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
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.
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.”
Nuclear Superpowers in Cold War

Truman Doctrine, 1947
Western Bloc supports anti-Communist forces

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.

Source: Raye C. Ringholz, historytogo.utah.gov
Prospecting Evolves

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.

Where’s the vanadium? Where’s the uranium?

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

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

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.
Moab Became a Boomtown

Main Street, 1951
Population 1,100

Main Street, 1956
Population 6,000

Photos courtesy of Museum of Moab
Boom and Bust
Yellowcake from Lisbon Valley Ores

Second wave as nuclear power plants start up

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
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”.

2001: Site to DOE
2003: GWIA Started
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.
### Air Monitoring Results

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Guideline</th>
<th>Sites</th>
<th>Offsite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radon</td>
<td>Inhalation risk</td>
<td>3.7 pCi/L average</td>
<td>1.4 – 2.3</td>
</tr>
<tr>
<td>Gamma</td>
<td>Dosage risk</td>
<td>182 mREM per year</td>
<td>98 – 187</td>
</tr>
<tr>
<td>Dust</td>
<td>Inhalation risk</td>
<td>10 mREM per year</td>
<td>1.5 – 5.1</td>
</tr>
</tbody>
</table>

- 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

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.

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

2008: DOEPreparing to Move Tailings
### Effective GWIA

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Guide</th>
<th>On Site</th>
<th>River</th>
<th>Intercepted by Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ammonia</strong></td>
<td>Habitat toxicity</td>
<td>FWS: 3 mg/L</td>
<td>50 - 500</td>
<td>0.4 - 2</td>
</tr>
<tr>
<td><strong>Uranium</strong></td>
<td>Heavy metal</td>
<td>SDWA: 30 μg/L</td>
<td>44 – 10,000</td>
<td>About 8</td>
</tr>
</tbody>
</table>

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

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“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.

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Project team does not use SDWA but rather an UMTRA limit of 44 micrograms uranium per liter for onsite ground water remediation.
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.
Tailings Loaded in Containers, Shipped by Rail

Full Containers Outbound
Photo from DOE

Containers sealed and exteriors decontaminated for both trips

Empties Inbound
Photo from Salt Lake Tribune

Video from crane control cab was played here, showing container being transferred from truck to train.
Thousands of Tons per Month

FY09 Base Annual Funding: ~$41 mil

Stimulus Funding added $108 mil

FY13: $31 mil, Shipments suspended Dec-Feb

38% of Tailings Removed So Far
- **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

**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

- State of Utah
  - Environmental Quality
  - Workforce Services
  - Sovereign Lands

- Federal
  - BLM
  - NPS

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

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