



Investigation and Cleanup For The Tuba City Dump

May, 2016



United States Environmental Protection Agency
Jeff Dhont, Project Manager for Tuba City Dump



U.S. EPA
Executes the
Superfund
Cleanup Law

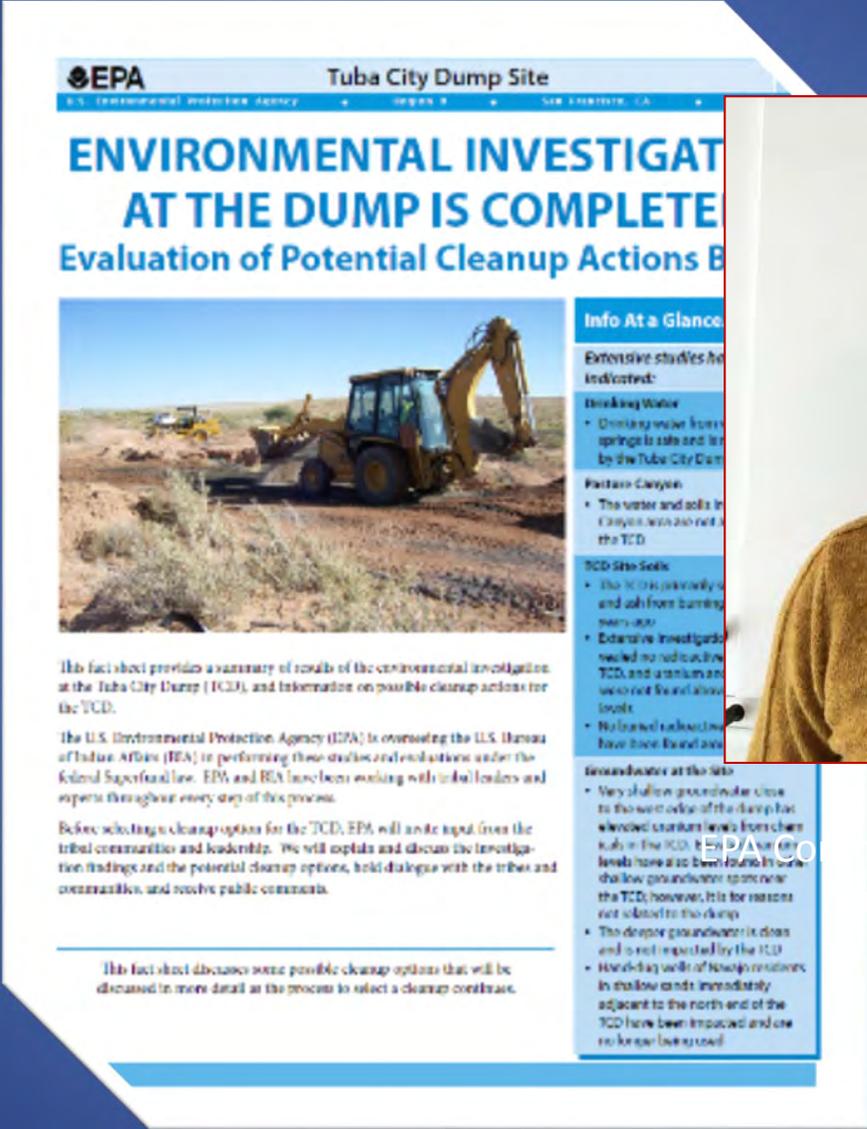


EPA Oversees
BIA conducting
studies



U.S. BIA
Responsible Party
for Tuba City Dump

USEPA Fact Sheet



EPA Tuba City Dump Site
U.S. Environmental Protection Agency

ENVIRONMENTAL INVESTIGATION AT THE DUMP IS COMPLETE

Evaluation of Potential Cleanup Actions Begins



Info At a Glance

Extensive studies have indicated:

- Drinking Water**
 - Drinking water from springs is safe and is not affected by the Tuba City Dump.
- Native Canyon**
 - The water and soils in Native Canyon are not affected by the TCD.
- TCD Site Soils**
 - The TCD is primarily composed of sand and soil from burning tires and other debris.
 - Extensive investigations revealed no radiocesium, TCE, and uranium at levels of concern were not found at shallow levels.
 - No buried radiocesium has been found at the site.
- Groundwater at the Site**
 - Very shallow groundwater close to the west edge of the dump has elevated uranium levels from clean wells in the TCD. Elevated uranium levels have also been found in very shallow groundwater near the TCD; however, it is for reasons not related to the dump.
 - The deeper groundwater is clean and is not impacted by the TCD.
 - Hand-dug wells of Native residents in shallow sands immediately adjacent to the north end of the TCD have been impacted and are no longer being used.

This fact sheet provides a summary of results of the environmental investigation at the Tuba City Dump (TCD), and information on possible cleanup actions for the TCD.

The U.S. Environmental Protection Agency (EPA) is overseeing the U.S. Bureau of Indian Affairs (BIA) in performing these studies and evaluations under the Federal Superfund law. EPA and BIA have been working with tribal leaders and experts throughout every step of this process.

Before selecting a cleanup option for the TCD, EPA will invite input from the tribal communities and leadership. We will explain and discuss the investigation findings and the potential cleanup options, hold dialogues with the tribes and communities, and receive public comments.

This fact sheet discusses some possible cleanup options that will be discussed in more detail as the process to select a cleanup continues.



Alejandro Diaz
EPA Community Involvement Coordinator
for Tuba City Dump Project

Tuba City Dump is a Separate Project from Other Things You've Been Hearing About..

- Not a uranium waste or UPTRCA Site
- Not an abandoned uranium mine
- Not related to the Cameron mines

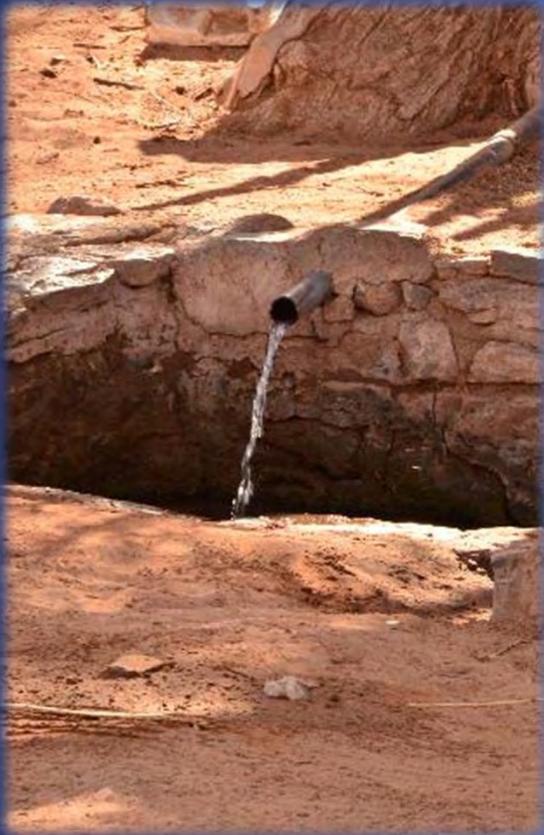
Also...

There is new information that may be different from what you may have heard about Tuba City Dump in the past.

To Discuss Today...

- About the Tuba City Dump
- The Process We Use to Investigate and Clean up
- What the Investigation Showed
- What Cleanup Options are Being Considered
- What Comes Next

Very Important to the Navajo and Hopi Communities



- Having enough water
- Having water that is safe to drink
- Having irrigation water that is safe to use
- Not having loss of usable land
- Making sure land and soil is safe
- Not being exposed to wastes or radioactivity



The Tuba City Dump



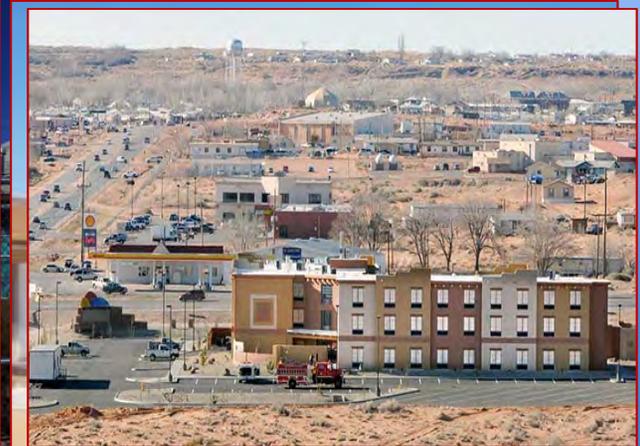
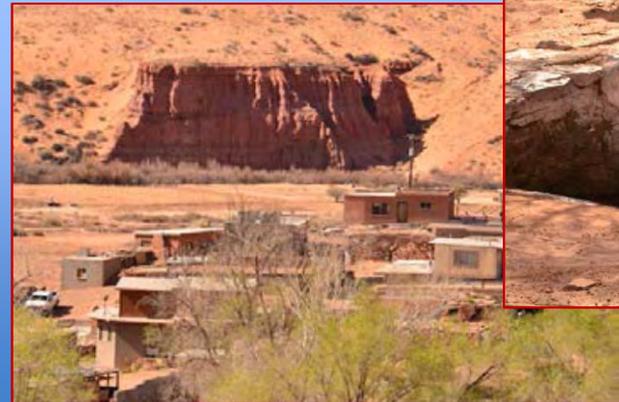
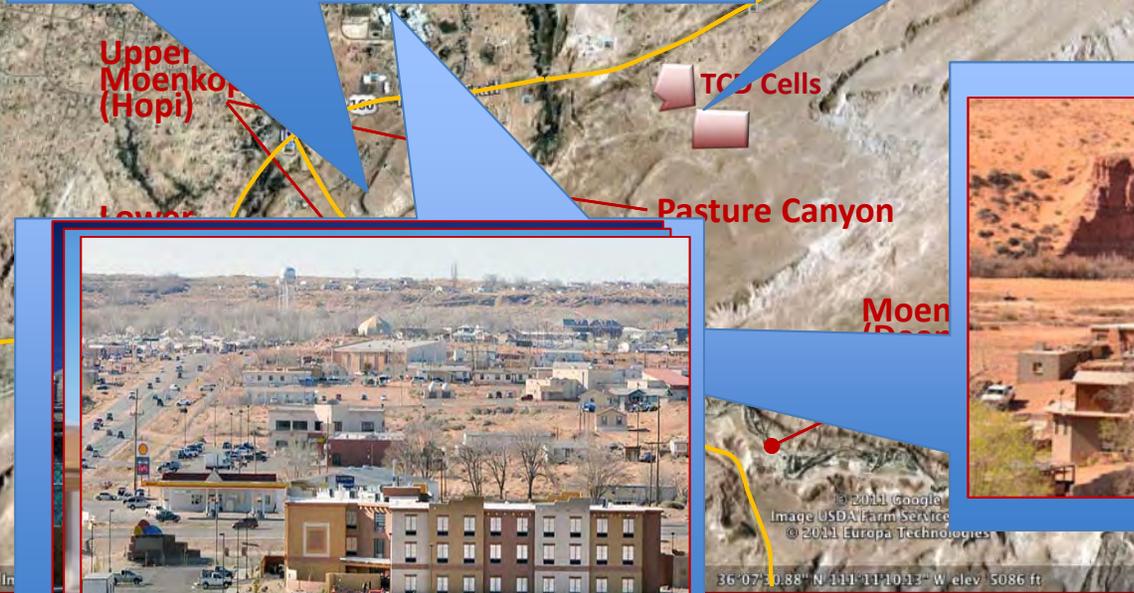
- Open burn general waste dump starting 1950s and ending in 1997
- Operated by BIA – mostly uncontrolled
- BIA did not keep records of what went in
- Various studies back to 1997
- Covers 30 acres and has 300,000 cubic yards of material in it
- The Dump is covered with clean soil but not finally “closed”
- Normally this type of dump is capped with soil, clay and special liners to close it.



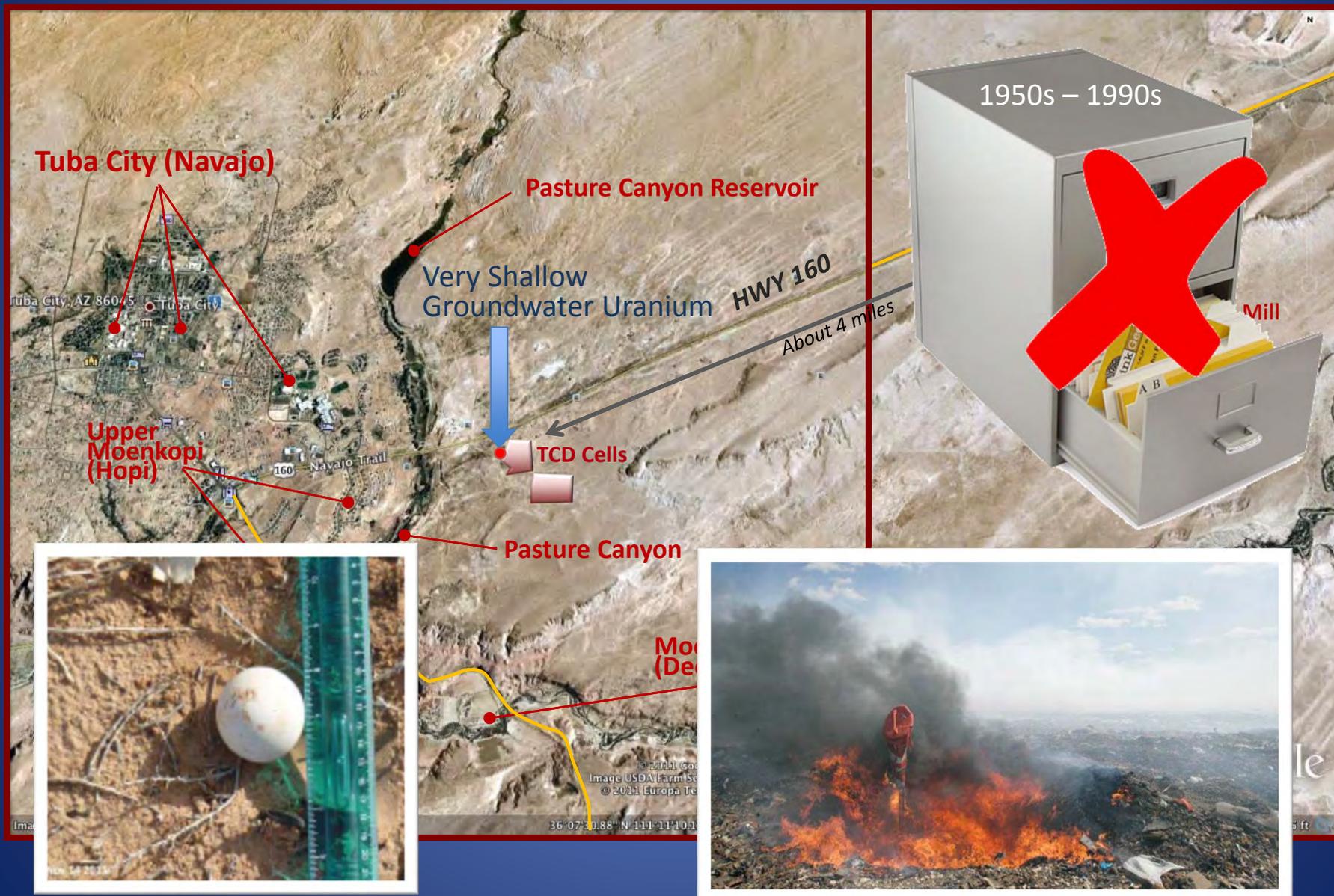
The Setting



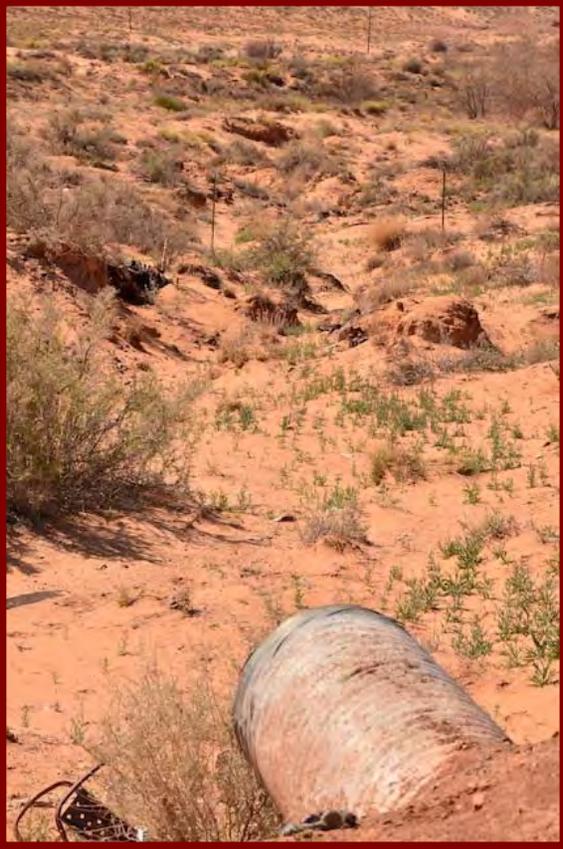
Pasture Canyon Reservoir



Concerns That Lead to Investigation in the Dump



Closer to the Dump



New Cell

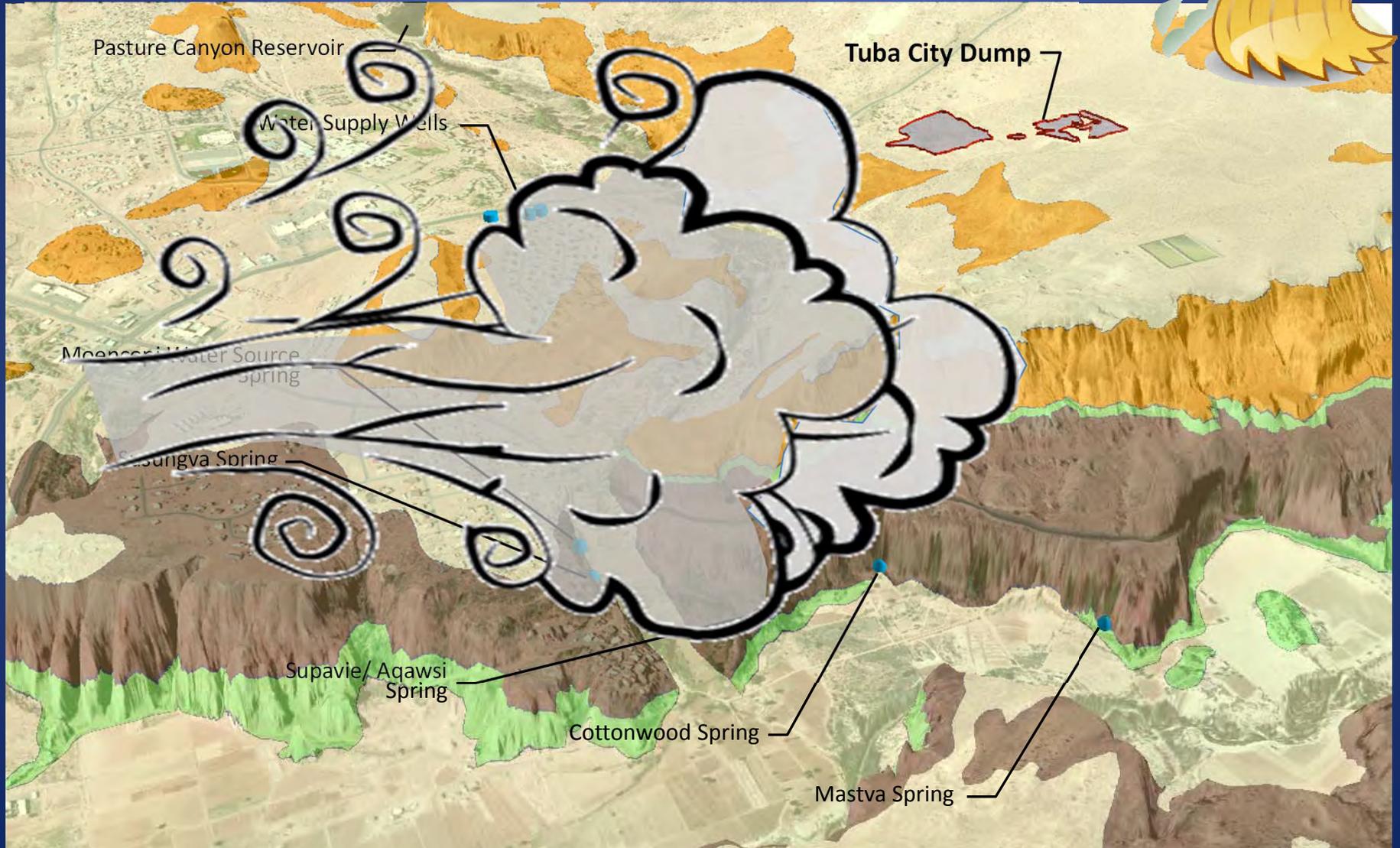


Imagery Date: 6/7/2007 1997

36°07'10.45" N 111°12'25.72" W elev. 4834 ft

Eye alt. 10457 ft

Airplane View: Looking Up Pasture Canyon from Moenkopi Wash



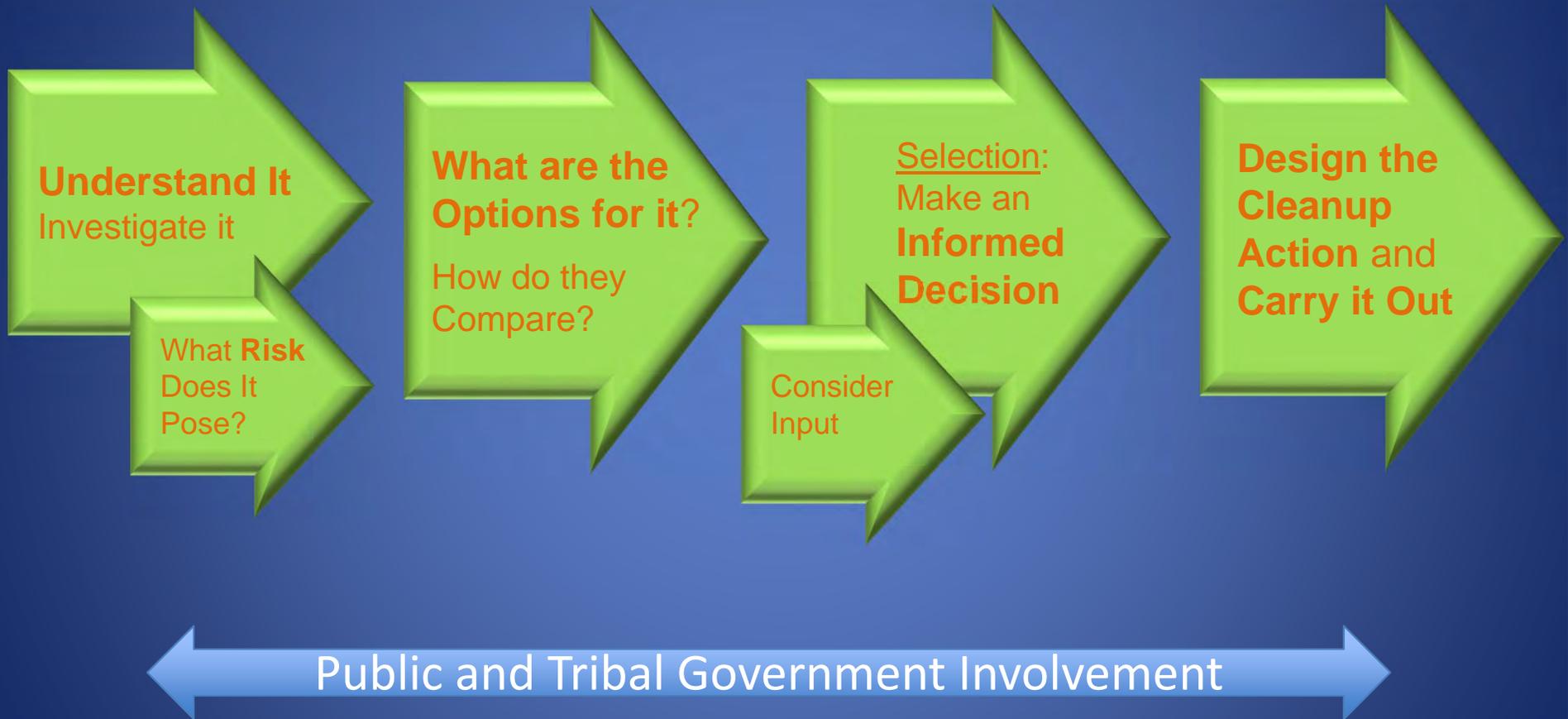
Moving on...



About the Tuba City Dump

- The Process We Use to Investigate and Clean up
- What the Investigation Showed
- What Cleanup Options are Being Considered
- What Comes Next

The Superfund Process at the Simplest Level



The Terms We Use

Investigate

Remedial Investigation & Risk Assessment

What is the problem?

Where is contamination and what risks does it pose?

Look at Options

Feasibility Study

What are the cleanup options to address the problem?

How do they compare?

Decide

Record of Decision

Obtain public input, then select a cleanup option



Consider Input

Do the Cleanup

Remedial Design and Remedial Action

Protectiveness Of Human Health and Environment

Compliance With Other Environmental Laws

Long Term Effectiveness & Permanence

Reduction of Toxicity, Mobility & Volume

Short-Term Impacts of Cleanup

Implement-ability

Cost

Community Acceptance

State/Tribal Acceptance

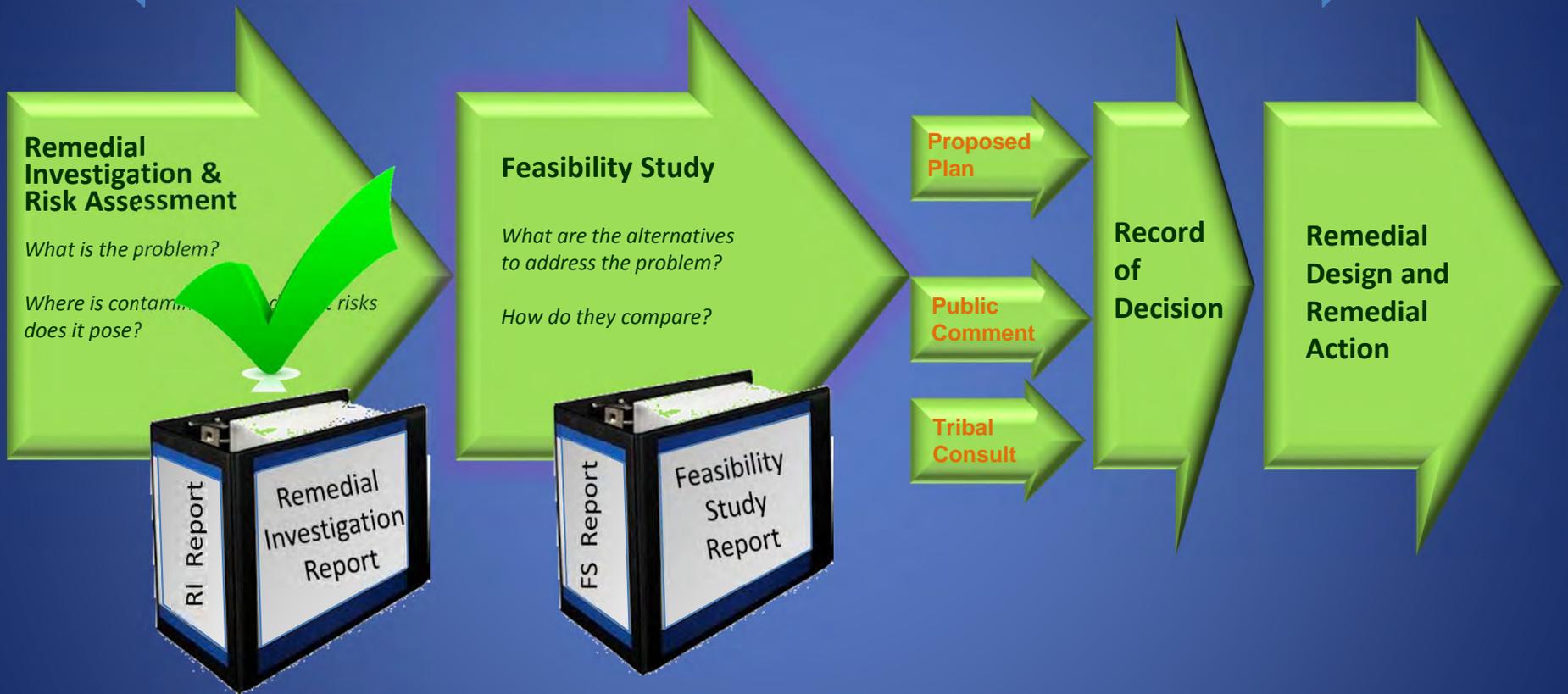
Threshold Criteria

Balancing Criteria

Modifying Criteria

Where Are We at TCD?

Public and Tribal Government Involvement



Working...



Moving on...



About the Tuba City Dump



The Process We Use to Investigate and Clean up



What the Investigation Showed



What Cleanup Options are Being Considered



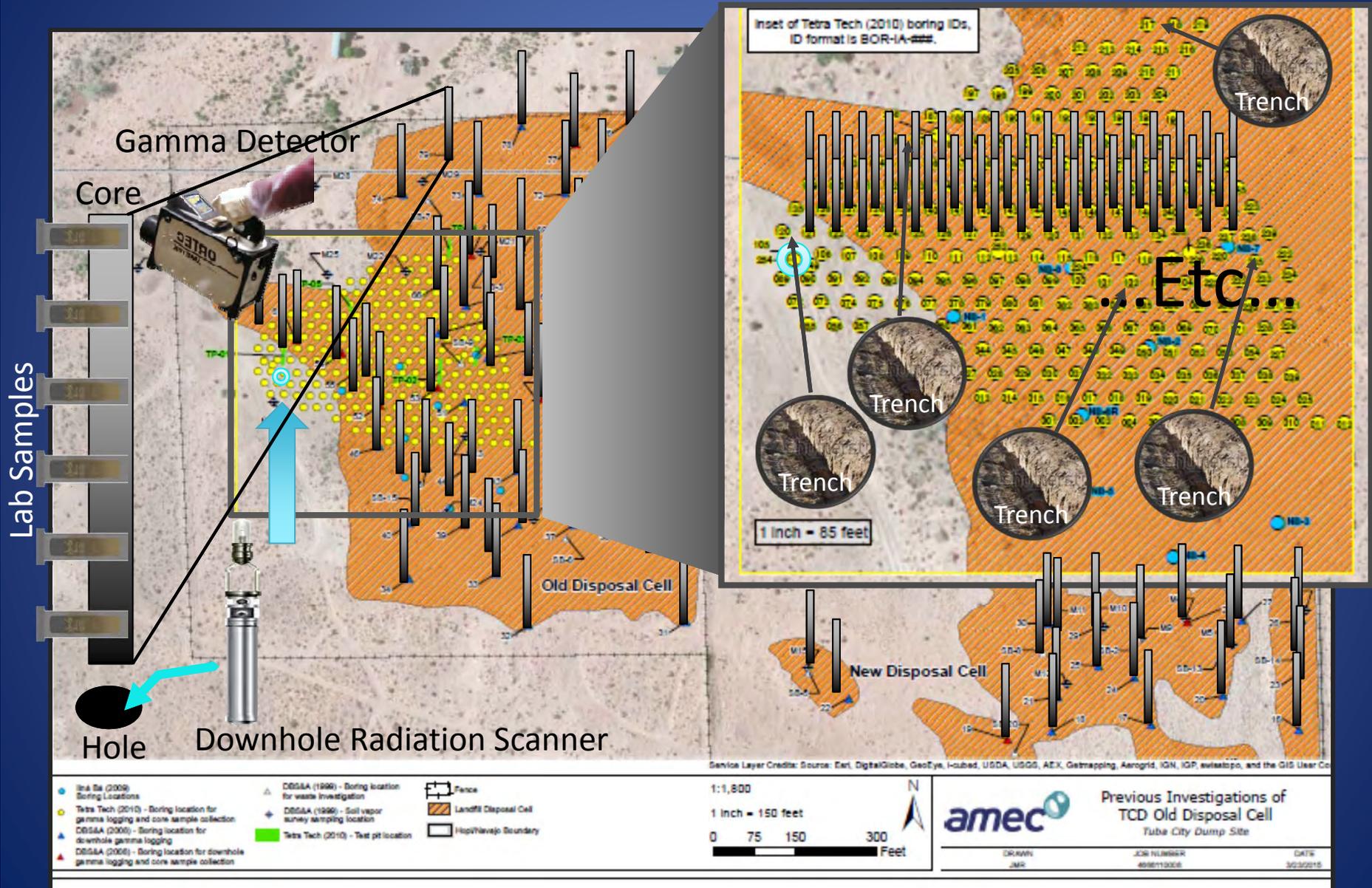
What Comes Next

Looking IN the Dump



- Over 360 borings, and trenches in investigations by EPA, BIA, Hopi Tribe and Navajo
- Thousands of downhole rad scans
- Thousands of core rad scans and samples for chemical analysis
- Leachate testing
- Surface area-wide radiological sampling
- Isotopic analyses
- Tritium analyses
- Soil gas analysis

Borings into the Dump – More than 360, 5 trenches, 3 investigations



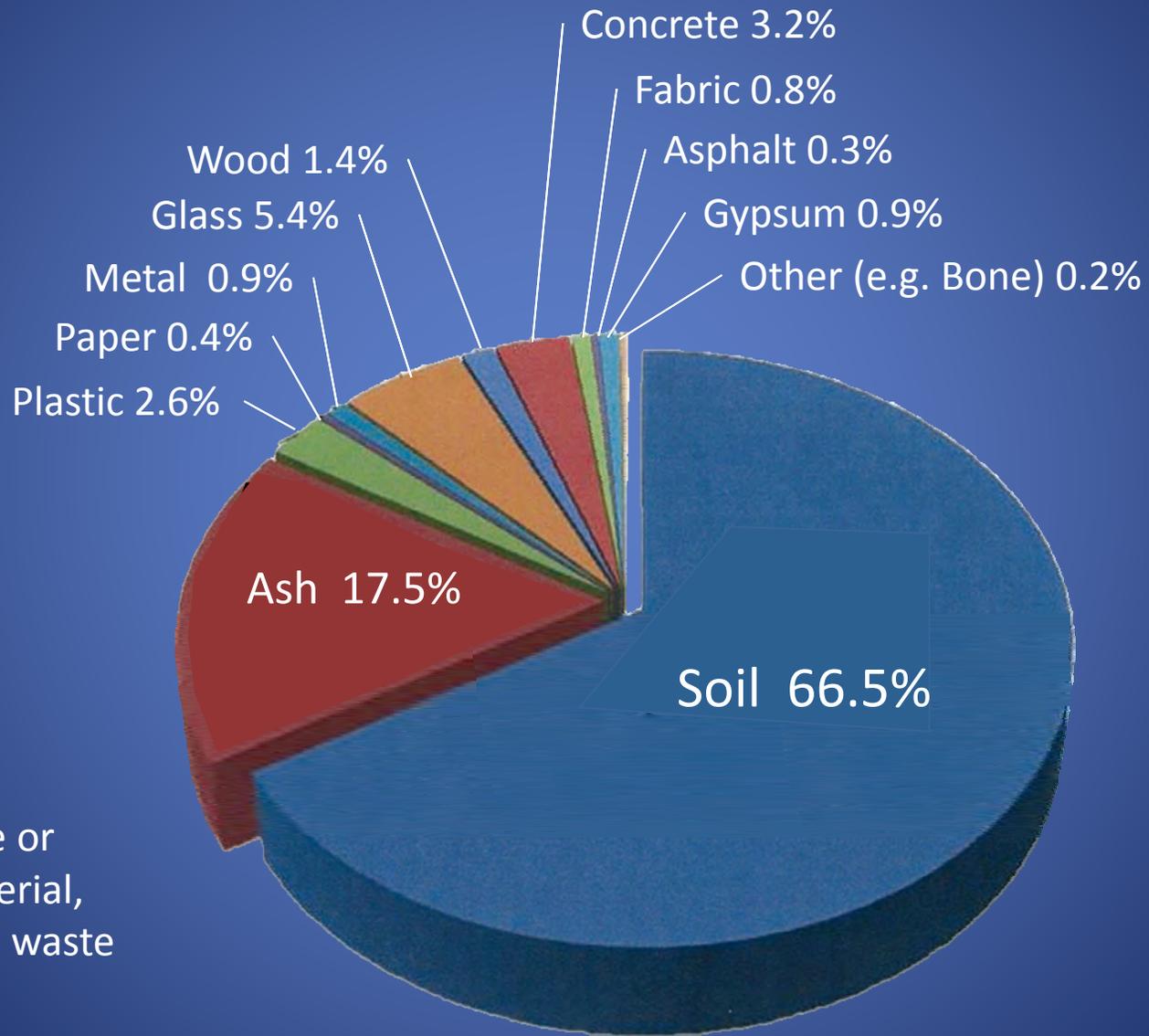
What's Did We Not Find In The Dump?



- No uranium ore-based mill waste found
- No uranium above background soils
- No elevated radiation levels

- No hazardous waste found
- Specialized testing of groundwater indicates no uranium ore or mill waste
- Dump is mostly soil and ash

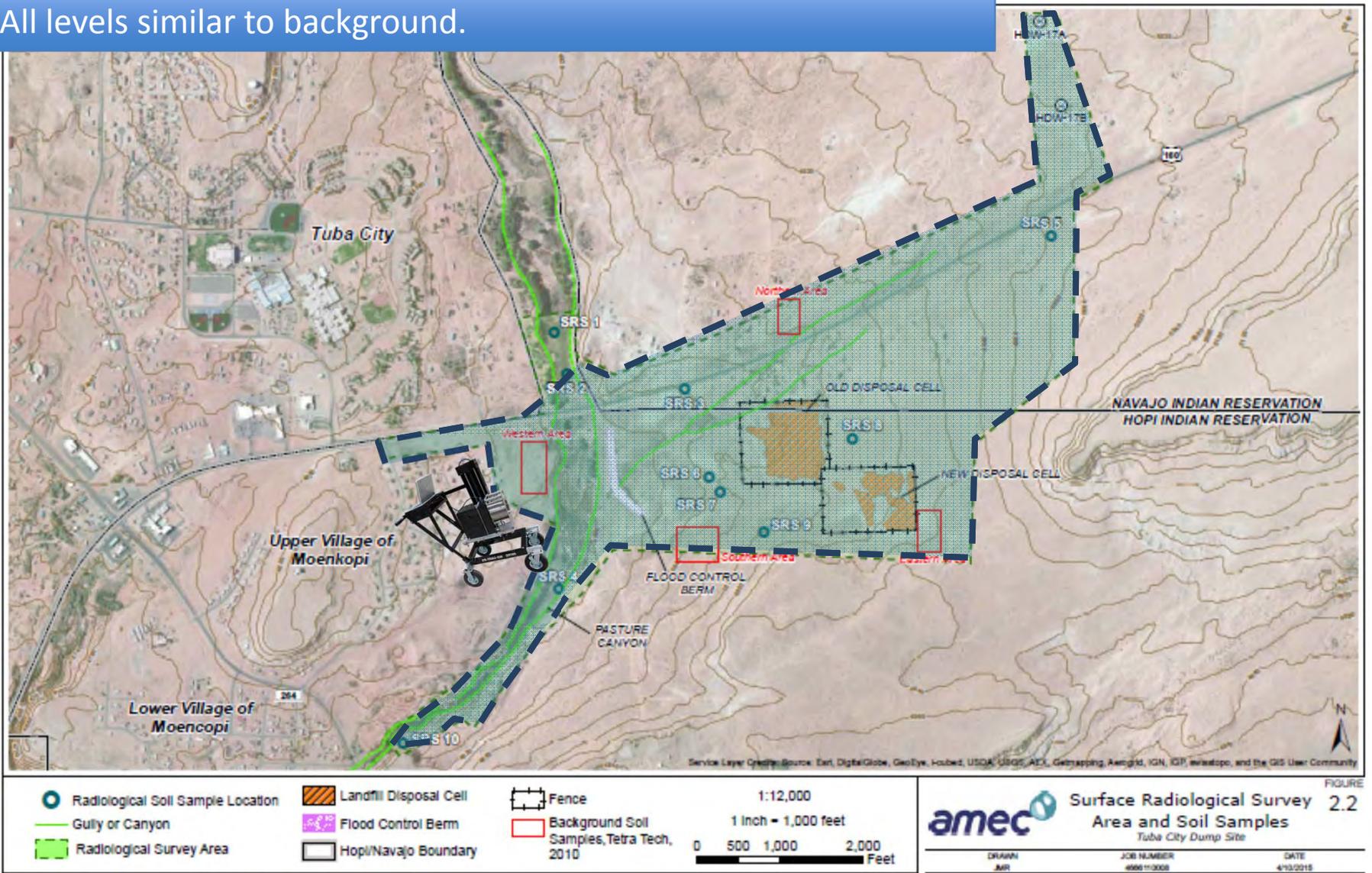
What's In the Dump?



No methane or organic material, because the waste was burned

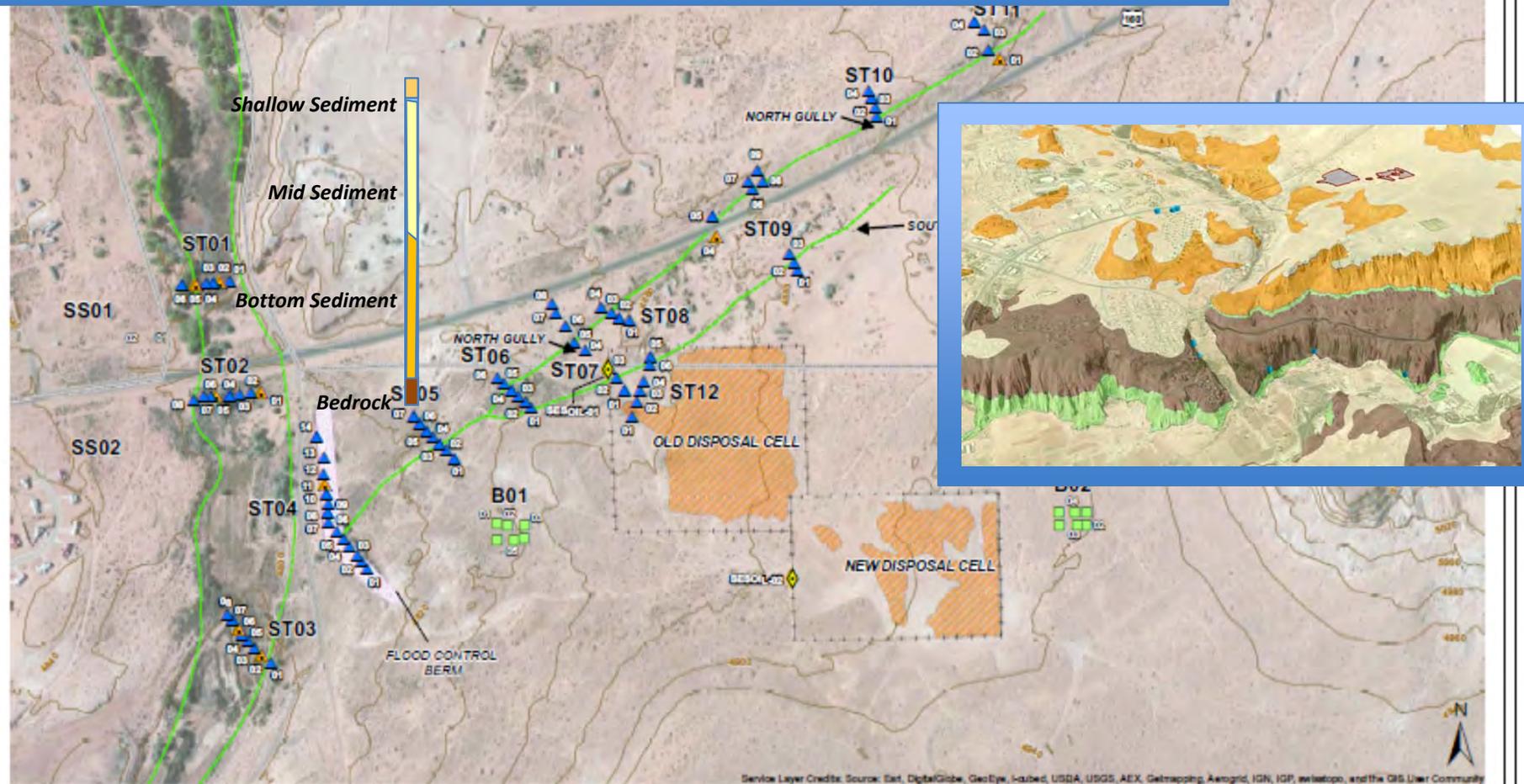
Checking for something buried: RAD (gamma) Survey In Dump Vicinity

No radiation found. No indication of buried uranium waste found.
All levels similar to background.



Looking in Sediments on Top of Bedrock: Sediment Transect Investigation

No radiation found. No indication of buried uranium waste found.
No indication of Dump chemicals found. All levels similar to background.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar, USDA, USGS, AeroGRID, IGN, IGP, Swisstopo, and the GIS User Community

- Storm Event Soil Sample
- Shallow Soil Boring
- Transect Boring Location
- Temporary Well
- Gully or Canyon
- Fence
- Landfill Disposal Cell
- Flood Control Berm
- Hopi/Navajo Boundary

1:6,000
MAP AREA SHOWN IS LOCATED WITHIN
TOWNSHIP 32 NORTH, RANGE 11 EAST.
1 Inch = 500 feet
0 250 500 1,000 Feet

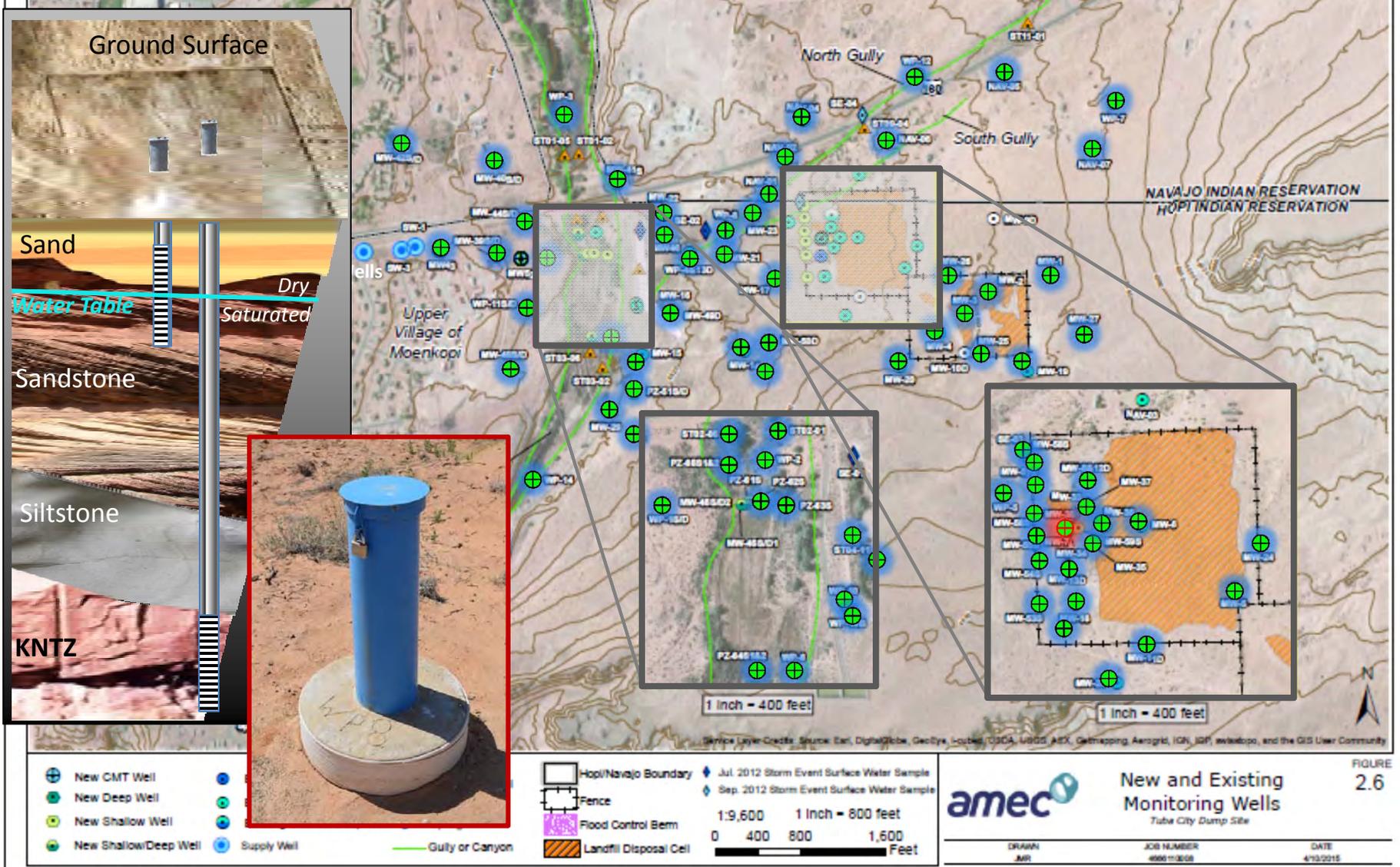
FIGURE 2.4

amec Transect and Shallow Soil Sampling Locations
Tuba City Dump Site

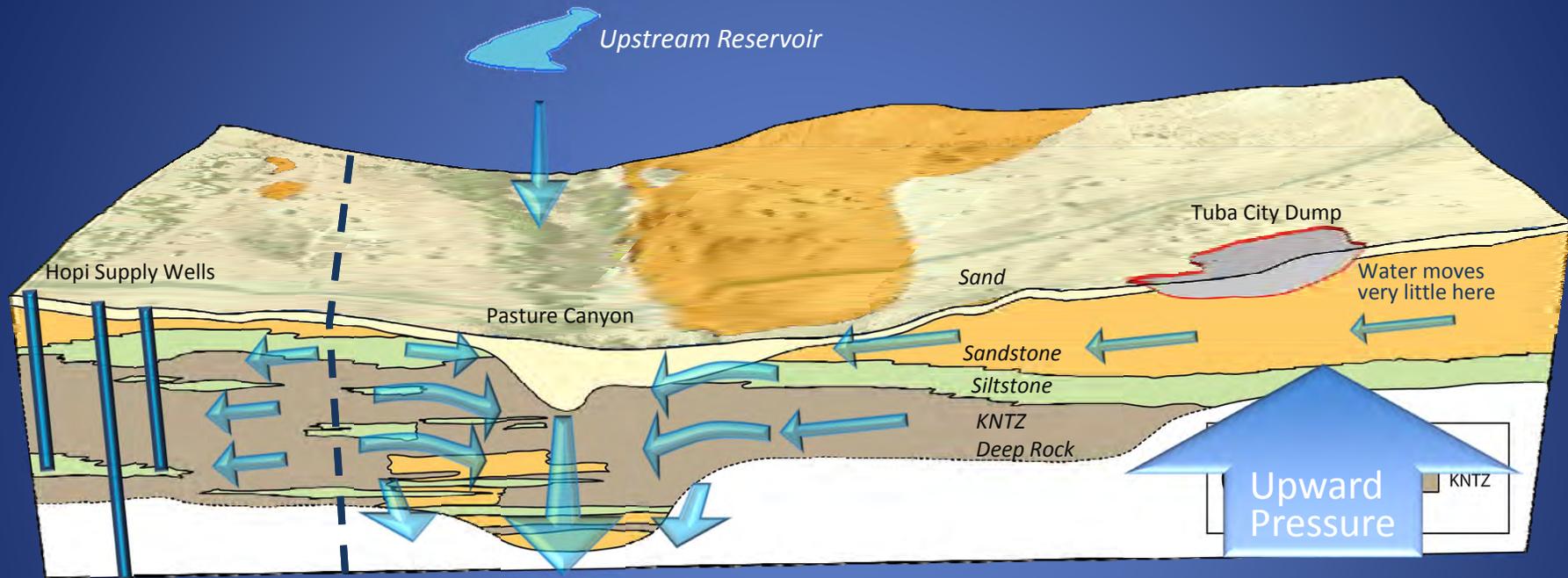
DRAWN: AMR JOB NUMBER: 4996110008 DATE: 4/13/2015

What about the Groundwater?

More than 75 monitoring wells have been installed in the shallow and deep units, aquifer pumping tests and modeling have been performed...



What Do All These Monitoring Wells and Tests Show Us?



- Explain the layers under the ground that can hold water
- How ground water can and can't move and how fast
- Where chemicals are dissolved in groundwater, and how much

What Did We Find About the Groundwater?



The drinking and agricultural water is safe.

The Dump Can't Affect the Tuba City Drinking Water

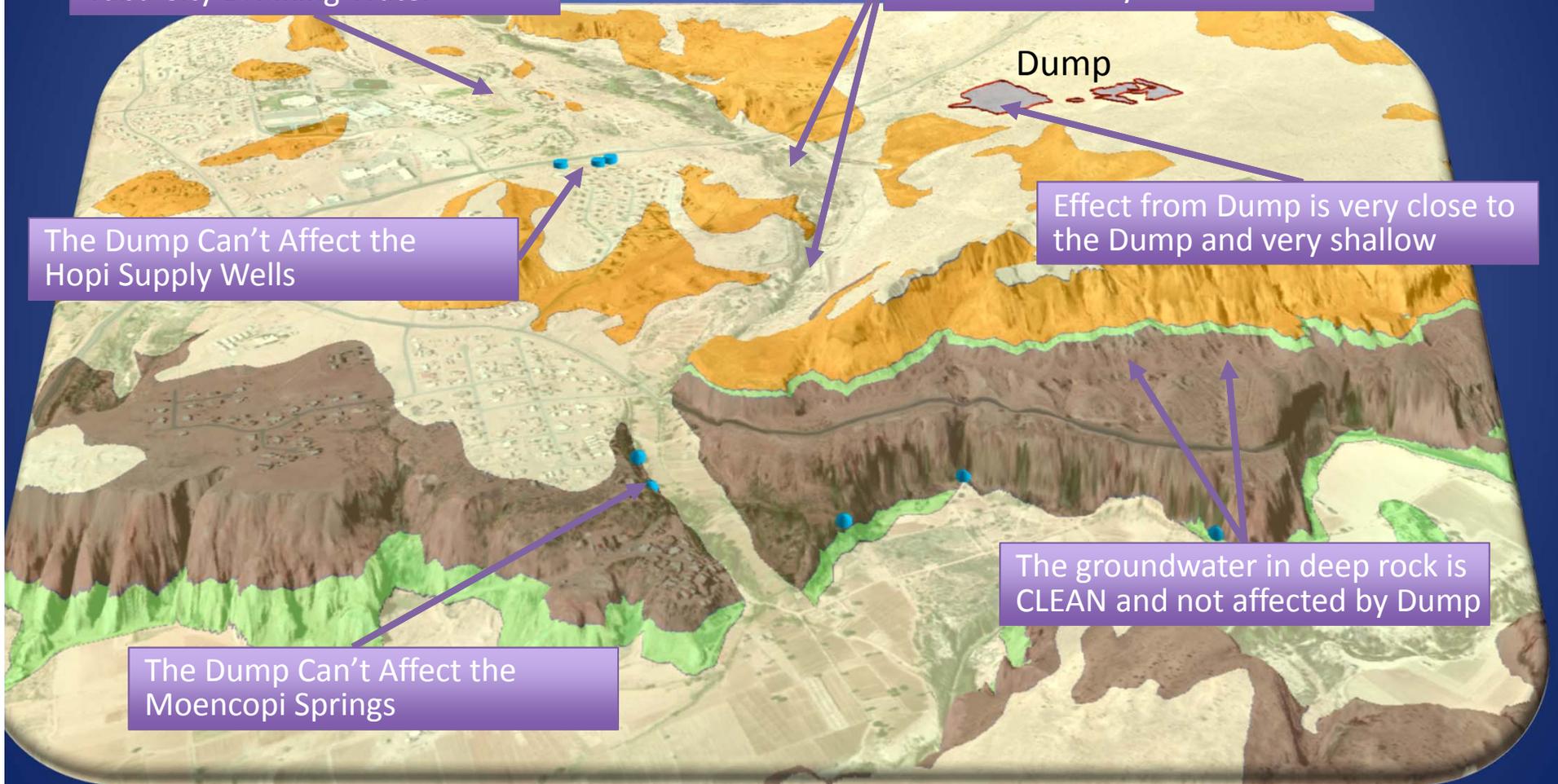
The Dump doesn't affect water in the Pasture Canyon

The Dump Can't Affect the Hopi Supply Wells

Effect from Dump is very close to the Dump and very shallow

The Dump Can't Affect the Moencopi Springs

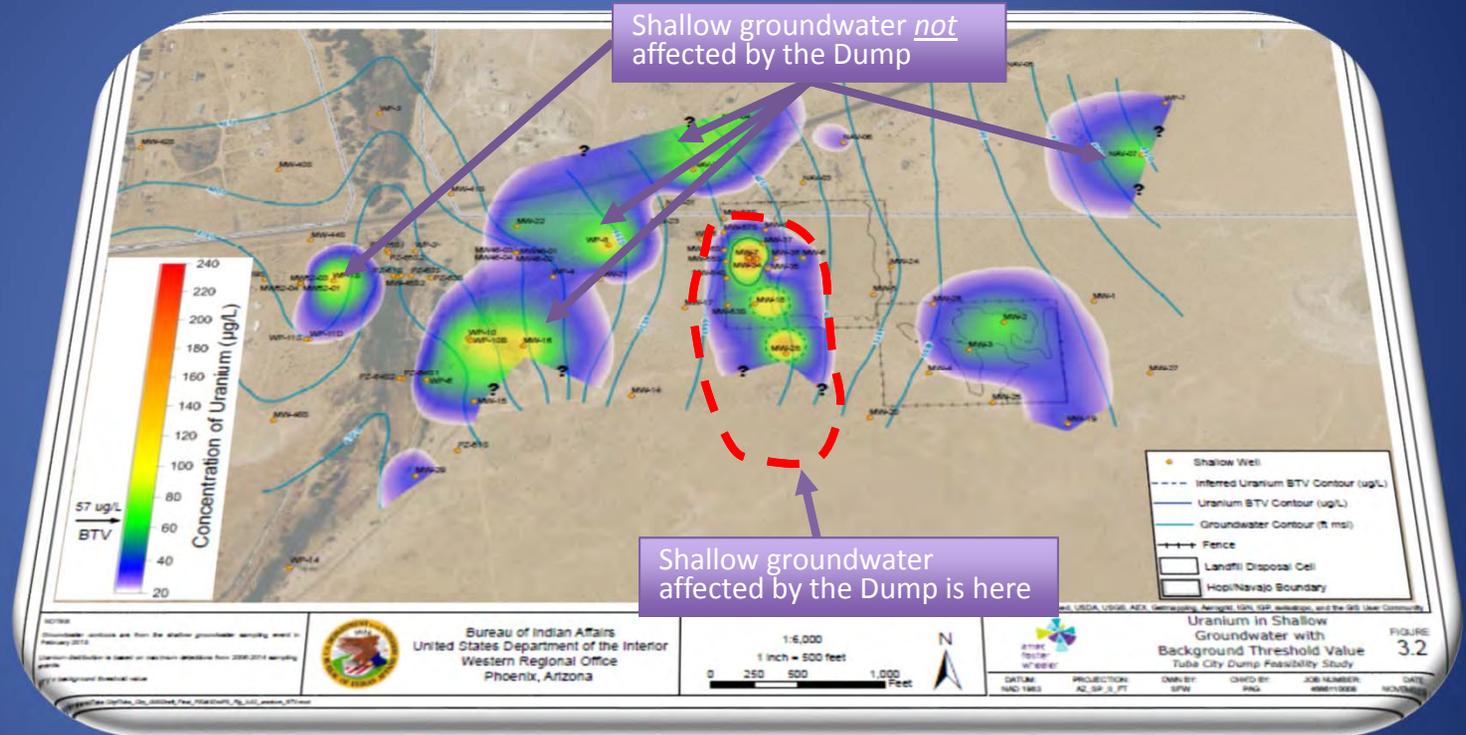
The groundwater in deep rock is CLEAN and not affected by Dump



Shallow Groundwater Near the Dump

The groundwater that is affected by the dump is shallow and very close to the dump.

This groundwater moves very little.



Moving on...



About the Tuba City Dump



The Process We Use to Investigate and Clean up



What the Investigation Showed



What Cleanup Options are Being Considered



What Comes Next

What Cleanup Options Are Being Considered?

Investigate

Remedial Investigation & Risk Assessment

What is the problem?

Where is contamination and what risks does it pose?

Look at Options

Feasibility Study

What are the alternatives to address the problem?

How do they compare?

Decide

Record of Decision

Obtain public input, then select a cleanup option

Do the Cleanup

Remedial Design and Remedial Action

Old and New Dump Cells, and Tribal Boundaries



What is a Cover? (TOP)

Thick layers of soil, clay, and synthetic lining on TOP that permanently close a cell of material. The cover makes water run off and keeps it from seeping through.



2 Kinds:

- An ENGINEERED cover can be built on and is usually more expensive.
- An EVAPOTRANSPIRATIVE (ET) cover can't be built on and is usually less expensive.

What is a Liner? (BOTTOM)

A synthetic material that goes UNDER waste in a cell to stop leaching from the waste. It provides extra protection for groundwater.



Liner on bottom, then waste material, then cover on top

Landfill Alternative 2A: Cover Cells in Place

Protection



- Protects people
- No liner, but groundwater impact remains limited/small

Land Use



- No freed up land
- Use limited on cover
- Engineered cover is more buildable

Cost



\$14 to 26 Million

Water Use



9 Million Gallons

Duration



12 months
10 hour work days

Truck Loads



16,000 Trips
1 truck every 5-10 min
100 trucks per day



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Landfill Alternative 2B: Move Old Cell onto New Cell + Cover in Place

Protection



- Protects People
- No liner, but groundwater impact remains limited/small

Land Use



- Half land freed up
- Use limited on cap
- Engineered cover is more buildable

Cost



\$14 to 23 Million

Water Use



20 Million Gallons

Duration



18 months

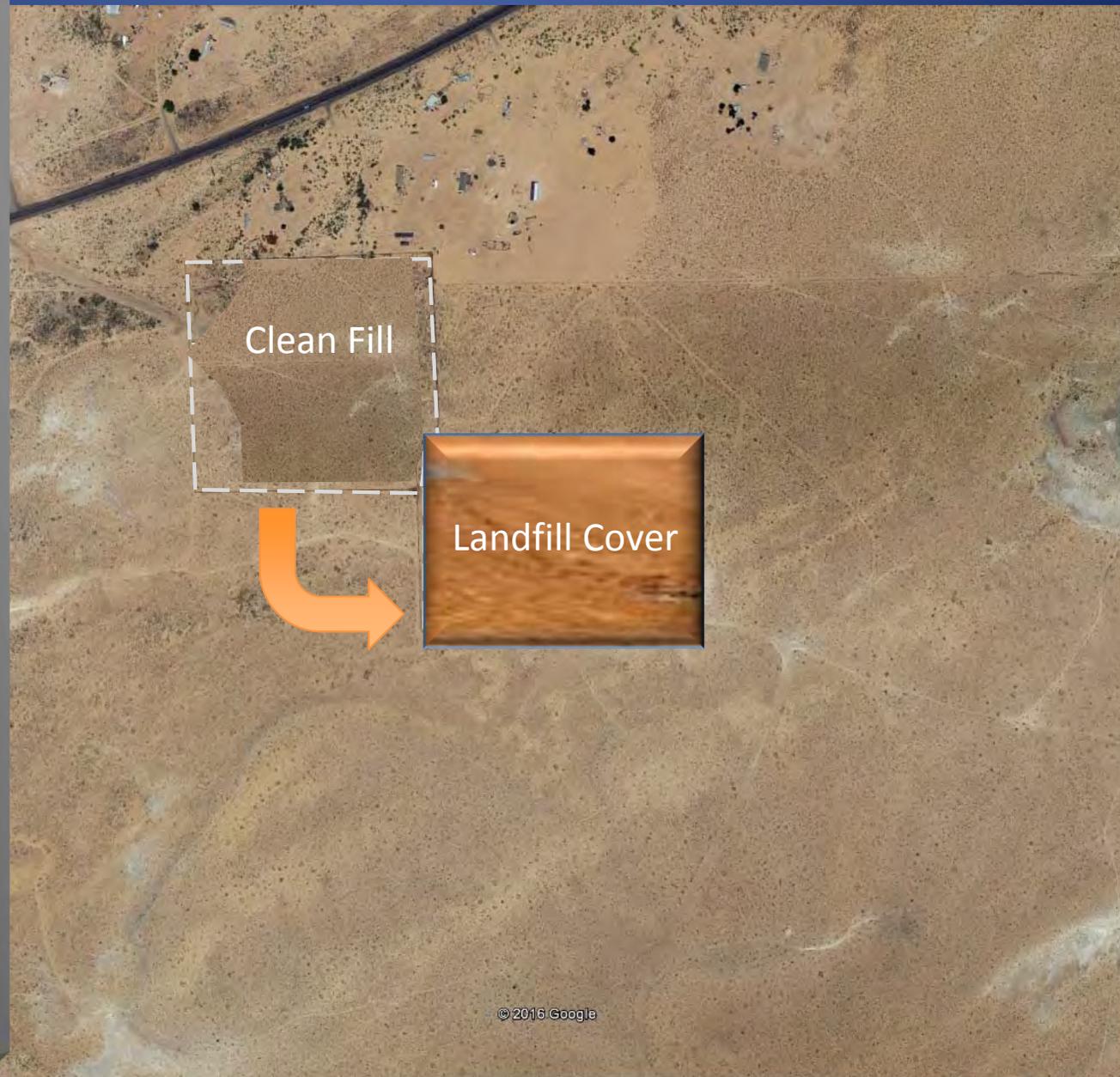
10 hour work days

Truck Loads



24,000 Trips

1 truck every 5-10 min
100 trucks per day



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Landfill Alternative 2C: Move all Waste into Lined Repository On-Site

Protection



- Protects people
- Liner adds extra protection from leachate to groundwater

Land Use



- Half land freed up
- Use limited on cap
- Engineered cover is more buildable

Cost



\$20 to 27 Million

Water Use



24 Million Gallons

Duration

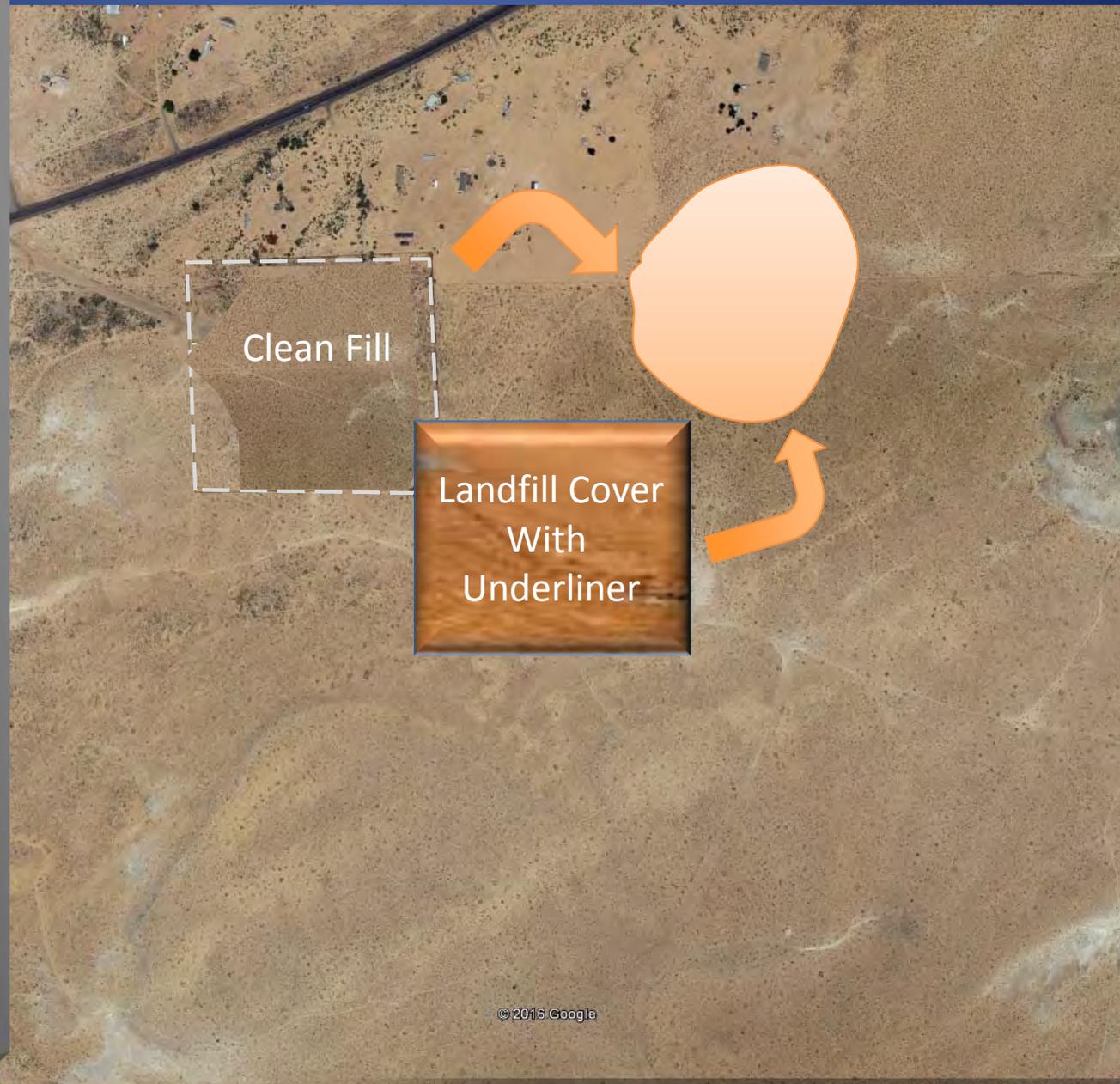


18 months
10 hour work days

Truck Loads



24,000 Trips
1 truck every 5-10 min
100 trucks per day



Landfill Alternative 4A: Lined Repository NEARBY On Reservation

Protection



- Protects People
- Liner adds extra protection from leachate to groundwater

Land Use



- All land freed up
- Full land use in original area

Cost



\$26 Million

Water Use



32 Million Gallons

Duration



24 months
10 hour work days

Truck Loads



36,000 Trips
1 truck every 5-10 min
100 trucks per day



Landfill Cover
With Underliner

Landfill Alternative 4A: Lined Repository Far Away on Reservation

Protection



- Protects people
- Liner adds extra protection from leachate to groundwater

Land Use



- All land freed up
- Full land use in original area

Cost



\$30 Million

Water Use



32 Million Gallons

Duration



24 months

10 hour work days

Truck Loads



36,000 Trips

1 truck every 5-10 min
100 trucks per day



Landfill Alternative 4B: Haul Dump Away Off-Reservation



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Protection



- Protects People
- Liner adds extra protection from leachate to groundwater

Land Use



- All land freed up
- Full land use in original area

Cost



\$40 to 45 Million

Water Use



17 Million Gallons

Duration



30 months

10 hour work days

Truck Loads



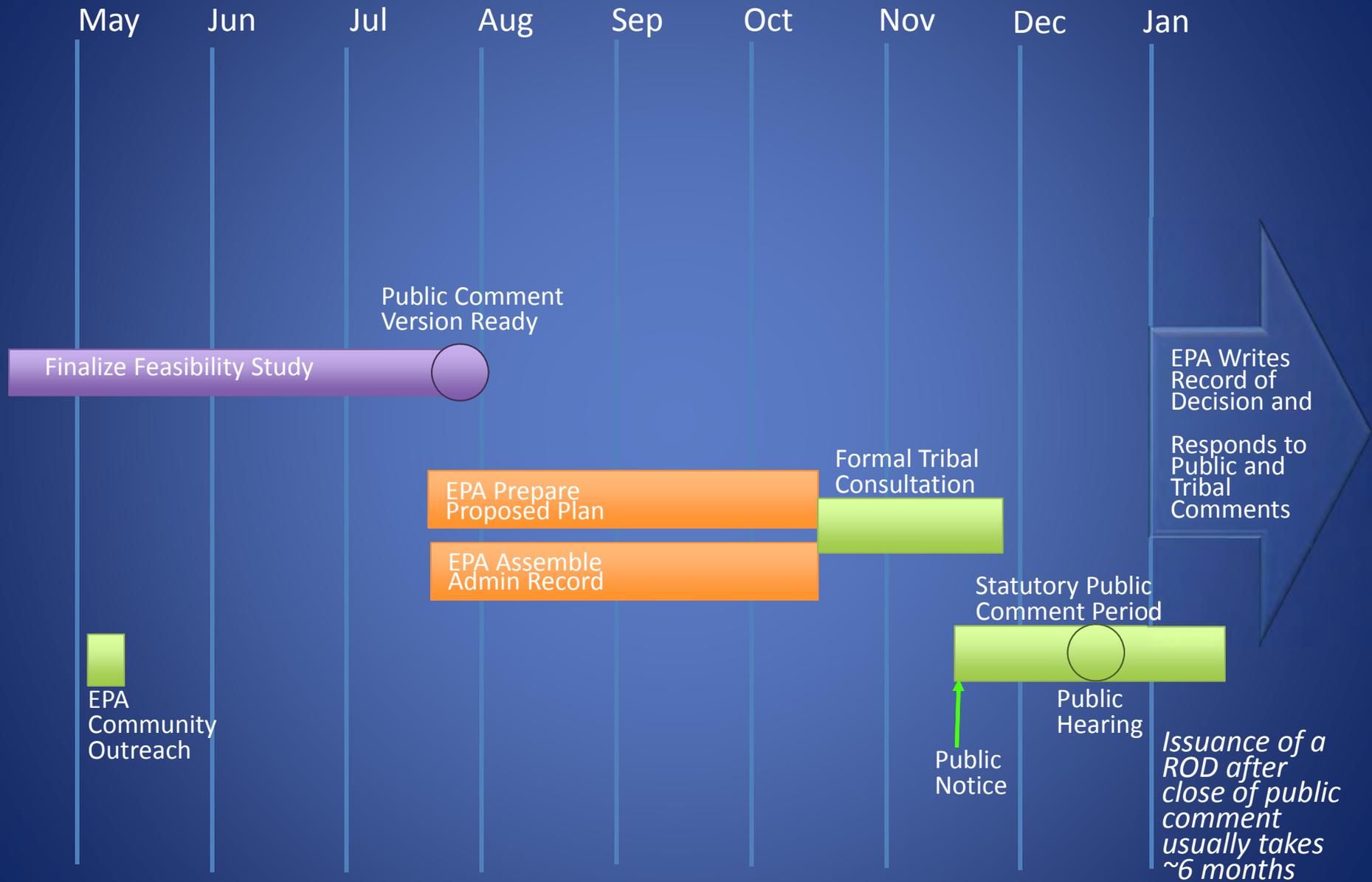
36,000 Trips
1 truck every 5-10 min
100 trucks per day

IN TOWN

Moving on...

- ✓ About the Tuba City Dump
- ✓ The Process We Use to Investigate and Clean up
- ✓ What the Investigation Showed
- ✓ What Cleanup Options are Being Considered
- What Comes Next

The Rest of the TCD Remedy Selection Process...



Landfill Alternatives Being Considered

Alternative 1: No Action



Alternative 2A: Cover in Place

Protection

- Protects people
- Groundwater impact small

Land Use

- None freed up
- Land use limited
- Engineered cover more buildable

Cost

\$14 to 26 Million

Water Use

9 Million Gallons

Duration

12 months
10 hour work days

Truck Loads

16,000 Trips
1 truck every 5-10 min
100 trucks a day

Alternative 2B: Move Old Cell onto New Cell and Cover in Place

Protection

- Protects people
- Groundwater impact small

Land Use

- Half freed up
- Limited on cover
- Engineered cover more buildable

Cost

\$14 to 23 Million

Water Use

20 Million Gallons

Duration

18 months
10 hour work days

Truck Loads

24,000 Trips
1 truck every 5-10 min
100 trucks a day

Alternative 2C: Move all Waste into LINED Cell where New Cell Was

Protection

- Protects people
- LINER adds extra protection to GW

Land Use

- Half freed up
- Limited on cover
- Engineered cover more buildable

Cost

\$20 to 27 Million

Water Use

24 Million Gallons

Duration

18 months
10 hour work days

Truck Loads

24,000 Trips
1 truck every 5-10 min
100 trucks a day

1 LINER put on bottom of pit where the New Cell was
This adds protection for leachate

2 ALL waste moved into lined cell

Alternative 4A: Move all Waste into LINED Repository nearby On-Reservation

Protection

- Protects people
- LINER adds extra protection to GW

Land Use

- All freed up
- Land use onsite not limited

Cost

\$26 to 33 Million

Water Use

32 Million Gallons

Duration

24 months
10 hour work days

Truck Loads

36,000 Trips
1 truck every 5-10 min
100 trucks a day

Alternative 4B: Haul all Waste Away to Permitted Facility Off-Reservation

Protection

- Protects people
- LINER adds extra protection to GW

Land Use

- All freed up
- Land use onsite not limited

Cost

\$40 to 47 Million

Water Use

17 Million Gallons

Duration

30 months
10 hour work days

Truck Loads

36,000 Trips
1 truck every 5-10 min
100 trucks a day