

To the Air Quality Control Commission, Colorado Department of Public Health and Environment . Harvey Nichols, Ph.D. January 25, 2015.

I write to oppose the burning of the 701 acres of the Rocky Flats National Wildlife Refuge planned by US Fish and Wildlife Service for April 2015. My opposition is based on the health hazards listed below, by my forty years of scientific interest in the site, and by knowledge that alternative proven weed controls by biotic methods are available. These are known to USF&W, are safer and possibly cheaper, and would reduce public apprehension about the burn plan as indicated by a popular petition opposing this scheme. The following evidence shows the extent and reality of plutonium contamination at Rocky Flats National Wildlife Refuge, contrary to the debatable claims of in-house sampling by plant operatives. I have had to use blunt language at times to emphasize the seriousness of the health risks to the Denver Metro population and the flimsy justifications for this management scheme.

1) My contract research (ERDA Contract EY-76-S-02-2736) was initiated by a 1974 invitation from DOE to study airborne particles at Rocky Flats based on my palynological research in the arctic (in *Science* and *Nature* etc.). I demonstrated that very large numbers of radionuclide particles (size ranges 5-0.5, and 0.5-0.05 microns) were deposited in snowfalls at eight study sites in the current Refuge area during the winter of 1975 – 6. Snow scavenged the plutonium particles emitted through the HEPA filters in the effluent stacks. This was admitted in response to my questioning of Rockwell International contractors for DOE Rocky Flats in a recorded sub-committee meeting of the Colorado House of Representatives' on 9/30/1987, convened by Senator Dorothy Rupert. Rockwell, for DOE, claimed that there were no health implications from their operations, which Sen. Rupert found incredible. (See below for my estimate of the number of plutonium particles to be released by the April 2015 burning).

2) This phenomenon of broadcast plutonium contamination of the Refuge was further revealed in a dose reconstruction study funded by DOE: "Review of Routine Releases of Plutonium in Airborne Effluents at Rocky Flats" authored by Paul G. Voilleque, MJP Risk Assessment Inc., and P.I. John E. Till, Ph.D., Radiological Assessments Corporation,

August 1999. These scientists used official DOE data from Rocky Flats to show that over 600 million nano-Curies of plutonium *as a minimum* (their caution) were emitted from the stacks of Buildings 771 and 776-777.

NB the EPA states that a nano-Curie is a "massive dose" to human health (EPA chief scientist at Rocky Flats, Tim Rehder, p.c.). Thus from the official Rocky Flats data there were over 600 million potentially-fatal doses of plutonium released by production operations. EPA states that the worst plutonium exposure for the public would arise from microscopic particles breathed into the lungs. The larger particles I measured could form lung cancers if inhaled, while the smaller particles could penetrate the alveoli and enter the bloodstream, later to form tumors, especially in

gonads, brain, and bones. Such plutonium particles were deposited in astronomical numbers at Rocky Flats, and they will be released and inhaled if radioactive prairie burning proceeds on a large scale. At a public meeting held in Boulder on May 1<sup>st</sup>, 2001, I rose to ask Dr. Till to critique my study which had found many orders of magnitude more particles than his reconstruction (above) implied. He replied "Harvey, I've seen your study and I believe your data" (witnessed by Dr. LeRoy Moore and the audience).

3) Please note that Gale Biggs, Ph.D., consultant meteorologist, was Chairman of the Air Committee of Governor Romer's Scientific Monitoring Panel, and he, as well as the Air Committee, had photographic access to the pitot tube and radiological samplers in the exhaust stacks. The Committee found that the pitot tube had not been calibrated since it was installed, and the samplers had not been properly emplaced to correctly monitor the passing stream of plutonium particles. In fact, the position of the radiological samplers made it highly likely that the number of plutonium particles leaving the exhaust stacks was underestimated. These results were presented in detail in a separate summary report dated April 26, 2007.

4) These evidences of widespread plutonium contamination throughout the Refuge were further corroborated by soil scientist Iggy Litaor, Ph. D. who worked under DOE contract for years at Rocky Flats and published his results in many peer-reviewed journals. After leaving DOE employment he stated his opposition to public recreation at Rocky Flats in a letter submitted to the (Boulder) Daily Camera,

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March 23, 2004, "During my extensive soil sampling in the buffer zone" (the current Refuge) "and beyond I commonly found that my personal protection equipment (PPE) was 'hot' by day's end and was discarded into the 'hot' contaminated bin. On this basis I strongly recommend that the buffer zone/wildlife refuge be highly limited for public use.

..... I sent this recommendation to US Fish and Wildlife Service on March 10 " (2004). Professor M. Iggy Litaor is now at Tel-Hai College, Israel, email: litaori@telhai.ac.il It is beyond the scope of this letter to include details of Dr. Litaor's experience of having his data sequestered by DOE Rocky Flats after he found evidence of unexpected plutonium migration in the Refuge due to the May 1995 abnormal rains. It is typical of DOE's historical behavior, at least in Colorado (and cf. in Alaska) to 'cover up' data and to damage independent science that contradicts their policies.

5) A letter from USF&W dated October 21, 2003, to Congressman Bob Beauprez (in response to my questions sent to USF&W via Cong. Beauprez' office) admitted that "We have not referred to the Buffer Zone (i.e. Refuge) as "pristine" because we do not believe it to be so. ***Some areas of the Buffer Zone are publicly known to have very low levels of plutonium contamination;*** much of the Buffer Zone is also

infested with exotic weeds.” Signed by USF&W Regional Director (“Ralph O. M.....” rest of signature illegible). NB the DOE admits that a micro-gram (millionth of a gram) of plutonium can be fatal, and further studies show that orders of magnitude less exposure have serious health consequences. So “very low levels “ should not reassure us, but be subjected to rigorous and conservative evaluation, especially as it is likely that current ‘safe’ radiation levels will be revised in future. The history of Rocky Flats was characterized by a wide variety of hazardous events, necessary and unnecessary secrecy, artful falsehoods and scandalous official cover-ups, and much of that attitude remains there today at Rocky Flats in respect to the public interest. In 1989 Interior Secretary Stewart Udall publicly described the Rocky Flats operatives as “apparatchiks.”

I submit the following account of further behavior I witnessed that throws light on USF&W’s attitude towards public relations. Congress required USF&W to tell the public about their plans for management of the Wildlife Refuge. When the USF&W spokesman appeared at several public presentations on this topic in and around Boulder he stated that they would contemplate four plans ranging from no public access to possible recreation at the Refuge : “A, B, C and D. ***We favor Plan B, but we will listen to you.***” We knew immediately which plan they would choose, and indeed it was “Plan B,” the full public access to this contaminated Refuge. The meetings were very tightly controlled and no questions were allowed that referred to remanent radionuclide levels, the stated belief being that it had been cleaned up according to EPA and CDPHE, so there was nothing to discuss. Written public comments were allowed, but that did not change USF&W’s decision. Dr. LeRoy Moore gained access to the numerous written comments and found that over 80% of them favored very limited or no public access under Plans A and C. Incidentally, when I politely raised a scientific point with USF&W at a public meeting I was met with a pugilistic posture of raised fists, (witnessed by chemist Anne Fenerty).

6) On a personal note I vividly recall that on Saturday October 24<sup>th</sup>, 1987, I attended an open air rally on the north side of Rocky Flats to hear Congresswoman Pat Schroeder speak on the need to close down and clean up Rocky Flats. The Colorado State Patrol officers were marshalling attendees’ cars off the grass verge of CO Highway 128 (on the ‘upwind’ side of the plant) and I noted that there was dust on their boots. I approached State Patrol Captain Penner and told him that I had done contract work for DOE at Rocky Flats and that I knew the dust to be contaminated with plutonium. So he might want to warn his men that they should clean off their boots and uniforms before heading home. Captain Penner surprised me by responding: “It’s alright sir, we have been warned about this and we have taken precautions against it.” This surely supports the above findings that the RFN Wildlife Refuge was widely contaminated with plutonium dust. I later described this experience to Cong. Pat Schroeder in her office in Washington, DC, where she admitted that she had not been warned to clean off her boots after her presentation on Oct. 24<sup>th</sup>.

7) An obvious precaution before burning the radioactive prairie at the Rocky Flats Refuge is to test the site's vegetation for presence of plutonium. The senior DOE ecologist at Rocky Flats, John Rampe, has repeatedly said at public meetings that "There is no uptake of plutonium in the vegetation at Rocky Flats." But he admitted publicly that there is rain-splashed plutonium on the surfaces of the plants at that site. I set my undergraduate class the task of finding evidence of this matter either way, and they promptly came up with a number of published reports and EPA studies e.g. "Plutonium-239 and Americium-241 Uptake by Plants from Soil" by Kenneth W. Brown, (Las Vegas, Nev.) EPA Ecological Research Series March 1979.

8) However, as I witnessed at a meeting of the Rocky Flats Coalition of Local Governments (now the Rocky Flats Stewardship Committee) when citizens warned against the health risks of burning the Refuge prairie, Mr. Rampe would not be persuaded. Council Member Lisa Morzel (representing City of Boulder) asked Rampe to submit plant materials from the Refuge for testing for plutonium prior to any burning for weed control; he refused, saying "It would cost too much." Dr. Morzel responded that as a scientist at USGS she would be able to test the vegetation at no charge. After a few minutes Dr. Morzel tried again to get Mr. Rampe to supply plant materials for testing, at which point he replied "The answer is no, we have a basic philosophical disagreement on the issue and that is the end of it."

9) On April 6<sup>th</sup>, 2000 there was a test burn of 50 acres of prairie at Rocky Flats and I watched it from the fourth storey of the CU building in which I held my class that day. The smoke cloud was surprisingly large (and NB the April 2015 ignition would be 14 times as big) and I walked the campus to detect any smoke from that burn. I telephoned the NOAA Aeronomy Lab. to speak to a meteorologist and asked her if NOAA had been tasked to detect the smoke. When she said no, I mentioned that it would reportedly be a couple of weeks before officials told us what was in that smoke. She replied "That would give them enough time to massage the data!" So at least one professional federal meteorologist on that day stated her disbelief in the accuracy of particulate reports from Rocky Flats prairie burnings. I strongly urge your commission, with support from our political representatives, to require that USF&W involve the professional atmospheric and environmental scientists in this area in the planning, air sampling, and any implementation of the upcoming burn at Rocky Flats.

10) The public claims by Rocky Flats' operatives are that they have conducted thousands of soil and other samples at the site and they show levels of radiation within regulatory levels. The public and our representatives need to know the independent validity of those regulations, where those samples were taken, the number within the Refuge versus those within the Central Operable Unit (Superfund) site. In March 2000 EPA senior Rocky Flats scientist Tim Rehder said that most of those soil samples were from the C.O.U. and only "a handful" were from the Refuge. We need to know by what precise detailed methods they were taken, analysed, and what chain of custody was in place? For instance, what were the depths of soil sampled, were there mixings of soil samples so that areas of higher

concentration were amalgamated with lower values? This detailed interrogation arises from the overwhelming impression of independent scientists that many of the personnel at Rocky Flats and their environmental sampling equipment are not state of the art. My own analysis of their perimeter air sampling devices detected inadequacies as far back as 1974, confirmed by Dr. Gale Biggs (see above) as being unable to detect particles in exactly those respirable size ranges known by EPA to be most dangerous for health. My calculations are that ~24,000 such air analyses were performed largely uselessly during routine operations, in effect “pacifiers” for public consumption, but for me they exemplify the inadequacy of their claims of vast numbers of innocuous samples.

11) It is claimed that the allowable soil radiation levels within the Refuge are barely above ‘background’ levels, but at 50 pico-Curies per gram of dry soil the allowable level is over 1200 times the 0.04pCi/g background. The 20<sup>th</sup> century saw early “safe” levels of radiation exposure reduced repeatedly, and supposedly safe today will probably not be regarded as safe in the future. A recent *New Scientist* report concluded that radiation exposure standards were too lax by at least 10x and in a 1993 PBS TV Frontline broadcast (“Secrets of a Bomb Factory”) NCAR radiochemist Dr. Ed Martell said that he and Dr. Karl Morgan (founder of US health physics) speculated that US radiation standards were too liberal by factors of 100 – 1000x. In light of advances in epigenetics and knowledge of the switching mechanisms that respond to environmental effects on the epigenome we should adopt cautious attitudes towards exposing populations to chronic low

level radiation. With a Pu-239 half-life of >24,000 years, isn’t it wiser to keep the radioactive dust within the Rocky Flats Refuge rather than export it into the communities? If USF&W plans annual burns, wouldn’t this progressively ‘cleanse’ the Refuge of plutonium via smoke clouds?

12) To expand this criticism: When the senior EPA scientist from Rocky Flats invited himself to two sections of my Critical Thinking classes in 2000 to correct the students’ impressions I’d given them (his words) that the prairie test burn in that year was dangerous, he received a re-education. His intellectual inadequacy shocked my students; he appeared to them to be a “shill” for the DOE. One example should suffice: He argued that since we were already at increased radiation levels due to high altitude solar exposure, plus radon effects, “a little bit more doesn’t really matter.” When I pointed out the obvious flaw, I could see his mind slowly opening as he reflected on his proposition: “Yes, that’s what Dr. Martell says too.” On such regulatory people do the CDPHE and others depend for their assurance that burning is safe at the Refuge. To employ a simple teaching analogy, think of an inverted pyramid or cone, with the extensive top layer representing the massive implications for public health and environment of this burn. Then imagine the narrow base of that figure, and that is the tiny number of competent officials and the few state-of-the-art environmental measurements that support the claim that this management method is “safe enough.” Critical thinking in this case is seen to be in calamitously short supply.

13) A decent respect for the opinions and health concerns of the Colorado citizenry demands as a minimum, that: A) Representative samples of vegetation from the Refuge be both federally and independently collected and tested for presence and quantity of plutonium from Rocky Flats; and

B) The area planned to be burned be fully-instrumented with state-of -the-art particle-sampling equipment, recommended and evaluated by independent atmospheric scientists with public input, before any large-scale prairie ignition takes place at Rocky Flats. (NB such consequential actions cannot be rationalized by assertions that there is insufficient money to test on that scale. If so, the burn should not proceed.)

C) Furthermore, that all alternative management methods of weed control at Rocky Flats, including standard biotic controls such as insect predation, (cf. J.K. Nelson's Rocky Flats legacy management report for DOE, and researched by e.g. Prof. Tim Seastedt of CU-Boulder) and grazing by dedicated goat herds (as recommended by the Lamming family business in Wyoming) be thoroughly investigated in conjunction with independent (non-USF&W) scientific personnel as a safer alternative to large-scale burning. My students researched these alternative methods and by comparing the federal costs of the 2000 test burn to the goat herding estimates found that the biotic costs were competitive or cheaper. They would certainly be seen to be safer and would mollify public concerns.

A final note on the bottom line : if this burn goes ahead despite the above realities and without independent environmental sampling, and if this initiates a series of **annual** burnings at Rocky Flats (as an EPA source suggested), this region may become notorious as the Love Canal of the West . That would diminish the attractiveness of the Denver - Boulder Metro area for white-collar business entrepreneurs.

**PS** : From my 'real-time' snow collections, my microscopic counts of the irradiated particles visible as fission tracks and "star bursts", my knowledge of the history of emissions at Rocky Flats, and extrapolation from "my" Refuge study sites up to the scale of the proposed 701 acre burn, I suggest the following conservative scenario. I based my calculations on only  $1/10^{\text{th}}$  of 1% of the largest "star burst" plutonium particles counted. I know from my transect surveys of the Refuge area that those largest plutonium particles diminished gravitationally with increasing distance from the source, so those are the most likely to have remained in the Refuge burn area. The smallest (0.5 - 0.05 micron) "fission track" plutonium particles were less likely under non-precipitation conditions to completely settle in the Refuge, so I leave those much larger numbers to one side for the present. The 0.1% that I suggest might as a minimum leave the site in the smoke cloud would thus be over 5 million plutonium particles.

I also calculated the likely plutonium burden in the burn area based on the uniform 1 pico-Curie per gram of soil suggested by David Lucas (US Fish & Wildlife Service)

in his memorandum to Mr. Abelson for the January 26, 2015, Rocky Flats Stewardship Council meeting. That would mean over 25 million nano –Curies of plutonium were present in the 701 acre burn zone, a nano-Curie being a potentially fatal dose (EPA). Thus some fraction of over 25 million possibly fatal doses would be released into the nearby communities in a radioactive smoke cloud; a conservative estimate at 0.1% (one tenth of 1%) would be 25,000 potentially fatal doses, derived from USFWS own model estimates. I suggest that the media will be interested in these figures.

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