Constraints

This chapter of the report discusses the constraints on uranium mine cleanup efforts, outlining the limits that may seem insurmountable, but have many actionable and straightforward remedies. A comprehensive state plan could develop lasting capacity but requires significant input from all relevant stakeholders.

To this end, we break down the constraints into four main categories, which correspond to the recommendations we offer in the next chapter of this report:

- Planning and administrative issues
- Challenges to businesses
- Challenges to workforce development
- Factors limiting the scope of cleanup efforts

5.1. Planning and Administration

Efforts by the State of New Mexico to remediate contamination related to uranium mines have been stymied by a lack of consistent, transparent, and well-referenced information; complex jurisdictional and ownership status of the mines; and the absence of a strategic plan that includes a clear timeline. Because of these challenges, the State is too often reactive to unanticipated initiatives advanced by other stakeholders.

As discussed in previous chapters of this report, not all uranium mine sites fall under US EPA jurisdiction. Remediation actions on various sites throughout the southwest have been enacted by state governments,[53] tribal governments,[54] the US Forest Service,[55] the Bureau of Land Management,[56] and the US EPA. Tracking the remediation work that has been done by each of these entities and linking it to sites and costs is laborious. Further, though some communication may be happening between agencies, it is not clear that each player knows what the others have done. There is a significant need for an information exchange and clearinghouse to ensure the work is being done in a comprehensive and cost-effective manner and interagency cooperation.

5.1.1. Informational Barriers

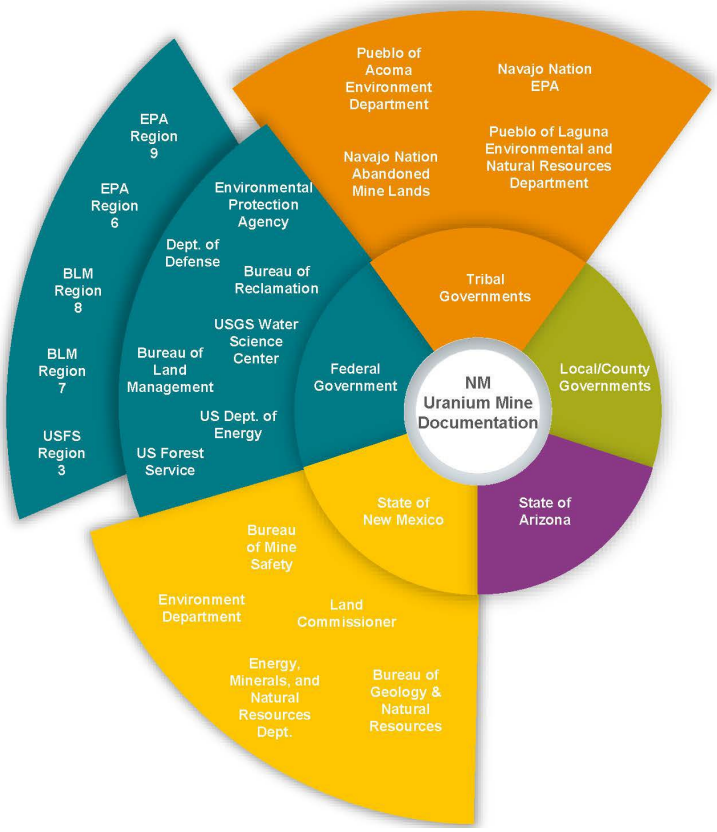
New Mexico lacks a single transparent, well-referenced repository of information. Rather, numerous federal, state, and tribal agencies, educational institutions, and community organizations have maintained information independently, with little sharing between them. The chart below identifies only a subset of organizations that generate or provide access to information critical to an effective program to cleanup uranium sites in New Mexico.

[53] https://deq.utah.gov/waste-management-and-radiation-control/uranium-mills-and-disposal-facilities
[54] https://www.aml.navajo-nsn.gov
[55] https://www.fs.usda.gov/science-technology/geology/aml
[56] https://www.blm.gov/programs/public-safety-and-fire/abandoned-mine-lands

This scattering of information is problematic because it is:

1) costly – any effort to address any aspect of the problem begins with an expensive, time-consuming processing of collecting and organizing data and information, often repeating the work of someone who has come before;
2) partial or contradictory; access to only a subset of information reinforces the tendency of individual organizations to approach the work from a narrow, siloed perspective, often failing to account for concerns of other stakeholders;
3) not up-to-date: the regulatory environment is complex and almost constantly changing.

Figure 5.1. Sources of Government Information Used for the Research Presented in this Report by Agency



A significant amount of time for this study went into the compilation and verification of documents explicitly related to uranium mine cleanup efforts. The reference section in this report illustrates the beginning of the work needed to be done to better organize and consolidate documentation pertaining not only to the cleanup efforts on these mines but also the histories, academic studies, technical reports, and other resources that pertain to uranium mining in New Mexico.

5.1.2. Lack of Process for Identifying Liability and Specifying Action

Cleanup project timelines present significant constraints; however, the State can take administrative actions to mitigate industry and workforce development challenges. Interagency coordination is essential for identifying unremediated mine site liability and specifying future cleanup plans. Cooperation and transparency in these processes could shorten the timelines and facilitate the deployment of a trained workforce to tackle remediation tasks.

As described in earlier chapters of this report, holding corporations and government entities responsible for cleanup stems from the difficulty of tracking down the potentially responsible parties (PRPs) of abandoned mine sites. Many of these sites have repeatedly changed ownership over time, resulting in difficulty determining the responsible party/parties for remediation. Under CERCLA and subsequent executive orders from Presidents Reagan and Clinton, the US EPA is responsible for tracking down potentially responsible parties.[57] However, the EPA's PRP Search Team was only formed in

[57] https://www.epa.gov/sites/production/files/2015-10/documents/prpbasictrainingmanual2015.pdf

2011 and exclusively focuses on CERCLA designated sites, excluding many uranium sites. Working with this search team to design a methodology for New Mexico's non-CERCLA designated sites would improve our ability to hold corporations financially responsible for cleanup.

Further, as the US Department of Energy was the primary purchaser of uranium from 1947-1973, uranium producers point to the government's liability for cleanup as well.[58] This often leads to split revenue streams for cleanup and more complications in asserting state control over funds. Litigation can slow remediation efforts, creating an uncertain timeline for actual cleanup to begin. Even with funding available, the process of addressing uranium mine sites can take decades. These delays make job creation and retention difficult, and the continued living conditions of those near the mine sites unacceptable. The slowdown of cleanup efforts is an economic, environmental, and social concern that can be partially remedied by a more robust State-led process for identifying liability and specifying action.

Finally, remediation efforts can be hindered by the inability to find solutions for cleaning up various sites. Different stakeholders will have differing views on the extent and outcomes of a cleanup project. Although this point fits into the discussion on innovation, it is also important to note here, as the transparency of how cleanup decisions are made often feels out of local communities' hands, despite public hearings and comment sessions. BBER repeatedly heard that the outreach efforts, especially from the EPA, often felt hollow rather than stemming from meaningful engagement with the community to find solutions for contaminated lands.

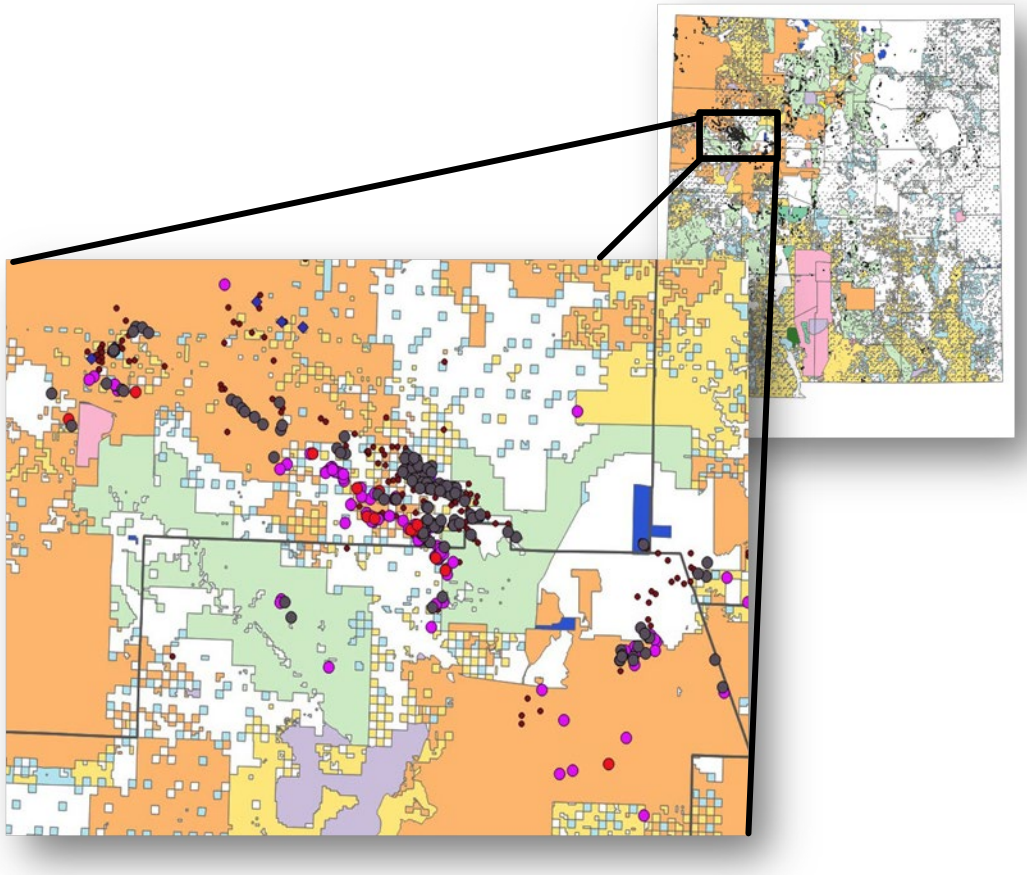
5.1.3. Land Ownership and Intergovernmental Relations

A significant constraint holding back uranium mine cleanup involves both land ownership and intergovernmental relations. As discussed in the background section, many of these mines are located on the "checkerboard," land divided up into parcels that may be controlled by the Federal government, governments of the Native Nations, the State government, and private property holders. This impacts not only the ability to clean up the mines, as different jurisdictions may have additional requirements but the ability to access the mines and transport equipment and potentially waste from one jurisdiction across another.

The following map encompasses one small portion of the Grants Uranium Belt, focused on the border between McKinley and Cibola Counties. There are seven different land management agencies in this projection, each with its own regulations, and five types of uranium sites, each with its own technical challenges. Additionally, some of the uranium sites may overlap or cross jurisdictional boundaries, creating ownership, responsibility, and regulation problems. This sample cutout illustrates the complexity of addressing uranium mine remediation from a jurisdictional, technical, and geographic perspective and reinforces the need for interagency cooperation.[59]

[58] The role of the US Department of Energy in uranium production is discussed in the background section of this report.
[59] The full map and legend are found in the Background Chapter of this report.

Figure 5.2. A Small Section of New Mexico's Uranium Mines and Drilling Sites Overlaid on Jurisdictional Boundaries



For example, without prior consent from the Navajo Nation, it is against the law to transport radioactive materials across Navajo Nation lands. This restriction came as a result of the Radioactive and Related Substances, Equipment, Vehicles, Persons, and Materials Transportation Act of 2012. Although this legislation builds on the Diné Natural Resources Protection Act of 2005, which prohibits the mining and processing of uranium on Navajo Nation sites, it may also affect agencies' ability to remove radioactive waste from sites undergoing remediation.[60] Recognizing that the land division patterns play a major role in not only the solutions for remediation but the process of cleanup efforts themselves is a first step in seeing the importance of interagency and intergovernmental cooperation. No single entity or government can tackle this problem alone.

[60] http://www.navajonationcouncil.org/pressReleases/2015/Aug/NABI_adopts_plan_of_operation_for_Dine_Uranium_Remediation_Advisory_Commission.pdf

5.2. Business Challenges

The obstacles described in this section present difficult barriers for smaller companies wishing to join the bidding. The following factors determine a company's ability to bid and perform such work: organizational capacity, networks, and collateral/cash for bonding.

5.2.1. Organizational Capacity

Bidding on, winning, managing, and maintaining an EPA contract requires a high level of administrative and legal capacity, such as filing the necessary documentation in a timely and correct manner. The reporting requirements for these contracts present formidable barriers for small companies that have never had a Federal Government project. Small, local firms often lack the general back-office skills for meeting all of the reporting requirements.

5.2.1.1. Formal Barriers

Formal institutional barriers that create obstacles for firms to participate in uranium mine cleanup efforts often involve navigating contracts on multiple levels. This section describes some of the specific formal barriers raised by the smaller firms we interviewed for this study.

At the Federal level, the EPA requires potential bidders on such projects to be registered as a Federal Government Contractor through the System for Award Management (SAM)[61]. There are several requirements to determine eligibility as a contractor for federal contracts to be registered in SAM. Beyond complying with these requirements, companies seeking to bid on uranium mine remediation projects – in whole or in part – must demonstrate the capacity and experience in hazardous waste cleanup. More specifically, they must retain employees with the requisite training and certifications to address and handle materials related to these mine sites, such as the OSHA HAZWOPER training and certification, which we discuss in greater detail in the workforce challenges section.

Once accepted as a potential Federal Contractor, companies need to monitor federal contract announcement sites such as FedConnect,[62] which requires registering to be allowed to use the site to find federal contract opportunities. Active monitoring of EPA sites to find announcements regarding potential uranium mine cleanup opportunities may give companies an advantage.[63]

Beyond completing and complying with the requisite bid registration requirements, a company awarded a contract funded by the EPA must complete required assurances and certifications. While they may vary to some extent by Federal agency, many are necessary regardless of the Federal funding source. These documents may be 20 or more pages in length and, in some cases, require certification of the company's legal counsel and board to ensure they are authorized to engage in these kinds of projects. Again, the additional hurdles after being awarded a contract may prove to be more burdensome for small companies than the potential rewards from the project.

Further, since many of the uranium mine sites are situated within the Navajo Nation, registering as a potential vendor[64] with the Navajo Nation is critical. Successful bidders for work on the Navajo Nation are also encouraged to engage and work with a Certified Navajo Business. For those eligible to be considered a Certified Navajo Business, registration must be done through the Navajo Business Regulatory Department at the Division of Economic Development. For companies deemed to be interested bidders for Navajo uranium mine cleanup projects, the Navajo Nation has a list of interested

[61] https://www.sam.gov/SAM/
[62] https://www.fedconnect.net/FedConnect/Default.htm
[63] https://www.epa.gov/newsreleases/search/field_press_office/region09?filter=abandoned%20uranium%20contract
[64] https://www.surveymonkey.com/r/AUMInterestedParties2

bidders,[65] which provides information regarding potential partners for companies trying to enter into uranium mine cleanup on the Navajo Nation lands.

Finally, there are two Federal EPA Regions responsible for uranium mine cleanup in New Mexico. In general, US EPA Region 9 is responsible for overseeing and coordinating uranium mine cleanup on Navajo Nation Lands. However, there are other sites in New Mexico, not on Navajo Lands, mostly in the Grants Mining District area.[66] This area falls under the auspices of US EPA Region 6 for coordination and administration. This District also falls under the State of New Mexico Environment Department's jurisdiction and the New Mexico Energy, Minerals, and Natural Resources Department. As with bidding on the EPA and Navajo Nation contracts, bidding on State contracts generally requires bidding firms to be registered with the state as bona fide contractors capable of performing the work. There are in-state preferences for New Mexico resident businesses; thus, companies residing in New Mexico can and should become registered by the New Mexico Tax and Revenue Department.[67]

It is clear that any company wishing to compete for uranium mine cleanup work in New Mexico faces many institutional hurdles. Each one typically entails completing multiple applications and, in some cases, obtaining other identifying information before it is possible to qualify for the work. For small companies, the challenges may be insurmountable. Further, in areas such as the Grants Mining District, it is possible that a cleanup project may be in multiple regulatory jurisdictions and therefore requires coordination with numerous separate agencies.

The formal institutional barriers are formidable, but there is potential for the State to implement activities and policies that could help mitigate these challenges, which we discuss in the recommendations section.

5.2.1.2. Informal Barriers

In addition to the formal barriers, informal barriers create challenges for New Mexico companies seeking to participate in uranium mine cleanup activities. These barriers are generally related to how subcontracts are awarded and followed through on.

While the EPA clarifies during the bidding process that Native firms are prioritized for subcontracts on the Navajo Nation, many of these companies indicated little follow up beyond the first year to ensure that Navajo or Native-owned firms are meaningfully engaged in the cleanup work. Once the large firm has demonstrated to the EPA that the minority/local community/firm has been committed in the first year, it was reported to BBER that monitoring and enforcement seem to disappear. As one respondent noted, "once the contract is awarded and an EPA Environmental Protection Specialist takes on the local management of the contract, [there is] little concern for subcontractors as long as the assessment/cleanup is completed according to EPA specs. The Environmental Protection Specialist's role is to make sure the work is completed to EPA technical standards, not contractual standards regarding local involvement." This issue of monitoring subcontracts came up in more than one interview and is something worth further exploration by the relevant agencies.

Another informal barrier – although to some extent a formal barrier that agency regulations or mandates may require – is the "requirement" to accept the lowest cost bid. Two New Mexico contractors, who are recognized bidders on the qualified bidders list, voiced this sentiment, arguing that the policy needed to be reconsidered as it allowed larger companies to outcompete the smaller businesses.

Finally, BBER heard from several contractors who have worked or attempted to work with the Navajo Nation on cleanup projects. It was frequently stated that the Navajo Nation Government is a challenging entity to work with bureaucratically. Whether this is a lived reality or an ingrained prejudice, ideas of bureaucratic difficulty create issues for both the Tribal

[65] Navajo AUM (AMRCS) Interested Vendors List (XLS)
[66] https://www.epa.gov/grants-mining-district
[67] http://www.tax.newmexico.gov/Businesses/in-state-veteran-preference-certification.aspx

Government and for businesses attempting to secure remediation contracts. This is illustrated by the following statement made by a representative of a Navajo-owned consulting firm. "The problem with the Navajo Nation is there are so many vested interests and cross-purposes associated with cleanup that even when there is an agreement, which is hard to get, there will be changes in mid-stream when new administrations/players come into the mix." This becomes a challenge to overcome on multiple levels, with the State needing to do the work to build better trust relationships with the Navajo Nation Government and other Tribal Governments on cleanup efforts, facilitating a collaborative effort to support local businesses in securing remediation contracts.

5.2.2. Networking

Due to cultural and institutional factors, smaller companies with limited experience often find it difficult to establish and maintain critically important relationships with larger national/multinational firms that typically oversee uranium mine cleanup projects.

For example, one New Mexico company owner offered, "The EPA does have higher qualification requirements for small contractors, so for small companies to participate, they have to be tied to a large, qualified bidder unless they can meet the US EPA requirements as a small business…Team up with knowledgeable players in the field to get experience and exposure."

Even for well-established New Mexico contractors and consultants, building and participating in a network that provides access to major national and international uranium mine remediation firms is a prerequisite to be considered in potential bidding opportunities. This becomes a significant barrier when most small firms' primary focus is pursuing and capturing the next project on which it can bid. The universal perception is that there are not enough opportunities to try to find and interact with large uranium mine cleanup firms or become known to regulatory bodies and demonstrate that the firm has the requisite skills and experience to engage in this kind of specialized work. Uncertain timelines for cleanup activities further exacerbate this issue. Additionally, personal networking is not always a skill that small contractors may even recognize as necessary.

In general, to successfully compete for a uranium mine EPA assessment and cleanup, firms must have experience doing this kind of work and demonstrate compliance and skills as required. This presents a particularly difficult barrier to competition as the only way to gain experience is through performing the work. The only path around this dilemma is for the in-state companies to develop working relationships with the large out of state firms usually granted the EPA contracts. The out of state firms are likely to subcontract a certain percentage of the work, which presents an opportunity, albeit small, for experience. This, however, requires effective networking to become part of a recognized group of in-state companies that are regularly used in projects.

Networking is an ongoing process and requires time and effort to be successful. Although the US Small Business Administration (SBA) offers counseling and technical support to businesses, the District Office is located in Albuquerque.[68] Additionally, in partnership with SBA, the New Mexico Small Business Development Center Network offers services to small New Mexico businesses – both startups and existing businesses.[69] These services could be expanded to better encompass New Mexico businesses' specialized needs attempting to win federal subcontracts. In Appendix 6, we discuss further networking options and opportunities as a resource for businesses, but ideally, these resources could be better tailored by the State to fit the complexity of the uranium mine remediation industry.

5.2.3. Insurance and Surety Bonding

[68] https://www.sba.gov/offices/district/nm/albuquerque
[69] http://www.nmsbdc.org/about-us.aspx

Uranium mine assessments and cleanups are often multi-million-dollar contracts and typically require surety bonds and liability insurance to guarantee the successful completion of work. Smaller firms often lack the financial assets and collateral needed to secure bonding and insurance. Even smaller firms that can access the bonding are required to pay premium costs that may price them out of the competition.

Short of having some pooled bonding authority for small New Mexico companies, the primary route around this challenge again lies with networking and subcontracting with a large out-of-state firm that can provide the bonding coverage for all its subcontractors.

5.3. Workforce Challenges

This section discusses the challenges to building a strong, diverse, New Mexico-based workforce that can do the specialized work required for uranium mine remediation. BBER found that the challenges for workers were not about the educational programs we have in place; New Mexico is doing a strong job educating workers across skill sets. Instead, we found that obtaining and maintaining specialized certifications, matching workers with jobs, and ensuring our educational institutions are coordinating their efforts are the key constraints on workforce development.

5.3.1. Specialized Certifications and Trainings

Uranium mine remediation requires both technical and physical skill sets. Additionally, because of the hazardous and radioactive substances present, onsite personnel must possess up-to-date OSHA certifications. In our extensive interviews with training programs, universities, and other workforce training organizations, we found that the burden of obtaining and maintaining the OSHA certifications falls primarily on the employee unless employed by a larger, well-established company. Only in limited instances do educational institutions offer OSHA trainings to their students.

Companies competing for contracts must have employees with the required credentials before beginning the bidding process to be successful. Worker training and certification often must be renewed annually. Yet, remediation work may not be consistent enough for many local businesses to justify the hiring and maintaining specialized employees.[70] Lack of regular employment in uranium mine cleanup directly relates to other constraints we have discussed, all of which impact the state's ability to mobilize an appropriately trained workforce when the need arises.

5.3.2. Worker Retention and Placement

Compounding training and certification issues, professional and technical employees are often challenging to attract and retain. Often, wages in rural New Mexico are not competitive, especially when compared to nearby metropolitan areas like Denver or Phoenix. Similarly, these urban areas offer more amenities for young professionals, as well as job opportunities for those with partners in the workforce.

Multiple firms BBER interviewed stated things such as, "One of the challenges [our firm] faces is that when it seeks to hire qualified young people who are excited about the work [our firm] does, the location of the firm becomes a barrier, particularly for younger people." One contractor noted, "If you hire a "newbie," train them and put them on jobs for a couple of years, you will likely lose them to higher paying jobs in cities and places where they would rather live than out in some remote area a long way from something that resembles the kind of life they wish to live. Further, they may start single, then get married, then have a family, and life priorities change. When that happens, they leave." Qualified workers will often take higher-paying jobs in larger metropolitan areas, only coming to sites for specific, short-term projects rather than permanently living and working in the region or the state.

[70] An important point to note is that many individuals in the region have been trained in the extraction industry and that this workforce could be potentially mobilized into remediation work with the appropriate OSHA trainings and job matching.

However, some stakeholders argue that if New Mexico could provide consistent remediation employment, underemployed individuals within the region will already be familiar with the area and want to remain residents.

Finally, the lack of a platform for statewide communication and networking makes it difficult for businesses to find workers and for workers to find jobs that appropriately match qualifications with employment. At this time, it isn't easy to find accurate information about job requirements and necessary skills for entering into uranium mine remediation work at any level of employment. This impedes the ability for meaningful job matching and our educational institutions' ability to respond to marketplace needs. To address workforce placement concerns, there needs to be greater effort to ensure needs are anticipated and met without duplication and that resources are effectively distributed and deployed.

5.3.3. Job Site Constraints

Another constraint on workforce development is that uranium mine sites are often in remote areas, not proximate to any towns or significant residential areas. Those with the required skills may likely have to drive an hour or two each way from their residence to get to a job site, which takes a heavy toll and may be unsustainable for the employees. In some cases, contractors indicate they take on the costs of transporting workers to sites daily, but not all contractors are able to do this, forcing the employee to not only have access to transportation at all times but the funds available to fuel and maintain vehicles that can travel long distances.

Additionally, roads into the area may be challenging to navigate and may be inaccessible except to high-clearance four-wheel-drive vehicles. As one contractor noted in a conversation: "We hire someone who is enthusiastic about the job, has the requisite skills or is easily trainable, and within a day or two on the job, they just don't show up. This is a real problem because of the remoteness, we may not be able to get a cellular connection, or they may live where there is no cellular connection. So, suddenly, we don't have that skillset on the jobsite to do what we are contractually obligated to do." Again, this is not necessarily something the State can tackle in policy change but noting the lack of cellular coverage and difficult terrain near many of these mines is an important constraint that needs attention.

5.3.4. Coordination among Universities

BBER's investigation suggests that higher education institutions in New Mexico currently provide most of the coursework that professionals need to undertake uranium mine cleanup. However, there is little consistency in applied training and professional placement due to limited collaboration and coordination among institutions.

Professional work in environmental engineering fields requires academic training, but students must tie this training to on-the-ground experience to be successful. Some universities, often due to the initiative of individual professors, are able to link coursework to hands-on research at uranium mine sites, but these opportunities are hit-or-miss. Coordination at the university level would allow for academic programs to share resources and encourage greater collaboration among students working on similar problems, rather than constraining the applications to individual institutions. Sharing resources, both physical and academic, could help New Mexico build a workforce ready to take on the complex issues involving abandoned uranium mines.

Similarly, there is a lack of adequate matching of students and young professionals with in-state employers, not unlike trades workers' challenges, as discussed above. Although jobs are posted in various locations online, most of the professors we spoke with described networks as being critical for job placement. In one interview, a professor mentioned that their graduating students were seeking jobs out of state, as the work was more regular, and the professor had ties to other universities and firms. However, in the course of the same interview, BBER mentioned that a state agency had job postings for relevant positions open for a month, something we had learned in an interview approximately one week earlier. The professor was unaware of these positions and mentioned that the state agency's network was better tied into a different university. Lack of communication should not be the reason New Mexico graduates are taking out-of-state jobs.

5.4 Broader Constraints

5.4.1 Dated and Expensive Remediation Solutions

The site cleanup solutions are often dated and/or very expensive because the waste from uranium mines is hazardous and radioactive, requiring specialized methods for disposal. All actions need EPA approval. In general, the EPA allows for three primary actions: non-disposal, on-site disposal, and offsite disposal. Non-disposal is an effort to improve community safety by limiting access, but it does not involve waste remediation. On-site disposal means the waste will stay in place, but the damage to the communities and the environment is reduced by developing physical barriers such as waste liners, caps, or other strategies to prevent further contamination. Offsite disposal removes the waste from the affected site, but the hauling of hazardous and radioactive waste through communities is dangerous and expensive, and facilities for permanent storage currently do not exist in New Mexico.

None of these options offers a satisfactory long-term solution, either from a technical perspective or in the eyes of affected communities. There has been little advancement in developing new solutions, which poses the ultimate barrier to an effective uranium cleanup.

Should new solutions be proposed, whether it be new technology or a more locally-based repository and processing center for waste, the economics of the solution will be a critical factor. Offsite disposal is currently cost-prohibitive as uranium mine waste – particularly waste from CERCLA designated sites – has severe restrictions on where it can be stored. This further limits the options for cost-effective disposal to on-site solutions, which is not acceptable to many affected communities. More work needs to be done investigating local and/or innovative solutions for uranium mine waste disposal.

5.4.2 Lack of Local Context in Remediation Decisions

5.4.2.1. Technical and Geographic Expertise

Affected communities have long been working on their own technological and engineering solutions to environmental problems. Yet, the EPA and other institutions' initiatives involving environmental remediation too often fail to acknowledge, let alone incorporate this knowledge.

> *"We told them where they wanted to place the bridge was not going to work because of how water acted in the arroyo. They ignored us and built a beautiful new bridge, and within one year, that bridge was no longer safe because the rate of the water flowing through the arroyo during the seasonal rains destroyed the bridge foundations and connections to the roadway leading to the bridge."*

Local knowledge can provide solutions based on historical, physical, and climactic factors that may not be obvious to those doing the work. Engineering solutions may fail when they miss vital details related to local knowledge. One example of such a situation was given at a public meeting by a member of a local Native American community in which a new bridge had been built to accommodate the heavy trucks carrying waste materials from the uranium mine site to a disposal site. The community member stated, "We told them where they wanted to place the bridge was not going to work because of how water acted in the arroyo. They ignored us and built a beautiful new bridge, and within one year, that bridge was no longer safe because the rate of the water flowing through the arroyo during the seasonal rains destroyed the bridge foundations and connections to the roadway leading to the bridge." Ignoring Traditional Ecological Knowledge does not

generate solutions appropriate for New Mexico communities. This is one way in which failing to listen to local knowledge creates problems and disrespects the people most impacted near the sites.

Another example illustrates the importance of utilizing local knowledge throughout the entire remediation process. During a public meeting, BBER attended one community expert, demonstrated that the current EPA standards for food consumption bear little to no resemblance to the dietary practices of Navajo Nation community members. In particular, those living closest to uranium mine sites may be grazing sheep in the area, growing and harvesting edible plants, and foraging for other foodstuffs. In his demonstration, he showed how the current standards for cleanup grossly underestimate the amount of uranium isotope uptake in the Navajo diet, as they fail to account for localized dietary practices. This is another way in which failing to listen to local knowledge can impact even the metrics used to determine standards of exposure and cleanup.

New Mexico communities' technical and geographic expertise should not be overlooked when considering solutions to remediation issues. Rather, solutions informed by best practices and driven by New Mexico-based expertise have the potential to pave the way for more complete and appropriate remediation actions given local context.

5.4.2.2. Cultural and Spiritual Relationships to the Land

Sensitivity, acknowledgment, and understanding are required when addressing issues on many sites, as there are often cultural and spiritual connections to the land and its various aspects and inhabitants. Cultural and spiritual issues may present unique challenges, most notably when the government established standards don't allow for accommodations agreed upon by stakeholders.

It is not unreasonable to expect companies, employees, and government agencies involved in cleanup to recognize the reality of a community's concerns and to make serious attempts to engage community members. At a minimum, these entities should engage with members and attempt to establish trusting working relationships with the impacted communities. As one Native-owned firm stated, "Cultural sensitivities are extremely important in working on Native lands. Some sort of 'sensitivity' training probably is appropriate for anyone who is not Native that wants to work in this arena." It is essential that this remediation work be done respectfully and with local knowledge treated as an equal resource.

Even in non-tribal lands, it is not uncommon for residents in these generally remote areas to have longstanding ties to the land and a wealth of local knowledge. Any entity that undertakes cleanup in New Mexico should address concerns and area-specific issues in ways that make community members feel their interests were considered, if not accommodated. Local knowledge and expertise illustrate the challenges to developing the remediation industry's use of nationally determined standards.