

Executive Summary

New Mexico was a principal site of uranium mining in the US from the 1940s until the collapse of demand in the 1990s. Much of the mining activity was in northwestern New Mexico, on and neighboring Native American tribal lands, particularly those of the Navajo Nation.

A legacy of uranium mining is severe environmental contamination, including approximately 1100 mining, milling, and exploratory drilling sites in northwest New Mexico, as well as extensive groundwater contamination. Native, especially Navajo, communities have suffered the majority of the consequences of this contamination. Native populations, many of whom were employed in uranium mining operations, also suffered severe economic dislocation following the collapse of the industry.

Significant measures to address the environmental impacts of past uranium mining have emerged only recently. Remediation has been complicated by the difficulty of identifying the parties who are legally responsible for the environmental damage, as control of mining operations and attached leases frequently changed hands during repeated cycles of boom and bust. Moreover, processes necessary to fund and oversee remediation work have been established only over the past two decades. A hopeful development was the 2015 Tronox settlement, under which the US Environmental Protection Agency (EPA) secured more than \$1 billion to fund the cleanup of 56 sites on or near territory of the Navajo Nation, including the Quivira mine sites and the Shiprock Uranium mill site in northwestern New Mexico.

Advantages and Challenges of Focusing on Uranium Mine Remediation

BBER conducted over 75 interviews with unique individuals, agencies, or companies working in fields related to uranium mine remediation, regionally. In these interviews, professionals commonly described a willing, able workforce with only piecemeal employment opportunities available. The mismatch of opportunities with skills is a key challenge the state will face when engaging in uranium mine remediation activities. However, from a New Mexico economic development perspective, given the significant levels of expertise in this state concerning nuclear materials, mining, engineering, health, and legal and legislative matters, developing a model for bringing all these resources together to address the various issues surrounding uranium mine cleanup could represent not only immediate benefit to residents and businesses in New Mexico but could also parlay this model into a significant new business sector. As we continue to see fluctuations in the extractive energy economy's stability, it is essential to diversify our economic development priorities. In those regions, such as northwestern New Mexico, most dependent on energy resource development, planning for environmental remediation work would also reposition our already experienced workforce for possible economic shifts.

As mines move into remediation and reclamation, work will need to occur on a potentially massive scale. Many of the individuals previously employed by the mining industry already have labor skills that could transition to environmental remediation work but may need reorientation or training to complete that transition. Working in uranium mine cleanup requires specific training, but some of the base-level skills developed across the mining industry could be transitioned to work in environmental remediation.

Mining jobs fluctuate with the market for natural resources, but environmental remediation jobs have the potential to endure over time. We know that cleanups for even the fraction of assessed mines will require multiple years of intensive labor in addition to follow-up monitoring into the foreseeable future. Beyond what we already know, hundreds of mines in New Mexico remain unassessed for remediation actions. Work will

depend on the intensity and speed of cleanup actions, which depends on the funding of cleanup efforts, but has the potential to last generations addressing New Mexico's mines alone.

Beyond New Mexico, a sector focused specifically on environmental remediation with specialized expertise in radioactive cleanup could export its industry nationally and internationally. Uranium mine sites exist all around the world. Further, there are active uranium mines that someday will close--either because demand and economics don't justify the continuation of the mines or because the deposits are sufficiently depleted as to render these mines uneconomic, compared to other sites with greater reserves. With the inclusion of environmental remediation as a priority industry, New Mexico could develop a skills list for businesses and individuals trained in uranium mine cleanup work and help increase our educational programs alongside in-state corporate growth. This focus could also make New Mexico a place for international education, attracting students from other countries to learn from our professionals at our state institutions.

Limitations of the Study

This report is limited in three regards.

- ▼ The economic impact analysis (EIA) is an exercise to illustrate how cleanup funds would be distributed throughout the New Mexico economic system. It is not predictive of funds secured under current or future settlements or those spent by responsible parties under other consent decrees. The EIA is presented in this document in a manner that allows the findings to be applied to new settlements.
- ▼ Funding for uranium cleanup is not always consistently available, nor is it always usable by state agencies. Further, available funding may cover multiple states and mine sites. For example, the current funding from the Tronox settlement covers uranium cleanup sites on or near the Navajo Nation not only in New Mexico, but in Arizona as well, and is being managed by the EPA. The analysis included in this document is limited to sites located in New Mexico, though again it is presented in a way that allows for application to other sites.
- ▼ Most importantly, this document addresses only the immediate or direct economic impacts of uranium waste cleanup and does not address longer term and/or broader impacts of contamination, such as provision of community health services or the benefits of a healthier workforce.

Recommendations to Develop Future Opportunities

In all, the findings of this report are based on more than 75 in-depth interviews, cost-estimate and invoice data from government agencies conducting uranium mine cleanups, geographic, geologic, and historical information about the nature and scope of uranium mining in New Mexico. In the report, we present twelve recommendations to systematically address challenges the State currently faces in tackling uranium mine remediation. They are presented not necessarily in order of priority but as a logically structured program to promote the cleanup of uranium sites.

Addressing these challenges will require the involvement of *all* stakeholders: federal, State and local governments, Native nations, private landowners, private sector firms, educational institutions, and community organizations; however, the recommendations here are designed for State action, as the State of

New Mexico sponsored this research project. Recommendations are presented not necessarily in order of priority but as a logically structured program to promote the cleanup of uranium sites.

Specifically, based on the findings of this comprehensive study BBER offers four categories of interrelated policy recommendations that may be undertaken by the State of New Mexico:

1. Overall planning recommendations
 - Create a central repository for all documentation related to uranium mining, employment, remediation, ownership, and land status.
 - Identify and engage key stakeholders who will be most impacted by uranium mine remediation activities.
 - Develop a unified plan with key stakeholders, creating a culture of communication and collaboration among the various entities impacted.

2. Addressing challenges faced by state businesses may include:
 - Establishing a specialized small business assistance center to maintain an up-to-date listing of contracting opportunities in environmental remediation and assist in navigating the paperwork and certification processes both before and while managing federal contracts.
 - Creating a shared workspace or workspaces for business networking and coordination. These spaces could also serve as a repository for contact information, both for businesses able to do remediation work in New Mexico and individuals with certifications and skill sets appropriate for the industry. They would provide centralized locations for notification of upcoming RFPs and potential subcontracting opportunities.
 - Creating a facility to provide support or guarantee for bonding and capital requirements for small New Mexico businesses.

3. Addressing challenges faced by the state's workforce may include:
 - Advancing consistent safety certification training programs for qualified workers.
 - Facilitating collaboration among higher education institutions to ensure research is being shared and institutional overlap is minimized.
 - Creating opportunities for worker placement locally, including the development of increased networking events.

4. A focus on the development of future opportunities
 - Prioritize environmental remediation as a target industry, focusing specifically on specialized expertise in radioactive cleanup.
 - Generate pathways for greater innovation by bringing together creative experts across industries.
 - Continue research on the effects of unremediated uranium mines beyond economic impacts, including, but not limited to cultural impacts, health impacts, and validity of metrics used for cleanup standards.

New Mexico's uranium mine issues may seem too big to tackle, but with the proper support, the State has the ability to leverage existing expertise in environmental remediation; thus, utilizing our existing resources for economic development and creating an industry to address this seemingly insurmountable problem.