

Cleaning Up A Legacy of the Cold War



Photo
Courtesy
of US
DOE



Moab Uranium Mill Tailings Remedial Action

A Grand County Perspective by Lee Shenton, UMTRA Liaison



- **This program was presented at the Moab Information Center on July 25, 2013 as a part of their Lecture Series.**

Comments made by the presenter during the presentation are summarized like this.

Comments provided after the presentation by the Moab UMTRA Project team are summarized like this.





➤ **WHY** were 16 million tons of uranium tailings near the Colorado River?



➤ **HOW** is the US Dept of Energy cleaning up the old Atlas Mill site?



➤ **WHAT** could be done with the mill site after remediation?



- **UMTRA Liaison**
 - **Grand County resident since 2002**
 - **Grand County employee since 2009**
 - **DOE reimburses related expenses**
- **While some factual material for this presentation was supplied by the DOE, I do not speak for the DOE or the Moab UMTRA Project.**
- **For official Project comments please contact Wendee Ryan, Public Affairs Manager for the Moab UMTRA Project, 970-257-2145**



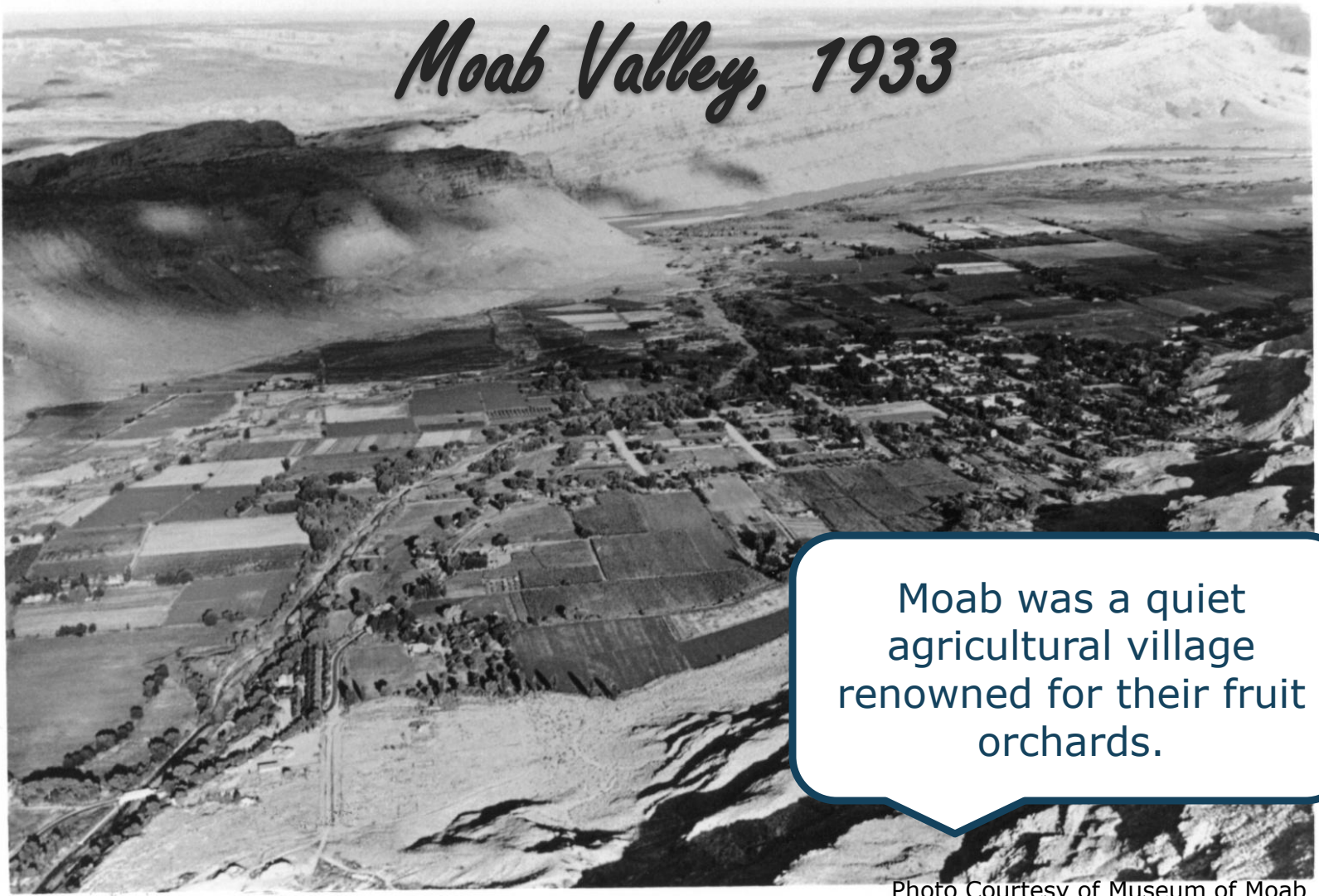
Moab Wash, 1905

When we talk later about what to do with the site, keep in mind that this is what it looked like before the mill was built.



Photo Courtesy of Museum of Moab

Moab Valley, 1933



Moab was a quiet agricultural village renowned for their fruit orchards.

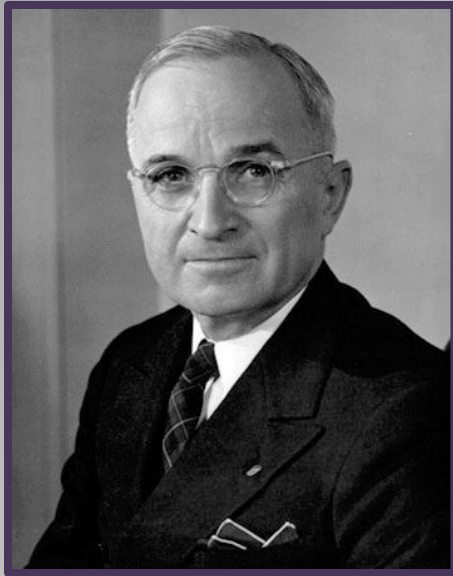
Photo Courtesy of Museum of Moab

Moab was beginning to change after World War II. Note the dapper gentleman outside the "66 Club."



*Main Street, 1949
Recovering from WWII*

Photo Courtesy of **Museum of Moab**



Truman Doctrine, 1947
Western Bloc supports
anti-Communist forces

Nuclear Superpowers in Cold War



Berlin Airlift, 1948-49



Russian response
to Truman
Doctrine was
blockade of land
transport across
East Germany to
West Berlin.



US Seeks Domestic Uranium

1947

AEC Established



- **Provided “civilian control of atomic energy”**
- **1948-1971: Only buyer of uranium in US**
- **AEC 1948 Offer to prospectors**
 - **\$10,000 bonus for discovery of new lodes**
 - **Guaranteed ore purchase for ten years**
 - **Guidance on where to prospect**

International tensions spurred US to seek domestic sources of uranium. AEC provided incentives and guidance on where to look.



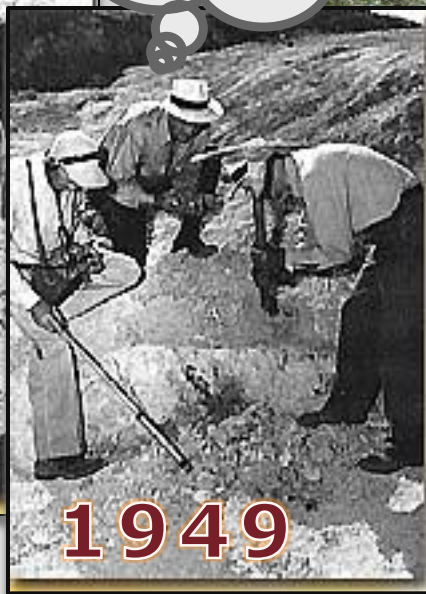
Prospecting Evolves

Where's the
vanadium?

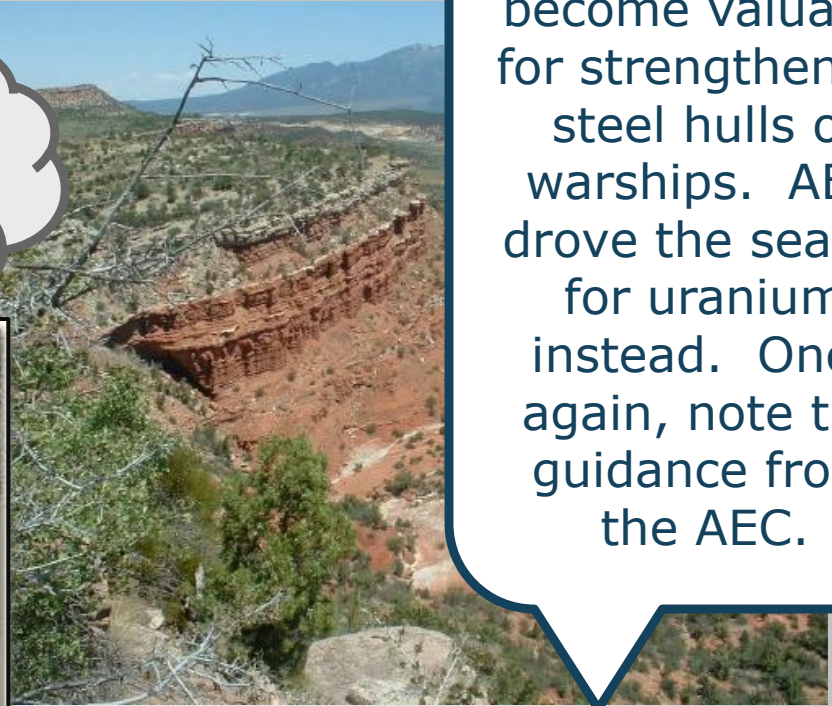


1918

Where's
the
uranium?



1949



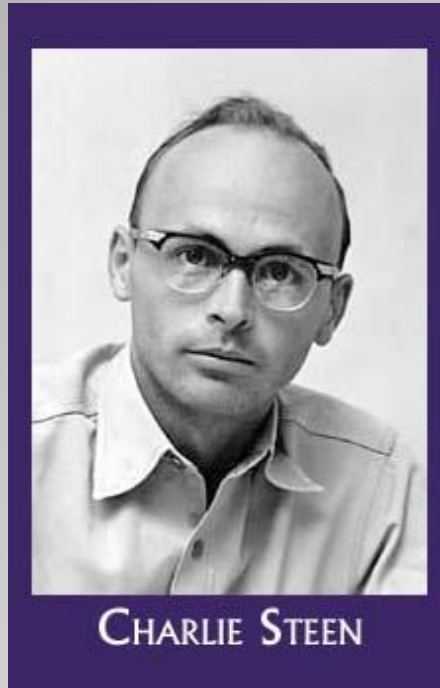
Lisbon Valley is "barren of ore"
- AEC, 1948

In WWI
Vanadium had
become valuable
for strengthening
steel hulls of
warships. AEC
drove the search
for uranium
instead. Once
again, note the
guidance from
the AEC.

B/W photos from historytogo.utah.gov



1951: “Steen’s Folly”



using
oil exploration methods
to look for uranium ore???



Geologist from Texas read about AEC's incentives and thought he could find uranium ore in the same type of underground geologic structures that trapped crude oil.



I Told You So!



Photos courtesy of



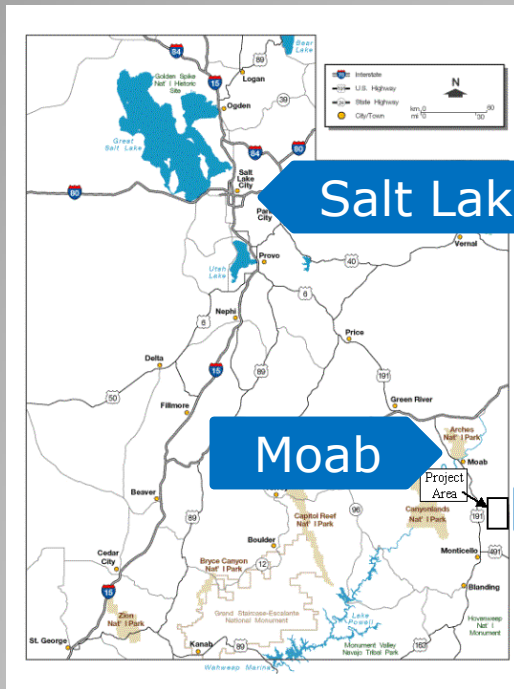
**Charlie Steen, 1959
And Co-Pilot "Butch"**



Charlie Steen, wife M.L., and
sons John Charles, Mark and Andy
the day of the Big Strike July 1952

Big Strike Day: July 6, 1952
Charlie, Minnie Lee and the kids

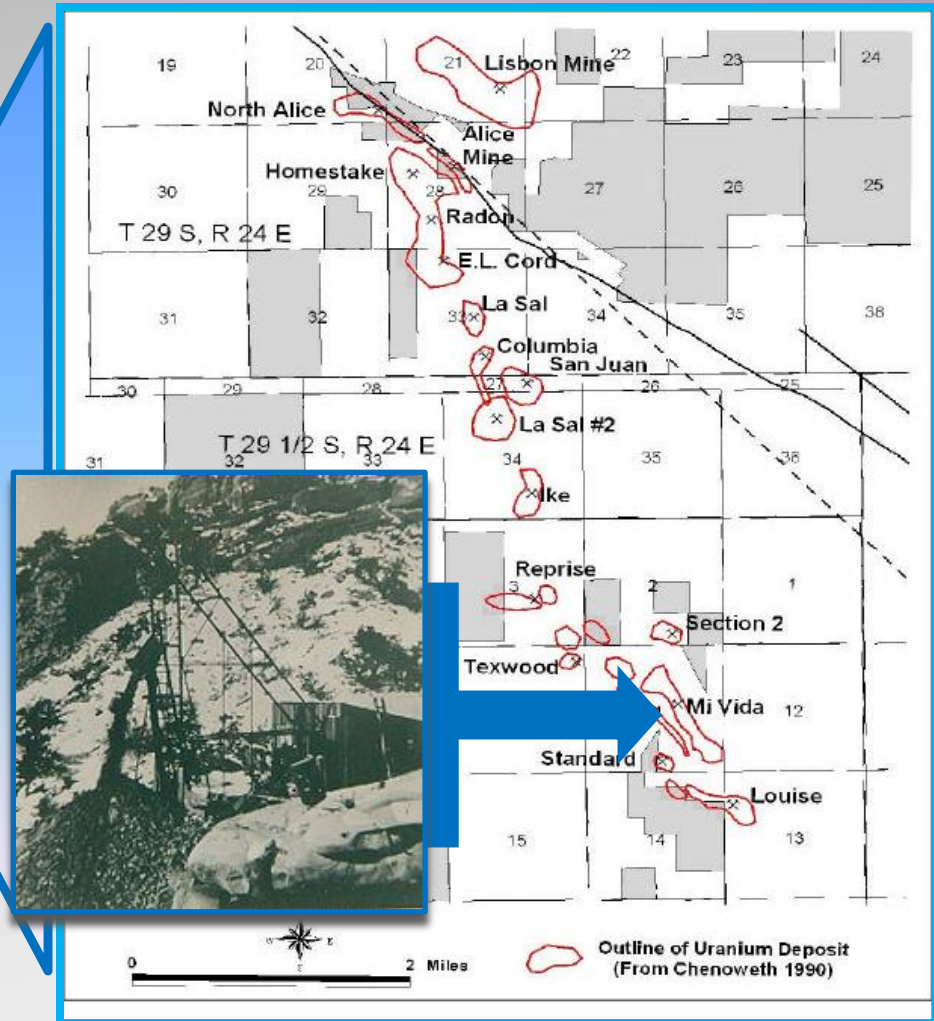




Salt Lake

Moab

Mi Vida mine produced
ore worth \$1 million
in first
six months.



Figures from **Lisbon Valley Uranium Project Technical Report**
For BZU Minerals Ltd., 2005



1956: Uranium Mill Built at Moab



1959

- 1956-62: Uranium Reduction Company
- 1962-84: Atlas Minerals

Pitchblende



MILL

Yellowcake



Charlie could now afford to build a mill to handle ore from the many uranium mines in the area. Yellowcake from the Moab mill was an intermediate processed further at other facilities to produce uranium.





Main Street, 1951

Population 1,100

Moab

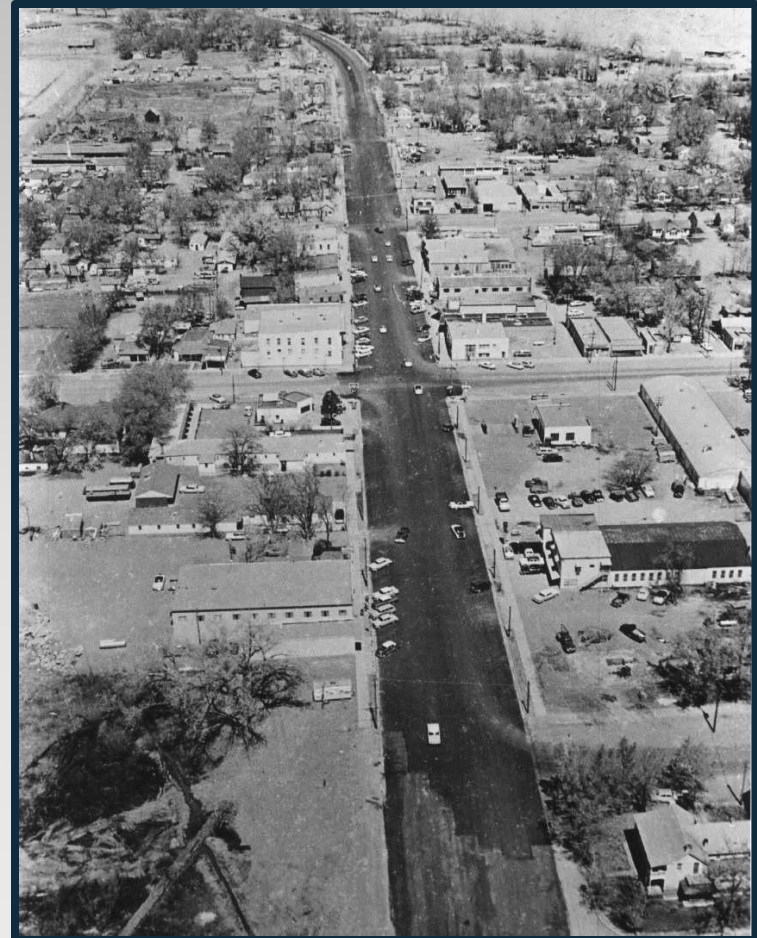
Became a

Boomtown

Main Street, 1956

Population 6,000

Photos courtesy of Museum of Moab



Boom and Bust

Yellowcake from Lisbon Valley Ores

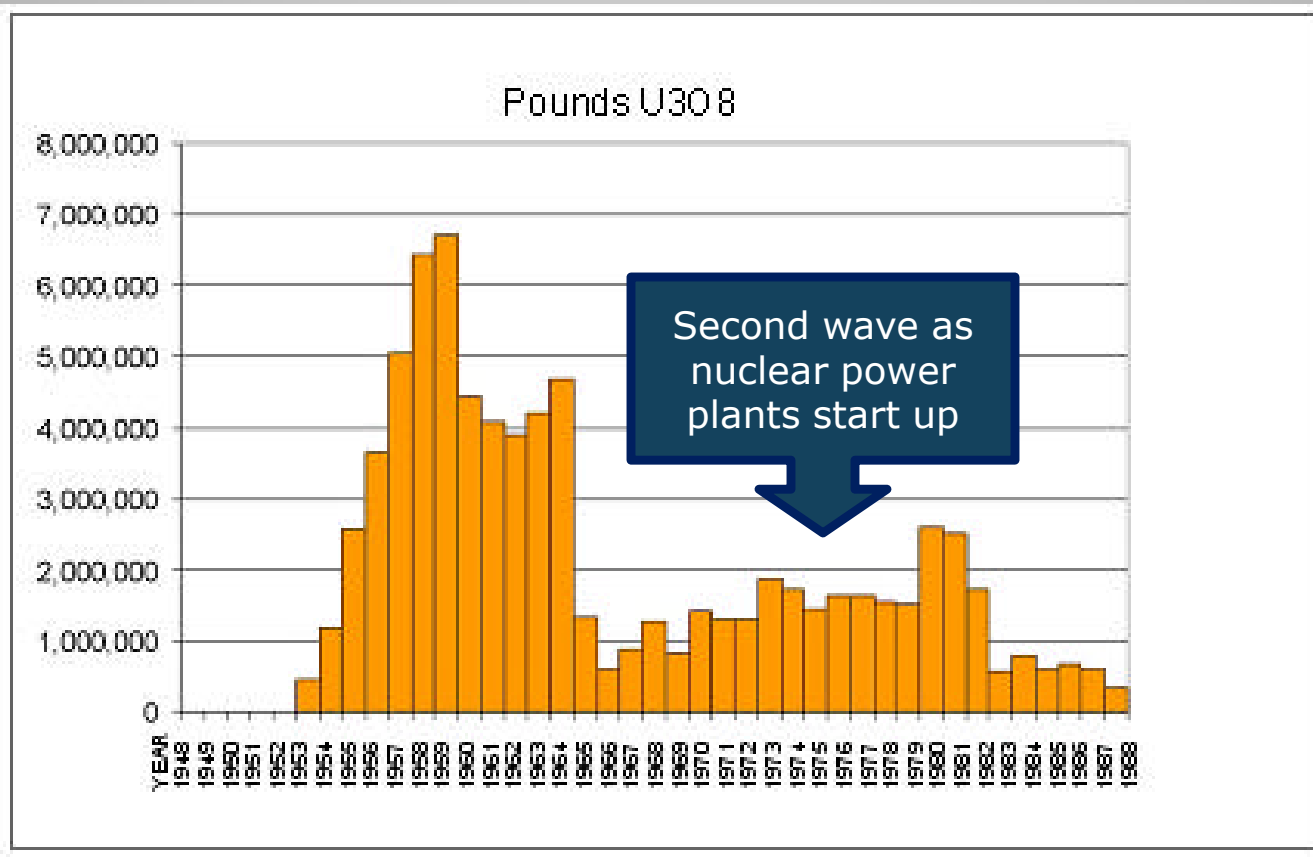
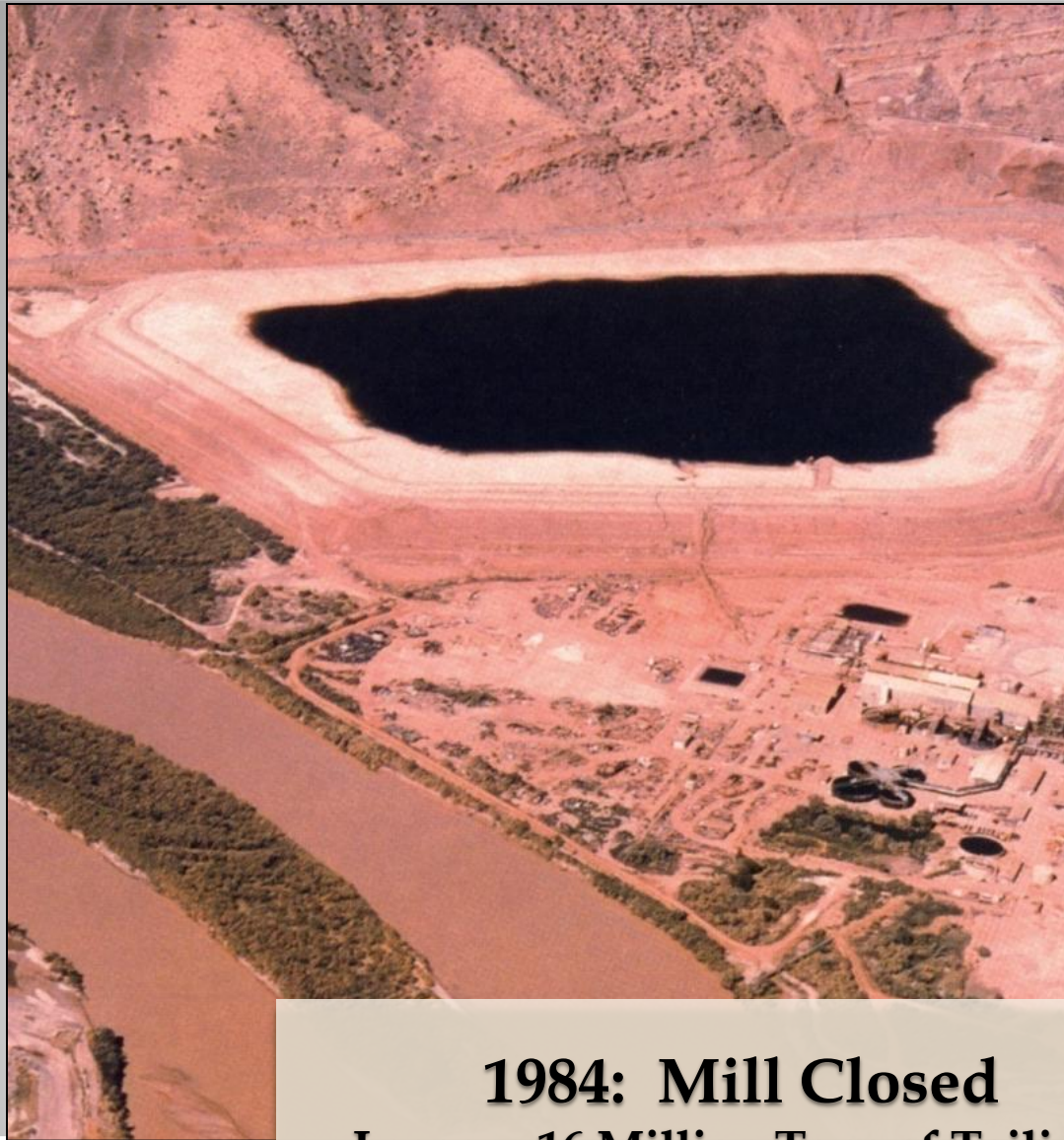


Chart from **Lisbon Valley Uranium Project Technical Report**
For BZU Minerals Ltd., 2005



We think of the tailings as a “pile” but it was actually a “tailings pond” until most of the fluids were removed later. The pond was not lined so the chemicals and heavy metals seeped into the ground water.

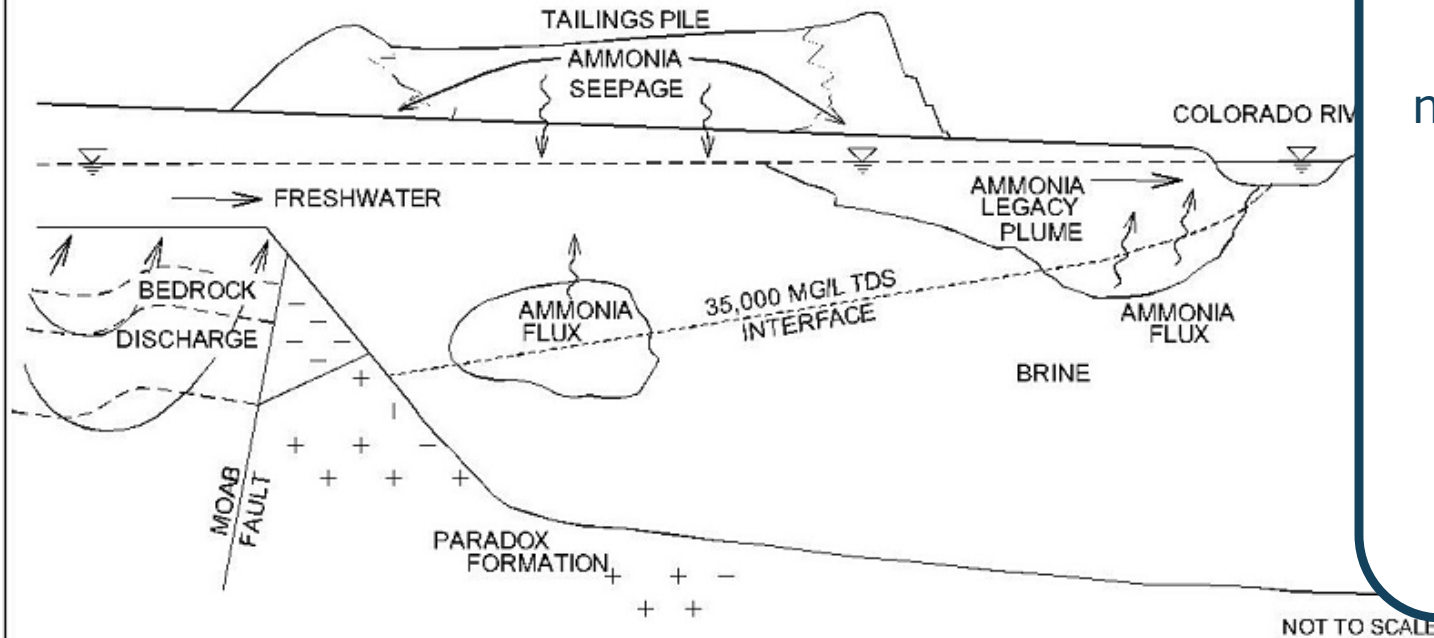


1984: Mill Closed
Legacy: 16 Million Tons of Tailings

Photo courtesy of DOE



Ground Water Contamination



DOE started a Ground Water Interim Action (GWIA) in 2003 to intercept contamination migrating to the river.

Today many wells extract contaminated water and others inject a freshwater "curtain".

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X0222600

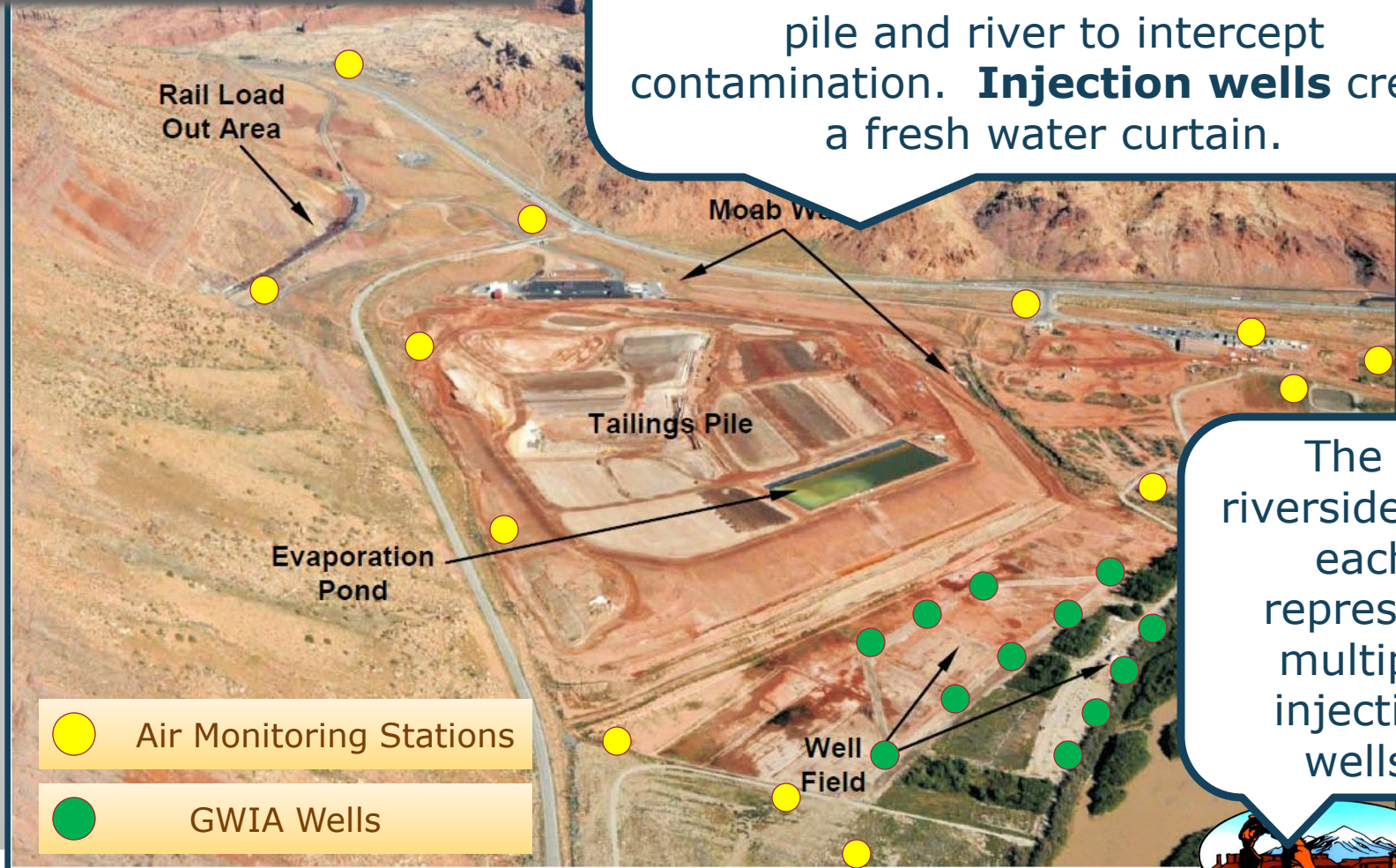
2001: Site to DOE
2003: GWIA Started

Figure courtesy of DOE



2009: First Tailings Shipment

Air monitoring stations are used on- and off-site to measure impacts to the employees and public. A grid of **extraction wells** is used between the pile and river to intercept contamination. **Injection wells** create a fresh water curtain.



The 4 riverside dots each represent multiple injection wells.

Photo courtesy of DOE



Air Monitoring Results

	Hazard	Guideline	Sites	Offsite
Radon	Inhalation risk	3.7 pCi/L average	1.4 – 2.3	0.7 – 1.7
Gamma	Dosage risk	182 mREM per year	98 – 187	82 – 121
Dust	Inhalation risk	10 mREM per year	1.5 – 5.1	0 – 0.2

- ❑ Background levels 0.7 pCi/L and 82 mREM near Moab, 0.9 pCi/L and 91 mREM near Crescent Junction
- ❑ EPA Radon indoor guideline 4 pCi/L
- ❑ Moab: 13 on-site monitoring stations, 14 off-site
- ❑ CJ: 7 on-site monitoring stations, 2 off-site



Guidelines are for public exposure.
NRC Occupational Dose Limit is
5,000 mREM per year.

The guidelines are 3 picoCuries per Liter and 100 milli-Roentgen Equivalents in Man above local background. Sites and Offsite values are averages of annual results. "Dust" guideline is absolute.



2008: DOE Preparing to Move Tailings

Effective GWIA

	Hazard	Guide	On Site	River	Intercepted by Wells
Ammonia	Habitat toxicity	FWS: 3 mg/L	50 - 500	0.4 - 2	780,000 pounds
Uranium	Heavy metal	SDWA: 30 µg/L	44 - 10,000	About 8	3,800 pounds

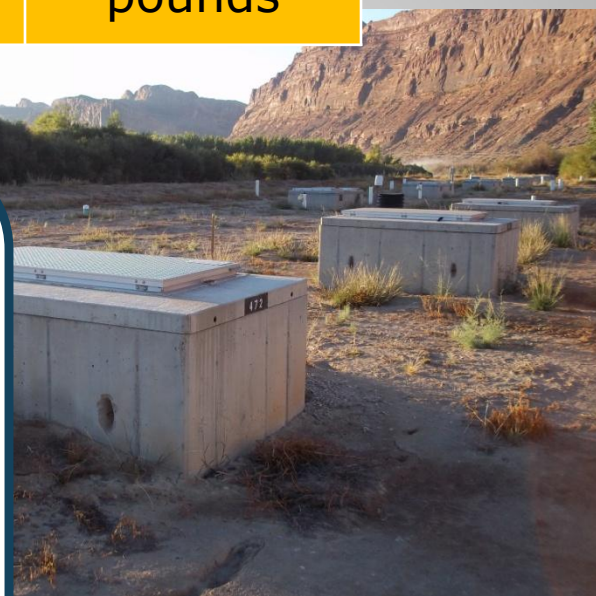
FWS = U.S. Fish and Wildlife Service
SDWA = Safe Drinking Water Act

Project team does not use SDWA but rather an UMTRA limit of 44 micrograms uranium per liter for onsite ground water remediation.

“On Site” values are for ground water.

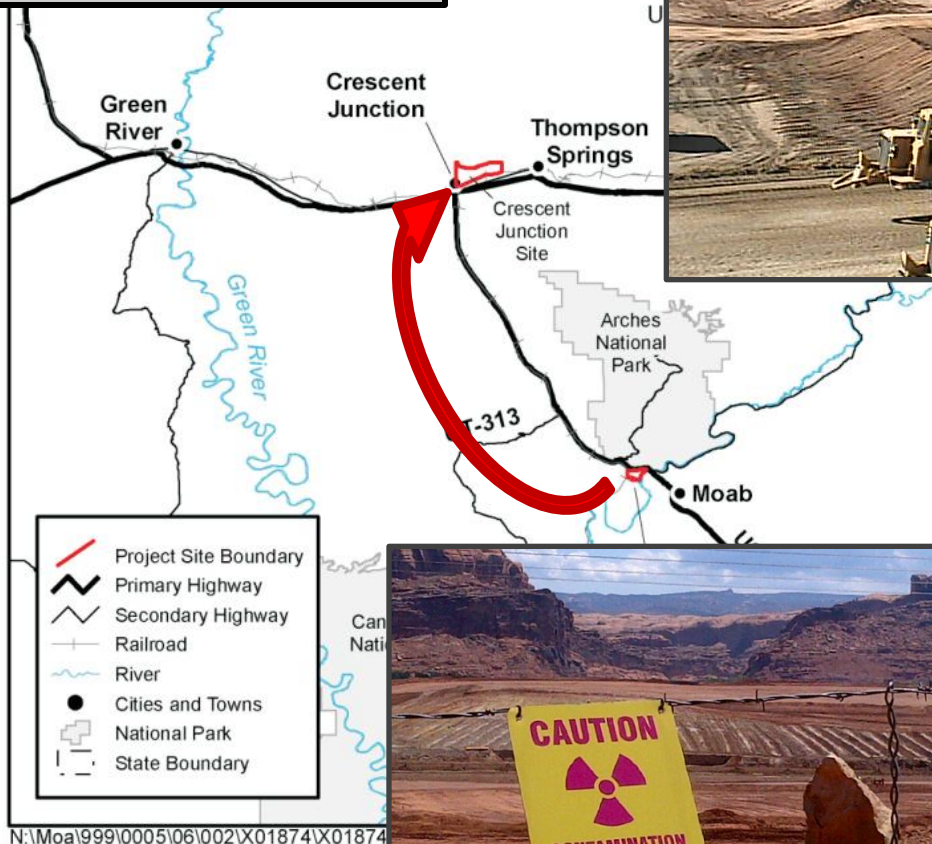
Ammonia is toxic to hatchlings of endangered fish species for several months each year when the side channel serves as habitat.

Uranium has toxicity as a heavy metal and could impact water used by 25 million people downstream. Uranium levels in the river are about the same immediately upstream and downstream of the Project site. The Safe Drinking Water Act limit applies to municipal water supplies.



Injection Wells: DOE Photo

Tailings Disposal



N:\Moab\999\0005\06\002\X01874\X01874

Disposal Cell, Crescent Jct



Grand Junction



I inspect the disposal cell site monthly to confirm compliance with the Conditional Use Permit. Seventeen citizens have visited the site with me so far. Contact me if you want to go also.

I am on duty at the mill site every Wednesday to facilitate access for the Project team and to monitor for CUP compliance. You must be part of a DOE-approved tour group to visit the mill site.



Mill Site, Moab

Tailings Loaded in Containers, Shipped by Rail



Empties Inbound

Photo from Salt Lake Tribune

Video from crane control cab was played here, showing container being transferred from truck to train.



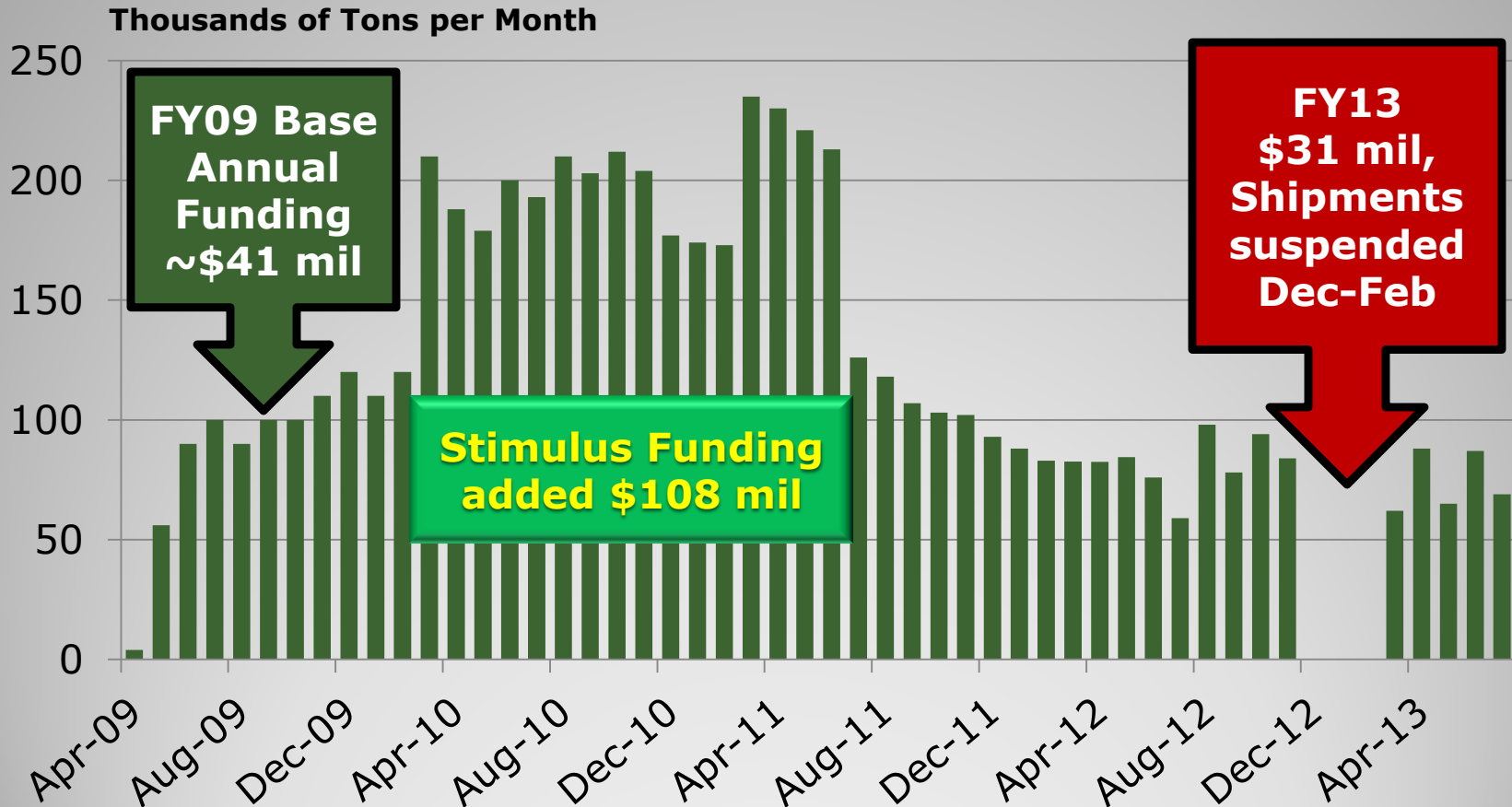
Full Containers Outbound

Photo from DOE

Containers sealed and
exteriors decontaminated
for both trips



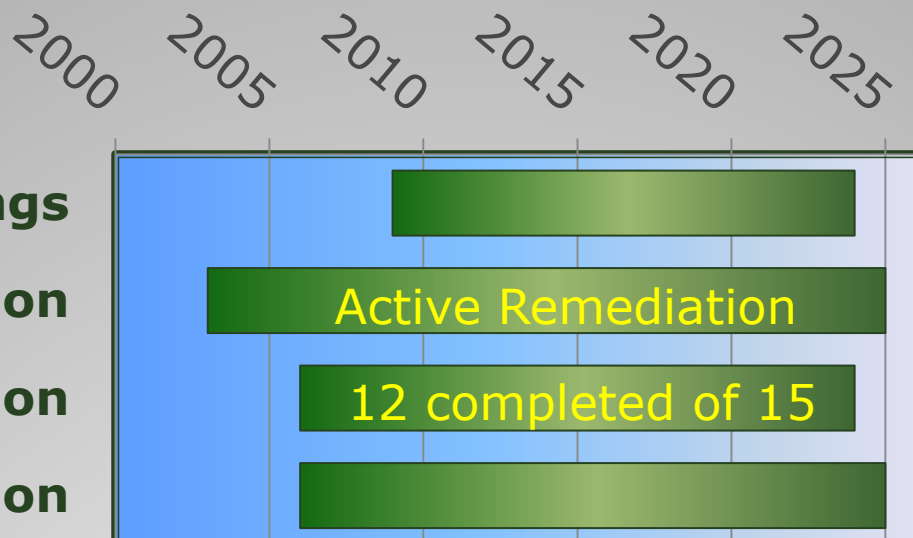
Funding Equals Progress



38% of Tailings Removed So Far

Project team:
timelines and activities
at future funding
levels are tentative.

Move Tailings
GW Remediation
VP Remediation
Site Reclamation



Expected Timelines

- **FY13 allocation \$31 million**
 - 9 months @ 4 days per week
 - 650,000 tons contracted
- **FY14 President's Budget Request \$36 million**
 - 12 months @ 4 days per week
 - Capacity estimated at 870,000 tons

Projected end-dates are estimates and depend on funding levels. Of 172 Vicinity Properties (VPs) identified, 15 needed remediation, final 3 when funding allows. Project will publish final notice before ending VP work.

NOTE: During Continuing Resolution, spending is limited to 1/12 previous annual budget per month.



Moab Tailings Project Steering Committee

- **Local Stakeholders**

- County Council
- City of Moab
- Thompson Springs
- Travel Council
- Road Department
- Water and Sewer
- Community Development
- Emergency Management
- The Nature Conservancy
- One At-Large Member

MTPSC was established by County Resolution to monitor the project, provide recommendations to Council, discuss and develop future site uses (see Res 2992).

- **State of Utah**

- Environmental Quality
- Workforce Services
- Sovereign Lands

- **Federal**

- BLM
- NPS



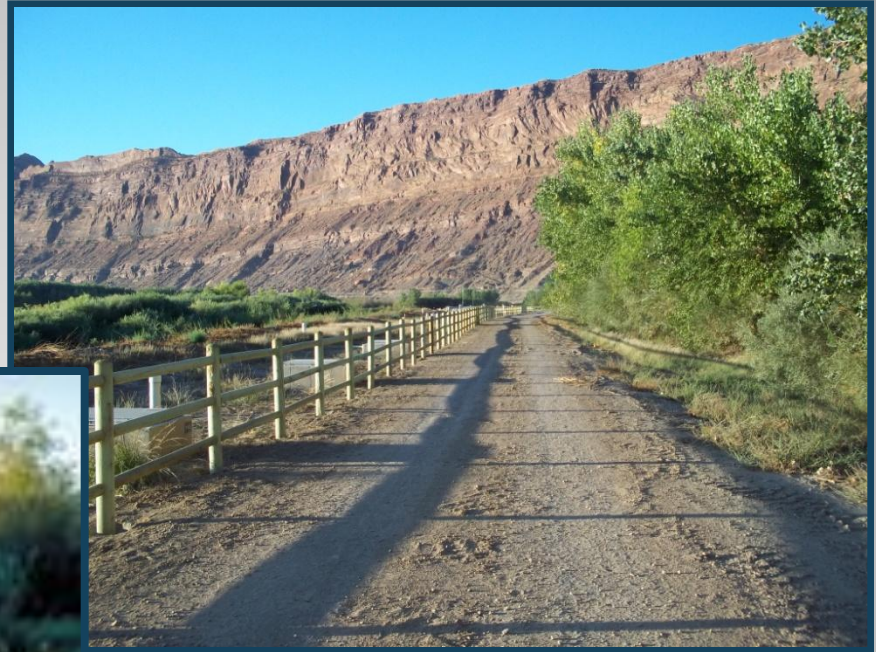
DOE might decide not to turn over site for public uses and thus might determine other uses for mill site.

Future of the Mill Site

“Beneficial public uses” to be determined by stakeholders and public input



A portion of the mill site has been contoured to defend the well field from major flood events. Thus a few acres could be seasonally swampy, similar to parts of the Matheson Wetlands across the river.



Millsite Riverside Trail

Photo courtesy of DOE

Matheson Wetlands

Photo courtesy of The Nature Conservancy



Commonly Submitted Ideas

- Concert/event venue
- Shuttle hub for Arches NP
- Fitness/recreation/nature trails
- Commercial development (resort, restaurants, tour companies, etc.)
- Combined Federal facility for BLM, NPS, GS, FS
- Clean energy facility (solar, wind)
- Golf course and sports fields
- Public beach and boat ramp

**Learn more and submit your comments to
Site Futures Committee:
www.moabtailings.org/sfc.htm**



**Next Public
Workshop
September 18
6 PM
Grand Center**

US Geological Survey (GS), US Forest Service (FS), National Park Service (NPS) and BLM could reduce costs by sharing a facility, freeing several buildings around Moab for commercial use.



For More Information

- www.MoabTailings.org
- www.gjem.energy.gov/moab
- www.GrandCountyUtah.net
- **Grand County UMTRA Liaison:**
435-259-1795 (Tue, Thu)
435-719-2811 (Wed)
or Ishenton@grandcountyutah.net

