Mixing Methods to Address Complicated Research Questions: Lessons from the BBER Uranium Mine Remediation Study

Prepared for the New Mexico Data User’s Conference
November 2019
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Figure 1: Northeast Church Rock Mine and United Nuclear Corporation site map
Overview

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Project Description
In 2019, Representative Wonda Johnson introduced HB0233 “for a study of the education and training programs needed to build a workforce sufficient to meet the demand for uranium mine site cleanup in New Mexico.”

Although HB0233 did not pass, the study was included in the junior appropriations bill, which gave funding to UNM BBER for the purposes of conducting the work.
The specifics in the original legislation asked BBER to:

- analyze the economic effects on the state and local communities associated with cleanup,
- assess current workforce capacity, and
- evaluate training and education courses potentially needed to meet workforce demands.
Translating Messy Quantitative Data
Translating Messy Quantitative Data

Finding the right documentation

- In the case of uranium mine cleanup, we found varying levels of cost estimate documentation.
- We spoke to dozens of stakeholders to obtain all possible documents that tied equipment and labor costs to cleanup efforts.
Translating Messy Quantitative Data

Triangulation of information is key

- With the technical assistance from geological engineers and project managers associated with the cleanup cases, we created a schema to generalize tasks from one project to the next.
- By including expert voices in our data coding process, we increased confidence in our generalization process.
Translating Messy Quantitative Data

Creating bridges

- After verifying the interpretation of the data is accurate, how do you then generate something the analysis software (IMPLAN) can read?
- To do this, we had to link our data to both NAICS (North American Industry Classification System) codes and IMPLAN codes.
Beyond the Numbers
Beyond the Numbers

• Analyzing the economic impact and the workforce skills required for uranium cleanup alone would not answer all of the points made in the legislation.

• Beyond that, the conversations we have had with stakeholders have unveiled a much more complicated relationship between cleanup efforts and community interests.

Qualitative analyses can provide powerful explanations.
Beyond the Numbers

Keys to rigorous qualitative analyses

Variety and quantity of relevant sources
Meticulous notetaking
Coding notes reflectively into larger themes
Reliability checks
Careful documentation of analytic decisions
Optional: utilization of software to aid in analysis
Beyond the Numbers

This is our current, frequently updated contact list.

We have had, have scheduled, or are planning to have conversations with each of the groups listed on these pages.

Key to our accurate representation of stakeholders’ interests is being in touch with as many different groups as possible.

Appendix: UMM BBER Uranium Mine Remediation Study Contacts List (Unprepared)

Government Organizations
- EPA Region 9
- EPA Region 10
- Laguna Pueblo Environmental and Natural Resources Department
- NM Bureau of Geology and Natural Resources
- U.S. Bureau of Mines
- NM Environmental Department
- NM Land Commissioner
- NM Office of the Natural Resource Trustee
- New Mexico Water Science Center (USGS)
- Navajo Nation Abandoned Mines Lands
- Navajo Nation EPA
- Pueblo of Acoma Environment Department
- USFS New Mexico, Arizona, Utah

Community Organizations
- Conservation Voters New Mexico
- Diné Uranium Mine Remediation Advisory Commission
- Multicultural Alliance for a Safer Environment
- New Mexico Environmental Law Center
- Pueblo 71 Uranium Workers Committee
- Southwest Research and Information Center

Educational Institutions
- Central New Mexico Community College
- Diné College
- Navajo Technical University
- New Mexico EPSCoR
- New Mexico Tech Institute of Mining and Technology
- Northern Arizona University Institute for Tribal Environmental Professionals
- San Juan College
- University of New Mexico Environmental Engineering
- University of New Mexico METALS Superfund Research Program Center

Economic Development Organizations
- Center for Indian Country Development – Minneapolis Federal Reserve Board
- Gallup Economics Development Organization
- Native Community Development Financial Institutions Network
- Northwest New Mexico Council of Governments

Labor Unions
- Laborers’ International Union of North America
- United Mine Workers of America

Business and Industry
- Arrow Hilten-Contractors
- Bisco Corporation
- Clinton Excavating
- DPH Environmental
- Diné Yahan Cultural Resources Management
- Diné, LLC
- Dinar Betcht Enterprises, LLC
- DRA Engineering
- Ecology and Environment, Inc.
- El Paso Emission Control Systems
- Energy Fuels (formerly Strataforce Resources US)
- Engineering/Remediation Resources Group
- Envirosystems of Utah, LLC
- ETI Incorporated
- Halco Resources, Ltd.
- INL
- IHS
- Iron Oxide and Engineering Solutions
- Lasalme Resources Ltd.
- Loganza Exploration
- Navajo Engineering and Construction Authority
- Navajo Research and Engineering
- Oceana Environmental Engineering
- Rio Grande Resources
- Rynah Construction
- SODA
- TerraTech
- General Electric - United Nuclear Corporation
- Watson Solutions
- Zionon Water & Irrigation
- WasteCon Resources (formerly Uranium Resources)
- Waterdesk & Cullen (formerly TRIG, Inc.)
Mixing Methods
## Mixing Methods

### Quantitative Data
- Economic impact
- Generalizations about workforce needs and capacity
- Numbers of certified workers in New Mexico
- Cost estimates for mine cleanup
- Businesses holding required licenses within New Mexico

### Qualitative Data
- Concerns among stakeholders about the cleanup process
- Assets and needs of workforce training programs
- Ways to improve communication and collaboration across institutions
- Experiences of stakeholders engaged in the cleanup process
Discussion
The complicated nature of generating data requires time, research, and input from experts.

Without combining qualitative and quantitative methods, we would not be conducting a study that represents all stakeholders well.
Thank You!

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