Lisbon Valley Uranium Mill
Lessons Learned

April 22, 2022

Stevie Norcross, PhD, Assistant Director

UTAH DEPARTMENT *of*
ENVIRONMENTAL QUALITY
WASTE MANAGEMENT
& RADIATION CONTROL

The Utah Division of Waste Management and Radiation Control, Uranium Recovery Program

- 1984 - Utah became an Agreement State and assumed regulatory responsibility for the control of radioactive materials
- 2004 – Utah was authorized by the NRC to administer the Uranium Recovery Program

The Uranium Recovery Program Team

Phil Goble, Program Manager
Dean Henderson, Hydrogeologist
Ryan Johnson, Health Physicist
Heather Mickelson, Engineer
Tom Rushing, Hydrogeologist
Russ Topham, Engineer

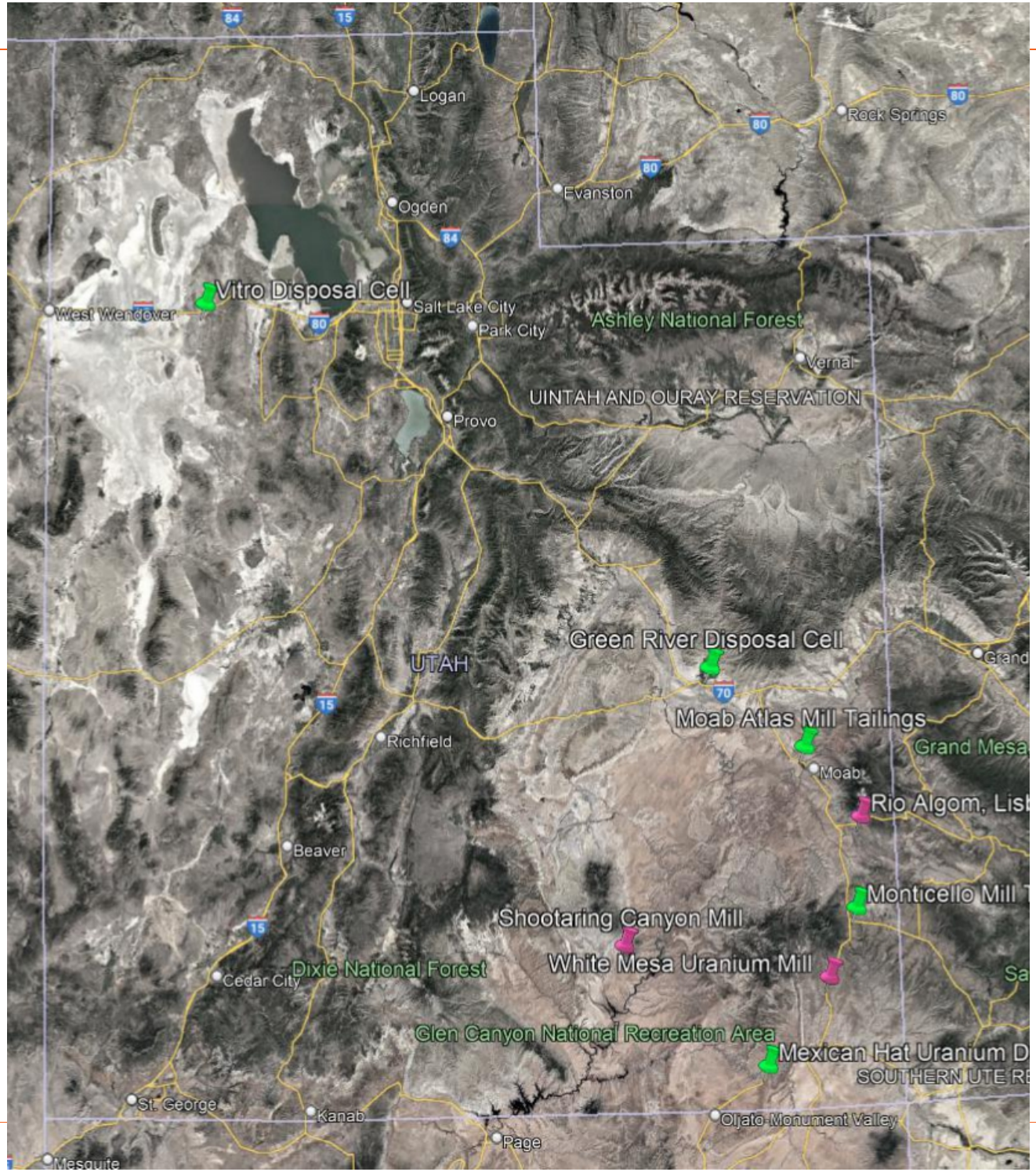
Three Out of Eight Uranium Mills in Utah are Regulated by Utah

Regulated by the State of Utah:

1. Former Lisbon Valley Mill, Rio Algom: Standby Status (Decommissioned with embankment cover and groundwater issues.)
2. Shootaring Canyon Mill, Anfield Resources Holding: Standby status
3. White Mesa Mill, Energy Fuels Resources Inc (EFRI): Active

Regulated by the U.S. Department of Energy (DOE):

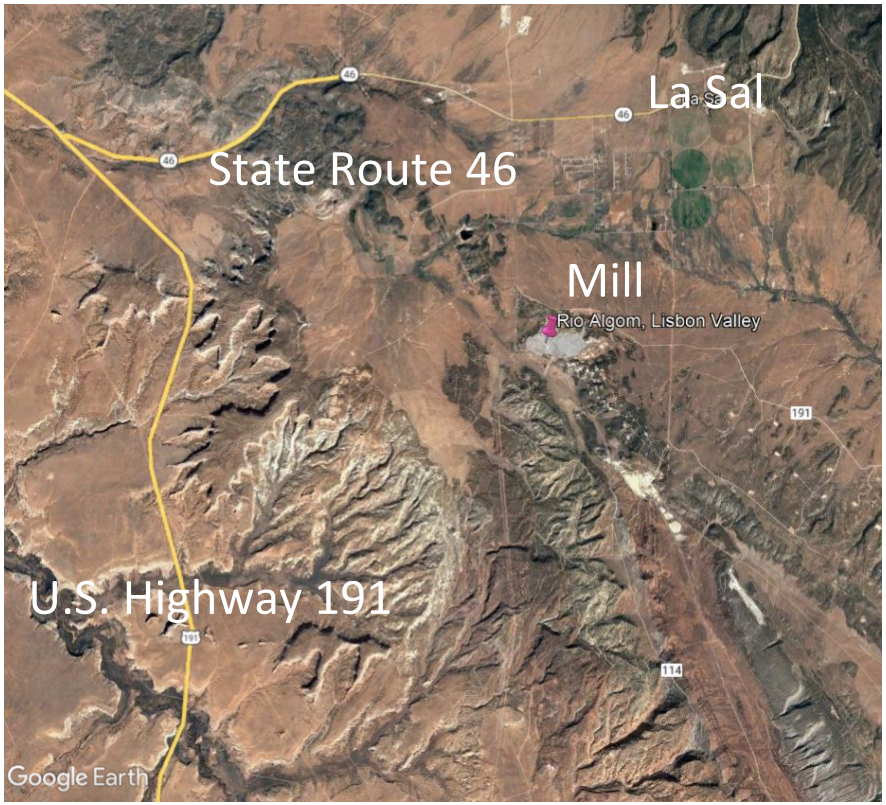
1. Former Salt Lake Processing Site, Vitro Chemical: Utah Cooperator Status
2. Green River, Utah Disposal Site: Utah Cooperator Status
3. Monticello, Utah Disposal and Processing Site: Decommissioned
4. Mexican Hat, Utah Disposal Site: Decommissioned
5. Former Atlas Moab Mill: Undergoing Remediation



Pink Pins = Utah Regulated Sites

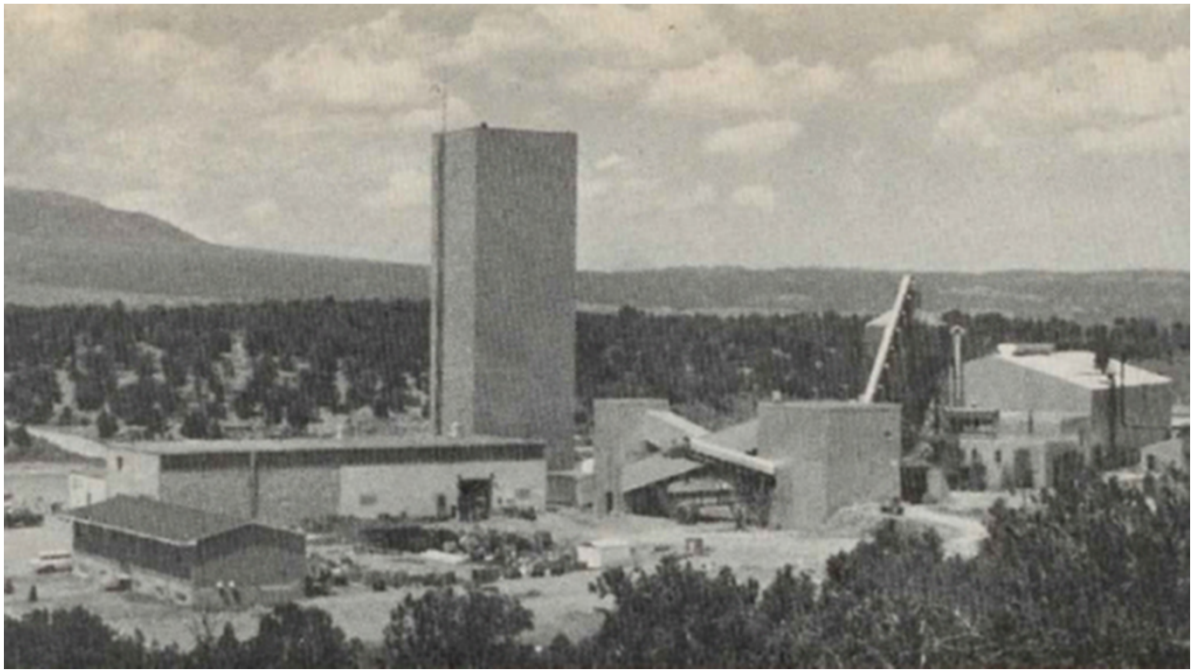
Green Pins = DOE Regulated Sites

The Former Lisbon Valley Uranium Mill is Located 3.5 Miles Southwest of La Sal, Utah



Lisbon Mining and Milling was Active from 1972 - 1989

- Mined from the Chinle Formation, on the downdropped, northeast side of the Lisbon Valley Fault
- Milling used an alkaline leach process
- Produced over 13 million pounds of yellowcake (U_3O_8)



Former Lisbon Valley Mill

The Lisbon Valley Uranium Mill Was Under an NRC License Until 2004

- A groundwater contamination plume was discovered in the late 1980's.
- Corrective action plan (CAP) was operated from 1990 to 2004. Evaluation results showed no decrease in plume concentrations.
- Rio Algom submitted an application for Alternate Concentration Limits (ACL's) to the NRC based on groundwater modeling. Modeling showed no predicted ACL exceedances for 200 years.
- ACL's made effective by the NRC in License Amendment 67 (July 6, 2004) just prior to regulatory transfer to the State of Utah.
- Upper and lower tailing impoundments covers were approved by the NRC prior to Utah regulation.

Utah Regulatory Oversight Began August 16, 2004.

- Utah issued a license to the Mill on March 18, 2005.
- In 2006, License Amendment 2 required some ACL's be revised to reflect groundwater modeling.
- In 2010 – 2011 a number of wells exceeded the ACL limits.
- In 2015, Utah requested a Hydrogeological Supplemental Site Assessment (HSSA) to characterize the extent of the groundwater plume.
- Numerous additional wells were installed to assist with this characterization.

Lisbon Valley Uranium Plumes

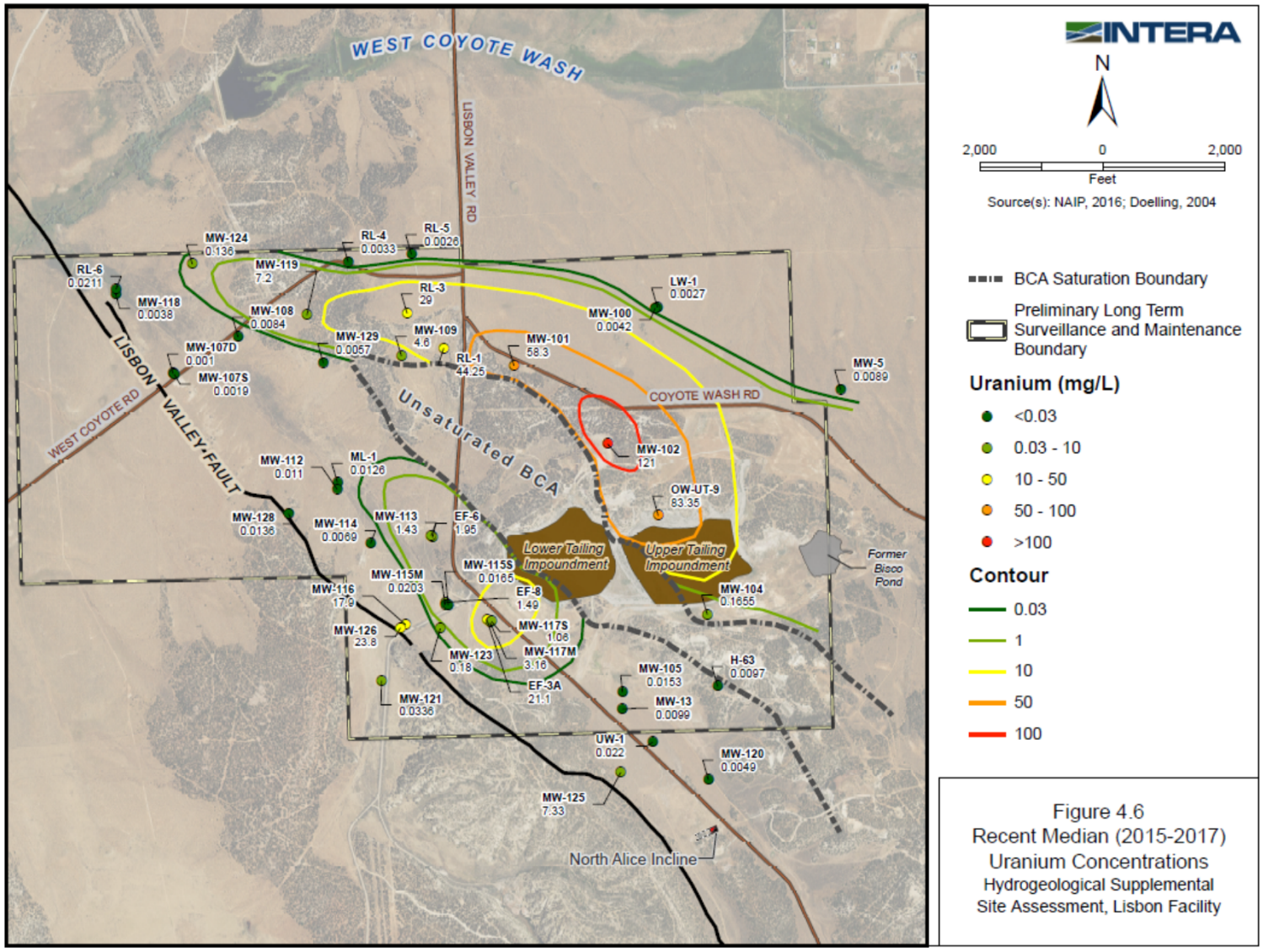


Figure 4.6
Recent Median (2015-2017) Uranium Concentrations
Hydrogeological Supplemental Site Assessment, Lisbon Facility

- Two plumes have been identified.
- The plumes flow west, northwest.
- The plumes have exceeded the long-term surveillance and maintenance (LTSM) boundary.

Utah and the Licensee Have Continued to Investigate and Characterize the Plumes

- In 2019, a Stipulation and Consent Agreement required an updated Hydrogeological Supplemental Site Assessment Report (Phase 4), a Background Evaluation Report, an update defining the source of the plume.
- Recent findings and discussions have determined that the impoundment covers are not preventing discharge of tailings into the groundwater. Cover does not appear to be constructed according to approved design.

Cover repair, continued mitigation, and continued groundwater modeling is necessary

Lisbon Valley Lessons Learned

- Groundwater modeling and actual measurements go hand in hand. Models should be revised and reviewed as additional, empirical data is obtained.
- ACL's must be established based on site-specific information. Established limits must be conservative in order to protect groundwater.
- Wells necessary to continue monitoring and ensure groundwater protection should be maintained. Do not abandon wells that may be useful for future work.

- Cover design must be built to prevent continued contamination (turn off the source). A slope is necessary to prevent water infiltration.
- Regulators must be present during cover construction to ensure the cover is constructed according to the approved design.