
Navajo Uranium Mill Sites Sidebar Meeting

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Navajo Division of Natural Resources Summit 2016



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Current LM Sites



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Summary of LM Involvement on Navajo Nation Land

- DOE has responsibility for four Navajo Nation sites
 - Mexican Hat, Utah, Disposal Site
 - Monument Valley, Arizona, Processing Site
 - Shiprock, New Mexico, Disposal Site
 - Tuba City, Arizona, Disposal Site
- DOE and the Navajo Nation work together through Cooperative Agreements
- Active groundwater remediation occurs at the Tuba City, Arizona, and Shiprock, New Mexico, sites
- Groundwater compliance strategies are reviewed annually with the Navajo Nation to track progress toward meeting cleanup standards



Former uranium processing sites on Navajo Nation land

Tuba City, Arizona, Disposal Site

Rich Bush, LM UMTRCA Program Manager

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Presentation Overview

- Frequently asked questions
- Site history
- Current operation
- Options for future site activities
- Future community engagement opportunities (meetings to gather input)



Frequently Asked Questions

- Is the water safe for my family and my animals?
- Is my family being exposed to radiation?
- How will the land be used?
- How will the options affect the water, air, and surrounding land?

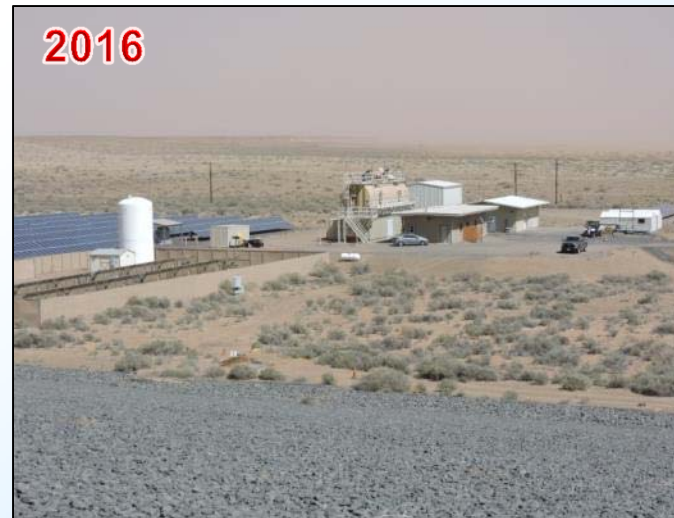


Tuba City Site History

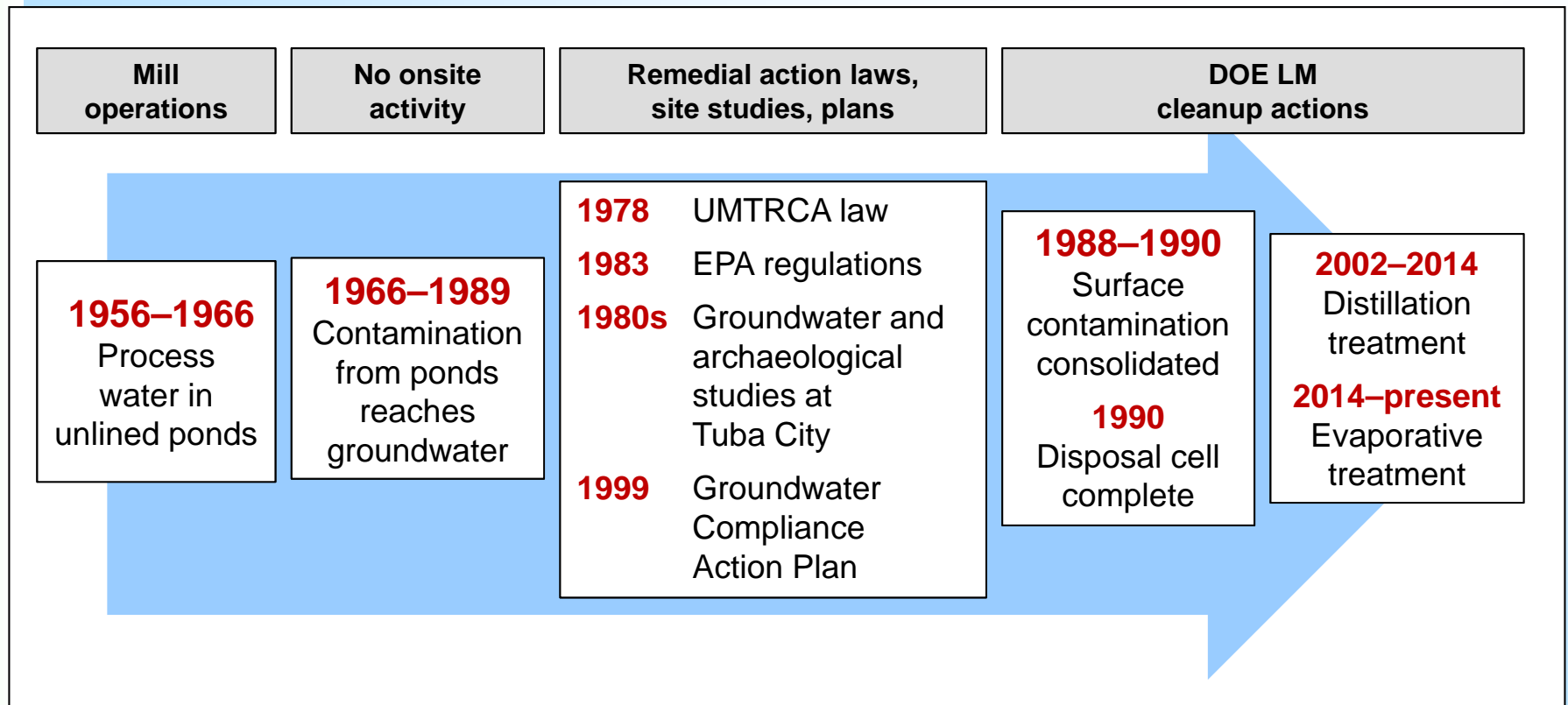
- Cold War legacy
 - Military veterans
 - Uranium mining and milling
- Tuba City operations
- Groundwater contamination at the site due to site operations
- Uranium Mill Tailings Radiation Control Act (UMTRCA) cleanup regulations
 - Relationship between the U.S. Nuclear Regulatory Commission and DOE



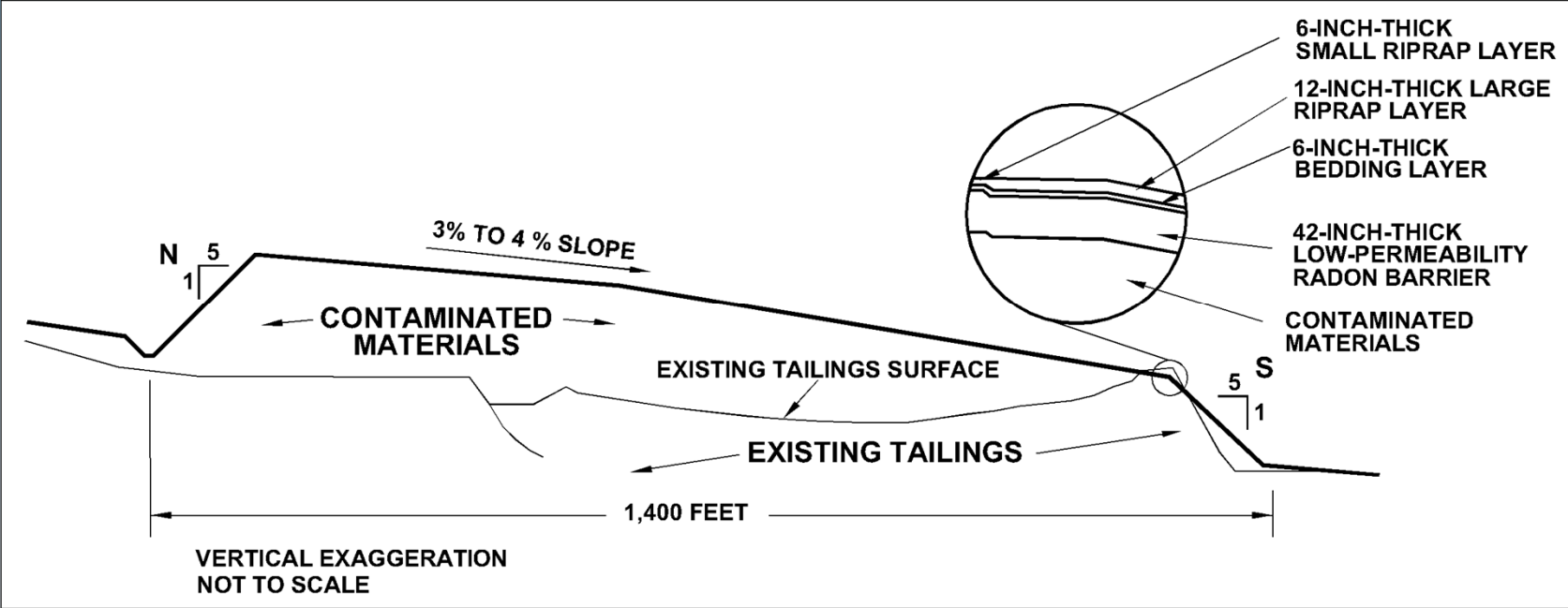
Tuba City Site History



Site Groundwater Impacts and Cleanup Efforts



Tuba City Disposal Cell Cross-Section



Site Accomplishments

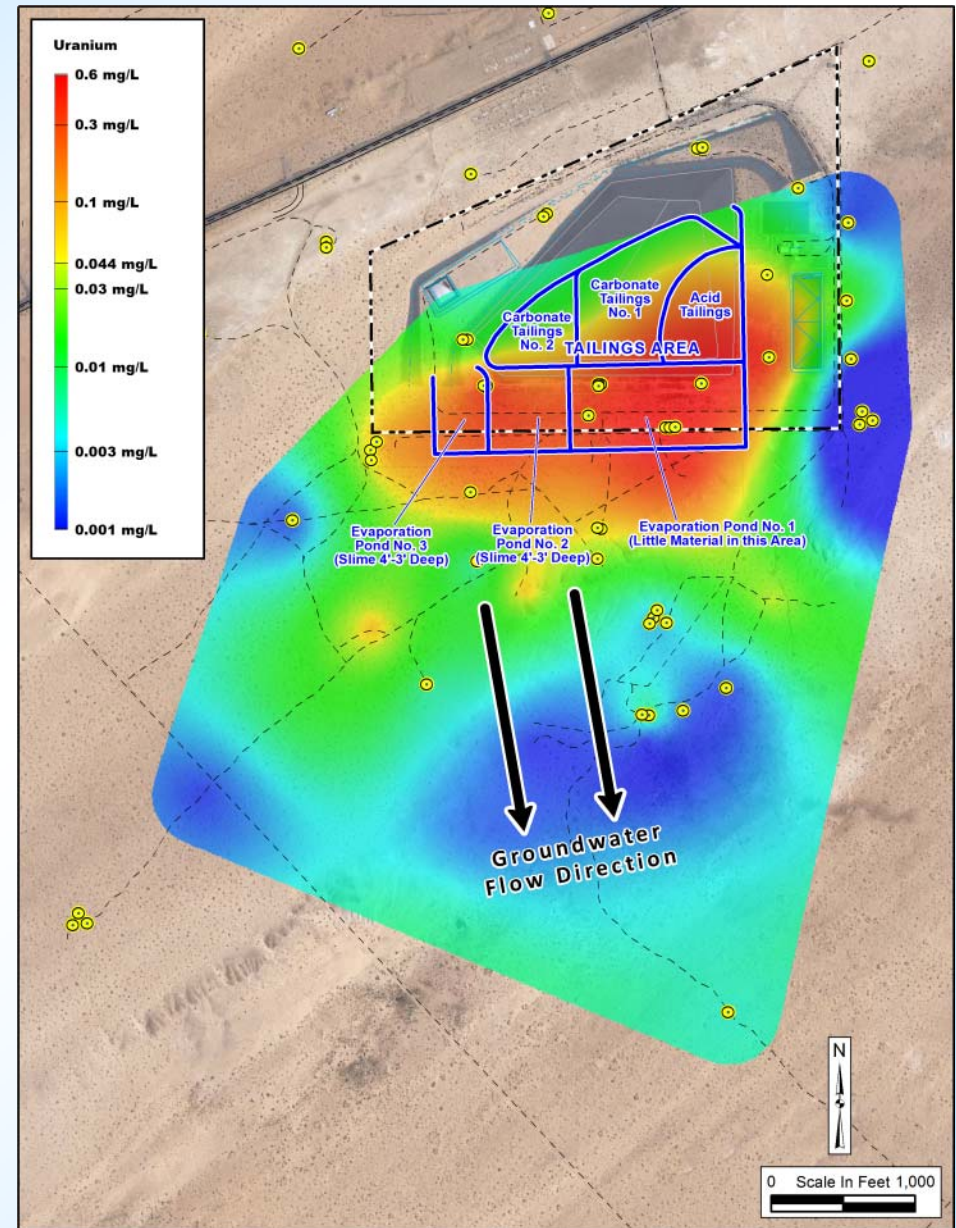
- Waste isolation completed
 - Disposal cell stopped exposure to radiation and eliminated risks from exposed tailings
 - Stopped contaminated pond water at the site from seeping into the ground
- Groundwater contamination at the site addressed through active cleanup
- Since 2002, treated more than 400-million gallons of water, removing 850 pounds of uranium
- Continued commitment to protect human health, animals, and the environment
 - Monitoring and treatment are ongoing
- Collaboration with Navajo and Hopi governments and communities



Groundwater Contamination Stability

Uranium plume

- Concentration change minimal
- Plume moving very slowly
- Still located mainly beneath the former processing site ponds
- 104 monitoring wells
 - Sampled twice per year (summer, winter)
- 37 extraction wells



Groundwater Flow Model

- Helps predict where groundwater will move over time
- Groundwater moving very slowly
 - Determined using 20 years of groundwater monitoring data
- Can be used to predict effects on contaminants due to pumping
 - Improve groundwater extraction strategy



Current DOE LM Activities to Address Site Groundwater Contamination

- Distillation plant is in safe standby
- Pumping from extraction wells to the evaporation pond
 - Approximate current pumping rate: 10 gallons per minute
 - Pumping from the most concentrated part of the plume
 - Pumping rate during summer months: 15 gallons per minute
- Almost as effective as the treatment plant for removing contaminants
- DOE LM considering options for addressing groundwater contamination



Developing Options

- What are we trying to do?
 - Reduce risks to human health and environment
 - Meet regulatory requirements
 - Consider community's concerns
 - Moenkopi Wash important resource
- How?
 - Clean up contamination; or
 - Implement protections
- Develop options based on:
 - Community input
 - Experience, site knowledge, judgment, innovation



Options Under DOE Consideration

Option A <ul style="list-style-type: none">▪ No groundwater extraction▪ Long-term monitoring and institutional controls<ul style="list-style-type: none">• Protections to help prevent exposure to humans and livestock	Option B <ul style="list-style-type: none">▪ Groundwater extraction▪ Treatment (distillation)▪ Return of clean water to aquifer
Option C <ul style="list-style-type: none">▪ Groundwater extraction▪ Treatment (filtration)▪ Return of clean water to aquifer	Option D <ul style="list-style-type: none">▪ Groundwater extraction▪ Evaporation of clean water from the pond

All options included long-term monitoring and measures to prevent exposure to humans and livestock.



Long-Term Monitoring with ICs

- All options include
 - Long-term monitoring
 - Groundwater sampling and analysis
 - Compliance wells
 - Used to ensure appropriate water quality standards are met (where in use)
 - Agricultural-use wells
 - Used to meet Navajo Nation standards where livestock are present
 - Sentinel wells
 - Used to show how groundwater is moving (allows LM to see if additional action is needed)
 - ICs
 - No groundwater use on the middle terrace
 - Groundwater can be used for agricultural purposes on the lower terrace
- Authority and responsibility for ICs

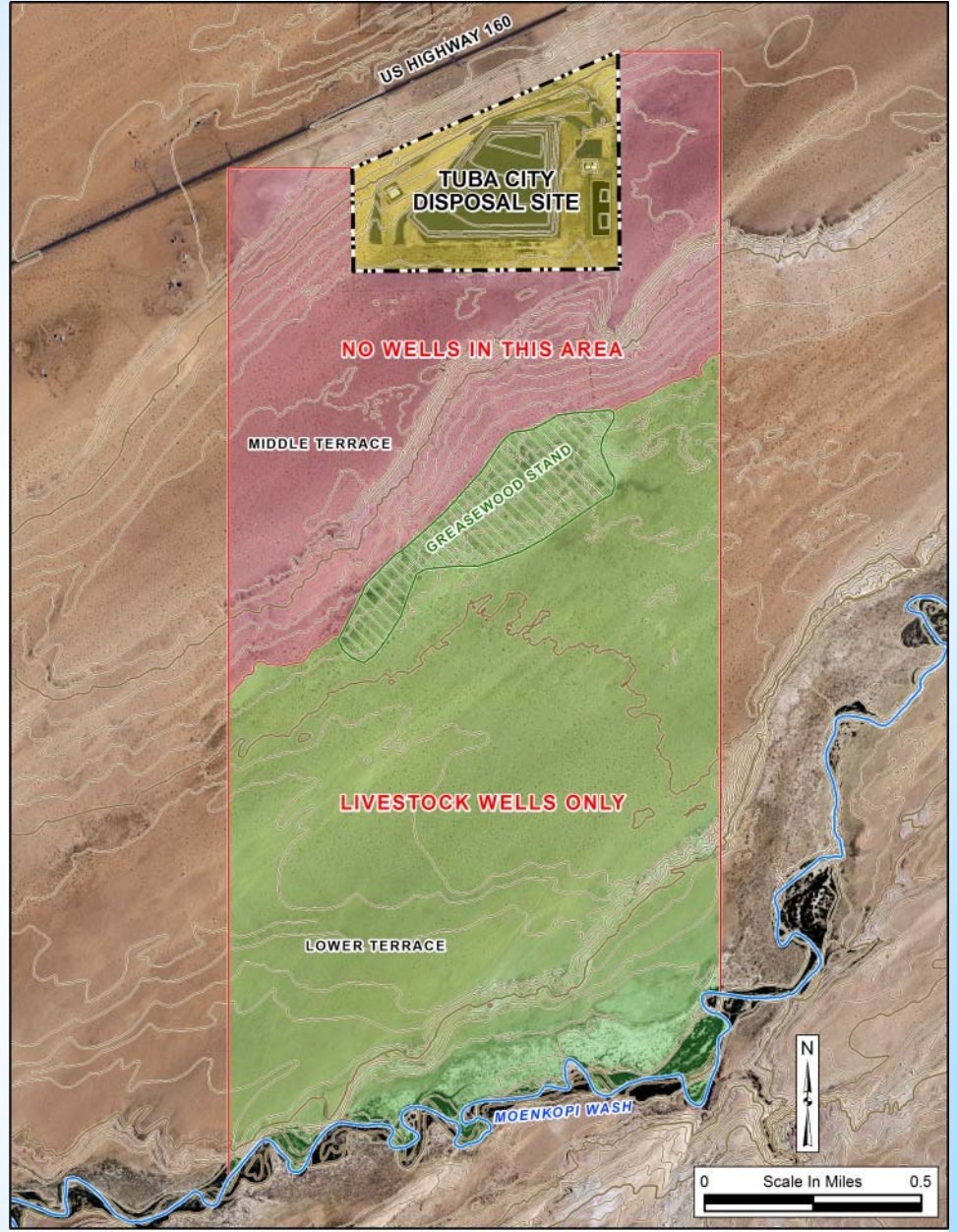


ICs Considered for Tuba City

- ICs used where contaminated water is present
 - Control areas determined by sampling and modeling results
 - Navajo Nation helping DOE LM keep people and animals safe
- Examples:
 - Land use restrictions (preserve greasewood stand on middle terrace)
 - Limited use of groundwater (livestock watering on lower terrace)
- ICs successful at many sites



Proposed ICs Area



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Institutional Controls

Mark Kautsky, LM Site Manager

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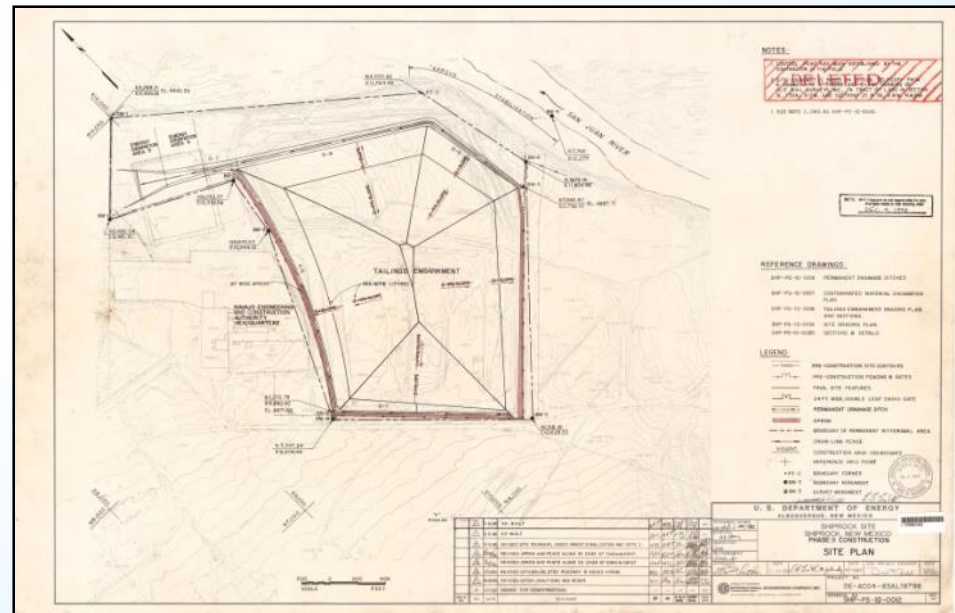


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What Are Institutional Controls (ICs)?

- ICs are mechanisms used to protect human health and sensitive, environmental resources
 - **Administrative controls** maintain historic documents which inform current and future stakeholders of potential hazards and risks at a legacy site
 - **Physical controls and practices** that minimize the potential for human exposure to contamination
 - **Environmental controls** that protect environmental resources



Site plan for the Shiprock disposal site



Why Do We Need ICs?

- No restrictions would leave contaminated groundwater accessible, which could lead to negative consequences (e.g., drilling water wells for domestic and livestock use)
 - Propose drilling restrictions through a well-permitting process
 - Limit access to contaminated soil through land-use and planning processes



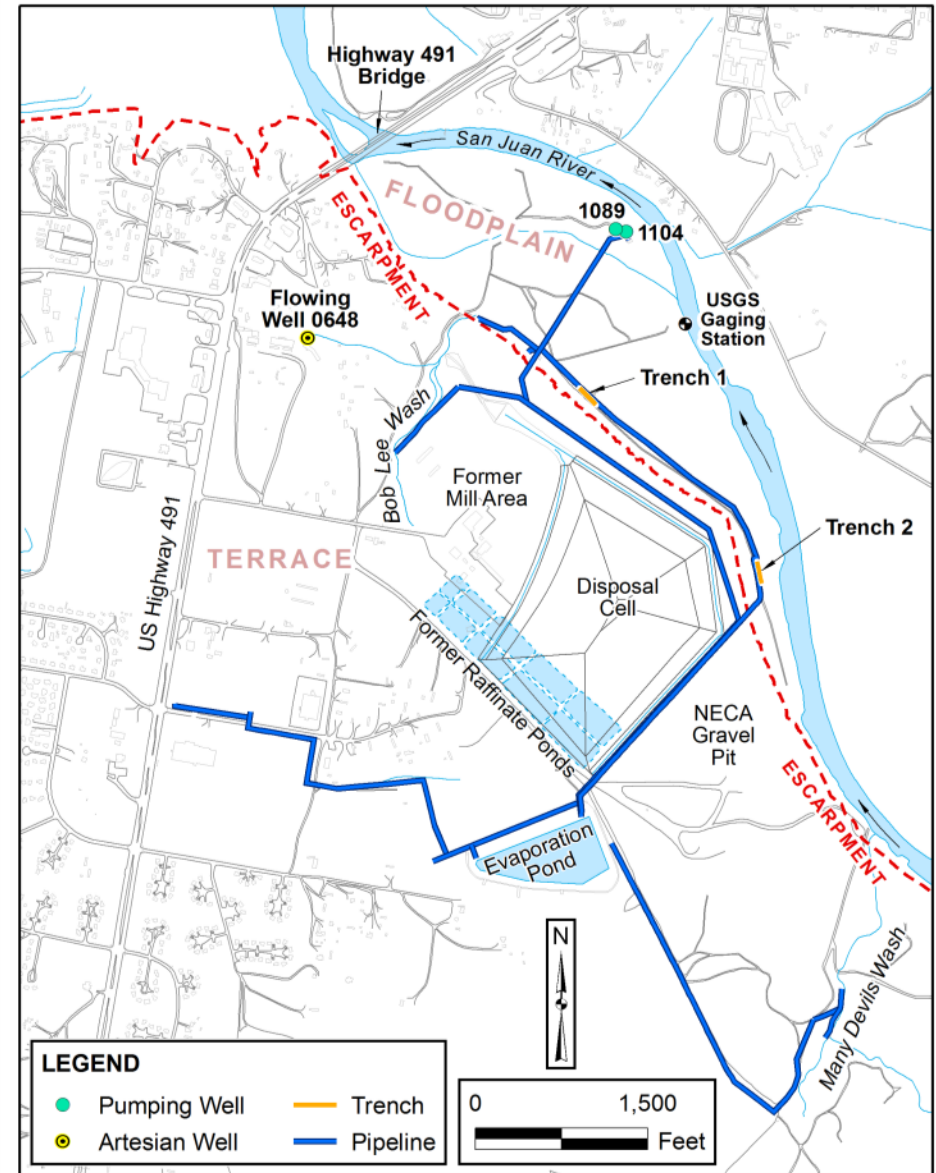
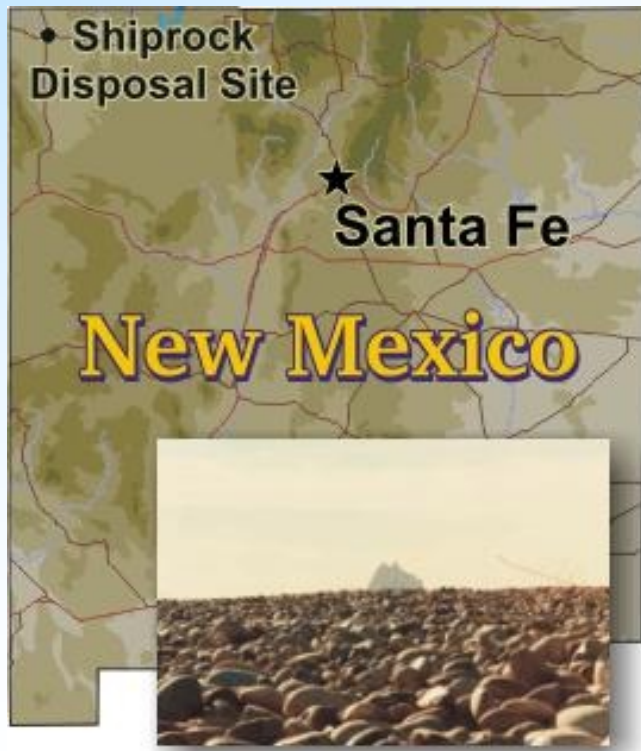
Perimeter fence at Shiprock disposal cell

Examples of ICs on Tribal Lands

- Care and custody agreement with the Navajo Nation
 - Limits disposal cell access
- Grazing restriction on the Shiprock site floodplain
 - Prevents possible contamination pathway through livestock to human consumption
- Informational and restriction signs at each site
 - Provides notice of potential hazard
- Well applications for designated areas are screened with assistance from the Navajo Nation Water Code Administration
 - Prevents exposure to contaminated groundwater

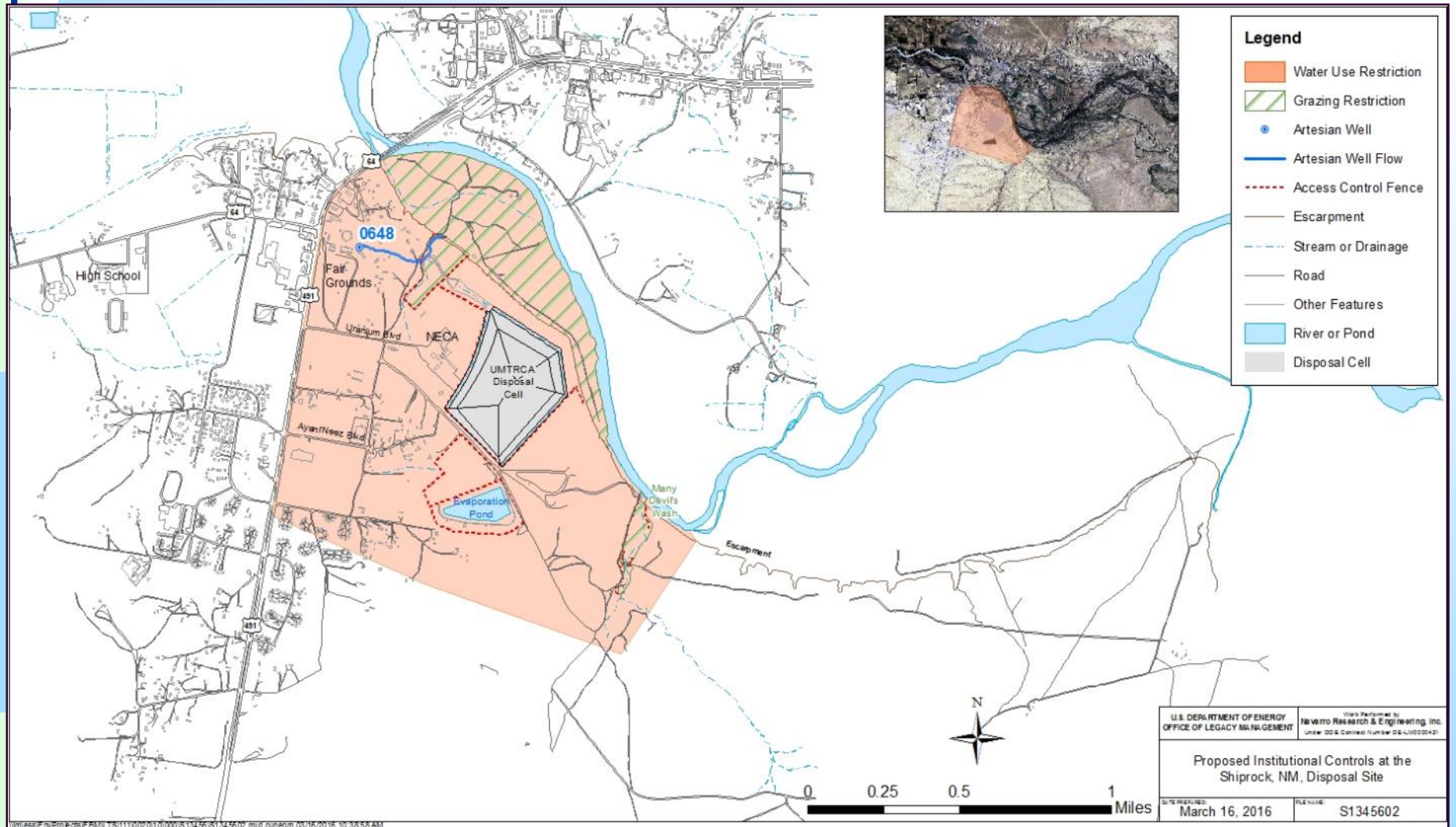


Shiprock Site Status of ICs



Layout of groundwater recovery system

Shiprock Site Status of ICs (continued)



*Participation with
the Navajo Nation*

Outreach

Angelita Denny, LM Site Manager

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Participation with the Navajo Nation

Navajo Nation Abandoned Mine Lands/ Uranium Mill Tailings Remedial Action (NN AML/UMTRA)

- Cooperative agreement for support
 - Independent oversight
 - Conducts inspections of DOE's sites
- Collaborate on Navajo Nation outreach events
- Provides more complete information for the public



Window Rock, Arizona

Participation with the Navajo Nation
Five-Year Plan: “Federal Actions to Address Impacts of Uranium Contamination on Navajo Nation”

- Participating agencies
 - U.S. Department of Energy
 - U.S. Environmental Protection Agency
 - Bureau of Indian Affairs
 - U.S. Nuclear Regulatory Commission
 - Indian Health Service
 - Agency for Toxic Substances and Disease Registry
 - NN AML/UMTRA
 - Navajo Nation Environmental Protection Agency
 - Navajo Nation Department of Health

Participation with the Navajo Nation

Five-Year Plan Community Outreach

- DOE has significantly increased outreach with Navajo Nation
- Opportunity for dialog
- Input on concerns and options
- Community outreach liaison position established
 - Frances Totsoni
 - Office with NN AML/UMTRA in Window Rock, Arizona



Participation with the Navajo Nation **Internships and Outreach Activities**

- Internships
 - Diné College
 - University of Arizona
- Recent interactions
 - NN/Hopi/DOE quarterly meetings
 - Chapter House meetings
 - Western Agency Council meeting
 - Navajo Nation Division of Natural Resource Summit
 - Fairs and public events



Participation with the Navajo Nation

Schedule for Future Interactions

- *Tuba City Public Meeting*
April 6, 2016
6:00/7:00 p.m. to 10:00/11:00 p.m. (Arizona Time/Daylight Savings Time)
Moenkopi Legacy Inn, Tuba City, AZ
- *Navajo Nation Five-Year Plan
Community Outreach Meeting*
April 8, 2016
Goulding's Lodge, Monument Valley, UT
- *Monument Valley Uranium Issues Open House*
April 9, 2016
9:00 a.m. to 4:30 p.m.
Monument Valley High School Gymnasium, Monument Valley, UT

Summary

Dr. April Gil, LM Environment Team Leader

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Discussion



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