Monumental Failure: The Navajo Tribe and Radiotoxic Wastes

By Devin Kenney

Uranium has a troubled history in the Navajo Nation, a history born of lack of representation, lack of interest, and ultimately, lack of regard for human life. The United States government failed to carry out its obligation to protect the health and economic well-being of the Navajo people during the period of the uranium mining boom. This was done not of malice but through willful neglect. Numerous opportunities presented themselves where the Atomic Energy Commission, the Environmental Protection Agency, the Bureau of Indian Affairs, and even the U.S. Congress could have inserted their authority and perhaps prevented this tragedy but, for various reasons, chose not to do so.

The uranium contamination of Navajo tribal lands was an entirely preventable, if accidental, man-made disaster that resulted from faulty decision-making processes which originated at the inter- and intra-bureaucracy level of government. The Atomic Energy Commission (AEC), in particular, possessed both sufficient knowledge and authority to recognize the danger posed to miners and establish safety standards to protect them yet opted instead to exploit the situational weakness of the tribe. According to Senator Orrin Hatch, “The government had adequate warning of the hazards involved in uranium mining, and yet these miners, many of whom were Native Americans, were sent into inadequately ventilated mines with virtually no instruction regarding the dangers of… radiation” (Committee on Labor and Human Resources, United States Senate 101st Congress, 1990, p. 2). Considering the position of the Navajo people in contemporary America along with the role of Navajo culture in the disaster, it is clear that they were a people uniquely suited and positioned to be abused under the circumstances.

RADON AND HEALTH

Radioactive materials occur naturally in the earth and generally at low enough levels that limited exposure causes little to no harm. Mining however, releases greater quantities of radiation than would otherwise be released naturally. Since the early 1500s “uranium-bearing ore [has] been mined” in Jachimov, Czechoslovakia, and Schneeburg, Germany, for the manufacture of dyes based on uranium (Brugge & Goble, 2006a, p. 26).

A connection was noted “between these mining activities and a lung disease… [accounting for as much as] 75% of all deaths among miners” (Brugge & Goble, 2006a, p. 26). Prolonged exposure to this radiation was already considered a possible health threat coming from centuries old Eastern European mining operations (Pasternak, 2010, p. 65). As early as 1930 the Eastern European mines began serious ventilation projects under standards similar to those later proposed, but not implemented, by U.S. public safety officials, standards that reduced exposure from 8.9 Working Levels (WL) to .35 WL (Brugge & Goble, 2006a, p. 30). “The concentration of radon daughters is measured in units of working level (WL) which is a measure of the potential alpha particles energy per liter of air” (Canadian Centre for Occupational Health and Safety, 2009). One WL is defined by the maximum daily exposure that workers may be subjected to and is meant to reduce the likelihood of adverse effects on human health (Ibid.).

By 1932, before industrial mining for uranium began in the U.S., “Germany and Czechoslovakia… [had] designated cancer in these miners as a compensable occupational disease” (Brugge & Goble, 2006a, p. 27). In 1944 the U.S. National Cancer Institute (NCI) issued a report based upon studies of European uranium miners. Ultimately the report was inconclusive because the NCI was unwilling to explicitly connect uranium mining with cancer because “a direct connection… could not be established [with] so many other complicating factors” (Eichstaedt, 1994, pp. 56-57).

This was because radon, a colorless, odorless gas denser than air, gathers in mines with high concentrations of uranium. Radon is a particular threat to underground miners since it “ooze[s] out of the mine walls or, because it is soluble in water, out of the water in the mine” (Eichstaedt, 1994, p. 49). As radon breaks down it forms the highly radioactive group of elements known as “radon daughters.” These so-called “daughters” are divided into two groups: long-lived, with half-lives ranging from half a year to 22 years, and short-lived, ranging from a half-life of 27 minutes to 180 microseconds (Canadian Coalition for Nuclear Responsibility, 1998). “The normal decay process would release a steady stream of radon daughters into the air [which] would become attached to dust particles or cluster together as particles” (Eichstaedt, 1994, p. 49).
Later it was discovered that “when radon gas is allowed to build up in an enclosed space, such as a mine shaft or basement, the radioactive hazard increases enormously because of the build-up of radon progeny” (Canadian Coalition for Nuclear Responsibility, 1998). For this reason, “[R]adon-daughter isotopes…contributed the bulk of the radiation to the lung. …[because] unlike radon gas, the radon daughters [derivatives of radon] can be retained in the lung adjacent to sensitive cells…as long as their radioactive half-lives [and]…deliver high doses of alpha radiation” (Brugge & Goble, 2006a, p. 31).

DEADLY POLICY-MAKING FAILURE

Since this link was not firmly established by U.S. scientists until the early 1970s, safety regulations were not put in place (Brugge & Goble, 2006a, p. 31). Thus, the AEC failed at the inception of the U.S. nuclear program to set standards reflective of the Eastern European mining experience. In time however, radon was pinpointed as the major causal agent behind mining-related lung cancers “and…is the primary source of lung cancer among Navajo uranium miners” (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 42).

At the inter-bureaucracy level, group pressure and homogeneity within the Atomic Energy Commission (AEC) prevented and preempted critical thinking within the policy creation process. This particular group failure, known as “groupthink,” occurs when members of a cohesive group strive for unanimity rather than “realistically apprais[ing] alternative courses of action” (Janis, 1982, p. 9). Pressure to do so leads to a deterioration of “mental efficiency, reality testing, and moral judgment” and thus, faulty decision-making (Janis, 1982, p. 9). The intra-bureaucracy power structure was considerably complex but reflected the position of relative power that the AEC occupied due to the post-World War II nuclear arms rush. Other important factors were technical and scientific expertise, compliance, resource constraints placed upon other concerned parties, and regulatory authority. Only as external political power shifted—reflective of changes in the political power structure—did public policy change, cleanup efforts begin, and compensation occur. “Once the results of this carelessness became impossible to deny by the late 1960s, a depressingly predictable saga ensued of buck-passing, stonewalling, and official obfuscation” (Smith, 2010).

Groupthink is especially common “when [group] members are similar in background, when the group is insulated from outside opinions, and when there are no clear rules for decision making” (Janis, 1982, pp. 242-243). All of these elements were present within the Atomic Energy Commission (AEC) at the beginning of the Cold War. Although health risks were projected even from the beginning of work in the mines, the bureaucracy of the AEC and the uranium industry itself were so new that rules regarding hazards unique to uranium were not addressed initially. In time, inaction became standard and the impetus was pushed toward maximizing production while minimizing costs—whatever they were.

Homogeneity and group pressure fostered a culture resistant to both Congressional oversight and scientific evaluation. Health and safety regulations perceived to threaten uranium production or supplies were not implemented and their proponents were pressured into silence. Groups affected by groupthink tend to “make an incomplete survey of alternatives, fail… to examine [the] risks of [the] preferred choice… [and display] selective bias in processing information at hand” (Janis, 1982, p. 175). By statute, the federal government established itself as sole legal purchaser of uranium. As such the AEC was responsible for, and later the Department of Energy (DOE), setting the price of extracted ore, encouraging development, and the regulation of safety within the industry from start to finish. No corrective measures were taken until a statistically significant number of deaths were linked to these operations and the evidence could no longer be denied, reinterpreted, or dismissed (Brugge & Goble, 2006a, p. 38).

Although uranium mining did not have a particularly lengthy history in the U.S., a considerable amount of evidence existed to suggest particular dangers—lung and other cancers for example—could result from prolonged exposure to uranium and other radiotoxic elements present within the ore. A report issued by the AEC in 1955 stated that:

“There is no doubt we are faced with a problem which, if not handled properly, could adversely affect our uranium supply. All information so far obtained indicates that practicable means exist to correct conditions which may be detrimental to health, but it is more difficult to avoid the exaggeration of fact[s] which are inherent in the subject.” (Eichstaedt, 1994, pp. 63-64)

From the beginning then, the AEC declined to establish safety guidelines—power delegated to them alone—because evidence was not entirely conclusive, costs were projected to increase, and because any delay in production threatened ‘national security’ as well as bureaucratic prestige (Eichstaedt, 1994, pp. 54, 106). Other agencies with special knowledge of the risks used this knowledge to mislead. When questioned by the Indian Affairs commissioner as to the toxicity of uranium, a mining supervisor for the U.S. Geological Survey (USGS) wrote that “there was practically [no danger of radioactivity] under the conditions existing in any of the mines on the Indian Reservation, and there would be [none] until the content of uranium in the ores was higher” (Eichstaedt, 1994, p. 54).

Other agencies lacked authority, funding, political clout, and/or independence necessary to enact and enforce policy regarding the industry. These agencies include the Public Health Service, National Cancer Institute, the Bureau of Mines, the Department of the Interior, U.S. National Council on Radiation Protection, and the Department of Labor. In some cases these agencies colluded with mining companies to withhold potentially damaging information from miners. The Public Health Service, when conducting voluntary health examinations of workers employed in uranium mines, agreed not to reveal the purpose of the testing at the behest of industry (Pasternak, 2010, pp. 73-74). Federal regulation called for state-level monitoring of mining interests that had authority on privately held lands but had no authority within the territory of the Navajo Reservation.

Federal policy, tied as it was to the industry, did little to protect either the tribe or workers from the abuses of the industrial system. Mining interests, such as the Vanadium Company of America (VCA), enjoyed a favorable position with the AEC, allowing them to push for as little oversight as possible. Even remedial and obvious mine safety measures, such as wetting dust and the provision of safety masks (measures to prevent silicosis, the result of breathing silica dust raised in mines), were not implemented. One miner recalled that,

“Workers were given no protection from the thick dust in the mill. The pay was $1.25 an hour. The[y] lack[ed] basic protective equipment, such as steel-toed boots [and as a] result… [his] toes were crushed in an accident [the company refused to pay for his medical treatment],…. The trucks [hauling ore] had no brakes or starts and had to be roll-started…. [A] truck fell on [his brother and left] him crippled for the rest of his life. (Eichstaedt, 1994, pp. 181-182) Ben Jones, another former miner, said that, “Sometimes they had vents, but [they were] not strong enough to move the air out…. [when the generator

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ran out of gas] they just left it off” (Eichstaedt, 1994, p. 184). During the 1950s through the late 1960s, the AEC, later the Department of Energy (DOE), denied the existence of any danger relating to conditions within the mines in spite of evidence they had gathered to the contrary (Eichstaedt, 1994, p. 79).

The case of VCA particularly exemplifies the element of private capture of public entities. They began supplying vanadium, a metal used to strengthen steel, during World War I. During the U.S. Naval buildup preceding World War II, vanadium became an increasingly important commodity as it was used extensively by both the Naval and Air Forces (Pasternak, 2010, pp. 28-29). Although VCA was a relative late-comer to the region they began to expand quickly across the reservation. Ironically, when mining began on the Colorado Plateau “VCA and [others] considered uranium a nuisance, waste created when their mills ground the ore to dust and sifted out [vanadium]” (Pasternak, 2010, p. 29).

As interest in the natural resources of the reservation increased, so did their apparent value to the tribe. In 1941, the Navajo Tribal Council asked the interior secretary that leases be put up for bid such that the highest bidder would receive the lease (Pasternak, 2010, p. 24). When one of the richest mines in the area was discovered, however, there is evidence that the VCA subverted the process such that on the day of the supposed auction no interested party other than the VCA appeared to bid. “[A]t least one... would-be bidder... accused [VCA] of bribing [tribal officials] so that the date of the bidding was not well known” (Eichstaedt, 1994, p. 27). Luke Yazzie, the tribe’s member who led prospectors to the area, was led to believe that “he would get paid... just for showing VCA the... rocks” while the company actually promised no more than “a job and to keep him on for as long as the company was working the [area]” (Pasternak, 2010, p. 39).

At one point the company set up a dummy operation in cooperation with a mine outside the Navajo tribal area. Rumor had it that those hauling ore to mill outside the reservation were “slipped $50 to $100... [which] they were to give to the assayer, who was expected... to double the amount of ore recorded [per] load” while the amount of ore extracted from tribally held lands was deliberately reduced (Pasternak, 2010, p. 101). Since each mill was required to report the amount of ore processed, this allowed VCA to avoid paying a Navajo royalty fee (Pasternak, 2010, p. 101).

As one of the biggest interests in the region and largest suppliers of uranium to the U.S. nuclear program, VCA was very important to the success of not only the nuclear program itself but the careers of many within the AEC (Pasternak, 2010, p. 56). One such person was Jesse Johnson, head of the Raw Materials Division of the AEC. In his position Johnson over-promised uranium ore, ore of a quantity and quality that he simply did not possess. In exchange for the help of VCA, Johnson turned over several mining leases that the company had sought for years (Pasternak, 2010, pp. 58-59).

The AEC was charged to both increase supply and regulate safety at all levels of industry. It was the AEC for example, that set the price for the industry (which began at $20.40 per ton—1.5 times the previous best offer) (Pasternak, 2010). Safety regulation was voluntary, however, and ran counter to the goals of its leaders. Those with opposing viewpoints within the agency—like Ralph Batie, chief of health and safety in the Colorado Raw Materials Office of the AEC—were pressured into silence.

Batie “was aware [of the standard set by] the U.S. National Council on Radiation Protection... 10 picocuries per liter of air” and so decided to investigate the radon gas present in the mines (Pasternak, 2010, p. 67). In 1948, after touring several operating uranium mills and a mine in Colorado owned by the VCA to test the level of radon and observe safety standards in the industry, it became clear that “safeguards were definitely needed” (Pasternak, 2010, p. 67). Experts with whom he consulted recommended that standards be implemented “geared to good industrial practice” even “without regard to either the legal or moral responsibilities of the AEC” (Pasternak, 2010, p. 68).

In order to encourage the implementation of and compliance with these recommendations—requirements to wear gloves when handling yellowcake uranium, to wearing of coveralls, and showering at the end of shifts. AEC suggested that the mills be required to process only ore from mines that met radon limits, similar to rules regulating the production of beryllium, “another key ingredient in nuclear devices” (Pasternak, 2010, p. 68). With uranium, just as beryllium, the AEC created the opportunity for the public health threat by creating demand: “very little [beryllium or uranium] would be manufactured [without the AEC]” (Pasternak 2010, p. 68). The AEC never explained why beryllium and uranium were legally different (Brugge & Goble, 2006a, p. 35).

From the Washington office came down the order that “safety inspectors at the state level—safety inspectors [with] no training in radiation” were in charge of mine safety (Pasternak, 2010, p. 69). Later, when Batie’s concerns were leaked to the media, he “was asked to attend a meeting with AEC and Colorado mining officials and the VCA general manager, Denny Viles” (Eichstaedt, 1994, p. 59). He and state officials were told “not to open [their] mouth[s] during the meeting,” where “[they] were harangued by Viles” (Eichstaedt, 1994, p. 59). Despite the warning, Batie refused to cancel a planned trip to the mines in the fall (Pasternak, 2010, p. 70).

Johnson, Batie’s superior in Washington, decided to make a trip to Grand Junction in order to fix the problem with Batie once and for all. Before meeting with Batie however, Johnson met with Denny Viles at the VCA’s mill to discuss Batie’s activities. His notes from the meeting reflect their discussion. He wrote, “Safety limit. No mining. No [Batie] October trip.” “Define Batie’s work within realistic limits,” and “No radioactive hazards but silicosis” (Pasternak, 2010, p. 71). “Realistic limits” meant “escort[ing] visitors...and driv[ing] between the mines and mills to check the mileage” (Pasternak, 2010, p. 72). Faced with his new responsibilities and the clear message he was receiving from his superiors, he transferred to the AEC’s Idaho office. “After trying in vain to operate a Health and Safety Program in Grand Junction and being told that the Director...wanted me fired for stirring up radiation problems in the mines and mills” he requested the transfer; his position as chief of health and safety “remained empty for more than a year” (Eichstaedt, 1994, p. 59).

THE NAVAJO ROLE

The Navajo people occupy a unique cultural and historical position outside the mainstream United States. They are “a [separate] nation, a nationality” that inhabits some 16 million acres and has 168,000 enrolled members living within the reservation, making it the “world’s largest” (Yazzie-Lewis & Zion, 2006, p. 1). Their regional homeland—located in the Four Corners region of Utah, Arizona, New Mexico, and Colorado—is also the area “where the largest quantities of uranium were mined in the United States” (Ibid.). Survival in the harsh environment of the reservation requires “learning the ways of the high desert,” ways that rely heavily upon those resources present in the land (Eichstaedt, 1994, p. 13).

Prior to the involvement of the United States government, the Navajo were a primarily agrarian society heavily dependent upon large fruit orchards and farms. Even today unemployment within the tribe remains around 40% (The Navajo Nation, 2004). As U.S. settlers and prospectors pushed
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westward in search of both land and gold, the Navajo were viewed as a nuisance. This pressure came to a head in 1864, when the United States government sent Col. Kit Carson to round up and force the Navajo from their traditional lands. In order to facilitate the forced removal of the tribe, their fields, orchards, stock animals, and even food vessels were destroyed (Brown 1970, p. 25). After arriving in their new home, the tribe was plagued by dysentery while “weather and insects ruined the crops they attempted to start with the seed” provided to them by the white man (Eichstaedt, 1994, p. 12).

After four years of forced “Americanization” ended in complete failure, the Navajo were offered the opportunity to return to their land in exchange for the concession of their claim to much of their ancestral territory (Brown 1970, p. 36). According to the conditions of the treaty, the United States government gave each member of the tribe two sheep and goats during the return (Eichstaedt, 1994, p. 12). By the early 1930s the number of sheep on the reservation swelled to more than 760,000. Drought and overgrazing, however, were of considerable concern leading the government to embark upon a “livestock reduction” plan.

“Extra” livestock were confiscated from individuals and pushed into ravines where they were killed and the carcasses burned. During the “reduction,” one man possessing more than 600 sheep and 37 horses had his flock reduced to 354 sheep and 13 horses. At least some of the agents responsible for the “reduction” were found to be personally profiting thereby, laying claim to animals taken from their owners (Pasternak, 2010, p. 21).

In protest, an official from the Office of Indian Affairs wrote, “We would not dream of applying to their white neighbors [similar coercive control]…. When the government wants a white farmer to reduce his herd or crops, it pays him” (Iverson, 2002, pp. 149-150).

Regulation by the Office of Indian Affairs is…unauthorized and illegal…. This is not to say that an individual has the right to do as he pleases with his land, but rather that his right is subject to restrictions imposed by law, and not to restrictions imposed by third parties without statutory authority, even if they are high officials of the Government who are much better informed than the Indians themselves about the interests of the Indians. (Ibid.)

This is an early demonstration of the heavy-handed, paternalistic manner that the federal government would later adopt with the tribe concerning the uranium mining industry. There is no doubt, however, of the effectiveness of the plan:

In 1956, Navajos owned less than a third the number of sheep units they had in 1931. In 1931, Navajos earned about half of their individual income from livestock; 25 years later that percentage had dwindled to slightly less than 10%. (Ibid., p. 221)

These and preceding events significantly exacerbated poverty and led to famine conditions within the reservation (Eichstaedt, 1994, p. 12). This, however, was not the end of the white man’s intrusion in Navajo territory.

By the early twentieth century it became clear that the less-desirable lands onto which the Navajo and other tribes of the West had been forced contained much of the mineral wealth of the country. Owing to this, the United States Congress failed to allow the tribes the right to lease their own lands. Since they were not deemed “intelligent enough” to handle their own affairs by the Congress, all fees and revenue associated with the use of Native American land was to be paid to the federal government to deposit in a fund for the benefit of the tribes. Said Senator Joseph Rawlins (D-Utah), “If any money is given them they gamble it away and dispense with it. It is [therefore] not for the best interest of the Indians to pay them money” (quoted in Eichstaedt, 1994, p. 16).

In this state, neither the Indians nor the government were open to lease reservation territory for mineral development. Of this, one Senator said that “these reservations…include vast mineral regions [and] I want every Senator to think of the responsibility of throwing away half of the mineral lands of the United States” (Eichstaedt, 1994, pp. 17-18). According to the U.S. Bureau of Mines “the radium-containing ores found in America most likely were among the richest deposits found in the world” (Eichstaedt, 1994, p. 18).

In time the presence of valuable deposits precipitated a change in public policy. Having denied individual tribes the authority to lease their own lands, in 1919 the United States Congress authorized “the Secretary of the Interior to open up Indian lands to prospecting and mining” (Eichstaedt, 1994, p. 19). Immediately, the Secretary of the Interior declared these lands open to “mining claims… by [United States] citizens in the same manner as mining claims are located under the mining laws of the United States” with no need to consult the tribe to which the land was allotted (Ibid., pp. 19-20).

Such a claim was valid for a year, after which the land could be leased for up to 30 years.

Just 5% of the net value of the mineral as it came out of the mine was to be paid to the government. The net value was the sale price of the ore after mining expenses had been paid. The government would place the royalties into funds that would annually flow to the tribe on whose lands the minerals were found….Reclamation was not mentioned [and] this basic arrangement for the leasing of Indian lands and payment of royalties remains in place today. (Eichstaedt, 1994, p. 20)

Within a few years this program was altered to give the tribes limited power to lease their lands—subject to approval by the Secretary of the Interior. Under the new law, royalty payments were doubled (Ibid., p. 24).

When individual Navajo were allowed to sublease their land for mining development, the prospecting boom took off. Navajo farmers and ranchers even borrowed Geiger counters from the major mining interests to search their land for ore (Pasternak, 2010, p. 62). Of the time, Timothy Benally later recalled, “Right after World War II, when the government found out what uranium can do, they decided to mine some of these areas and a lot of it was found on the reservation. People just went crazy looking for uranium, prospecting all over the reservation” (Iverson, 2002, p. 219).

Inadequate safety precautions, the result of incomplete science and insufficient regulation by the federal government, allowed exposure to radioactive and toxic chemicals.

Navajo culture also contributed to the disaster. For example, because a Navajo hooghan (home) is built from local building materials and “is never torn down, for it is a holy thing, a nurturing center of life,” several generations of family may occupy the same home and be exposed to the same radiation (Pasternak, 2010, p. 250). Separating a Navajo from their ancestral land is “tantamount to separating the Navajo from [his or] her spirit” (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 27). Even when informed of the danger, most Navajo lack the means to rebuild their homes without uranium at uncontaminated sites.

“I was told that it is very dangerous to live in this stone house,” said Carl Thomas, a former uranium miner testifying before Congress. “I don’t have any money. I don’t work [at the time he was suffering from lung cancer]. There is no way I could get money to build me a house that does not contain…uranium” (Eichstaedt, 1994, p. 113). At one such home, where a family had lived for years, federal workers found that radiation levels within the home were so high that workers declined to set foot in the house without protection from radiation (Fahys, 2011, p. A6). Few studies have been carried out
which address the long-term effects of such exposure (Eichstaedt, 1994, p. 142; Pasternak, 2010, p. 151).

As early as 1975, the Environmental Protection Agency (EPA) was aware that in at least some dwellings “tailings and/or uranium ore [were] used in their construction…[They were found] in concrete floors, exterior stucco, mortar,…in footings, walls, and in one fireplace” (Eichstaedt, 1994, p. 142). According to the report “the reason for their use is that the residents have unrestricted access to the tailings pile and the broken stones at the mine” (Eichstaedt, 1994, p. 142). In these homes radiation exposure reached between 332 milliroentgens per year to 402 milliroentgens per year, “roughly triple the annual exposure of the average American” (Eichstaedt, 1994, p. 142).

Because these contaminated materials were left uncontained on the surface, they were incorporated into tribal dwellings and have polluted grazing lands. Considering how clear the source of contamination is, it might be assumed that the compensation process would be simple—after all, the only thing that need be proved is that the source of contamination is uranium from the mines. Lorissa Jackson’s home had radiation levels so high that the EPA assumed it must be built upon a natural uranium deposit and was not therefore eligible for compensation. Only when asked to perform a conclusive test was the top layer of dirt removed and crushed yellow rock—obviously mine waste—revealed (Pasternak, 2010, p. 251). During the construction of the house the waste was brought in to level the ground beneath (Pasternak, 2010, p. 252).

With the end of the Cold War and thus the apparent need for the ongoing production of nuclear armaments, the federal government suspended the purchase of uranium. Suddenly, the industry bottomed out and both the government and private interests dumped and otherwise abandoned the mines, tailings, wastes, and mills known or at least perceived to be hazardous to the elements. This included uranium-laced dust from the mines, uranium tailings, and other toxic materials—all of which have leached into the soil. Due in part to the fact that many of these do not exceed minimum daily standards for exposure, the presence of these wastes has not been considered a serious health issue until relatively recently (Pasternak, 2010, p. 151).

Concerned over these and other abuses of the leasing system, the Navajo tribal council passed legislation mandating that any further claims be made by Navajo which, under pressure from the AEC, was altered to allow for the “subletting” of uranium claims (Pasternak, 2010, p. 61). “Only a Navajo could stake a claim, but [they] could temporarily assign mining rights to outsiders” (Pasternak, 2010, p. 61). The unfortunate side effect of this policy was the distension of responsibility for the land once all the valuable deposits were extracted. On behalf of the Navajo, the BIA approved the leases on the condition that the land be left “in as good condition as received,” yet “the federal government was left to enforce those terms” (Pasternak, 2010, p. 63). Yet “Once the BIA signed off, whether damage was repaired or not, the land, and the legal responsibility for it, returned to the Navajo claim holder…likely…an ill-educated shepherd or farmer. In the end, the land reverted to the tribe” (Ibid.). Jerry Gidner, Director of BIA, testified before Congress in 2007 that his agency took a limited role in the “remediation effort,” citing “lack [of] expertise in cleaning up uranium” (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 154).

Decades earlier however, it would appear that Indian agents possessed sufficient expertise to determine that insufficient ore was being extracted from tribal lands. During a meeting arranged with the Navajo Tribal Council, Allan G. Harper, head of the local Office, pushed the tribe to allow the construction of a mill on tribal property (Pasternak, 2010, p. 77). When pressed for details as to the actual amount the tribe received from uranium, he deflected the question by suggesting that “the income of Navajos in a particular district [is] derived as much from mining as from livestock” (Pasternak, 2010, pp. 78-79). When the legality of some of these leases were questioned in the late 1980s, the 10th Circuit Court issued a particularly scathing ruling, in McClanahan v. Hodel, invalidating several uranium leases granted through the BIA. The Court concluded, “The BIA and Interior generally seem to have been more concerned throughout the leasing process with their relationship with [the…lessee] than their relationship with the Indian owners” (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 29).

Concerned government officials worked individually to address safety concerns. Duncan Holaday of the Public Health Service, used this data to argue for ventilation to minimize risks to miners. Realizing that without “further information” the AEC would not and the PHS could not proceed to establish safe concentration level of radon, he suggested that health officials meet with mining executives wherever they were based “to discuss control measures” (Pasternak, 2010, p. 76). As noted previously however, similar measures were already in place and had been proven effective in Eastern Europe. Wilhelm Hueper, a scientist that linked radiation to mining-related cancers, “was forbidden to speak in public about his concerns about the health hazard of radon in uranium mines [and to even]…travel west of the Mississippi” (Brugge & Goble, 2006a, p. 34).

Other toxins present both in the mines and their wastes include:

1. Uranium, which as a heavy metal causes damage to the kidneys and birth defects;
2. Radium, which causes bone cancer, cancer of the nasal sinuses and mastoid air cells and leukemia; and
3. Arsenic, which causes lung and skin cancer, as well as neurotoxicity, hyperpigmentation, and hyperkeratosis of the skin. (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 42)

The limited medical testing of miners, allowed on a voluntary basis by some mine owners, was conducted on the condition that workers not be informed of the hazards supposed to exist. The Public Health Service acquiesced to these terms and conducted regular tests on many miners and former miners over the course of many years but “failed to inform miners of the risks being studied” (Brugge & Goble, 2006a, p. 32). This is in clear violation of the central tenet of the Nuremburg Code, that of “voluntary consent [by a person with] legal capacity to give consent…[with] sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision” (Office of Human Subjects Research). At no time were the subjects—mainly Native Americans with limited English proficiency—made aware of either the “nature [or] the purpose of the experiment” (Office of Human Subjects Research).

**POST-COLD WAR REALITIES**

Today well over 500 abandoned mines and over 1,000 contaminated sites are known to be located within reservation boundaries (Committee on Oversight and Government Reform, House of Representatives, 110th Congress 2008, p. 35). The Nuclear Regulatory Commission (NRC), successor to the AEC, has ruled that radiation from mining wastes “doesn’t..."
have to be included in public dose calculations [because they] are now part of the background” (Committee on Labor and Human Resources, United States Senate 101st Congress, 1990). When a former mining operation, Homestake/Barrick Gold, proved unable to meet safe water standards for the cleanup of their site, the NRC devised a more lenient standard based upon the fact that other companies upstream also contributed to contamination.

Homestake is thus responsible “for [a] cleanup standard far below safe drinking water standards” (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 18). Deeming cleanup to be excessively cost-ridden, the Indian Health Service (IHS) decided to mix contaminated water with clean water sources in order to bring contaminant levels down to maximum safety standards (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 118).

One of the earliest assessments of the danger posed by abandoned uranium ore and mill waste tailings noted that “potential health problems are magnified… by the milling and concentrating process” (Eichstaedt, 1994, p. 143).

The problems… come from… radioactive materials such as radium and thorium, which are concentrated by processing instead of being left buried and dispersed…. About 85% of the total radioactivity originally in uranium ore remains after removal of the uranium…. Although [radium and thorium] occur in nature, their concentrations in tailing material are several orders of magnitude greater than their average concentrations in the earth’s crust. (Ibid.)

The report further estimated that although “the presence of the tailings can be expected to increase the… occurrence of lung cancer by 18% for those… within one mile,” their health impact was “minimal” given “the low population density and low radiation levels of the tailings” (Ibid.). What this and similar studies fail to account for is continual, daily exposure both in the environment and “in dwellings contaminated with mill tailings” (Ibid.). Medical experts, testifying on behalf of the Navajo miners, for example, estimated that the miners averaged “cumulative exposures that were about 44 times higher than the levels at Hiroshima and Nagasaki” (Pasternak, 2010, p. 154).

The damage has been devastating. On July 16, 1979, the largest spill of radioactive waste in the United States occurred in Navajo country as 94 million gallons of radioactive sludge and 1,100 tons of toxic and radioactive mill wastes were released into the Puerco River when a tailings-pond dike failed (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 28). According to the U.S. Geological Survey (USGS), “1.5 metric tons of uranium and 46 curies of gross alpha activity” were released (Van Metre, Wirt, Lopes, & Ferguson, 1997, p. 1).

An additional “560 metric tons of uranium and 260 curies of gross alpha activity” entered the river through mine dewatering between 1960 and 1986 (Van Metre, Wirt, Lopes, & Ferguson, 1997, p. 1). In comparison, sites near Chernobyl were found to have radiation levels between “1 to 15 curies per square kilometer” (Marples, 1996, p. 22) and the leakage of as little as 1 curie per square mile is considered contamination (De Laguna, 1959, p. 36). The same USGS study found that “larger concentrations of uranium in the alluvial gravel are caused principally by mine-dewatering releases” (Van Metre, Wirt, Lopes, & Ferguson, 1997, p. 1). Larry King, a Navajo tribal member testified before Congress that:

The[se] contaminated fluids… ran right through our property, in the Puerco River, where we watered our livestock. I remembered the foul odor and yellowish color of the fluids…. [A]n elderly woman was burned on her feet from the acid in the fluid when she waded into the stream while herding her sheep…. When water lines were being installed in the bed of the Puerco, I noticed the same odor and color in a layer about eight feet below the stream. To this day, I don’t believe that contamination from the spill has gone away. (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008 p. 44)

The totality of these releases far exceed the disaster at Three-Mile Island and yet has not been cleaned up to this day (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 43).

As late as the 1990s, Navajo children swam in open pit mines where tests from 2006 showed radium levels over 270 times the EPA standard (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 8). Ray Manygoats of the Navajo Nation testified before Congress that, as a child, “[h]e would play in the yellowcake sand at the mill, jumping and rolling around in it. [H]e also found small metal balls…. [These] were used to crush and process the uranium. [H]e played marbles with them….” (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 89). Radioactive tailings were piled into hills in the center of Shiprock, the largest town in the Navajo Nation, as well as other communities. At least four such dumps exist on the reservation. Studies have shown that the areas exposed to mine waste reported higher rates of defects than “those near the nuclear test sites [in Utah]” (Pasternak, 2010, p. 141). Teenagers suffered 17 times the reproductive, breast, and bone cancers expected (Ibid.).

Several years after serious mining began on the reservation an entirely new, and purportedly genetic, disorder known as Navajo neuropathy began to appear in the children of the tribe. The disease is distinguished by “peripheral nerve degeneration, liver disease, disease and corneal ulcers” (“Navajo neuropathopathy,” n.d.). As yet, it is an open question whether the disorder results from genetic or environmental factors or some mix of the two. Genetic sequencing of sufferers indicated the disease may be genetic since “Mitochondrial DNA (mtDNA) depletion was detected in the livers of two patients, suggesting a primary defect in mtDNA maintenance” (Karadimas, et al., 2006). This indicates a “founder effect” caused by “two descendants [of a person with a recessive gene match[ing] up and hav[ing] children” (Pasternak, 2010, p. 231). These studies did not address whether contaminated water might be the “cause of illness because no single well supplied all… [but] did not explore whether the various water sources shared common contaminants” (Pasternak, 2006).

On the other hand, it never “appeared…[before] 1959 [and its] rise and decline mirror[s] the Navajos’ exposure to contaminated water” (Stevens, 2006). “New cases increased through the 1960s, 70s, and 80s… but have now all but disappeared…. The increase in cases occurred while the mines were being abandoned and were filling with water [and the] decrease coincided with the filling-in of the pits by the tribal government” (Pasternak, 2006). A survey of water sources in the region—springs, wells, and washes—found that “one of every five water sources was contaminated with dangerous amounts of uranium, other toxins…. [and/or radiation]” (Pasternak, 2010, p. 194). “Uranium levels… were as high as 139 picocuries per liter in wells and… 4,024 in [the] abandoned” open-pit mines many rural Navajo used as sources of drinking water. By comparison, Environmental Protection Agency (EPA) standards “permit no more than 20 picocuries per liter in drinking water” (Pasternak, 2006).

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same symptoms. “The[ir] birthrate dropped, and the few new lambs that did appear had a [difficult] time walking [while others] were born without eyes;” others “developed shaking limbs, yellow eyes, and white patches on internal organs” (Pasternak, 2006). The most devastating effects of the disease manifest themselves upon the children born to the Navajo in these remote areas.

One child was born with “her stomach all bloated [and] no strength to her ankles and knees…. [h]er nerves were [also] not there” (Helms, n.d.). Documentation shows that “[w]hen mothers drank uranium-poisoned water while pregnant, they bore children with Navajo neuropathy. When they [did not], they bore healthy children” (Pasternak, 2010, p. 192). One Navajo mother drinking regularly from these pits “was exposed to uranium at levels nearly 100 times the federal maximum” for every 3 liters of water that she drank. “The water [also] contained high concentrations of lead, arsenic, and cadmium” (Pasternak, 2006). Of her 10 children, the six she had while utilizing the pits as a water source were all born with and eventually died of neuropathy (Pasternak, 2006). Although a health worker with the Indian Health Service (IHS) discovered the level of contamination in these pools and documented human use of this water in 1986, IHS declined to either inform the Navajo or “give them water that was safe to drink” (Pasternak, 2006).

When the families of neuropathy victims filed a lawsuit in tribal court against the companies that operated the mines, the mining companies fought to have the case moved to federal court. They argued all the way to the Supreme Court that since this was a “nuclear-materials matter [it] was governed by a Congressional law that limited liability for the industry” and therefore belonged within the jurisdiction of the federal court system (Pasternak, 2010, pp. 192-193). After the case was taken from the tribal court system a federal mediator was appointed and the company was allowed to “settle for $500,000 with no admission of wrongdoing” (Pasternak, 2010, p. 193).

Waste was also dumped furtively in the Tuba City municipal landfill as well as the grazing land of a local family without ever consulting the family for permission. Although the DOE maintained there were no records of unauthorized dumping, at the site were found “patches… conspicuously and completely devoid of any plant life at. Each empty space seemed to be a rectangle, roughly 9 feet across… metal barrel fragments… protrude[ed] from the surface (Pasternak, 2010, p. 227). There is evidence to suggest that these wastes have leached into underground aquifers on and off the reservation. “There is radioactive and chemical groundwater contamination under all these sites [that in some areas] is moving towards municipal drinking water wells” (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 35). According to the DOE however, they had authority to “decontaminate groundwater, but only… at the mill sites themselves.” Therefore, if the pollution leaching into the groundwater came from these or other clandestine dump sites, then the DOE had no responsibility to clean it (Pasternak, 2010, p. 229).

Similar waste sites located near areas of greater population density, such as Moab, have already been cleaned or have been in the process of such cleaning for years. For example, “In 1978 the government had agreed to spend $180 million to cover up [a dozen] uranium mill tailings piles… [some of which] had been exposed for nearly 30 years” (Eichstaedt, 1994, p. 112). This has led many to question the intent of the federal government. “Why is this not happening on the Navajo Reservation[?]” asked Stephen Etsitty, director of the Navajo Nation Environmental Protection Agency (Navajo EPA). “Are we seeing environmental injustice in action once again” (Burr, 2007)? “[I]t would be extremely difficult…to construct [even] a solid waste…landfill…in accordance with current environmental laws unless that landfill was built with a liner to protect the underlying groundwater. Yet in…the Navajo Nation we have what amount to four unlined radioactive waste dumps” (Etsitty, speaking before Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 35).

There should be little surprise then that the Navajo, once believed impervious to cancer, now experience cancer at a rate equal to or greater than that of the general population (a reversal of earlier trends). Even as the U.S. average declined, cancer rates among the Navajo doubled between 1970 and 1990 (Pasternak, 2010, p. 138) while former uranium miners experience lung cancer at a rate almost 28 times that of the average Navajo (Daitz, 2003, p. F5). “The death rate among Navajo miners from respiratory diseases like pneumoconiosis and emphysema is also extremely high, about the same as the death rate from lung cancer” (Daitz, 2003, p. F5).

“[The agencies] had a duty to warn the miners, to warn the mine operators, to warn the states and the state safety agencies, to warn the Navajo Tribe, to warn the Bureau of Indian Affairs, of the dangers that they knew about” (Eichstaedt, 1994 p. 111). However, the convoluted leasing ordinances regulating Native American lands have allowed both parties to leave the responsibility of cleanup to the native residents. “In spite of traditional cultural ties to the land and environment, the Navajo Nation has few native-born environmental professionals available to address these problems and manage their vast homelands” (Semken, 1992, p. 11).

CLEANUP?

Lacking the expertise to carry out an effective cleanup operation, the Navajo Nation applied for the Superfund program. The EPA Superfund was created to force polluters to contribute financially toward the cleanup of contaminated sites for the purpose of sparing the taxpayer from “footing the bill.” Although this program may appear ideal for the situation of the Navajo Nation, where hundreds of contaminated sites could cost billions to clean, applying the program is not so easy. The first issue is that of responsibility and liability. When the federal government began to lease out Native American lands for mineral exploration they guaranteed the land would be returned to its natural state—not the companies or interests involved in mining operations. The Atomic Energy Act of 1954 also limits corporate liability for environmental damage (Pasternak, 2006). For this reason, private business maintains that the federal government is responsible for cleanup while the government lays the blame at the foot of industry—neither party does anything, inevitably.

Second, “uranium mill tailings and waste water are considered byproduct materials[,] not pollutants,” as such the Clean Water Act does not limit them and the sole regulatory authority over them is the NRC (Committee on Oversight and Government Reform, House of Representatives 110th Congress, 2008, p. 19). A third issue is more fundamental: even were the Navajo sites to make it to the Superfund list, the EPA is underfunded and prioritizes projects in more heavily populated areas (Pasternak, 2010, pp. 167-169) like the cleanup of the Moab dump site.

When the government proved unresponsive to their concern, the Navajo Nation sought compensation through the federal court system as one sovereign nation to another. In Begay v. United States (1984) the District Court for the District of Arizona acknowledged “negligence… arising from decisions of the federal government” and that “this tragedy of the nuclear age… cries out for redress.” The case was dismissed, however, on the grounds that “the alleged acts and omissions of government officials were shielded
from tort liability by...the Federal Tort Claims Act” to accept responsibility; this has left the Navajo to conduct such efforts as they may at their own expense while waiting for a Congressional solution (Begay v. United States, 1984).

All of the original cleanup efforts carried out on Navajo land therefore were done at Navajo expense and with limited Navajo tribal funds. The sites within Navajo territory were simply not considered “the worst of the worst.” Therefore, the EPA encouraged the Navajo to fund their own private cleanup with monies distributed from old coal leases, money originally intended to clean up and fill old coal mines (Pasternak, 2010, p. 169).

Navajo activist movements, along with medical researchers working within the Nation, have been the most powerful forces pushing toward a complete examination and cleanup of contamination within the reservation. After years of prodding both the tribal and federal governments, in May of 2011 the EPA began the cleanup of the Oljato Mesa, located near the home of Elsie Mae Begay. The cleanup effort, which consists of removing several old tailings and mine waste piles left from the mine formerly situated on the mesa, is expected to cost $6 million. Other projects underway include $22 million for “alternative water systems” and $60 million to “identify and deal with contaminated homes and mine sites” (Fahys, 2011, p. A6). According to the EPA, at least 80 spots on the mesa record radiation levels twice that of the natural background (Fahys, 2011, p. A6).

Concerns over the “downwinders,” into which group are lumped the former Navajo uranium miners, led to the passage of the 1990 Radiation Exposure Compensation Act (RECA). However, the Navajo often lack the documentation required to receive compensation. Certain provisions of the act also were written in such a way as to appear to discriminate against their claims. When considering eligibility for compensation under RECA, lifetime cigarette smoking is defined as “a person having smoked greater than ‘one pack year’ over a lifetime” and any miner having smoked in excess of this limit was ineligible for compensation (Brugge & Goble, 2006b, p. 140). A pack year is the “equivalent of 20 cigarettes per day for one year; one cigarette per day for 20 years” would be included for example (Ibid.).

Given scant records however, smoking status was determined from whatever medical records were available under “the assumption...that anyone who was listed as a smoker by his or her physician must have smoked more than one pack year due to the addictive nature of smoking” (Ibid.). This rule stands in stark contrast to the standard imposed for downwinders which, under the same legislation, was 20 pack years (Ibid.). Effectively, a downwinder could smoke as much as 20 times that of a uranium miner, the majority of whom were Native American, and still be eligible for the same benefit (Ibid.).

CONCLUSION

In the Navajo Nation the United States government failed to carry out their obligation to protect the health of the Navajo people. This was done not of malice but official neglect. Numerous opportunities presented themselves when the AEC, the EPA, the BIA, and even the U.S. Congress could have inserted their authority and perhaps prevented a tragedy of this magnitude occurring. Lack of funds, lack of representation, lack of interest in either the people or the land certainly played a part yet most striking is the utter lack of regard for human life. Ultimately, “The greatest irony... is that the only victims of U.S. nuclear arms since World War II have been our own people” (Committee on Labor and Human Resources, United States Senate 101st Congress, 1990, p. 228).

As a lawyer speaking on their behalf once said, “I think it’s about time that we faced up to the fact that there would have been no nuclear arsenal if there had not been these human beings willing to make sacrifices for their country” (Eichstaedt, 1994, p. 112). These are and were people who gave their lives to the country. Official callousness, as well as inadequate and underappreciated science, collided with traditional Native American culture to create the nuclear disaster in the Navajo territory. Cleanup and remediation efforts continue to be hindered by inter- and intra-bureaucracy decisions made for personal or group benefit. Native Americans, often situated outside the mainstream U.S. economy, are particularly vulnerable to exploitation by extractive industries: underdevelopment renders resource development the only viable economic strategy available to most tribes. Significant changes are yet to be made, fixes implemented. Most importantly, the regulatory function of government must be separated from resource management since it is clear that no agency can fulfill both the mission to protect public health and encourage mineral development.

REFERENCES


People and Uranium Mining (pp. 57-78). Albuquerque, NM: University of New Mexico Press.


