B-reader program as proficient in the classification of chest radiographs for pneumoconiosis using the ILO classification system, reviewing either film screen or digital radiographs, and recording findings in the Centers for Disease Control (CDC) 2.8 chest radiograph classification form.[8] The findings from the most recent chest radiograph obtained on each worker between 2005 and 2015 were abstracted from the form, in this cross-sectional study. Our outcomes included parenchymal abnormalities including both small opacities and large opacities. Small opacities are described by profusion, affected zones of the lung, shape (rounded or regular), and size. In addition, pleural changes and other abnormalities were reviewed.

The profusion of small pneumoconiotic opacities refers to the concentration of small opacities in the affected zones of the lung. The category of profusion *i.e.* 0, 1, 2, or 3 is based on comparisons with the standard radiographs. Profusion is classified into one

of 12 ordered subcategories, which are represented from 0/– to 3/+. Category 0 refers to the absence of small opacities or the presence of small opacities that are less profuse than Category 1 and comprises subcategories 0/–, 0/0, and 0/1. Classification of a radiograph using the 12 subcategories scale was performed as follows. The appropriate category is chosen by comparing the subject radiograph with standard radiographs that define the level of profusion characteristic of the centrally placed subcategories 0/0 (for Category 0), 1/1 (for Category 1), 2/2 (for Category 2), and 3/3 (for Category 3). A radiograph that shows profusion which is considered to be similar to that shown on a category 1 standard radiograph is classified as 1/1. Subcategory 1/0 refers to a radiograph with a profusion of small opacities judged to be similar in appearance to that depicted on a category 1 standard radiograph but category 0 was seriously considered as an alternative.

The opacities are recorded by the affected zone. Each lung field is divided into three zones (*i.e.*, upper, middle, and lower) by horizontal lines drawn at approximately one third and two thirds of the vertical distance between the lungs apices and the domes of the diaphragm.

The shape and size of small opacities are recorded. Two kinds of shape are recognized: rounded and irregular. In each case, three sizes are differentiated. For small rounded opacities, the three size ranges are denoted by the letters p, q, and r, and are defined by the appearance of the small opacities of the corresponding standard radiographs. These illustrate p opacities with diameters up to 1.5 mm, q opacities with diameters exceeding about 1.5 mm and up to about 3.0 mm, and r opacities with diameters exceeding about 3 mm and up to about 10 mm. The three size ranges of small irregular opacities are denoted by the letters s, t, and u, and are defined by the appearance of small opacities on the corresponding standard radiographs. These illustrate s opacities with widths up to 1.5 mm, t opacities with widths exceeding about 1.5 mm and up to about 3 mm, and u opacities with widths exceeding about 3 mm and up to about 10 mm. The shape and size of primary opacities (*i.e.* the most predominant opacity type) and secondary opacities (*i.e.* the second most predominant opacity type) are recorded.

A large pneumoconiotic opacity is defined as an opacity having the longest dimension exceeding 10 mm. Three sizes of large opacities are differentiated. Category A is defined as one or multiple large opacities with the sum of the longest dimension not exceeding about 50 mm. Category B includes one or multiple large opacities with the sum of the longest dimension exceeding 50 mm but not exceeding the equivalent area of the right upper lung zone. Category C includes one or multiple large opacities which exceeds the equivalent area of the right upper lung zone.

Pleural abnormalities are divided into pleural plaques (localized pleural thickening), costophrenic angle obliteration, and diffuse pleural thickening. Pleural plaques may be seen on the diaphragm, on the chest wall, and at other sites. Those present on the chest wall are recorded as in-profile or face-on and separately for the right and left sides. A minimum width of about 3 mm is required for an in-profile plaque to be recorded as present. Other radiographic abnormalities of importance were also reviewed.

Frequency of abnormal findings was summarized in univariate analysis, using Statistical Analysis Software SAS 9.4 version (Cary, NC). Logistic regression analysis was additionally performed. Institutional Review Board approval was obtained (HRPO 14–058).

Results

Based upon their last surveillance visit, most of the 429 uranium workers studied were either American Indian (38.3%) or Hispanic (30.1%), and almost all were older men (97.2% males and 65.8% males ≥ 65 years of age). Most workers were uranium miners (82.6%), and the rest were millers and transporters in the uranium industry. Most subjects worked underground, either partly or entirely (77.6%; Table 1).

Chest radiographs showed small pneumoconiotic opacities of profusion score of ≥ 1/0 in 155/429 (36.1%) uranium workers, reflecting the preponderance of relatively mild disease. The most common profusion score category of small pneumoconiotic opacities was 1/0, seen in 29.6% of all uranium workers and 81.9% of those with score category of ≥ 1/0; Table 3). Among workers with score category ≥ 1/0, the shape/size of the primary opacity was s type in 90.3%, t type in 6.5%, q type in 2.6%, and p type in 0.6%. The shape/size of the secondary opacity was t type in 83.7%, s type in 13.7%, and q type in 2.6%. Small opacities were most commonly seen in lower lung zones, usually involving multiple zones (Table 2). Large pneumoconiotic opacities were found in only two subjects (one A and one C opacity).

Localized pleural thickening (*i.e.* pleural plaques) was not common among the uranium workers (10.5%). Pleural plaques, when present, were more commonly right-sided, non-calcified, and in-profile in location. Costophrenic angle obliteration (2.8%) and diffuse pleural thickening (2.8%) was rare among these uranium workers (Table 4).

Chest radiographs of 75.3% of these uranium workers demonstrated other abnormalities (Table 5). Among those with other abnormalities, cardiovascular abnormalities were most common, including atherosclerotic aorta (33.7%) and abnormal cardiac shape or size (17.0%). This was followed by skeletal abnormalities, including scoliosis (16.1%) and fractured ribs (13.0%). Thickening of interlobar fissures (16.1%) and significant apical pleural thickening (4.3%) were also noted.

Race/ethnicity was a significant predictor for the radiographic presence of small pneumoconiotic opacities. Compared with non-Hispanic Whites, American Indians had the highest relative odds for having ≥ 1/0 profusion score category of opacities, followed by Hispanics (Table 6). No other subject characteristics, including age and smoking, were strongly associated with pneumoconiotic opacities.

Discussion

A substantial proportion of uranium workers (36.1%) in our study showed radiographically defined pneumoconiotic changes, meeting the threshold of 1/0 profusion score, substantially greater than the 8% described in 1984 by Samet *et al.*[5] A possible explanation for our higher prevalence of radiographic abnormality is that the current study population had a greater length of time between uranium work exposure and evaluation. Those with radiographic pneumoconiotic changes usually had mild disease, predominantly involving lower lobe-predominant, irregular, and small opacities. While pleural changes were not common, cardiovascular and skeletal abnormalities were seen in a significant proportion of uranium workers. American Indian workers were the population group at greatest relative odds for demonstrating small pneumoconiotic opacities.

Table 1.

SUMMARY OF DEMOGRAPHIC AND EXPOSURE CHARACTERISTICS AMONG URANIUM WORKERS (N = 429)

Characteristics	Frequency (%) or mean ± S.D.
Male sex	416 (97.2%)
Race/ethnicity	
Non-Hispanic White	131 (30.6%)
Black	4 (0.9%)
Hispanic	129 (30.1%)
American Indian	164 (38.3%)
Age (in years), mean ± SD	69.2 ± 7.8
Smoking status	
Never	142 (33.1%)
Current	66 (15.4%)
Former	221 (51.5%)
Mining experience, lifetime	341 (82.6%)
Location of uranium mining	
Underground	151 (50.5%)
Above ground/Open Pit	67 (22.4%)
Both	81 (27.1%)
Self-reported history of asthma	44 (10.3%)
Self-reported history of chronic lung disease	41 (9.6%)

Table 2.

DISTRIBUTION OF ZONAL INVOLVEMENT OF THE LUNG, AMONG URANIUM WORKERS WITH SMALL PNEUMOCONIOTIC OPACITIES OF PROFUSION SCORE OF ≥ 1/0 (N = 155)[a]

Zonal involvement of the lung	Frequency of opacities (%)
Upper right zone	17 (11.0)
Middle right zone	64 (41.3)
Lower right zone	136 (87.7)
Upper left zone	14 (9.0)
Middle left zone	80 (51.6)
Lower left zone	146 (94.2)

[a]98.7% had multiple zones marked and 1.3% had missing data.

Table 3.

DISTRIBUTION OF PROFUSION SCORE OF SMALL PNEUMOCONIOTIC OPACITIES AMONG URANIUM WORKERS (N = 429)

Profusion score category	Frequency (%)
0/0 or 0/–	217 (50.6%)
0/1	57 (13.3%)
1/0	127 (29.6%)
1/1	16 (3.7%)
1/2	4 (0.9%)
2/1	3 (0.7%)
2/2	3 (0.7%)
2/3	2 (0.5%)
>2/3	0 (0%)

Table 4.

DISTRIBUTION OF LOCALIZED PLEURAL THICKENING (I.E. PLEURAL PLAQUES) IN ALL URANIUM WORKERS (N = 429)[a]

Location	Frequency of right-sided pleural plaques only (%)	Frequency of left-sided pleural plaques only (%)	Frequency of bilateral pleural plaques (%)
In-profile	13 (28.9%)	6 (13.3%)	3 (6.7%)
Face-on	1 (2.2%)	3 (6.7%)	3 (6.7%)
Diaphragm	2 (4.4%)	3 (6.7%)	1 (2.2%)
Other site/s	–	–	–

[a]Localized pleural thickening (*i.e.* pleural plaques), found in 45 of 429 (10.5%) uranium workers, and in 23 of 155 (14.8%) of uranium workers with pneumoconiotic opacities of profusion score ≥ 1/0. Calcification was seen in one right-sided in-profile, one left-sided in-profile, two left-sided face-on, two right-sided diaphragmatic and three left-sided diaphragmatic pleural plaques.

Table 5.

DISTRIBUTION OF ANY 'OTHER ABNORMALITIES' FOUND AMONG 323 OF 429 (75.3%) URANIUM WORKERS SCREENED

Symbols	Frequency (%)	Other symbols	Frequency (%)
Atherosclerotic aorta	109 (33.7%)	Eventration of diaphragm	4 (1.2%)
Significant apical pleural thickening	14 (4.3%)	Hiatal hernia	7 (2.2%)
Coalescence of small opacities	3 (0.9%)	Increased bronchovascular markings	12 (3.7%)
Calcified non-pneumoconiotic nodules or nodes	20 (6.2%)	Hyperinflation	3 (0.9%)
Abnormality of cardiac size or shape	55 (17.0%)	Bony chest cage abnormality	4 (1.2%)
Emphysema	17 (5.3%)	Healed non-rib fracture	2 (0.6%)
Fractured ribs	42 (13.0%)	Scoliosis	52 (16.1%)
Enlargement of noncalcified hilar or mediastinal lymph nodes	2 (0.6%)	Vertebral column abnormality	18 (5.6%)
Ill-defined diaphragm border	8 (2.5%)	Lung infiltrate	5 (1.5%)
Ill-defined heart border	7 (2.2%)	Lung nodule	20 (6.2%)
Septal (Kerley) lines	2 (0.6%)	Foreign body	30 (9.3%)
Plate like atelectasis	14 (4.3%)	Postsurgical changes	33 (10.2%)
Parenchymal bands	20 (6.2%)	Anomaly of aorta	13 (4.0%)
Pleural thickening of an interlobar fissure	52 (16.1%)	Other vascular abnormalities	1 (0.3%)

Table 6.

UNADJUSTED ASSOCIATION BETWEEN SUBJECT CHARACTERISTICS AND SMALL PNEUMOCONIOTIC PROFUSION SCORE CATEGORY OF ≥ 1/0, AMONG ALL URANIUM WORKERS (N = 429)

	≥ 1/0 profusion score	
Subject characteristics	**Odds ratio (95% C.I.)**	**p value**
Age ≥ 65 years	1.06 (0.70, 1.62)	0.78
Race/Ethnicity		<.001[a]
Non-Hispanic White	1.00	
Black	2.85 (0.39, 21.05)	
Hispanic	1.28 (0.75, 2.20)	
American Indian	2.65 (1.61, 4.36)	
Mining experience, lifetime	0.93 (0.55, 1.57)	0.78
Smoking status		0.83[a]
Never	1.00	
Current	1.20 (0.66, 2.18)	
Former	1.02 (0.66, 1.59)	
Self-reported history of asthma	1.01 (0.53, 1.93)	0.97
Self-reported history of heart attack	1.03 (0.60, 1.74)	0.93
Self-reported history of chronic lung disease	1.02 (0.52, 1.99)	0.95
Self-reported history of hypertension	0.96 (0.64, 1.45)	0.85

[a]refers to the global p value for the characteristic studied

In addition to nuisance dust, uranium workers are exposed to radiation (including short-lived radon gas progeny), silica, and diesel exhaust. Uranium workers develop chronic bronchitis and emphysema phenotypes of chronic obstructive pulmonary disease, silicosis and other pneumoconiosis, pulmonary fibrosis, and lung cancer.[9,10] Dose-dependent associations between silica dust exposure and decline in FEV_1, decline in FEV_1/FVC ratio, and pathological changes of lung silicosis are described in studies of uranium miners.[9,11] Extrapulmonary cancers involving the stomach and the liver as well as multiple myeloma and non-Hodgkin's lymphoma have also been described in uranium miners.[10,12] While no significant increase in cardiovascular mortality was found in the Wismut cohort of German uranium miners, a statistically insignificant increase for mortality from cerebrovascular diseases with increased radon exposure was reported.[10]

The chest radiographic pattern that we observed in New Mexican uranium workers is most consistent with diffuse interstitial fibrosis. Radiation-induced diffuse interstitial fibrosis in humans was previously thought to occur only as a complication of radio-

therapy to the chest. Occupational radiation fibrosis was reported as early as 1931, in case reports associated with alpha emitting radium in dust from florescent paint.[13,14] The predominant injurious agent to the lung in uranium miners is believed to be alpha particles from inhaled radon progeny, decaying in or adjacent to lung tissue.[14] Although silica also probably contributed, the paucity of quartz crystals in the pathological lung specimens from uranium miners suggested silica was not the major pathogen in these cases.[14] In animal studies, the fibrogenic effect of silica in the lung was enhanced by ionizing radiation.[15]

Our results contrast with a smaller study by Samet *et al.* that reports preponderance of upper lobe rounded opacities in New Mexican uranium miners.[5] Our results also contrast with another study of 34 working uranium miners, 15 of whom had radiographic changes of pneumoconiosis; 13 of these 15 miners had bilateral widespread nodular densities and the remaining two had densities characteristic of diffuse interstitial fibrosis.[16] On the other hand, our results support the findings from a 1998 study of 400 uranium miners; 102 (25.5%) of those were considered as possibly having radiographically defined lung fibrosis.[14] The pathological findings reported in lung specimens from a selected group of five uranium miners showed severe and diffuse interstitial fibrosis with honeycombing of the lung, consistent with a pathological lesion known as usual interstitial pneumonitis (UIP).[14] In addition, anthracosilicotic nodules were present in four of the five cases.

Our results are also consistent with a prior study conducted at the Miners' Colfax Medical Center, Raton, New Mexico, using a separate cohort, which demonstrated radiographic pneumoconiosis was more common in American Indians than either Hispanics or non-Hispanic Whites in New Mexico.[1] This study however did not describe the radiographic appearance of pneumoconiosis. A possible explanation for the observed racial/ethnic difference includes a disproportionately greater amount of underground uranium mining exposure in American Indian workers. A genetic basis for uranium workers' pneumoconiosis cannot however be excluded.

The differential diagnoses of lower lobe predominant interstitial lung disease includes idiopathic pulmonary fibrosis that is associated with a UIP pathological pattern, asbestosis and other pneumoconiosis, chronic aspiration pneumonitis, and collagen vascular diseases involving the lung such as rheumatoid lung. To this list, uranium workers' pneumoconiosis should be added, in the right occupational exposure setting. Like asbestosis and unlike UIP, uranium workers' pneumoconiosis is slowly progressive. It can however be differentiated in chest radiographs from asbestosis due to the uncommon presence of radiographic pleural changes. Currently, there exists no specific treatment for uranium workers' pneumoconiosis. Preventive vaccinations, oxygen supplementation, and pulmonary rehabilitation are offered, when applicable. This contrasts with patients with idiopathic pulmonary fibrosis/UIP who may be treated with nintedanib and pirfenidone.[17,18] It is therefore important to differentiate uranium workers' pneumoconiosis from idiopathic pulmonary fibrosis/UIP to avoid unnecessary and expensive treatment.

The strength of our study includes a large number of uranium industry workers with a long length of time between uranium work exposure and evaluation, from the same geographic area. Additional strength includes our use of standard ILO clas-

sification, the pertinence of which has been previously demonstrated by studying the correlation between lung anatomic lesion and chest x-ray features.[19] Our study is limited by interpretation by a single B reader; many occupational studies use at least two B readers to account for inter-reader misclassification on presence and profusion of pneumoconiotic opacities. Our study is also limited by selection bias caused by differential loss to follow-up of individuals with pneumoconiosis who receive federal compensation benefits and discontinue follow-up once chest radiographs demonstrate a profusion score of 1/0 (which may partly explain the preponderance of 1/0 profusion category in our database); healthy worker survivor bias that occurs in occupational studies whereby less healthy uranium workers are more likely to reduce their workplace exposures due to employment termination (which may underestimate the prevalence and profusion severity of pneumoconiotic opacities);[20] confounding findings of opacities on the chest radiograph due to alternative diseases such as congestive heart failure; and inadequate quantitative past uranium dust exposure estimation in this study. During the study period, there occurred a shift in chest x-ray technology from film-based to digital imaging but a recent NIOSH study has demonstrated that inter- and intra-reader variability was not affected by this change.[8] Cigarette smokers demonstrate an overall increase of non-specific lung markings on chest radiographs, which has been described as "dirty chest" and explained by the presence of bronchial wall thickening on computed tomography.[21,22] Increasing age may also lead to one- or two-subcategory increase in the profusion of irregular type opacities in individuals without concomitant occupational dust exposures.[22–24] However, the lack of association between smoking status/age and pneumoconiotic changes, as shown in Table 6, argues that smoking and age are unlikely explanations for our findings.

A substantial proportion of uranium workers in our study showed radiographically defined pneumoconiotic changes. Those with radiographic pneumoconiotic changes usually had mild disease, predominantly involving lower lobe-predominant, irregular, and small opacities. Clinical providers caring for patients with lung disease and policymakers involved in provider education and worker compensation must consider uranium workers' pneumoconiosis as an important differential in lower lobe predominant interstitial lung disease, in the appropriate exposure setting.

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D95. CHRONIC RESPIRATORY DISEASE IN THE MINING INDUSTRY

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Post-1971 Uranium Industry Workers Have a Similar Radiologic Lung Disease Burden to Pre-1971 Workers

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D95 CHRONIC RESPIRATORY DISEASE IN THE MINING INDUSTRY / Mini Symposium / Wednesday, May 24/1:30 PM-3:30 PM / Room 147 A-B (Middle Building, Street Level) Walter E. Washington Convention Center

Post-1971 Uranium Industry Workers Have A Similar Radiologic Lung Disease Burden To Pre-1971 Workers

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Rationale: Workers employed in the uranium industry prior to 1971 are eligible for compensation benefits under the Radiation Exposure Compensation Act (RECA) but post-1971 workers are not. Our objective was to compare the prevalence of radiologic lung disease between pre-1971 and post-1971 uranium industry workers in New Mexico.
Methods: Workers were invited for screening examination at 'mobile' clinics held in New Mexico communities and a 'fixed' clinic at the University of New Mexico hospital between 2015 and 2016. A standard posterior anterior chest radiograph was obtained. The chest radiograph was interpreted by a NIOSH-certified B-reader using the International Labor Organization's International Classification of Radiographs for Pneumoconiosis. A B-read profusion score of small pneumoconiotic opacities of at least 1/0 was considered pneumoconiosis and defined as 'abnormal' pattern. The distribution of abnormal chest radiographs was compared between pre-1971 and post-1971 workers, using a Pearson's chi-squared test. A P- value of less than 0.05 was considered statistically significant.
Results: Of the 81 uranium industry workers who were evaluated (Table 1), 22 (27%) were pre-1971 and 59 (73%) were post-1971 subjects. The prevalence of abnormal chest radiograph was 68% and 66% in the pre-1971 and post-1971 groups respectively (p=1.0).

Table 1: Prevalence of radiologic disease among Uranium miners overall distinguished by Pre- or Post- 1971 employment.

	Pre-1971-n (%)	Post-1971-n (%)	Total - n (%)
Abnormal Chest Radiograph	15 (68%)	39 (66%)	54 (67%)
Normal Chest Radiograph	7 (32%)	20 (34%)	27 (33%)
Total	22 (100%)	59 (100%)	81 (100%)

Conclusions: Our results suggest that the prevalence of abnormal chest radiograph pattern is not significantly different between pre-1971 and post-1971 uranium industry workers. While we may have under-estimated the abnormal chest radiograph patterns in pre-1971 workers because they may already be compensated under RECA and may choose to no longer participate in our screening program, we still saw a substantial proportion of abnormal patterns in post-1971 workers. This argues that post-1971 uranium industry workers should be screened for the presence of respiratory diseases and that expansion of RECA to this group may be warranted.

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Previous Abstract Next Abstract

LETTERS

Post–1971 Era Uranium Workers in New Mexico Have Significant Lung Disease Burden

To the Editor:

At the peak of uranium production during the Cold War, the Colorado Plateau of the American Southwest was the major source of uranium in the United States. Between 1949 and 1989, the Four Corners region (at the intersection of the borders of Colorado, Utah, Arizona, and New Mexico) had 4,000 mines that produced more than 225 million tons of uranium ore. Currently, uranium is still produced in the United States, but in more limited quantities (1). In 1990, the U.S. Congress approved the Radiation Exposure Compensation Act (RECA) to provide screening, medical and compensation benefits to diseased former uranium workers exposed from January 1, 1942, through December 31, 1971 (2). RECA does not cover health conditions resulting from uranium mining exposures after 1971, the date that ended the U.S. government's role as sole purchaser of uranium ore.

Although the U.S. government no longer screens for or compensates respiratory conditions in uranium miners exposed after 1971, recent evidence suggests that uranium miners are often poorly protected from mining dust, experience perceived health problems related to their work (3), and are at elevated risk of developing malignant and nonmalignant respiratory health conditions (4–7). In a recent study, the Four Corners region demonstrated among the highest mortality rates in the United States for interstitial lung disease and pneumoconiosis (8). Given these findings, we hypothesized that the respiratory disease and symptom burden would be similar between RECA era and post–RECA era uranium workers. If true, this would provide evidence for extending screening and medical benefits to workers employed after 1971 in an industry that mostly hired minority, rural, and underserved populations.

After obtaining institutional review board approval, we analyzed 169 eligible former surface and underground uranium workers from rural mining communities in New Mexico who voluntarily completed a free screening visit at community-based mobile clinics between 2015 and 2017 and had complete spirometry data (9). The screening visit included the following: a limited American Thoracic Society Diffuse Lung Disease (ATS-DLD) questionnaire completed by the workers and verified by a trained interviewer (10), history and physical examination, prebronchodilator spirometry performed using the American Thoracic Society guidelines by trained personnel using race/ethnicity-specific reference standards (11, 12), and a posterior–anterior chest radiograph interpreted by a certified B-reader using the International Labor Organization's International Classification of Radiographs of Pneumoconioses (13). The exposure variable was the RECA era employment status in the uranium industry. A post–RECA era worker was employed in the uranium industry for any duration but exclusively after December 31, 1971. The primary outcome was the presence of radiographic changes consistent with uranium workers' pneumoconiosis (defined by profusion score ⩾1/0 or ⩾1/1 subcategories of small pneumoconiotic opacities, usually irregular lower-zone opacities). Secondary outcomes included prebronchodilator forced expiratory volume in 1 second (FEV_1), forced vital capacity (FVC), and FEV_1/FVC ratio; self-reported physician-diagnosed respiratory diseases (asthma, chronic obstructive pulmonary disease, and dust-related interstitial

Table 1. Comparison of demographic characteristics between Radiation Exposure Compensation Act and Post–Radiation Exposure Compensation Act era uranium industry workers

Demographics	RECA Era Group (*n* = 47) (Worked ⩾1 Yr before December 31, 1971)	Post-RECA Era Group (*n* = 122) (Worked Exclusively after December 31, 1971)
Race/ethnicity		
Non-American Indian, *n* (%)	17 (36.2%)	56 (45.9%)
American Indian, *n* (%)	30 (63.8%)	65 (53.3%)
Number missing race/ethnicity	0	1
Female sex*, *n* (%)	3 (6.4%)	28 (23.0%)
BMI*, kg/m^2, mean ± SD	28.9 ± 5.5	32.8 ± 6.8
Age*, yr, mean ± SD	71.1 ± 6.7	62.7 ± 6.0
Number missing age	0	1
Duration of uranium exposure, yr, mean ± SD	8.3 ± 8.4	6.3 ± 5.1
Number missing duration of uranium exposure	7	7
Duration of total mining exposure, yr, mean ± SD	10.7 ± 10.0	8.8 ± 8.7
Number missing duration of total mining exposure	2	2
Exposure to underground mining, *n* (%)	26 (54.2%)	66 (51.6%)
Current smoker, *n* (%)	3 (6.4%)	16 (13.1%)
Number missing smoking status	5	6

Definition of abbreviations: BMI = body mass index; RECA = Radiation Exposure Compensation Act; SD = standard deviation.
*Significant differences between the two groups ($P < 0.05$).

Supported by the Health Resource Service Administration and the Patient-Centered Outcomes Research Institute.

Table 2. Comparison of primary and secondary outcomes between Radiation Exposure Compensation Act and Post-Radiation Exposure Compensation Act era uranium industry workers

Categorical outcomes		RECA Era ($n = 47$)		Post-RECA Era ($n = 122$)		Unadjusted Odds Ratio (95% CI)	*P* Value	Adjusted Odds Ratio* (95% CI)	*P* Value
		n	Events (*n* [%])	*n*	Events (*n* [%])				
Chest radiograph B reads	Abnormal chest radiograph (profusion score ⩾1/0)	45	34 (75.6%)	119	81 (68.1%)	0.69 (0.32 to 1.51)	0.35	0.73 (0.29 to 1.88)	0.52
	More severe chest radiograph abnormality (profusion score ⩾1/1)	45	10 (22.2%)	119	22 (18.5%)	0.79 (0.34 to 1.84)	0.59	0.70 (0.25 to 1.97)	0.50
Spirometric parameters	FVC < LLN	47	13 (27.7%)	122	24 (19.7%)	0.64 (0.30 to 1.40)	0.26	0.26 (0.09 to 0.77)	0.02
	FEV_1 < LLN	47	11 (23.4%)	122	23 (18.9%)	0.76 (0.34 to 1.72)	0.51	0.23 (0.08 to 0.71)	0.01
	FEV_1/FVC ratio < LLN	47	8 (17.0%)	122	19 (15.6%)	0.90 (0.36 to 2.22)	0.82	0.56 (0.18 to 1.73)	0.31
Lung diseases†	Ever asthma	42	7 (16.7%)	114	29 (25.4%)	1.71 (0.68 to 4.28)	0.25	1.42 (0.12 to 1.64)	0.32
	Current asthma	42	6 (14.3%)	114	23 (20.2%)	1.52 (0.57 to 4.03)	0.40	1.30 (0.42 to 4.01)	0.65
	Dust-related interstitial lung disease‡	26	8 (30.8%)	59	7 (10.9%)	0.30 (0.10 to 0.95)	0.04	0.30 (0.08 to 1.16)	0.08
	COPD (emphysema/ chronic bronchitis)	29	11 (37.9%)	82	24 (29.3%)	0.68 (0.28 to 1.65)	0.39	0.47 (0.16 to 1.41)	0.18
	Hypoxemia‡	47	1 (2.1%)	121	3 (2.5%)	1.17 (0.12 to 11.53)	0.89		

Continuous outcomes		N	RECA Era (mean ± SD)	N	Post-RECA Era (mean ± SD)	Unadjusted Mean Difference (95% CI)	*P* Value	Adjusted Mean Difference* (95% CI)	*P* Value
Respiratory symptoms	Cough–phlegm score	47	5.6 ± 3.7	120	5.0 ± 3.5	−0.56 (−1.77 to 0.65)	0.36	−1.42 (−2.89 to 0.05)	0.06
	Wheeze score	47	2.7 ± 2.2	121	2.7 ± 2.1	0.01 (−0.71 to 0.73)	0.98	−0.22 (−1.09 to 0.65)	0.62
	mMRC dyspnea score	29	2.3 ± 1.5	100	1.9 ± 1.5	−0.36 (−0.98 to 0.27)	0.26	−0.53 (−1.26 to 0.20)	0.15
	Total symptom score	47	9.8 ± 6.1	121	9.2 ± 5.2	−0.41 (−2.36 to 1.55)	0.68	−1.77 (−4.09 to 0.62)	0.15
Spirometric parameters	FVC, L	43	3.8 ± 0.8	114	4.5 ± 8.5	0.92 (−1.65 to 3.50)	0.48	−0.05 (−3.18 to 3.07)	0.97
	FEV_1, L	43	2.6 ± 0.6	115	3.5 ± 7.5	0.88 (−1.39 to 3.15)	0.45	0.04 (−2.73 to 2.82)	0.98
	FEV_1/FVC, ×100%	43	72.6 ± 5.8	114	74.9 ± 8.4	2.32 (−0.43 to 5.06)	0.10	1.82 (−1.39 to 5.03)	0.27

Definition of abbreviations: CI = confidence interval; COPD = chronic obstructive pulmonary disease; FEV_1 = forced expiratory volume in 1 second; FVC = forced vital capacity; LLN = lower limit of normal; mMRC = modified Medical Research Council; Post-RECA era = exclusively worked after December 31, 1971; RECA = Radiation Exposure Compensation Act; RECA era = worked for at least 1 year before December 31, 1971 (referent group); SD = standard deviation.

*All models adjusted for age, sex, smoking status, and body mass index.

†Lung diseases are self-reported physician diagnoses, except for hypoxemia; dust-related lung diseases include silicosis, pneumoconiosis, and asbestosis.

‡Hypoxemia is defined on the basis of self-reported use of oxygen prescription or measured oxygen saturation as measured by pulse oximetry less than 89% at rest on room air. We did not include this outcome in the adjusted model, owing to the small number of events in both groups.

lung disease); self-reported respiratory symptoms (modified Medical Research Council questionnaire score for dyspnea and sum of subject responses to symptom-specific questions from the American Thoracic Society Diffuse Lung Disease questionnaire) (10, 14); and hypoxemia (self-reported use of supplemental oxygen or oxygen saturation as measured by pulse oximetry <89% at rest on room air). Multivariable analyses were performed using logistic and linear regression techniques for categorical and continuous outcomes, respectively, with adjustment for age, sex, smoking status, and body mass index (BMI). SAS software (SAS, Cary, NC) was used, and $P < 0.05$ was considered significant. The margins of error for a prevalence estimate in the RECA era and post–RECA era groups were ±20% and ±13%, respectively (exact Clopper-Pearson 95% confidence interval [CI]). We used the fully conditional specification method to impute missing covariate values for age ($n = 1$) and smoking status ($n = 11$) (SAS/STAT version 14.1 proc mi). Fifty complete datasets were generated and analyzed. Combined parametric estimates and hypothesis tests that reflect uncertainty due to missingness were obtained (SAS/STAT version 14.1 proc mianalyze).

Of the 169 uranium workers screened, 72.2% worked in the post–RECA era and 56.5% were American Indians. The distributions of race/ethnicity, current smoking status, duration of uranium exposure, and mine location were similar between groups (Table 1). The post–RECA era group had a significant burden of lung disease: 18.5% had a profusion score greater than or equal to 1/1 of small pneumoconiotic opacities on a chest radiograph, and 15.6% had airflow obstruction as defined by FEV_1/FVC ratio below the lower limit of normal. In unadjusted analyses, the prevalence of a profusion score ⩾ 1/0 was similar between RECA era and post–RECA era participants (76% and 68%, respectively; odds ratio, 0.69; 95% CI, 0.32 to 1.51) (Table 2). Similarly, the prevalence of a profusion score ⩾ 1/1 was similar between groups (22% and 19%, respectively) (Table 2). In unadjusted analyses, the prevalence of self-reported dust-related interstitial lung disease was lower in the post–RECA era group (31% and 11%, respectively; odds ratio, 0.30; 95% CI, 0.10 to 0.95). Although the magnitude of this association was identical in an adjusted analysis, the estimate was less precise (adjusted odds ratio, 0.30; 95% CI, 0.08 to 1.16). In additional adjusted analyses, the post–RECA era participants had lower odds of having reduced FEV_1 and FVC values (respectively, adjusted odds ratio, 0.23; 95% CI, 0.08 to 0.71; adjusted odds ratio, 0.26; 95% CI, 0.09 to 0.77). All other effect estimates were imprecise with CIs including the null value (Table 2).

Our study shows a high burden of respiratory disease in uranium workers. We also show that respiratory outcomes were similar between the RECA era and post–RECA era groups. Based upon lessons learned from the recent black lung epidemic in the United States (15–17), mining dust exposures are challenging to control and may not have been reduced substantially in uranium mines after 1971.

Limitations of our study include geographic coverage being limited to New Mexico, possible selection bias due to voluntary participation and potential for compensation benefit for RECA era miners, small numbers, and lack of objective exposure measurements. Recall bias is an unlikely explanation because our findings on self-report measures are largely confirmed using chest radiograph measures.

Uranium workers in New Mexico constitute an underserved, poor, rural population with a high proportion of American Indians and Hispanics. Unlike those employed during the RECA era, post–RECA era workers are not eligible for screening, medical, or compensation benefits (18). Similar to recent findings of increased incidence of black lung in coal miners (15, 19), our study findings support the conclusion that despite presumed improvement in exposure control, uranium miners continued to be exposed to harmful levels of mining dust, resulting in a high burden of respiratory disease among former uranium workers in New Mexico, employed after 1971. Our findings argue that medical screening for respiratory diseases under federally funded worker surveillance programs should be extended to post–RECA era uranium workers, especially if large epidemiologic studies confirm our results.

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Patient Preference to Accept Medical Treatment Is Associated with Spokesperson Agreement

To the Editor:

A foundational element of advance care planning (ACP) is designating a spokesperson to make medical decisions on behalf of incapacitated patients (1). However, studies assessing spokespersons' predictions of patients' treatment preferences have found only moderate agreement levels (50–70%) (2–4). To date, few variables have strong independent associations with spokesperson–patient agreement rates, and more work is needed to understand the sources of this disconnect (2). We compared agreement between patient and surrogate responses when patients chose to "accept" versus "decline" treatment in a randomized trial evaluating online ACP tools (5).

Methods

We conducted a *post hoc* analysis of a randomized controlled trial (project no. 5R01NR012757) of dyads of patients with advanced, chronic illness and their designated spokespersons. Patients were eligible if they received medical care at Penn State Hershey Medical Center or Brigham and Women's Hospital, were at least 18 years old and had either class III or IV congestive heart failure, stage III or IV chronic obstructive pulmonary disease, chronic kidney disease stage 4 or 5, or advanced cancer. Full descriptions of selection criteria, recruitment, randomization, and the interventions were published previously (5).

For this *post hoc* study, the prespecified primary analysis was comparison of agreement between patient and surrogate responses when patients "accepted" versus "declined" treatment for 28 decisions about potentially lifesaving treatments in six hypothetical vignettes. These included decisions about cardiopulmonary resuscitation, mechanical ventilation, surgery, hemodialysis, feeding tube, and intravenous antibiotics.

Each question was analyzed individually, and patients were classified as desiring to "accept" or "decline" treatment. Agreement between patients' choices and spokespersons' predictions was assessed as a categorical variable (yes/no), and the percentage agreement was calculated for each group. Median agreement was calculated across all 28 questions, as were median differences in agreement rates.

Multivariate logistic regression used the Wald chi-square test to assess the association between agreement and the independent variable of choosing to "accept" treatment. On the basis of historical data, patient and spokesperson demographics previously found to be associated with agreement, together with primary clinical diagnosis (cardiac, pulmonary, renal, cancer) and study site (Hershey, PA; Boston, MA), were included in the multivariate analysis. Median adjusted odds ratios between spokesperson–patient agreement and choosing to "accept" treatment were calculated for all 28 questions; results were considered significant if the *P* value was less than 0.05. The adjusted odds ratio represents the likelihood that a surrogate accurately represents a patient's preference for treatment when the patient agrees to accept treatment, compared with when the patient declines treatment.

Results

Overall, 267 patient–caregiver dyads enrolled, and 7,394 paired responses were analyzed. The average patient age was 64 years (standard deviation [SD], ±13.4), and 46% were female. The average spokesperson age was 56 years (SD, ±13.9), and 75% were female. The most common diagnosis was cancer (33%). Demographic and clinical characteristics of patients and spokespersons are presented in Table 1.

Spokesperson–patient agreement was higher when patients "accepted" versus "declined" treatment, with statistically significant differences for 24 of 28 questions (Figure 1 and Table 2). The overall median agreement rate was 87% when patients "accepted" versus 44% when patients "declined" treatment, and the median difference in agreement was 46% (Figure 1 and Table 2). In multivariate testing, "accepting" treatment was a significant independent predictor of spokesperson–patient agreement for 25 of 28 questions, with an overall median adjusted odds ratio favoring agreement when patients "accepted treatment" of 10.9.

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Greater Odds for Angina in Uranium Miners Than Nonuranium Miners in New Mexico

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Objective: The aim of this study was to test the hypothesis that uranium miners in New Mexico (NM) have a greater prevalence of cardiovascular disease than miners who extracted the nonuranium ore. **Methods:** NM-based current and former uranium miners were compared with nonuranium miners by using cross-sectional standardized questionnaire data from the Mining Dust in the United States (MiDUS) study from 1989 to 2016. **Results:** Of the 7215 eligible miners, most were men (96.3%). Uranium miners ($n = 3151$, 43.7%) were older and diabetic, but less likely to currently smoke or use snuff ($P \leq 0.001$ for all). After adjustment for covariates, uranium miners were more likely to report angina (odds ratio 1.51, 95% confidence interval 1.23 to 1.85) than nonuranium miners. **Conclusion:** Our data suggest that along with screening for pulmonary diseases, uranium industry workers should be screened for cardiovascular diseases.

Learning Objectives

- Become familiar with the occupational health risks associated with uranium mining, and with emerging research on cardiovascular risks associated with radiation exposure.
- Summarize the new findings on the risks of cardiovascular outcomes in uranium miners in New Mexico, compared to non-uranium miners.
- Discuss the implications for health screening and follow-up in this occupational group.

Cardiovascular disease is the leading cause of death in both men and women in the United States (U.S.), amounting to 610,000 deaths in 2015.[1,2] It is the leading cause of death among blacks, Hispanics, and non-Hispanic whites, but is second to cancer among American Indians or Alaska natives as well as Asians or Pacific Islanders.[1] The estimated cost of heart disease in the U.S. is $200 billion annually, which includes the cost of health care services, medications, and lost productivity.[1] Obtaining a history of patients' medical problems and lifestyle habits can help decipher what preventive measures are needed to reduce risk factors for cardiovascular diseases. Risk factors such as tobacco use, diabetes mellitus, dyslipidemia, and obesity are the most universally known and well-studied causes of cardiovascular diseases.[1] One important risk factor that has not been highlighted in the public arena is radiation exposure.

Radiation exposure has been studied extensively as a cause for pulmonary fibrosis, hematological disorders, and certain cancers.[3–7] There is also a growing number of studies showing that high-dose ionizing radiation exposure in environmental and therapeutic settings increases the risk for cardiovascular diseases.[8–10] Among Japanese atomic bomb survivors, acute whole-body irradiation was associated with an increased risk for cardiovascular diseases with a linear dose response and a latency of approximately 10 years.[11–15] Similarly, therapeutic chest irradiation, which involves high-dose ionizing radiation, among patients with lymphoma or different solid tumor cancers, also increases the risk for cardiovascular diseases.[16–18] Occupational exposures to radiation, which are generally at lower doses but over longer durations than atomic bomb and therapeutic radiation exposure, have been inconsistently associated with cardiovascular diseases.[19–22] Mining, processing, and transporting uranium ore, associated with occupational exposure to radiation, have been investigated as a risk factor for cardiovascular disease, but current literature is inconclusive, constituting a critical gap in this field.[21,23–28]

One of the richest uranium ore deposits in the U.S. is located in northwestern New Mexico (NM), an area that was extensively mined between 1949 and 1989, produced more than 225 million tons of ore during that period. Although much lower in amount, the U.S. continues to produce uranium amounting to 1125 tons in 2016.[29] Uranium workers, due to the long latency period involved, continue to suffer from malignant and nonmalignant respiratory health effects: the latter including chronic obstructive pulmonary disease (COPD), pneumoconiosis/silicosis, and pulmonary fibrosis.[25,30] American Indians are disproportionately affected with an elevated standardized mortality ratio of 2.6 found in Navajo uranium workers for nonmalignant respiratory diseases.[31] Our objective was to examine the risk for cardiovascular diseases in uranium workers. We hypothesized that NM uranium workers have a higher prevalence of cardiovascular diseases relative to workers who extracted other minerals from the ground and were able to assess this in screening data from NM miners.

METHODS

Study Design

In this cross-sectional study, we used data obtained from the NM-based Mining Dust in the United States (MiDUS) study from 1989 to 2016. The MiDUS study recruits current or former workers employed in the NM mining industry who voluntarily undergo medical surveillance. These surveillance activities are performed using a mobile outreach clinic, organized by rotation in each of the 20 rural NM communities with a high concentration of miners. This surveillance program is jointly run by Miners' Colfax Medical Center (MCMC) at Raton, NM, and the University of New Mexico

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(UNM) School of Medicine at Albuquerque, NM, and is supported by the New Mexico Black Lung Clinics Grant funded by the Health Resources and Services Administration. Data collected at baseline evaluation were examined.

Inclusion Criteria

The study included all those employed in the mining industry for at least 1 year who also participated in the above-mentioned clinical surveillance initiative.

Study Methods

Upcoming mobile clinics are advertised in the target rural communities through print, media, and radio, as well as by working with community/church leaders and mine safety officers. Patients can also self-refer themselves for screening evaluations. Participants are not charged out-of-pocket expenses for their screening clinic visit, which takes approximately 1 hour to complete. At each mobile screening clinic, miners are assessed for respiratory, hearing, and musculoskeletal disorders associated with mining-related exposures. Assessment also includes common health conditions such as lung diseases and exposures such as tobacco use.

The mobile screening clinic is held in a specially outfitted trailer, which is 53 feet long with a diesel generator to supply power. The clinic consists of five separate areas, including a patient reception area, a digital chest x-ray unit, sound-proof audiometry booth, spirometry room, and an examination room. The staffing model in the mobile screening clinic consists of a mid-level provider (ie, a physician assistant or nurse practitioner), a radiology/audiometry technician, and a medical assistant/nursing technician who is certified by the National Institute of Occupational Safety and Health (NIOSH) for performing spirometry. Race and ethnicity-specific predicted values were used for non-Hispanic whites and Hispanics. Crapo American Indian reference standards was used for American Indians.[32,33]

Before the screening examination, patients complete a comprehensive occupational and clinical history intake form, based on the adult American Thoracic Society Diffuse Lung Disease 1978 (ATS DLD-78) Questionnaire.[34] The questionnaire responses are reviewed and confirmed by the mid-level clinical provider. The screening visit includes a vital sign assessment, including a blood pressure assessment at rest and measurement of standing height and weight without shoes, pre-bronchodilator spirometry using ATS guidelines, audiometry, and a standard posterior-anterior chest radiograph. A complete history and physical examination is performed by a mid-level provider who develops a treatment and care plan for the patient depending on the primary diagnosis. The records are reviewed for quality by a UNM-based preventive medicine and pulmonary medicine specialist.

Exposure

Exposure status was classified as those who were ever employed with the uranium mining industry (termed uranium miners in this study) versus those who were never similarly employed, but instead worked with extracting and processing other minerals such as coal, metal, and nonmetals (termed nonuranium miners).

Outcomes

Study outcomes included self-reported history of physician diagnosed angina, myocardial infarction, cerebrovascular events and hypertension, as well as measured systolic or diastolic hypertension. For self-reported angina, myocardial infarction, cerebrovascular events, and hypertension, the subjects were asked the following questions:

(1) Has a doctor ever told you that you have angina or chest pain from your heart?
(2) Has a doctor ever told you that you had a heart attack?
(3) Have you ever had a cerebrovascular accident?
(4) Have you ever had high blood pressure/hypertension?

Measured hypertension was defined as either systolic blood pressure at least 140 mm Hg or diastolic blood pressure at least 90 mm Hg, measured by either a manual blood pressure cuff (sphygmomanometer) or automatic blood pressure cuff, in a resting sitting position. Severe hypertension or hypertensive urgency, a subset of measured hypertension, was defined as either systolic blood pressure at least 180 mm Hg or diastolic blood pressure at least 110 mm Hg.

Covariates

Selection of covariates was based upon known biological and/or mechanistic plausibility of each variable's role as a potential confounder in evaluating the risk for cardiovascular disease. Covariates in multivariable analysis model 1 included age, sex, race/ethnicity, body mass index (BMI), self-reported diabetes mellitus, current cigarette smoking status, current snuff use status, current alcohol use status, and total mining tenure. Current snuff user was defined as a subject who reported having ever used snuff or chewing tobacco for at least a week or more and had used it within the prior 6 months. Current alcohol user was defined as a subject who reported having consumed alcohol within the prior 24 hours. Total mining tenure was used as a continuous variable. The correlation between age and total mining tenure was modest at 0.33. The variance inflation factors for miners' age and total mining tenure was 1.24 and 1.19 respectively, which was small. It is therefore reasonable to include both variables in the multivariable analysis. In addition, statistical model 2 included prebronchodilator forced expiratory volume in 1 second (FEV_1) as a covariate. Reliable information on lipid disorders was not available and therefore not used as a covariate. The multivariable analysis of cardiovascular outcomes also included self-reported hypertension or measured hypertension as an additional covariate.

Statistical Analysis and IRB Approval

Chi-square and Student t test were utilized for univariate analysis of categorical and continuous outcomes respectively. For the Chi-square test, a 2 by 2 test for each variable was created with the two categories of (uranium vs nonuranium) miners. Logistic regression (PROC LOGISTIC function) was used for multivariable analysis. Formal two-way tests of interaction were separately performed between uranium mining exposure and underground mining/mining tenure/smoking variables on the outcome "angina." Data were analyzed using Statistical Analysis Software (SAS) 9.4 version (Cary, North Carolina) with two-tailed P values less than 0.05 considered significant.

This study was approved by the University's Human Research Protection Office Institutional Review Board (HRPO 14–058) that also approved a waiver of consent from participants.

RESULTS

Table 1 demonstrates the distribution of select characteristics, many known to be associated with risk for cardiovascular disease, among all eligible uranium ($n = 3151$ or 43.7%) and nonuranium miners ($n = 4064$ or 56.3%). The two groups of miners had a similar gender distribution, which both were predominantly male. Relative to nonuranium miners, uranium miners were older, less educated, and more likely to be American Indian; however, reported lower pack years of smoking. They were also less likely to be current miners and current smokers or snuff or alcohol users ($P \leq 0.001$ for all). Uranium miners had fewer years of mining tenure and were more likely to be employed in underground mining activities than nonuranium miners ($P < 0.001$). Despite a lower

TABLE 1. Comparison of Characteristics Between Uranium and Nonuranium Miners, $N = 7{,}215$, 1989–2016; MiDUS Cohort

Characteristic	All Miners $N = 7{,}215$ N (%) or Mean ± SD	Nonuranium Miners $N = 4{,}064$ N (%) or Mean ± SD	Uranium Miners $N = 3{,}151$ N (%) or Mean ± SD	P
Male sex	6,946 (96.3%)	3,897 (95.9%)	3,049 (96.8%)	0.05
Age, years	55.0 ± 14.3	51.9 ± 15.7	59.0 ± 11.1	<0.001
BMI, kg/m^2	28.8 ± 5.0	29.2 ± 5.2	28.3 ± 4.7	<0.001
≥ High school education	3,090 (42.8%)	2,100 (51.7%)	990 (31.4%)	<0.001
Race/ethnicity				
(missing)	134 (1.9%)	87 (2.1%)	47 (1.5%)	
Non-Hispanic white	2,071 (28.7%)	1,586 (39.0%)	485 (15.4%)	
Hispanic	2,627 (36.4%)	1,742 (42.9%)	885 (28.1%)	<0.001
Black	39 (0.5%)	23 (0.6%)	16 (0.5%)	
American Indian	2,342 (32.5%)	624 (15.4%)	1,718 (54.5%)	
Other	2 (0.0)	2 (0.0)	0 (0)	
Smoking status				
(missing)	85 (1.2%)	25 (0.6%)	60 (1.9%)	
Never	3,424 (47.5%)	1,832 (45.1%)	1,592 (50.5%)	<0.001
Former	2,406 (33.3%)	1,383 (34.0%)	1,023 (32.5%)	
Current	1,300 (18.0%)	824 (20.3%)	476 (15.1%)	
Pack-years of smoking (for current and former smokers)	10.2 ± 19.5	11.2 ± 19.9	8.7 ± 18.8	<0.001
Snuff user				
(missing)	619 (8.6%)	47 (1.2%)	572 (18.2%)	
Never	4,713 (65.3%)	2,806 (69.0%)	1,907 (60.5%)	
Former	1,148 (15.9%)	676 (16.6%)	472 (15.0%)	<0.001
Current	735 (10.2%)	535 (13.2%)	200 (6.3%)	
Alcohol intake				
(missing)	630 (8.7%)	53 (1.3%)	577 (18.3%)	
Never	779 (10.8%)	392 (9.6%)	387 (12.3%)	<0.001
Former	4,922 (68.2%)	3,035 (74.7%)	1,887 (59.9%)	
Current	884 (12.3%)	584 (14.4%)	300 (9.5%)	
Current miner status	2,046 (28.4%)	1,895 (46.6)	151 (4.8%)	<0.001
Mining location				
(missing)	1,731 (24.0%)	1,546 (38.0%)	185 (5.9%)	
Below ground mining	2,629 (36.4%)	724 (17.8%)	1,905 (60.5%)	
Above ground/open pit mining	1,812 (25.1%)	1,296 (31.9%)	516 (16.4%)	<0.001
Both below and above ground mining	1,043 (14.5%)	498 (12.3%)	545 (17.3%)	
Total mining tenure, years	15.0 ± 11.9	16.7 ± 12.6	13.5 ± 11.0	<0.001
Uranium mining tenure				
Unknown/no exposure	4,187 (58.0%)		123 (3.9%)	
1–4 years	926 (12.8%)		926 (29.4%)	
5–9 years	780 (10.8%)		780 (24.8%)	NA
≥10 years	1,322 (18.3%)		1,322 (42.0%)	
Total mining tenure category				
(missing)	1,540 (21.3%)	1,415 (34.8%)	125 (4.0%)	
1–4 years	1,173 (16.3%)	497 (12.2%)	676 (21.5%)	<0.001
5–9 years	1,057 (14.7%)	388 (9.5%)	669 (21.2%)	
≥10 years	3,445 (47.7%)	1,764 (43.4%)	1,681 (53.3%)	
FEV_1, L	3.2 ± 0.9	3.4 ± 0.9	3.1 ± 0.8	<0.001
FEV_1% predicted	97.0 ± 20.0	97.6 ± 19.7	96.3 ± 20.2	0.0037
Self-reported COPD/chronic bronchitis/emphysema	873 (12.1%)	472 (11.6%)	401 (12.7%)	<0.001
Self-reported COPD/chronic bronchitis/emphysema (missing)	629 (8.7%)	50 (1.2%)	579 (18.4%)	
Self-reported asthma	663 (9.2%)	405 (10.0%)	258 (8.2%)	0.95
Self-reported asthma (missing)	643 (8.9%)	57 (1.4%)	586 (18.6%)	
Self-reported diabetes mellitus	992 (13.7%)	507 (12.5%)	485 (15.4%)	<0.001
Self-reported diabetes mellitus (missing)	940 (13.0%)	287 (7.1%)	653 (20.7%)	

Missing data were noted among the 7,215 miners for the following continuous variables: age ($n = 20$ or 0.3%); BMI ($n = 87$ or 1.2%); pack-years of smoking ($n = 357$ or 4.9%); FEV_1 ($n = 448$ or 6.2%); and FEV1 percent predicted ($n = 476$ or 6.6%). Missing data for total mining tenure (continuous variable) are provided in the row for the categorical variable total mining tenure.

mean BMI, uranium miners had a significantly higher prevalence of self-reported diabetes mellitus than nonuranium miners ($P < 0.001$). Absolute and percent predicted FEV_1 values were also lower and self-reported prevalence of COPD was higher in uranium miners than in nonuranium miners ($P < 0.001$).

Uranium miners were significantly more likely than nonuranium miners to self-report hypertension, even after adjustment for covariates (Models 1 and 2, Table 2). Uranium miners were significantly more likely to have measured hypertension in the unadjusted model, but this association was reversed, when

TABLE 2. Association Between Uranium Mining Exposure and Hypertension, $N = 7{,}215$; 1989–2016; MiDUS Cohort

Cardiovascular Outcomes	Uranium Miners $N = 3{,}151$ N (%)	Nonuranium Miners $N = 4{,}064$ N (%)	Unadjusted Model OR (95% CI)	Multivariable Model 1* OR (95% CI)	Multivariable Model 2* OR (95% CI)
Self-reported hypertension	1,099 (44.4%)	1,254 (33.6%)	1.58 (1.42–1.75)	1.43 (1.24–1.66)	1.42 (1.22–1.65)
Measured hypertension	1,339 (43.3%)	1,329 (33.5%)	1.51 (1.37–1.67)	0.85 (0.74–0.97)	0.88 (0.77–1.02)
Hypertensive urgency	17 (0.5%)	21 (0.5%)	1.04 (0.55–1.97)	0.53 (0.20–1.38)	0.51 (0.19–1.37)

CI, confidence interval; OR, odds ratio.

*Multivariable analysis model 1 was adjusted for age, sex, race/ethnicity, diabetes mellitus, BMI, current smoking status, current snuff use status, current alcohol use status, and duration of total mining tenure. Model 2 additionally adjusted for absolute FEV_1 as a covariate. The missing data for total mining tenure are included in order to keep sample size among analyses consistent.

adjustment was made for covariates, indicating that this association was explained by confounding variables.

Uranium miners were also more likely to self-report angina, myocardial infarction, and cerebrovascular event. In the multivariable model adjusting for self-reported hypertension, only the association with angina remained consistently significant (Table 3). In the multivariable model adjusting for measured hypertension, the association with angina and myocardial infarction remained significant (Table 4).

In unadjusted interaction analyses, underground mining and longer mining tenure were disproportionately associated with higher odds of self-reported angina in nonuranium miners than in uranium miners (interaction $P = 0.004$ and $P < 0.001$, respectively). As compared to never smoking, former smoking was disproportionately associated with self-reported angina among nonuranium miners than uranium miners (interaction $P = 0.002$). The adjusted interaction analyses confirmed differential angina association for nonuranium miners with smoking status ($P = 0.04$) but not with mining location ($P = 0.89$) or mining tenure ($P = 0.50$).

DISCUSSION

Our cross-sectional study indicates that exposure to uranium mining is associated with greater odds for angina than exposure to nonuranium mining. This association is not fully explained by the older age and higher prevalence of diabetes mellitus in uranium miners, who also had lower BMI, lower nicotine use, and lower duration of mining tenure than nonuranium miners.

Kreuzer et al[21] utilized the German Wismut cohort, the largest cohort of uranium miners in the world, in assessing the risk for cardiovascular and cerebrovascular death in uranium miners. The results of their 2006 study showed that there was no significant increase in cardiovascular mortality among uranium miners.[21] A Canadian group headed by Villeneuve et al[23] reviewed the Newfoundland fluorspar mining cohort in order to validate the previous study by Kruezer et al,[21] with results being consistent with a nonsignificant excess risk for cardiovascular mortality. Drubay et al[24] studied French uranium miners in assessing the exposure risk of external gamma rays and radon on cardiovascular and cerebrovascular disease mortality by the use of the French National Vital Statistics Registry. These results again showed that there was no significant increase in cardiovascular death rates among uranium miners; there was however a significantly higher risk of cerebrovascular mortality. On the contrary, a study of nonwhite uranium miners, predominantly Navajo, in the Colorado Plateau Study group, found that the standardized mortality rate from cardiovascular causes was significantly lower than the mortality rates for nonwhites.[31] In a 1991 cross-sectional study, Samet et al[35] examined a relatively young group of NM underground uranium miners and noted that their observed death rate from circulatory causes, as identified on death certificate, was significantly lower than that expected for the general population, with a standardized mortality ratio of 0.6 [95% confidence interval (95% CI) 0.4 to 0.8]. These studies, like our own, did not directly measure occupational uranium exposure or even the exposure to particulate matter that they were studying but estimated cumulative radiation exposure. Another weakness of these studies is the unreliability of death certificates in helping to define the cardiovascular cause of death outside the hospital.[36] Data indicate that clinical diagnoses certified in death certificate, and later found to disagree with autopsy findings were most frequent for cerebrovascular and cardiovascular disease.[37] Our approach of documenting self-reported questionnaire-based physician diagnosis of cardiovascular diseases and measured hypertension among living miners may be more accurate than data abstracted from death certificates. Most studies compared uranium miners with the general population, an approach that is limited by the healthy worker effect, whereby workers may exhibit lower overall morbidity and mortality rates than the general population because the severely ill and chronically disabled are ordinarily excluded from taxing jobs or suffer attrition from the work force.[38] By comparing uranium miners to miners involved in other extractive industries, our

TABLE 3. Association Between Uranium Mining Exposure and Vascular Diseases, $N = 7{,}215$; 1989–2016; MiDUS Cohort

Cardiovascular Outcomes	Uranium Miners $N = 3{,}151$ N (%)	Nonuranium Miners $N = 4{,}064$ N (%)	Unadjusted Model OR (95% CI)	Multivariable Model 1* OR (95% CI)	Multivariable Model 2* OR (95% CI)
Self-reported angina	655 (21.3%)	390 (10.2%)	2.40 (2.10–2.75)	1.61 (1.32–1.97)	1.51 (1.23–1.85)
Self-reported myocardial infarction	378 (13.5%)	274 (7.2%)	2.02 (1.72–2.38)	1.35 (1.05–1.73)	1.25 (0.98–1.61)
Self-reported cerebrovascular event	141 (5.9%)	113 (3.8%)	1.58 (1.23–2.04)	1.10 (0.79–1.53)	1.06 (0.76–1.49)

Covariates include self-reported hypertension.

CI, confidence interval; OR, odds ratio.

*Multivariable analysis model 1 was adjusted for age, sex, race/ethnicity, diabetes mellitus, BMI, self-reported hypertension, current smoking status, current snuff use status, current alcohol use status, and duration of total mining tenure. Model 2 additionally adjusted for absolute FEV_1 as a covariate. The missing data for total mining tenure are included in order to keep sample size among analyses consistent.

TABLE 4. Association Between Uranium Mining Exposure and Vascular Diseases, $N = 7{,}215$; 1989–2016; MiDUS Cohort

Cardiovascular Outcomes	Uranium Miners $N = 3{,}151$ N (%)	Nonuranium Miners $N = 4{,}064$ N (%)	Unadjusted Model OR (95% CI)	Multivariable Model 1* OR (95% CI)	Multivariable Model 2* OR (95% CI)
Self-reported angina	655 (21.3%)	390 (10.2%)	2.40 (2.10–2.75)	1.68 (1.37–2.06)	1.57 (1.28–1.93)
Self-reported myocardial infarction	378 (13.5%)	274 (7.2%)	2.02 (1.72–2.38)	1.42 (1.11–1.82)	1.33 (1.04–1.71)
Self-reported cerebrovascular event	141 (5.9%)	113 (3.8%)	1.58 (1.23–2.04)	1.08 (0.78–1.51)	1.05 (0.75–1.48)

Covariates include measured hypertension.
CI, confidence interval; OR, odds ratio.
*Multivariable analysis model 1 was adjusted for age, sex, race/ethnicity, diabetes mellitus, BMI, measured hypertension, current smoking status, current snuff use status, current alcohol use status, and duration of total mining tenure. Model 2 additionally adjusted for absolute FEV_1 as a covariate. The missing data for total mining tenure are included in order to keep sample size among analyses consistent.

study minimizes the healthy worker effect. Depending on the mean miner age in individual studies, cardiovascular morbidity may be a more sensitive measure than mortality, even if there will be an eventual cardiovascular cause of death. Given that excess mortality from cancers has clearly been demonstrated for uranium miners, excess cardiovascular morbidity may not lead to significant excess cardiovascular mortality.[35]

A limited cross-sectional analysis of disease morbidity among 2835 NM miners screened during 2004 to 2014 in the MiDUS study has been previously published by Shumate et al.[39] As compared to the study by Shumate et al[39] that compared across various sectors of miners, our current analysis includes a larger number of miners accrued over a longer timeframe in a binary categorical analysis, and therefore has greater power. Similar to our current analysis, Shumate et al[39] showed a significantly higher prevalence of self-reported hypertension among uranium miners than other miners. Although the odds for having angina and heart attack in the study by Shumate et al[39] was higher in uranium miners, these associations did not reach statistical significance after adjusting for covariates including self-reported hypertension.[39] A potential weakness of previously published studies of miners, including that by Shumate et al,[39] is inadequate adjustment for the confounding effect of low FEV_1 value. It has been previously reported that low FEV_1 ranks second to smoking and above blood pressure and cholesterol as a predictor of cardiovascular mortality.[40] Our study however demonstrated that the pattern of significant outcomes did not differ much with and without adjustment for FEV_1 in Tables 2 and 3, except in the case of self-reported myocardial infarction where the association lost statistical significance after additional adjustment for FEV_1.

Studies linking nonoccupational uranium exposure to cardiovascular disease provide supportive evidence for our findings without establishing causality.[41] A recent study highlighted the effects of inhalational environmental uranium exposure on cardiovascular disease outcomes among Navajo community members who live in close proximity to abandoned uranium mines in NM.[41] Primary human coronary artery endothelial cells treated for 4 hours with serum provided by Navajo study participants revealed that proximity to abandoned uranium mine strongly predicted endothelial transcriptional responses to serum cell adhesion molecules and chemokines (including CCL2, VCAM-1, and ICAM-1), suggesting inflammatory potential associated with residential proximity to abandoned uranium mines.[41] The upregulation of these cell adhesion molecules and chemokines by endothelial cells has been shown to play a role in the multistep process leading to cardiovascular diseases.[42] Although our study does not demonstrate causation, it is possible that uranium miners exhibit similar inflammatory endothelial responses and this possibility needs further research.

Most studies pertaining to the radiation effect on the cardiovascular system involve doses above 2 Gy. Radiation-specific mechanisms at low doses of exposure are as yet unclear, although there is evidence pointing to vascular structures and tissues of the heart as possible initiating targets.[22] Basic research has shown that exposure to particulate matter during mining causes endothelial inflammation and dysfunction in both myocardial tissues and peripheral blood vessels, thus a mechanism to explain the increased of risk of hypertension and cardiovascular diseases in miners.[41] An increased thickness of the intima in irradiated arteries and an increase in proteoglycan deposition in the media has been demonstrated.[43] Radiation also induces functional changes in the endothelium by increasing production of inflammatory eicosanoids and von Willebrand factor and decreased production in thrombomodulin and adenosine diphosphatase.[44]

The strengths of our study include its large sample size and the use of a control population that was occupationally exposed to similar agents except radiation, reducing the possibility of healthy worker effect.[38] Our study included a significant proportion of American Indian and Hispanic miners, thus increasing the generalizability of this study to minority populations. Additional strength includes community-based recruitment of study subjects without charge to them. As compared to hospital-based recruitment, our recruitment strategy allows for greater geographic and socioeconomic inclusion as well as avoidance of Berkson bias.

The limitations of our study include absence of occupational radiation and silica exposure measurements; absence of direct measurement of uranium concentrations via urine sampling; possible confounding from environmental radiation exposure from uranium tailings in and near homes; and information bias based upon self-report of vascular outcomes. Some studies have utilized a job-exposure matrix to obtain estimates on exposure without direct measurement. However, that would be difficult in the present study due to the history of remote uranium mining and associated recall bias. Urine samples for uranium testing were not collected, as the mobile screening clinic lacks this capability, and the study lacks the resources for the same.[45] Several of our study outcomes rested largely on self-report of previously physician-diagnosed health outcomes. Our study assumes that all miners are equally likely to have received a physician diagnosis. However, some health hazards associated with uranium mining are well known, and uranium miners may receive significantly more medical scrutiny than do other miners, such as through the Radiation Exposure Screening and Education Program (RESEP). This might increase the likelihood that uranium miners receive a physician diagnosis of cardiovascular disease or hypertension. This is however unlikely, as our screening activity was funded by the New Mexico Black Lung and not the RESEP program, and therefore, a reverse bias against uranium miners might be possible. Further, due to the greater awareness of the risks of uranium mining, it is possible that uranium miners themselves sought health care with primary care providers to a greater extent, were more likely to recall diagnoses, or had greater familiarity with the medical terms used in the question. This is less likely, as uranium miners in our study were significantly less

educated than other miners (Table 1). Nevertheless, molecular and imaging studies looking at biomarkers of cardiovascular disease in occupational cohorts will be helpful. Uranium miners are disproportionately American Indian, a group known to have a high prevalence of chronic health conditions including cardiovascular diseases.[46] It is however unlikely that race and ethnicity explains away our findings, as this was included as a covariate in our multivariable statistical model. Our study did not have data on and therefore could not adjust for dyslipidemia, an important risk factor for cardiovascular disease. There are many ways in which an opt-in community clinic screening can lead to selection bias based on who chooses to report for screening evaluations. For instance, retired miners are more likely to report for screening than current miners. Given the drop off in uranium mining in NM, uranium miners of the same age are more likely to be retired or underemployed and have more time to report than nonuranium miners. Sicker workers are often assumed to be more likely to report to such a clinic, further contributing to selection bias.

Low lung function is a risk factor for cardiovascular diseases.[40] Although uranium miners had a lower FEV_1 than nonuranium miners, the inclusion of FEV_1 in the multivariable analysis model in Table 2 did not significantly change the results for angina. Miners are typically screened for pulmonary diseases such as COPD and pneumoconiosis, due to significant data on the association of these diseases with mining and recent reports of increasing prevalence of pneumoconiosis among miners.[47] Due to limited data on cardiovascular risk in miners, monitoring for cardiovascular disease has not been enforced during surveillance. However, our study provides evidence for further research on cardiovascular disease monitoring in uranium miners.

CONCLUSION

Our data conclude that NM uranium miners are more likely to demonstrate angina than nonuranium miners, after adjustment for covariates. This is the first study that we are aware of to demonstrate an association between cardiovascular disease and occupational radiation exposure. In conclusion, our data suggest that while screening for pulmonary diseases in uranium miners is well established, further research on cardiovascular disease monitoring is needed.

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My name is Cipriano Lucero and I am 63 years old. My birth date is 03/24/1954 and I live in Grants, New Mexico. I began working in the uranium mines in April of 1977 and continued working in uranium until 1985. I began my career working in what was called the baskets. The baskets were filled with resin and water that needed forced through the basket holes. I was responsible for the aeration of the baskets with air hoses connected to a 4-foot nozzle that forced the ore through the basket holes. I also worked on the mud presses. The mud press was where the yellowcake was separated from the mud and leaching chemicals and then the yellowcake was sent to the dryers to prepare it for transportation. After the yellowcake was dry, it was loaded into 55-gallon barrels or drums. The barrels were then sealed, (this job did not always end well with some of the seals blowing off the drum and sending yellowcake everywhere), and then the barrels were washed down with an acid wash to remove any yellowcake on the outside of the drum. After the barrels were clean, they were loaded into semi-trucks and then they were shipped out.

I also worked in the yellowcake tank area and part of the job required me to remove the yellowcake from the floors and walls of the processing areas. To do this part of the job, large scoop shovels and large flat scrapers were needed as the yellowcake was stuck on every surface in the yellowcake area. When the yellowcake was dry it had the consistency of baking flour, so when it was being loaded into the barrels via a drop chute, the whole room was a giant dust storm of deadly yellowcake. There was a ventilation system in the form of a single fan, but it was much too small and inefficient to control the quantity of yellowcake in air and it only worked sometimes due to the yellowcake build up that covered it. The lunch room where we ate lunch was covered in a fine layer of the yellowcake as well and that was the only place we had to sit and eat. No matter how many times we wiped it down the table and chairs were always covered

in the fine yellowcake. We did not have a source of fresh drinking water, the company did not provide any water for consumption on-site so we had to carry water from home in a thermos that by lunch was also coated in yellowcake. There was a shower area, but as with the rest of the yellowcake department, it was constantly covered in yellowcake and other filth and most of the time there was no hot water to shower with. After a graveyard shift no one wanted to take a cold shower in a filthy room covered in yellowcake. I was provided with overalls to work in, but the company did not have washing machines to wash the overalls on-site, so I took them home and my wife washed them in our washer at home. My respiratory protection consisted of a single paper mask per shift and the mask was useless after the first hour or so because it was covered in yellowcake. Most of the rest of the shift I used a bandana to cover my face but that stopped little of the yellowcake dust from being inhaled directly. There was no real protection from over exposure to radiation in the yellowcake area.

After the yellowcake department shifted positions around I was assigned to the crusher department. The crusher began the process of yellowcake production. I worked in the beginning of this process by loading and dumping raw ore by ore car down a trestle to a conveyor belt that moved the raw ore to the primary jaw crusher. Ore from the mines first went through the primary jaw crusher where it was reduced to 4" or less in diameter, then on conveyor belts it was moved to the secondary impact crushers where it was reduced to less than one inch. Throughout the conveyor belt system there were several stations for workers to pick trash out of the ore and a giant magnet at the end that had to be dumped regularly. The ore then could be conveyed to the rod mill where water and chemicals were added to begin the process of leaching the yellowcake from the ore. I dumped ore from 30 or more cars a day because the bosses were always pushing us for better production numbers for more profit. The crusher department had the same problem

that the yellowcake department had, that is, one single, small inefficient fan that did not work most of the time, no potable water supply, filthy showers with no hot water, and no protection from the radiation dust that was everywhere.

After working for several years in the uranium industry I was given a dosimeter, which is a gamma radiation detector badge, to wear in my hard hat. I was told 3 different times that I had been overexposed to high levels of radiation. The first time I was over exposed, I was sent to a nurse that sent me to the medical department at the mill site, not the hospital in town, a medical department within the company. The medical department had me urinate in a plastic urinal over the weekend, I was told to bring it back on Monday when I returned to work and they would look at it then. The readings came back and showed that I had been exposed to very high radiation levels, so I was moved to a low-level radiation area for a week or two, then I was moved to the labor gang until they deemed the radiation was out of me. At that point I was returned to the area where the high readings came from. As I said before, this happened on 3 different occasions.

As a result of my overexposure to high levels of radiation, my health has been deteriorating since my early 20's and it is getting worse as I age. I have shortness of breath from the scarring in my lungs that requires me to be on oxygen 24/7. The diagnosis is officially pulmonary fibrosis, a disease acknowledged by the current RECA, (Radiation Exposure Compensation Act), program requirements. I have sleep apnea, high blood pressure, congestive heart failure, a kidney transplant from kidney failure, arthritis, and diabetes. I tire very easily and must be careful not to overexert myself which does not allow for a quality in life. The medications I must take daily are a staggering amount, there are just too many to list.

I am asking you to please support the RECA Amendments for those of us that worked in unsafe environments and dangerous conditions. The companies never told us of the dangers of

working in radiation or how much radiation we were being exposed to because they wanted the profits over protecting the workers. The Post '71 uranium workers are suffering with the same illnesses and diseases as the workers before us, but we are ignored the compensation that they receive for their sicknesses. It is time for all the uranium impacted workers to be compensated justly. Again, I ask that you please support the RECA Amendments, Senate Bill # 197 and House Bill # 2049.

Thank you,

Cipriano Lucero

Cipriano Lucero

Mr Lucero died from Covid during 2020. He was vulnerable to COVID due to his exposures to uranium while he was a worker. Because of the limits of RECA, his family will not be eligible to collect any compensation.

National Association of
Atomic Veterans, Inc.
Including Nuclear Veterans

To: Committee of Judiciary, Subcommittee on the Constitution, Civil Rights, and Civil Liberties

Representative Steve Cohen Chairman
Representative Deborah Ross Vice Chair
Representative Mike Johnson Ranking Member
Representative Cori Bush
Representative Michelle Fischbach
Representative Sylvia R. Garcia
Representative Sheila Jackson Lee
Representative Henry C. "Hank" Johnson
Representative Tom McClintock
Representative Burgess Owens
Representative Jamie Raskin
Representative Chip Roy

From: Mr. Keith Kiefer, NAAV (National Association of Atomic Veterans) National Commander, & Enewetak Radiological Cleanup Veteran (1978)

Subject: Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act

I would like to thank this committee for their interest in and support of Atomic Veterans and the opportunity to testify.

My name is Keith Kiefer, I have the honor to serve as the NAAV National Commander. I was also part of the Enewetak Radiological Cleanup Project in 1978. This project was conducted from 1977 to 1980.

Full disclosure: Even though I'm an Enewetak Radiological Cleanup Veteran, I would not personally benefit from this Act, since my related illnesses are not included.

Both NAAV and myself support the passage of this Act and amendments.

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Radiation Exposure Compensation Act (RECA) is intended to provide some compensation for those whom, through no fault of their own, have been adversely effected by the “Cold War” Nuclear legacy.

RECA will presently sunset (terminate) on July 10, 2022 if action is not taken soon. This program is one of the best implemented programs that exist. Individuals qualifying for this program have been adversely affected by ionization radiation contamination through air, food and/or water consumed. They have been impacted economically and with adverse health outcomes.

Our experience with RECA and Claimants is this program is often the difference between individuals loosing there home and/or bankruptcy.

“Atomic Veterans” (On site participants) were under an oath of secrecy until it was lifted in 1996 though the Nuclear Radiation and Secrecy Agreements Act. Under this oath these Veterans could not talk with their doctor, spouse or family members without risking criminal and/or civil prosecution and fines. NAAV still runs into individuals that are unaware this oath of secrecy has been rescinded.

As records are declassified and become more accessible, information regarding the reach of this contamination (ionization radiation, fallout) are revealed. Examples are Guam and areas of the States not previously covered. This necessitates the impacted groups to be expanded. Additionally, cohorts previously overlooked should be added; Cleanup operations like Enewetak Atoll and Palomares, Spain should be included, as well as, Broken Arrow operations.

We advocate for the language in HR3783 introduced in the 116th session, adding Palomares, Spain cleanup and Broken Arrow operations, be adopted.

Atomic Veterans have played a vital role in the defense of the Nation.

We favor this legislation and urge it’s expedient passage.

I welcome any questions or further discussion on this topic.

Thank you,

Keith Kiefer, NAAV National Commander, etc.

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United States House of Representatives
Committee on the Judiciary
Subcommittee on the Constitution, Civil Rights, and Civil Liberties

Hearing on Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act
Testimony Provided by Congressman Michael F.Q. San Nicolas (GU-00)

Wednesday, March 24, 2021

Good afternoon, Chairman Steve Cohen, Ranking Member Deborah Ross, and Members of the Subcommittee on the Constitution, Civil Rights, and Civil Liberties. *Hâfa Adai*. I would like to thank you for providing me and the people of Guam the opportunity to speak on an incredibly important civil rights issue that can be quickly remedied by this Congress.

The Radiation Exposure Compensation Act ("RECA") was created by Congress in 1990 to provide a benefit payment to innocent victims, or their surviving beneficiaries, who have been significantly harmed by their involuntary exposure to the radiation caused by our nation's testing of atomic weapons or uranium mining, milling, or transportation. Since its creation, the United States Justice Department has awarded benefits to more than 37,000 claimants. In its creation, Congress recognized that "fallout from atmospheric nuclear tests exposed people to radiation that is presumed to have caused an excess of cancer and that this risk was borne by these people to serve the national security interests of the United States."

What Congress failed to do was recognize the innocent Americans and patriotic people of the island of Guam who were egregiously impacted by the 67 nuclear weapons testing that took place in the Marshall Islands and the additional 106 tests that took place in the surrounding areas in the Pacific Ocean. While Guam's location affords our residents with beautiful year-round weather and a gorgeous tropical backdrop, our geographical location proved destructive due to the radioactive contamination and nuclear fallout from both atmospheric and underground nuclear testing that occurred between 1947 and 1962.

The current law recognizes individuals who meet certain disease requirements (primarily cancer) and meet geographic requirements as "downwinders". It is incredibly vital for Members of the Subcommittee to understand that since nuclear weapons testing ceased in areas within the Pacific Ocean, the incidence of new cases of all cancers in Guam have vastly risen. Additionally, while the rest of the United States has achieved a decline in overall rates of cancer mortality, our Pacific island's mortality rates have risen. Malignant neoplasms (cancerous tumors) is the second leading cause of death on the island after heart disease. Of the top five cancers that continue to plague the people of Guam, four types of cancers: breast, colon, liver, and lung are specific cancers that meet requirements recognized by the RECA.

The National Research Council of the National Academies formed a Committee to Assess the Scientific Information for the Radiation Exposure Screening and Education Program. One of the Committee's responsibilities was to review and assess other possible locations that had been exposed to the radiological consequences of nuclear testing by the United States. The Committee concluded that Guam experienced "a measurable fallout" and that residents who lived in the island during the testing period "should be eligible" for benefits as downwinders under RECA. Sixteen years has passed since the Congressionally mandated report was submitted to Congress; no action to correct this injustice, not even in the form of an apology, to the people of Guam has been formalized.

I respectfully request this Committee move to include a provision in the Radiation Exposure Compensation Act that would allow affected residents of Guam the ability to file a claim as those others who suffered from cancers due to the radioactive exposure caused by this nation's testing of nuclear weapons. You will be closing wounds and healing the minds of a people who stood for and by America during and after World War II.

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Barbara K. Kent

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On July 16, 1945, the United States detonated the Worlds first atomic bomb named Trinity, over the state of New Mexico.

And because of its secrecy, residents of New Mexico were not warned before the Trinity blast or informed of the health hazards and no residents were evacuated. Radiation exposure rates were over10,000 times higher than allowed.

After years of litigation, New Mexico has yet to have a bill passed providing monetary assistance to victims and their families as a result of the Trinity blast in 1945. Yet people that were affected by other nuclear testing that took place in the 50's in States of Nevada, Utah and Arizona have been compensated by the Radiation Compensation Exposure Act.

Senator Tom Udall of New Mexico has had a bill pending in Congress since 2010 and Congressman Ben Lujan and Senator Mike Crapo has had a bill pending since 2017 to provide assistance to those in their State that were affected by as a result of this blast.

Thousands of families in New Mexico have been devastated by cancer and various other ailments and are reluctant to have children as they feel these ailments will have a genetic affect.

I am a survivor who at that time of the test was at summer camp in Ruidoso, NM, 53 miles from ground zero. When the blast hit, I fell out of my upper bunk bed onto the floor. That afternoon, we were all exited to play outside in the warm summer "snow" but in reality it was fallout from the bomb. I have suffered thyroid cancer endometrial cancer, skin cancer leukemia and have had my gall bladder removed. All of my friends from camp in 1945 have passed away from various cancers by the ages of 30-40.

This is the story about the thousands of New Mexico residents, their families, and their future offsprings who, for 73 years, have yet to receive any compensation from our Government as a result of this atomic experiment.

Thank you.

Barbara Kent

Barbara K. Kent
May 15, 2018

QUESTIONS AND RESPONSES FOR THE RECORD

Rep. Chip Roy
Questions for The Record

House Judiciary Committee, Subcommittee on the Constitution, Civil Rights, and Civil Liberties
Hearing: Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act

March 24, 2021

Questions for Ms. Tina Cordova

1. Do you believe the people of El Paso were affected by the Trinity Test?

2. If there were people who were visiting or working in the area from out of state when the Trinity Test bomb was detonated, would they have been affected by the radiation exposure and, if so, would they be eligible for RECA benefits?

3. What is the geographic range RECA includes for the Trinity test?

4. When medical records are too old to track down or doctors have passed away, how do potential RECA beneficiaries submit proof of these early cancers and illnesses?

In Pursuit of Justice for All Those Who Were Damaged

May 6, 2021

To The House Judiciary Subcommittee on the Constitution, Civil Rights & Civil Liberties
Answers to Questions Submitted by The Honorable Representative Chip Roy March 24, 2021 Hearing; "Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act."

Dear Representative Roy,

I want to thank you for submitting these questions and allowing me to answer them. They are very good questions and right on point. I hope that my answers will help you as you go about reviewing future proposed amendments to the Radiation Exposure Compensation Act. If you have any other questions or need further clarification that I can assist you with, please feel free to contact me.

Sincerely,

Tina Cordova
Co-Founder
Tularosa Basin Downwinders Consortium

Question 1 answer:
Yes, I do believe the people of El Paso were affected by the radioactive fallout that traveled in every direction and fell from the sky for days after the Trinity test of July 16, 1945. Ferenc Morton Szasz wrote in his book *The Day the Sun Rose Twice* that five days after the Trinity test, Stafford Warren, one of the Manhattan Engineering District (MED) physicians assigned to the Trinity test to monitor human health, wrote a letter to General Groves, warning that the Tularosa Basin, also referred to as the Jornada del Muerto region of New Mexico, was too populated for further use in nuclear explosion tests. He urged that any future tests be located in an area with a radius of at least 150 miles without inhabitants. El Paso falls within or very

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close to the 150-mile radius from Trinity. Currently the Radiation Exposure Compensation Act (RECA) compensates people that live 180 miles from the Nevada Test Site. Exposure to radiation is a factor of distance and time. The closer you live to the test site the more exposure you receive. It is also recorded that El Paso was downwind of the Nevada Test Site during the above ground nuclear testing that took place through the summer of 1962.

Question 2 answer:
In answering this question, we have to reflect on the porous nature of the New Mexico, Texas border. We have people working and vacationing on both sides of the border. People from Texas often vacation in Ruidoso, New Mexico where many people maintain second homes. The detonation took place during the summer when an unknown number of people from El Paso and other parts of Texas would have likely been vacationing in Ruidoso. The mountains of New Mexico are home to several summer camps where people often send their children (please see attached written statement from Barbara Keller Kent from El Paso who was a child at one of those camps on July 16, 1945). If there were people in New Mexico from Texas on July 16, 1945, or during the summer months after the July 16th detonation, it is likely they were overexposed to radiation. They would likely qualify for RECA if it's amended to include the Downwinders of New Mexico. The problem will arise with proving that you were in New Mexico on July 16, 1945, or during the summer of 1945. Further, the current RECA law at Sec. 4 requires physical presence "in an affected area for a period of at least one year" for claims related to leukemia and specific diseases. Since New Mexicans were not added at the beginning of RECA 31 years ago many people will find themselves struggling to prove they were present in New Mexico. Qualification will become burdensome. Congress must address this as they go about amending RECA. Otherwise, the amendments are moot and will cause tremendous harm to those trying to qualify for themselves or on behalf of deceased loved ones.

Question 3 answer:
Currently RECA does not cover any of New Mexico except for Uranium Miners/Workers who mined before 1971. RECA has never extended compensation to the Downwinders of New Mexico. If RECA is amended as we are working to make it so, we are asking that the entire state of New Mexico be included in RECA compensation. We firmly believe that the members of Congress from Texas should consider joining with other members of Congress to make certain RECA is amended in 2021 before the bill sunsets July 2022. We also believe the

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Congressional delegation from Texas should push for El Paso to be added to the RECA compensation program for a reasonable amount of time associated with the fallout from the Trinity test.

Question 4 answer:

It is going to be problematic for people to track down records from 76 years ago. Many hospitals and doctors have likely purged records from that timeframe. Counties and States did not have the means for keeping records as we do today. In reviewing records for example, about infant mortality we've found that they are most often difficult to come by. Congress will have to address this as part of amending RECA so as not to cause more harm than good. If people have current records that reference an older cancer for example that should suffice. It will be impossible to access records for those who died 50 years ago much less 76 years ago. It may be that sworn affidavits from those that can attest to certain facts will be a necessary part of the proof that is considered acceptable. Other suggestions that might be considered as proof of residency or physical presence are documents such as property tax records, title searches, property liens, photographs, military enlistment or discharge records (DD213), marriage records, divorce records, child birth records, church records such as baptismal, first holy communion and confirmation, school records, census records, tribal or pueblo census records, chapter house enrollment records, letters and or envelopes to the individual with post dates etc. The goal is to make it reasonably possible to qualify not impossible. All due consideration must be given to the length of time that has passed since the test in 1945.

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Rep. Chip Roy
Questions for The Record

House Judiciary Committee, Subcommittee on the Constitution, Civil Rights, and Civil Liberties
Hearing: Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act

March 24, 2021

Questions for Mr. Scott Szymendera, PhD

1. Due to the length of time that has passed without RECA being amended, would the families of Downwinders who have died due to cancer caused by the Trinity Test be eligible to claim their family member's RECA benefit?

2. If there were people who were visiting or working in the area from out of state when the Trinity Test bomb was detonated, would they have been affected by the radiation exposure and if so, would they be eligible for RECA benefits?

3. What is the geographic range RECA includes for the Trinity test?

4. When medical records are too old to track down or doctors have passed away, how do potential RECA beneficiaries submit proof of these early cancers and illnesses?

MEMORANDUM April 27, 2021

To: House Committee on the Judiciary
Attention: Will Emmons

From: Scott D. Szymendera, Analyst in Disability Policy, sszymendera@crs.loc.gov, 7-0014

Subject: **Responses to Questions for the Record for the March 24, 2021 Subcommittee on the Constitution, Civil Rights, and Civil Liberties Hearing "Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act"**

This memorandum provides my responses to the questions for the record submitted by Representative Chip Roy for the House Committee on the Judiciary, Subcommittee on the Constitution, Civil Rights, and Civil Liberties hearing "Examining the Need to Expand Eligibility Under the Radiation Exposure Compensation Act" held on March 24, 2021.

If you would like any additional information, please contact me by phone at x7-0014 or email at sszymendera@crs.loc.gov.

Question 1: Due to the length of time that has passed without RECA being amended, would the families of Downwinders who have died due to cancer caused by the Trinity Test be eligible to claim their family member's RECA benefit?

Response: Under current law, Radiation Exposure Compensation Act (RECA) benefits may be paid to a living downwinder, or, if the downwinder is deceased, to the survivors of the downwinder in the following order of precedence:

1. spouse, provided the spouse was married to the claimant for at least one year before the claimant's death;
2. children, in equal shares;
3. parents, in equal shares;
4. grandchildren, in equal shares; and
5. grandparents, in equal shares.[1]

Thus, if eligibility for RECA benefits were to be extended to include persons who may have been affected by fallout from the Trinity test in 1945 in New Mexico, the survivors of any deceased downwinders would be eligible for benefits in the same manner as survivors of downwinders from the Nevada Test Site (NTS).

[1] Section 6(c)(4) of the Radiation Exposure Compensation Act (42 U.S.C. §2210 note). Only the survivors listed here are eligible for RECA benefits, and if there are no such survivors to a claimant, no benefit is paid on that claim.

Question 2: If there were people who were visiting or working in the area from out of state when the Trinity Test bomb was detonated, would they have been affected by the radiation exposure and if so, would they be eligible for RECA benefits?

Response: It is possible that such persons may have been affected by fallout from the Trinity test. The eligibility of such persons would depend on the specific legislative language utilized to provide RECA eligibility to Trinity test downwinders. Under current law, for example, for NTS downwinders, persons must have been physically present in the designated eligibility area for one of the following periods:

- for claims related to leukemia (with initial exposure to fallout prior to age 21):
  - a period of at least 1 year during the period beginning on January 21, 1951, and ending on October 31, 1958; or
  - the entire period between June 30, 1962, and July 31, 1962;
- for claims related leukemia (with initial exposure to fallout after age 20) and other types of cancer:
  - a period of at least 2 years during the period beginning on January 21, 1951, and ending on October 31, 1958; or
  - the entire period between June 30, 1962, and July 31, 1962.[2]

Subsections (c) and (g) of Section 4 of H.R. 3783, the Radiation Exposure Compensation Act Amendments of 2019, as introduced in the 116th Congress, would have created a new downwinder area, consisting of the entirety of the state of New Mexico, for the Trinity test. Any person who was present in the state of New Mexico for at least one year during the period beginning on June 30, 1945, and ending on July 31, 1962, would have been considered a downwinder for the purposes of RECA eligibility.

Question 3: What is the geographic range RECA includes for the Trinity test?

Response: Under current law, there are no provisions for the eligibility of Trinity test downwinders. Under Subsections (c) and (g) of Section 4 of H.R. 3783, the Radiation Exposure Compensation Act Amendments of 2019, as introduced in the 116th Congress, the geographical area for Trinity test downwinders would have been the entire state of New Mexico.

Question 4: When medical records are too old to track down or doctors have passed away, how do potential RECA beneficiaries submit proof of these early cancers and illnesses?

Response: Current law requires that claimants submit written documentation of the medical conditions which are the bases of their claims.[3] The RECA program regulations require that all submitted medical records be originals or certified copies or originals, unless it is impossible to obtain original or certified copies of such documents. In such cases, claimants may submit uncertified copies of documents accompanied by a written statement explaining why it is impossible to obtain an original or certified copy

[2] Section 4 of the Radiation Exposure Compensation Act (42 U.S.C. §2210 note).

[3] Provided in the following sections of the Radiation Exposure Compensation Act (42 U.S.C. §2210 note): for downwinders and onsite participants with leukemia, Section 4(a)(1)(A)(ii); for downwinders and onsite participants with other types of cancer, Section 4(a)(2)(C); and for uranium miners, millers, and ore transporters, Section 5(a)(1)(A)(ii).

of the document.[4] In addition, program regulations require that all documents submitted by claimants "bear sufficient indicia of authenticity or a sufficient guarantee of trustworthiness."[5]

The program regulations provide detail on the specific types of medical documentation that can be submitted for each specific compensable medical condition, with these documentation requirements also included as attachments to the RECA claim forms.[6]

As an alternative to submitting medical documentation, claimants with claims based on any type of cancer that was diagnosed in Arizona, Colorado, Nevada, New Mexico, Utah or Wyoming, may authorize the Department of Justice to contact the appropriate state tumor or cancer registry. Verification from the state tumor or cancer registry that the claimant was diagnosed with a compensable type of cancer is accepted as proof of a medical condition for the purposes of establishing RECA eligibility.

If a uranium miner, miller, or ore transporter was a subject in a federally-supported health study of uranium workers, claimants for benefits may authorize the Department of Justice to contact the custodian of records of that study to request any relevant health records. These records are accepted as proof of a medical condition for the purposes of establishing RECA eligibility.

Section 6(b)(1) of the RECA statute requires the Department of Justice to resolve all issues of reasonable doubt as to whether or not a claimant is eligible for RECA in favor of the claimant. In addition, Section 6(d)(5) requires the procedures used by the Department of Justice when making determinations on claims involving Native Americans to "take into consideration and incorporate, to the fullest extent feasible, Native American law, tradition, and custom...."[7] Specific information on how the Department of Justice adjudicates individual claims in which medical records are unavailable; how the department resolves issues of reasonable doubt involving medical documentation; and how the department incorporates Native American law, tradition, and custom in its determinations of claims would have to come from the Department of Justice.

[4] 28 C.F.R. §79.5(a).

[5] 28 C.F.R. §79.5(b).

[6] Various sections of Part 79 of Title 28 of the Code of Federal Regulations (C.F.R.). The RECA claims forms can be accessed online on the website of the Department of Justice at https://www.justice.gov/civil/common/reca.

[7] 42 U.S.C. §2210 note.