

US EPA ARCHIVE DOCUMENT

# TUBA CITY OPEN DUMP

## A HOPI PERSPECTIVE



Presented November 4, 2009

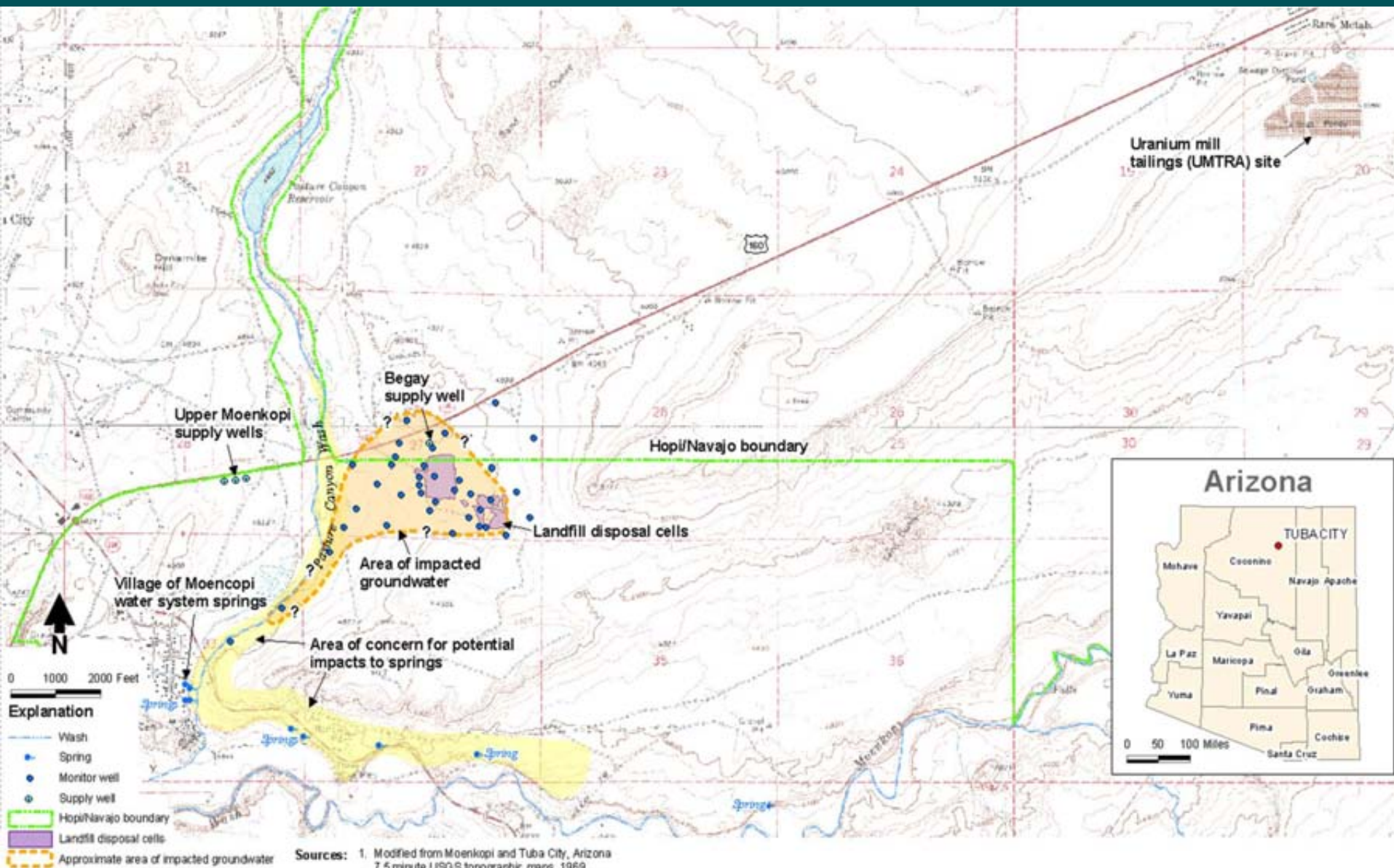
Navajo Uranium Contamination Stakeholder Workshop

Gallup, New Mexico

# Site Background

- 1950s to 1990s - Dump opened and operated by the Bureau of Indian Affairs (BIA)
  - Land withdrawn from the Navajo Reservation
  - Dumping generally unregulated and unsupervised
- 1950's to 1980's - Old waste cells (10-acres) active
- 1980's to 1997 - New waste cells (20-acres) active
- 1997 - Waste disposal ended in 1997
  - Surface debris consolidated and covered
  - New cells fenced

# Site Location Map





# Aquifer is Sole Drinking Water Supply

- Dump overlies aeolian sands and Navajo Sandstone
- Drinking water supply wells for the Village of Upper Moenkopi are completed in Navajo Sandstone and underlying Kayenta Formation (N-Aquifer)
- Drinking water spring for the Village of Moencopi discharges from the N-Aquifer
- Springs provide irrigation water in areas downgradient from the landfill
- No alternate drinking water supply is readily available to serve needs of community

# Groundwater Contaminant Plume

- N-aquifer water table is shallow
  - 6 to 26 below ground
  - Dump waste cells extend to the water table
- Uranium mobile in geochemical conditions
  - Groundwater is oxidizing keeping uranium ions in solution
- Contaminant Plume Migration
  - Uranium exceeds MCL 4,000 feet downgradient
  - Plume is near water supply sources (influenced by supply well capture zone)
  - Low-level organics in leachate and downgradient wells
  - Stormwater runoff from exposed waste continues

# Groundwater Quality Results

Parameters exceeding the drinking water Maximum Contaminant Level (MCL) include:

Arsenic	Chloride
Lead	TDS
Selenium	Nitrate
Gross alpha	Sulfate
Vanadium	Total coliforms
Uranium	

Strontium elevated, but no MCL



# Evidence of Uranium Mill Waste Dumping at TCOB

- Rare Metals Uranium Mill operated 1956 to 1967
- Testimony of residents
  - Trucks brought waste from mill day and night
  - Children played with “marbles” (mill balls)
- Striking similarity of groundwater quality impacts at TCOB and the Rare Metals Mill
- Studies by the Hopi Tribe, USGS, and BIA geochemist have all concluded that TCOB groundwater contaminants are the result of uranium mining or mill sources

# Common Uranium Mill Impacts

- Typical groundwater impacts by uranium mill tailings:
  - Non-radioactive derived from ore: selenium, arsenic, molybdenum, vanadium
  - Process by-products: chloride, nitrate, sulfate

- At TCOOD:

Constituent	MW-27 N-Aquifer Background	MW-7 Impacted by Leachate
Molybdenum ( $\mu\text{g/L}$ )	ND (<8)	24
Selenium ( $\mu\text{g/L}$ )	15	139
Uranium ( $\mu\text{g/L}$ )	8.9	232
TDS (mg/L)	690	7,100
Sulfate (mg/L)	220	2,700

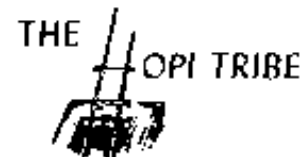
# TCOD and Rare Metals UMTRA Site Contaminant Concentrations

## Similar Water Quality in Groundwater Contaminant Plumes

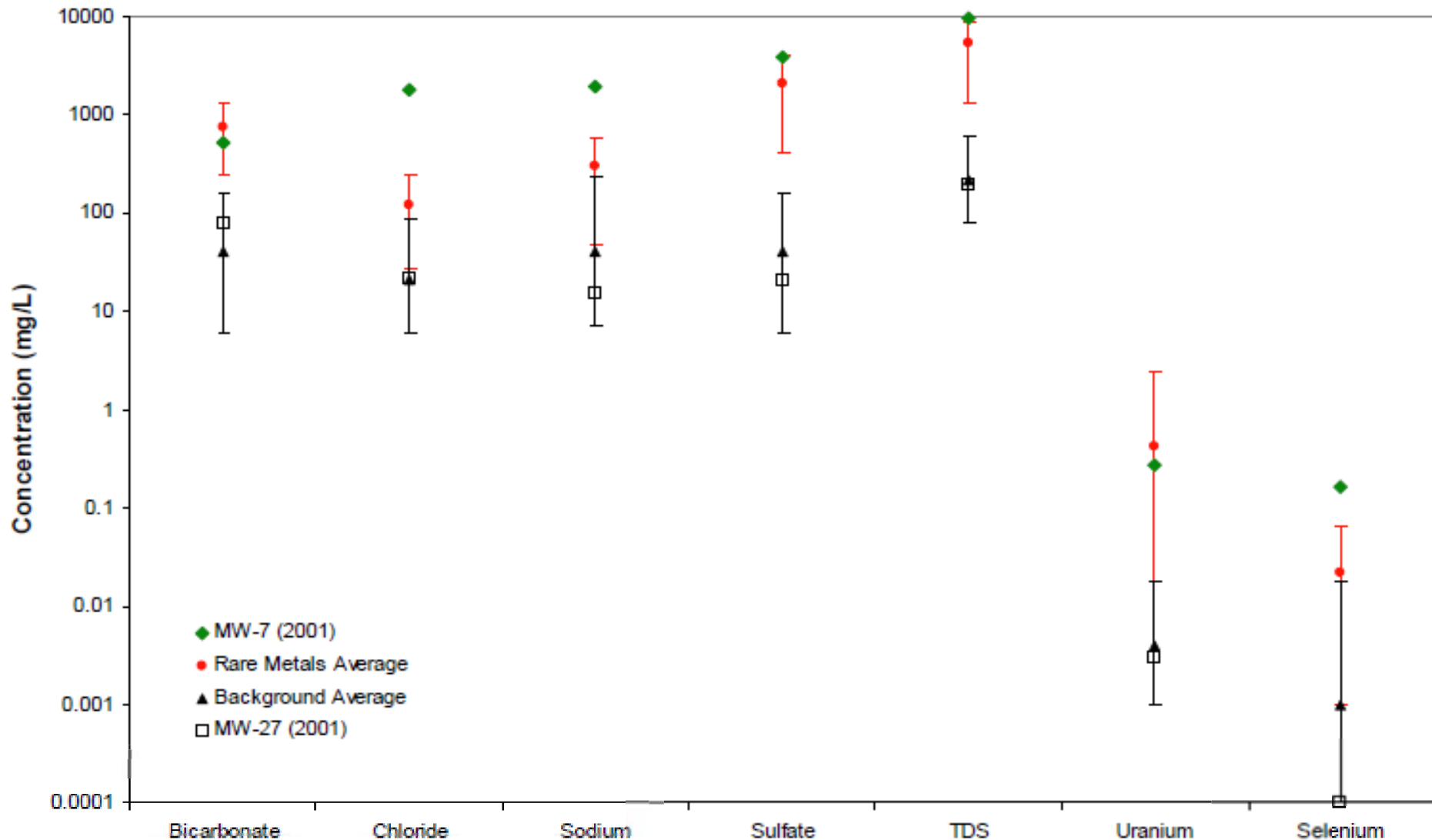
Contaminant	Tuba City Open Dump	Rare Metals Median UMTRA
Selenium	158 µg/L	96 µg/L
Uranium	240 µg/L	404 µg/L
Sulfate	3,590 mg/L	2,257 mg/L

Source: USDOE, 1998, Environmental Assessment of Ground Water Compliance at the Tuba City Uranium Mill Tailings Site

**Tuba City Open Dump**



# Water Quality Comparison of TCOD Background and Plume to Rare Metals



# Hopi Tribe and Villages of Upper Moenkopi and Lower Moencopi want:

- Clean closure – all waste removed from site for disposal in a permitted facility
- Groundwater cleanup
- Closure plan and site restoration in accordance with regulatory requirements
- Expedited action after non-compliance over 10 years

# Recommendations for Interim Actions

- Water supply testing should be frequent until groundwater corrective action is completed
- Contaminants near Upper Moenkopi supply wells should be investigated
  - Sentinel well WP-1S has uranium twice MCL
- Groundwater remediation must occur immediately
  - Contain and treat contamination
- Moenkopi supply wells are safe; but alternatives for replacement or improvement should be evaluated
- Limited waste removal may be considered prior to full clean closure to remove all waste

# Conclusions and Recommendations

- Technical evidence shows:
  - Dump is not in compliance with RCRA
  - Contaminant plume has migrated 4,000 feet
  - Plume is near water supply sources
  - Failure to contain the plume threatens springs used for drinking water and irrigation
- Immediate remedial action needed to contain the groundwater plume and treat water
- Process to select final closure method can proceed while action is taken on groundwater cleanup
- Water supply testing should continue to ensure safety

# Tuba City Open Dump Closure

Questions/Discussion?

Hopi Water Resources Program

Hopi Environmental Protection Office