

RESOLUTION OF THE  
NAVAJO NATION COUNCIL

23<sup>RD</sup> NAVAJO NATION COUNCIL - Third Year, 2017

AN ACTION

RELATING TO LAW AND ORDER, HEALTH, EDUCATION AND HUMAN SERVICES, RESOURCES AND DEVELOPMENT, NAABIK'ÍYÁTI' COMMITTEES, AND THE NAVAJO NATION COUNCIL DEMANDING IMMEDIATE ASSISTANCE AND ATTENTION FROM THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, THE OFFICE OF NAVAJO-HOPI INDIAN RELOCATION, THE NAVAJO NATION ENVIRONMENTAL PROTECTION AGENCY, THE STATE OF ARIZONA, AND APACHE COUNTY, ARIZONA FOR ASSISTANCE IN ADDRESSING URANIUM CONTAMINATION IN THE WATER SUPPLY NEAR SANDERS, ARIZONA

WHEREAS:

- A. The Health, Education and Human Services, Resources and Development, Law and Order, and Naabik'íyáti' Committees are established as standing committees of the Navajo Nation Council. 2 N.N.C. §§ 400(A), 500(A), 600(A), and 700(A).
- B. The Law and Order Committee is empowered to review and recommend resolutions regarding coordination between the Navajo Nation and the federal government. 2 N.N.C. §§ 601(B)(1)(a) and 601(B)(13).
- C. The Health, Education, and Human Services Committee is empowered to review and recommend "Resolutions relating to social services, health, environmental health, education, veterans and veterans services, employment and labor." 2 N.N.C. § 401(B)(6)(a).
- D. The Resources and Development Committee (RDC) exercises oversight authority over water, land, the environment, and environmental protection to establish optimum utilization of all Navajo Nation resources. RDC is empowered to promulgate rules and regulations governing environmental protection. 2 N.N.C §§ 500(C)(1) and 501(B)(1).
- E. The Naabik'íyáti' Committee is empowered to coordinate all federal programs and to assist and coordinate all requests for information, appearances and testimony relating to federal legislation impacting the Navajo Nation. 2 N.N.C. §§ 701(A)(4) and 701(A)(7).

- F. A proposed resolution that requires final action by the Navajo Nation Council shall be assigned to the Naabik'iyáti' Committee before it is heard by the Navajo Nation Council. 2 N.N.C. § 164 (A) (9).
- G. The water supply in the area in and around Sanders, Arizona is contaminated with Uranium. See the news article, "Research into Arizona town's uranium-contaminated water supply sparks change." The article is attached as Exhibit A.
- H. The Puerco-Little Colorado River Watershed Navajo Community-Based Uranium Water Quality Assessment Project, through To Lani Enterprises and the Southwest Research and Information Center has determined wells located in the Park Estates area of Sanders and the Sanders School District contain unsafe levels of uranium. See Exhibit B, Slide Presentation from September 2015.
- I. The United States has prepared a plan to address uranium contamination within the Navajo Nation entitled, "Federal Actions to Address Impacts of Uranium Contamination in the Navajo Nation." The report is attached as Exhibit C.
- J. Water to Sanders Park Estates community is now being supplied by Navajo Tribal Utility Authority (NTUA). Although NTUA is providing water from a different source than the previous supplier, Arizona Windsong Water Company (AWWC), NTUA is using AWWC's water lines. Since the existing water lines are being used to supply water to Park Estates residents, the likelihood of contamination remains. See Navajo Times article dated April 14, 2016, attached as Exhibit D.
- K. The Sanders Unified School District tested the uranium levels in its water supply and received notice on August 10, 2016, that the sample collected exceeded the maximum contaminate level for uranium. See Exhibit E.
- L. Both the Sanders Park Estates and the Sanders School need new water lines to avoid additional contamination from the water delivery system.

- M. The Nahata Dziil Commission Governance passed a Resolution on July 30, 2015, requesting the United States Environmental Protection Agency, the Navajo Nation Environmental Protection Agency, the Office of Navajo-Hopi Indian Relocation, the state of Arizona, and Apache County, Arizona take the following actions: (1) declare a state of emergency due to uranium contamination in the public water system in Sanders, (2) that these entities collaborate to provide short-term and long-term alternative water supplies to the Sanders Unified Elementary School, (3) provide new lines for both Park Estates and Sanders Unified Elementary School, (4) that these entities provide for ongoing monitoring, documentation, and reporting of uranium, radioactivity, and heavy metals in surface water, (5) these entities support a policy of no new uranium mining and processing in the watershed of the Colorado and Rio Grande, (6) that Sanders, Arizona be included in the federal plan to address contamination in the Navajo Nation, and (7) amend existing State of Arizona laws on water monitoring reporting for the subject on "non-transit wells." See Nahata Dziil Commission Governance Resolution attached as Exhibit F.
- N. The Tse Si Ani Chapter passed resolution TSA-2016-10-048 on October 13, 2016 which supports this legislation. TSA-2016-10-048 is attached as Exhibit G.

**NOW THEREFORE, BE IT RESOLVED:**

The Navajo Nation hereby demands immediate assistance and attention from the United States Environmental Protection Agency, the Navajo Nation Environmental Protection Agency, the Office of Navajo-Hopi Indian Relocation, the state of Arizona, and Apache County, Arizona: (1) declare a state of emergency due to uranium contamination in the public water system in Sanders, (2) that these entities collaborate to provide short-term and long-term alternative water supplies to the Sanders Unified Elementary School, (3) provide new lines for both Park Estates and Sanders Unified Elementary School, (4) that these entities provide for ongoing monitoring, documentation, and reporting of uranium, radioactivity, and heavy metals in surface water, (5) these entities support a policy of no new uranium mining and processing in the watershed of the Colorado and Rio Grande, (6) that Sanders, Arizona be included in the federal plan to address contamination in the Navajo Nation, and (7) amend

existing State of Arizona laws on water monitoring reporting for the subject on "non-transit wells.

**CERTIFICATION**

I hereby certify that the foregoing resolution was duly considered by the Navajo Nation Council at a duly called meeting in Window Rock, Navajo Nation (Arizona) at which a quorum was present and that the same was passed by a vote of 17 in favor and 0 opposed, this 18<sup>th</sup> day of April, 2017.



LoRenzo C. Bates, Speaker  
Navajo Nation Council

4/18/18

Date

Motion: Honorable Davis Filfred  
Second: Honorable Benjamin Bennett

NAVAJO NATION

RCS# 720

NNC Spring Session

4/18/2017

01:52:59 PM

Amd# to Amd#

Legislation No. 0345-16

PASSED

MOT Filfred  
SEC Bennett

Yea : 17

Nay : 0

Not Voting : 7

Yea : 17

Begay, K  
Begay, S  
BeGaye, N  
Bennett  
Chee

Damon  
Filfred  
Hale  
Perry

Pete  
Phelps  
Shepherd  
Smith

Tso  
Tsosie  
Witherspoon  
Yazzie

Nay : 0

Not Voting : 7

Bates  
Begay, NM

Brown  
Crotty

Daniels  
Jack

Slim



# Research into Arizona town's uranium-contaminated water supply sparks change

Joe Dana and Nancy Harrison, KPNX 9:36 AM, MST April 10, 2016



(Photo: 12 News)

SANDERS, Ariz. - A northern Arizona town's water supply is contaminated with potentially dangerous levels of uranium, exposing hundreds of people in homes and a local school district, according to water test records.

A public notice said the contaminant levels in the water



<https://b6613b452e5aa648d2f8d6999fbc500008b05170.googleusercontent.com/host/0BzDSr5i6uBA2f1NEQmRZeEFuZiB2Y2xuMVNkzRtWxJRTVVGTXpUZERSUThGaXk0SiZ4QmM/201648162643adeq.pdf> exceeds federal standards, but that the water was still safe to drink, according to the Arizona Department of Environmental Quality.

Long-term exposure to uranium can lead to kidney disease and radiation-induced cancer.

Town leaders want to know why the state agency issued the first public notice about the danger in August of 2015, despite having reports of chemical samples showing federally unsafe contamination levels more than a decade earlier.

"Folks have been using the water for so many years without being told," said Raymond Smith Jr., a community leader in Sanders. "Everybody is wondering, why are we just now getting this information?"

## Sounding the alarm

The announcement by ADEQ in August appears to have been prompted by a Northern Arizona University P.H.D. student whose independent water tests in July triggered concerns.

Forty-year-old Tommy Rock is a student of earth science and environmental studies. Rock decided to examine uranium levels in the Sanders drinking water supply in July, 2015. The town sits within the jurisdiction of the state of Arizona and is located near New Mexico and the Navajo Reservation.



NAU graduate student Tommy Rock discovered dangerous levels of uranium toxicity in the water supply of Sanders, AZ. (Photo: 12 News)

As the grandson of a Navajo uranium miner, Rock was probing a question linked to his own family's legacy.

Rock grew up in Monument Valley, Utah, on the Navajo Reservation. His family tree is dotted with cancer cases about which he wonders whether they're related to decades of uranium exposure.

The reservation has more than 500 abandoned uranium mines linked to the Cold War era. Uranium contamination in homes, soil and drinking water across Navajo country is well-documented by the EPA (<https://www3.epa.gov/region9/superfund/navajo-nation/>).

"I've especially been interested in the relationship between the federal government and the communities affected by these mines," Rock said. "The tribes are worse off today. There's a lack of response, a lack of immediate action by the government and we're still living the consequences of it."

Uranium is a radioactive element and a building block for weapons and nuclear fuel. It's one of 130 contaminants in public drinking water monitored by the EPA and ADEQ.

The legal threshold set by the EPA for uranium in drinking water, known as "maximum contaminant levels" (MCL), is 30 micrograms per liter, also known as 30 parts per billion.

In 1979, catastrophe struck a mine in Church Rock, New Mexico that many people believe still impacts Sanders today. A mining wastewater pond, known as a tailing, spilled into the Puerco River. The breach caused the single largest release of radioactive material in U.S. history.

The Puerco River flows downstream about 50 miles before it reaches Sanders, trickling into streams and seeping into rocky terrain.

Drinking water tests conducted in the 1980s in Sanders showed the underground wells did not appear affected. Uranium concentration was 6 to 8 parts per billion – not a cause for concern.

But by 2003, uranium levels in the town's well water began showing up in high concentrations, ADEQ records show. A sample in 2003 showed uranium levels at 69 parts per billion. Over the span of the next 12 years, water samples totaled an average of nearly 50 parts per billion.

"You're talking about a six- to sevenfold increase in uranium concentration over that period of time," said Chris Shuey, a uranium impact specialist at the [Southwest Research and Information Center \(http://www.sric.org\)](http://www.sric.org), a nonprofit research group that analyzes public health issues in the Southwest.

Shuey's organization assisted Rock in analyzing water samples in July.

The two men conducted water tests and researched the history of water quality in Sanders, using documents provided by the Environmental Protection Agency and the ADEQ. Records show the town's primary water supplier, Arizona Windsong Water Company, had a long history of state and federal code violations dating back to 1990.

The company operates a 175-foot well that sits near the edge of the Puerco River.

Water companies are required to monitor contaminant levels, submit data to the state, and notify the public of water test results in annual "consumer confidence reports." Since 1990, the company has been reprimanded for failing to submit those reports, repair structural deficiencies and gain certification.

12 News contacted the owner of Arizona Windsong Water Company, Lillie Paulsell. She declined to comment for this story and referred questions to ADEQ.

The ADEQ provided 12 News with documents detailing the agency's efforts over the past 12 years to bring Windsong Water Company into compliance with federal testing and reporting laws, including uranium standards. The agency issued annual notices, warnings for fines and written reprimands.

Documents show Paulsell often responded to the agency by saying the company did not have funds to make system improvements. During this time, the EPA also issued at least two administrative orders against the company.

"Arizona Windsong has experienced a variety of challenges for years, including funding," wrote ADEQ spokeswoman Caroline Opelman in a statement to 12 News. "During this time ADEQ and EPA have been and are continuing to work with Arizona Windsong to bring this system into compliance."

Troubled by the long history of noncompliance and their own water tests, Rock and Shuey held a Sanders town meeting in August 2015.

"It's a sad injustice that this is once again happening to Navajo people that has been disproportionately effected in my view by this entire uranium legacy that has been going on for seventy years," Shuey said.

Shuey's firm, SRIC, presented to residents a slideshow regarding the history of uranium toxicity in the region and the test results of water samples in Sanders.

Their message to residents was straightforward: Local drinking water is not safe to drink, period. Showering is discouraged because of possible radon inhalation. Water temperatures should be kept cool to reduce exposure to radon.

"You know I was really irate at that time, to learn about all these violations over so many years," said Genevieve Lee, a grandmother and lifelong Sanders resident who attended the meeting.

Over the years, Lee said she knew there were concerns about uranium toxicity in the region but she assumed the public would be notified if it was ever a problem for Sanders.

In August, ADEQ issued a public notice about the uranium levels in the water. However the agency declared the water was still safe to drink for healthy adults and children.

Then in November, ADEQ issued a revised statement that cited an opinion from the Arizona Department of Health. It advised residents not to allow children under 1 to drink the water.



Genevieve Lee of Sanders, AZ only uses faucet water for washing dishes and showering. She buys bottled water for drinking and cooking. (Photo: 12 News)

"While the water being delivered to consumers by the Arizona WINDSONG Water Company exceeds the standard, drinking this water does not pose an immediate risk to your health. If it did, you would have been notified immediately," the notice stated. It added that some people who drink water containing uranium in excess of the MCL "over many years may have an increased risk of getting cancer and kidney toxicity."

The statement stresses that the risk level is low and even lower in relation to bathing and washing with the water.

"Because in Arizona's small communities, there may only be one public water system available to provide drinking water to residents, ADEQ makes every effort to work collaboratively with these systems to achieve compliance versus shutting down a community's sole water system, which can present a greater risk to public health," ADEQ's Oppleman said.

Shuey and Rock insist ADEQ's public notification is more than a decade overdue and not strong enough to protect the public.

"There's no evidence in the record that the Arizona Department of Environmental Quality intervened when it became clear this company was not informing its customers of the quality of the water beginning in 2003," Shuey said. "The biggest issue remains ADEQ's failure to take responsibility for not enforcing the uranium MCL's until last fall's administrative order and for not informing customers about the uranium contamination."

According to federal Safe Drinking Water Act, water suppliers are responsible to notify the public of contaminated water that exceeds EPA standards.

If a water supplier does not fulfill its obligation, the state should have at minimum an ethical responsibility to notify customers directly, Shuey said.

In an emailed statement to 12 News, Director of ADEQ Misael Cabrera said public water systems bear the responsibility to notify their customers through public notices and consumer confidence reports.

"As evidenced by the 172 documents ADEQ provided to KPNX, ADEQ has engaged with Arizona WINDSONG and EPA for years to resolve the system's issue," Cabrera wrote.

Cabrera added that beginning in June, ADEQ will put into place a new process that for the first time will directly notify customers of drinking water violations if the companies do not do it themselves.

"ADEQ is developing a process to notify consumers with timely notice about drinking water violations when public water systems fail to do so," Cabrera said.

Cabrera added that information regarding inspections and public notices of water systems is



available to anyone online through the [ADEQ Water Quality Division homepage](http://www.azdeq.gov/enviro/water/dw/index.html) (<http://www.azdeq.gov/enviro/water/dw/index.html>).

**WATCH:** Part two of our investigation (<http://www.12news.com/news/local/valley/excess-uranium-in-school-drinking-water/126913336>)

## Botched ADEQ records removed oversight from schools

The research by Rock and Shuey also exposed an alleged record-keeping snafu by ADEQ regarding the Sanders Unified School District's water supply.

The district does not use Arizona Windsong Water Company for its water source. Rather, it manages its own water well for its estimated 800 students. Another 150 staff members reside in on-campus housing.

Prior to 2008, the school system's water was properly classified as a "community based well." But the state changed the school district's water supply classification to a "non-transit well," which did not require the same water quality testing.

"In 2008, an ADEQ inspector, no longer employed at ADEQ, reclassified the Sanders School District public water system, to a class that does not require uranium monitoring," said Oppleman in a statement to 12 News. "In the fall of 2015, ADEQ reclassified Sanders School District water system to require uranium monitoring."

The reclassification means that for several years, school children drank water that exceeded state and federal uranium standards without oversight by the state. There is no indication an employee for ADEQ purposely violated policies regarding classification of water systems, and records show ADEQ sent a letter to the district in 2010 notifying it of federal uranium violations.

However, to prevent any water systems from being misclassified in the future, Cabrera said ADEQ will institute a new policy to provide checks and balances for re-classification of water systems. No single ADEQ inspector will have the authority to re-classify a water system, Cabrera said.

Sanders Unified School District Superintendent Dan Hute said when he learned last year about the state misclassification, he was unsettled.



"For me, it means we're putting our future generations at risk," said Dan Hute, Sanders Unified School District Superintendent. (Photo: 12 News)

"Somewhere in the back of my mind I would probably have speculation about why it happened, but I don't want to go there," Hute said. Instead of focusing on why, Hute said he is determined to keep his students protected moving forward.

After Rock and Shuey notified the superintendent about the unlawful uranium levels – a 2008 ADEQ test showed uranium at 31 parts per billion and two tests conducted by Rock and Shuey in July, 2015 showed uranium levels between 34 and 37 parts per billion – Hute immediately shut off drinking fountains on campus.

He advised staff members to use the tap water sparingly and not to drink it.

"For me, it means we're putting our future generations at risk," Hute said.

Hute began a GoFundMe account, asking the public for funds to purchase bottled water for staff and students.

Hute said when he talked to ADEQ about the problem in August, he felt the agency was not being proactive enough.

"The notice they gave us was the water would be safe to use as long as there was not long-term exposure," Hute said. "But what constitutes long-term exposure? We have kids who have been already attending this school for years."

According to ADEQ, the MCL is designated to protect more susceptible individuals who drink two liters of water every day for their entire life.

But Hute does not want to take chances. He's working with the Arizona School Facilities Board, which funds improvement projects, to come up with a solution.

### What's next?

For now, many homeowners use bottled water.

Since the August public meeting, Lee has changed her lifestyle drastically.

"We've decided to start trucking in water from Gallup. We also get some donations of bottled water that have been given to the town," Lee said.

Outside water is costly. Lee says she still uses well water for washing dishes and showering. There is always uncertainty about whether her health is in jeopardy, she said.

"Everything we have comes from the environment, the soil. So we don't really know," she said. "I just pray. I pray a lot."

Shutting down the Windsong Water Company for noncompliance is not an option, said Director Cabrera in his email statement.

"ADEQ's (<http://www.azdeq.gov/environ/water/dw/index.html#sdwis>) mission (<http://www.azdeq.gov/environ/water/dw/index.html#sdwis>) is to protect and enhance public health and the environment and we have not taken a heavy-handed approach to Arizona Windsong because when a community has NO water, it faces immediate and acute public health risks. Shutting down a water system anywhere in rural Arizona when alternate water sources are not readily available is akin to asking residents of Maricopa County to stop breathing on a high pollution advisory day."

But Shuey and Rock say something drastic is needed.

"There needs to be a new public water system for the town of Sanders and the elementary and middle school," said Rock. "And instead of talking about it we need some action."

The community of Sanders and the school district are looking at several possible solutions to bring drinking water into compliance with acceptable uranium levels. They include filtration systems, deeper wells, and connecting to separate water sources. But all options are costly and will likely require investments by tribal, state or federal authorities.

Some community leaders are skeptical, based on history.

"Arizona ADEQ, they've known this for a long time and I think we're just too far up north out of Phoenix. If this happened in Phoenix or any other place there would be people in action," said Wayne Lynch, a rancher who grew up in Sanders.

Cabrera said unfortunately, smaller water systems that operate in rural areas experience similar challenges with funding and system maintenance.

"It should be noted that this is something we're seeing nationally," Cabrera said.

According to news reports, the water crisis in Flint, Michigan has also caused many communities nationally to be more sensitive to problems in their own water systems. Issues that may have seemed minor in the past are getting more attention now.

The most likely solution appears to be connecting Sanders' water system to pipes from the nearby Navajo Tribal Utility Authority (NTUA).

A hearing is scheduled in two weeks in Phoenix at the Arizona Corporation Commission to consider a takeover of the water system by the NTUA.

Raymond Smith Jr. is a Navajo Nation Council delegate.

"We've been talking, we've been meeting and it seems the state and the county won't say 'we will help you in this matter'," Smith said. "We need progress."

ADEQ Director Cabrera said the agency is prepared to work toward a solution.

"ADEQ and other concerned state and tribal agencies recently identified an alternative drinking water source for Arizona Windsong Water system customers," Cabrera said. The solution he referred to is the NTUA water connection.

"This alternative source could be in place within the next few months," Cabrera said.

Superintendent Hute said he believes ultimately the responsibility for providing safe water to Sanders lies with the Environmental Protection Agency.

"If I'm going to lay blame with anything it would be the federal government," Hute said. "But somewhere down the line the state (ADEQ) should be working hand in hand with the federal government to clean this up. It's time they stop talking about it, took responsibility, and do something."

Copyright 2016 KPNX

### JOIN THE CONVERSATION

To find out more about Facebook commenting please read the [Conversation Guidelines and FAQs \(http://StaticDomain/conversation-guidelines/\)](http://StaticDomain/conversation-guidelines/)

[LEAVE A COMMENT \(\)](#)



EXHIBIT

B

## PUERCO-LITTLE COLORADO RIVER WATERSHED NAVAJO COMMUNITY-BASED URANIUM WATER QUALITY ASSESSMENT PROJECT

### USEPA Environmental Justice Grant:

- Tó Łani Enterprises (Tommy Rock, Jacques Seronde)
- Southwest Research and Information Center (Chris Shuey)
- in collaboration with of Little Colorado River Watershed Chapters Association (Janene Yazzie)

September 2015



### Why study water quality in Puerco-LCR Watershed?

- Waste discharges to Puerco River since 1950s
  - Mine water discharges to Puerco River, 1960-1986
  - Church Rock Uranium Mill Tailings Spill, July 1979
  - Gallup sewage treatment return-flows
- Previous studies showed contamination in surface water and ground-water wells – new surveillance needed
- Water Security: To put water to use, we must understand water quality in the Puerco and and Little Colorado rivers and their tributaries
- *Nahata'* — Water quality data informs plans for developing good water
- Community empowerment — direct involvement in water resource science and policy; training builds capacity



## Capacity-building: Hiring and training community water quality specialists and insuring scientific validity of data

- Manuelito, Tsé Si Aní (Lupton), Houck, Nahata Dziil (New Lands), Birdspring, Leupp, Tolani Lake, Cameron, Blue Gap/Tachee
- Coordinators hired in each community (except Blue Gap-Tachee) as water quality specialists
- All coordinators trained by TLE and SRIC professional staffs in proper water quality surveillance: sample collection, preservation, shipping
- USEPA, Navajo EPA-PWSSP approved TLE/SRIC Quality Assurance Plan (QAP) for water sampling
- Samples tested at USEPA-certified laboratory in Ft. Collins, CO, using USEPA-approved methods

### Puerco- Little Colorado River Watershed Navajo Community-Based Uranium Water Quality Assessment Project

**Locations:** Along Rio Puerco and the Little Colorado River on the Navajo Nation starting from Manuelito Chapter, Lupton Chapter, Houck Chapter, and New Lands Chapter. Along the Little Colorado River that has Birdspring Chapter, Leupp Chapter, and Cameron Chapter, the chapter listed all reside within the Navajo Nation. The Blue Gap/ Tachee Chapter unregulated wells and stock ponds near the Abandoned Uranium Mines will be sampled.

Prepared by: Tommy Kock: [Signature] Date: 4-1-15  
 Tolani Lake Enterprise: Technical Director/Project Co-Manager  
 Eugene McNaughton: [Signature] Date: 3/30/15  
 US EPA Region 9 Quality Assurance Office  
 Data Format Reviewed by: Yolanda Barney: [Signature] Date: 3/24/15  
 Navajo EPA Environmental Program Manager  
 Linda Reeves: [Signature] Date: 3/24/15  
 US EPA Region 9 Project Manager

## Regulated Water

- "Safe" drinking water
- Regularly tested and treated pursuant to NNEPA, USEPA or state regulations
- PWS: 15 service connections, or serves 25 residents yearlong
- Must comply with primary drinking water standards



Regulated water at two hauling stations



Examples of unregulated water sources

## Unregulated Water

- Not regularly tested or treated
- Windmills, springs, artesian wells, private wells, stock ponds
- Originally intended for livestock watering, irrigation
- Navajo Nation policy is humans should not drink from livestock-use-only water sources

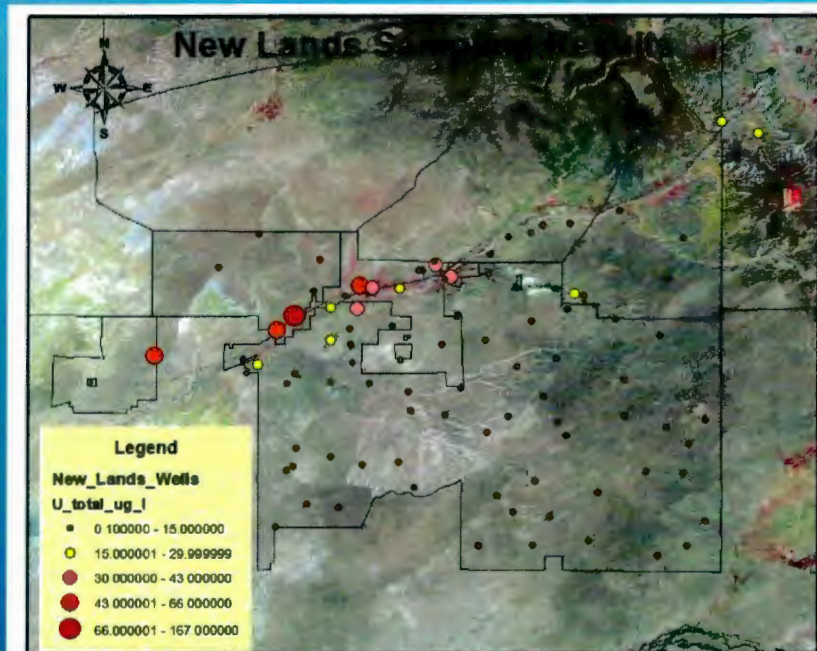


## TLE Sampling Focused on Radionuclides

- Use **Safe Drinking Water Act** (federal and tribal) Maximum Contaminant Levels (MCLs) applicable to Public Water Systems (PWSs) for comparison purposes
- **Uranium**: 30 micrograms per liter ( $\mu\text{g/l}$ ), or parts per billion (ppb)
- **Gross Alpha Particle Activity** (total): 15 picoCuries per liter ( $\text{pCi/l}$ )
  - For regulatory compliance, uranium and radon activities are subtracted from the gross alpha (total) result
- **Radium 226+228 (combined)**: 5  $\text{pCi/L}$
- More than 120 contaminants in drinking water have MCLs: metals, solvents, petroleum products, pesticides, chlorination byproducts
- Bacteriological contaminants tested monthly in PWSs

## Uranium-contaminated wells concentrated along the axis of the Puerco River

As shown on this map, the majority of wells sampled by TLE do not have elevated uranium concentrations (i.e.,  $>1/2$  of MCL). In fact, only about 12% of wells tested had U levels  $>30 \mu\text{g/l}$ . However, nearly all of the wells with elevated U levels (yellow, orange and red dots) are located along the axis of the Puerco River. A preliminary review of previous studies in the region suggests that many, if not most, of the contaminated wells are completed in the alluvium.



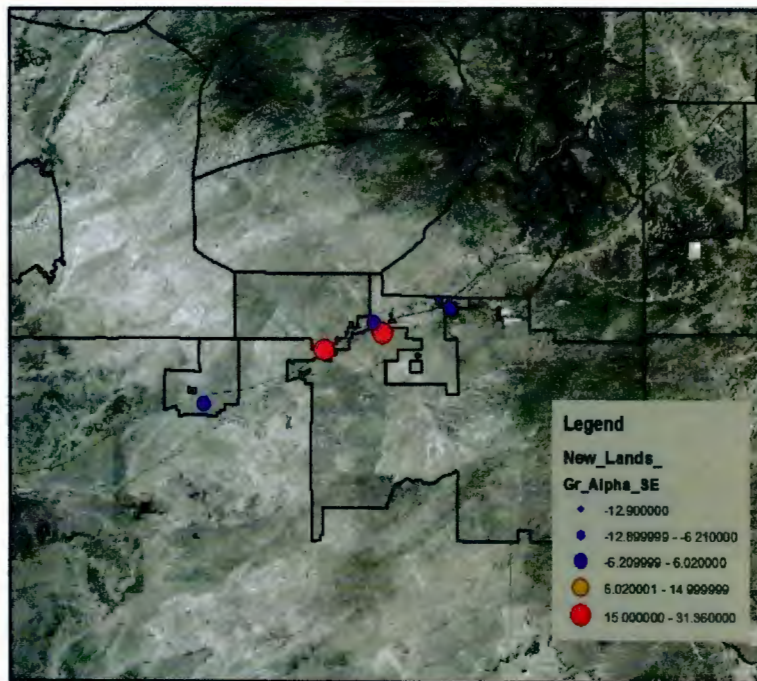
Map by Tommy Rock



## Gross alpha particle activity indicative of uranium contamination of wells in New Lands area

*This map shows total gross alpha particle activity in TLE-sampled wells in New Lands area. Red dots indicate levels greater than the MCL*

*No wells sampled by TLE to date have contamination by total radium (Ra-226+228)*



## Radionuclide data for New Lands-area wells exceeding uranium MCL

Sample #	Well_Name	DD_Lat	DD_Long	Date Sampled	Chapter	pH	Gross Alpha pCi/l	Total Ra (226+228) pCi/l	U_ppb
N001	Park Estates home	35.21014	-109.32447	4/23/2015 8/11/15	Sanders	7.83	34.7	0.299	42.8 43.0
N004	Chambers Well #8	35.17764	-109.42115	5/4/2015	Nahata Dziil	9	52.8		32
N073	ATSF-3 Chamber 65	35.19036	-109.43351	6/5/2015	Nahata Dziil	8	31		48
N076	Lynch private well	35.22186	-109.34070	6/5/2015	Nahata Dziil	7	22.6	0.431	43
N088	Jones well	35.16962	-109.4864	6/23/2015	Nahata Dziil	8	101	0.29	170
N090	Highway well #47	35.15449	-109.50406	6/23/2015	Nahata Dziil	11	58	0.45	63
N091	Interstate well 64	35.08339	-109.67786	6/23/15	Chambers		43	0.28	67
N092	Sandhill well	35.12818	-109.63082	6/23/2015	Nahata Dziil	10			66
N0104	ONHIR well	35.19893	-109.40567	6/29/2015	Nahata Dziil	7			34.7
N0115	Sanders School Admin Bldg.	35.215635	-109.32869	8/11/15	Sanders				37
N0116	Noggle private well			8/11/15	Sanders				37
L005	18A-112			5/29/15	Lupton				36

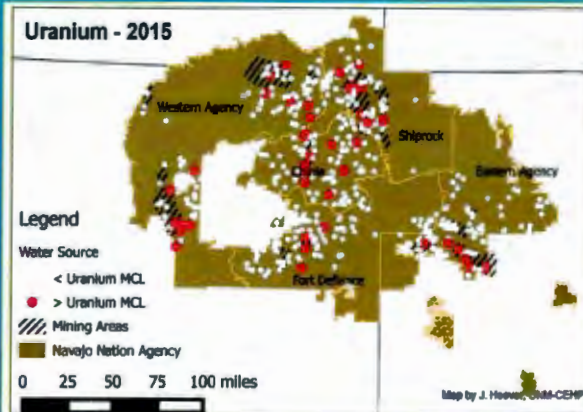


## HOW DO THE TLE-NEW LANDS URANIUM RESULTS COMPARE WITH PREVIOUS SAMPLING OF NAVAJO WATER SOURCES?

Study	% water sources exceeding U MCL (# sources tested)	Range (µg/l)	U, mean (µg/l)	U, median (µg/l)
USACE-USEPA (AZ) (1994-2000)	~17% 222	0-286	19.8	7.6
DINEH Project (NM) (2003-2011)	~9.0% 135	0-260	9.0	0.27
TLE Puerco-LCR WQP* (April-July 2015)	~10% 121	0.1-170	8.4	2.4

- TLE sampling results consistent with water quality findings in other areas of the Navajo Nation
  - percentage of wells exceeding uranium MCL (table above and map at right)
  - average U levels
- Median values, which represent the 50<sup>th</sup> percentile (middle point) of these data sets, indicate vast majority of uranium levels in Navajo water sources are much lower than the average values

\*Samples collected in August and September 2015 not included in calculations



Uranium > 30 µg/L is found in 10% of tested unregulated water sources; ranges from 8 to 19%, depending on agency.

11

## EXPOSURE ASSESSMENT: URANIUM IN PARK ESTATES AND SANDERS SCHOOL WATER SYSTEMS





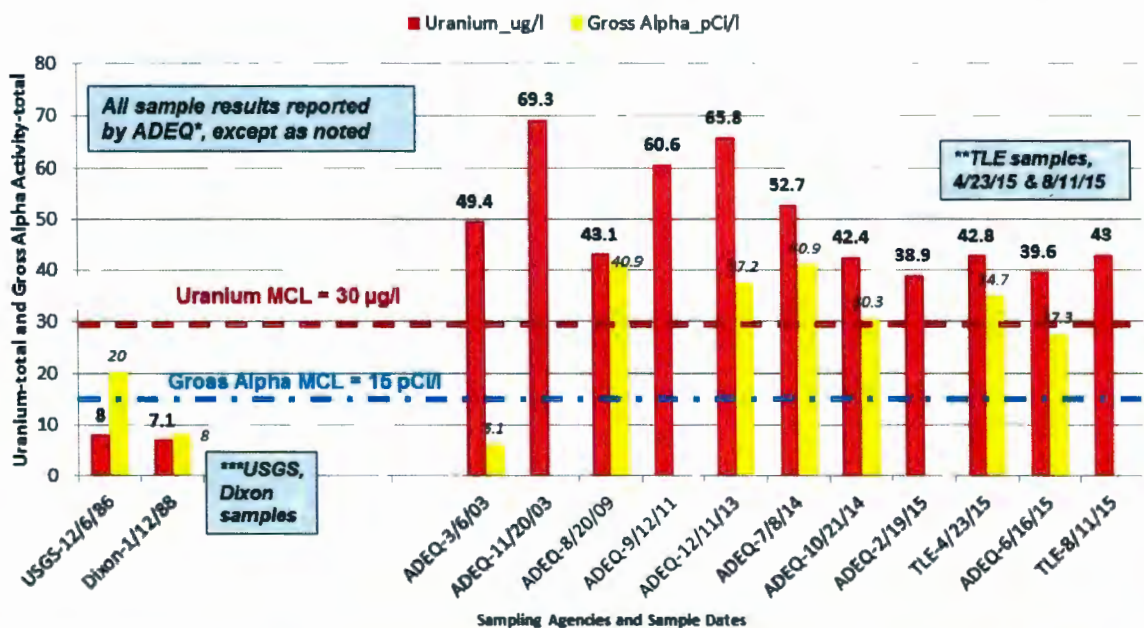
# Sanders/New Lands Area showing Park Estates and Sanders Schools



Arizona Windsong Water Co. well house, 100' south of Puerco River ~0.5 mile west of Sanders Fire house



## Uranium (total) and Gross Alpha Particle Activity (total) in Arizona Windsong Water Co. PWS System, Sanders AZ



Sources: \*ADEQ 2008-2015 (see, [http://azsdrwis.azdeq.gov/DWW\\_EXT/JSP/WaterSystemDetail.jsp?tinwsys is number=9&tinwsys st code=AZ](http://azsdrwis.azdeq.gov/DWW_EXT/JSP/WaterSystemDetail.jsp?tinwsys is number=9&tinwsys st code=AZ); Radiochemistry results for samples collected in 2003, converted from pCi/l to ug/l; Public Notice, Aug. 4, 2015; \*\*Tó tani Enterprises Puerco-LCR Water Quality Project, 2015. \*\*\*Webb et al, WRI-87-4126; Dixon, Masters Thesis, 1990. MCL = Maximum Contaminant Level (40 CFR 141).

# TLE AND SRIC RECOMMENDATIONS ON 7/24/15 AND 8/21/15\*

***TLE and SRIC recommended Park Estates residents NOT drink the water in the AWWC PWS system***

## ■ Rationale:

- Most recent samples by TLE: 42.8 µg/l and 43 µg/l
- 11 exceedances of the uranium MCL (30 µg/l) since 2003
- Average concentration during that time, 49.8 µg/l
- Large, exposed population: at least 232 residents in 62 homes
- Concern is for long-term (chronic) exposure, especially among sensitive members of the population: pregnant women, children, elderly
- Showering is discouraged because of possible radon inhalation; limit shower time, keep water temp cool
- Residents should seek alternate clean drinking water

13

*\*Reiterated at community meetings on Sept. 9-10, 2015*

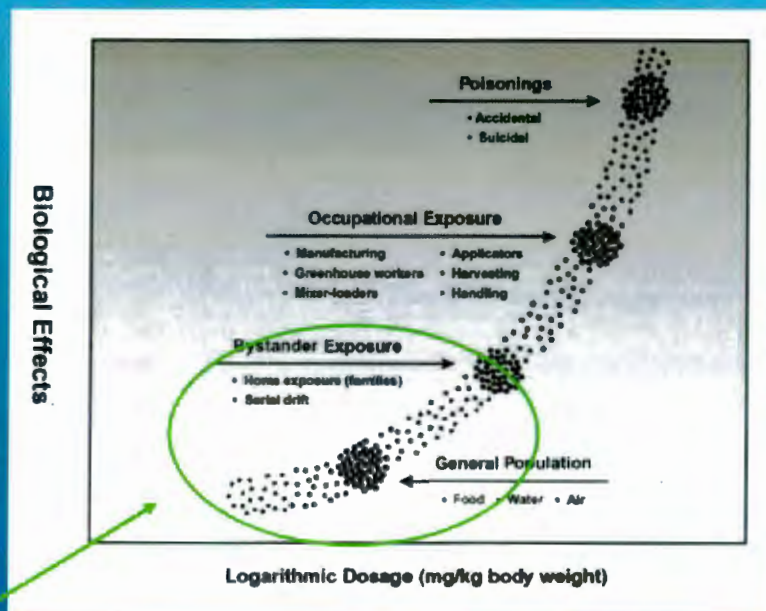
## What do we mean by "chronic exposure"?

← **Chronic** ----- **Acute** →  
(long-term, over time) (immediate effects)

- Generally, lower dose → less risk

However,

- *Exposures to low concentrations over longer periods → higher cumulative dose, greater risk*



*Most of the environmental exposures we see in human uranium studies are in the chronic, low-dose region*

14



## IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

### The Arizona Windsong Water Company System 01-009 Has Levels of Uranium Above Drinking Water Standards

The Arizona Windsong Water Company water system violated federal and state drinking water standards. Although this is not an emergency, you have the right to know what happened, what you should do, and what Arizona Windsong Water Company is doing to correct this situation.

Arizona Windsong Water Company is required to routinely monitor for the presence of drinking water contaminants. Testing results received in 2014 and 2015 show that the system exceeds the standard, or maximum contaminant level (MCL), for uranium. The standard for uranium is 30 µg/L. The average level of uranium during the last three samples was 44.5 µg/L, with the most recent sample result of 38.9 µg/L, collected on February 19, 2015. The Arizona Department of Environmental Quality (ADEQ) has not received results for the second quarter 2015, but is working to obtain them from the system operator.

#### What does this mean?

While the water being delivered to consumers by the Arizona Windsong Water Company exceeds the standard, drinking this water does not pose an immediate risk to your health. If it did, you would have been notified immediately. US EPA regulates uranium in drinking water for its potential long-term adverse effects on the kidney. Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity. The MCL is designed to protect a more-susceptible individual (for example, those with existing kidney problems) that drinks two liters of this water every day for their entire life. Drinking water with uranium somewhat above the MCL (i.e., 44.5 µg/L), but for shorter times, will be of a similarly low health risk. Risks from bathing, washing or otherwise using water with low levels of uranium are even less, since the exposures are much less.

#### What should I do?

You do NOT need to seek an alternate (for example, bottled or heated) water supply. The water remains safe to use until treatment is put into place. The water can be used for drinking, cooking, washing and other purposes. However, if you have specific health concerns, contact your doctor.

If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from your health care providers about drinking this water.

#### What is being done?

In response to this situation, ADEQ is issuing this public notice on behalf of Arizona Windsong Water Company and will ensure that Arizona Windsong Water Company continues to notify its customers of water quality issues. ADEQ and the US EPA are currently investigating possible remedies to ensure that you are provided drinking water that meets federal and state drinking water standards.

## ADEQ PUBLIC NOTICE DISTRIBUTED IN COMMUNITY AUG. 4, 2015

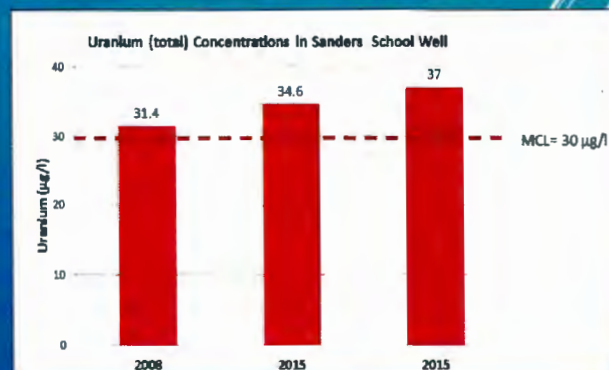
- U exceeded MCL in Feb. 2015 sample = 38.9 µg/L
- Last 3 samples averaged 44.5 µg/L
- "The Arizona Windsong Water Company water system violated federal and state drinking standards...[T]his is not an emergency.... You do NOT need to seek an alternate water supply. The water remains safe to use..." [emphasis added]

**TLE-SRIC: We stand by our recommendation of July 24 that you should not drink the AWWC water.**

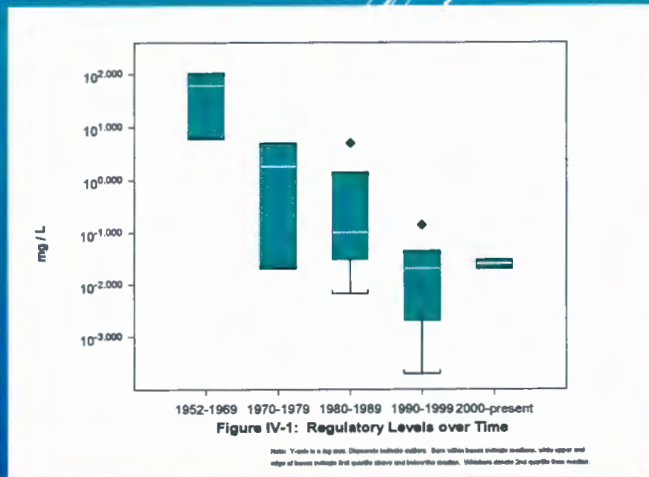
## Uranium exceeds MCL in Sanders School water system (#AZ0401022)

- Two recent samples had U levels exceeding MCL
  - SSD, 8/1/15: 34.6 µg/L
  - TLE, 8/11/15: 37.0 µg/L
- ADEQ\* reports 1 previous sample containing 31.4 µg/L on 12/3/2008
- USGS reported well is 160 ft. deep and completed in alluvium
- System provides water to:
  - ~500 students, K-8, and staff
  - 55 staff live in homes on school property
  - Local resident use water from school system year-round
- School issued public notice 9/22/15
- School reports providing alternative drinking water

\*[http://azdeq.azdhs.gov/DWW\\_EXT/JSP/NonToxSampleResults.jsp?show\\_results=1&show\\_sys\\_code=AZ&is\\_sample\\_num=14132745&sample\\_sys\\_code=AZ&history=1&counter=0](http://azdeq.azdhs.gov/DWW_EXT/JSP/NonToxSampleResults.jsp?show_results=1&show_sys_code=AZ&is_sample_num=14132745&sample_sys_code=AZ&history=1&counter=0)

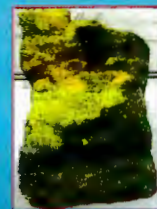


# OVERVIEW OF URANIUM TOXICITY



## WHAT IS URANIUM?

(~~LEETSO~~, OR "YELLOW DIRT", MAY NOT BE ACCURATE)

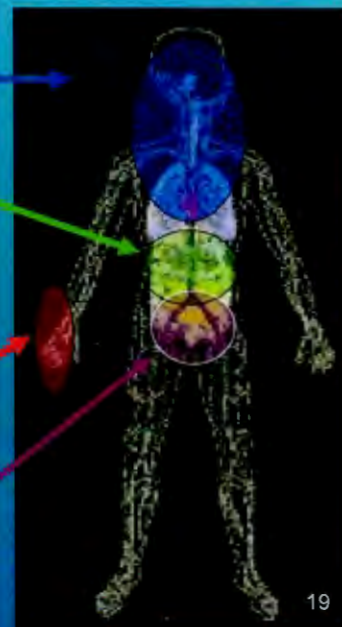


- Discovered in Russia in 1789
- A **heavy metal** — the heaviest natural element (No. 92)
- Abundance about 0.5-5 ppm (0.00005%-0.0005%) in the continental crust (1000x more abundant than gold)
  - Carnotite, most common uranium mineral
  - Yellow flecks or streaks in gray-black matrix
- A mixture of three different weights of atoms, called isotopes:
  - U-238 (99.3%), U-235 (0.7%), U-234 (<0.05%)
- U is **radioactive** (its atoms spontaneously decay, releasing energy as a new element is formed)
- Primary uses:
  - 1940s-1960s: fissile material for nuclear weapons
  - 1960s – present: fuel for nuclear power
  - 1980s – present: metal casings for field ordnance



# HOW DOES URANIUM GET IN YOU?

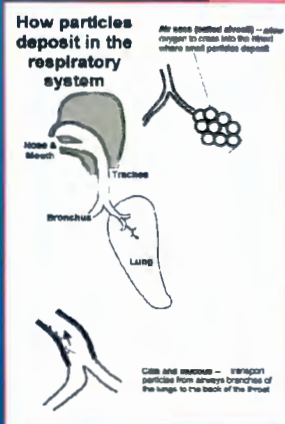
- **Inhalation** — breathing uranium in air from mine and mill wastes, dirt and rocks
- **Ingestion** — eating and drinking substances that contain uranium
  - drinking water most important pathway: about 80%
  - eating animals, plants
- **Absorption** — skin contact; washing work clothing, playing in wastes, contaminated water
- **Circulation** — uranium passes through the placental barrier



19

# WHY IS URANIUM HARMFUL?

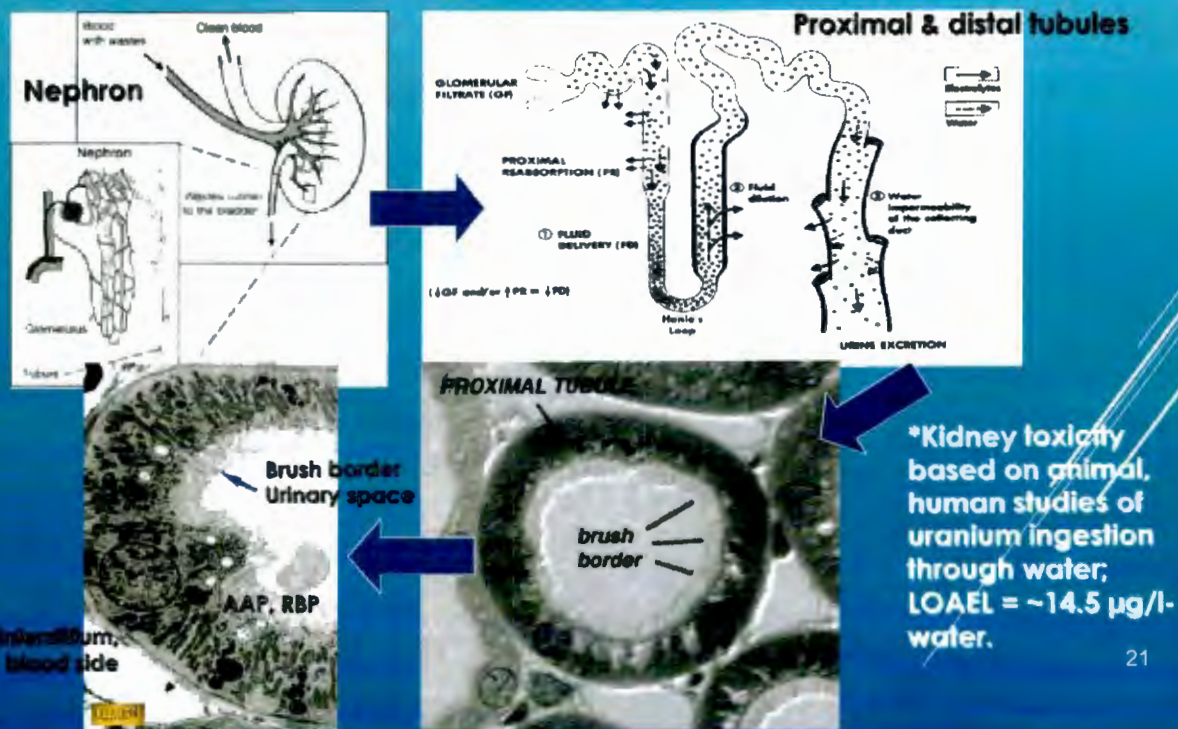
- ❑ **Chemical toxicant:** causes kidney damage, disease (proximal tubules); may be an estrogen-mimicker
- ❑ **Radiotoxicity:** causes lung and bone cancers from radioactive decay products
- ❑ Dozens of scientific, medical studies over last 125 years
- ❑ Studies of human populations exposed to *low levels* of uranium in drinking water



20



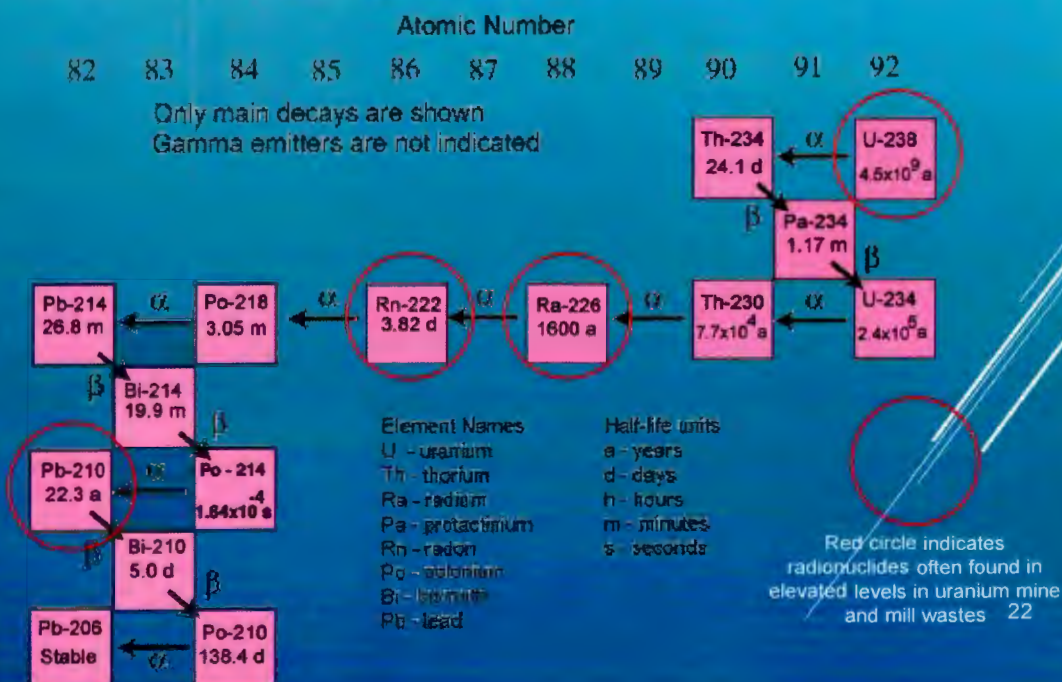
## SITES OF URANIUM CHEMICAL TOXICITY TO THE KIDNEY\*: PROXIMAL TUBULES



21

## WHAT ARE THE ELEMENTS THAT RESULT FROM THE RADIOACTIVE DECAY OF URANIUM, AND WHAT TYPES OF RADIATION DO THEY EMIT?

### The Uranium-238 Decay Chain

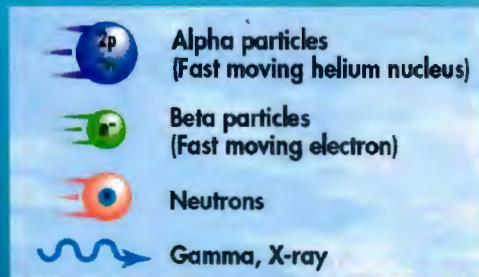


22



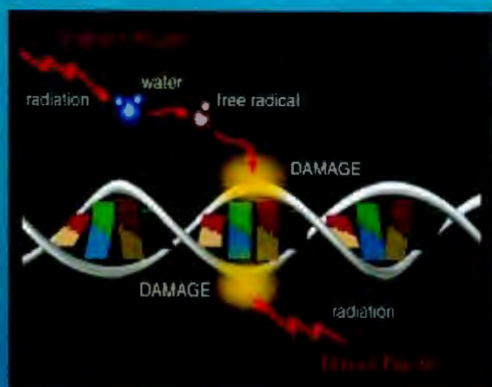
# TYPES OF RADIATION

- **Radiation:** Energy that travels through space in the form of particles or waves
- **Ionizing radiation:** energy sufficient to remove an electron from an atom or molecule
  - Radiation associated with uranium deposits, ore, wastes
- **Non-ionizing radiation**
  - Light, heat, microwaves and radio waves



23

## URANIUM'S RADIOLOGICAL PROPERTIES: ROUTES OF CELLULAR DAMAGE FROM RADIATION EXPOSURE



- **Direct route** — radiation damages DNA or other critical components for cell survival
- **Indirect route** — radiation breaks water apart and the parts interact with cell to cause damage

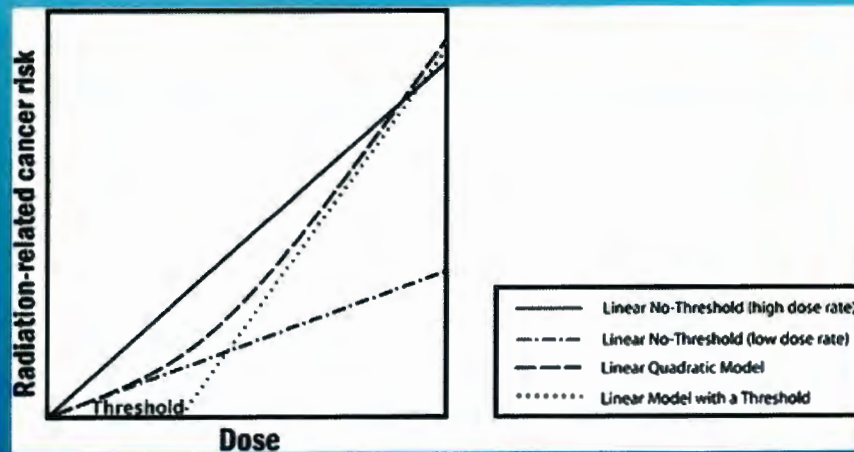
**Cell Response to Damage:** Rapidly-dividing cells are more likely to die or divide damaged before successfully repairing themselves





## BEIR VII CONCLUSION:

# NO PURELY "SAFE" LEVEL OF RADIATION EXPOSURE

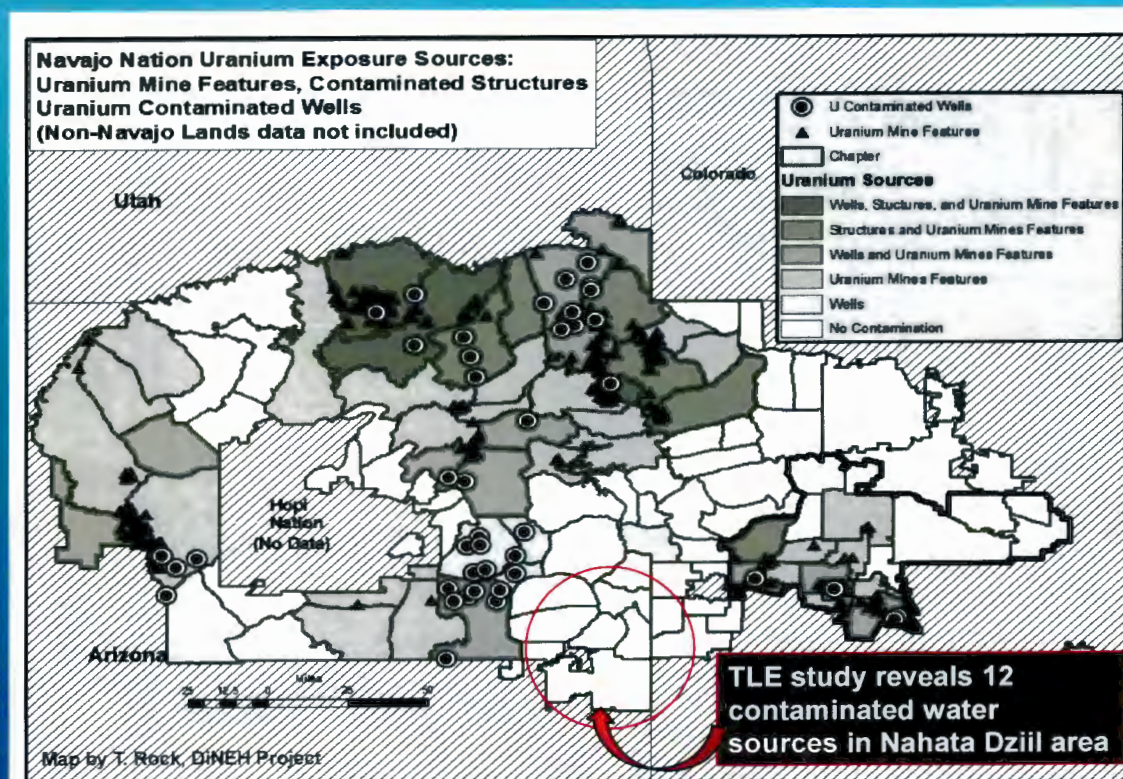


"A comprehensive review of the biology data led the committee to conclude that the [life-time cancer] risk would continue in a linear fashion at lower doses *without a threshold* and that the *smallest dose has the potential to cause a small increase in risk to humans*. This assumption is termed the 'linear no-threshold model'" [emphases added]. Committee on the Biological Effects of Ionizing Radiation, BEIR-VII, National Academy Press, Public Summary, 2006; available at <http://www.nap.edu/read/11340/chapter/2>.

25

## COMMUNITY EXPOSURES TO URANIUM

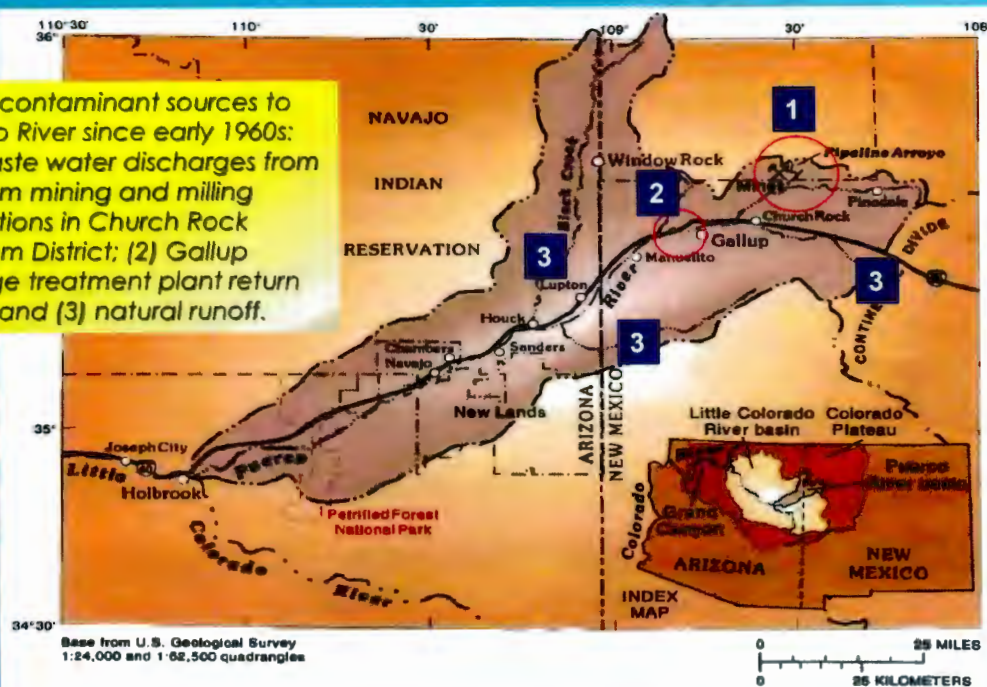
ABOUT HALF OF ALL NAVAJO CHAPTERS HAVE 1 OR MORE URANIUM EXPOSURE SOURCES





## Where did the uranium come from? Contaminant sources in the Puerco River basin

Major contaminant sources to Puerco River since early 1960s:  
(1) Waste water discharges from uranium mining and milling operations in Church Rock Uranium District; (2) Gallup sewage treatment plant return flows; and (3) natural runoff.



Puerco River Basin, New Mexico and Arizona. USGS WRI 94-4192, p. 4.

## PUERCO RIVER CONTAMINANT SOURCES CHURCH ROCK URANIUM MILL TAILINGS SPILL, \* JULY 16, 1979 \*LARGEST RELEASE OF RADIOACTIVE WASTES, BY VOLUME, IN US HISTORY

United Nuclear Corp. Uranium Mill Tailings Dam, July 16, 1979



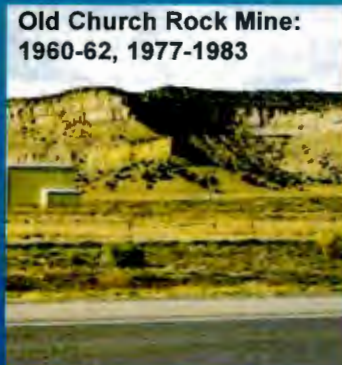
Community leaders Larry J. King (L) and Robinson Kelly addressed long-term impacts of spill in 2009.

Photos courtesy of Southwest Research and Information Center, New Mexico Environmental Improvement Division, Albuquerque Journal.



## PUERCO RIVER CONTAMINANT SOURCES MINE WATER RELEASES, 1960-1986

- Peak discharges from all 3 mines: 5,200 gpm, 1977-1983
- U in mine water typically 1,000-4,000  $\mu\text{g/l}$
- Puerco River continuously flowing during this period
- More radioactivity released by mine dewatering than in 1979 tailings spill



29

## Historic Contaminant Discharges to Puerco River

(from Shuey, 1992; Wirt 1994, Van Metre et al., 1997)

- 20+ years of discharge of uranium mine water
  - 450 gpm in 1963 to 5,200 gpm in 1982
  - Wirt, USGS (1994): "[E]ffects of uranium mining can no longer be identified in water and sediment samples from the Puerco or Little Colorado rivers"
  - Van Metre et al., USGS (1997): "Uranium-isotope ratios...indicate that larger concentrations of uranium in the alluvial aquifer are caused principally by mine-dewatering releases."
- 1979 Church Rock Uranium Mill Tailings spill
  - 94 million gallons; pH = 1.5; one-time "shock loading"
- Gallup Wastewater Treatment Plant (1958-present)
  - 6.1 million gallon release of raw sewage in 1988
  - 2.4 million gallons treated effluent per day since 1989
- Natural runoff
  - Wirt: "high sediment concentrations cause streamflow to exceed Federal standards for radioactive...and nonradioactive elements"



# WHEN REMOVED FROM *NIK'ASHBÁÁH*, URANIUM IS OXIDIZED AND MOVES RAPIDLY IN WATER

**$U^{+4}$  — in most undisturbed rocks and groundwater, insoluble**

**$U^{+6}$  — when brought to the surface and exposed to oxygen in the air, highly soluble**

## Solubility

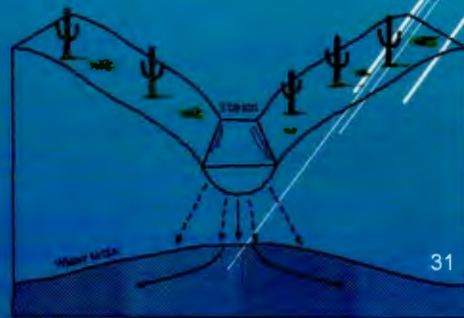
Does it dissolve slowly or quickly?



Modified from slide by J. deLemos, 2007

## Transport:

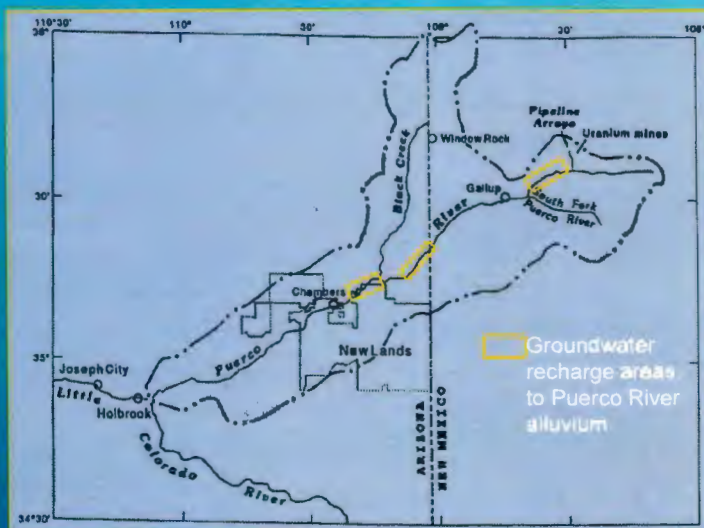
Where does it go?



## So where did the uranium go?

"Our results suggest that the low sediment uranium concentrations likely resulted from the dissolution and flushing of uranium during precipitation events. Surficial, weathered sediments are depleted of more soluble uranyl phases relative to deeper (>~20 cm) sediments."

Source: J. DeLemos, et al. Rapid Dissolution of Soluble Uranyl Phases in Arid, Mine-Impacted Catchments near Church Rock, NM. ES&T, 2008.



Geologic cross-sections in Van Metre et al. (USGS WPS-2476, 1997) indicate a thickening of the alluvium under Sanders in an area of active groundwater recharge. The AWWC well is 175 ft. deep. Did it take 20+ years for U to migrate into the deeper parts of the alluvium?



## Reducing exposures: Options for bringing clean drinking water to Sanders



- Haul in water from clean sources
  - National Guard
  - NNDWR water trucks, storage tanks
- Donate, buy bottled water
  - <https://www.gofundme.com/waterfor sanders>
- Ask NTUA to connect its system to Park Estates
- Install treatment system (IX, RO) on AWWC well
- Drill new, deeper well (below the Puerco alluvium)
- Certify new well at Sanders School<sup>33</sup>

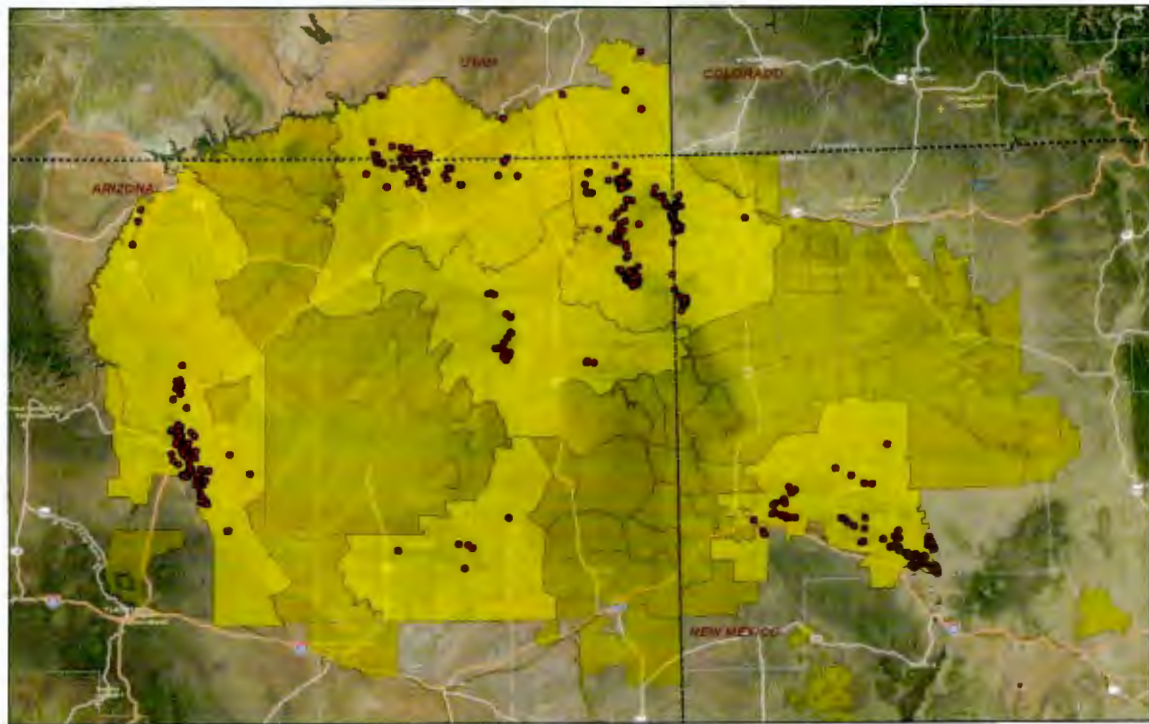
## Acknowledgements/*Ahéhee'*

USEPA Region 9-Linda Reeves  
Tolani Lake Enterprise  
Southwest Research and Information Center  
Little Colorado River Watershed Chapters Association  
Park Estates Homeowners Association  
Navajo Tribal Utility Authority  
Forgotten People  
Lupton Chapter  
Manuelito Chapter  
Houck Chapter  
Nahata Dził Commission Governance (New Lands Chapter)  
Birdspring Chapter  
Leupp Chapter  
Cameron Chapter  
Blue Gap/Tachee Chapter  
Navajo EPA  
Navajo Department of Water Resources



2014

# Federal Actions to Address Impacts of Uranium Contamination in the Navajo Nation



ATSDR



## TABLE OF CONTENTS

<b><i>Executive Summary .....</i></b>	<b><i>1</i></b>
<b><i>Introduction.....</i></b>	<b><i>2</i></b>
Summary of Work Completed 2008-2012.....	2
<b><i>Objectives.....</i></b>	<b><i>4</i></b>
<b><i>Objective 1: Assessment and Cleanup of Contaminated Structures .....</i></b>	<b><i>4</i></b>
1. Background .....	4
2. Current Status of Work .....	4
3. Goals for Next Five Years .....	4
4. Specific Actions for Next Five Years .....	5
5. Potential Limitations and Challenges .....	5
<b><i>Objective 2: Assessment of Contaminated Water Sources, and Provision of Alternative Water Supplies.....</i></b>	<b><i>6</i></b>
1. Background.....	6
2. Current Status of Work .....	6
3. Goals for Next Five Years .....	6
4. Specific Actions for Next Five Years .....	7
5. Potential Limitations and Challenges .....	7
<b><i>Objective 3: Assessment of Abandoned Uranium Mines With Detailed Assessments of those Most Likely to Pose Environmental or Health Problems.....</i></b>	<b><i>8</i></b>
1. Background .....	8
2. Current Status of Work .....	8
3. Goals for Next Five Years .....	9
4. Specific Actions for Next Five Years .....	11
5. Potential Limitations and Challenges .....	11
<b><i>Objective 4: Cleanup of the Northeast Church Rock Mine Site and Additional High Priority Abandoned Mine Sites .....</i></b>	<b><i>12</i></b>
1. Background .....	12
2. Current Status of Work at NECR.....	14
3. Goals for Next Five Years .....	14
4. Specific Actions for Next Five Years .....	15
5. Potential Limitations and Challenges .....	15
6. Status of Cleanup Work at Additional High Priority Mines.....	15
7. Goals for Next Five Years .....	17

8.	Specific Actions for Next Five Years .....	17
9.	Potential Limitations and Challenges .....	18
<b>Objective 5: Tuba City Dump Site .....</b>		<b>19</b>
1.	Background .....	19
2.	Accomplishments at the TCD Site.....	20
3.	Current Status of Work .....	21
4.	Specific Actions for Next Five Years .....	12
<b>Objective 6: Protection of Human Health and the Environment at Former Uranium Processing Sites.....</b>		<b>23</b>
1.	Background .....	23
2.	Current Status of Work .....	24
3.	Goals for Next Five Years .....	25
4.	Specific Actions for Next Five Years .....	26
5.	Potential Limitations and Challenges .....	26
<b>Objective 7: Health Studies.....</b>		<b>28</b>
1.	Background .....	28
2.	Current Status of Work .....	28
3.	Goals for Next Five Years .....	28
4.	Specific Actions for Next Five Years .....	29
5.	Potential Limitations and Challenges .....	30
<b>Cross Cutting Strategies.....</b>		<b>31</b>
<b>Enhanced Coordinated Outreach and Education .....</b>		<b>31</b>
1.	Background .....	31
2.	Goals for Next Five Years .....	31
3.	Specific Actions for Next Five Years .....	32
<b>Workforce Development and Training.....</b>		<b>33</b>
1.	Background .....	33
2.	Current Status of Work .....	33
3.	Goals for Next Five Years .....	33
<b>APPENDIX A:.....</b>		<b>35</b>
<b>Statement of the Navajo Nation.....</b>		<b>35</b>



**LIST OF ACRONYMS**

AEC	Atomic Energy Commission
ATSDR	Agency for Toxic Substances and Disease Registry
AUM	Abandoned Uranium Mine
BIA	Bureau of Indian Affairs
CDC	Centers for Disease Control and Prevention
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DiNEH	Diné Network for Environmental Health
DOE	Department of Energy
FS	feasibility study
GCAP	Groundwater Compliance Action Plan
GE	General Electric
HAZWOPER	Hazardous Waste Operations and Emergency Response
HRSA	Health Resources and Services Administration
IAR	Interim Action Report
IHS	Indian Health Service
LTS&M	long-term surveillance and maintenance
NECR	Northeast Church Rock
NMED	New Mexico Environment Department
NNAML	Navajo Nation Abandoned Mine Lands Reclamation Program
NNEPA	Navajo Nation Environmental Protection Agency
NNDWR	Navajo Nation Department of Water Resources
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
RA	remedial action
RD	remedial design
RECA	Radiation Exposure Compensation Act
RESEP	Radiation Exposure Screening and Education Program
RI	Remedial Investigation
ROD	Record of Decision
TCD	Tuba City Dump
UMTRCA	Uranium Mill Tailings Radiation Control Act
UNC	United Nuclear Corporation
USEPA	United States Environmental Protection Agency



## LIST OF FIGURES

Figure 1. Map of Contaminated Structures Assessments and Cleanups.....	5
Figure 2. High Priority Abandoned Uranium Mine Sites .....	10
Figure 3. Northeast Church Rock Cleanup Site.....	13
Figure 4. Cleanup Processes for the Northeast Church Rock Mine Site .....	14
Figure 5. Identified Potentially Responsible Parties.....	16
Figure 6. Four Corners Area and the Navajo Nation Former Mill Sites.....	22

## ***Executive Summary***

In January 2013, the United States Environmental Protection Agency (USEPA), the Bureau of Indian Affairs (BIA), the Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), the Indian Health Service (IHS), and the Agency for Toxic Substances and Disease Registry (ATSDR), in consultation with the Navajo Nation, completed a Five-year effort to address uranium contamination in the Navajo Nation. The effort focused on the most imminent risks to people living on the Navajo Nation. While the last five years represent a significant start in addressing the legacy of uranium mining, much work remains and the same federal agencies have collaborated to issue a second Five-Year Plan. The purpose of the second Five-Year Plan is to build on the work of the first plan, make adjustments based on information gained during this period, and plan the next steps in addressing the most significant risks to human health and the environment.

This Five-Year Plan has the following major objectives:

**Objective 1: Assessment and Cleanup of Contaminated Structures**—Navajo Nation Environmental Protection Agency (NNEPA) will assess and scan up to 100 homes per year and will refer those with elevated levels of radiation to USEPA for follow-up actions.

**Objective 2: Assessment of Contaminated Water Sources and Provision of Alternative Water Supplies**—Expand geographic focus for providing access to safe drinking water to all six abandoned uranium mine (AUM) regions, encompassing 55 Navajo Nation chapters.

**Objective 3: Assessment of AUM Sites with Detailed Assessments of those Most Likely to Pose Environmental or Health Problems**—Conduct detailed assessments at up to fifty of the highest priority mines.

**Objective 4: Cleanup of the Northeast Church Rock Mine Site and Additional High Priority AUM Sites**—Complete the design of the cleanup of the Northeast Church Rock mine site with input from the Navajo Nation, the community, and other agencies. For the United Nuclear Corporation to submit a License Amendment Request to the NRC for the disposal of the mine waste at United Nuclear Corporation Mill Site, and if approved, for EPA to negotiate a consent decree with GE to begin remedy construction. Conduct appropriate cleanup actions at mine sites that pose an unacceptable risk to residents or the environment.

**Objective 5: Cleanup of the Tuba City Dump**—Complete Remedial Investigation and Feasibility Study and select and begin implementing a remedy.

**Objective 6: Protection of Human Health and the Environment at Former Uranium Processing Sites**—Update the groundwater compliance strategy at Shiprock, NM and evaluate different treatment options for the Tuba City, AZ site.

**Objective 7: Health Studies**—Complete work on the Navajo Birth Cohort study in cooperation with the University of New Mexico, the Navajo Nation Community Health Representative Program, and Navajo Area IHS. Work with the Navajo Nation's Epidemiology Center and support their efforts to evaluate various cancer case rates by geographic location of cancer patient's



residence and known radiation exposure sources, and the health status of descendants of uranium miners/mill workers.

### ***Introduction***

The Navajo Nation encompasses more than 27,000 square miles, spread between the three states of Utah, New Mexico and Arizona in the Four Corners area. The unique geology of the region makes the Navajo Nation rich in uranium, a radioactive ore in high demand after the development of atomic power and weapons at the close of World War II in the 1940s. Approximately four million tons of uranium ore were extracted during mining operations within the Navajo Nation from 1944 to 1986. The federal government (i.e., the Atomic Energy Commission [AEC]) was the sole purchaser of uranium until 1966. The AEC continued to purchase ore until 1970, although sales to the commercial industry began in 1966. The last uranium mine on the Navajo Nation shut down in 1986. Many Navajo people worked in and near the mines, often living and raising families in close proximity to the mines and mills.

Uranium mining and milling activities no longer occur on Navajo lands, but the legacy of these activities remains, including more than 500 abandoned uranium mine claims<sup>1</sup> with thousands of mine features such as pits, trenches, holes, etc., and some homes that were built from mine and mill site materials. In addition, there are drinking water sources with elevated levels of uranium, radium, and other metals. Uranium and other elements (selenium, arsenic, etc.) are associated with mine and mill sites, although the same constituents occur naturally at elevated levels in rock, soil, surface water, and groundwater across the Navajo Nation and the broader Four Corners region. Health effects as a result of non-occupational exposure to these elements can include lung cancer and impaired kidney function.

For Navajo miners and millers and their families, health consequences of uranium mining and milling have been widespread. In 2000, Congress expanded the Radiation Exposure Compensation Act (RECA) to provide monetary compensation to individuals who contracted certain cancers and other serious diseases following their occupational exposure to radiation while employed in the uranium industry during the Cold War arsenal buildup. As of April 4, 2014, 1,347 Navajos have received compensation under RECA for illnesses from occupational radiation exposure as uranium miners, millers, or ore transporters.

### ***Summary of Work Completed 2008-2012***

In October 2007, at the request of the United States House Committee on Oversight and Government Reform, the United States Environmental Protection Agency (USEPA), along with the Bureau of Indian Affairs (BIA), the Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), and the Indian Health Service (IHS) developed a coordinated Five-Year Plan to address uranium contamination in consultation with the Navajo Nation. The Five-Year Plan was

---

<sup>1</sup> Note that the entire mine claim may not have been mined. Also, a mine claim may include multiple mine sites. We are utilizing mine claims in order to maintain consistency with the Navajo Abandoned Mine Lands Program that has a database of mines based on claims.

the first coordinated approach by the agencies, and outlined a strategy for gaining a better understanding of the scope of the problem and for addressing the greatest risks first.

Between 2008 and 2012, USEPA, BIA, NRC, DOE, IHS, and the Agency for Toxic Substances and Disease Registry (ATSDR) spent more than \$100 million to address uranium contamination on the Navajo Nation. This effort was guided by the Five-Year Plan. Details about this effort are described in a [January 2013 report](http://www.epa.gov/region9/superfund/navajonation/pdf/NavajoUraniumReport2013.pdf) (<http://www.epa.gov/region9/superfund/navajonation/pdf/NavajoUraniumReport2013.pdf>).

During the first five years, the agencies focused on collecting data, identifying the most imminent risks and addressing contaminated structures, water supplies, mills, dumps, and mines with the highest levels of radiation. During that time, more information was discovered about the scope of the problem and the work needed to be performed. The agencies agreed to develop a second Five-Year Plan based on information obtained and lessons learned over the last five years. All agencies are committed to continue working with the Navajo Nation to reduce the health and environmental risks and to find long-term solutions to the remaining uranium issues on Navajo lands.

*This report is issued as a working draft for the purposes of informing the public of federal agency actions and for continuing consultation, communication, and cooperation with the Navajo Nation.*



## ***Objectives***

### ***Objective 1: Assessment and Cleanup of Contaminated Structures***

**Federal Agency: USEPA**

**Navajo Nation Agency: NNEPA**

#### ***1. Background***

Uranium mining or milling waste was occasionally used as sand for aggregate (in foundations and stucco) and contaminated stones were incorporated into the walls and floors of structures, including homes. Structures may also be contaminated by the presence of mined or naturally-occurring radioactive materials in outside dust and soil brought into homes on shoes and clothing. Also, native soil and bedrock with elevated uranium concentrations can contribute to elevated radiation readings in and around structures. If contaminated structures are occupied, there is a risk to inhabitants from gamma radiation and alpha radiation (e.g., radon gas) which is a potent lung carcinogen.

#### ***2. Current Status of Work***

Between 2008 and 2012, USEPA and NNEPA surveyed 878 structures and, when found to pose a health risk, USEPA demolished and rebuilt or provided financial compensation for the structures. In total, 34 structures were addressed either through financial compensation or with a rebuilt home and contaminated soil was removed from eighteen yards. USEPA expects to complete construction of an additional eight homes by the fall of 2014.

Figure 1 shows areas where scanning assessments have been conducted by NNEPA and USEPA. During 2013 an additional 142 structures were scanned by NNEPA.

#### ***3. Goals for Next Five Years***

- a. NNEPA will scan up to 100 homes per year and will refer those that show elevated levels of radiation to USEPA for follow-up actions.
  - i. These homes will be chosen based on proximity to abandoned mines and at the request of homeowners who believe their home may be impacted by uranium.
  - ii. Radon testing not completed in the first Five-Year Plan will also be included.
  - iii. Additional homes found to be of concern may be referred to USEPA for detailed surveys. USEPA may involve other federal agencies as appropriate.
- b. USEPA will follow up on homes referred by NNEPA with detailed assessments and remediation as necessary.
  - i. USEPA will conduct detailed assessments to determine whether the home poses a risk to residents. If demolition of a contaminated structure is necessary, USEPA generally will offer the residents either a replacement structure or financial compensation depending on the circumstances. Likewise, USEPA will provide temporary housing for residents as appropriate while remediation is conducted.

USEPA and NNEPA will work together to improve and streamline the process based on lessons learned during the last five years.

#### 4. Specific Actions for Next Five Years

- a. NNEPA expects to scan 100 homes per year.
- b. USEPA expects to conduct remediation at up to ten homes per year (note that the number is dependent on the number of homes referred by NNEPA and the number found to pose a health risk).

#### 5. Potential Limitations and Challenges

USEPA will continue to work with NNEPA and Navajo residents to secure access to structures and perform surveys. USEPA will continue to consult with NNEPA on potential actions including compensation and temporary relocation if demolition or partial removal is indicated. If USEPA finds that structures have high naturally occurring radon levels but low gamma radiation levels, then USEPA will involve the Navajo Nation Radon Program. USEPA will take removal actions where contaminated structures and surrounding soils are found to pose a risk to residents. However, land use issues may arise that are beyond USEPA's ability to resolve if high radon levels are considered to be naturally occurring and thus will require the involvement of other Navajo agencies.

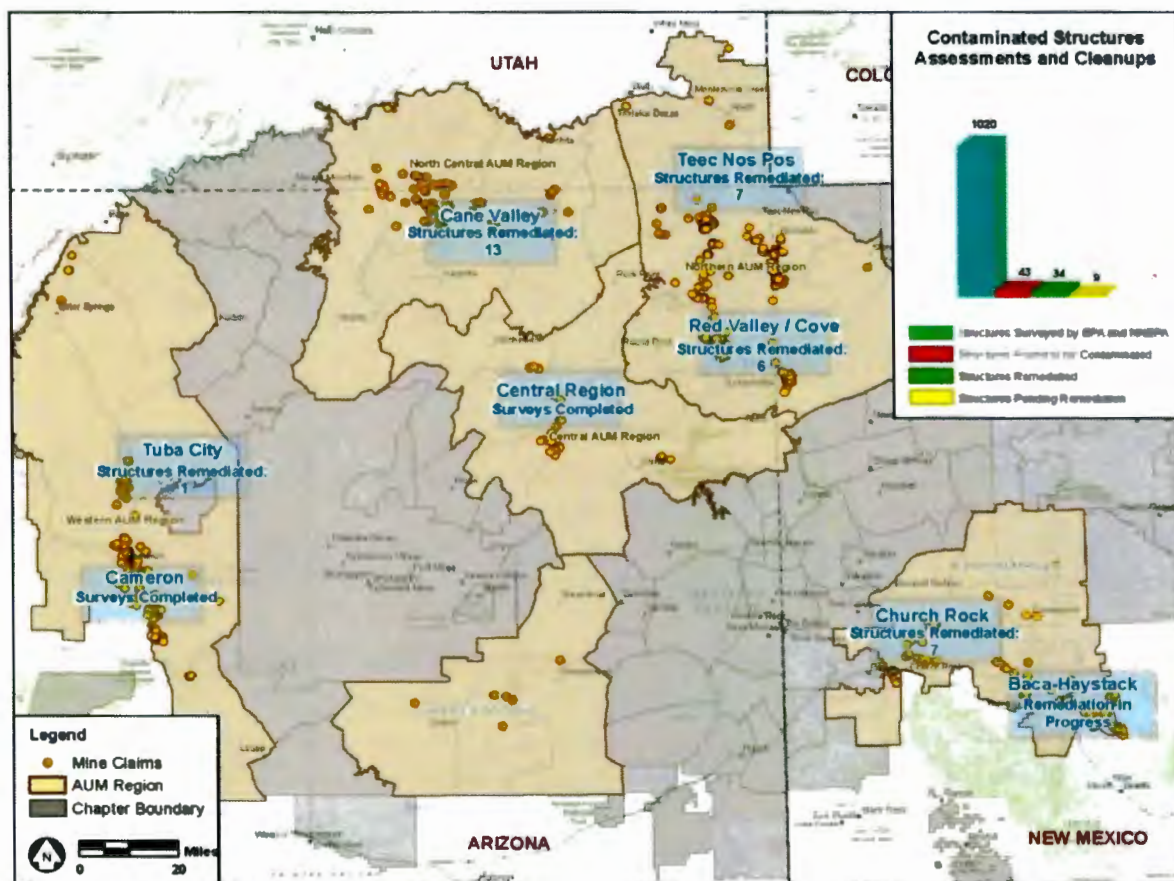


Figure 1. Map of Contaminated Structures Assessments and Cleanups



## ***Objective 2: Assessment of Contaminated Water Sources, and Provision of Alternative Water Supplies***

**Federal Agencies: USEPA and IHS**

**Navajo Nation Agencies: NNEPA and NNDWR**

### ***1. Background***

In 2008, the Centers for Disease Control and Prevention (CDC), USEPA, NNEPA and the Diné Network for Environmental Health (DiNEH) identified 29 unregulated water sources with levels of uranium and other radionuclides in excess of USEPA drinking water standards.

In response, NNEPA advised residents to only drink from regulated potable water sources and implemented a comprehensive public outreach campaign. Working together, CDC, NNEPA, USEPA, DiNEH, and the University of New Mexico met with residents and Chapter officials, posted warning signs, and issued public service announcements through the Navajo Times and local radio stations. Three unregulated wells that exceeded USEPA standards were shut down with the support of Navajo Chapter officials.

IHS identified water infrastructure needs for homes within a ten-mile radius of the 29 unregulated water sources with levels of uranium or other radionuclides exceeding drinking water standards. IHS, USEPA, and the Department of Housing and Urban Development provided approximately \$27 million for 14 projects that extend piped water to hundreds of homes near these unregulated water sources, and improve access to safe drinking water for over a thousand homes. USEPA also provided \$2.6 million to the NNDWR to implement a water hauling program to serve residents in remote areas that are not served by piped water.

### ***2. Current Status of Work***

IHS is working to complete design and construction of four projects funded at the conclusion of the original Five-Year Plan. The NNDWR continues to implement the water hauling program. Water deliveries under this program are occurring in the Western Agency, Eastern Agency, Chinle Agency, and Fort Defiance Agency.

### ***3. Goals for Next Five Years***

- a. Complete water infrastructure projects funded during original Five-Year Plan. IHS will complete the Thoreau Extension, Leupp/Grand Falls Test Well, Mexican Water Walker Creek Extension, and the Church Rock Peretti Canyon Scattered Sites water infrastructure projects.
- b. Increase access to safe drinking water in expanded geographic areas. The geographic focus for providing access to safe drinking water will expand to 55 Navajo Nation chapters. Naturally elevated levels of uranium and other metals have been reported in water sources in these areas. According to 2012 data from the IHS Sanitation Deficiencies System, there are 3,064 homes without piped water in those 55 chapters, and the one time construction costs would be approximately \$192 million to serve these homes lacking access to safe drinking water.

- c. Continue to implement water hauling program. NNDWR will continue to implement the Water Hauling Feasibility Study and Pilot Program. USEPA funding for the program has been extended through 2014. NNDWR is developing a feasibility study to identify options for the long-term sustainability of the program.

#### **4. *Specific Actions for Next Five Years***

- a. Available funds will be awarded for high ranking water infrastructure projects. In 2013, \$22.8 million was provided to serve about 757 homes lacking access to safe drinking water in the 55 chapters. This includes \$7.3 million provided by the Navajo Nation, and \$15.5 million provided by IHS and USEPA.
- b. Projects funded under the original Five-Year Plan will be constructed, including: Thoreau Extension, Leupp/Grand Falls Test Well, Mexican Water Walker Creek Extension, and Church Rock Peretti Canyon Scattered Sites.
- c. NNDWR will continue to implement the Water Hauling Feasibility Study and Pilot Program and evaluate options for sustaining the program when USEPA funding ends, currently scheduled for December 2014, but may be extended into 2015.

#### **5. *Potential Limitations and Challenges***

The number of homes served with piped water in the 55 chapters will be based on the amount of funds available, the ability of Navajo Tribal Utility Authority to operate and maintain water service to these homes, and other program requirements and prioritization processes. According to 2012 IHS data, 76 percent of the projects are economically infeasible, exceeding the IHS cost caps of \$84,500 per home for water and wastewater in Arizona, \$81,000 per home in Utah, and \$80,000 per home in New Mexico.

Even with the prior mitigation efforts, some residents may continue to drink water hauled from unregulated water sources that may have elevated levels of uranium or other constituents of concern.

NNDWR will evaluate options for sustaining the Water Hauling Feasibility Study and Pilot Program after USEPA funds expire on December 31, 2014.

Navajo livestock water sources are not regulated by USEPA or NNEPA. The Safe Drinking Water Act's definition of a public water system applies only to those systems that regularly serve an average of at least 25 people each day for at least 60 days per year or have at least 15 service connections.



### ***Objective 3: Assessment of Abandoned Uranium Mines With Detailed Assessments of those Most Likely to Pose Environmental or Health Problems***

**Federal Agency: USEPA**

**Navajo Nation Agencies: NNEPA and NNAML**

#### ***1. Background***

From 2008 through 2012, USEPA and NNEPA conducted screening level assessments of 521 abandoned uranium mines, with detailed assessments of the 45 sites most likely to pose a threat to human health or the environment. Based on these assessments, the agencies have gained a better understanding of the scope of potential exposure to uranium contamination on the Navajo Nation and can better prioritize the work that remains to be done. The screening reports are available to the public and can be requested through USEPA's information request webpage at <http://www.epa.gov/region9/comments.html>.

For Navajo Nation uranium mine claim screening, USEPA considered contamination greater than twice the naturally occurring levels (background levels) of gamma radiation to be evidence of an observed hazardous release that may require further investigation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 United States Code Section 9601, et seq.). Of the total mine claims screened, 71 mine claims show levels of gamma radiation at less than two times background levels. Areas with levels that are at or below two times background levels should pose little or no current threat to residents.

Of the total mine claims screened, 177 mine claims show gamma radiation levels above two times but below ten times background levels. Long-term exposure to soils at these mines should be avoided. Residents should not build homes, corrals or other structures, and should not gather building materials from these sites. USEPA and NNEPA have initiated outreach to residents in these areas to provide warning of these conditions, and this work will continue over the next Five-Year Plan period.

Two-hundred and twenty-six (226) mine claims show gamma radiation levels higher than ten times background levels. Proximity of mines to homes is an important factor in determining risk to residents. Thirty-eight (38) of these mine claims are located within a quarter mile of a potentially inhabited structure.

#### ***2. Current Status of Work***

In consultation with Navajo Nation, USEPA developed criteria to prioritize work at abandoned mines based on the level of radiation and proximity to homes and sensitive environments. As described in more detail below, USEPA and NNEPA have focused their efforts on 43 mine claims near residents and seven mine claims near sensitive areas.

To date, investigation or cleanup actions have been initiated at nine mine claims with elevated radiation and additional actions will be necessary. Of these nine mine claims, seven are considered high priority based on the criteria developed with NNEPA.

USEPA continues to search for Responsible Parties to pay for investigation and cleanup. USEPA has signed Administrative Orders on Consent with five Responsible Parties.

On April 3, 2014, the United States entered into a \$5.15 billion settlement agreement with Kerr McGee Corporation and some of its affiliates ("New Kerr McGee") that, if approved by the U.S. District Court for the Southern District of New York (SDNY), would provide almost \$1 billion for USEPA Region 9 cleanup of 50 abandoned uranium mine sites on and very near the Navajo Nation. These mine sites were previously operated by corporate predecessors ("Old Kerr McGee") of New Kerr McGee. The \$5.15 billion settlement would also provide substantial funding for cleanups at many other sites, including the Shiprock uranium mill site on the Navajo Nation. The settlement follows a determination by the SDNY that Old Kerr McGee had fraudulently conveyed billions of dollars in assets in an attempt to avoid environmental liabilities. Any portion of the settlement funds allocated to cleanup of the 50 Old Kerr McGee Navajo Nation uranium mine sites that is not needed for that purpose will be returned to the Hazardous Substance Superfund Trust Fund.

USEPA will amend Objectives 3 and 4 of this plan to reflect the work to be completed at the 50 abandoned uranium mines that are part of the settlement once the final settlement is approved and the full scope of work is determined.

### **3. Goals for Next Five Years**

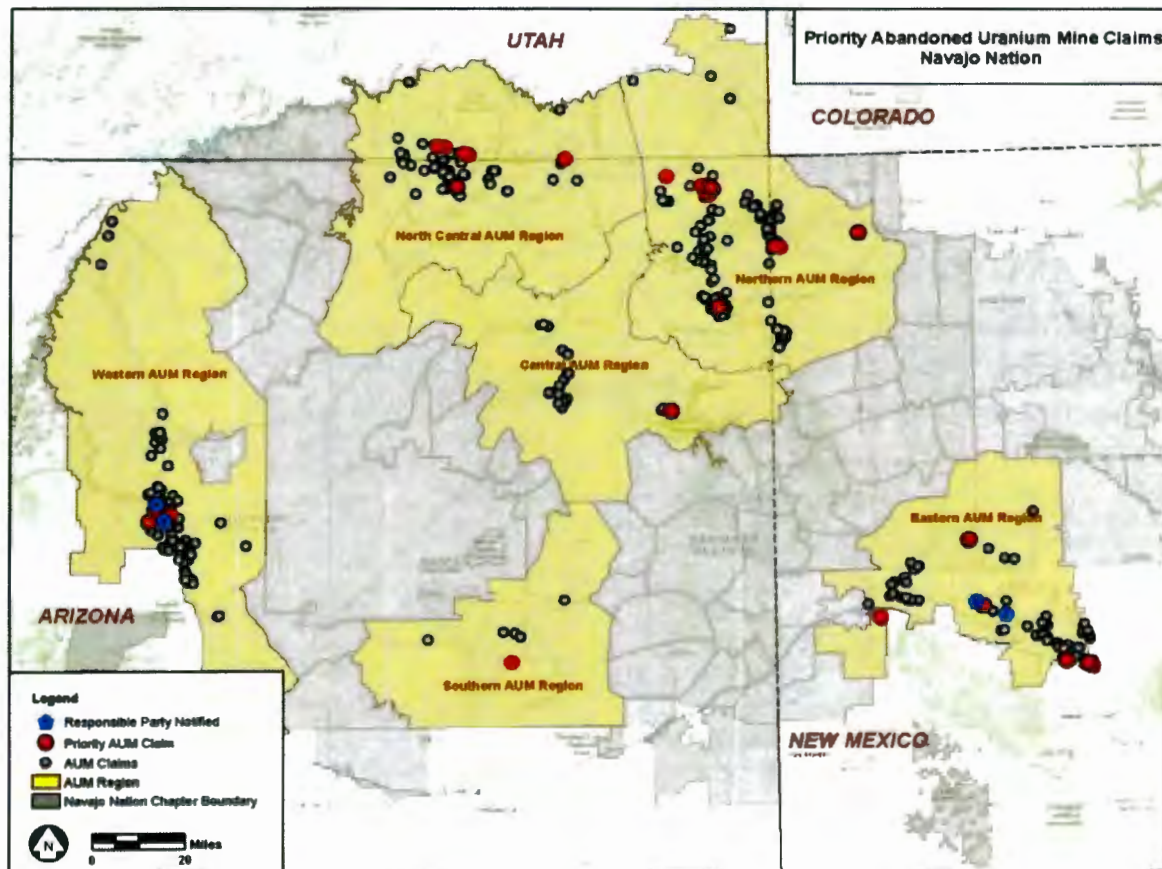
During the next five years, USEPA, NNEPA, and NNAML will conduct assessment and urgent cleanup work at mines most likely to pose a risk to human health or the environment. This includes mines that are known to exhibit:

- a. Gamma radiation more than ten times background levels and located within a quarter mile of a potentially inhabited structure (38 mine claims).
- b. Gamma radiation more than two times background and located within 200 feet of a potentially inhabited structure (five mine claims).
- c. A potential impact to aquatic resources such as streams and wetlands (seven mine claims).
- d. Mines targeted for actions from 2014 through 2018 are shown on Figure 2. Additional mine claims may be added if found to pose an imminent and substantial endangerment to health.

Work at mines located near potentially inhabited structures (bullets a and b, above) will include:

- a. Conduct visual inspection and gamma scanning for radiation covering 100 percent of the mine claim surface area for 43 mine claims.
- b. Conduct time-critical response actions at sites found to pose an imminent and substantial endangerment to health. Actions could include fencing, signage, stabilization, consolidation, and public outreach. Time-critical removal to an off-site disposal facility will be considered for small volumes (e.g., less than 500 cubic yards) of contaminated waste that pose a high risk to residents, if removal is found to be the most protective, cost effective, and implementable action available.





**Figure 2. High Priority Abandoned Uranium Mine Sites**

Mine claims likely to impact aquatic resources will require more detailed investigation and potential remedial action. From 2014 through 2018 the agencies will:

- a. Conduct preliminary assessments and site investigations at seven mine claims located in two watershed areas (Section 9 Lease at the Little Colorado River near Cameron, Arizona and Mesa I Mines 10 through 15 at Cove Wash near Cove, Arizona).
- b. Evaluate the suitability of these mines for listing on the Superfund National Priorities List (NPL).
- c. For mines listed on the NPL, initiate CERCLA remedial investigation and action per the Superfund National Contingency Plan.

USEPA will continue to search for and work with responsible parties to pay for investigation and cleanup of mines. To date, USEPA has signed administrative orders on consent with five responsible parties who are working to investigate and clean up a total of 25 mine claims, of which, six mine claims are considered high priority.

The NNAML used the Surface Mining Control Reclamation Act to conduct reclamation actions at approximately 90 percent of the uranium mines on the Navajo Nation. Reclamation actions are intended to address physical hazards; they do not necessarily address radiological risk. USEPA will partner more closely with NNAML to utilize their expertise during future cleanup efforts.

***4. Specific Actions for Next Five Years***

Evaluate up to ten mines per year. Conduct urgent actions at those that pose high health hazards.

***5. Potential Limitations and Challenges***

USEPA will continue its efforts to find and work with responsible parties to pay for assessment of mines.

Selection of final cleanup plans for mines is dependent on identification of suitable long-term disposal options for contaminated soil.



### ***Objective 4: Cleanup of the Northeast Church Rock Mine Site and Additional High Priority Abandoned Mine Sites***

**Federal Agencies: USEPA, NRC and DOE**

**Navajo Nation and State Agencies: NNEPA and New Mexico Environment Department (NMED)**

#### ***1. Background***

Located near Gallup, New Mexico, the Northeast Church Rock (NECR) Mine site was identified by both Navajo Nation and USEPA as the highest priority abandoned uranium mine for cleanup prior to the initial Five-Year Plan. The mine adjoins the United Nuclear Corporation (UNC) uranium mill site that is a NPL cleanup project within USEPA Region 6. This inactive UNC mill site is also licensed by the NRC (see Figure 3). The mine is mostly on Navajo tribal trust land, while the mill is on privately owned land. At the request of the Navajo Nation, USEPA Region 9 is using Superfund removal authority to investigate and clean up the NECR mine site, in coordination with USEPA Region 6 which has CERCLA authority for the NPL mill site.

The historical timeline below identifies the major accomplishments that have been completed up to beginning of this Five-Year Plan in 2014. During the initial Five-Year Plan, USEPA had anticipated beginning construction of the NECR Mine Site cleanup. Instead, during this time period, USEPA focused on cleaning up the highest risk residential areas first while working with the community to select the long-term mine site cleanup remedy. USEPA and the responsible party conducted three large-scale interim cleanup actions to remove a total of approximately 150,000 cubic yards of contaminated soil, addressing all known soil contamination remaining on the reservation from the NECR mine site. These three actions were within the interim cleanup areas identified on Figure 3.

In addition to these interim actions, USEPA issued a cleanup plan in a 2011 Non-Time-Critical Action Memo for the NECR Mine Site. After thorough consideration and evaluation by USEPA and the Navajo Nation, and with significant involvement of the local Navajo community, USEPA selected excavation of approximately one million cubic yards of waste material from the NECR Mine Site. USEPA selected the NRC-licensed UNC Mill as the disposal site for the bulk of the mine waste to be placed in a repository above the existing tailings impoundment and further documented this decision in a 2013 Surface Soil Record of Decision (ROD) for the UNC Mill Site. This disposal location is contingent upon General Electric (GE)/UNC submittal of a license amendment application and NRC's approval of this license amendment. A small amount of higher level or "principal threat" waste will be sent to a licensed disposal facility. The cleanup plan selected in the 2011 Action Memo provides for unlimited surface use of the mine site after cleanup, voluntary alternative housing options during the cleanup for community members living near the mine, and job training and employment for interested local residents during the cleanup.

### Historical Timeline

Year	Action
2005	Navajo Nation requests USEPA take the lead for the NECR Cleanup.
2006-2007	Characterization of the Extent of Contamination at the Mine Site summarized in the Removal Site Evaluation Report.
2007	USEPA completed the first interim cleanup of approximately 6,000 cubic yards of contaminated soil from the yards of adjacent residences.
2009	<ul style="list-style-type: none"> <li>USEPA completed and put out for public comment the Engineering Evaluation/Cost Analysis.</li> <li>Under USEPA oversight, General Electric (GE) completed a second interim cleanup of approximately 110,000 cubic yards of contaminated soils in a residential area adjacent to the NECR Mine. These soils were consolidated on a waste pile on the mine sites which was re-graded, covered with clean soil, and re-vegetated to provide stability during planning of the long-term NECR soil cleanup.</li> </ul>
2010-2011	Extensive consultation with the Navajo Nation and the community on the Cleanup Plan.
2011	NECR Non-Time-Critical Removal Action Cleanup Plan Signed.
2012	Under USEPA oversight, GE completed a third interim cleanup of approximately 30,000 cubic yards in an additional residential area east of Red Water Pond Road.
2013	<ul style="list-style-type: none"> <li>UNC Mill ROD for disposal of NECR waste at UNC Mill Site.</li> <li>Pre-Design Field Sampling at the NECR Mine and UNC Mill sites.</li> </ul>

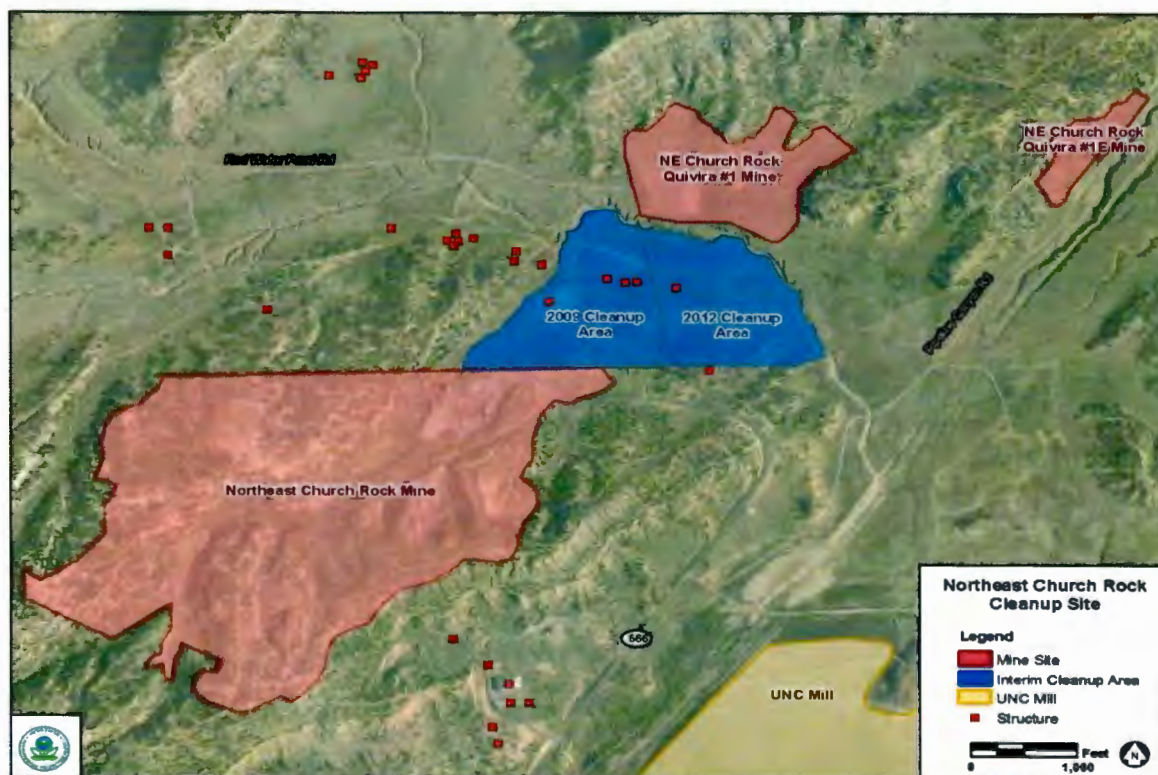


Figure 3. Northeast Church Rock Cleanup Site



## 2. Current Status of Work at NECR

In 2013, under federal oversight, UNC/GE completed a pre-design sampling effort on the NECR Mine and UNC Mill Sites to further inform the design process. The sampling effort helps to more accurately define the volume and characteristics of the mine waste and cover soils, as well as confirm the existing profile and properties of the UNC Mill's tailing impoundment. USEPA is currently in negotiations with UNC/GE to sign a settlement agreement to complete the NECR cleanup design process and to submit a license amendment to the NRC for review. A design review team has also been formed to coordinate the review process among the various agencies.

The design review team currently consists of USEPA Regions 6 and 9, NRC, NNEPA, NMED (regulatory agencies), and DOE. The team also includes a representative from the community assisted by a technical support representative from the Technical Assistance Services for Communities contract administered by USEPA.

## 3. Goals for Next Five Years

The primary goal for this Five-Year Plan is to successfully complete the design of the cleanup with input from the Navajo Nation, community, and other agencies and to begin construction cleanup activities if an NRC License Amendment is approved for the UNC Mill Site (see Figure 4).



Figure 4. Cleanup Processes for the Northeast Church Rock Mine Site

#### ***4. Specific Actions for Next Five Years***

During the next five-year planning period, UNC/GE is expected to initiate and complete the cleanup design under a Settlement Agreement with USEPA. UNC/GE is expected to submit the License Amendment Request to the NRC who will initiate their safety and environmental review of the request. Depending on the potential limitations and challenges discussed below, a license amendment decision may be issued before the end of the five-year planning period. If NRC approves the license amendment for the UNC Mill Site, GE could begin construction of a repository after entering into a consent decree with USEPA for the remedy construction. Finally, USEPA will work with the Navajo Nation to assess the need for additional NECR groundwater studies during the five-year planning period.

#### ***5. Potential Limitations and Challenges***

There are many challenges to beginning project construction during this Five-Year Plan. Factors for potential delays in completing the cleanup design include the need for additional sampling events to fill any unanticipated data gaps identified during the design and environmental review processes.

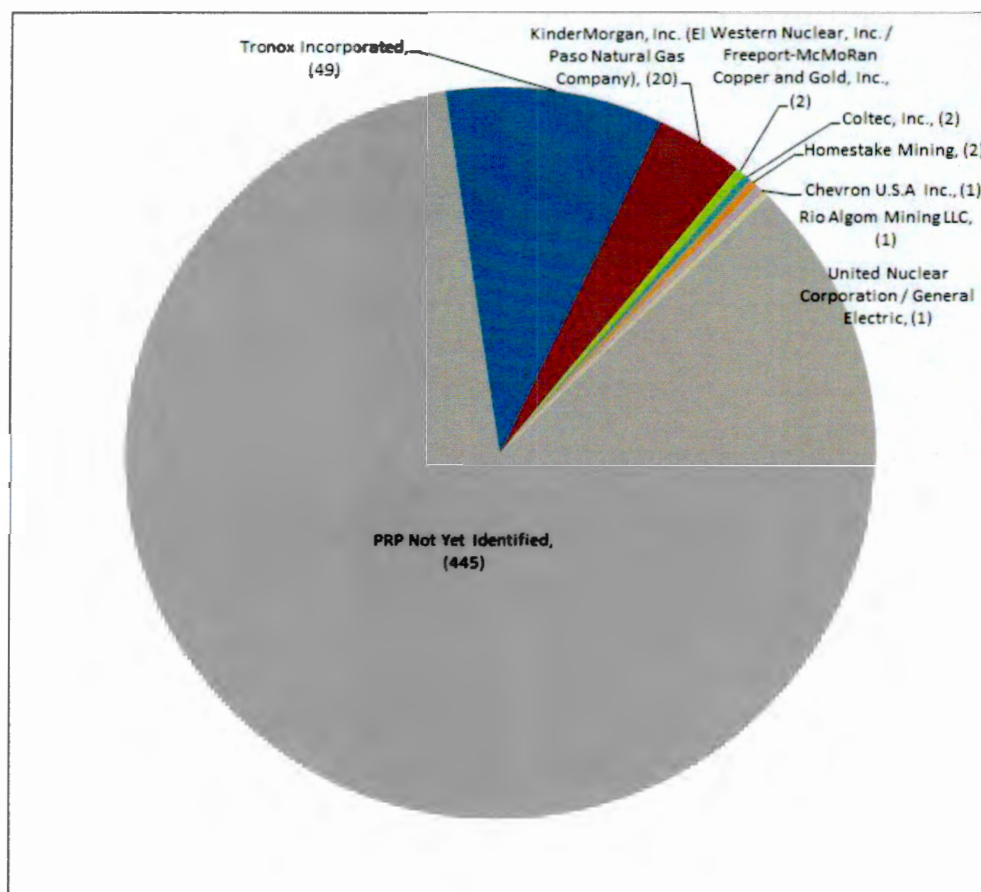
The NRC staff estimates that completion of the safety and environmental reviews will take approximately two years after receipt of the application, assuming the information in the application is of sufficient scope and quality to allow the NRC staff to conduct its reviews. If there is a hearing for this action, the hearing process may take several years. Although the NRC can issue the license after completing its safety and environmental reviews under certain conditions, licensees may be reluctant to begin operations until the hearing is completed because the hearing can result in a reversal or modification of the NRC's decision to issue a license. Therefore, the time required from submission of the license application or amendment request to issuing or amending the license is estimated to take from two to five years, considering the safety and environmental reviews, and the hearing.

#### ***6. Status of Cleanup Work at Additional High Priority Mines***

USEPA has conducted urgent cleanup actions at nine mine sites. Of these nine mine sites, five are considered high priority based on the criteria agreed on with NNEPA and described in the previous objective. These actions ranged from fencing and signage, to excavation and consolidation, to full removal and on-site disposal. These actions are described in the [January 2013 report](http://www.epa.gov/region9/superfund/navajo-nation/pdf/NavajoUraniumReport2013.pdf) (<http://www.epa.gov/region9/superfund/navajo-nation/pdf/NavajoUraniumReport2013.pdf>).

In addition, USEPA signed administrative orders on consent with five responsible parties, identifying them as liable for assessment and cleanup of 25 mine claims.





**Figure 5. Identified Potentially Responsible Parties**

### **7. Goals for Next Five Years**

USEPA will continue efforts to identify responsible parties to conduct this work. USEPA currently has agreements with five parties to investigate 25 priority and other mine claims. USEPA has identified two additional responsible parties for assessment and future clean up at four mines, of which two are high priority. As described above, USEPA expects to conduct or oversee assessments first at the highest priority mine claims (up to 50). USEPA will seek to require responsible parties to conduct initial, urgent actions at sites that pose an unacceptable risk to nearby residents. Urgent actions will include activities such as fencing, signage, consolidation, and limited offsite disposal.

In addition, USEPA will prepare an addendum to this Five-Year Plan to include cleanup work for 50 mines under the Kerr McGee settlement.

### **8. Specific Actions for Next Five Years**

USEPA or responsible parties will conduct urgent actions at sites determined to pose an unacceptable risk to nearby residents.

## ***9. Potential Limitations and Challenges***

USEPA will continue its efforts to find and work with responsible parties to pay for assessment of mines. Selection of final cleanup plans for mines is dependent on identification of suitable long-term disposal options for contaminated soil.



### ***Objective 5: Cleanup of the Tuba City Dump Site***

**Federal Agencies: BIA and USEPA**

**Tribal Agencies: NNEPA and Hopi Tribe**

#### ***1. Background***

The Tuba City Dump (TCD) was used for more than 50 years as an open, uncontrolled dump receiving solid waste from local communities. During this time, the BIA maintained the TCD by covering trash and burying waste. It was the principal dump site in the Tuba City/Moenkopi area during this period. The TCD was closed to further dumping by BIA in August 1997. Information on wastes disposed of at the TCD is limited as the TCD was unmanned and unsecured. The TCD occupies land both on the Hopi Reservation and the Navajo Nation.

The TCD occupies approximately 41 enclosed acres and includes two primary disposal cells, identified as the “new disposal cell” (New Cell), and the “old disposal cell” (Old Cell). Based on studies conducted to date, it appears that dump related waste materials occupy approximately 7.7 acres of the New Cell and 13.9 acres of the Old Cell.

The BIA, the USEPA, and IHS, are working with the Hopi Tribe and Navajo Nation to address environmental concerns at the site. These concerns include persistent elevated levels of uranium, vanadium, radium 226/228, gross alpha, and beta activity, and other metals in the shallow groundwater at the site. Deeper groundwater and nearby drinking water supply wells have, to date, not exhibited elevated levels of the above constituents.

Approximately four miles northeast of the TCD is the Tuba City inactive uranium milling site (mill) that is currently being managed by the DOE under the Uranium Mill Tailings Radiation Control Act (UMTRCA) program. The Navajo Nation and Hopi Tribe have long maintained that waste from the mill was improperly disposed of at the TCD. A United States Geological Survey study, dated October 2006, suggests that the radionuclides in the shallow groundwater may be from a different formation than the native rock at the site. However, despite extensive subsurface investigations within the TCD, with a particular emphasis on the area near Monitoring Well #7 (the ground water well with the highest concentration of uranium), USEPA was not able to identify any milled material.

Since 1999, the BIA has been conducting assessment activities of uranium contamination of shallow and deep groundwater, springs, contaminant migration pathways, sources and receptors, for the purpose of formulating a final closure plan. The springs are used by the Hopi Tribe for religious and ceremonial purposes. Groundwater monitoring data indicates that uranium is present, at elevated levels, in the shallow groundwater which extends to the west and southwest of the TCD. Additionally, groundwater monitoring data has identified uranium at elevated levels in the shallow groundwater up-gradient of the TCD. This indicates that elevated uranium levels are not limited to the TCD. Other natural geochemical and topographic conditions appear to be contributing to elevated levels of uranium in the shallow groundwater.

Landfill characterization studies have not detected contamination in landfill materials at levels that constitute hazardous waste or radioactive waste. Soil vapor studies detected no hazardous waste

constituents and determined that methane was not migrating from the landfill. Both tribes want “clean closure” (removal of all waste).

## **2. Accomplishments at the TCD Site**

**Task 1: RI/FS Work Plan**—In 2007, the BIA contracted to prepare the Remedial Investigation/Feasibility Study (RI/FS) Work Plan with the option for limited additional studies. The purpose of the RI/FS Work Plan was to identify the tasks and establish a schedule for a remedial investigation of the TCD and to develop remedial alternatives.

In December 2010, the RI/FS Work Plan was completed. The RI/FS Work Plan was delayed by the below listed tasks and accomplishments including: (1) the implementation of the limited additional studies; (2) the development of the Interim Action Report (IAR); and, (3) the implementation of the IAR recommendations.

**Task 2: Limited Additional Studies**—In 2008, based on the conceptual site model developed by BIA’s RI/FS Work Plan contractor and on information provided by the Hopi Tribe and Navajo Nation, limited additional studies and actions were necessary to assess and evaluate the potential imminent threat or risk to public health and the environment posed by the TCD.

- Additional wells were installed, including sentinel wells to assess water quality migrating from potential up-gradient sources northeast of the TCD and in Pasture Canyon, and to assess the lateral and vertical extent of potential impacts from the TCD. Two well clusters consisting of shallow and deep wells were installed on the west side of Pasture Canyon between the TCD and the Moenkopi water supply wells. These wells were intended to be used to identify any migration of potential contaminants toward the water supply wells.
- Baseline water monitoring was conducted on all 52 groundwater monitoring wells, three supply wells, seven springs, the irrigation pipeline water, and the Pasture Canyon Reservoir. In addition, discrete sampling was performed in up to 12 groundwater wells to assess water quality in near surface alluvium and bedrock. Each sample was analyzed for a comprehensive suite of analytes to differentiate differences in study background water quality and leachate from the TCD. The monitoring at the site increased the understanding of the groundwater contamination at the time and served as a snap shot in time against which to analyze migration of contaminants.
- Aquifer testing included installation of an extraction well, two observation wells, a 72-hour pump test, and slug testing of up to 19 wells.

**Task 3: Interim Action Report**—In 2008, in order to address data needs for the RI/FS Work Plan, limited additional studies were implemented. In August 2008, USEPA recommended that BIA complete an IAR to study the need and feasibility for conducting interim measures prior to the completion of the RI/FS. The IAR was completed in June 2009. The results of the IAR found no imminent threat to the Hopi community, water supply wells, irrigation water, springs, and seeps. Water wells west, across Pasture Canyon from the TCD were found not to be in imminent danger since groundwater appeared to migrate south-southeasterly toward Pasture Canyon.

The IAR proposed interim actions to mitigate immediate risks. These interim actions included: (1) fencing the limits of the waste in the Old Cell, (2) an investigation of the waste materials in the



vicinity of Monitoring Well 07 (MW-07) where elevated uranium readings had occurred, quarterly groundwater monitoring to monitor migration of contamination, and (3) additional supply well water studies. By August 2011, BIA completed the above actions associated with the IAR recommendations. BIA constructed a fence around the Old Cell. Through a BIA interagency agreement with USEPA, USEPA conducted the MW-07 investigation. This investigation did not find a uranium contamination source. Lastly, BIA funded the Hopi Tribe to conduct the quarterly groundwater monitoring and wellhead protection study.

**Task 4: RI/FS Implementation**—In June 2011, BIA began the RI/FS implementation. In July 2011, USEPA determined that the RI/FS Work Plan should be revised. From July 2011 through July 2012, BIA worked with USEPA and the stakeholders to revise the RI/FS Work Plan. The revised RI/FS Work Plan was approved in July 2012.

Radiological surveys and baseline risk assessment field efforts began in 2011 and continued through 2012 while the RI/FS Work Plan was being revised. After final approval of the RI/FS Work Plan in July 2012, the field investigation began. Under the RI field work, BIA installed and sampled an additional 46 groundwater monitoring wells (including 26 shallow wells, nine temporary shallow wells, and 11 deep wells), installed and sampled 84 sediment borings, and analyzed approximately 300 soil samples and 39 soil gas/landfill gas samples. BIA also performed additional aquifer tests, termed the Cone of Depression study, under conditions where supply wells were pumping, to assist in evaluating whether contamination from the TCD could cross Pasture Canyon and be pulled into the supply wells. These tests, and significant data on groundwater conditions and flow directions between the TCD and the supply wells, indicate that the Moenkopi water supply wells of the Hopi Tribe are not contaminated and that groundwater from the area of the TCD does not flow to the supply wells; therefore, the contamination is not able to be captured in the supply wells.

A baseline risk assessment was performed as part of the RI/FS. The purpose of the baseline risk assessment was to characterize the current and potential threats to human health. The health risk assessment evaluated chemicals of concern, exposure pathways, and potential receptors. This information was needed to determine whether a potential threat to human health or the environment exists. It will help in assessing the type of remedial actions or closure criteria to be applied at the TCD.

The BIA development of the alternatives phase of the RI/FS began during scoping when response scenarios were identified. The development of alternatives in the FS considered the remedial objectives, potential treatments, and various containment technologies that could satisfy the objectives. Screening and assembly of the technologies was based on their effectiveness, ease of implementation, and cost. The information collected in the RI was used as the basis for the alternatives presented in the FS.

### **3. Current Status of Work**

The BIA submitted the Draft Final RI Report to USEPA on April 7, 2014 and the Draft FS Report on May 12, 2014. BIA plans to finalize the RI and FS Reports after review and comment by USEPA, Navajo Nation, and Hopi Tribe. The review and comment process is expected to take several months with finalization of both documents expected by the end of 2014.

After completion of the RI/FS Reports, USEPA will complete a ROD, the formal document that will identify the long-term cleanup remedy. Associated with this determination, USEPA will provide for a formal ROD public comment period that lasts either 30 or 60 days and hold a public hearing on its proposed cleanup remedy. After that period ends, USEPA is required to respond to public comments received and issue the ROD which formally selects the cleanup remedy to be implemented. This process should take about a year between the completion of the Final FS Report produced by BIA and the issuance of the ROD.

#### ***4. Specific Actions for Next Five Years***

Once the remedy is selected, the BIA will begin the Remedial Design/Remedial Action (RD/RA) process. The RD is the phase of a CERCLA site where the technical specifications for cleanup remedies and technologies are designed. The RA follows the RD phase and involves the actual construction or implementation phase of site cleanup or remediation. The RD/RA uses the specifications outlined in the ROD to build the design and construct the remedy. The RD process is planned to take a year to be completed and approved. BIA expects to commence remedial action at the site within the Five-Year Plan window. However, the timeframe to complete the RA at TCD is heavily dependent upon the remedy selected.



## ***Objective 6: Protection of Human Health and the Environment at Former Uranium Processing Sites***

**Federal Agencies: DOE and NRC**

**Navajo Nation Agencies: NNAML and NNEPA**

### ***1. Background***

The DOE's responsibility for the four former mill sites on the Navajo Nation includes ground water remediation and long-term surveillance and maintenance. Although DOE has completed surface remediation at all four sites on the Navajo Nation, groundwater remediation continues at the Tuba City and Shiprock sites.

The NRC has oversight responsibility at the four former mill sites on the Navajo Nation that have been transferred to DOE under an NRC general license. The NRC oversees DOE as the licensee and federal agency responsible for the long-term surveillance and maintenance of the site.



**Figure 6. Four Corners Area and the Navajo Nation Former Mill Sites**

DOE continues to monitor the three disposal cells (Shiprock, New Mexico; Tuba City, Arizona; and Mexican Hat, Utah) to ensure they remain effective in protecting human health and the environment. DOE's long-term surveillance and maintenance (LTS&M) duties will continue at the three disposal cells for the foreseeable future. In addition, DOE has been conducting a multi-year phytoremediation pilot study at the Monument Valley site.

A site-specific long-term surveillance plan is written for each site outlining monitoring requirements and actions to be taken if erosion occurs, etc. DOE conducts annual inspections and performs routine maintenance, such as: repairing signs and fences, managing vegetation on the disposal cells (including controlling noxious weeds), repairing erosion damage on the disposal cells and property within the long-term care boundary, managing records, and conducting numerous other activities.

NRC reviews and provides comments on reports developed by DOE regarding the sites, conducts inspections of the sites in conjunction with DOE and, if DOE revises the long-term surveillance plan or ground water compliance action plan for the site, NRC will review and concur on the revision before it is implemented.

DOE recently extended its cooperative agreement with the Navajo Nation for groundwater cleanup for another five years through March 2017. DOE's Office of Legacy Management, in consultation with the Navajo Nation, has been addressing groundwater contamination at the four sites. (Note that at the Mexican Hat, Utah site, groundwater contamination is confined and the hydraulic conditions prevent the future use of groundwater within the area; therefore, no further remedial action is warranted at the site. Groundwater monitoring was also discontinued because not enough water was available to sample; however, if seeps form again, monitoring will be restarted and, depending on the sampling results, appropriate actions will be evaluated in cooperation with the Navajo Nation.)

## ***2. Current Status of Work***

### ***Cleanup Progress***

DOE funds maintenance of groundwater remediation activities and LTS&M at the four Navajo Nation sites for a cost of approximately \$4 million dollars annually. The groundwater compliance strategies are reviewed annually with the Navajo Nation to track progress toward cleanup standards in the groundwater plumes. DOE will continue to work with the Navajo Nation using the currently approved plans to complete its groundwater remediation responsibilities.

### ***LTS&M Activities***

DOE will continue to fund the Navajo Nation, under the Cooperative Agreement, to provide the resources to review and participate in DOE's activities during these long-term actions.

### ***NRC Activities***

NRC will continue conducting oversight activities at the four UMTRCA sites on the Navajo Nation. These activities include the review of annual DOE inspection reports and, for sites with ongoing groundwater remediation, the review of monitoring and performance reports. In addition, if changes to the long-term surveillance plan were proposed by DOE, NRC would review and concur on the revision. In addition to the site-specific activities at the four Navajo Nation sites,

NRC staff has been evaluating and resolving generic issues at UMTRCA Title I sites, including generic groundwater and policy issues related to UMTRCA Title I sites under DOE management that would be relevant to the Navajo Nation sites. The NRC also has a concurrence role on any cooperative agreement, or modification of cooperative agreement, DOE proposes to enter with the Navajo Nation, other Native American Tribe, or State for these sites, which obligation will be fulfilled, as appropriate, after these agreements are submitted to the NRC for review.

### **3. Goals for Next Five Years**

- a. Update the groundwater compliance strategy at Shiprock, New Mexico and evaluate different treatment options for the Tuba City, Arizona site.
  - i. DOE will update the groundwater model and review the condition of existing monitoring wells at Tuba City.
  - ii. DOE will work with the Navajo Nation to revise the groundwater compliance strategy by proposing new alternatives for Shiprock and Tuba City (2014). This will include working with the NRC to obtain its concurrence on the revised strategies.
  - iii. DOE will continue its evaluation of naturally occurring groundwater constituents, such as those at Many Devils Wash, which appear to have been erroneously attributed to uranium milling. If such evidence continues to be supported by research results from DOE and evaluations by other independent agencies, groundwater efforts in the wash may end, although all parties agree that Many Devils Wash will not be an acceptable source of drinking water. Any changes to DOE's groundwater compliance approach (including changes to treatment actions in the wash) will be documented in an update to the Groundwater Action Plan, which requires Navajo Nation and NRC approval.
  - iv. The NRC will conduct oversight activities at the four UMTRCA Title I sites on the Navajo Nation in accordance with NRC's responsibilities under the NRC regulations and the Atomic Energy Act and the UMTRCA. When DOE updates the compliance strategy at the Shiprock and Tuba City sites, NRC will review and concur, as appropriate, on any revisions DOE contemplates for the groundwater compliance activities. In addition, NRC has reviewed and provided comments on the DOE phytoremediation pilot project at the Monument Valley site and if DOE proposes to revise the Groundwater Compliance Action Plan (GCAP) for the site, the NRC will review and, if appropriate, concur on the revised GCAP.
- b. DOE will continue to work with IHS and provide technical support as requested. In addition, DOE will work with IHS to hold joint workshops, as needed, to inform the public of the effectiveness of the mitigation of risks of radiation from uranium mill tailings.
- c. DOE will work with the Navajo Nation to create and implement an outreach and communication plan. This will include activities such as continuing to work with Diné College, supporting summer interns, and developing an online media page. DOE's actions will be integrated with the broader interagency communication effort.
- d. DOE will continue to support NNEPA's use of legally available Highway 160 funds to remediate mill site-related contamination in Tuba City, near the mill site. DOE funded the Navajo Nation through a cooperative agreement to conduct the remediation of the Highway 160 site, which was completed in 2011. The NRC reviewed the completion report and concurred that the cleanup met the 40 Code of Federal Regulations Part 192 cleanup



standards. The Navajo Nation is using remaining funds to remediate several structures that have mill site-related contamination. DOE will support the Navajo Nation by opening and operating the Grand Junction Disposal Cell for the disposal of the radiologically contaminated material. In addition, DOE will continue to offer and provide technical support to facilitate the remediation and hauling of the material for final disposal.

#### **4. Specific Actions for Next Five Years**

During the next five years, DOE plans to revise the groundwater compliance strategies for both the Shiprock and Tuba City disposal sites, as follows:

- Propose treatment alternatives and a revised groundwater compliance strategy at Tuba City.
- Develop strategies to enhance natural flushing in the floodplain aquifer and update the terrace strategy at Shiprock.
- Work with the Navajo Nation on selecting and implementing revised compliance strategies.
- Request NRC review and support their concurrence on the revised groundwater treatment approaches.
- Continue groundwater remediation at the Shiprock and Tuba City Disposal sites during this process.

During the next five years, the NRC will continue its oversight activities at the four UMTRCA sites on the Navajo Nation pursuant to its responsibilities under UMTRCA. The NRC will review DOE's treatment alternatives and revised ground water compliance strategies for the Tuba City and Shiprock sites and will work with DOE to address any issues that the NRC staff identifies during its reviews. If appropriate, the NRC will concur on the revised ground water compliance strategies before they are implemented by DOE.

In addition, DOE will work with NNEPA on a mutually agreed upon schedule to accept mill-site-related materials from any further cleanup using Highway 160 funds.

#### **5. Potential Limitations and Challenges**

Tuba City, Arizona Disposal Site—Due to the small amount of groundwater and long ground water travel times, the Tuba City disposal site's groundwater treatment system has not performed as expected. DOE has been pumping and treating groundwater at the Tuba City site for over ten years. The extraction rate of groundwater is very limited due to the slow travel times for the groundwater, and the small amounts of groundwater available in the aquifer. Although the treatment system has successfully removed uranium and other contaminants, this has had little effect on groundwater concentrations such that progress towards the compliance goal is not measurable. Studies have shown that the groundwater plume moves so slowly that it may never reach a point of exposure in Moenkopi Wash. During this Five-Year Plan, other alternatives to pumping and treating contaminated groundwater will be assessed.

Shiprock, New Mexico Disposal Site—During the first Five-Year Plan, DOE acquired a significant amount of data on the natural system and has a better understanding of the hydrology at the Shiprock disposal site; during Fiscal Years 2015 and 2016, DOE will continue working with the Navajo Nation to revise and update the GCAP to include this information. Challenges at the Shiprock Disposal Site include: 1) reaching agreement on a revised strategy for enhanced natural

flushing of the alluvial aquifer; 2) evaluating the need for continued active remediation on the terrace; 3) continuing a robust monitoring and technical data-collection program to support understanding system performance; and, 4) clearly communicating environmental risks to community members and others interested in or affected by the site.

## ***Objective 7: Health Studies***

**Federal Agencies: IHS and ATSDR**

**Navajo Nation Agency: NNEPA**

### ***1. Background***

Over the period of the last Five-Year Plan, the following was accomplished:

- a. University of New Mexico performed a study funded by the National Institutes of Health, on relationship between uranium in drinking water, kidney disease, and diabetes. Data from the study informed policy changes regarding uranium mining and remediation. The Navajo Area IHS participated in the study.
- b. Navajo Area IHS implementation of a Community Uranium Exposure Journey to Healing (CUEJTH) program consisting of medical screening of individual health histories and health status, and the provision of community based education and information gathering services across the Navajo reservation.
- c. Navajo Area IHS Radiation Exposure Screening and Education Program (RESEP) services funded by a Department of Health and Human Services, Health Resources and Service Administration (HRSA) grant targeting potentially compensation eligible individuals as a result of the RECA.
- d. Navajo Area IHS staff collaboration with the Navajo Nation Division of Health Epidemiology Program on a Navajo Nation cancer report and designation by the Epidemiology Program of a lead epidemiologist to work on uranium related issues.
- e. CDC-ATSDR collaboration with the Navajo Area IHS to conduct health care provider training on the impact of uranium and other heavy metals on the health of individuals.
- f. CDC-ATSDR funding provided to the University of New Mexico, the Navajo Nation Division of Health, and the Navajo Area IHS to implement a Navajo Birth Cohort Study of the health effects of non-occupational exposure on pregnancy outcomes and infant health.

### ***2. Current Status of Work***

The above items b, c, d, and f are currently ongoing activities.

### ***3. Goals for Next Five Years***

- a. Provision of Community Based Services.
  - i. Listen to community concerns and provide location specific health education to community residents.
  - ii. Provide medical screening evaluations to non-occupationally exposed individuals.
  - iii. CDC-ATSDR will provide community education materials (such as environmental health “frequently asked questions”), handouts, and resources.
  - iv. IHS will transfer health information from medical screening evaluations to each individual’s medical home health record.



- b. Provision of RESEP services. IHS will provide services as identified in the HRSA grant's Scope of Work to individuals with potentially compensable health conditions.
- c. Collaboration with the Navajo Nation Division of Health Epidemiology Program. IHS and ATSDR will work with the Navajo Nation's Division of Health Epidemiology Program supporting its efforts to:
  - Evaluate various cancer case rates by geographic location of cancer patient's residence and known radiation exposure sources.
  - Evaluate the health status of descendants of uranium miners/mill workers.
  - Evaluate the potential for a longitudinal human health impact study (as requested by the Navajo Nation to include physical, psychological and social parameters).
- d. CDC-ATSDR funded Navajo Birth Cohort Study.
  - i. Continue and complete work on the Navajo Birth Cohort study in cooperation with the University of New Mexico, the Navajo Nation Community Health Representative Program, and Navajo Area IHS.
  - ii. Consider the viability of expanding the laboratory component of the study.
  - iii. Conduct outreach education about study results to participants and Navajo Nation leaders and others at community gatherings.
  - iv. Develop a sustainability plan to evaluate the potential for follow up and/or surveillance of children from the Birth Cohort study beyond the research study period (with guidance and input from the Navajo Nation).
- e. Health Care Staff Training. Provide continuing education sessions to Navajo Nation hospital/clinic healthcare and community based staff.

#### **4. Specific Actions for Next Five Years**

Specific actions for the next five years within existing resources will include the provision of community based services by IHS staff as outlined in this plan under Objective 7 (Health Studies), item 3.a. (Goals for Next Five Years).

For the CDC-ATSDR funded Navajo Birth Cohort Study, the following actions are planned for the next five years within existing resources.

- Continue and complete work on the Navajo Birth Cohort Study in cooperation with the University of New Mexico, the Navajo Nation Community Health Representative Program and Navajo Area IHS.
- Continue outreach to potential study participants to achieve recruitment target of 1500 enrolled mothers and their infants.
- Consider the viability of expanding the laboratory component of the Birth Cohort Study to include other analytes such as polycyclic aromatic hydrocarbons.
- Disseminate study results to participants and Navajo Nation leaders and others at community gatherings.
- Continue to conduct developmental assessments of infants enrolled in the study at 2, 4, 6, 9 and 12 months.

- With guidance and input from the Navajo Nation, develop a sustainability plan to evaluate the potential for follow up and/or surveillance of children from the Birth Cohort Study beyond the research study period.

### ***5. Potential Limitations and Challenges***

The IHS will communicate through the U.S. Department of Health and Human Services American Indian / Alaska Native Health Research Advisory Council (HRAC) the needs for research as expressed by the Navajo Nation in order to attempt to overcome existing challenges through better communication and coordination with HRAC Federal partners.

Potential limitations for the Navajo Birth Cohort Study include on the ground recruitment of study participants.

## ***Cross Cutting Strategies***

### ***Enhanced Coordinated Outreach and Education***

**Federal Agencies: All Federal Agencies**

**Navajo Nation Agencies: All Navajo Nation Agencies**

#### ***1. Background***

Based on experience gained during the last five years, in-person outreach and education play a very important role in informing residents about the potential impacts of exposure to radiation, radon, radium, uranium, and other heavy metals. The federal and Navajo Nation agencies have achieved success reaching out to residents by attending Chapter meetings and holding periodic stakeholder workshops. They have found it is most helpful to the Nation when representatives from agencies coordinate outreach efforts so that a multitude of issues raised by residents can be addressed by the appropriate representative. A coordinated outreach approach is outlined below.

#### ***2. Goals for Next Five Years***

- a. Create a Community Outreach Network consisting of representatives from relevant federal and Navajo Nation agencies (including but not limited to: USEPA, NNEPA, NNAML, DOE, IHS, ATSDR, NRC, BIA). The Network will meet on a regular basis and support the following:
  - i. Community Outreach Coordinator who will lead the Network and who will be located on the Navajo Nation.
  - ii. A physical location that serves as an office and visitors' center where people can obtain information about uranium-related issues from all of the agencies involved in this effort. The office will be staffed by the Community Outreach Coordinator.
  - iii. Maintain a master outreach calendar that tracks outreach events planned by each agency.
  - iv. Develop an easily accessible website with relevant information regarding uranium issues with links to resources provided by all agencies.
  - v. Plan and organize two stakeholder workshops per year. Workshops will be located in different geographic locations on the Navajo Nation and will cover topics relevant to the interest in the area. Workshops will be planned with assistance from local grassroots organizations.
  - vi. Conduct a face-to-face community information effort by communicating with Navajo and Hopi residents in their homes and in small groups.
  - vii. Conduct a proactive media relations effort that educates reporters about uranium-related issues so they can disseminate that information to local residents through the news media.
  - viii. Develop a poster of relevant information regarding uranium mines, health and water impacts to be placed in health clinic waiting rooms and Chapter houses.
  - ix. Create a "Radiation 101" workshop that can be provided to Chapters at their request.
  - x. Develop a fact sheet that includes information and contacts from various agencies (e.g., RECA, safe drinking water, homes scans, and abandoned uranium mine areas).



### ***3. Specific Actions for Next Five Years***

- Draft a budget for the Network.
- Select outreach coordinator.
- Form outreach network and hold two to three meetings.
- Obtain an office space on the Navajo Nation.
- Develop master outreach calendar.
- Hold two workshops per year on the Navajo Nation.
- Create website of relevant information.
- Place relevant resources in the Community Outreach Office.
- Advertise availability of resources at the office.
- Develop and conduct “Radiation 101” workshops when requested.
- Begin needs assessments in affected chapters.

## ***Workforce Development and Training***

**Federal Agency: USEPA**

**Navajo Nation Agency: NNEPA**

### ***1. Background***

The actual work on the ground at various sites has identified the need for additional resources and attention to job training and workforce development for Navajo community members. The various cleanup actions to date mobilized federal government employees, Navajo Nation employees, and federal and Navajo Nation contractors. These projects highlight the opportunity to provide meaningful and safe involvement of Navajo community members as remediation project workers at future cleanup projects.

### ***2. Current Status of Work***

In summer of 2012, the Navajo Nation was the site for a USEPA Superfund Job Training Initiative project and 19 Navajo community members successfully completed the training. Currently, the NNEPA is partnering with the Northern Arizona University Institute for Tribal Environmental Professionals on an environmental workforce development and job training program from USEPA's Brownfields Program. An initial class of 20 Navajo community members will begin a training program in 2014.

### ***3. Goals for Next Five Years***

In 2013, USEPA selected Northern Arizona University for an Environmental Workforce Development and Job Training grant for \$215,000. Through its Institute for Tribal Environmental Professionals, Northern Arizona University plans to train students and place 35 graduates in environmental jobs, and track graduates for one year. The core training program includes 142 hours of instruction in 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER), radiological technician training, construction safety, hazardous materials safe handling, and orientation to environmental cleanup. A total of three federal certifications will be offered. The university is targeting unemployed residents of the Navajo Nation, particularly those living in communities impacted by uranium mining and cleanup activities. Key partners include Navajo Nation Department of Workforce Development, NNEPA, Navajo Nation Office of Economic Development-Church Rock and Shiprock Chapters, and Navajo Nation Council Delegates.

**Training Schedule**

<b>Year</b>	<b>Task</b>
Year 1	<ul style="list-style-type: none"><li>▪ Orientation to Environmental Cleanup, April 2014</li><li>▪ Hazardous Materials Safe Handling, April 2014</li><li>▪ 40-Hour HAZWOPER, April 2014</li><li>▪ Radiological Technician, May 2014</li><li>▪ Occupational Safety and Health Administration (OSHA) Construction Safety, May 2014</li></ul>
Year 2	<ul style="list-style-type: none"><li>▪ Orientation to Environmental Cleanup, April 2015</li><li>▪ Hazardous Materials Safe Handling, April 2015</li><li>▪ 40-Hour HAZWOPER, April 2015</li><li>▪ Radiological Technician, May 2015</li><li>▪ OSHA Construction Safety, May 2015</li></ul>



## APPENDIX A:

### *This statement was provided by the Navajo Nation.*

The Navajo people, or the Diné, have an obligation under the Diné Fundamental Law to respect, preserve and protect Mother Earth as stewards and guardians for the benefit of future generations. The Fundamental Law is codified in 1 Navajo Nation Code (N.N.C.) §206.

The Fundamental Law is comprised of Natural Law, Traditional Law, Customary Law, and Common Law. 1 N.N.C. §§201-206. There is a Diné world view and concept of and relationship between the environment and the natural elements of life. The Diné world view is strongly linked to the use of core ancient Diné principles and values which should guide environmental reclamation, restoration and related activities.

The Diné know that all things have within them the capability of both *hozho* (good or goodness) and *hashkeji* (bad or badness), and that both must be balanced to achieve beneficial results. This balance, known by the Navajo word *hózhó*, meaning harmony, is disrupted when natural laws are not observed. In Western science, this is known as a state of equilibrium, in which opposing forces balance each other out and stability is attained and maintained.

The Diné journey narratives speak of two Hero Twins that set about dealing with the Monsters. Confrontations with certain of these Monsters, such as hunger and poverty, led to accommodations to allow them to live for the benefit of the People.

Navajo elders have taught that uranium, or *leetsó* (literally, “the dirt that is yellow”), is one of these Monsters - a powerful element that can disrupt *hózhó* when it is misused or disrespected. Certain substances in Mother Earth are not to be disturbed from their resting places, and “the people now know that uranium is one such substance”. 18 N.N.C. §1301.D.

Since *leetsó* has been disturbed by past mining and processing activities, Navajo natural laws charge the Diné with seeking ways to return *leetsó* to its natural balance with Mother Earth so that it does not further harm the sacred elements or the sacred balance of life.

On May 7, 2012, Ben Shelly, President of the Navajo Nation, created a Uranium Task Force to coordinate activities relating to the economic, health and environmental impacts of past uranium mining and processing, and to “promote and achieve cleanups and remediation actions that are most protective of human health and the environment ...”

On November 4, 2013, the Navajo Nation Uranium Task Force unanimously adopted a resolution supporting the formation of a commission or advisory board which would be responsible for offering advisory opinions on appropriate remediation options at abandoned uranium mine sites and former uranium mill sites located in Navajo Indian Country. The Task Force recommended that the commission be guided by the principles of Diné Fundamental Law, 1 N.N.C. §§201-206. The commission also will give full consideration to the comments and opinions of the citizens of the Navajo Nation. The resolution has been submitted to the Navajo Nation President and the Navajo Nation Council for review and possible action.

The Navajo Nation supports the efforts of the United States Government to restore *hózhó* by addressing the impacts of past uranium mining and processing in Navajo Indian Country. Such efforts should continue in alignment with the Diné Fundamental Law and with full participation of the citizens of the Navajo Nation.

# Sanders will soon be getting cleaner, safer water

BY ARLYSSA BECENTI  
NAVAJO TIMES

**WINDOW ROCK** – Sanders Park Estates will soon be getting cleaner and safer water after the Arizona Corporation Commission approved the transfer of water service from Arizona Windsong Water Company to Navajo Tribal Utility Authority during an April 12 meeting in Phoenix.

For months, Nahata Dził community members have been going without running water after tests on 144 well sites found eight of those wells had concentration of uranium.

Since those tests, residents had to find alternative ways to get water for

'This transfer was a necessary step to improve the **safety and quality of the drinking water** in Sanders. Currently, potable water must be shipped to Sanders, because the water provided by Windsong is contaminated with uranium.'

**Carlyle Begay**  
Arizona State Senator

everyday living. That's expected to end in a few weeks, as NTUA will soon be completely hooked up to give the community better quality water for a cheaper price, NTUA officials said.

"We are going to go through the process of signing them all up with their new accounts and starting the process of making them our customers," said NTUA Deputy Manager Rex Kontz in a phone interview, "as soon as the water starts flowing and starts going through their meter. Probably by the



Navajo Times  
4/14/2016



## **WATER:** Water will be substantially lower than Windsong, NTUA rep says

FROM PAGE 1

of Sanders for making this all happen," wrote Begay. "This transfer was a necessary step to improve the safety and quality of the drinking water in Sanders. Currently, potable water must be shipped to Sanders, because the water provided by Windsong is contaminated with uranium."

In order to speed up the process to give the residents of Park Estates better quality water, Kontz said they had to negotiate with Windsong owner Lillie Paulsell and purchase Windsong's water pipes. NTUA plans to eventually replace the entire water system, including the pipes.

"If we didn't take possession of her system, we'd have to wait until we got the new system built before we could take over," said Kontz. "We gave her a small amount to buy her

pipes in the ground (so) we can connect it and start flowing water."

Even with using the same system and pipes for now, Kontz said that the cost for water would be substantially lower than what customers were paying Windsong, and the pressure will be enhanced also.

The next step for Kontz and NTUA is to try and get Sanders Unified School District hooked up to their water system as well.

Sanders Elementary and Middle School have over 1,000 students and employees that utilize the buildings. They have been getting their water from Sanders Valley High School, which is hooked up to NTUA.

Kontz said that there was a problem with not having enough water to give to the schools, but with the planned system improvement, they will

be able to get the schools on board as well.

"The next thing I have to do is start a dialogue with the school," said Kontz. "They also have a problem but we found two wells that we can renovate, upgrade and then put a bigger well in. Once we get to that point, we'll have more water ... to hit the school as well."

Begay also applauded NTUA's effort to help supply the community's need for safer water and was grateful for Arizona Corporation Commission's quick unanimous vote.

"The quick resolution of this docket will substantially improve the lives of the people of Sanders," wrote Begay. "Thanks to the efforts of the people of Sanders and NTUA, steps can now be taken to provide the Sanders community with safe water for drinking, cooking, cleaning and bathing."



Dan Hute  
Office of the Superintendent  
P.O. Box 250  
Sanders, Arizona 86512

Office: (928) 688-4756  
Fax: (928) 688-4723  
E-mail: [danhute@sandersusd.net](mailto:danhute@sandersusd.net)  
Website: [www.Sandersusd.net](http://www.Sandersusd.net)



## SANDERS UNIFIED SCHOOL DISTRICT #18

### IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

Sanders Unified School District Has Levels of Uranium Above Drinking Water Standards. Our water system recently violated a drinking water standard. Although this is not an emergency, as our customers, you have a right to know what happened, what you should do, and what we did (are doing) to correct this situation.

We routinely monitor for the presence of drinking water contaminants. On 08/10/2016, we received notice that the sample collected on 05/18/2016 showed that our system exceeds the standard, or maximum contaminant level (MCL), for uranium. The standard for uranium is 30 µg/L. Uranium was found at 38.8 µg/L.

#### What should I do?

- There is nothing you need to do. You do not need to boil your water or take other corrective actions. However, if you have specific health concerns, consult your doctor.
- If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from your health care providers about drinking this water.

#### What does this mean?

This is not an emergency. If it had been, you would have been notified within 24 hours. However, some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.

#### What is being done?

Currently SUSD is working with ADEQ and Arizona School Facilities Board looking at the installation of a filtering system. In the meantime, SUSD has implemented a voluntary water supply to schools and housing. We anticipate that the filtering system will be up and operational by the end of the 2016. Please note that this notice does not apply to Valley High School or the Transportation Department.

For more information, please contact Dan Hute at 928-688-4756 or by email at [danhute@sandersusd.net](mailto:danhute@sandersusd.net)

This notice is being sent to you by Sanders Unified School District. State Water System ID#: 01-022.  
Date distributed: 09-23-2016.

TSE SI ANI CHAPTER  
PO BOX 403  
LUPTON AZ 86508

PH: 923 688 2128  
FAX 928 688 3150  
SEPTEMBER 22 2016

Arnold Goodluck  
Board President

Anita Watchman  
Board Member

Marlene Apachee  
Board Clerk

Daisy Slim  
Board Member

Kirby David  
Board Member

# NAHATA DZIIL COMMISSION GOVERNANCE

Darryl Ahasteen – President  
Wayne Lynch – Vice President  
Mae Horseman – Secretary

Margaret Bedonie - Treasurer  
LaVonne Tsosie - Member

## RESOLUTION OF NAHATA DZIIL COMMISSION GOVERNANCE

NDCG-2015-07-081



**Requesting that the State of Arizona, Navajo Nation, Office of Navajo Hopi Indian Relocation (ONHIR) and Apache County, Arizona; (1) declare a State of Emergency due to uranium contamination of the one public water system in Sanders; (2) take immediate effective collaborative action to provide short-term and long-term alternative water supplies; (3) provide for continuous ongoing monitoring, documentation, and reporting of uranium, radioactivity and heavy metal in surface water, ground waters, soils, air-borne dust, vegetation, and animals along the Puerco and Little Colorado Rivers; and (4) support a policy of no new uranium mining and processing in the watershed of the Colorado and Rio Grande.**

### WHEREAS:

1. The Nahata Dziil Commission Governance is certified by the Navajo Nation Council Resolution CAP-36-91 as a local governmental entity of the Navajo Nation Government which has the responsibility and authority to promote, protect and preserve the interest and general welfare including the safety of its community, people, programs, property, etc.; and
2. Transportation and Community Development Committee of the Navajo nation by Resolution TCDCAU-66-02, approved governance certification of the Nahata Dziil Commission Governance Five Management Policies and Procedures pursuant to 26 N.N.C. Section 102(B), which permit's the Nahata Dziil Commission Governance to exercise local governance authorities contained within 26 N.N.C. Section 103 (D)(1); and
3. The Nahata Dziil Commission Governance is further certified by the Navajo Nation in accordance with its Community Based land Use Plan, pursuant to Resolution of the Transportation and Community Development Committee of the Navajo Nation Council, to administer its community lands with the New Lands Chapter boundaries and to decide on the best options for its land use; and
4. On January 20, 2008, the Nahata Dziil Chapter converted its Governmental entity into the Nahata Dziil Commission Governance; and
5. The Dine and Non-Dine residents of Nahata Dziil and surrounding areas have long been afflicted by uranium contamination of their water sources, primarily due to past releases of uranium mining and milling wastes into the Puerco River in New Mexico; and
6. There has been insufficient attention to, or accountability for, this uranium contamination by government and corporate entities directly and indirectly responsible to protect public health and the natural environment along with ranches along the Puerco River; and
7. After decades of impacts of uranium mining and milling on the public health, water supplies, soils, vegetation, livestock and wildlife in the Puerco River watershed, technical and financial resources are still inadequate to conduct comprehensive public health studies and to determine the extent of, and required mitigation and remediation measures for, uranium contamination of water, soils, air, plant and animals resources in the Puerco and downstream Little Colorado River watershed; and
8. In response to these unacceptable conditions, To Lani Enterprise (TLE), the Little Colorado River Watershed Chapter Association (LCRWCA), and the Southwest Research and Information Center (SRIC) have secured funding from the U.S. Environmental Protection Agency (USEPA) to conduct rigorous water sampling and water quality analyses for uranium levels in wells along the Puerco and Little Colorado rivers; and

NDCG-2015-07-081



9. Preliminary results of these analyses, conducted during the Spring 2015, show that at least eight (8) wells along the Puerco River in the Nahata Dziil/Sanders region are contaminated with levels of uranium that exceed the USEPA safe drinking water limit for uranium, including in the public water system owned and Operated by the Arizona Windsong Water Company that serves hundreds of Dine and Non-Dine residents, including children and pregnant woman; and
10. The negative health effects of chronic uranium as heavy metal and of uranium as radioactive element are well known and unacceptable for all residents of the Puerco River valley; and
11. The uranium contamination of public waters in Nahata Dziil and Sanders have long been known by the State of Arizona, the USEPA and the Navajo Nation, for at least the past decade, and despite enforcement actions against the AWWC, yet nothing has been done to date to bring safe drinking water to the community; and
12. Safe, clean drinking water is available close to the affected contaminated public water system, in the water system owned and operated by the Navajo Tribal Utility Authority(NTUA) at Nahata Dziil on the Navajo Nation; and
13. The Arizona Corporation Commission, among other entities, has funds available that could be used to drill a new well and supply uncontaminated water to the residents of Nahata Dziil and Sanders; and
14. This is an emergency situation, and the health of the Nahata Dziil and Sanders community members has been put at risk for too long.

#### **NOW THEREFORE, BE IT RESOLVED THAT**

1. The Nahata Dziil Commission Governance and community residents of Nahata Dziil and Sanders and surrounding areas along the Puerco River hereby request that the State of Arizona, the Navajo Nation, the Office of Navajo Hopi Indian Relocation (ONHIR) and Apache County immediately declare that a State of Emergency now exists due to the lack of clean water in their public water system in Park Estates, Sanders, Arizona; and
2. Nahata Dziil Commission Governance and community residents of Nahata Dziil and Sanders and surrounding areas along the Puerco River hereby request that the State of Arizona, Navajo Nation and Apache County immediately set aside jurisdictional, programmatic, and other red tape that prevent effective collaborative and responsible action, and solve the problem by;
  - (a) Connecting the Arizona Windsong Water Company public water system to the adjacent NTUA water system, as a short-term emergency measure to provide safe water to local residents; or in the alternative;
  - (b) Bringing clean drinking water to the community in tank trucks until residents' homes can be connected to the NTUA system; and
  - (c) Identifying cost-sharing funds to drill a new well to provide water to the Arizona Windsong Water Company system as soon as possible; and
3. Nahata Dziil Commission Governance and community residents of Nahata Dziil and Sanders and surrounding areas along the Puerco River hereby request the Navajo Nation and the USEPA immediately amend the current Five Year Plan for Uranium Remediation and Cleanup, to provide for continuous ongoing monitoring, documentation, and public reporting of uranium and radioactivity in surface waters, ground waters, soils, air-borne dust, vegetation, and animals along the Puerco and Little Colorado Rivers in New Mexico and Arizona, so that all affected communities may know with certainty what risks they face and what measures they must take to protect and ensure public health and well-being; and
4. Nahata Dziil Commission Governance and community residents of Nahata Dziil and Sanders supports the Navajo Nation prohibition on new uranium mining and processing in Navajo Indian Country, and furthermore request that the State of Arizona and State of New Mexico support a policy prohibiting new uranium mining and processing activities in the watershed of the Colorado River and Rio Grande.

### CERTIFICATION

I hereby certify that the foregoing resolution was duly considered by Nahata Dziil Commission Governance at a duly called special meeting at Nahata Dziil Commission Governance Meeting Hall, NAVAJO NATION, Sanders, (Arizona), at which a quorum was present and that same was passed by a vote of 03 in favor, 00 opposed and 01 abstained, on this 30<sup>th</sup> day of July 2015.



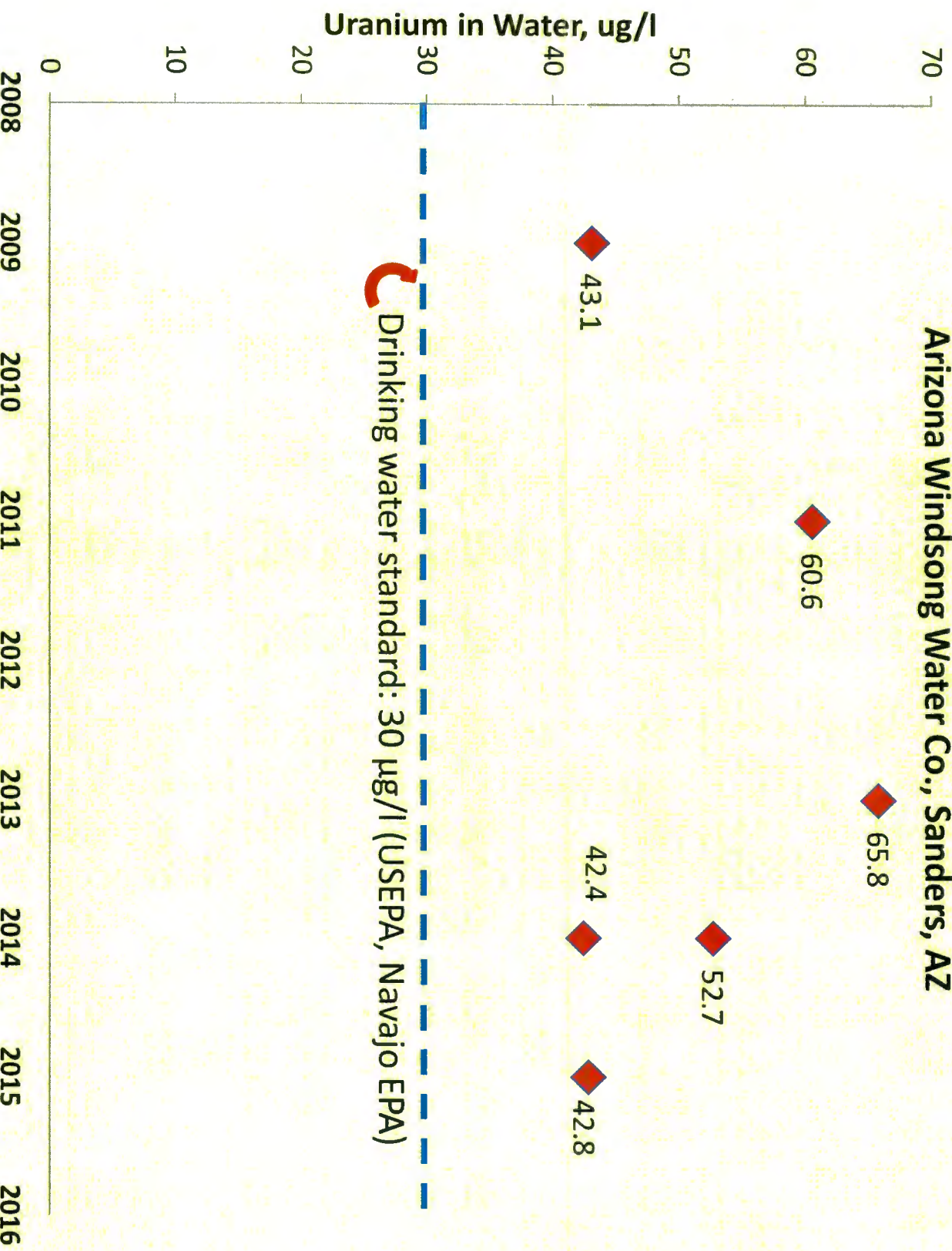
Darryl T. Ahasteen, Commission President  
Nahata Dziil Commission Governance

Motion by: **Wayne Lynch**

Second by: **Margaret Bedonie**

# Uranium in Drinking Water (µg/l)

Arizona Windsong Water Co., Sanders, AZ





# New Lands Sampling Results



## Legend

### New\_Lands\_Wells

#### U\_total\_ug\_l

- 0 100000 - 5 000000
- 5 000001 - 16 000000
- 16 000001 - 34 700000
- 34 700001 - 66 000000
- 66 000001 - 167 000000

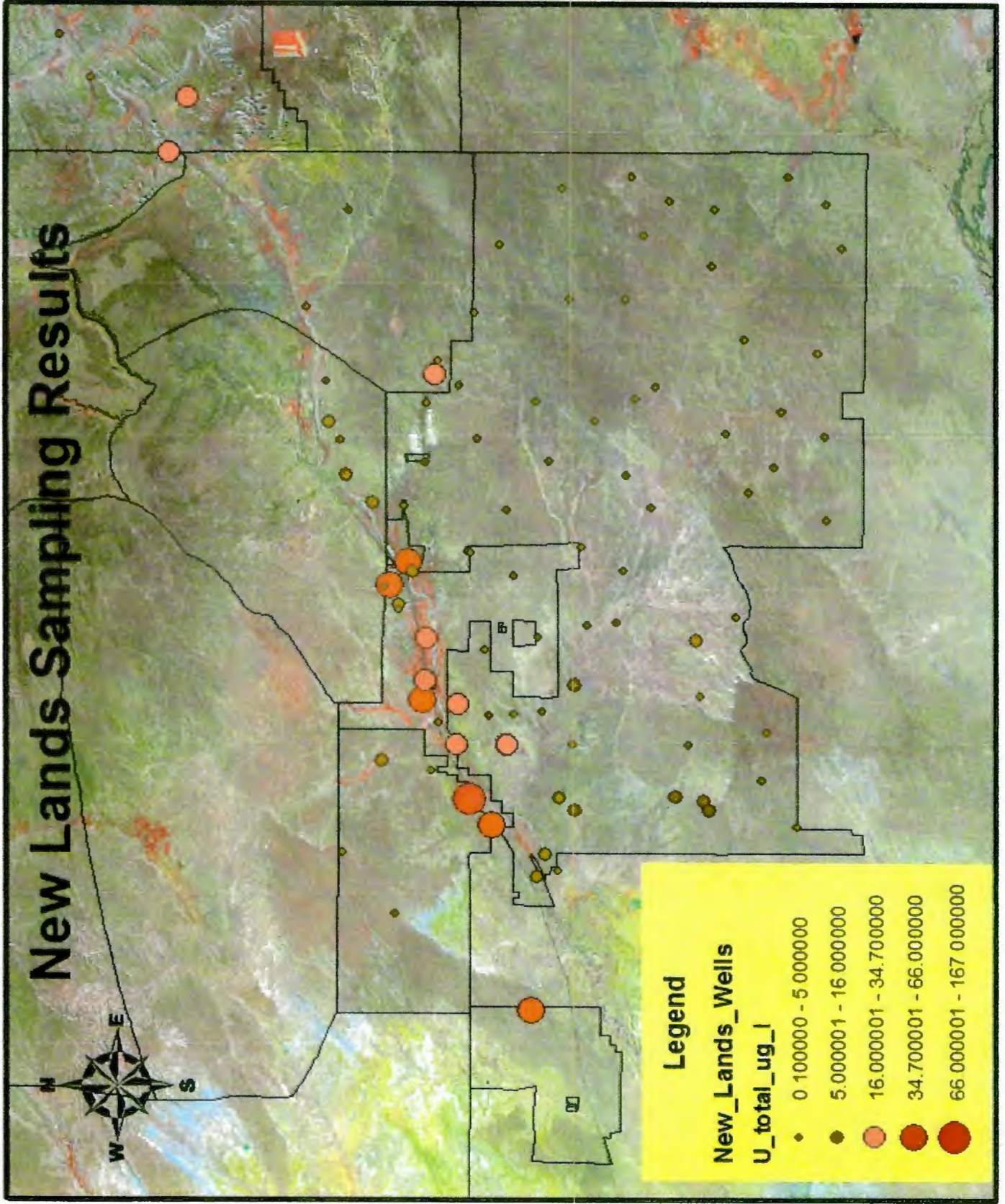


Exhibit G



TSA -2016-10-048  
Resolution of the Tse Si Ani Chapter  
Lupton, Arizona

**TSÉ SÍ ANÍ**  
CERTIFIED CHAPTER

Support for NNC legislation 0345-16; An Action Relating To Law and Order, Health, Education and Human Services, Resources and Development, Naabik'iyati' Committees, and the Navajo Nation Council; Requesting Support From the United States Environmental Protection Agency, the State of Arizona, and Apache County, Arizona for Assistance in Addressing Uranium Contamination in the Water Supply Near Sanders, Arizona

**WHEREFORE:**

1. Pursuant to the "Local Governance Act", 26 NNC, Chapter 1, Subchapter 1, Section 3 (s), the Tse' Si Ani Chapter was established as a Chapter of the Navajo Nation Government by the Navajo Nation Council Resolution Number CAP 34-98, AND;
2. Pursuant to Chapter 1, Subchapter 1, Section 131 (1) (2) of the same "Act", the Tse' Si Ani Chapter has the responsibility and authority to promote, protect, and preserve the interest and general welfare including the safety and health of its community people, programs, property, AND;
3. The Tse Si Ani Chapter is known for its leadership among the Navajo chapters in areas of function and accountability, AND;
4. The proven uranium contamination of the Sanders community water supply is a major health hazard and affects those upstream communities in like manner, AND;
5. The United States Environmental Protection Agency, as an agent of the United States government, is a responsible party to the general welfare of its citizens, as both the State of Arizona and Apache County likewise hold responsibility, AND;
6. Local resources are ill equipped for an appropriate response to a crisis the magnitude of the uranium contamination of the fresh water supply.

**BE IT THEREFORE RESOLVED:**

1. The Tse Si Ani Chapter, in alliance with the Puerco Valley Chapters, including the NaHa Ta Dził Chapter acknowledges the published findings of uranium contamination of the water supply in and around the Sanders community, AND;
2. The Tse Si Ani Chapter additionally makes direction that the Navajo Nation Council require ADEQ to expedite the installation of a filtration system for the school and to conduct public meetings in all communities serviced by the school district on the status and actual timeline for full installation of the filtration system, and monitor surrounding water and waste water systems for additional contamination, AND;

ALVIN BLACKGOAT  
PRESIDENT  
FREDDIE J. NELSON  
VICE PRESIDENT  
REGAN R. HAWTHORNE  
SECRETARY/TREASURER  
RAYMOND SMITH JR.  
COUNCIL DELEGATE  
RANDALL COMB  
GRAZING OFFICIAL



3. Together with the immediately affected chapter and community residents the Tse Si Ani Chapter strongly supports legislation 0345-16 and calls on the Navajo Nation Council to further the voice of the people and move the legislation forward.

#### CERTIFICATION

We hereby certify that the foregoing resolution was duly considered by the Tse' Si Ani Chapter at a duly called meeting in Lupton, AZ, at which a quorum was present and the same was passed by a vote of: 16 in favor, 2 opposed and 2 abstained this 13th day of OCTOBER, 2016.

Motion: Jackie Yazzie

Alvin Blackgoat  
Chapter President

Regan Hawthorne  
Secretary/Treasurer

Second: Verna Henry

Freddie J. Nelson  
Chapter Vice President