

Marsha Weisiger

Happy Cly and the Unhappy History of Uranium Mining on the Navajo Reservation

The camera pans across the vermillion mesas and buttes of Monument Valley that John Ford and John Wayne made mythic. Here, near the border between Utah and Arizona, lives the most famous family you have never heard of, the family of Happy Cly, pictured again and again in *Arizona Highways*, the portfolios of photographers Josef Muench and Ray Manley, and postcards sold at Goulding's tourist lodge. Dissolve. The next scenes introduce Cly's great-grandson, Lorenzo Begay. He leafs through old black-and-white pictures of his family, stills from a movie he has never seen: a smiling girl in a velvet blouse studded with silver conchos, a grinning boy with a bandana tied across his forehead. "I never thought that pictures would change anyone's life," Begay narrates. "But that was before the return of the Navajo boy."¹

So begins the poignant documentary film, *The Return of Navajo Boy*, directed and coproduced by the independent filmmaker Jeff Spitz and first broadcast on PBS in 2000. The title is a play on words. In 1997, a Chicago developer named Bill Kennedy sent Spitz a videotape of a short silent movie, "Navaho Boy: The Monument Valley Story," which his late father, Robert Kennedy, had produced shortly after graduating from film school in the early 1950s. That film, written and directed by the elder Kennedy's mentor, Rex Fleming, and starring the Cly family, coupled a six-minute-long ethnographic scene of

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Marsha Weisiger, "Happy Cly and the Unhappy History of Uranium Mining on the Navajo Reservation," *Environmental History* 17 (January 2012): 147–159.

doi:10.1093/envhis/emr146

family life—herding sheep; caring for children; fashioning hair into the traditional bun; carding, spinning, and weaving wool—with a fabulous tale. The story begins when the Navajo boy learns that his grandmother is ill. He rides his donkey day and night across the desert sands and, along the way, has a vision featuring two supernatural beings. Eventually, he reaches a medicine man, who accompanies the boy to his home; the healer creates a sandpainting and chants a ceremony. Once the ritual is complete, the boy rides back into the desert, scales a red-rock butte, and—silhouetted against the sun—raises his arms like the wings of an eagle in praise of the gods. Intrigued by this film, Spitz showed it to a specialist in Native American history and culture at the Newberry Library, who—horrified that it captured a sacred sandpainting on celluloid and thereby violated a taboo—advised Spitz to burn it. Bill Kennedy decided instead to return the film to the Clys. Kennedy and Spitz thus journeyed to the reservation, with cameras rolling, to give the “Navaho Boy” to the family as a sort of repatriation.² It seems at first, then, that the film’s title refers to its own return.

But as Jimmy Cly and his sister Elsie Mae Begay—the Navaho Boy and the girl in the velveteen blouse—watch the old film while the camera records the scene, we learn that *The Return of Navajo Boy* is about a much bigger story than the mere restitution of images from the family’s past. Elsie Mae and Jimmy had a younger brother, John Wayne Cly (named by the actor himself), who was taken away when he was just a toddler because their grandmother, Happy Cly, and their mother, Elsie Zina, had contracted a lung disease. When their mother died, Happy Cly, too sick to care for her grandson, felt compelled to place the child in the care of missionaries. In the end, John Wayne Cly and his family are reunited, and we discover that the film’s title refers to the repatriation of *that* Navajo boy.

At its core, though, this is a story about environmental justice. *The Return of Navajo Boy* confronts why the two-year-old John Wayne was taken away, and it does so on the Cly family’s terms. In an early scene, Elsie Mae and her son Lorenzo enlist Bill Kennedy and Jeff Spitz to help them use the old footage to make “a different kind of film,” one that would “fill in the missing parts,” the truths most image-makers omit from their timeless portraits of pastoral Navajos. The resulting documentary juxtaposes cinéma vérité footage of the present with romanticized images of the Clys from the 1950s—postcard pictures and snippets from four film shorts, including Kennedy’s “Navaho Boy” and a promotional film for the uranium industry—to tell an utterly unromantic family history of exploitation and loss. These images of Happy Cly’s family draw us into the depths of the unhappy history of uranium mining on the Navajo Reservation and the efforts of the Diné (as they call themselves) for redress. As *The Return of Navajo Boy* reveals, the Diné suffered physically and

emotionally from the fatal fallout of the Cold War and the development of nuclear power. Federal officials once touted “atomic power” as cheap, clean energy. The Diné paid the price.³

Happy Cly was “probably the most-photographed woman in America,” wrote Joyce Muench, the writer and wife of photographer Josef Muench, after Cly’s death in 1960.⁴ That was most certainly an exaggeration, but it may well be true that she was the most photographed woman in Navajo Country. Photographers often portrayed her as a weaver, much as Muench did below in the 1950s. Seated on a colorful rug before an upright loom, Cly weaves a diamond-patterned textile in white, oranges, and black against a gray field. Her tools—a weaving comb in her hand, a long spindle and rectangular carding combs propped up against her loom, a straw hairbrush by her side—signify a Navajo woman’s domain. This postcard of Happy Cly is stereotypical, the most common depiction of Diné women. To be sure, women often worked as weavers, and yet the photographers’ intent was not to capture true pictures of everyday life but rather to



Figure 1: Happy Cly weaves for the camera in a photograph by Josef Muench, ca. 1955. The caption identified her only as “Navajo Indian weaver,” noting that “A woman in her summer shelter on the Reservation exploits a skill for which her tribe is world-famous in making a rug.” Used by permission from Northern Arizona University, Cline Library, Josef Muench Collection. NAU.PH.2003.11.3.7674. This image also appears in *The Return of Navajo Boy*.

render archetypes. Tellingly, postcards like this one never identified Cly by name, only as “Navajo Indian weaver” or “Navajo woman.”⁵ In *The Return of Navajo Boy*, Spitz contrasts these idealized images with the Cly family’s actual poverty and pain.

Along with the classic rug weaver motif, Spitz deploys a second archetype (this one from the historic footage of “Navaho Boy”): the Navajo woman as Madonna. Happy’s daughter, Elsie Zina, appears bedecked in the traditional Navajo woman’s velvet finery, with turquoise pendants dangling from her ears, her baby John Wayne on her lap. This image conveys a double meaning in *The Return of Navajo Boy*: the representation of a timeless maternal ideal and the reality that a tragic blow broke the familial bond with John Wayne Cly. So as this footage crops up again and again over the course of Spitz’s documentary, its meaning shifts from a romantic rendering to one that evokes loss and dislocation.

Spitz uses decidedly disturbing images from the 1950s film to introduce us to the documentary’s environmental story. A woman (Happy Cly) and a child (her grandson, Richard Blackwater) sit stripped to the waist—their backs to the camera—as a medicine man, or *hataatii*, chants the Windway, a healing ceremony. Because scenes like the Navaho Boy’s long journey across the sand dunes were obviously staged by the filmmaker, we viewers at first assume that the ceremony is fake, too. And yet when asked on camera, Elsie Mae observes that the sacred rite was not only “authentic” but real. We cannot know exactly what made Happy Cly (or her daughter Elsie Zina) sick, but as the documentary’s narrative unfolds, it becomes clear that uranium mining in Monument Valley ravaged her family.

Uranium mining began in their small corner of the Colorado Plateau in the early 1940s after Harry Goulding, the local trading-post owner



Figure 2: Elsie Zina with her baby boy John Wayne Cly, ca. 1955. From *Navaho Boy: The Monument Valley Story*, by Robert Kennedy. The image also appears in *The Return of Navajo Boy*. Courtesy of Groundswell Educational Films, www.navajoboy.com.



Figure 3: Happy Cly, Richard Blackwater, and (in the foreground) the hataali Khetso during the Windway, ca. 1955. From *Navaho Boy: The Monument Valley Story*, by Robert Kennedy. The image also appears in *The Return of Navajo Boy*. Courtesy of Groundswell Educational Films, www.navajoboy.com.

(famed for introducing filmmaker John Ford to the valley), learned about the ore-bearing sandstone from a local Diné man. Goulding passed the information on to a geologist with the Vanadium Corporation of America, which had already opened a mine in the Carrizo Mountains to the southeast. Nearly 3 million pounds of uranium oxide from Monument Valley would be used for the Manhattan Project. And as the arms race took off, the Colorado Plateau proved to be the only place in the United States where uranium ore could be extracted economically. By the time most of the reservation's mines played out in the 1960s, Monument Valley alone had supplied 1.4 million tons of uranium ore for bombs and energy production.⁶

The Return of Navajo Boy offers a glimpse of Harry Goulding, who promoted the uranium boom in the valley and thereby transformed the lives of the Diné who lived there, but other images that do not appear in the film are more revealing. Photographer Thomas Stimson, Jr., in a 1950 *Popular Mechanics* photo essay, depicts Goulding with a nameless “Navajo prospector” against the cinematic backdrop of one of Monument Valley’s famous “Mittens,” a rock formation.⁷ Wearing headphones and holding a Geiger counter, Goulding demonstrates how the machine works to Willie Cly (visually identified as Navajo by the bandana around his head), who holds the ore. Another shot leads the eye from a Diné man gazing at a gigantic chunk of ore in his hands to a pile of yellow rocks in the foreground, which suggests the riches that are just waiting to be picked up. These and other contemporaneous—yet traditional—images of Diné with horse-drawn wagons, churra sheep, and looms (the latter likely of Happy Cly, but her back is to the camera) juxtapose a primitive past



Trader Goulding shows Navajo prospector how a Geiger counter reveals radioactivity in piece of uranium ore
PHOTO BY THOMAS E. STIMSON, JR.

Figure 4: Harry Goulding and Willie Cly, the “Navajo prospector.” Photograph by Thomas E. Stimson, Jr., originally published in the June 1950 issue of *Popular Mechanics*. Courtesy of Popular Mechanics. See also the front cover of this issue.

with an industrial future. They represent Navajos as people on the cusp of modernity.⁸

In this same vein, an industry-sponsored film, *A Navajo Journey*, featuring the Cly family and Monument Valley, and excerpted in *The Return of Navajo Boy*, depicts Navajos in transition between the pre-modern and modern worlds. Kerr-McGee Corporation made the film in 1952 to promote its mining operations on the Navajo Reservation. By 1950, the Oklahoma-based petroleum company held rights to about a quarter of U.S. uranium reserves and was a leading producer in Navajo Country. It opened mines in Monument Valley, the Carrizo Mountains, and elsewhere, and operated a major uranium mill at Shiprock, on the other side of the mountain range.⁹ The company’s film, *A Navajo Journey*, is typical for its time, part travelogue, part educational video, part corporate advertisement.

Spitz overlaps scenes from that film and his own footage to create a montage of sardonic irony: the Kerr-McGee Corporation, he suggests, exploited the image of the Clys even as it killed them. A scene showing Happy’s husband, Willie, washing his hair in an enameled bowl of sudsy water appears as Bernie Cly, talking with his sister Elsie Mae at the kitchen table, draws the connection between the uranium in the water and the death of his mother, Elsie Zina. “One day, my mother went to the hospital,” he recalls. “Us kids waited all summer for her to come home. Harry Goulding came and told us that Mom died.” Here we see a stained photograph of his mother as she is being examined by a doctor, who holds a tongue depressor in her mouth. “Grandma,” he continues, “started to cry, ‘My daughter . . .’” His words hang in the air. Pensive pictures of the Clys from the 1950s project onto the screen. And the narrator from *A Navajo Journey* trumpets in a tone that calls to mind a Disney nature film: “Today’s people

are living on ground hallowed by their ancestors, looking forward to the future of many brilliant tomorrows.”¹⁰

Those “brilliant tomorrows” would be made possible by uranium mining, implied the industry-sponsored film. In the full-length original, a long sixteen-minute ethnographic prologue portrays Navajos engaged in the “laborious toil” of everyday life, cultivating corn and squash, tending sheep, making soap from yucca roots, and hauling water in pails across long distances, scenes that form a counterpoint to the film’s coda: the industrial revolution wrought by uranium. “The hills resound with the whirl of modern machinery,” the narrator proclaims as a mining cart filled with broken rock emerges from a shaft. Unlike the *Popular Mechanics* photo essay, nothing in the picture identifies these workers as Diné. Wearing blue jeans, work shirts, and hard hats, the men look like ordinary American laborers. Only the narration that accompanies these images—announcing that the “royalties from the uranium mines are providing much-needed cash for the Navajo prospector and for the tribe,” and that “many of the Navajo men are employed in the uranium mines, where they are valued as conscientious workers”—inform viewers that these workmen are Diné. And that is the point. These uranium miners, the corporate film suggests, will lead their people from a picturesque yet primitive past into the modern era, when the Navajos will become undifferentiated mainstream Americans.

These images of industrious Navajo miners flicker across the screen for less than one minute of *A Navajo Journey’s* eighteen-minute running time, but in *The Return of Navajo Boy*, Spitz plays and replays this rare footage of Diné men and machines to insinuate the



Figure 5: “The hills resound with the whirl of modern machinery.” A Diné worker carts uranium-laden rock from the mine shaft in a scene from the Kerr-McGee promotional film, *A Navajo Journey*, 1952. The image also appears in *The Return of Navajo Boy*. Courtesy of Groundswell Educational Films, www.navajoboy.com.

painful paradox of uranium mining. Certainly Diné families welcomed mining jobs. They allowed men to stay close to home. After the U.S. Bureau of Indian Affairs, in a failed attempt at soil conservation, all but destroyed the local livestock economy during the 1930s and early 1940s, many men were forced to seek railroad or migratory agricultural work, which drew them away from the reservation.¹¹ Uranium companies helped change that. At the local mines, Diné men found employment as blasters and muckers (who dynamited and shoveled up the ore-bearing rock), timbermen (who built the wooden supports underground), and drivers. Kerr-McGee's film documented that labor, but it was disingenuous; it touted the economic benefits of uranium yet failed to convey its dangers. In Spitz's hands, those same scenes of men at work connote corporate culpability.

Still, Spitz's documentary sometimes asserts the hazards of uranium, rather than showing them, in part because he focuses on the historical images and the testimony of the Clyses themselves. The result is a powerfully personal film, but its story sometimes seems incomplete. It may well be that such a visual medium is imperfectly suited to the depiction of invisible perils that begin with dust. Uranium dust produces a gas, radon, which is one of the most potent carcinogens known on earth. Radon decays into atomic-sized radioactive particles called "radon progeny" (or "daughters"), which attach themselves to drops of moisture, smoke, and dust. When people inhale that dust or swallow it with lunch, the particles find their way into the bone marrow and deep into the lungs, and as the particles decay, they emit alpha particles. The result is often lung cancer and death. The dangers of radon for uranium miners were well documented by the 1950s in the scientific and public health literature, and samples then taken in Monument Valley's mines in the late 1940s and 1950s recorded concentrations of radon that were 4 to 750 times the exposure limits established for other industries, such as radium-dial factories. Officials with the Atomic Energy Commission, the sole legal buyer of uranium until 1971, refused to establish safety standards for the mines, even though government scientists informed them that adequate ventilation, mandatory showers, and daily changes of clothing, safeguards that the Belgians took in their uranium mines in Belgian Congo, could reduce health hazards. Safer working conditions simply would have cost too much and slowed the arms race.¹²

The yellow rock depicted as a resource of the future in *A Navajo Journey* became heaps of waste when the uranium companies closed the mines in the 1960s. No one told the families living near the old mines that this debris was dangerous, that it contained exposed radioactive uranium-238, with a half-life of 4.5 billion years. As wind and water eroded the waste, uranium dust contaminated soils and aquifers. One in six wells near the mines—including the one the Cly family used for drinking water—contain unacceptably high levels of radionuclides,

according to the U.S. Environmental Protection Agency (EPA). Compounding the damage, families scavenged the rock piles for building stones, which they used for foundations, walls, bread ovens, and cisterns. Diné had no way of knowing that these materials continually exposed them to gamma rays, energy that radiates from the nucleus of the atom and penetrates deeply into bodily tissues, where it can damage the kidneys, liver, and lungs. Nor did they realize that uranium-laced floors would emit radon as they eroded, with its cancer-causing effects.¹³

The Return of Navajo Boy does not explain the physics of uranium exposure, nor does it directly address the question: How many Diné did the uranium boom kill or sicken? The truth is, nobody knows. Historically, Diné had unusually low rates of lung cancer, until the uranium mines opened. In the most comprehensive scientific review of medical records, involving 757 Diné miners who worked in the mines in the 1950s and 1960s, one researcher concluded that death from lung cancer was three times the expected rate. This was especially significant because the majority of those in the study had never smoked cigarettes (nationally, the leading cause of lung cancer).¹⁴ Another scientist found that of thirty-two Diné men with lung cancer in New Mexico between 1969 and 1982, twenty-three had been uranium miners; indeed, at the Shiprock hospital, sixteen of the seventeen men with lung cancer had mined uranium.¹⁵ That does not necessarily mean that uranium mining caused their lung cancer. Unfortunately, epidemiological correlations suggest possibilities, not proof.¹⁶ Nonetheless, the high incidence of lung cancer among Navajo uranium miners, the astronomical levels of radon in the mines, and the physics of radon decay make an awfully strong case.

The challenges of proving causation likely shaped the making of *The Return of Navajo Boy*. Instead of using statistics or animations of radon progeny and alpha particles attacking lungs, Spitz creates a series of visual impressions and implicitly asks his viewers to connect the dots. Two girls squatting on the ground construct a doll-sized hogan. Behind them, a white streak staining the red-rock mesa leads our eye from the waste rock that collected on the Cly family's land to the Skyline uranium mine above. As the camera zooms in, we are horrified to see that the girls are building their doll house out of rocks that bear the telltale yellow hue of uranium. Dissolve. The camera follows Bernie Cly as he takes us to the Skyline Mine above his family's land, the arched opening of its shaft now sealed off with concrete blocks. Then at a rally for the compensation of uranium mine victims, he lifts up his blue plaid shirt to reveal a long thin scar along his ribcage where surgeons removed half his lung. Dissolve. Elsie Mae Begay stands outside the rock hogan where she and her six children lived, off and on, for years, and points out the yellow-tinged rock of the foundation walls. Radiation tests have recorded emissions that are off the charts, at least 75 times the EPA's recommended



Figure 6: Diné girls smile as they play with uranium-laced stones that they have collected from the waste-rock piles left behind by the Skyline Mine ca. 1998. From *The Return of Navajo Boy*. Courtesy of Groundswell Educational Films, www.navajoboy.com.

maximum exposure. One of Elsie's sons died at age twenty-five from a brain tumor; a second, age forty-two, succumbed to lung cancer. It could be coincidence, but Elsie Mae does not think so. "We had a ceremony to diagnose why our family is constantly ill," she observes as the camera scans across steel cables and pulleys from the old mining operations rusting on the ground. "We live in the midst of uranium. We walk upon it every day. Our houses are built with it—it's in the walls."¹⁷ These images and the testimony that accompanies them prove persuasive. They lead viewers to conclude that the Cold War and our infatuation with nuclear energy have cost the Diné dearly.

If there is a happy ending to this story, it is foreshadowed in the words that Lorenzo Begay used to open the film: "I never thought that pictures would change anyone's life. But that was before the return of the Navajo boy." It turns out that Begay's words bear yet another meaning: the power of the images in *The Return of Navajo Boy* to bring environmental justice. In a new epilogue to the documentary's 2008 edition, a yellow bulldozer demolishes Elsie Mae's tainted hogan, which Jeff Spitz had brought to the attention of the EPA.¹⁸ After that epilogue was filmed, Spitz and Elsie Mae showed the film to members of Congress, which subsequently authorized the cleanup of the Skyline Mine's waste behind her home. On an internet companion site, a "webisode" made by Elsie Mae's daughter Mary Begay captures the image of a Caterpillar front-end loader as its enormous shovel removes contaminated soil and dumps dirt into a cable-operated hopper; once full, the hopper will carry the toxic waste to a repository on the mesa near the mine. And Bernie Cly finally received compensation for his lung cancer under the federal Radiation Exposure Compensation Act. That triumph, too, reflects the potency of

pictures. For some time, the U.S. Department of Justice would no longer return calls from Bernie Cly's attorney, Stewart Udall, the former secretary of the interior. Two weeks before *The Return of Navajo Boy* aired nationwide on PBS in 2000, the Justice Department, informed of the upcoming broadcast, told the director Jeff Spitz (not Bernie Cly, nor his lawyer) that the agency would pay Cly's claim.¹⁹ It is, nonetheless, a bittersweet victory.

Happy Cly and her family were once, perhaps, the most photographed family in Navajo Country, but they never had a voice, not even a name. Today her descendants are deploying a new set of images and discovering their voice, not only through their collaboration in the creation of this documentary, but in their public appearances at film festivals and on college campuses. Their visual narrative, *The Return of Navajo Boy*, holds the power to alter viewers' perceptions of nuclear weapons and so-called clean nuclear energy because it all begins with uranium.

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Notes

The author thanks Cindy Ott for her incisive critiques and her help in shaping this essay.

- 1 Jeff Spitz and Bennie Klain, *The Return of Navajo Boy*, DVD, directed by Jeff Spitz (Berkeley: Berkeley Media, 2001), available from Groundswell Educational Films, www.navajoboy.com. Unless otherwise indicated, the quotations and all the images I discuss come from this documentary. The Cly family collaborated with the filmmakers and granted them permission for the use and distribution of all the images used here. I am indebted to Gregg Mitman for bringing this extraordinary film to my attention. I also thank Christy Roye for sharing her master's thesis research with me.
- 2 Mike Sula, "Mystery in the Desert," *Chicago Reader*, January 20, 2000; Jeff Spitz, presentation on the making of the documentary, University of Oregon, October 6, 2011. My description here of the original production is based on Robert J. Kennedy's "Navaho Boy: The Monument Valley Story," written and directed by Rex Fleming, c. 1955; viewed courtesy of Groundswell Educational Films.
- 3 On nuclear power as cheap, clean energy, see, for example, "Seaborg Sees Atom Brightening Future," *New York Times*, November 24, 1967. Navajos were not the only ones to pay the price; see Michael A. Amundson, *Yellowcake Towns: Uranium Mining Communities in the American West* (Boulder: University Press of Colorado, 2002).
- 4 Joyce Muench, "Happy Cly," *Westways* 53 (July 1961):14–15. Muench states that Happy Cly had gallstones when she was taken to the hospital, where she died. But Cly's family says she suffered from a lung disease. One illness does not necessarily preclude the other one.

- 5 At the same time, it is worth noting that throughout *The Return of Navajo Boy*, Elsie Mae uses these postcards, much as a photo album, to recount her family's history to her grandchildren and the viewers. I am indebted to Jennifer Nez Denetdale for assistance in explicating this image.
- 6 Judy Pasternak, *Yellow Dirt: An American Story of a Poisoned Land and a People Betrayed* (New York: Free Press, 2010), 36, 54, 114; Amundson, *Yellowcake Towns*, Chapter 1; Doug Brugge and Rob Goble, "A Documentary History of Uranium Mining and the Navajo People," in *The Navajo People and Uranium Mining*, ed. Doug Brugge, Timothy Benally, and Esther Yazzie-Lewis (Albuquerque: University of New Mexico Press, 2006), 27. Goulding and Luke Yazzie tell their stories of discovery in Sam Moon, *Tall Sheep: Harry Goulding, Monument Valley Trader* (Norman: University of Oklahoma Press, 1992), Chapter 24. Vanadium, used in steel alloys, occurs in association with uranium. In an effort to keep uranium mining top secret throughout World War II, the federal government referred only to vanadium. See Pasternak, *Yellow Dirt*, 51, 114.
- 7 Harry Goulding, "The Navajos Hunt Big Game . . . Uranium," with photographic essay by Thomas J. Stimson, *Popular Mechanics* 93 (June 1950): 89–92.
- 8 Willie Cly is identified in Sula, "Mystery in the Desert."
- 9 Barbara Rose Johnston, Susan E. Dawson, and Gary E. Madsen, "Uranium Mining and Milling: Navajo Experiences in the American West," in *Half-Lives and Half Truths: Confronting the Radioactive Legacies of the Cold War*, ed. Barbara Rose Johnston (Santa Fe: School for Advanced Research, 2007), 100. For a brief history of the Kerr-McGee Corporation, consult Ross Peterson-Veach's entry in the *Encyclopedia of Oklahoma History and Culture* (Oklahoma City: Oklahoma Historical Society, 2007), <http://digital.library.okstate.edu/encyclopedia/entries/K/KE010.html>. In the 1970s, the Kerr-McGee Corporation gained notoriety as the result of the mysterious death of whistle-blower Karen Silkwood, who alleged safety violations at their Cimarron, Oklahoma, plant. The Anadarko Petroleum Corporation acquired the company in 2006.
- 10 My discussion draws in part on the original Kerr-McGee film, *A Navajo Journey*, directed by C. J. Colby, with scenario by Arthur S. Davenport (Tulsa: Bud Woods Productions, 1952), Smithsonian Institution, Human Studies Film Archives, <http://www.youtube.com/watch?v=EOPRxsivjIw>.
- 11 Marsha Weisiger, *Dreaming of Sheep in Navajo Country* (Seattle: University of Washington Press, 2009); Colleen O'Neill, *Working the Navajo Way: Labor and Culture in the Twentieth Century* (Lawrence: University of Kansas Press, 2005).
- 12 Catherine Caufield, *Multiple Exposures: Chronicles of the Radiation Age* (Chicago: University of Chicago Press, 1989), 78–79; Pasternak, *Yellow Dirt*, 65–66, 73, 92; Johnston, Dawson, and Madsen, "Uranium Mining and Milling," 99–102; Stewart L. Udall, *The Myths of August: A Personal Exploration of Our Tragic Cold War Affair with the Atom* (New York: Pantheon Books, 1994), 191–93; Howard Ball, *Cancer Factories: America's Tragic Quest for Uranium Self-Sufficiency* (Westport: Greenwood Press, 1993), 34–36, 45–54. For early research on the dangers of radon progeny, see John H. Harley, "Sampling and Measurement of Airborne Daughter Products of Radon," *Nucleonics* 11 (July 1953): 12–15. Also consult Ellen Bales, "From Calamity Mesa to Boyertown, PA: Risk, Radon, and Regulation in Cold War America," *IEEE Technology and Society Magazine* 27 (Fall 2008): 25–31. The AEC actively withheld information on radon hazards from the Diné because it did not want to discourage them from working in the mines. (The agency even kept it secret from the Bureau of Indian Affairs, which, considering its trust responsibilities, might have felt duty-bound

- to speak up.) The U.S. Public Health Service, which monitored radon in the mines and studied miner health, also kept mum.
- 13 Doug Brugge, Timothy Benally, and Esther Yazzie-Lewis, eds., *The Navajo People and Uranium Mining* (Albuquerque: University of New Mexico Press, 2006), Appendix. On the environmental hazards of the detritus of abandoned uranium mines on the reservation, see U.S. Environmental Protection Agency, "Abandoned Uranium Mines on the Navajo Reservation," <http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/ViewByEPAID/NNN000906087?OpenDocument>, and "Gamma Rays" fact sheet, <http://www.epa.gov/radiation/understand/gamma.html#difference>.
 - 14 Robert J. Roscoe, J. A. Deddens, and T. M. Schnorr, "Mortality among Navajo Uranium Miners," *American Journal of Public Health* 85 (1995): 535–40. Some studies have also linked radon exposure to kidney disease, leukemia, and other diseases, but an analysis of eleven scientific studies indicates that only the association with lung cancer is statistically significant. See Sara C. Darby, E. P. Radford, and E. Whitley, "Radon and Cancers Other Than Lung Cancer in Underground Miners: A Collaborative Analysis of 11 Studies," *Journal of the National Cancer Institute* 87 (1994): 378–84.
 - 15 Jonathan M. Samet, D. M. Kutvirt, R. J. Waxweiler, and C. R. Key, "Uranium Mining and Lung Cancer in Navajo Men," *New England Journal of Medicine* 23 (1984): 1481–84.
 - 16 For a good discussion of the difficulties of proving causation between environmental toxins and disease, consult Nancy Langston, *Toxic Bodies: Hormone Disruptors and the Legacy of DES* (New Haven: Yale University Press, 2010), 12–16.
 - 17 Pasternak, *Yellow Dirt*, 194–95; Judy Fahys, "A Legacy of Uranium, A Prayer for Healing," *Salt Lake Tribune*, March 22, 2011, <http://www.sltrib.com/sltrib/home/50949776-76/uranium-begay-died-epa.html.csp>. The EPA notes that the "background radiation" most people receive is about 300 millirem (mrem) per year and recommends only 100 mrem per year beyond that amount. Elsie Mae Begay's house registered more than 1,000 microrentgens (or 1 mrem) per hour. See U.S. Environmental Protection Agency, "Gamma Rays" fact sheet, <http://www.epa.gov/radiation/understand/gamma.html#difference>.
 - 18 Spitz first recognized that a hotspot on an EPA aerial survey of radiation contamination was Elsie Mae's place, which convinced him to focus his documentary on environmental justice. He subsequently contacted a radiation specialist who was working with the EPA to test Elsie Mae's old hogan. A few months later, a story about uranium-contaminated houses on the reservation, published in the *Boston Globe*, caught the attention of U.S. Representative Patrick Kennedy, who visited Elsie Mae. Seven months later, the EPA demolished the hogan. See Pasternak, *Yellow Dirt*, 185–95; Bill Papich, "Deposits of Ore, Danger: Tribe Seeks Redress for Illnesses Tied to 'Uranium Homes,'" *Boston Globe*, December 27, 2000; Nathan J. Tohtsoni, "'Uranium Hogan': Congressman Kennedy Tours Monument Valley," *Navajo Times*, January 25, 2001; Judy Fahys, "Radioactive Hazard Hits Home for Navajos," *Salt Lake Tribune*, July 16, 2001.
 - 19 Cindy Yurth, "'Return of Navajo Boy' Results in Uranium Cleanup," *Navajo Times*, August 29, 2011; Mary Begay, "Film Moves Congress and Mountains" (June 2011) and "Cleanup Continues" (October 2011), Groundswell Educational Films, <http://navajoboy.com/webisodes/>. The details of the Justice Department's response to Bernie Cly's case come from Jeff Spitz's presentation at the University of Oregon, October 6, 2011.