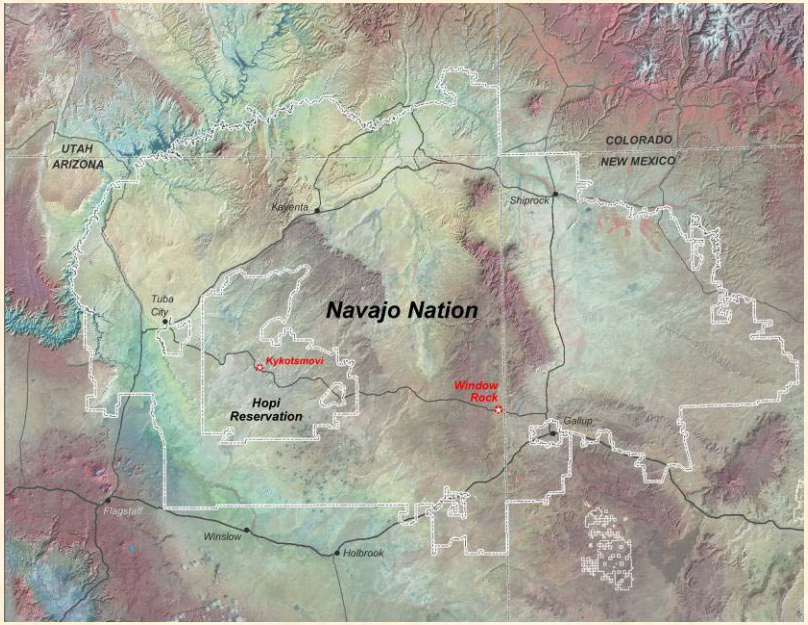
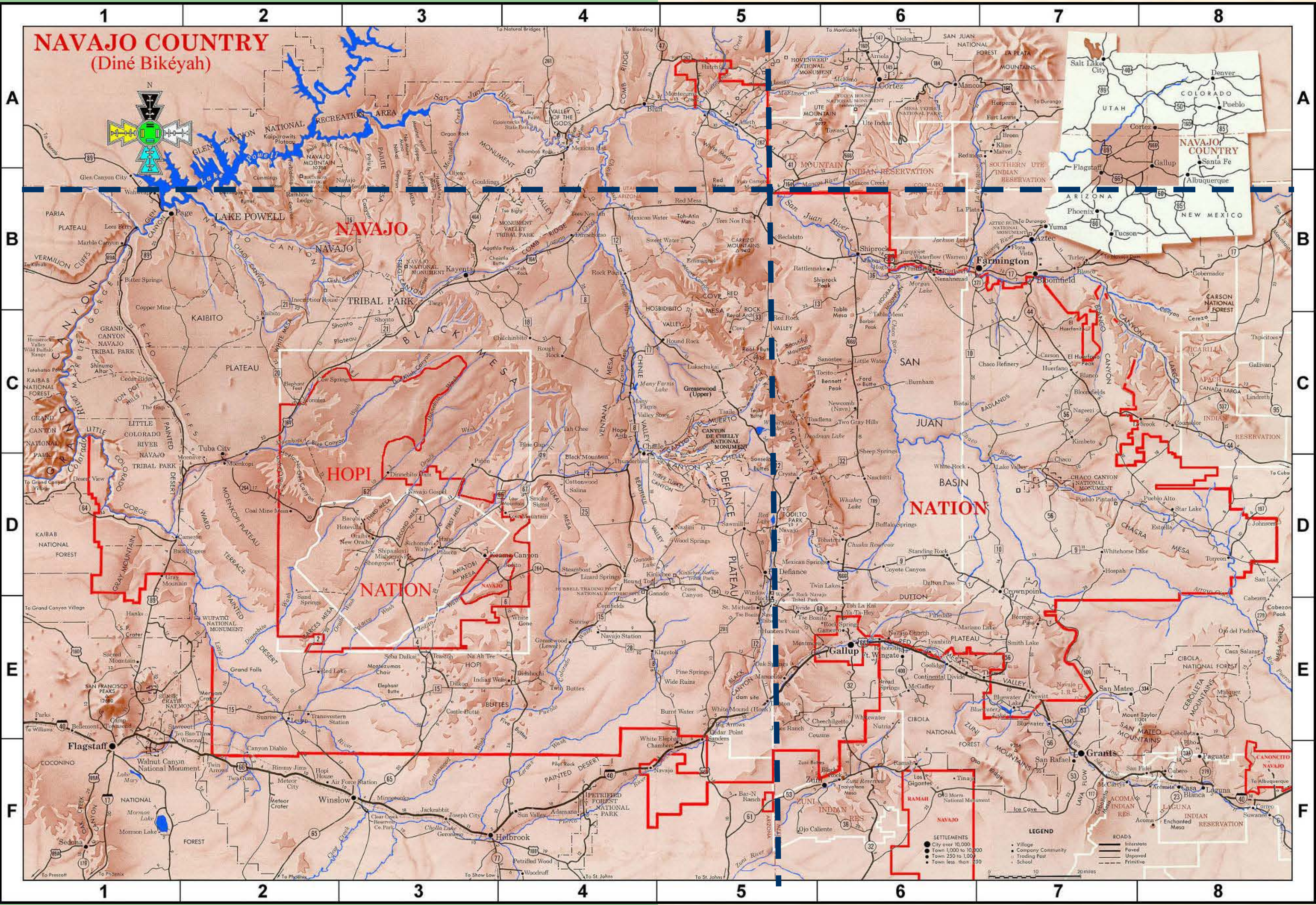
Five-Year Plan to Address Uranium Contamination on Navajo Nation

Navajo Uranium Stakeholder Workshop
November 2009





NAVAJO COUNTRY
(Diné Bikéyah)
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JUAN
BASIN
LAKE POWELL
GLEN CANYON NATIONAL RECREATION AREA
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Kayenta
Tuba City
Flagstaff
Winslow
Holbrook
Gallup
Farmington
Shiprock
Bloomfield
Cortez
Grants
Chinle
Window Rock
Crownpoint
BLACK MESA
UTAH
COLORADO
ARIZONA
NEW MEXICO
Salt Lake City
Denver
Pueblo
Santa Fe
Albuquerque
Phoenix
Tucson
NAVAJO COUNTRY
LEGEND
SETTLEMENTS
ROADS

Five-Year Agency Action Plans

- Structures – EPA
- Water Sources – EPA
- Abandoned Mines – EPA
- Northeast Church Rock Mine Site – EPA
- Inactive Milling Sites – DOE
- Highway 160 Site – DOE
- Tuba City Dump – BIA
- Health Assessment – IHS
- Summary of Activities - NRC

Structures - Background

- Originally started with three lists of potentially-contaminated structures. Lists were the result of outreach efforts to local Chapter officials and a desktop study.

- 2007 - Mapped locations of structures near each mine; resulted in 500 structures requiring screening and assessment.

Outdoor Radiation Analysis

Structures – Action Plan

- EPA, in coordination with NNEPA, plans to assess about 500 structures over five years.
- EPA will use Superfund authority for appropriate response actions.

Contaminated Hogan Removal

Structures – Status and Next Steps

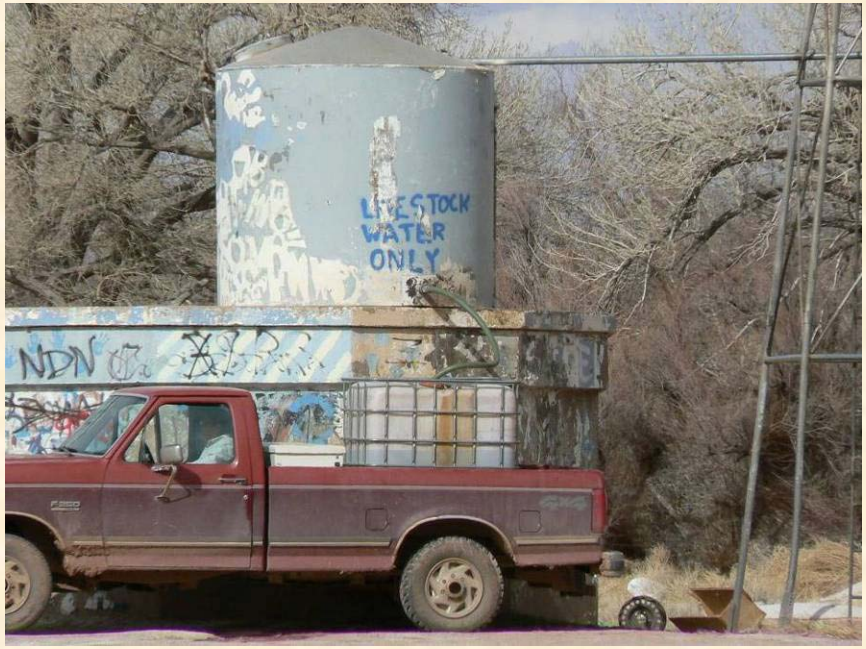
- 2008/2009 - Assessed 117 structures and yards. Demolished 27 structures and remediated 10 yards.
- 2009/2010 - Rebuilding or compensating homeowners for demolished structures.
- 2009/2010 - NNEPA screening and assessing additional structures; 100+ screened to date.
- 2010 - Demolish and rebuild additional identified structures.

New Replacement Home

Water Sources - Background

- 70% of Navajo families get drinking water from regulated public water systems.

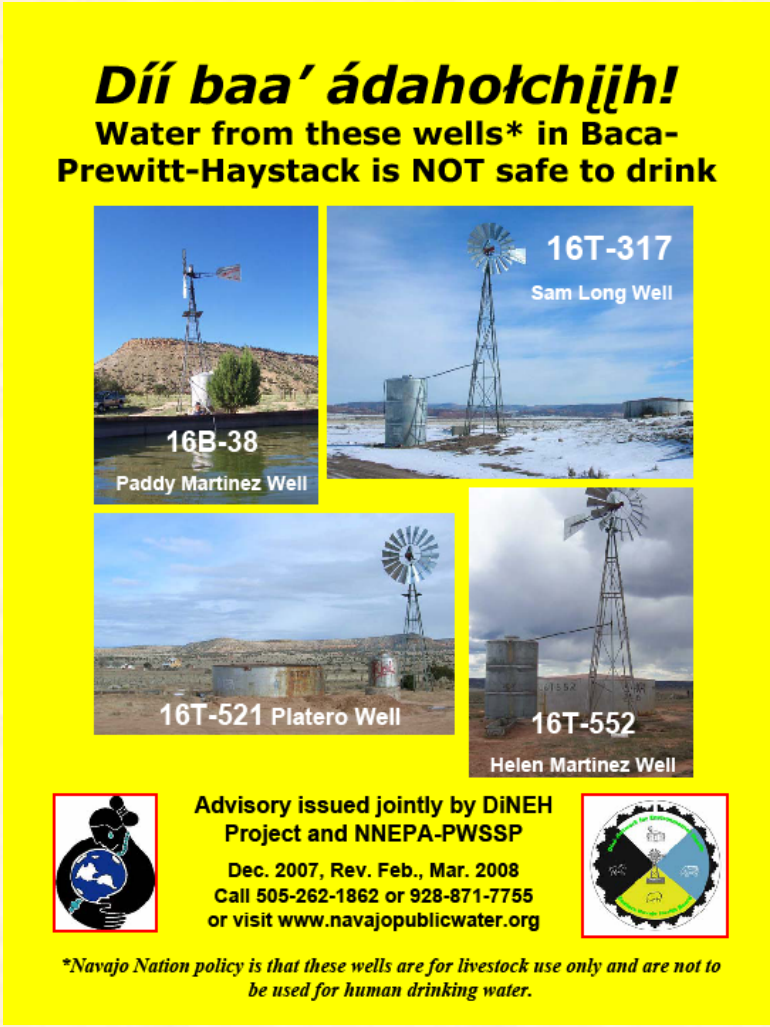
- 30% of Navajo families (54,000 people) lack access to safe, piped water - the highest percentage of any U.S. tribe or state. Most of these families haul drinking water from livestock wells, springs, and other unregulated sources.



Livestock Well Used for Water Hauling

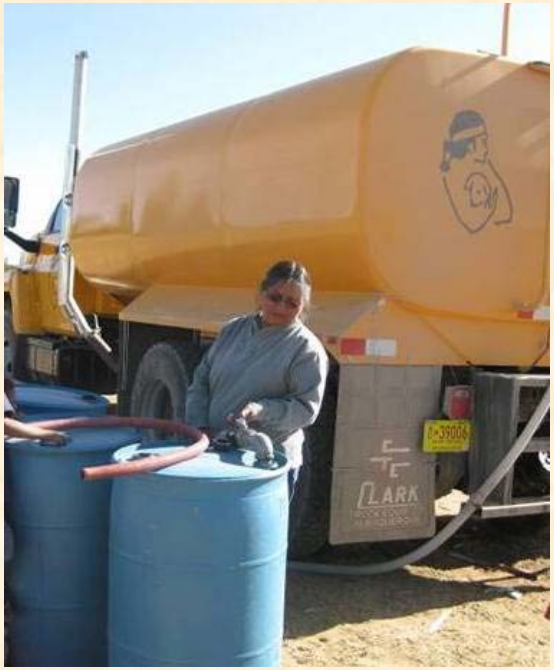
Water Sources - Action Plan

- Test unregulated water sources that may contain elevated radionuclides.
- Post warnings on contaminated wells and conduct outreach to residents.
- Provide alternative water sources where possible by extending existing water lines, building new systems, or delivering water.



Water Sources - Status

- 2008 - 249 water sources tested; 22 exceeded standards for radionuclides. All wells posted and residents notified.
- 2009 - Two wells shut down; prioritized 12 of the remaining 20 contaminated water sources.
  - Black Falls water line and watering point constructed to serve 12 homes near 4 contaminated water sources
  - $13.2M provided to serve 358 water hauling homes near 8 contaminated water sources in Dennehotso, Monument Valley, Oljato, Sweetwater, Mexican Water and Red Mesa
  - $1.6M provided for Navajo Nation Water Hauling Feasibility Study and Pilot Program to serve up to 4,000 water hauling homes



Private Water Hauling on Navajo Reservation

Water Sources - Next Steps

- 2010 - NNEPA and CDC sampled 36 unregulated water sources near uranium mines and sources within the CDC study area.
- 2010 - Indian Health Service will initiate design and construction of water infrastructure projects funded in 2009.
- 2010 - Navajo Nation will implement Water Hauling Feasibility Study and Pilot Program.

Unregulated Water Hauling Source

Abandoned Uranium Mines - Background

- 2007 - EPA completed a multi-year $12 million effort to assess the extent of uranium contamination across the Navajo Nation.
- EPA flew aerial surveys over 1,440 square miles, reached out to Chapters, sampled unregulated water sources, and scanned structures.
- EPA developed an atlas and GIS database identifying 520 potential abandoned uranium mines.

Abandoned Uranium Mines - Action Plan

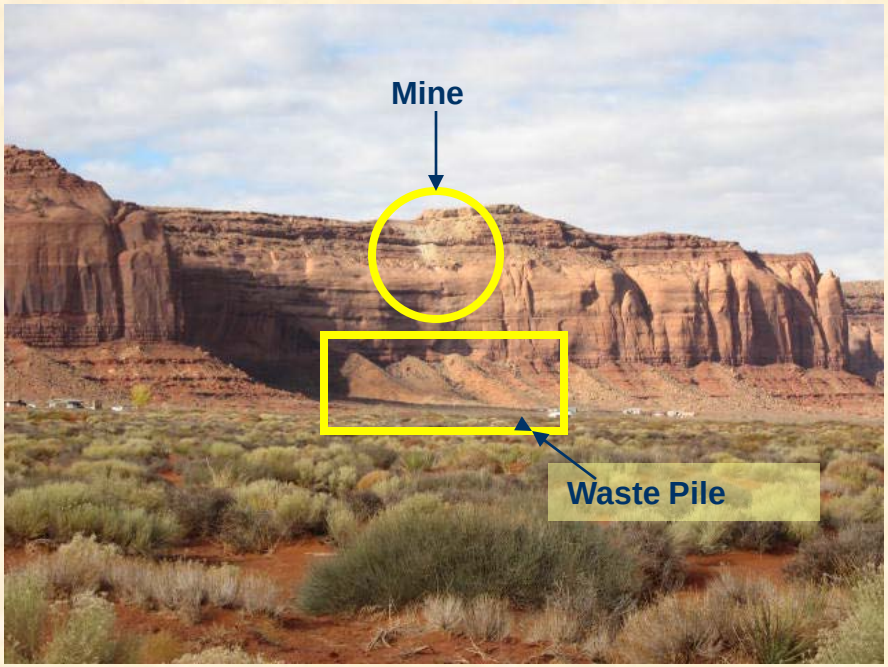
- EPA working with NNEPA to conduct on-site screening evaluations of all 520 abandoned uranium mines over five years.
- EPA will conduct more detailed assessments as needed.
- EPA will work with NNEPA to determine appropriate courses of action for highest priority mines.

Skyline Mine Assessment

- EPA received over 25,000 pages of corporate operational history information from 9 companies and will evaluate possible enforcement options at sites.

Abandoned Uranium Mines - Status

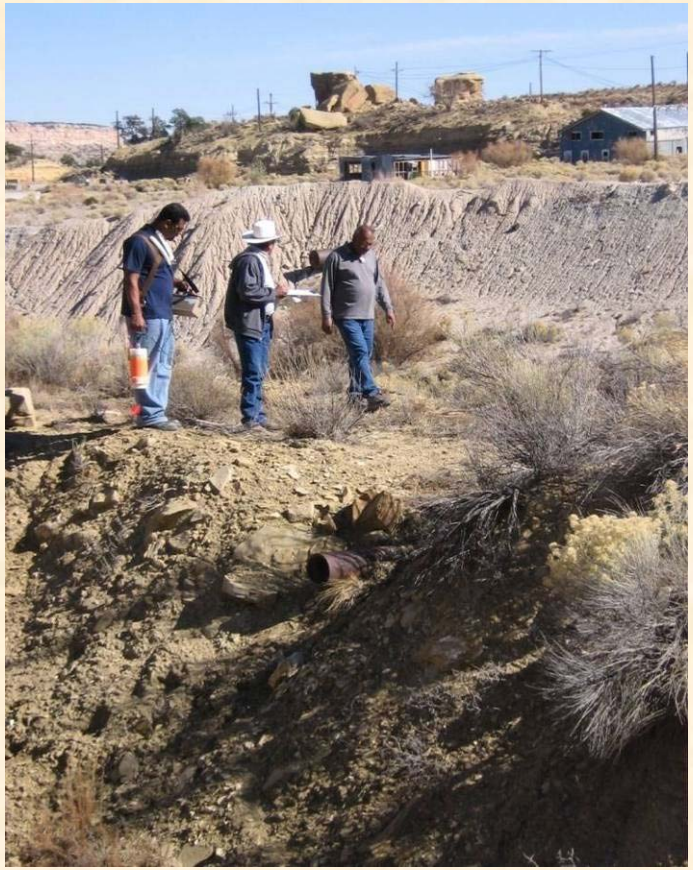
- 2008/2009 - On-site screening of over 83 mines; 5 detailed assessments. Removal assessment at Skyline Mine initiated.
- 2009 - On-site screening of 128 mines. Removal assessments at Mariano Lake and Section 23.
- 2010 - EPA and NNEPA will determine appropriate actions for additional high priority mines.



Skyline Mine

Northeast Church Rock Mine - Background

- Largest underground uranium mine in country and highest priority mine for Navajo Nation.
- 2006 - EPA ordered United Nuclear Corporation (UNC) to investigate mine.
- 2007 - EPA ordered UNC to cleanup one structure and four yards.
- 2009 - EPA ordered removal of almost 100,000 cubic yards of contaminated soil and sediments near the homesites and from the arroyo. This cleanup is occurring now.



NECR – Next Steps

- Currently considering options for longterm cleanup of nearly 900,000 cubic yards of soil at NECR.
- EPA and Navajo Nation held productive consultations in August 2008, December 2008, and October 2009.
- At Navajo Nation's request, EPA agreed to suspend our plans to select a cleanup option for NECR soils.
- Both EPA and Navajo Nation agree that we need to do more work to understand and evaluate concerns of the nearby community.
- EPA will do more work to evaluate the relative "safety" of the various options.
- EPA will start the evaluation of groundwater in Spring 2010.

Assessing Public Health Risks from the Practice of Water Hauling on Navajo Nation

Centers for Disease Control and Prevention

Navajo Uranium Contamination Stakeholder Workshop

November 3, 2009

Public Health Risks from Water Hauling: CDC Focus

- Water hauling is widespread on Navajo Nation
- 30% of households are not connected to a public water system
- Sources of hauled water may include:
  - Livestock wells
  - Community wells
  - Natural Springs
- Not all sources used for hauling are approved for human drinking water
- Potential health risks from drinking hauled water are not well understood

Public Health Risks from Water Hauling: CDC Initial Response (2006-07)

- CDC tested 199 unregulated water sources used for hauling drinking water:
  - CDC identified drinking water sources containing bacteria, arsenic, uranium and other contaminants and shared data with EPA
  - CDC identified 5 regions where drinking water contaminants were concentrated

Public Health Risks from Water Hauling: CDC Follow-up Response (2008-09)

- Assess human exposure to drinking water contaminants

- Community Health Representatives collected data from 296 households in the 5 regions identified in the initial response
  - Conducted interviews on water use, hauling practices and relevant health information
  - Tested drinking water stored in the home
  - Tested household residents' urine for exposure to arsenic, uranium and other chemicals

- Collaboration: Navajo Nation Division of Health, Navajo Nation EPA and CDC

People living in these communities should be aware of, but not alarmed by, certain exposures

- 22% of households haul water for drinking, including some with access to public water
- Those that haul water are more likely to be exposed to bacterial contaminants in drinking water
- Human exposure to uranium as measured in urine was:
  - Lower than levels known to cause health effects
  - Higher in this population than the general US population
  - Comparable to other Southwest populations
- Drinking water contamination does not appear to be the sole source of uranium or other chemical exposures in this population

Public Health Risks from Water Hauling: Current CDC Focus

- CDC trained 50 Community Health Representatives on health and drinking water exposures
- CDC provided physician education (via a training DVD) to health care providers serving the 5 chapters included in the study
- Navajo Nation Division of Health and CDC shared results with all individual participants
- CDC offered urine testing to participant's family members
- Navajo Nation Division of Health is leading ongoing community awareness efforts

Public Health Risks from Water Hauling: Current CDC Focus

- CDC and EPA are investigating additional unregulated water sources used for hauling drinking water
  - Water sources not previously tested by CDC or EPA
  - 18 identified by CDC study participants and 52 identified by EPA (Total=70)
  - CDC collected water samples from 36 of 70 sources for testing by EPA
- CDC will continue to share results and work with other agencies (IHS, EPA, and Navajo agencies) to assist in guiding policy and interventions to improve access to safe water

DOE Status of Legacy Sites, New Issues

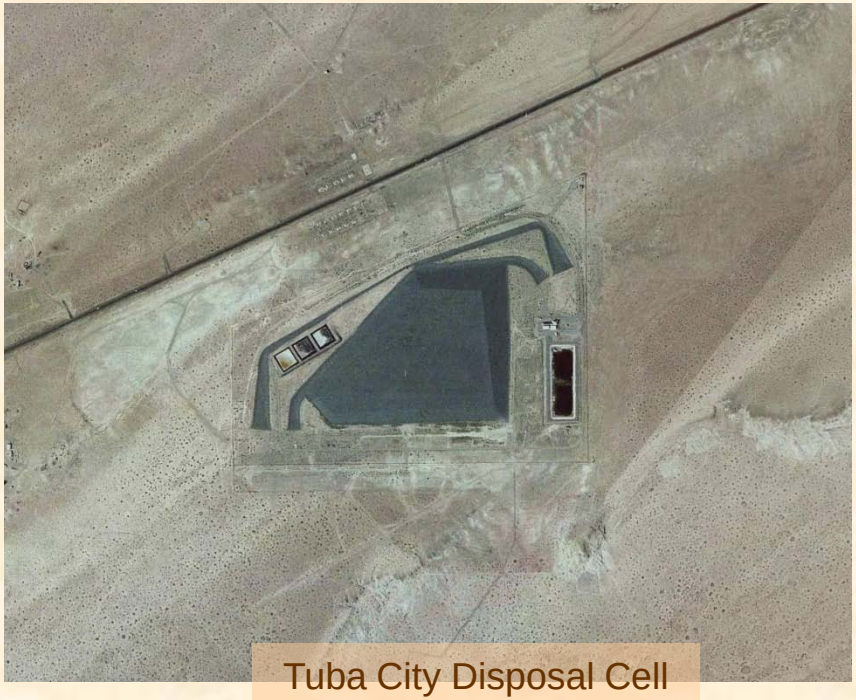
November 2009

DOE has responsibility for four sites on the Navajo Nation

- DOE remediated four former uranium mill sites located in the Navajo Nation (Tuba City, Arizona; Mexican Hat, Utah; Shiprock, New Mexico; and Monument Valley, Arizona) as authorized under the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978.
- Each of these sites had abandoned mills with associated uranium mill tailings and holding ponds.
- These former uranium mill sites and associated vicinity properties were remediated to Nuclear Regulatory Commission (NRC) surface cleanup standards promulgated by the EPA (40 CFR Part 192).
- The mill buildings, tailings, ponds, and other contaminated materials were placed in disposal cells constructed at three of the sites: Tuba City; Shiprock and Mexican Hat.

NRC and the Navajo Nation have concurred on designs of DOE-built disposal cells.

- DOE placed mill tailings in disposal cells designed to last for 200 to 1,000 years. NRC and the Navajo Nation concurred on the designs.
- Designs are similar to those of other disposal cells built by DOE. UMTRCA Title I disposal cells do not require a liner to meet performance objectives. Disposal cells are on stable geologic formations and are not threatened by river migration or flooding.
- The surface cleanup program and authorization ended in 1998.
- Existing groundwater plumes are primarily the result of previous mill operations.
- Groundwater contamination is being addressed.



Tuba City Disposal Cell

Long-term surveillance and maintenance of DOE sites within the Navajo Nation ensures protection of human health and the environment.

- DOE continues to perform surveillance and maintenance activities, including groundwater remediation, at the former mill sites in the Navajo Nation to ensure sites are protective of human health and the environment.
- In collaboration with the Navajo Nation DOE continues Long Term Surveillance and Maintenance including groundwater cleanup at the former mill sites.
- Maintenance activities include active groundwater treatment at the Shiprock and Tuba City mill sites, a pilot treatment study at Monument Valley, maintenance of three disposal cells (Shiprock, Tuba City and Mexican Hat), and annual inspections at all sites. The latest inspection report is available on the LM public website at http://www.lm.doe.gov
- LM continues to evaluate disposal cell cover performance as part of our long-term surveillance and maintenance program.
- Average cost at the four sites is $4 million/year. Average cost of performing surveillance and maintenance at other UMTRCA Title I sites is $120,000 each/year. The primary difference is the active treatment of groundwater within the Navajo Nation.
- DOE continues to plan activities and operate in accordance with the Cooperative Agreement with the Navajo Nation.

DOE operates state-of-the-art treatment systems at two former uranium-ore processing sites (Tuba City and Shiprock)

- Tuba City
  - DOE has been pumping and treating groundwater at the former Tuba City uranium-ore processing site for seven years.
  - The treatment plant has extracted 320 Million gallons of contaminated groundwater containing 680 pounds of uranium,
    1million pounds of nitrate and 2.7 million pounds of sulfate salts.
  - DOE has no evidence that connects groundwater contamination from the disposal cell (former mill site) to groundwater contamination near the Tuba City open dump. DOE has provided funds to the Navajo Nation to install up to nine wells between the mill site and the landfill to complete investigations into possible connections between the sites.
- Shiprock
  - An extraction system installed on the terrace has been successful in reducing groundwater elevations.
  - Extraction wells and trenches installed in the floodplain have been successful in reducing contaminant concentrations by up to 90 percent.

Five-Year Plan Commitments

- DOE-Legacy Management (LM) participated in the development of an integrated five-year plan in response to the House Committee on Oversight and Government Reform on the impacts of uranium contamination on the Navajo Nation.
- LM addressed two issues among the specific objectives in the five-year plan:
  1. Long-term surveillance and maintenance (LTS&M) and treatment of groundwater contamination at the former mill sites; and,
  2. Characterization and remediation of the Highway 160 site or Rare Metals site which is across Highway 160 from the former mill site outside Tuba City, Arizona. Funding for this cleanup activity has been provided to the Navajo Nation, while DOE will verify the cleanup is consistent with the US EPA standards found at 40 CFR 192.

Current Status – DOE is implementing the actions outlined in the Navajo Nation Five-Year Plan.

- DOE continues to monitor and maintain the disposal cells and operate groundwater treatment systems.
- DOE continues to fund the Navajo Nation (funds have been directed to the Department of Natural Resources per existing cooperative agreement terms) to support Nation participation in all site activities under our Cooperative Agreement.
- DOE continues to supply technical expertise to the Indian Health Service and Bureau of Indian Affairs as requested.
- DOE continues to collaborate with the Navajo Nation on status and issues surrounding the UMTRCA Title II, NRC-licensed, Church Rock mill tailings and associated mine site under remediation through EPA Superfund authority.
- The Navajo Nation has filed a motion seeking to intervene in the El Paso Natural Gas law suit, which raises RCRA and UMTRCA claims. The EPNG suit UMTRCA claims have been dismissed although that decision is under appeal.

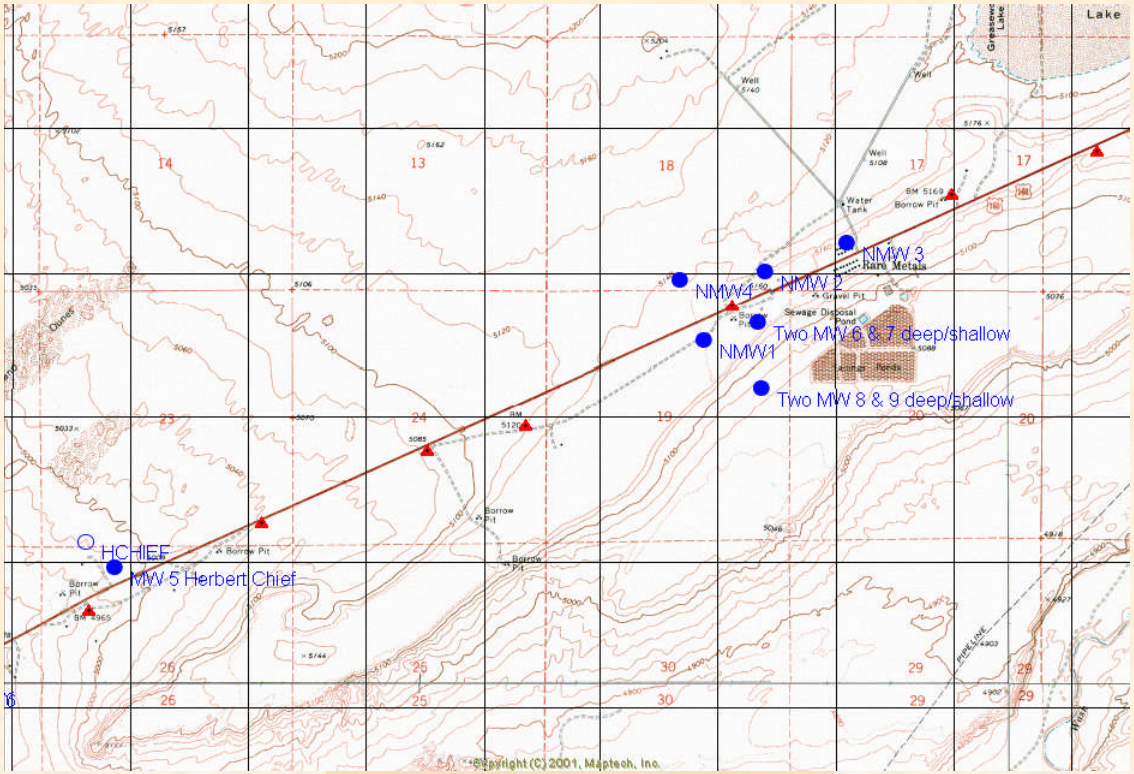
Current Status – The contaminated portion of the Highway 160 Site has been fenced and El Paso Natural Gas Co. has applied a soil fixative.

- DOE has been given authority to perform surface characterization and remediation of the Highway 160 site as part of the 2009 Omnibus Bill. DOE has provided the Navajo Nation that funding for their performance of this cleanup activity, with support from DOE as requested.
- Contaminated materials from the site will be evaluated and properly disposed in approved disposal facilities.
- The first face to face meeting between the principals in DOE and Navajo Nation was held June 8th in Washington, D.C., with the first planning meeting to discuss the work held June 24, 2009 in Tuba City. Modifications to the Cooperative Agreement have been made with $4.5 Million being committed to complete the work.
- Further discussions with the Navajo Nation to detail the scope of work for characterization, removal, and post cleanup verification are being planned.

Current Status – Technical coordination with the Navajo Nation

- DOE has coordinated with the Navajo Nation through several avenues:
  - Has held regular quarterly meetings since 1998 with Navajo UMTRCA program and Navajo EPA staff to discuss groundwater remedies.
  - Has provided groundwater monitoring data, annual treatment system performance reports, and annual site inspection reports, along with a number of special study reports to evaluate alternative treatment technologies.
  - Has provided funding through Cooperative Agreement to Navajo EPA to install and monitor new wells near Tuba City to address concerns about ground water contamination they suspect originates at the DOE UMTRCA site near Tuba City
  - Has maintained continuous involvement of Navajo UMTRCA staff through the Cooperative Agreement in site management and surveillance and maintenance.
  - Has sponsored periodic field trips for students and faculty of the Diné College to UMTRCA sites and has arranged for class visits at several campuses.

Current Status – Technical coordination with the Navajo Nation (continued)



New wells - proposed locations

Current Status – Technical coordination with the Navajo Nation (continued)

- DOE has expanded technical coordination with the Navajo Nation to include Navajo EPA and Navajo Justice Department:
  - December 2007—Tuba City (Tuba City site)
  - February 2008—Tuba City (Tuba City site)
  - April 2008—Window Rock and Shiprock (UMTRCA sites)
  - August 11 and 12, 2008—Focus on further work at the Tuba City site
  - August 13, 2008—Navajo Uranium Contamination Stakeholder Workshop (Gallup, New Mexico)
  - September 11, 2008—Shiprock (Shiprock site)
  - December 2008 – provided funding for 9 new Tuba City wells for Navajo installation and sampling
  - January 21, 2009—Window Rock (UMTRA sites)
  - April 21, 2009 – Monument Valley focus on Shiprock site
  - May 8-9, 2009 – Church Rock site tour and discussions
  - June 8, 2009 - Meeting in Washington, D.C. with EM, LM, Navajo Nation
  - June 24, 2009 – Tuba City for planning Highway 160 site cleanup work
  - October 13-14, 2009 – public and technical focus meetings in Shiprock

Tuba City Open Dump Project Update

Navajo Uranium Contamination
Stakeholder Workshop
Gallup, New Mexico
November 3, 2009

Purpose

Provide an update on efforts to:

Establish a predictable and mutually agreeable path forward to understanding and addressing risks to human health and the environment at the Tuba City Open Dump.

Interim Action Report

Recommendations

- Fencing of Old cell
- Quarterly ground water monitoring
- Water supply well studies
- MW-7 source investigation

Accomplishments

- Fencing completed
- IA funded Hopi to conduct quarterly ground water monitoring
- IA funded EPA via an Interagency Agreement to characterize potential MW-7 source contamination and dispose of investigative waste. This project is underway.
- Hopi is funded for water supply wells studies.

MW-07 Project Rationale

- The MW-07 area shows the highest concentration of uranium in the shallow groundwater.
- Contaminated groundwater could potentially migrate from this location.
- Waste in this area may be contributing to the elevated uranium concentrations in the groundwater.

IA and EPA Interagency Agreement

- IA provided $1.2M to EPA via an Interagency Agreement to implement the MW-07 project.
- FY 2010 IA provided an additional $490,000 to EPA for access road repairs and expansion of the MW-07 project, as necessary.
- EPA contractors are implementing the work with EPA oversight.

RI / FS

- Preliminary assessment and limited investigation
- Develop RI/FS work plan
- Implement RI/FS
- Select remedy
- Remedial action design and implementation

Scope of RI / FS

- Waste within dump
- Air contaminants
- Ground water (shallow and deep)
- Plants
- Surface water
- Near surface sediment assessment
- Water supply wells
- Springs

RI / FS Projected Time Line

- December 2009
  - Final Draft RI/FS Workplan Submitted for Comment
- July 2010
  - Start RI/FS Work
- July 2011
  - Complete RI/FS Work
- December 2011
  - Select Remedy
- January 2012
  - Design Remedy
- January 2013
  - Implement Remedy

Administrative Order on Consent

- EPA and IA are discussing entering into an Administrative Order on Consent (AOC) for performance of an RI/FS.
- Under the AOC, IA would perform the RI/FS with EPA oversight.
- Following completion of the RI/FS, EPA will select the final remedy in conjunction with IA and with input from the Tribes and the public.

Summary

- IA is implementing interim actions to address potential risks from the TCOD.
- EPA is currently conducting the uranium source characterization project.
- IA is planning a comprehensive investigation and development of cleanup and closure alternatives as part of the RI/FS.
- The RI/FS work may be conducted under an agreement between IA and EPA with an established scope and timeframe.

INDIAN HEALTH SERVICE

FIVE YEAR
Action Plan
Progress Report

Diagnose and treat known health conditions in eligible Indian beneficiaries…

1. Implement uranium medical monitoring protocol—Staff hiring process underway…Clinics planned to start by end of 2009 – funded by NAIHS.

Support Navajo Area IHS Radiation Exposure Screening and Education Program…

1. HRSA grant awarded to IHS in Shiprock, New Mexico for 2009-2011.

In-kind IHS support to Navajo Uranium Assessment and Kidney Health Project, a NIH funded research project awarded to UNM specifically for Eastern Navajo Agency residents…

1. Ongoing.

Interagency scientific meetings and discussions consistent with 5 Year Plan….

1. Ongoing discussions involving the Navajo Nation Epi Center, UNM, U of A, NAU, CDC, EPA, ATSDR, NIOSH, BIA, NRC, and DOE.

2. IHS funds identified from 2009 appropriations for transfer to BIA for Tuba City landfill fencing.

Review with CDC/USEPA, water contamination and facility contamination data for potential health impacts.

1. Individuals referred from the CDC household survey will be enrolled in the IHS medical monitoring program and will receive clinical follow up at Navajo Area clinics/hospitals, as per the individual's medical condition requirements.

Assessing the potential for case control studies on health conditions…

1. Occupational lung cancer case control study.*
2. Non-occupational longitudinal case control study.**

*In FY 2009-2010, IHS will update occupational studies with existing resources.

**Dependent on FY 2010 Budget.

NRC's 5-Year Plan Update

William von Till

Uranium Recovery Licensing Branch

Decommissioning and Uranium Recovery Licensing

Division of Waste Management & Environmental Protection

Office of Federal and State Materials and Environmental Management Programs

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Shiprock Title I
Uranium Mill Tailings Site

- DOE Implementing active groundwater remediation

Current Status

- NRC staff attended meetings in Shiprock, NM with DOE and Navajo Nation on October 13-14, 2009.
- NRC staff listened to public at meeting in Shiprock Chapter House on October 13, 2009.
- When DOE revises GCAP the NRC plans to consult with Navajo Nation in gov-gov meetings.
- Radon monitoring being implemented on Shiprock cover by Navajo AML staff.
- NRC staff coordinating with DOE on cover discussions.

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United Nuclear Corporation (UNC) Church Rock, Uranium Mill

- NRC and EPA-Region 6 have joint jurisdiction over groundwater remediation

Current Status

- Semi-annual groundwater monitoring program in progress in all 3 zones
- Groundwater extraction system operates only in Zone 3
- Three (3) tailings disposal Cells reclaimed 1989-1995. Radon barrier in-place.
- NRC currently reviewing Part II of the Supplemental Site Wide Feasibility Study submitted in July 2009, by UNC.
- License Termination - TBD

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UNC Church Rock, Uranium Mill

- Site inspections biennially (every 2 yrs) by NRC staff
  - Completed 07/2007 & 05/2009 – no violations
- March, 2008. Technical meeting in New Mexico (EPA-R 6&9, NRC, NMED & NNEPA)
  - Update on remediation system and field study activities
  - Potential jurisdictional issues for co-disposing non-11e.2 material (i.e. Northeast Church Rock mine waste) with 11e.2 material at UNC Mill
- March 2009. NRC meeting with EPA Region 6 & 9 in Texas.
  - Integrated site-wide cleanup to avoid dual regulations
  - Technical impracticability of continued remediation to achieve cleanup goals
  - Administrative challenges to modifying EPA's ROD and NRC's License Termination
  - EPA & NRC's future role under the site specific MOU.

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UNC Church Rock, Uranium Mill

- NRC notified UNC in March 2009 that License Amendment Request for Alternative Concentration Limit to be held in Abeyance

- Early-May 2009, NRC coordinated site visit and inter-agency meeting in New Mexico amongst NNEPA, EPA-Region 6 &9, NMED and DOE.

  - Stakeholder input on integrated site-wide cleanup approach to achieve cleanup goals
  - Groundwater plume migration unto Navajo Land and future groundwater use
  - Potential issues arising from Institutional Controls and Deed Restrictions
  - Co-disposal of NECR mine waste with 11e.2 material at UNC Mill

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UNC Church Rock, Uranium Mill

- June 2009. NRC & EPA joint update to Congressional Staff on the Navajo Ur 5-Yr Plan
- June 2009. NRC working group met with EPA-Region 9 to discuss design criteria for enhancing the tailings cover at UNC Church Rock.
- NRC continues to assist EPA in technical peer review.
  - Supplemental Site Wide Feasibility Study –Part 2, 07/ 2009. Part 3 expected in 2010.
- Proposed path forward for NRC's license termination, EPA's - NPL delisting & DOE's long term custodial care
  - Technical meetings (amongst each Agency's project managers)
  - Periodic Inter-agency Meetings (to resolve administrative/policy issues)
  - Agencies to have Tribal Consultation with BIA, Tribal Allottees, Navajo Nation

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UNC Church Rock, Uranium Mill

- Issues Identified by Stakeholders to be Resolved
  - Need for an Integrated Cleanup Goal (Record of Decision, current State and federal MCLs, and NRC License)
  - Groundwater contaminant migration unto Navajo Nation Land
  - Technical Impracticability of implementing other remedial strategies
  - Institution Controls (e.g. groundwater deed restrictions)
  - Future Groundwater Use (historically water in shallow zone, non-potable)
  - Amendment to ROD or Explanation of Significance Difference to be further examined after submittal of Part 3 – Supplemental Site Wide Feasibility Study by Licensee

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Northeast Church Rock Mine (NECR)

- NECR Mine adjoins the UNC Mill. EPA Region 9 is the lead Agency.
- NECR Mine is not under an NRC License
- NRC reviewed EPA's proposed EE/CA for mine waste (i.e. non-11e.2 material) disposal
  - Proposal to co-dispose non 11e.2 material within UNC Mill tailings disposal cells acceptable - NRC letter Feb. 2009
  - Design implementation to be further reviewed by NRC
- Currently NRC evaluating historical documentation that NECR mine shafts were backfilled with 11e.2 material from UNC Mill