

Appendix A

The Gift on Nonviolence

In May 1948, on the warm night of the last day of my junior year in high school, when I was 16, I put an end to my father's beating me with a rubber hose. He'd escalated to this weapon for his wholly unjustified punishments some years earlier. On the night in question, as I made my way through the darkened house toward the room I shared with my brother, I sensed my father's presence before seeing him with that garden hose doubled over in his hand. He ordered me to lie down on the bed as I'd always done. It suddenly came to me that I didn't have to take this any longer. My refusal triggered a struggle in which he tried to force me down. I responded by wrapping my arms around his neck and lifting my feet from the floor so that I hung deadweight down the front of his body, absorbing all his energy. Within seconds he went limp with exhaustion, and I removed my arms from around his neck, ending forever his physical violence toward me.

As the years passed I saw a straight line from the violence of my father to the violence of my country, the extremity of the former fortunately no worse than a rubber hose, but of the latter enough nuclear force to end human life on Planet Earth several times over. When in 1978 I learned about Rocky Flats, where the fissile core of every U.S. nuclear warhead was made, I sought with others to stop what was done there. In nonviolence training for my first civil disobedience at Rocky Flats, we did a role-play called "deadweight" in which you contain a belligerent person's behavior by hanging yourself deadweight down that person's torso. Tears burst from my eyes. Amazingly, what I'd done spontaneously at age 16 was being taught in carefully choreographed nonviolence training.

My father, without knowing he was doing so, had made a gift to me, for he had planted within me the seed of nonviolence and had even brought it to blossom. As for Rocky Flats, an eventual fruit of the flowering of nonviolent resistance was to end production there of nuclear bombs, the extremity of violence.

Appendix B

Plutonium in bodies of workers will shut the industry down

In 1987 Gregg S. Wilkinson of DOE's Los Alamos Lab published results of a study of Rocky Flats workers that presented the first epidemiological findings suggesting that exposure to plutonium produced adverse health effects.¹ Wilkinson divided the 5,413 workers he studied into three groups: the *more exposed* (those with a plutonium body burden of 5 or more nanocuries [nCi]), the *less exposed* (those with a body burden of from 2 to 4.9 nCi), and the *unexposed*. The unexposed workers were the control group to which the exposed workers were compared; that is, workers were compared with their peers in the workplace, not with the population in general. Both the less exposed and more exposed workers by comparison with the non-exposed showed no significant increase in cancers of the liver, bone and lung, organs of the body where plutonium is known to accumulate. But both groups showed surprising increases in a wide range of other cancers. Excess brain cancers were found among both the less exposed and more exposed.

DOE's occupational standard for plutonium is a maximum permissible body burden of 40 nCi. Many of the workers Wilkinson studied had body burdens considerably below this level. Because 2 nCi – a mere 5% of DOE's standard for permissible exposure – was the lowest level his instruments could detect with certainty, Wilkinson classified as unexposed all workers with a body burden of less than 2 nCi. Any cancers among workers burdened at this very low level were not counted as possibly due to occupational exposure. Wilkinson thus thought his study underestimated the true effect of plutonium exposure.

As soon as his results began to be known, his study created a firestorm of controversy within DOE. A physician on the Los Alamos staff told him that his findings, if true, "would shut down the nuclear industry!"² His supervisor at Los Alamos urged him to modify his findings prior to publication to please "the customer"³ that is, DOE. When he published his results without change in the *American Journal of Epidemiology* in 1987, his Los Alamos work was downgraded and subjected to increased levels of internal review, making future research more difficult and publication less likely. In response, he resigned.⁴ His colleague George Voelz, one of the eight co-authors of the Wilkinson study, was moved into the position Wilkinson vacated.

In an article published in *Los Alamos Science* in 2000, Voelz presents what purports to be a comprehensive review of what is now known about risk from exposure to plutonium. He refers to Wilkinson's study of Rocky Flats workers, saying that it showed "no evidence of statistically increased rates of lung, liver, and bone cancers."⁵ While this is true, Voelz makes no mention of what made the Wilkinson study so controversial in the first place, namely, the finding of elevated levels of other cancers, including brain cancers, among workers with plutonium exposure at very low doses. Voelz' name, by the way, as noted above, appears on the title page of Wilkinson's article as one of the co-authors.

Having heard Wilkinson's Rocky Flats study dismissed as inadequate because he did not consider data on the use of tobacco among the workers he studied, I asked Wilkinson about this. He pointed out, first, that data on tobacco use would be pertinent for lung cancer but not for other cancers. Second, "the potential relationship between smoking, plutonium lung burden and lung cancer should be studied." In fact, while he was at Los Alamos he had drafted a proposal to seek National Cancer Institute funding for research in this area, but DOE officials "would not allow the proposal to be sent to the NCI for review."⁶

¹ Gregg S. Wilkinson et al, "Mortality among Plutonium and Other Radiation Workers at a Plutonium Weapons Facility," *American Journal of Epidemiology* 125, 2 (1987): 231-250.

² Wilkinson, "Seven years in search of alpha," *Epidemiology*, 10 (1999).

³ Keith Schneider, "Panel Questions Credibility of Nuclear Health Checks," *New York Times*, February 28, 1990.

⁴ Wilkinson, "Seven years in search of alpha," *Epidemiology*, 10 (1999).

⁵ George L. Voelz as told to Ileana G. Buican, "Plutonium and Health: How great is the risk?," *Los Alamos Science*, No. 26 (2000), 85.

⁶ Wilkinson to Moore, April 26, 2001.

Appendix C Rocky Flats Fast, 1989

The FBI raided Rocky Flats on June 6, 1989 to collect evidence of environmental law-breaking at the plant. A few days later a small group, myself included, went to Governor Roy Romer with this request: "Tell the DOE to halt production at Rocky Flats until independent investigators verify that the plant can be operated safely. We know you lack the legal authority to close a federal facility," we said, "but as governor you possess an exceptional moral authority. We urge you to use your moral authority to get Rocky Flats closed by July 4."

I left the governor's office that day convinced he would do nothing. But he did do something: He reached an agreement with the DOE to keep the plant operating. This was distressing, because it set a precedent: *Go along with the DOE. Go along to get along.* I could see this happening. Romer was setting a precedent, and I knew other officials would follow his lead. And indeed they did, notably those responsible for the "cleanup."

How should I respond? I decided that if he did not take the action we had requested by July 4, on the very next day, July 5, to highlight his lack of moral nerve I would initiate a water-only fast.

With my close friends the idea of a fast was hotly discussed. I told them it would end only when production ended. It could continue until I died – at age 57. Expecting my death, a Catholic Worker friend made a wooden box to contain my ashes. To be willing to die for a cause is not unusual. I was asking no more of myself than is asked repeatedly of soldiers in our country's military ventures. But some very close to me were angry at any thought of fasting to death. Others wondered: Why Romer? Why not the DOE? or Congress? The answer was simple: Many of us had for years urged the DOE and Congress to close Rocky Flats. Now conditions were ripe for the governor of Colorado to take a stand.

The question of fasting to death was more difficult. I found Mohandas Gandhi persuasive. He fasted to change the behavior not of adversaries but of allies. The one time he fasted to change the behavior of a British Viceroy in India, he quickly realized this was a mistake and ended his fast. To fast to death to change Governor Romer's behavior would likewise be a mistake, for its insistence that he meet our demands would be coercive in an extreme way. So fasting to death was rejected. Instead the fast would end on a specific date. It would begin on July 5, and, unless production at Rocky Flats halted, it would end 35 days later, on August 9, Nagasaki day. It would make no demands. It would simply reveal for all to see our exchange with Governor Romer and his response.

A news conference on July 5 announced the beginning of a 35-day water-only fast to acknowledge the governor's failure to use his moral authority to call for an end to production at Rocky Flats. "The difference between dying from nuclear exposure and dying from nuclear explosion," I commented, "is a matter of degree, and the only way to eliminate either is to eliminate both."

Activists for years had called Rocky Flats a local hazard and a global threat. The hazard would be less if the site were cleaned to the maximum extent possible. This, DOE said in 1995, would take 70 years and cost \$36 billion. But later that year DOE decided for a cheaper accelerated "cleanup" and made a closed-door deal with Congress that capped the cost at \$7 billion and the time at 10-years. The "cleanup" thus was driven by cost and calendar, not by public health and environmental integrity. When the final proposal for this accelerated "cleanup" was put out for public comment, 86% of the parties commenting rejected it. But officials responsible for the "cleanup" went along with the DOE. Rocky Flats thus is a local hazard forever.

The public aspect of the fast would occur daily from 7 AM till 6 PM at a place on the Capitol lawn, marked by a large banner that declared: "Fast of sadness for Rocky Flats victims." The list of victims included workers exposed to toxins on the job, off-site people endangered by contaminants, those killed or made ill by bombs made at Rocky Flats, the hungry and homeless who suffer the effects of a militarized economy, taxpayers who pay for what they did not choose.

Early on the second morning of the fast I was alone when a car pulled up and Governor Romer stepped out. He came to my side and after a torrent of words said: "You have targeted the wrong

person.” “No,” I said, “by virtue of the office you hold, you and only you possess the moral authority to persuade the DOE to halt production at Rocky Flats until independent specialists show the plant can be safely operated.” At this he turned away. He missed an opportunity and set a precedent.

A lesson I learned from the Vietnamese Buddhist monk Thich Nhat Hanh is, when meditating, to watch my breath. How appropriate, I thought, since the likeliest way to be exposed to plutonium is to breathe in tiny particles. My meditation at the Capitol each day focused on the silent suffering delivered by plutonium particles wafting on the breeze. To fast was to wake up. No more politics of begging for favors.

The public was invited to join the fast – for the sixty minutes of silent meditation at the start of each day, or for a couple of hours or for several days, for conversation, or for silence. People came, some days a few, some days hundreds. On the sixth day of the fast one of Romer’s aides said the governor had received hundreds of letters urging him to get Rocky Flats shut down.

But all was not well. One day the governor came out on the Capitol lawn to talk with a large group participating in the fast, and some were hostile. We want him to do the right thing, I thought, but we make it hard for him to hear us, much less heed us. We have a long way to go.

My sign-up book has names from 13 countries and 48 states. Many asked how I got involved with Rocky Flats. In 1974 I arrived in Colorado to teach at the University of Denver. I was not aware of Rocky Flats. But I was concerned that human life on this planet could end due to three fundamental threats of our own making: first, nuclear holocaust; second, ecological disaster; and third, authoritarian and secretive governance. I learned about Rocky Flats in 1978 when people occupied the railroad tracks leading into the plant. I saw immediately that Rocky Flats combined in a concentrated way all three threats to our existence. At this point my life changed forever. I left the academic world and joined people on the tracks in my first act of civil disobedience. From this moment I have devoted myself to stopping Rocky Flats.

The fast was in the papers almost every day. But most persistent was my being asked most mornings to talk on the phone with a radio broadcaster who addressed an audience of commuters in their cars. Besides asking about Rocky Flats, he wanted me to badmouth Governor Romer, but I refused.

When we met with the governor soon after the FBI raid he took great pride in telling us that he and Secretary of Energy James Watkins were about to establish a dose reconstruction study to see how the health of people in off-site areas had been affected by Rocky Flats. The first of three op-eds I published while fasting applauded this move. Only later did I realize that dose reconstruction studies are rarely of any help to the affected public. The study done for Rocky Flats was in fact an expensive diversion that sidestepped the medical monitoring of individuals that should have occurred and did not. To this day there has never been a public study of the specific health of off-site individuals affected by Rocky Flats.

The fast acknowledged that we are responsible for the fate of the generations coming after us. The contamination at Rocky Flats gives rise to a great deal of scientific uncertainty. This calls for caution. The DOE, EPA and Colorado Health call the “cleanup” “risk-based.” This means there is a risk. Therefore, to call the site “safe” is wrong. We the people possess the moral authority to deal with Rocky Flats in a much more comprehensive way. It is folly to depend on someone else. The failed “cleanup” is a reminder of this folly.

As for my health, on every day of the fast a physician, the late Paul Klite, checked my health, led me in physical exercises and reported on my condition to Barbara Engel, my partner. Others, too many to mention, helped in various ways. Over the 24 days of having only water and a bit of salt, I never craved food, lost some weight, but in truth never felt better.

The Buddhist monk Sawada Shonin belongs to an order created in Japan after World War II to oppose nuclear weapons. It placed their monks at nuclear weapons production sites in various countries. Sawada was assigned to Rocky Flats. He was traveling when my fast began. I invited him to join the fast when he returned. One afternoon as I sat on the Capitol lawn I saw a distant figure in saffron beating a drum, chanting and marching toward me. It was Sawada. Three days later he proposed that I end my portion of the fast and let him continue it until August 9.

So, on the 24th day I broke my fast and passed to Sawada the responsibility of finishing it 11 days later, on August 9. He was not alone. Forty-five others, most of them local, continued the fast, some for a short time, some till August 9. Thus ended the fast of solidarity with all who suffer because of Rocky Flats. Although the fast ended, the suffering continues.

Appendix D

Fire in 2003, Unknown to the Public

Twice in the month of May 2003 I and about 20 participants in the Rocky Flats Cleanup Agreement (RFCA) Focus Group met with officers of the DOE, EPA and CDPHE to discuss the cleanup underway at Rocky Flats. Those from the Focus Group were highly engaged in issues related to Rocky Flats. We met in Broomfield, maybe five miles from the eastern edge of the Rocky Flats site. Each meeting lasted 2 to 3 hours.

One day that May 2003 a fire broke out in Building 371, the newest, largest, most expensive of the plutonium processing buildings at Rocky Flats. Also, all the plutonium to be shipped off site before the cleanup was finished was stored in 371. Early one day Randy Sullivan, captain of the Rocky Flats Fire Department, suddenly received a radio message that there was a fire in Building 371. Randy knows it has to be a plutonium fire. This is bad news. He soon is in the fire truck that stops in front of the building from which workers are rushing out.

The fire is several stories down, well underground. The air is full of smoke and debris. It is difficult to see. Randy realizes many workers are still in the vicinity of the fire, which he cannot see. Visibility was about 6 inches. Finally he can see the fire at the back of a glovebox. He stays in the building until he's sure the fire is out. Then he leaves and heads for those responsible for decontamination, only to learn that he's so exposed he'll have to be taken to the on-site medical center.

Despite the seriousness of this fire, not a word was said about it to members of the Focus Group by personnel from DOE, EPA and CDPHE. I learned about the fire from reading a draft of Kristen Iversen's new book, *Full Body Burden: Growing Up in the Nuclear Shadow of Rocky Flats*, N.Y.: Crown Publishers, 2012, pp. 289-298.

Appendix E

Superfund and Rocky Flats

Rocky Flats was cleaned for the specific land use of a wildlife refuge. The preference for limiting cleanup to a particular land use seems a far cry from the intent of the original legislation. The initial impetus for Superfund was Love Canal, New York, where contamination from a former industrial site found its way into a school yard and the basements of houses. Hooker Chemical and Plastics Corporation had deeded land to the local school board with a clause stipulating that the site had chemical waste, and the company was assured that no construction would occur where waste had been dumped. But after a few years a school was built on the site and residences were constructed nearby. This striking failure of land use controls provided the impetus for creating the Superfund law.

The original Superfund legislation indicated a clear preference for cleanups that “permanently and significantly reduce the volume, toxicity or mobility of the hazardous substances.” To implement the law, EPA, however, had to develop guidelines, primarily the National Oil and Hazardous Substance Contingency Plan (NCP). Along the way, EPA came under intense pressure from polluters, entities of the federal government, and economic development interests to make cleanup guidelines more lax. While the original law referred to cost effectiveness, this concept certainly was not the heart of the law. Yet, in the process of developing guidelines, the closely related concept of cleanup for “reasonably anticipated future use” evolved and took hold. Hence, the cleanup at Rocky Flats, a radioactively polluted site, was guided in large part by a ten page EPA guidance to staff document (OSWER Directive No. 9355.7-04 , Land Use in the CERCLA Remedy Selection Process), drafted in 1995, not subject to any type of public approval.

EPA runs a program known as “Brownfields” which essentially promotes the industrial reuse of contaminated industrial sites. These sites require less cleanup and therefore cleanup that costs less than a cleanup designed to protect a potential resident of the site. This program tends to promote the economic value of the sites, as opposed to emphasizing the health-threatening condition of the sites. It is possible that wildlife refuges will become the Brownfields of large federal facilities.

While in practice Superfund has morphed from a law favoring thorough cleanup to one favoring limited cleanup based on site use, the agencies at Rocky Flats were not required to base plutonium cleanup on the wildlife refuge worker designation. They chose to base their calculations on this designation. Both CDPHE regulations and the Nuclear Regulatory Commission’s Decommissioning Rule that apply at Rocky Flats express preference for unrestricted-use cleanups rather than the restricted cleanup happening at Rocky Flats (restricted to a wildlife refuge). Cleaning the site to protect a resident subsistence farmer, as recommended by the Rocky Mountain Peace and Justice Center, would have fulfilled this preference as well as met the original intent of Superfund law.

Appendix F

Plutonium from Rocky Flats to Texas

In January 2018 this link caught my eye: <http://www.theirminesourstories.org/?p=671> If you open it you will find a brief article about Asarco's poor environmental practices. Reading the article, suddenly this passage stood out:

“In the early 1990's, with copper prices falling and many plants shuttered, Asarco contracted with the Department of Defense to accept hazardous waste at its subsidiary, Encycle, in Corpus Christi, Texas. The waste came from DOD facilities at the Rocky Mountain Arsenal and Rocky Flats in Colorado and Tooele, Utah, among others, where napalm, saarin nerve gas, cluster bombs, plutonium and white phosphorous had been produced.”

The early 1990s at Rocky Flats would be the period after the FBI raid and the beginning of the “cleanup.” The passage says that plutonium “had been produced.” This is a mistake; plutonium was processed at Rocky Flats, not produced. The statement suggests that plutonium was sent from Rocky Flats to Encycle, an Asarco subsidiary in Corpus Christi, Texas. This was never publicly revealed by DOE or any of its corporate contractors. Why was this hidden? What else do we not know?

Appendix G

Jock Cobb's Study of Rocky Flats Plutonium in Body Tissue (6-14-18)

Very soon after I learned about Rocky Flats in 1979, I attended a seminar on radiation health effects offered by John (Jock) Cobb, MD, of the faculty of the CU Medical School. It was an eye opener. He was a remarkable teacher who brought clarity to complex subjects. And, as the following account makes clear, he was also a very original researcher regarding present and long-term health effects of exposure to plutonium released from Rocky Flats. He first learned details about Rocky Flats in 1974-75 when he was appointed by newly-elected Governor Dick Lamm and Congressman Tim Wirth to the Lamm-Wirth Task Force, a public group that studied all aspects of the Rocky Flats plant and issued a very influential report that said the plant should never have been built near a major population center and should be shut down and its operations moved elsewhere.

When I first met Cobb he was deeply immersed in an unusual study in which his team of researchers collected samples of tissue from Colorado people who had died and been autopsied. His wanted to see how much Rocky Flats plutonium had been deposited in the bodies of these deceased people. It's difficult to imagine this happening now, but in the 1970s EPA actually invited him to do a study. This meant that the DOE could not control the study. Cobb was doing a study that would show definitively that people who lived downwind of Rocky Flats had taken various quantities of plutonium into their bodies, mainly by inhalation, the worst way to be exposed to plutonium.

Cobb was not liked by DOE. A Rocky Flats worker told him people in the Rocky Flats Public Relations Office "were trying to get you fired from the University. They found you had tenure, so they couldn't." DOE disliked anyone who wanted to tell the public about health problems at Rocky Flats. Cobb says Union leader Jim Kelly and his brother Pat "blew the whistle on the plutonium dispersal from the lip area [of the 903 Pad] that was blowing downwind into Denver. . . . Yet he [Jim] was quite patriotic and loyal to Rocky Flats, because he had a very good job." Cobb says he received many calls from Rocky Flats workers afraid they had been exposed to radiation on the job, and that the plant was not helpful. He helped them get needed tests and analysis. But at the plant, people who asked too many questions were considered troublemakers. They were told they had to go see a plant psychiatrist. This could be the first step toward being eased out of the plant.

Cobb mentions a man named "Yokins" from Los Alamos, who found excess cancers among Rocky Flats workers. His study was ready for publication when he was forced out of his job. And at the plant they were "intentionally throwing away the high-dose badges" worn by workers. "If it was embarrassing, they'd classify it. So that was standard operating procedure."

Back to Cobb's EPA study. It is well known that internalized plutonium deposits in the tissue of lung, liver and bone will lodge there and continue to irradiate surrounding tissue, typically for the rest of one's life. So Cobb was studying lung, liver and bone tissues. But he also wanted to study the presence of plutonium in the tissue of the gonads, because plutonium in the gonads would have a genetic effect that could be passed on to future generations. Such a study was far more complicated than analysis of lung, liver and bone. Moreover, it had never been done by anyone. Cobb wanted to do it, and EPA agreed.

This is where he came up against political reality. At just the time he was doing this study the EPA underwent a major transformation. In its early years it was truly an *environmental protection agency*. But when Ronald Reagan was elected president in 1980 one of his goals was to abolish the EPA. He did not succeed in doing this, but Ann Gorsuch (later known as Ann Buford, due to marriage), whom he named head of the EPA, terminated the funding for Cobb's study of plutonium in body tissue. Cobb says they did this "because they didn't want to find out the results that we were getting. . . . As we got nearer and nearer to embarrassing findings, they got more and more upset about it . . . So I think that they had good reason not to see the final results, and particularly the thing about the gonads." Also, they were afraid of what our study "would show, that Rocky Flats had been such a terrible mess and scattered plutonium all around and it got into people."

The EPA-sponsored study began in 1975. Cobb's team of researchers measured plutonium concentrations in samples collected from more than 500 persons who died and were autopsied in Colorado

hospitals, 8 or 10 in the Denver area, one in Pueblo. The researchers routinely sought permission from the closest of kin to take the samples. The study compared those who lived near Rocky Flats with those who lived far from the site. The Rocky Flats plutonium could be identified by doing mass spectrometry, getting the ratio of plutonium-239 and the other isotopes. The bodies of all these people contained plutonium from bomb fallout, but those who lived nearer the plant had identifiably Rocky Flats plutonium in tissues of lung, liver and bone, with concentrations higher the closer the person lived to the plant. Cobb periodically shared study results with DOE and Rockwell officials. They found the results embarrassing, but they couldn't stop the study because it was sponsored by the EPA. So, as noted above, they tried to get him dismissed from the university. This failed because he had tenure.⁷

When his study was terminated, Cobb insisted that the data already gathered be made publicly available, but people at EPA resisted. When Cobb persisted, EPA personnel rewrote the report's conclusion to say that Rocky Flats harmed no one. In response Cobb appealed to members of Congress to get the report's original language restored. Finally, the report, more or less in its original language, was made available by the National Technical Information Service.⁸ You could get a copy only if you contacted them and paid a fee. Very few people ever saw the report or knew of its existence. Rumors were that Cobb had found nothing worth reporting. But as it finally appeared the report stated clearly that plutonium from Rocky Flats was present in lungs and liver of people who lived near the plant. Results of the study, if not widely available, at least were formally recorded. The report can be read at the Norlin Library of the University of Colorado in Boulder.

As stated previously, Cobb's original plan was to study plutonium in the gonads, with an eye on the effect on future generations, but it did not happen: In Cobb's view the most important part of the study was not done. His research team had collected tissue from lung, liver and bone, but also from the gonads. In his Rocky Flats Oral History interview, he said, "It was my hypothesis that the plutonium was being deposited in the gonads, right where it would be affecting the sperm and causing mutations in the sperm, which would then show up . . . in future generations as . . . childhood cancers, deformities, and all that sort of thing." He agreed to do the study EPA requested only when they agreed to let him analyze tissue from the gonads in addition to lung, liver and bone. He was familiar with studies of plutonium in gonads of rats. These studies showed that plutonium was "deposited in the basement membrane" of the gonads "right near where the sperm were being generated. . . . This would be the worst place to have plutonium in your body, and if it was there in significant amounts that would be not only endangering the present but all future generations, because it would be damaging the genes."

The research Cobb was most eager to do had never been done with humans, and, so far as I know, has not yet been done "It takes a whole lot more finesse," he said, "to find the amount of plutonium in the gonads, which weighs only 5 or 6 grams, maybe, than it does in a lung, which is maybe a thousand grams." So the samples from the gonads "were left for last." One of his colleagues in the study was a man named Wes Erford, who undertook the task of developing a method for measuring the very tiny amounts of plutonium deposited in the gonads. His success in doing this was a major breakthrough for studying the gonads, but it happened just as funding for the study ended. Thus Cobb and Erford never got to take advantage of Erford's innovation. With the end of the study, all the gonads samples, which remained unexamined, were "sent to Los Alamos by the EPA."

Cobb said, "I wanted to find out how much plutonium was in the gonads of humans. We know in animals it's quite a lot. I wanted to be able to point out whether those people had offspring with cancers and deformities and so forth. But that study was never done. I think it still should be and probably could be, if they haven't taken all those gonads and pooled them."

The gonads samples sat in a freezer in Los Alamos for 20 years. When Shawki Ibrahim of Colorado State University's nuclear research program learned about the samples he asked Los Alamos to send them to CSU in Fort Collins. He designed a study that would get government support. Cobb had intended to find out how much plutonium was in the gonads of individuals and to show on a map where each person lived and how much

⁷ Most of the information in these several paragraphs on Cobb is drawn from the interview by Hannah Nordhaus of John (Jock) Cobb, Rocky Flats Oral History project, Maria Rogers Oral History Program, OH1180V.

⁸ Cobb et al., "Plutonium Burdens in People Living Around the Rocky Flats Plant," March 1983, EPA-600/4-82-069, Springfield, VA: National Technical Information Service.

plutonium was present in that person's gonads. This information would show where genetic problems might appear in later generations, a type of research that, as pointed out earlier, had not previously been done anywhere. Ibrahim's plan, by contrast, "would have negated" what Cobb had hoped to find out. According to Cobb, Ibrahim "was going to take all the gonads [samples] and put them into one big pot and analyze the whole thing and then get a figure from that of how much [plutonium] was in each gonad on average." Ibrahim sought Cobb's blessing for this approach, but Cobb didn't give it, because only separate analysis of individual samples would provide the important results he wanted. Ibrahim's approach would totally destroy the very possibility of learning about the presence of plutonium in the gonads of specific persons.

In August 2014 Ibrahim and I had a couple of email exchanges. I learned from him, first, that the gonads samples were sent from Los Alamos to CSU; second, that he never did a study with them; and third, that, though the samples were kept securely in a freezer at CSU, they were destroyed by a weekend power outage. Thus ended what could have been a pioneer study of plutonium from Rocky Flats in human gonads.

Cobb died a few years ago without ever knowing the results of plutonium in the gonads. In the oral history done toward the end of his life he said, "We have to consider the worst case in making decisions about public health. You take the plausible worst case and take your preventive measures on the basis of that. That's what Dr. Carl Johnson was doing when he said it's not a good idea to have housing that near to Rocky Flats. . . . He was being cautious. I think that's what we should do in public health, and not wait until people start dying of cancer, and you can prove it was caused by it."