

REVIEW OF ENVIRONMENTAL HEALTH STUDIES ADDRESSING THE NAVAJO URANIUM LEGACY AND IMPACTS OF HARDROCK MINING ON NATIVE COMMUNITIES IN THE WEST

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Several environmental health research studies have been initiated on the Navajo Nation over the past 20 years to assess health outcomes from exposures to uranium wastes. SRIC has been a partner in many of these studies, working with communities, community groups, tribal, state and federal agencies, and academic institutions, most notably the Community Environmental Health Program at the University New Mexico (UNM) College of Pharmacy.

Community members have had played indispensable roles in these studies by defining the research agenda, contributing local knowledge, participating in field research activities, and ensuring the process has a sound and appropriate cultural foundation. These hypothesis-driven studies have examined the presence of contaminants in water, land and air near abandoned mines and in the mine wastes themselves; predicted the health effects of living in close proximity to uranium wastes; shown relationships between uranium and arsenic exposures and biomarkers of immune dysfunction and cardiovascular disease; demonstrated the toxicological effects of exposures to fine-particles in mine waste dusts in laboratory mouse experiments; and documented increased concentrations of uranium and micronutrient insufficiencies in Navajo study participants compared with national averages. Salient findings of these studies include:

- Active uranium mining-era exposures of workers and families significantly increased kidney disease risks while ongoing legacy exposures increased risks for hypertension, autoimmune disease and development of one or more chronic diseases (Hund et al, 2015).
- Uranium mine wastes are replete with uranium, vanadium and other heavy metals in concentrations thousands of times greater than normal soils and contain respirable, submicron particles that present chronic inhalation risks (Blake et al, 2015).
- Lab mice exposed to solutions containing mine dust exhibit significant pulmonary toxicity compared with exposures to controls and normal soils (Zychowski and Campen, in press).
- Arsenic (15%) and uranium (12%) are the leading contaminants in nearly 500 unregulated water sources on the Navajo Nation, and wells containing As and U in concentrations exceeding drinking water standards tend to be located closer to abandoned mines than wells located farther away (Hoover et al., 2016).
- Research on the types, severity and causes of disabilities in Native American children is limited, but evidence exists that suggests exposures to metal mixtures in mining wastes in Native American communities may be linked to developmental disabilities and higher rates of congenital anomalies in Native populations (Lewis et al., 2015).
- Increased serum levels of oxidized LDL cholesterol, a biomarker of cardiovascular disease, and increased levels of biomarkers of immune system dysfunction were observed in study participants to who live close to abandoned uranium wastes (Harmon et al, 2014 and 2016, and MacKenzie et al, 2014).

Direct Actions Presentation

Direct Actions - Talli Nauman - Dakota Rural Action, South Dakota moonrisemountain@gmail.com

- A. Health Studies as Direct Action: International perspectives on the challenge of using grassroots health and environment studies to achieve goals in government forums - International Pesticides Elimination Network (IPEN) "For a Toxics-Free Future" Conference, San Francisco, CA Nov. 14-17, 2016
 1. Challenges and Pitfalls
 - a. Expensive
 - b. Requires a lot of human resources
 - c. Demands training and expertise
 - d. Time consuming
 - e. Governments and corporations try to discredit grassroots monitoring and findings
 - f. Other?
 2. High Side
 - a. Involves community members in a project, exciting and inspiring
 - b. Interests students, teachers, young people, increasing and improving membership
 - c. Provides media with stories on grassroots mobilization, raising profile of issue
 - d. Attracts attention of decision makers
 - e. Can boost legitimacy
 - f. Can lead to multi-stakeholder cooperation, e.g. between government agency and NGO
 - g. Other?
- B. New Era of Direct Action to Establish Social License - "Bring Back the Way" - "Take it Back"
 1. Civil Obedience Actions
 - a. Ceremonies, Cultural Events, Prayer, Song, Dance, Parades, Rallies,
 - b. Other
 2. Civil Disobedience Actions
 - a. Trespass, Graffiti, Lock-on, Sit-in
 - b. Other
- C. Case studies, Keystone XL and Dakota Access, Other
- D. Messaging
 - a. Keep it in the ground, Stop Uranium Mining v. No DAPL
 - b. Other