

ENVIRONMENTAL INVESTIGATION AT THE DUMP IS COMPLETED

Evaluation of Potential Cleanup Actions Begins



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 dialogue 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.

Info At a Glance...

Extensive studies have indicated:

Drinking Water

- Drinking water from wells and springs is safe and is not affected by the Tuba City Dump (TCD)

Pasture Canyon

- The water and soils in the Pasture Canyon area are not affected by the TCD

TCD Site Soils

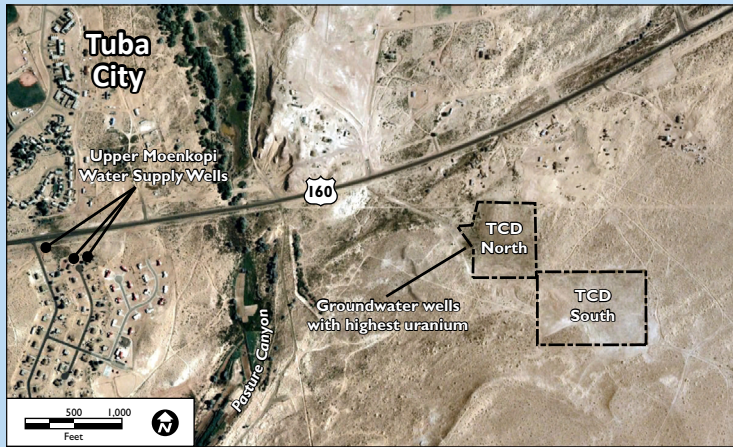
- The TCD is primarily soil, debris, and ash from burning trash many years ago
- Extensive investigation has revealed no radioactive waste in the TCD, and uranium and radioactivity were not found above background levels
- No buried radioactive materials have been found around the TCD

Groundwater at the Site

- Very shallow groundwater close to the west edge of the dump has elevated uranium levels from chemicals in the TCD. Elevated uranium levels have also been found in other shallow groundwater spots 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 Navajo residents in shallow sands immediately adjacent to the north end of the TCD have been impacted and are no longer being used

About the Tuba City Dump

The TCD was operated by BIA from the 1950s until 1997. It was primarily used by local businesses and the general public to dispose of municipal waste. Formal records of what was dumped were not kept. Municipal waste was burned to ash that was mixed with soil and non-burnable wastes in the TCD.



Tuba City Dump and surrounding areas

Today the dump waste is covered by one to four feet of clean soil, but the TCD was never closed permanently in accordance with landfill laws. The TCD covers about 30 acres and holds about 300,000 cubic yards of material in two cells. The waste is between one foot and 15 feet thick. The boundary between the Navajo Nation and Hopi

Reservation runs through the TCD. About 90% of the TCD lies on the Hopi lands. Navajo residents just north of the Dump live closest to the waste material.

Tribal residents recalled waste dumping and fires when the dump operated. Discarded iron and ceramic balls from a mill grinding machine were found at the TCD. These are not toxic or radioactive, but people wondered whether the TCD may contain uranium waste from the former Rare Metals uranium mill that was located four miles to the east of the TCD on Highway 160. In 2008, elevated levels of uranium were found in very shallow groundwater immediately adjacent to the TCD, within about 100 feet of the west edge of the dump waste. Among questions asked by the community and agencies were:

- Does the dump contain hazardous or radioactive wastes?
- Is groundwater in the area becoming contaminated by the Dump?
- Might contamination spread to drinking water supply wells?

EPA's investigation has examined these questions and provided answers on pages 3 and 4. There is a shortage of domestic water for these communities and it has been important to EPA and the tribes to ensure that the drinking water supply is safe and does not become contaminated in the future.

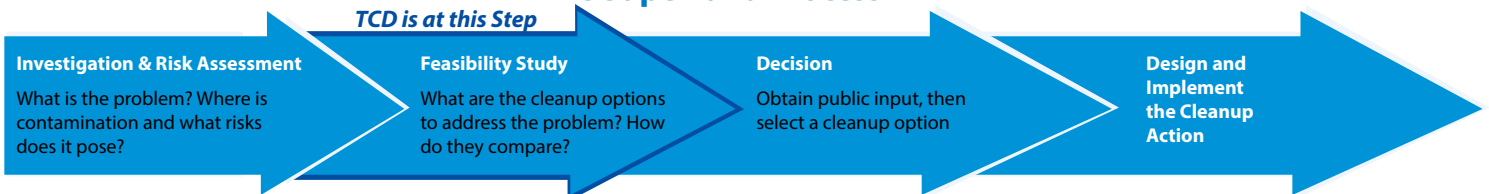
Past Environmental Studies and the Start of the Superfund Process

Over the 13 years before 2010, many environmental studies were performed at and near the Dump by various parties, including the Hopi Tribe, Navajo Nation, U.S. Geologic Survey, BIA, and EPA. While useful, these studies were not comprehensive and were not conducted under a consistent strategy, and as a result, some studies reached different conclusions.

To complete the understanding of the Site, in 2010 EPA and BIA signed an order requiring that BIA pay for and perform a remedial investigation and a feasibility study under the Superfund law, subject to EPA's oversight and approval. The Superfund process considers previous studies, collects new information, and leads to selecting and performing a cleanup action.

The **remedial investigation** is a comprehensive and detailed evaluation of the nature and extent of contamination, how or where it may be moving, and any health risks it may pose.

The Superfund Process



How Does Superfund Make It's Cleanup Decision?



Next, the *feasibility study* will assemble and compare alternatives for cleanup actions that protect human health and the environment.

The remedial investigation is completed and the 2nd draft of the feasibility study report is expected to be complete in December 2016. EPA, BIA, and tribal representatives are in regular discussions as this work near completion.

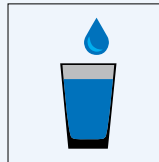
What Kind of Field Sampling Work Was Done in the Remedial Investigation?

To supplement studies done in the past, major additional work performed included:

- More than 360 borings and exploratory trenches into the TCD waste, as well as under and adjacent to the waste;
- Thousands of waste and soil samples looked for contamination at multiple depths; including tests for hundreds of different chemicals, including uranium and other radioactive substances;
- Scans for radioactivity from hundreds of cores in the TCD waste;
- Tests and surveys revealing the dump contents, waste thickness and locations;
- Thousands of samples from hundreds of boring holes at all depths in the sands and sediments down hill from the dump and in the Pasture Canyon;
- Installation, sampling, and groundwater testing at more than 70 monitoring wells in both the shallow and deep groundwater from east of the TCD to west of the Moenkopi water supply wells, and from southern Tuba City south to Moenkopi Wash;
- Many borings and cores deep into the ground that reveal the nature of the layers of rock under the ground that carry groundwater (aquifers);
- Many aquifer pumping tests that show where and how fast groundwater can move, and whether groundwater is able to move from near the TCD to drinking water wells;
- Surface radiological scans to look for buried waste; and
- Many other tests, sampling, modeling and procedures that were used to evaluate TCD contents, compare naturally- and non-naturally occurring uranium, calculate background levels, and provide other pertinent information.

What Did the Investigation Find?

The data and evaluations in the RI indicate that:



Drinking Water

The drinking water from the Moenkopi supply wells and Tuba City wells is safe, and cannot be affected by the TCD.

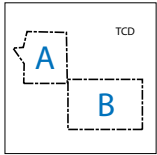
The data show that groundwater cannot flow from the Dump to the supply wells that lie west of Pasture Canyon, even when the supply wells are pumping.



The drinking water from the Moenkopi Springs is safe, and cannot be affected by the TCD.

The data shows that the Moenkopi Springs are fed by clean water from an aquifer that is deep under the ground. It is separate from the very shallow groundwater affected by the TCD. The data and modeling show that the shallow groundwater very near the dump does not travel to the Moenkopi Springs.





What's In The Dump

Extensive investigation has shown no uranium-bearing mill waste in the TCD, and the groundwater chemistry indicates against mill waste being present.

The investigation included samples, scans, analyses and tests from hundreds of soil and waste cores and trenches, and also a technically advanced study called isotopic ratio analysis. Uranium mill waste has not been observed, and none of the extensive investigation data indicate the presence of mill waste.

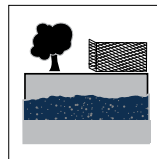
The dump is primarily composed of soil, ash, glass, brick, and burned municipal debris. These materials are not mobile and while the TCD needs to be properly closed, they do not pose a significant threat to the public.

There is no evidence of significant uranium or radioactivity in or around the TCD.

Levels of uranium and radioactivity in the TCD waste are similar to levels found naturally in soils in areas not near the TCD. Also, radioactivity scans more than a mile wide found no evidence of buried radioactive waste.

The TCD does not pose a health risk to people in its current state.

The dump has an intact temporary cover of soil that prevents people from making contact with the waste. However, the TCD has not been closed in accordance with federal landfill laws to prevent long-term exposure to wastes.



How the TCD has Affected Shallow Groundwater

Uranium levels in the very shallow groundwater right next to the TCD have uranium levels that are higher than usual.

As rainwater has moved through the dump waste, the ash and other debris in the TCD has released ionic salts to the very shallow groundwater very near to the dump. These salts are commonly released from dumps in what is referred to as leachate. Their presence allows uranium present in rocks or soils to dissolve in the shallow groundwater more than normal.

The groundwater affected by the TCD lies in a very limited area close to the TCD and doesn't move.

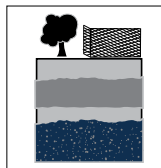
Groundwater affected by the TCD lies mostly within the dump fence line. Investigation shows that this groundwater stays very near the dump and does not migrate into the drainages or Pasture Canyon.



Pasture Canyon

Water and sediments in Pasture Canyon are not affected by the TCD.

The sands and sediments downhill from the TCD are not contaminated. Sampling and monitoring wells show that water affected by the TCD does not flow into Pasture Canyon.



Deep Groundwater

The deeper aquifer (layer) of groundwater, which is most useful for drinking, is not contaminated.

Groundwater in the shallower groundwater does not flow downward to the deeper groundwater. There is pressure in the deeper groundwater that pushes the groundwater upward. There is also a thick layer of tight rock that separates the shallow and deep groundwater.


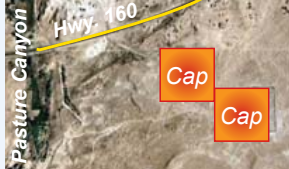
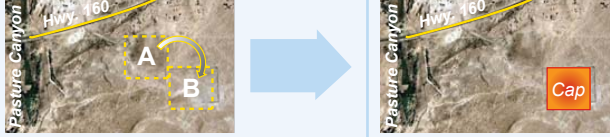



How Uranium Can Be Higher Than Usual in Some Shallow Groundwater Spots for Reasons Not Related to the Dump

Sampling from numerous groundwater monitoring wells shows limited spots east of Pasture Canyon where very shallow groundwater has uranium above drinking water standards. However, many of these spots lie in places where the TCD could not have caused contamination. These spots are usually (but not always) near depressions, drainages, and storm water ponding areas. These locations have a high rate of a process called evapotranspiration that can concentrate uranium. This process is not related to the TCD. Also, these spots can have elevated levels of salts and ions and these can allow uranium in soils or rocks to dissolve more than normal into the groundwater. Because of this, most of the elevated uranium seen in very shallow groundwater in the area is not related to the TCD. However, the waste does affect groundwater very close to the TCD and the highest uranium levels that have been found in shallow groundwater are adjacent to the TCD.

What Cleanup Alternatives are Being Evaluated for the Dump Material?

The draft feasibility study report will compare several cleanup alternatives for the TCD material. This draft report will be issued to the public soon. Below is the criteria used to compare the alternatives:

Cleanup Alternatives for the TCD waste currently being considered are depicted in the table below. The feasibility study will also contain alternatives for the groundwater. The table is only an introduction to initiate discussion about the alternatives. The feasibility study and fact sheets EPA will issue in the future will provide more detail about the alternatives, their benefits and drawbacks, and their costs. No decision has been made yet on which alternative will be chosen for the TCD, for either the waste or the groundwater.

Option	Description	Steps and Final Result...
1	No Action	 <p>Cells A and B stay as they are now. We must consider this option as a basis of comparison.</p>
2A	Cap Both Cells in Place	 <p>Engineered cap layers are placed over the top and sides to stop infiltrating water and to prevent contact with the waste.</p>
2B	Move Cell A onto Cell B. Then Cap it	 <p>First, Cell A waste is dug up and moved on top of Cell B. Then, engineered cap layers are placed over the top and sides just as in Option 2A.</p>
2C	Install Liner at Cell B, Put All Waste in Lined Cell, Then Cap it	 <p>First, Cell B waste is temporarily moved out of the way and a liner is built where Cell B was. Then, all the waste is put into the new lined cell. The liner prevents flow out the bottom of waste in the future. Last, the new cell with liner and all the waste are capped with engineered layers to seal it, just as in Option 2A.</p>
4A	Excavate and Haul all Waste to Lined Cell at Another Location ON Reservation	 <p>A waste repository, with a liner, is built on the reservation but away from the dump site from 1/4 mile to 15 miles away. Then, all the waste from the two cells is dug up and moved into the new lined repository. Finally, the new repository is capped with engineered layers to seal it as in Option 2A.</p>
4B	Excavate and Haul all Waste to Dispose OFF Reservation	 <p>All waste is dug up and disposed at an off-reservation disposal facility.</p>

What Happens Next?

Within a few months, EPA will make the remedial investigation report and the draft feasibility study report available for public review and comment. We will also issue what is called a proposed plan, in which EPA will state which among the alternatives it proposes to choose and the reasons for its proposal. EPA will then schedule a formal public hearing and consultation meetings with the tribes to solicit tribal and community input prior to making any decisions on the cleanup remedy for the TCD.

How Can I Get More Information?

If you have questions or concerns about the TCD or related activities, please contact:

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