RADIOACTIVE REFUGE

WHY THE ROCKY MOUNTAIN GREENWAY SHOULD BE HALTED

Jon Lipsky, MAS and FBI Retired
Dr. Michael Ketterer, Professor Emeritus at Northern Arizona University
Dr. Deborah Segaloff, Physicians for Social Responsibility
Dr. Sasha Stiles, MD MPH
Diane D'Arrigo, Radioactive Waste Project Director at NIRS
Randy Stafford, Rocky Flats Public Health Advocates

City of Westminster Study Session
July 15, 2024

Rocky Flats Crime Scene

Criminal Fallout at Rocky Flats

Jon Lipsky

MAS and FBI Retired

INTRODUCTION

Honorable Mayor McNally and Councilors:
Thank-you for affording me the time to urge why the City of Westminster should withdraw from the Rocky Mountain Greenway (Greenway), its associated Federal Access Land Program (FLAP) grant and deny any direct access from Westminster to the Rocky Flats National Wildlife Refuge. In August 2023 the Federal Highway Administration (FHWA) denied public comment about the Greenway.

In 2016 the depicted pedestrian bridge is 210 feet from Westminster to the Rocky Flats National Wildlife Refuge; In 2023 FHWA decided that the pedestrian bridge is be 189 feet without considering the proposed Jefferson Parkway right-of-way that is 300 feet wide. THE PEDESTRIAN BRIDGE IS DOOMED TO FAIL.

The pedestrian bridge over Indiana Street is to be placed in the most contaminated area of the Refuge (Windblown Area) and most contaminated area of Rocky Flats Operable Unit 3 (OU3), offsite 20,000 acres, downwind of the Rocky Flats "Americium Zone" (903 Lip and Hillside) that recently underwent revegetation to suppress plutonium flux. The refuge and offsite lands were not remediated.

Bridge abutments and piers will most likely be buried more than six-feet deep where weapons-grade plutonium-239 has no Standard (unlimited), inevitably disturbing much contaminated soil.

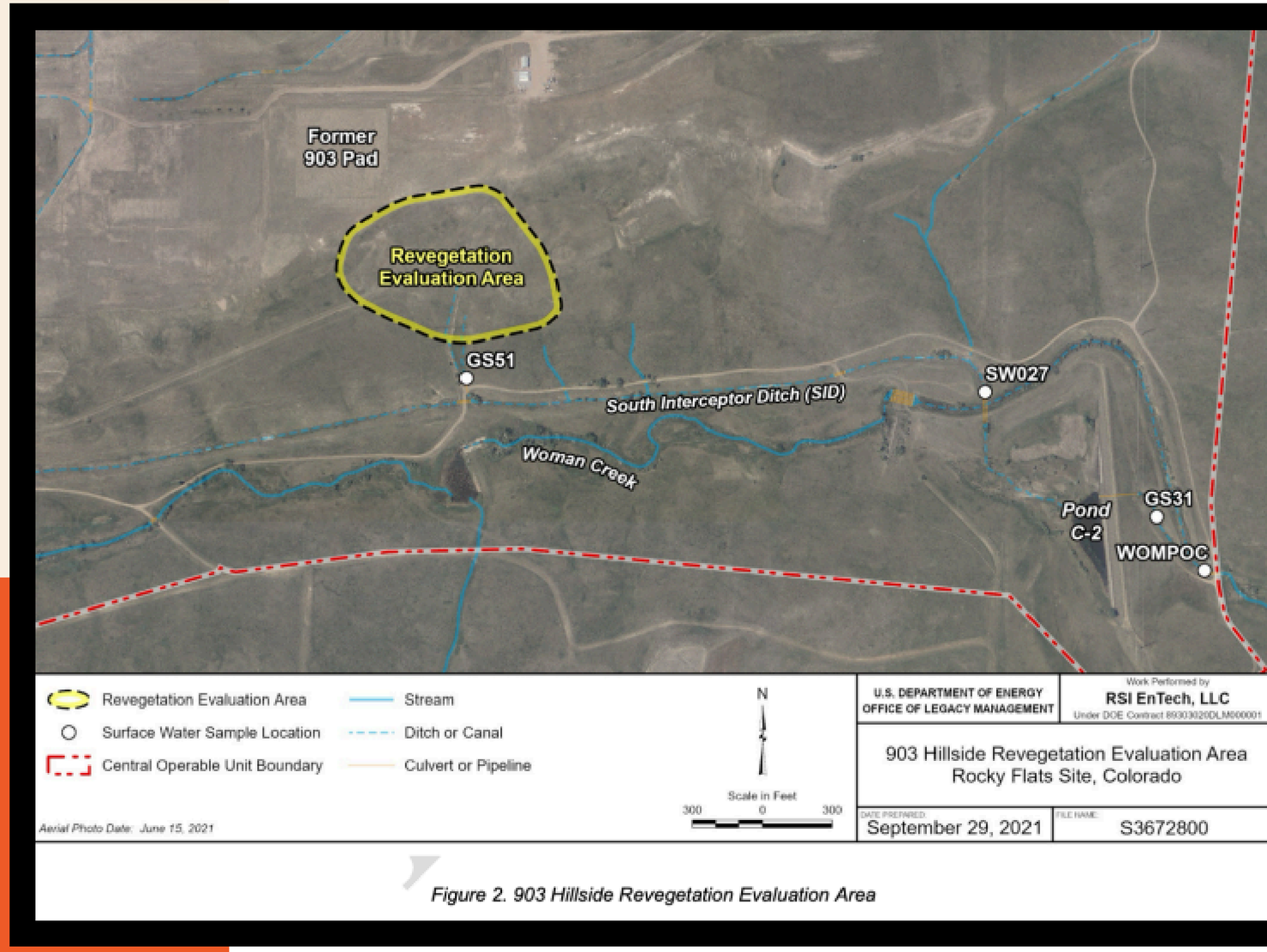


Figure 2. 903 Hillside Revegetation Evaluation Area

USDOE IS A FRINGE-MANAGER OF ITS OWN WASTES.

"We believe it's safe for the public and all of our visitors."
- David Lucas, USFWS, 2018

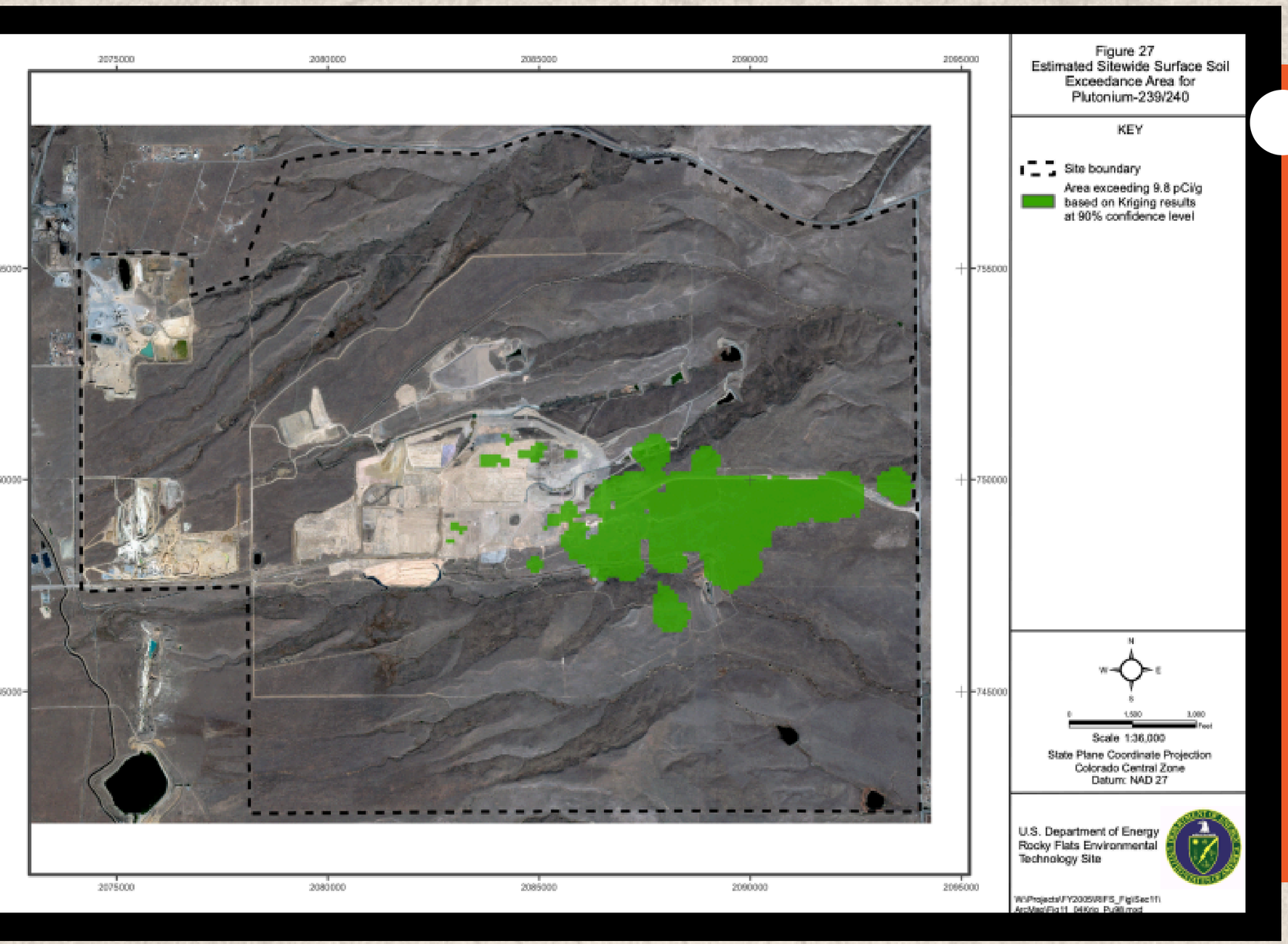
June 6, 1989
I served a federal criminal search warrant at Rocky Flats Nuclear Weapons Plant crime scene

September 1989
Rockwell International sued USDOE and USEPA for illegal activity requirements

September 1989
Rocky Flats added to the CERCLA (Superfund) National Priorities List (NPL)

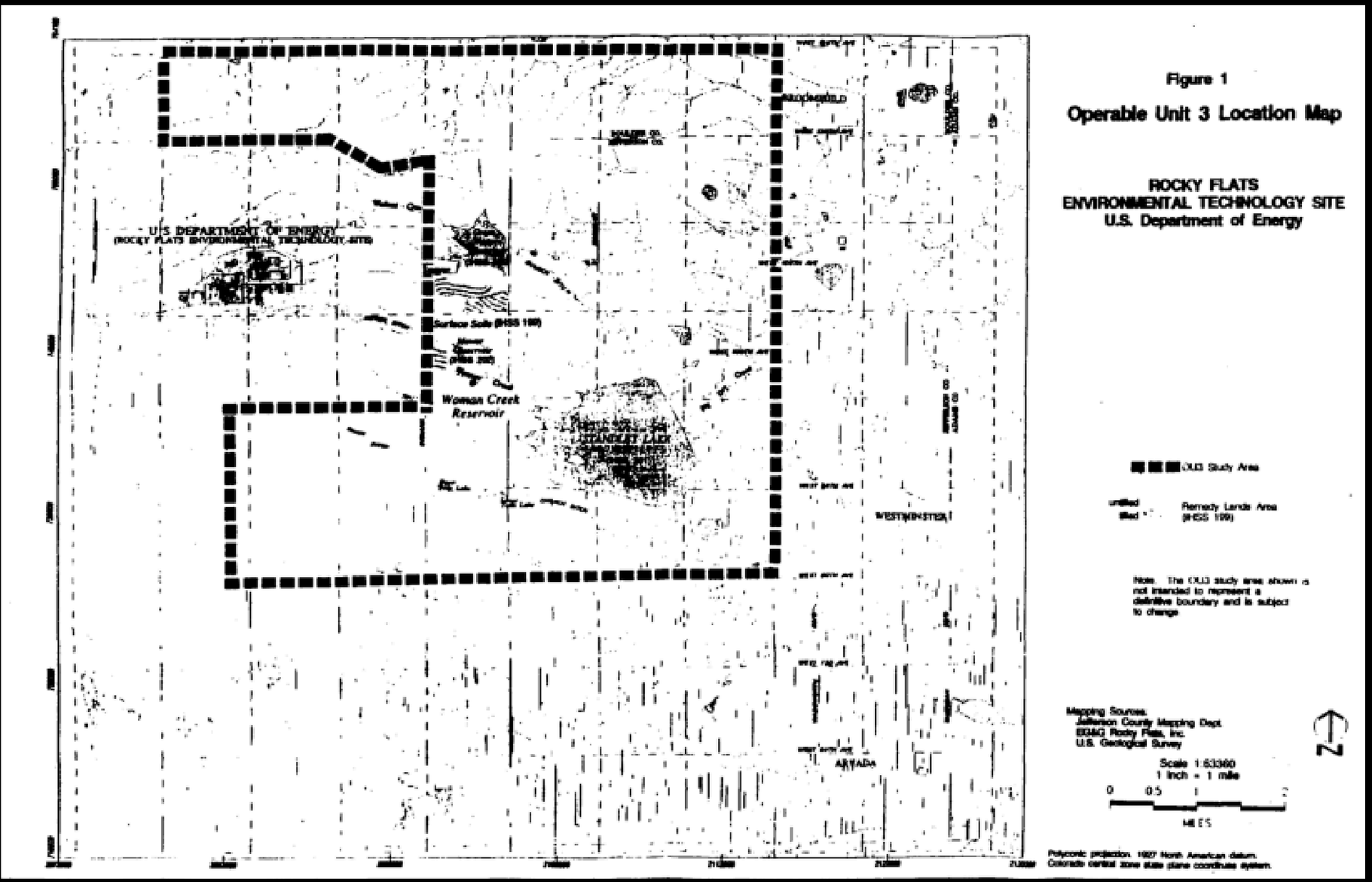
June 1992
Federal Judge approved the criminal Plea Agreement with Rockwell, 4 felonies and 6 misdemeanors

- **Count 9:** Plant effluent, 80M gallons/year, sprayed over legacy burial pits and trenches from 1986-1988



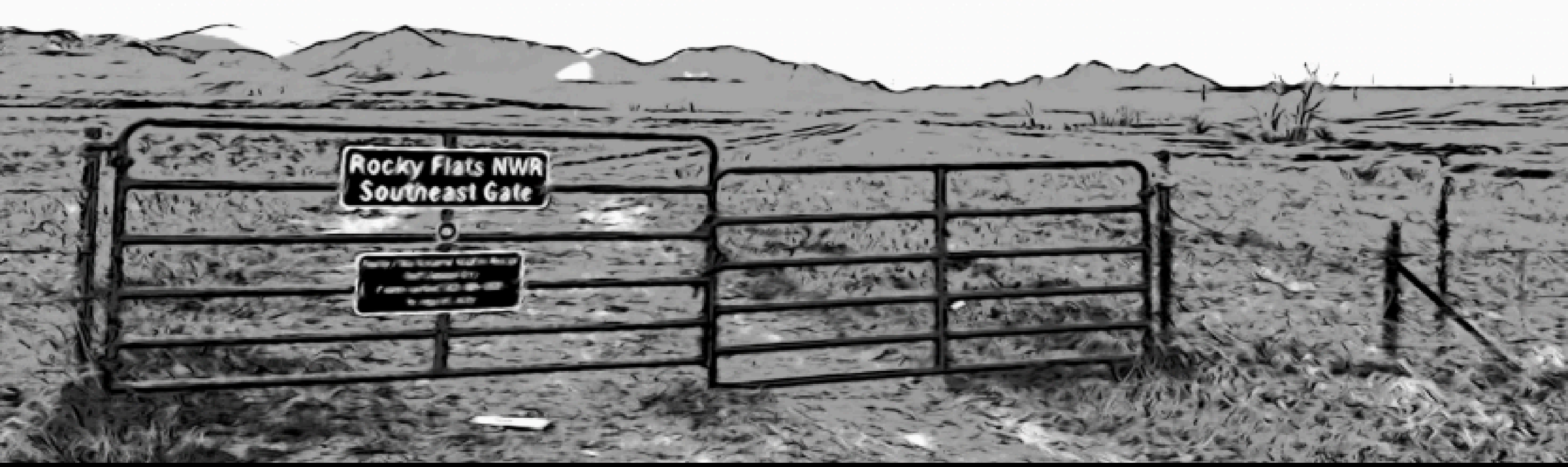
February 2006

- A federal civil jury found Dow Chemical/Rockwell had contaminated off site property (Cook plaintiffs) with weapons-grade plutonium-239, that will remain indefinitely
- Capacity of plutonium-239 from Rocky Flats "Exceedance Area" towards Westminster with windy conditions



May 2007

- USEPA Delisted the Refuge and 20,000 offsite acres (including Westminster) from Superfund with risk-based public access.
- Rocky Flats operations contaminated drinking water at Great Western Reservoir and Standley Lake
- Unfortunately, government actors claim that the Refuge is safe



May 2016

USDOE settled with with Cook Plaintiffs for $375 million without admitting the disposition of 2,600 pounds of missing weapons-grade plutonium-239

January 2019

USDOE announced the presence of Colorado regulated PFAS constituents at Rocky Flats

May 2024

PFOA/S detected in Walnut Creek at Indiana. USDOE did not disclose the use of neptunium-237 in its 1962 through 1983 manufacturing, therefore current sampling does not report the toxic radioactive metal in surface or ground water. Neptunium-237 could not be reconstructed for Rocky Flats nuclear workers. (NIOSH 2013)

CONCLUSION

Westminster City Council is being requested to withdraw from the Greenway, FLAP grant and deny any access from Westminster to the Rocky Flats National Wildlife Refuge to protect human health and the environment.

Detection of Plutonium in Indiana St. Roadside High-Volume Filters During the April 6, 2024 Wind Event

What is the flux of 239+240Pu entering non-Federal property during high wind conditions?

Dr. Michael Ketterer

Professor Emeritus,
Northern Arizona University

NARRATIVE SUMMARY

Air filter samples were collected near Rocky Flats during high-wind events on April 6, 2024 and weapons-grade plutonium was detected in two Indiana St. samples. During high wind episodes, contaminated soil is being entrained into the air as air masses pass over the Central Operating Unit and Pu-contaminated portions of the Refuge; horizontal movement of contaminated soil is spreading plutonium into non-Federal areas. Further study and measurements of the flux (in terms of mass of contaminated soil, or microcuries Pu moved per event) of Pu are needed by non-DOE, independent investigators. Refer to my Declaration of May 21, 2024 for additional experimental details.

EXPERIMENTAL MEASUREMENTS OF PU OFF-SITE FLUX

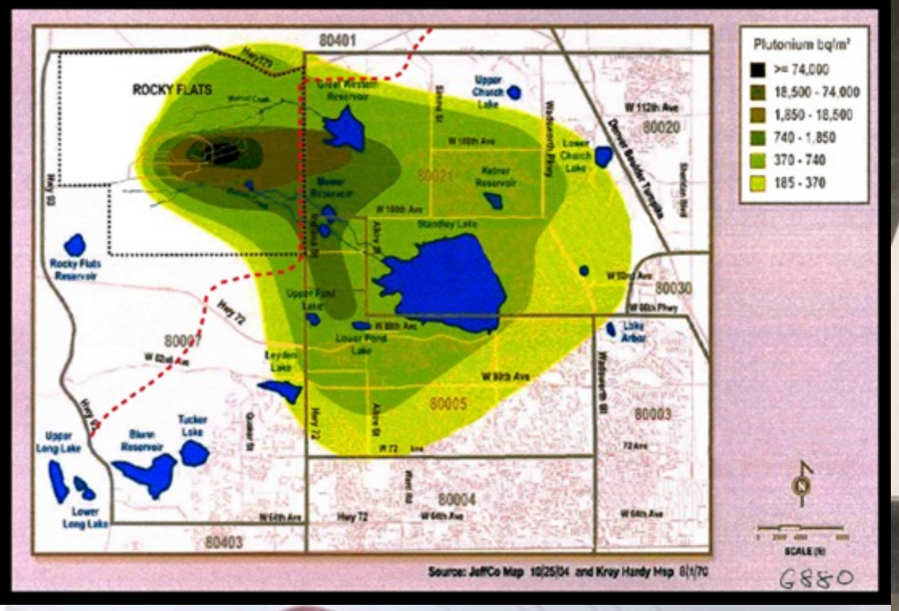
LINGERING QUESTION:

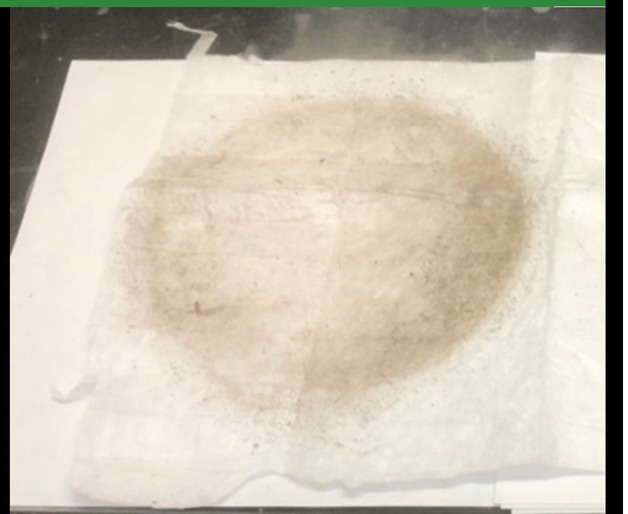
Is Pu being transported/present in the air during high-wind events?

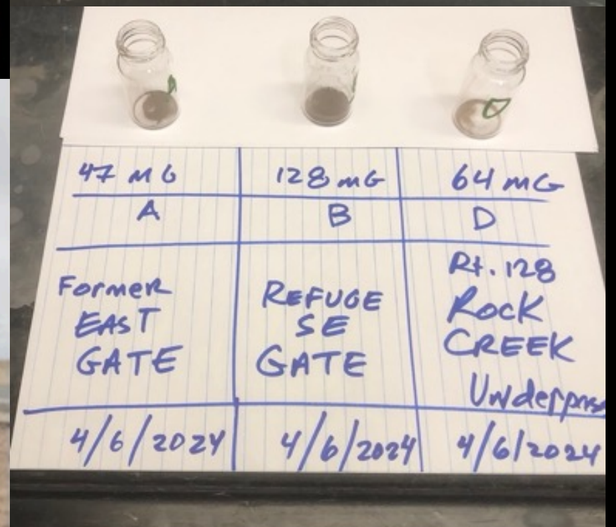
- On April 6, Jon Lipsky and I collected high-volume air filters with portable equipment at roadside locations along Indiana St (former plant East gate, SE Refuge gate), and along Highway 128 (upwind)
- 20-22 min run time with home-constructed 1590 cfm sampler using two layers of MERV-12 furnace filter, situated 3 feet above ground level, yields 47 – 128 mg of inorganic ash matter
- Measure 239Pu and 240Pu by mass spectrometry using 242Pu as an internal standard
- Pu found to be present in the two “downwind” samples collected along Indiana St., but was absent in the Highway 128 sample
- Sampling and analytical details are given in my Declaration of May 21

DECLARATION OF MICHAEL E. KETTERER, PhD

Detection of Airborne Plutonium in Air Filters Collected Along Indiana Street Under the Episodic High-Wind Conditions of April 6, 2024







Mr. Carmelo Melendez
Director, U.S Department of Energy, Office of Legacy Management
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Melendez:

With continued drought and increased fire activity throughout the state of Colorado, the City and County of Broomfield - similar to other communities surrounding Rocky Flats - are concerned about the multilevel impact from a wildfire at Rocky Flats. Our community has suffered public health impacts from the Rocky Flats areas for decades, and now, adding to the potential concerns, includes wildfires.

The Marshall Fire on December 30, 2021, which devastated communities immediately north of Rocky Flats and stopped just shy of our community's border, drives our request to immediately seek the strategic deployment of air quality monitors in the vicinity of Rocky Flats. This deployment would identify, through data collection, any impacts on our communities resulting from the transport of material during and following a wildfire.

Through our extensive air quality monitoring program, the City and County of Broomfield is well versed with the deployment of air quality monitoring devices, data collection techniques, and the power of understanding the air quality impacts on public health. The heightened sense of urgency is twofold - one, knowing that wildfires will be occurring at a much higher rate in the future, and secondly and most concerning, what is buried at Rocky Flats.

If we have learned anything over the last few years of monitoring Oil & Gas operations, gathering data to establish a baseline prior is critical to understanding the actual change in air quality and allows for better public policy and decision making.

We stand ready to share our experience in the air quality monitoring arena: strategic monitoring area deployment, data signatures in the results, understanding public health impacts and community communications, lessons learned, making data driven decisions, and robust stakeholder involvement/engagement.

The City and County of Broomfield is committed to work with DOE, Environmental Protection Agency, Colorado Department of Health and Environment, United States Fish and Wildlife Service, and all community partners to gather data, share resources, and better understand the impact of air quality on Coloradans health.

Thank you for your attention to this important issue.

Mayor Guyleen Castriotta

Cc: Jill Hunsaker Ryan, Executive Director, Colorado Department of Health and Environment
Kathleen Becker, Regional Administrator, EPA Region 8
Congressman Ed Perlmutter, U.S. House of Representatives, Colorado District 7
Congressman Joe Neguse, U.S. House of Representatives, Colorado District 2
Rocky Flats Stewardship Council
City and County of Broomfield City Council

View Tools Window Help

On Off Queue

Neb. : 2.3 bar Fwd.: 1373 W Ref.: 2 W Load: 73 Tune: 204 Exp.: 1.8 x10+0 mbar Ana.: 2.3 x10-7 mbar Speed 1000 Hz

Operate BTPPNWR ESPLQD

Setup | Instrument Calibrations | Calibration Method | QC Setup | Sample List | Results | Reports

Calibration Data | Numerical Results | Spectra

23 04062024-02p 5/2/2024 1:47:09 PM

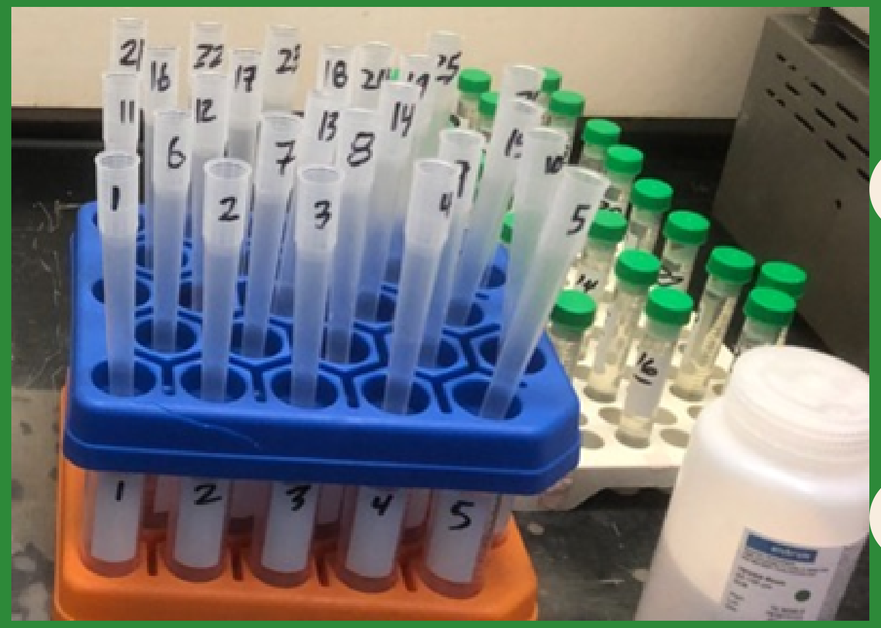
Run	237Np	238U	239Pu	240Pu	242Pu
	3 04062024-03 5/2/2024 1:53:54 PM				
1	0.400	42801.321	1.300	0.300	3651.933
2	0.500	39460.657	2.100	0.200	3294.197
3	0.300	36640.290	0.900	0.700	3084.823
4	0.500	36508.561	1.700	0.500	3117.535
5	0.300	38536.807	1.400	0.000	3201.564
x	0.400	38789.527	1.480	0.340	3270.010
σ	0.100	2570.545	0.449	0.270	228.407
%RSD	25.000	6.627	30.368	79.466	6.985
	1 04062024-01 p 5/2/2024 1:59:57 PM				
1	0.300	26382.527	49.800	3.400	4007.583
2	0.700	26428.961	47.600	2.500	3873.925
3	0.400	26101.116	53.400	3.400	3949.958
4	0.200	26283.942	51.300	2.900	3891.533
5	0.200	25654.648	53.400	2.300	3872.425
x	0.360	26170.239	51.100	2.900	3919.085
σ	0.207	314.461	2.478	0.505	58.653
%RSD	57.601	1.202	4.849	17.413	1.497
	1 04062024-01p1 5/2/2024 2:04:56 PM				
1	0.400	25438.642	48.400	2.700	3842.012
2	0.200	13632.213	28.900	1.300	2146.053
x	0.300	19535.428	38.650	2.000	2994.032
σ	0.141	8348.406	13.789	0.990	1199.224
%RSD	47.140	42.735	35.676	49.497	40.054
	25 04062024-01p2 5/2/2024 2:08:55 PM				
1	0.400	40962.579	22.500	0.700	4313.623
2	0.400	39402.004	19.500	0.900	4176.559
3	0.600	38844.914	25.900	1.200	4136.041
4	0.800	39393.869	19.300	1.200	4201.471
5	0.100	39027.494	20.000	0.800	4211.876
x	0.460	39526.172	21.440	0.960	4207.914
σ	0.261	838.000	2.803	0.230	65.918
%RSD	56.689	2.120	13.075	23.981	1.567
	Rinse 5/2/2024 2:16:21 PM				
1	0.000	2557.760	0.100	0.100	2.800
2	0.000	2653.787	0.100	0.000	3.200
3	0.100	2842.444	0.700	0.000	3.300

Thermo Plasmalab Servi

Time	Event
14:21:56	Acquiring RTD
14:21:56	Closed Experi
14:21:55	Starting Post-E
14:21:54	Starting Sampl

Display run time

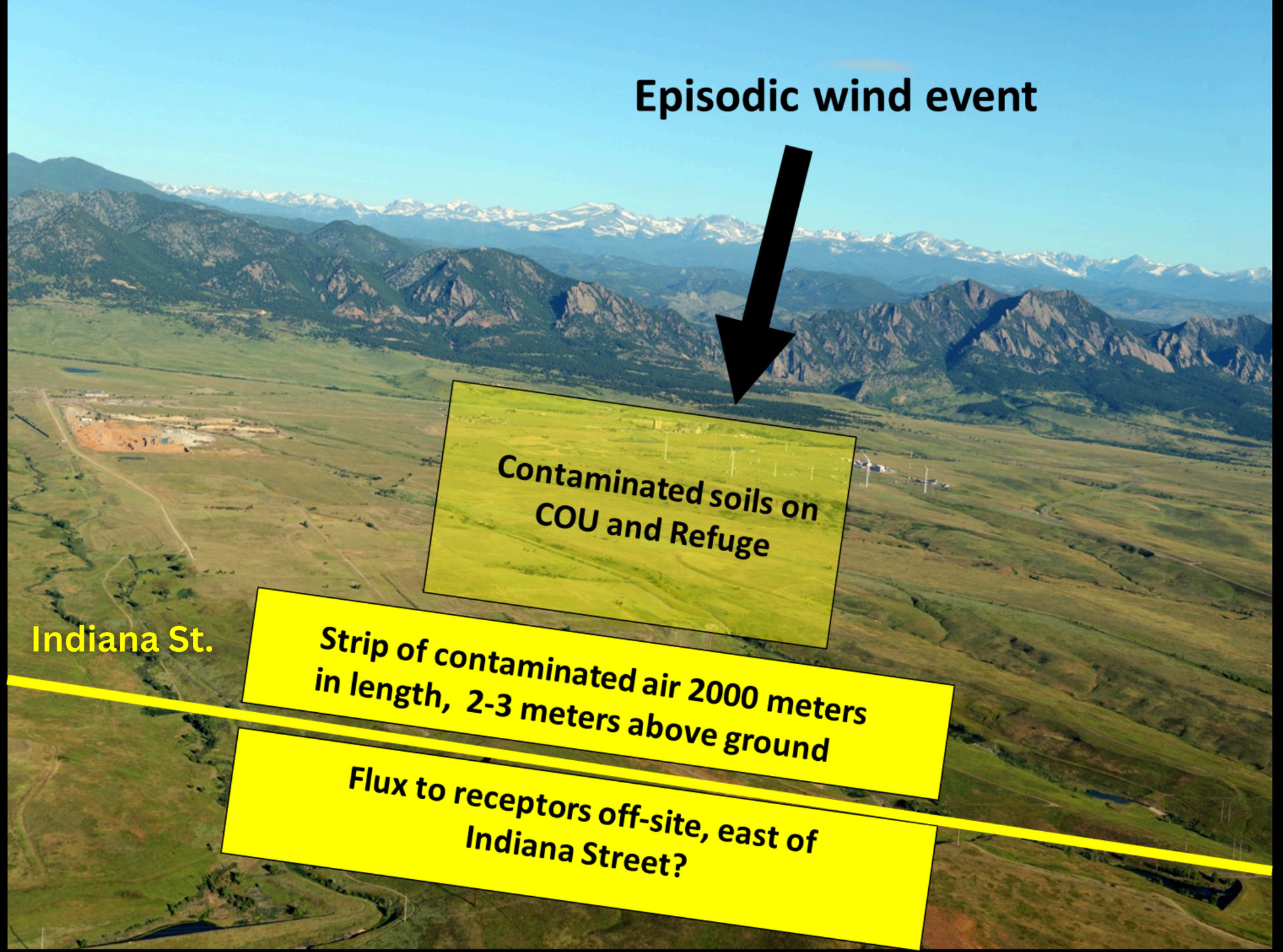
Analyte Dilution Conc. | Mass Uncorrected ICPS | Analyte ICPS | Survey Analyte Dilution Conc. | Survey Mass



- Ion count data reveal whether 239Pu is present, or not
- Detection threshold is about 2 counts per second at mass 239 and one cps at 240
- 240Pu/239Pu ratio is measured for source ID where sufficient Pu is present

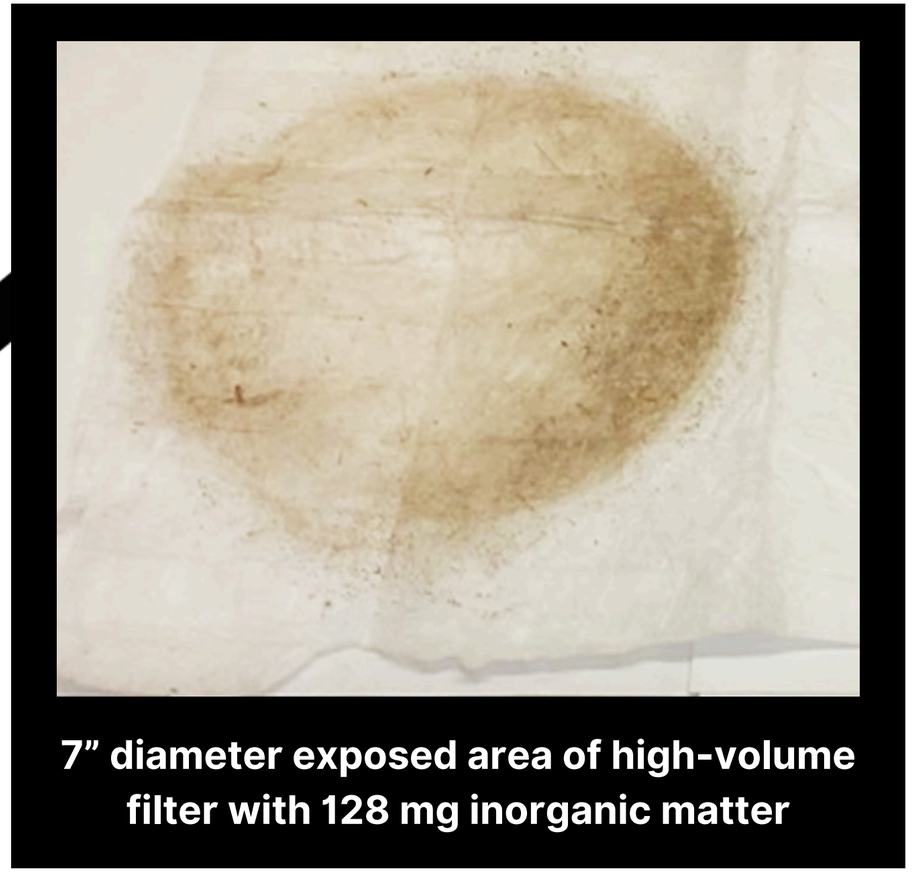
Attachment 14. Results for plutonium activities and isotope compositions for Samples 01, 02, and 03 collected on April 6, 2024 along Indiana Street and Colorado Highway 128

Sample	Lab ID	Location	pCi/gram $^{239+240}$Pu ± standard deviation[1]
01	1[2]	Former East Gate	1.19 ± 0.05
01	25	Former East Gate	0.69 ± 0.09
02	2	RMNWR Southeast Gate	0.85 ± 0.06
02	21	RMNWR Southeast Gate	0.20 ± 0.03
02	22	RMNWR Southeast Gate	0.15 ± 0.04
02	22	RMNWR Southeast Gate	0.18 ± 0.02
03	3	Colorado 128 at Rock Creek	Not detected
		Detection limit[3]	**0.13**


Episodic wind event
Contaminated soils on COU and Refuge
Indiana St.
Strip of contaminated air 2000 meters in length, 2-3 meters above ground
Flux to receptors off-site, east of Indiana Street?

EXPERIMENTAL MEASUREMENTS OF PU OFF-SITE FLUX

Extrapolation indicates flux is on the order of a few hundred kg of Pu-contaminated soil per April 6th-like wind event, containing a few tens of micrograms of 239+240Pu



7” diameter exposed area of high-volume filter with 128 mg inorganic matter

Strip of contaminated air 2000 meters in length, 2-3 meters above ground, being transported horizontally

EXPERIMENTAL MEASUREMENTS OF PU OFF-SITE FLUX

CONCLUDING REMARKS:

- Pu is being transported in air away from Federal property under episodic high-wind conditions that entrain contaminated soils from the COU and Refuge
- Estimates possible for the quantities of contaminated soil, and quantities of Pu carried (flux per event)
- Two types of measurements: air monitoring under episodic wind conditions; placement of dust adhering sampling strips to adhere the dust being transported horizontally
- Needs to be done by independent parties without DOE involvement or input

Dangers Posed by Plutonium

Why Construction of the Greenway Poses a Risk to Public Health

Dr. Deborah Segaloff

Physicians for Social Responsibility

BACKGROUND AND CREDENTIALS

- Boulder County resident
- Biomedical research scientist
- Speaking today as an individual as well as on behalf of PSR Colorado (the Colorado chapter of Physicians for Social Responsibility), where I am on the Board of Directors
- Ph.D in biochemistry from Vanderbilt University
- Until retirement in 2018, Professor of Molecular Physiology and Biophysics at The University of Iowa Carver College of Medicine
- Focus of research, funded continuously by grants from the National Institutes of Health, was cellular signaling in the endocrinology of the reproductive system.

BACKGROUND AND CREDENTIALS

- Because cellular signaling is integral to cancer initiation and growth, I also held a faculty position in the medical school's Cancer Center, I received funding from the American Cancer Society, and I served on a national panel reviewing grant applications submitted to a cancer research foundation.
- Throughout my scientific career, my laboratory routinely used various radioactive compounds following strict federal and state safety guidelines.
  - (As documented in most of my 100-plus peer-reviewed publications at https://www.ncbi.nlm.nih.gov/myncbi/12iJuMr7qxg5L/bibliography/public/)

PLUTONIUM CONTAMINATION OF ROCKY FLATS

- For many years Rocky Flats produced plutonium triggers for atomic weapons. The central operating unit is now a Superfund Site. The surrounding buffer zone is now the Rocky Flats Wildlife Refuge.
- The soil of the Superfund Site, which was minimally cleaned up, and the soil of the surrounding Wildlife Refuge, which was never cleaned up, remain heavily contaminated with plutonium.
- The resulting risks to public health form the basis for serious concerns regarding the construction of the Rocky Mountain Greenway.

FOCUS OF TODAY'S PRESENTATION

- Dangers posed by plutonium
- Why construction of the Greenway poses a risk to public health
  - The Greenway would encourage greater use of the trails on the Refuge, disturbing the surface soil and potentially generating contaminated airborne dust
  - The Greenway would open the gates to tracking plutonium and other carcinogens outside of the Refuge, including into the Rocky Mountain National Park, placing many more unsuspecting men, women, and children at risk
- Installation of the overpass would greatly disturb soil on the windblown area of the Refuge including soil many feet below the surface, which may be more heavily contaminated than surface soil

WHY IS PLUTONIUM DANGEROUS?

1 PLUTONIUM EMITS LONG-LIVED ALPHA RADIATION

- Alpha radiation is a particularly strong form of ionizing radiation and the damage it causes in irradiated cells is far more severe than that from other forms of radiation. Its damage results in frequent double stranded breaks in DNA.
- Damaged DNA is repaired by cells, but this process can lead to errors (i.e., mutations) in the DNA sequence. If mutations occur in one or more genes that cause uncontrolled cell multiplication, this initiates and sustains cancer growth.
- The resulting cancers may not be detectable for years, even decades, after the exposure that led to the uptake of a plutonium particle into one’s body.

WHY IS PLUTONIUM DANGEROUS?

PLUTONIUM-239 HAS A HALF-LIFE OF 24,100 YEARS

It takes 24,100 years for a given plutonium particle to lose one-half of its radioactive energy.

WHY IS PLUTONIUM DANGEROUS?

PLUTONIUM, IF TAKEN UP,REMAINS IN THE BODY FOR THE PERSON'S LIFETIME

- Alpha radiation travels a very short distance and, if outside of the body, it lacks the energy to penetrate the skin.
- The primary route by which the body can take up plutonium is by inhalation.
- **"Breathing plutonium-contaminated air is the most dangerous way to be exposed to plutonium. If you know or suspect that plutonium has been released to the air, you should leave the area immediately."**
  - *U.S. Dept Health and Human Services, Toxicological Profile for Plutonium*

WHY IS PLUTONIUM DANGEROUS?

3

PLUTONIUM, IF TAKEN UP,REMAINS IN THE BODY FOR THE PERSON'S LIFETIME

- Inhaled plutonium generally remains in the lungs. However, it can get into the bloodstream and be deposited elsewhere, typically but not exclusively in bone or liver.
- Plutonium is not eliminated by the body. Once deposited, it remains there for the person's lifetime continuously emitting dangerous alpha radiation for the person's lifetime (and beyond).
- Imagine if you were advised to get a lung x-ray every hour on the hour for the rest of your life. You would understandably be worried about developing cancer. But now consider plutonium, which would be emitting a far more dangerous form of radiation all the time, and continuously throughout your life.

WHY IS PLUTONIUM DANGEROUS?

ALL IT TAKES IS ONE PARTICLE OF PLUTONIUM

- Because inhaled plutonium remains in one's body for their lifetime, continuously emitting dangerous alpha radiation, the inhalation of a single plutonium particle poses a health hazard.
- Most of the soil samples taken from the Rocky Flats Wildlife Refuge (especially in the Windblown area to the east) or just outside of the eastern side of the Refuge, have been shown to contain levels of plutonium that are higher than background levels remaining from fallout of atmospheric testing of atomic weapons (0.01-0.1 pCi/gm soil).
- This suggests a pervasive, not sporadic, contamination of the Refuge with plutonium.
- As such, disruption of the surface soil by wind and/or recreation is likely to cause plutonium-contaminated dust that could be inhaled.

WHY IS PLUTONIUM DANGEROUS?

5 DIFFICULTY OF DETECTION

- You can’t readily measure plutonium in soil or airborne dust. It requires the analyses of samples with sophisticated methodologies.
- If you are concerned you may have inhaled plutonium, there is no way to ascertain that.

AN IMPORTANT ADDITIONAL NOTE

- Plutonium is not the only carcinogen in the soil on the Refuge
- Other radionuclides that emit alpha radiation
  Neptunium-237, Uranium-233/234, Americium-241
- Non-radioactive carcinogens
  Arsenic, Chromium, Benzo(a)pyrene

WHY CONSTRUCTION AND USE OF THE ROCKY MOUNTAIN GREENWAY IS A THREAT TO PUBLIC HEALTH

- Installation of the overpass would greatly disturb soil on the windblown area of the Refuge including soil many feet below the surface, which may be more heavily contaminated than surface soil
- The Greenway would encourage greater use of the trails on the Refuge, disturbing the surface soil and potentially generating contaminated airborne dust
- The Greenway would open the gates to tracking plutonium and other carcinogens outside of the Refuge, including into the Rocky Mountain National Park, placing many more unsuspecting men, women, and children at risk

IN CLOSING

For these reasons, I and PSR Colorado urge you to withdraw from the Rocky Mountain Greenway Project.

Thank you for your consideration of this matter.

Rocky Flats From a Physician's Point of View

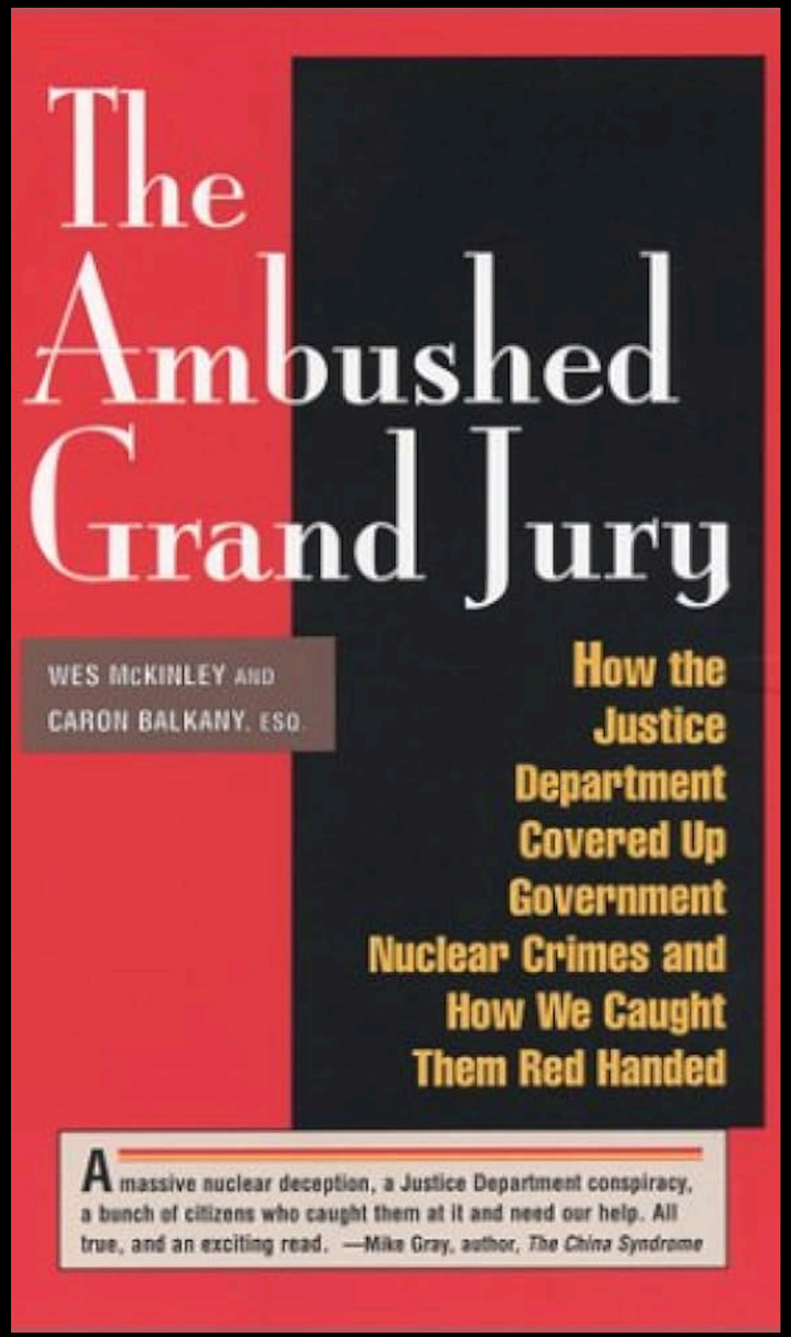
A Physician' View Living Near Rocky Flats

Dr. Sasha Stiles

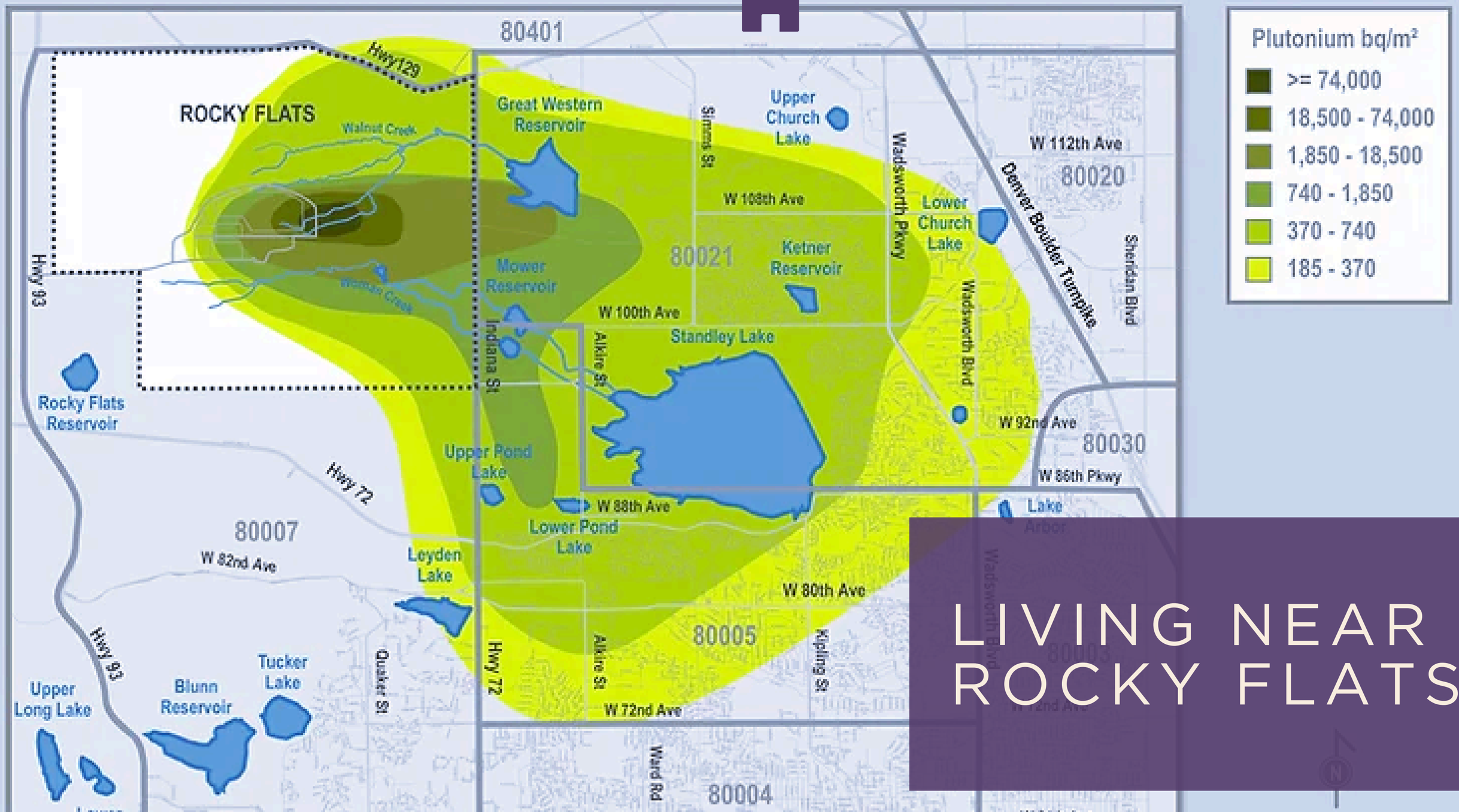
MD MPH

BACKGROUND AND CREDENTIALS

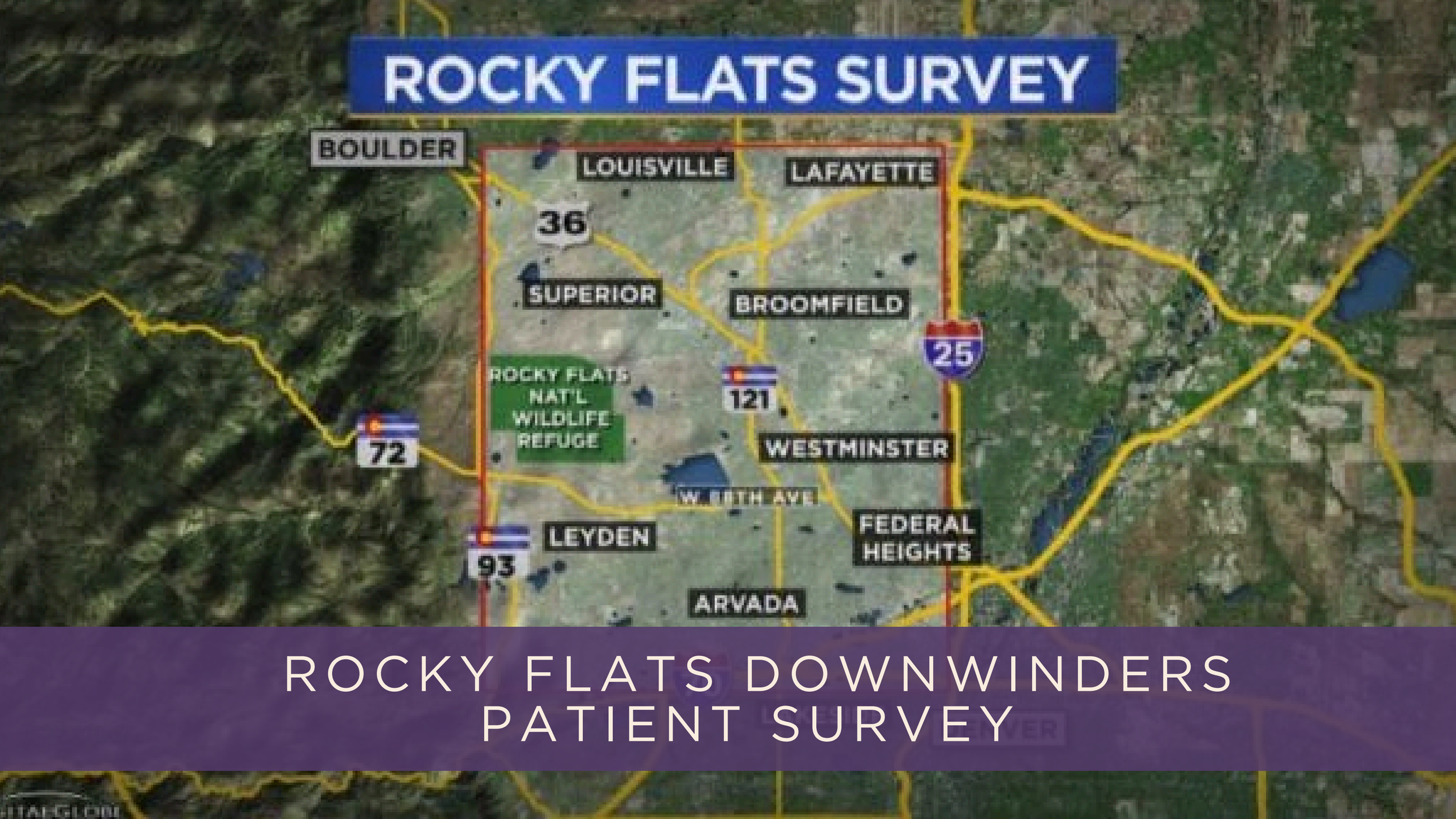
- Graduated cum laude from UCLA, ran an innovative care plan at the UCLA Marion Davies Children's Clinic
- Completed premed science courses at Stanford University
- Med school at UC San Francisco
- Master of Public Health from Berkeley in Epidemiology and Environmental Health
- Acquired Board Certification in two subspecialties
- Ran a solo clinical practice on Kauai
- Practicing medicine, moved to Honolulu, then to San Francisco
- Clinical Faculty positions at Tufts Medical Center and NYU Langone Medical Center



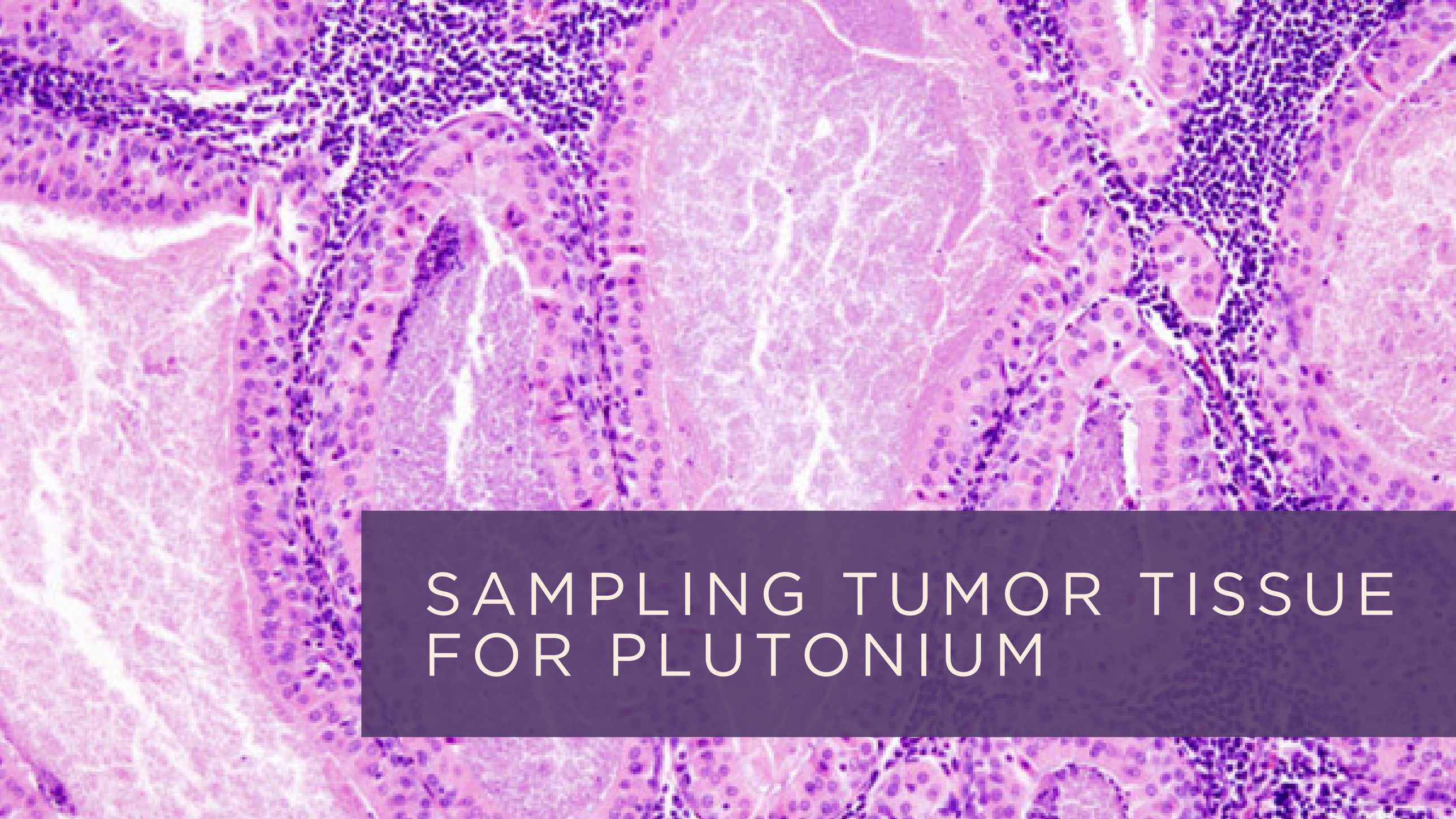
LEARNING ABOUT ROCKY FLATS AND GETTING INVOLVED



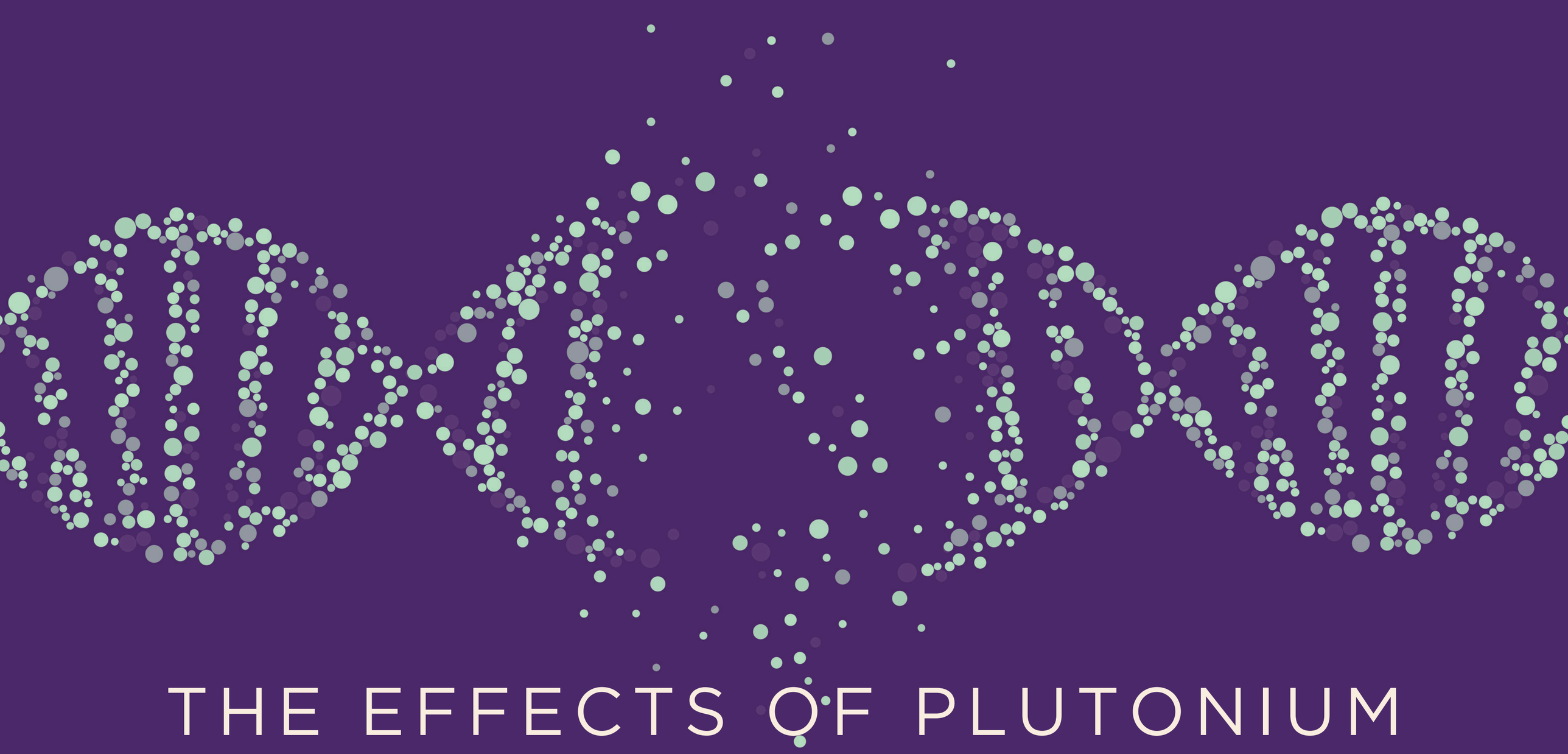
LIVING NEAR ROCKY FLATS



ROCKY FLATS DOWNWINDERS PATIENT SURVEY



SAMPLING TUMOR TISSUE FOR PLUTONIUM



THE EFFECTS OF PLUTONIUM ON OUR EPIGENOME

MEDICAL CONSULTATION FOR ATOMIC WORKER ADVOCACY

IN CLOSING

My neighbor in Superior grew up in another neighborhood, Arvada, and keeps in touch with his graduating class from Arvada High. He talks to me about how many friends he has lost to cancer already. His parents died early of bone and lymphatic cancer with no prior risk factors except living their lives in Arvada.

Now back to my own neighborhood: I have recently been diagnosed with colon cancer and my same neighbor wonders if he might develop cancer and worries more that he might have transmitted it to his kids.

What would you tell him? What can you do to protect us and future generations?

Predicting Radiation Risks on the Rocky Mountain Greenway

No Guarantee of Public Protection

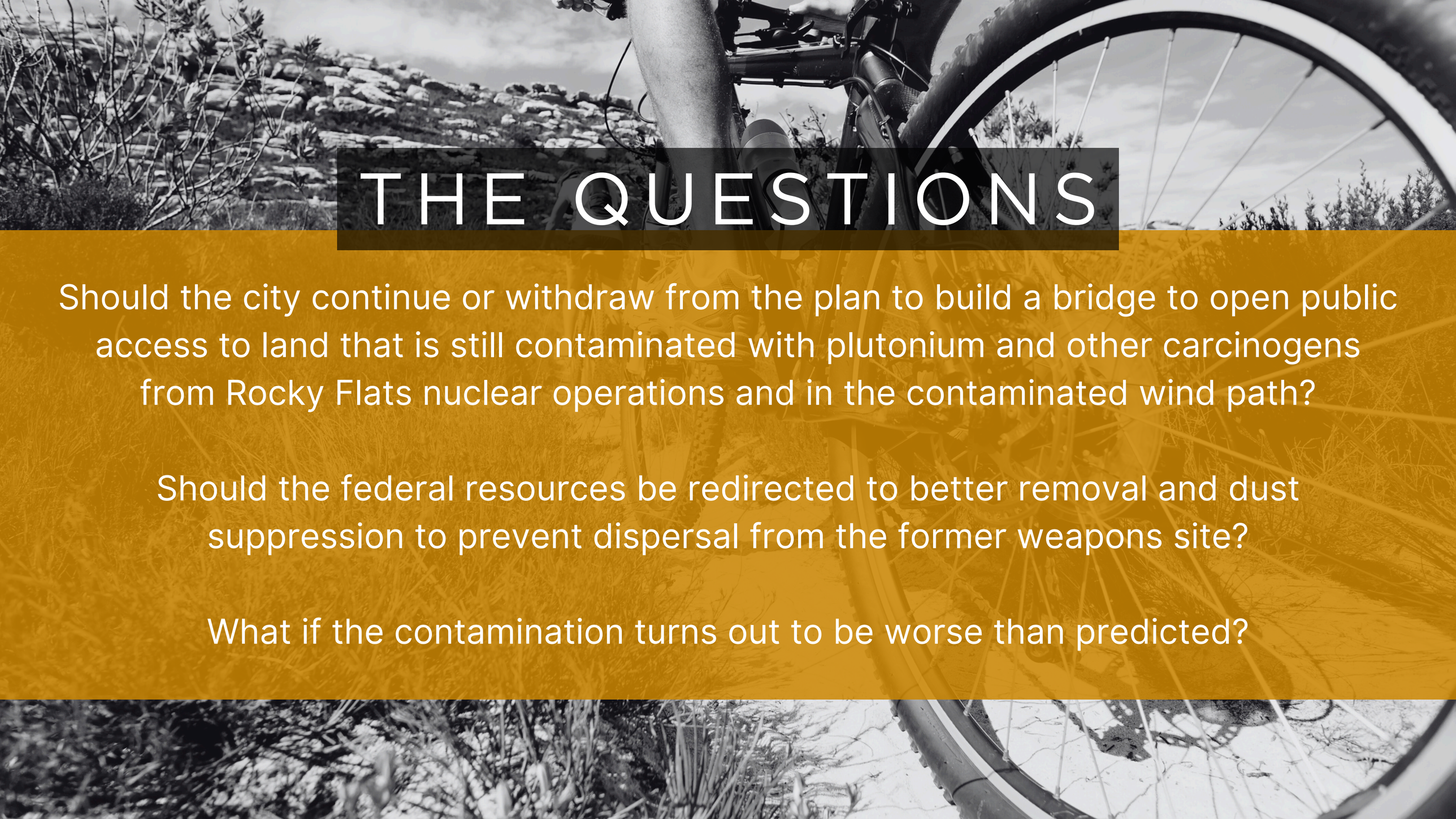
Diane D'Arrigo

Radioactive Waste Project Director,
Nuclear Information and Resource Service

BIOGRAPHY AND CREDENTIALS

My degrees are in Chemistry and Environmental Studies, and I have worked in research, analytical chemistry and environmental biochemistry labs and taken the Dept. of Energy Argonne RESRAD training.

In my capacity at Nuclear Information and Resource Service, I have repeatedly challenged changes in federal radiation standards and orders of 4 agencies that would increase the allowable radioactivity to the public, workers and the environment. I have successfully challenged the make-up of the National Academy of Sciences panels that were skewed to recommend weakened radiation protection. I have also worked with people in communities contaminated by Manhattan Project radioactive waste whose sites were determined to be clean and released, only to be reassessed later requiring one or two additional cleanups.



THE QUESTIONS

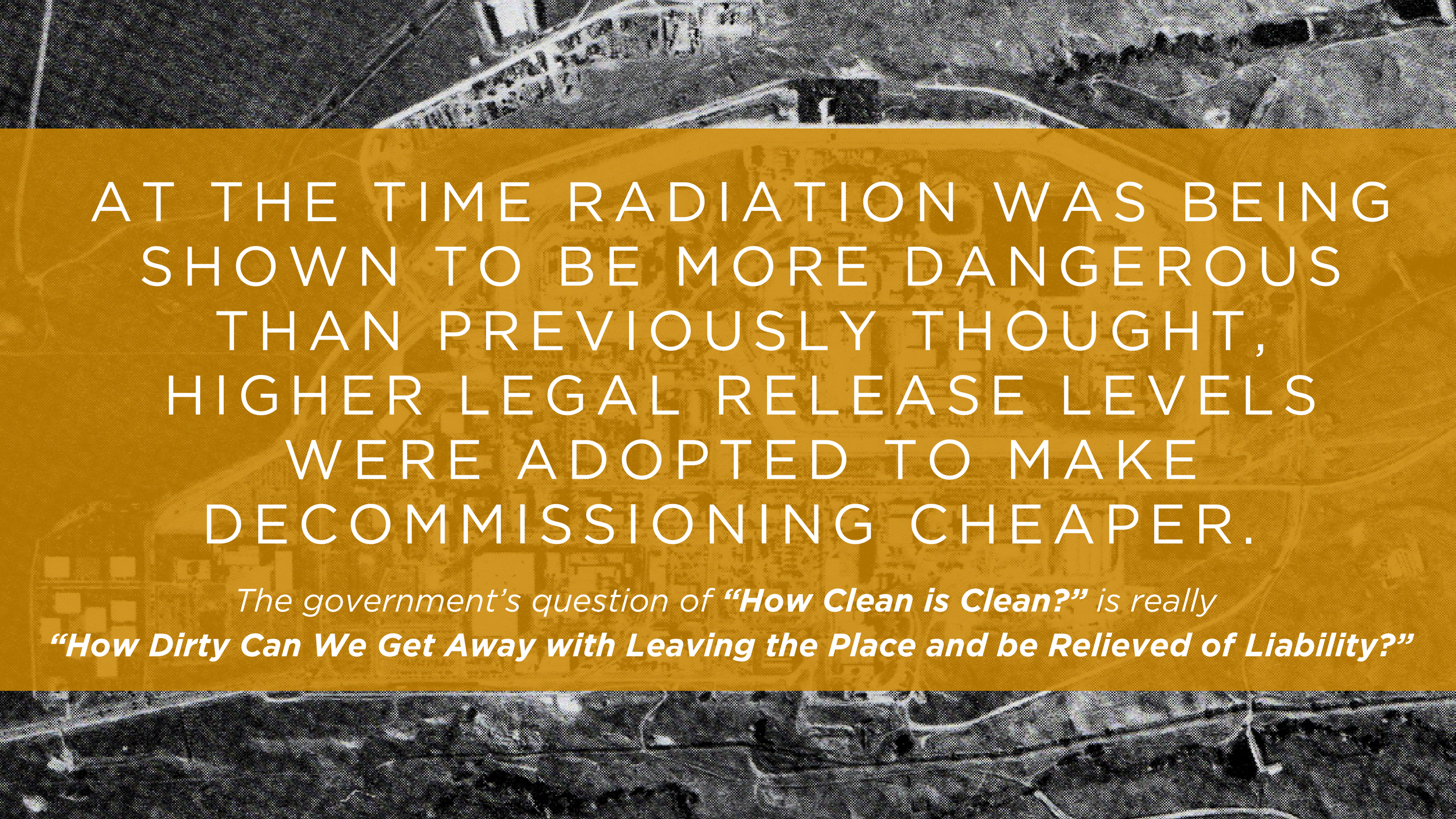
Should the city continue or withdraw from the plan to build a bridge to open public access to land that is still contaminated with plutonium and other carcinogens from Rocky Flats nuclear operations and in the contaminated wind path?

Should the federal resources be redirected to better removal and dust suppression to prevent dispersal from the former weapons site?

What if the contamination turns out to be worse than predicted?

LEGAL LEVELS OF IONIZING RADIATION ARE NOT SAFE LEVELS

They are the amounts that can remain after radioactive controls are removed. They are based on levels that can be met that will relieve the polluters from liability. They are rarely based on biological damage to humans, living beings and the ecosystems.



AT THE TIME RADIATION WAS BEING SHOWN TO BE MORE DANGEROUS THAN PREVIOUSLY THOUGHT, HIGHER LEGAL RELEASE LEVELS WERE ADOPTED TO MAKE DECOMMISSIONING CHEAPER.

The government's question of ***"How Clean is Clean?"*** *is really*

"How Dirty Can We Get Away with Leaving the Place and be Relieved of Liability?"

BELOW REGULATORY CONCERN-
CLEARANCE OR RELEASE OF NUCLEAR
WASTE—REJECTED BY CONGRESS IN 1992,
BY COLORADO AND 13 OTHER STATES
BEFORE THAT.

RESRAD-RECYCLE—JUSTIFYING UNRESTRICTED RELEASE OF RADIOACTIVITY

The RESRAD codes were developed by the Department of Energy (DOE), funded by DOE and the NRC to justify letting go of radioactive materials, waste and properties.

OPPOSITION FROM THE METAL INDUSTRY; RESRAD USED AT FOREIGN RECYCLER

RESRAD CODE

CREATED BY DOE FOR DOE

- RESRAD is a combination of hundreds of equations and assumptions to predict hypothetical doses to future people
- Purpose to estimate and to justify radioactive releases and contamination
- Validation/Verification of the code not convincing
- Small tweaks in the assumptions can lead to orders of magnitude differences in the doses
- Secrecy in underlying tenets of the code
- RESRAD generally allows 2-3 more contamination than the EPA PRG Calculator.

RADIOACTIVITY

Radioactivity is the energy emitted from a radioactive material in the form of alpha particles, beta particles, gamma rays and neutrons emitted from the nucleus of radioactive isotopes.

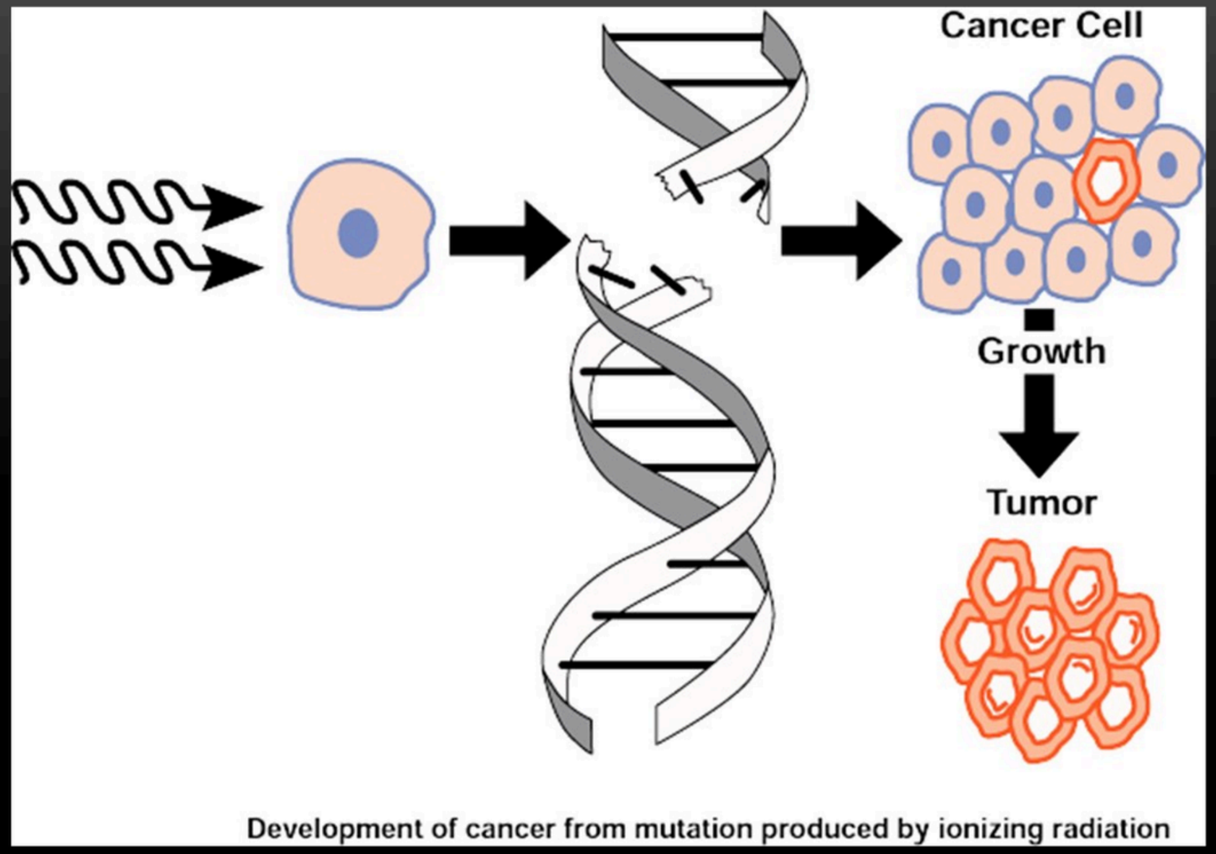
DOSES

Dose is the calculation of damage to tissue from bombardment by those radioactive particles and rays. There is no direct conversion of radioactivity to dose. It depends on the type of radionuclide, the energy of the particles and rays, the size and sensitivity of the body parts and organs being exposed and other factors.

RISKS

Risk is the likelihood of getting or dying of cancer (ignoring all other detrimental health effects) from that radioactive bombardment.

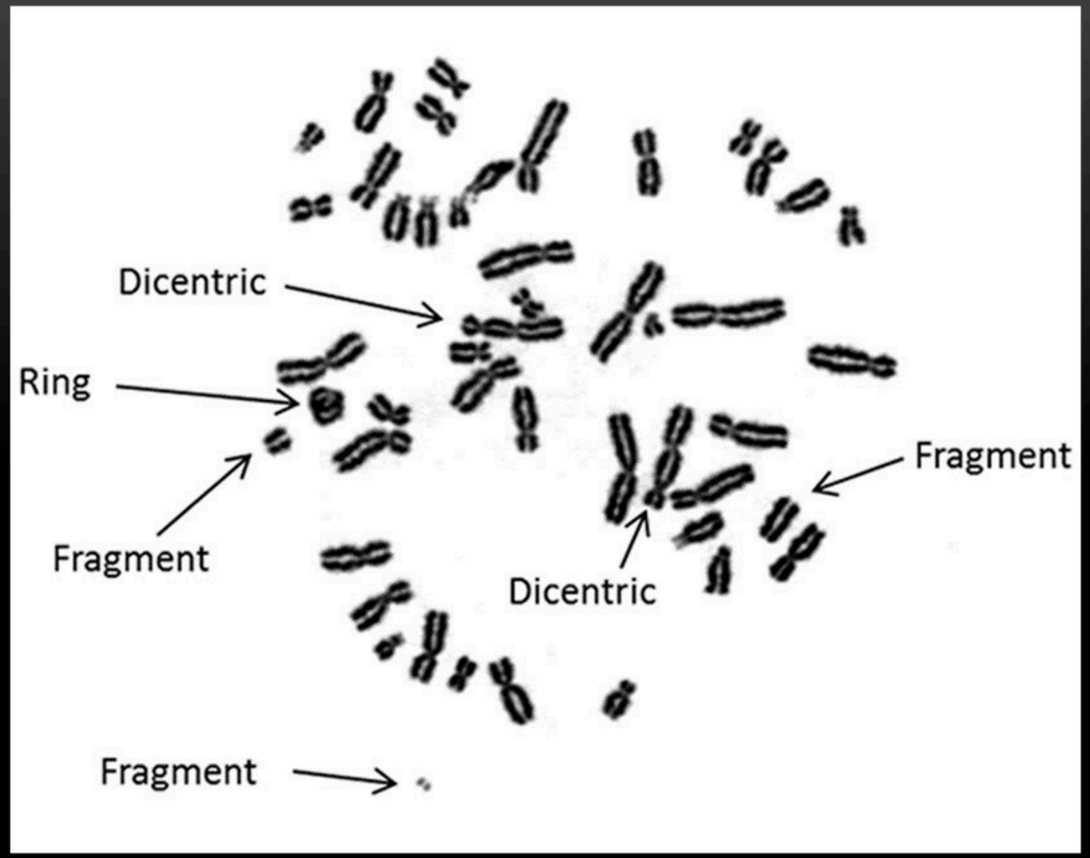
Medical Impacts of Ionizing Radiation: Cancer



Development of cancer from mutation produced by ionizing radiation

Ionizing radiation harms our cells.

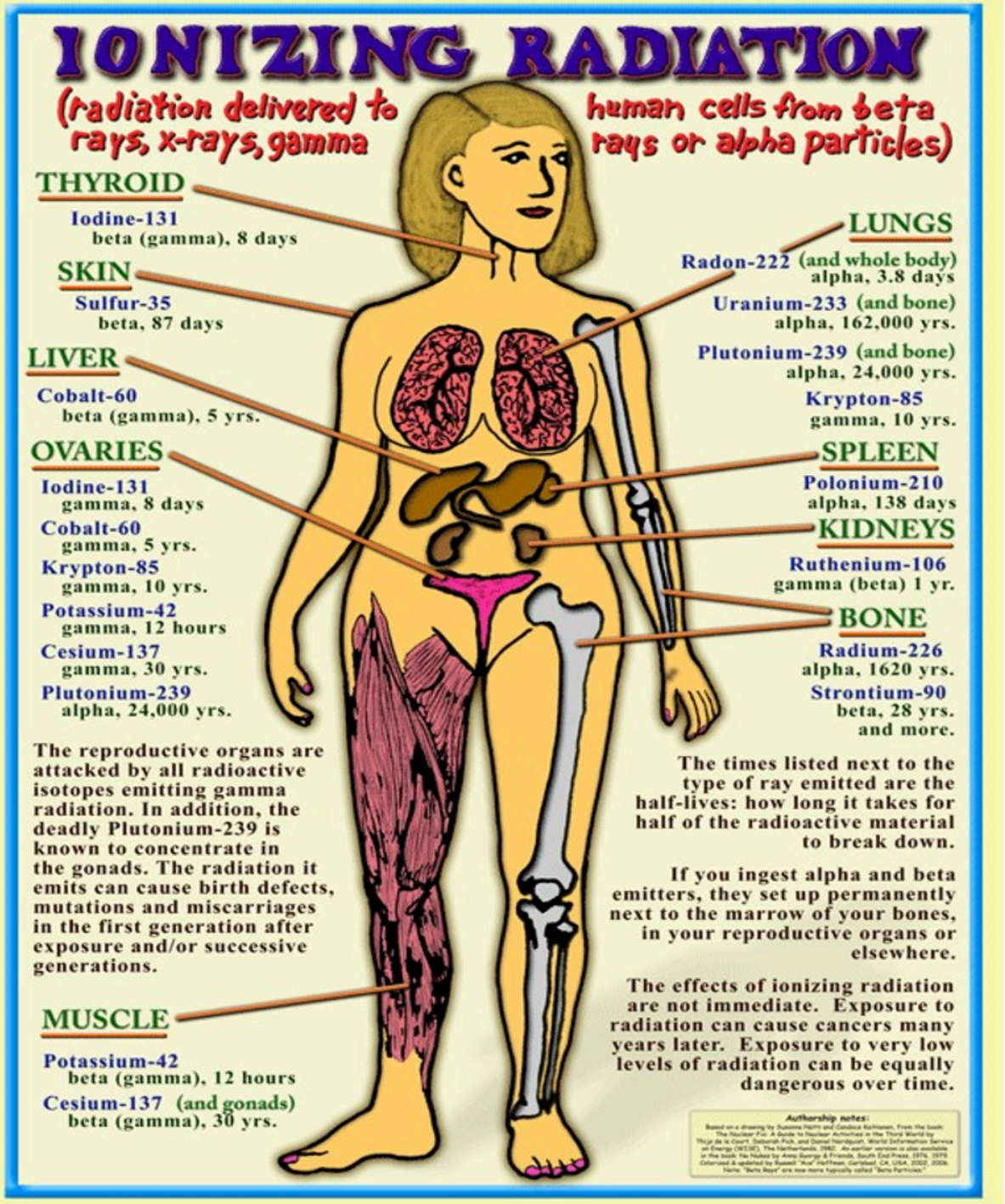
Radiation Induced Chromosomal Aberrations, as seen with microscope



HEALTH EFFECTS OF IONIZING RADIATION

- CANCER
- REDUCED IMMUNITY AND GREATER SUSCEPTIBILITY TO OTHER AILMENTS
- BIRTH DEFECTS
- GENETIC DAMAGE
- HEART DISEASES
- OTHER HEALTH PROBLEMS IN THIS AND FUTURE GENERATIONS

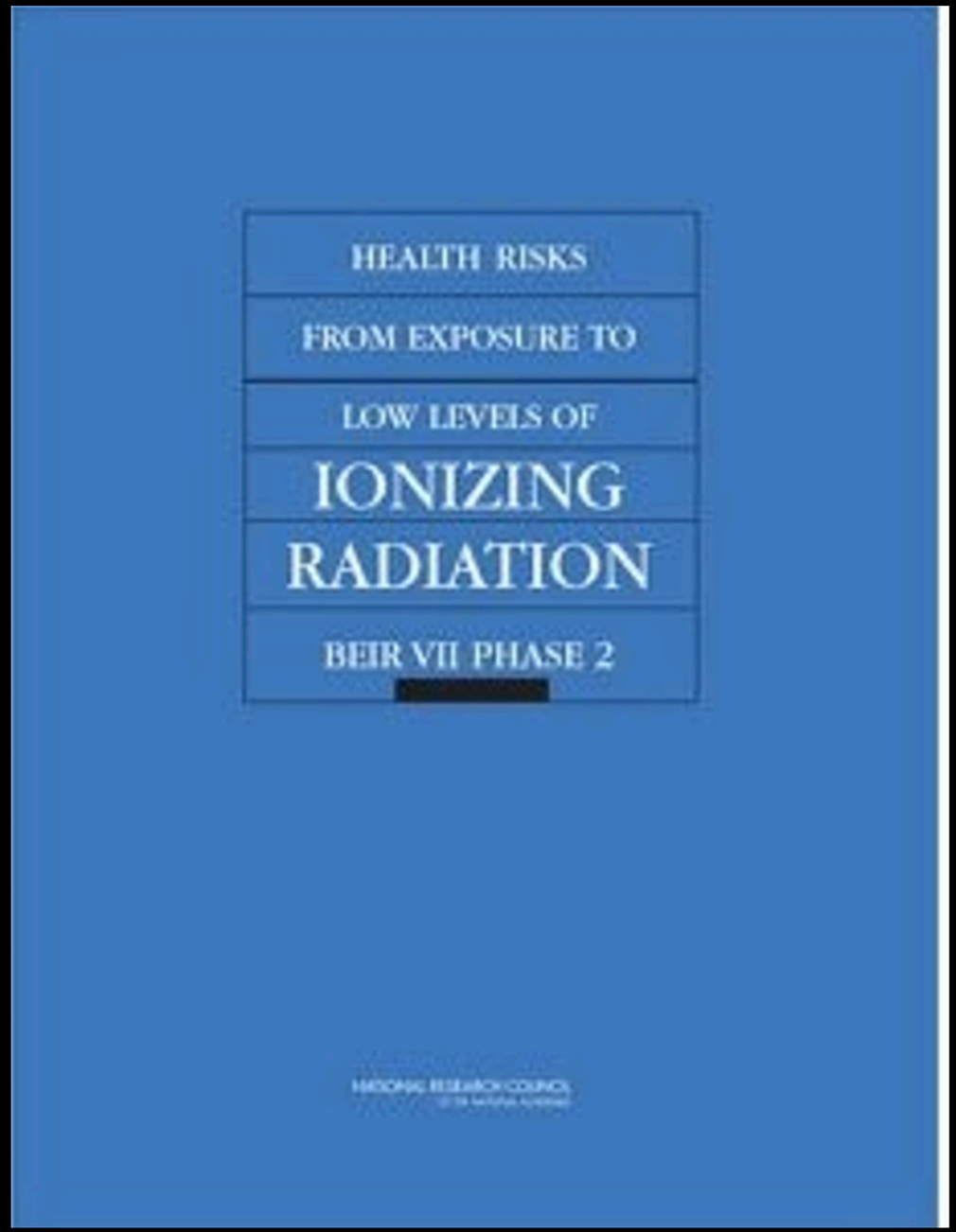
RADIONUCLIDES MIMIC NUTRIENTS--CONCENTRATE IN DIFFERENT PARTS OF THE BODY, INITIATING AND ACCELERATING RELATED HARM TO THOSE TISSUE AND ORGANS



Radiation Risks and Doses according to the National Academy of Sciences BEIR VII Biological Effects of Ionizing Radiation report.

Tables provided in this report indicate:

- Higher Risks from the same dose to Women and Children VS Standard or Reference Man
- Disparate impacts of radiation on women and children, especially female infants and little girls



U.S. National Academy of Science:
Biological Effects of Ionizing Radiation (BEIR Phase 2)
Published 2006

Lifetime Cancer fatalities among those exposed to ionizing radiation as adults

2 Men

3 Women

Lifetime Risk of Cancer Incidence (acute exposure between birth and age five)

2 Boys

4 Girls

THE ARGUMENTS IN FAVOR OF THIS PROJECT

- Rely on promises that risks and doses will be low or nonexistent.
- Rely on computer and risk models based on assumptions to conclude the risks are low enough to justify the actions.
- There is the implication that the doses will be acceptable.

THE ARGUMENTS AGAINST THIS PROJECT

- Plutonium is present at the site and at the places that would be accessed by the bridge connection.
- Both the models and the assumptions are flawed or unprovable, unenforceable.
- RESRAD underestimates the risks compared to EPA PRG calculator.
- The spread of contamination and exposure to unsuspecting people of all ages cannot be undone.

CONCLUSIONS

- Radiation causes cancer and many other health effects.
- The risks are greater for some parts of our human reproductive cycle. More females get and die from cancer than males. Infants, babies and young children are at even greater risk than adults.
- Computer Codes and Models that are being relied upon, such as RESRAD, are not sufficiently protective of public health. They provide a mechanism to relieve the polluters of liability. They provide false assurance.
- They can make estimates, but we will never know if they are right…we won't know all the consequences of exposure to Rocky Flats plutonium and other radioactive and chemical pollutants.
- Use your power to prevent further spread of radioactivity.

Summary: Arguments Against Rocky Flats Greenway

Promoting Public Recreation in Plutonium is Immoral

Randy Stafford

Rocky Flats Public Health Advocates

SUMMARY POINTS

1. Plutonium is in the soil and wind
2. Inhaled plutonium is carcinogenic
3. Standards-setting is arbitrary or worse
4. RESRAD vs. reality
5. The Greenway through Rocky Flats is immoral
6. Why would you do this? Please withdraw.

CONTAMINATION AT THE GREENWAY CROSSING

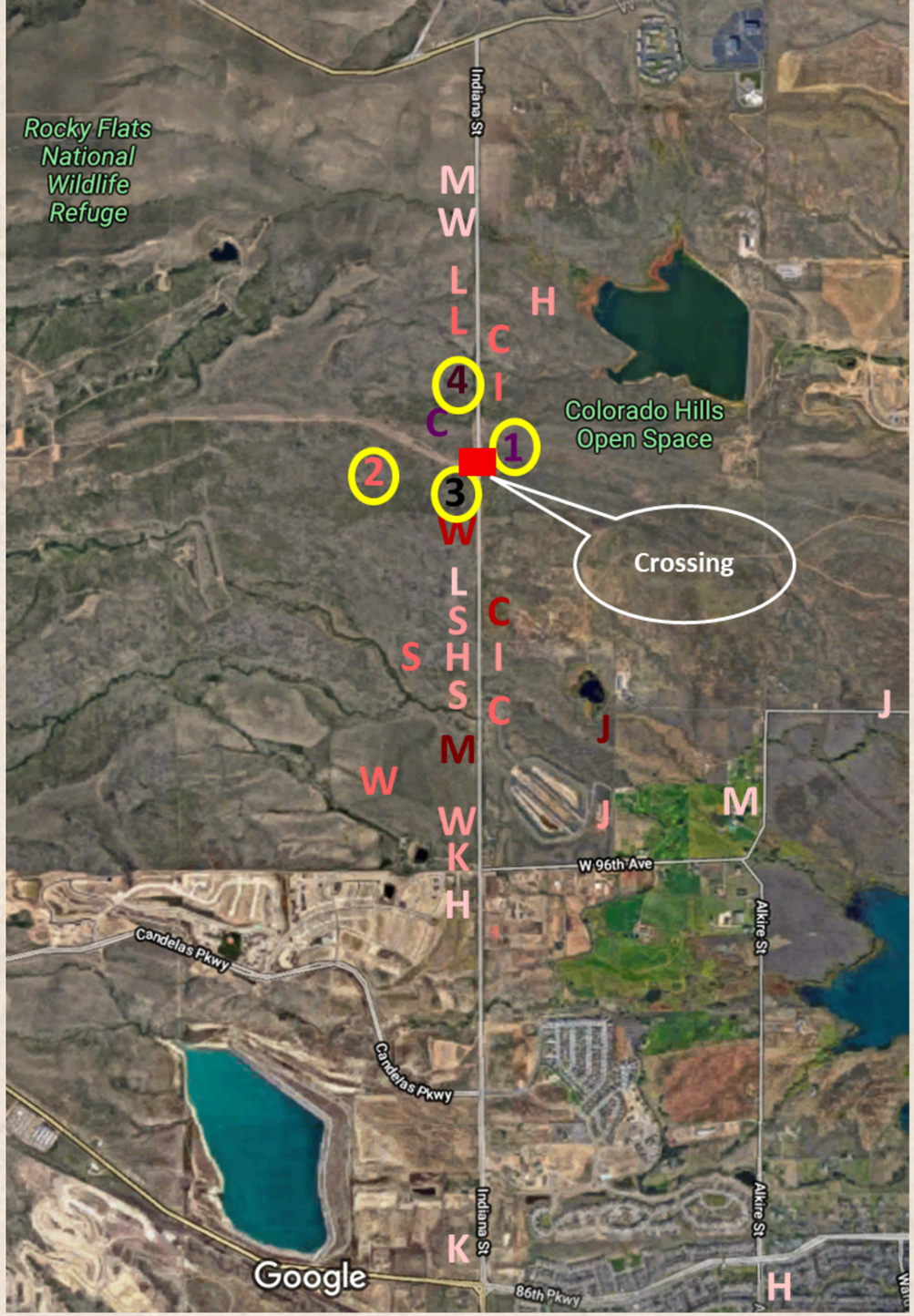
Multiples of Background Radiation

>10x >50x >100x >200x >300x >500x

>1000x >10000x

1. **Greenway Trail crossing: 19.4 pCi/g = 992x bkgnd**
2. **Greenway Trail in Refuge: 3.51 pCi/g = 174x**
3. **Parkway ROW for JPPHA: 264 pCi/G = 13,500x**
4. **Parkway ROW for RFD: 41.9 pCi/g = 2,144x**

The Greenway crossing of Indiana Street is in an area heavily contaminated with plutonium. Recent soil samples show 992 to 13,500 times background radiation.



WIND AND DUST AT ROCKY FLATS

- Rocky Flats is notoriously windy
- Often hurricane-strength wind
- This photo taken July 4, 2018 by Drake Panzer
- Looking NW from Standley Lake
- The dust devil is on the COU
- Winds were only ~25mph

DR. MICHAEL KETTERER'S AIR SAMPLING

- Dr. Ketterer definitively proved that Rocky Flats –specific plutonium becomes airborne and blows off the site
- He did air sampling because DOE wouldn't, despite requests from Reps. Neguse & Pettersen, Mayor Castriotta
- He captured TENS to HUNDREDS of BILLION individual Pu atoms in just 22 minutes on just a 7" disk of filter paper

HOW MANY ATOMS IN A RESPIRABLE PARTICLE?

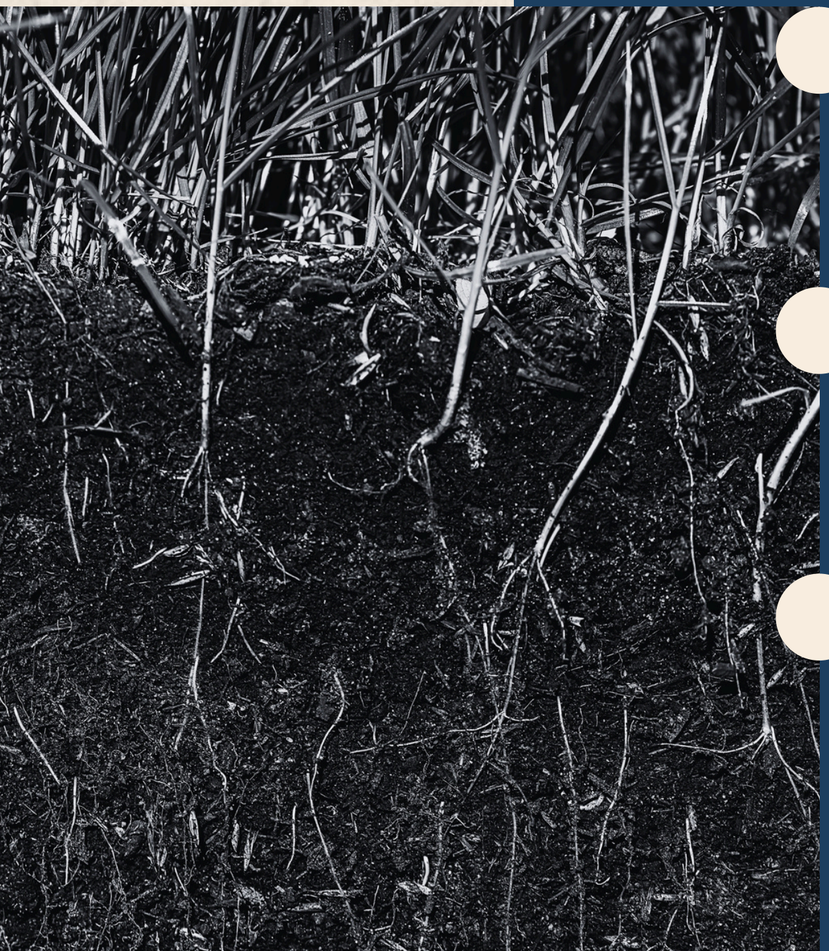
- Plutonium density is 19.86 grams (0.7 ounces) per cubic centimeter
  - 23 cubic centimeters weighs one pound
- CDPHE says respirable Pu-laden dust is 3-10 micrometers (microns) in size
  - For comparison, a human hair is ~60 microns in diameter
- One cubic micron of 239Pu = 19.86pg = 0.046 Bq = 49.65x109 (billion) atoms
- A 10-micron cube of 239Pu = 19.86ng = 45.558 Bq = 49.65x1012 (trillion) atoms
- **Every three-micron 239Pu cube inhaled would have 1.34 trillion atoms and would emit an alpha particle more than every second in the body**
- **Every ten-micron 239Pu cube inhaled would have 50 trillion atoms and would emit alpha particles 46 times per second in the body**

DR. CARL JOHNSON'S TESTIMONY ON DEVELOPMENT NEAR ROCKY FLATS

"I felt that to put people in this area known to be contaminated would significantly increase their risk of leukemia, cancer, birth defects, and also the rate of general ill health due to chromosome injury."

Decision at Rocky Flats 21:30 - 22:12

SOIL ACTION LEVEL DETERMINATION PROCESS SUMMARY



- The 50 pCi/g soil action level on the Refuge was reverse-engineered from the cleanup budget, through a presumed safe annual individual exposure
- The DOE ignored the recommendations of the local working groups and oversight panels it itself had established
- The future site use scenario used in the process DID NOT CONSIDER residents downwind of major construction projects at the site

WHAT RESRAD SAYS

DOE Rocky Flats Closure Project

Item	Value
Receptor	Wildlife Refuge Worker
Contaminant of Concern	Plutonium-239/240
Exposure Unit	Wind Blown Area
Exposure Assumptions	250 days/year for 18.7 years, 50% outdoors onsite, 50% indoors in office
Radiation Dose Estimate	0.34 mrem/year
Excess Cancer Risk	**2 cases in 100,000 receptors**
RESRAD Code & Version	RESRAD v6.0 run 9/15/2005
Source Citation	RCRA Facility Investigation – Remedial Investigation/Corrective Measures Study – Feasibility Study Report for the Rocky Flats Environmental Technology Site (RI/FS/CRA)

WHAT RESRAD SAYS

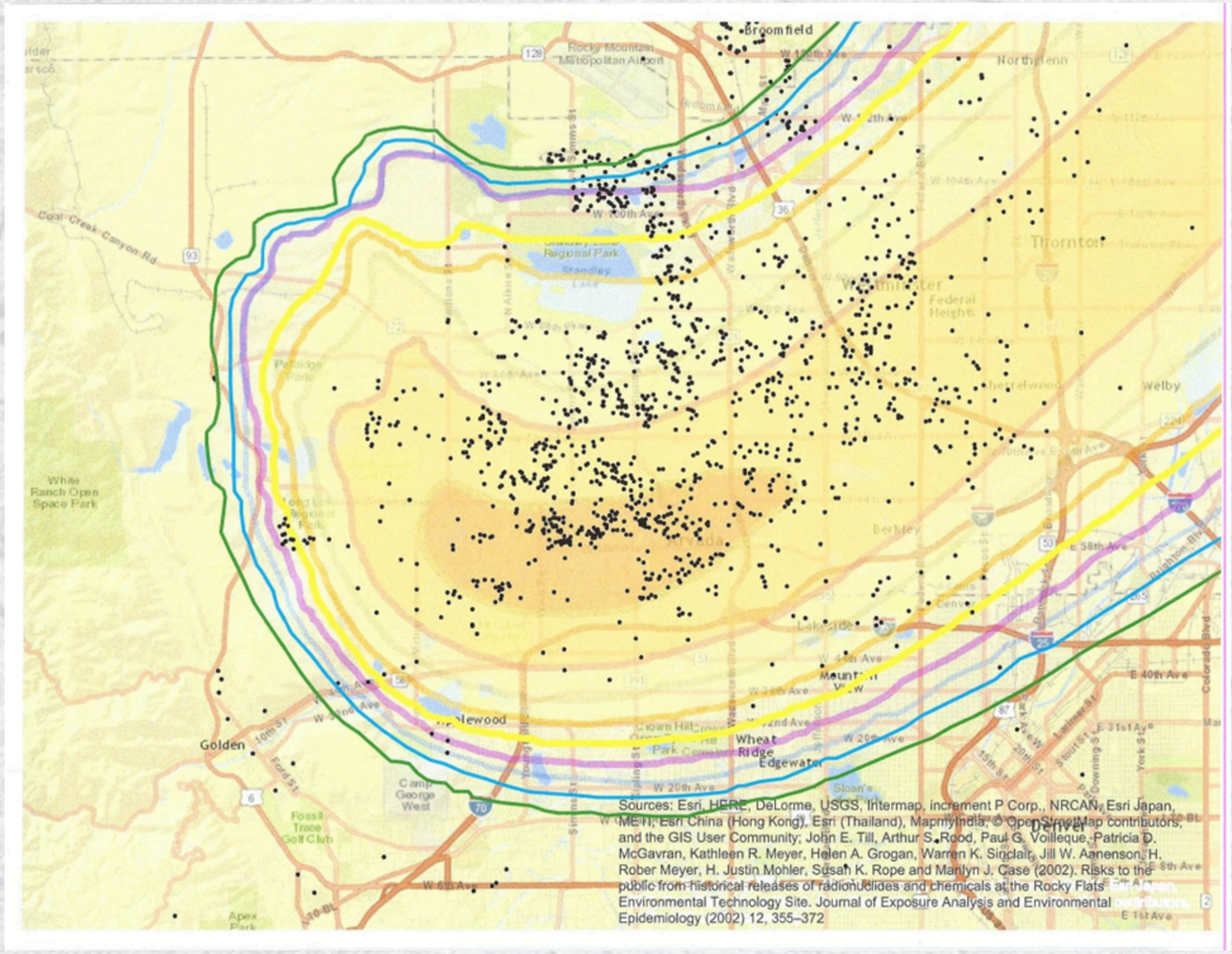
CDPHE Jefferson Parkway Radiation Dose Review

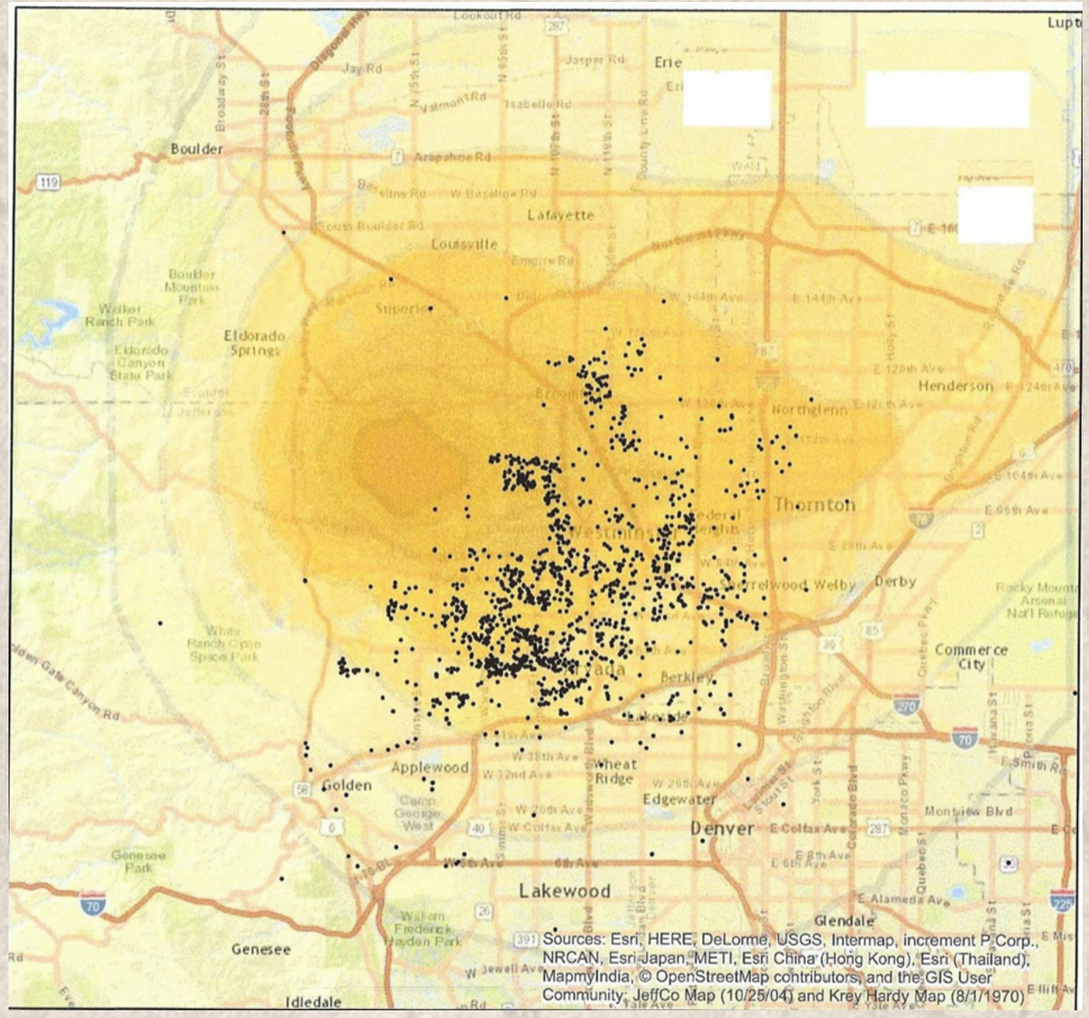
Item	Value
Receptor	Offsite resident farmer
Contaminant of Concern	Plutonium-239/240
Exposure Unit	N/A (Jefferson Parkway RoW, a 300’ strip adjacent Indiana Street between Hwys. 72, 128)
Exposure Assumptions	150µg/m3 inhaled at various rates (according to age) for 1, 3, 5 years
Radiation Dose Estimate	1.977 mrem/year
Excess Cancer Risk	**Not reported: review stopped at dose estimate less than 25 mrem/year regulatory limit**
RESRAD Code & Version	RESRAD OFFSITE (version and run date not reported by CDPHE)
Source Citation	Colorado Department of Public Health and Environment's Jefferson Parkway_ review

MSU HEALTH SURVEY PRELIMINARY RESULTS

- Within the 1,745 completed surveys for the 64-year time period, there were 848 cases of cancer
- 414 of those cases (49%) were “rare” (meaning fewer than 15 cases per 100,000 people).
- The US rate for “rare” cancers is 25 percent. We have twice that rate.
- The most common cancers in this study, in order of prevalence, are breast, thyroid, prostate and colon
- Thyroid cancer ranks 9th in prevalence nationally, but 2nd in the health survey results

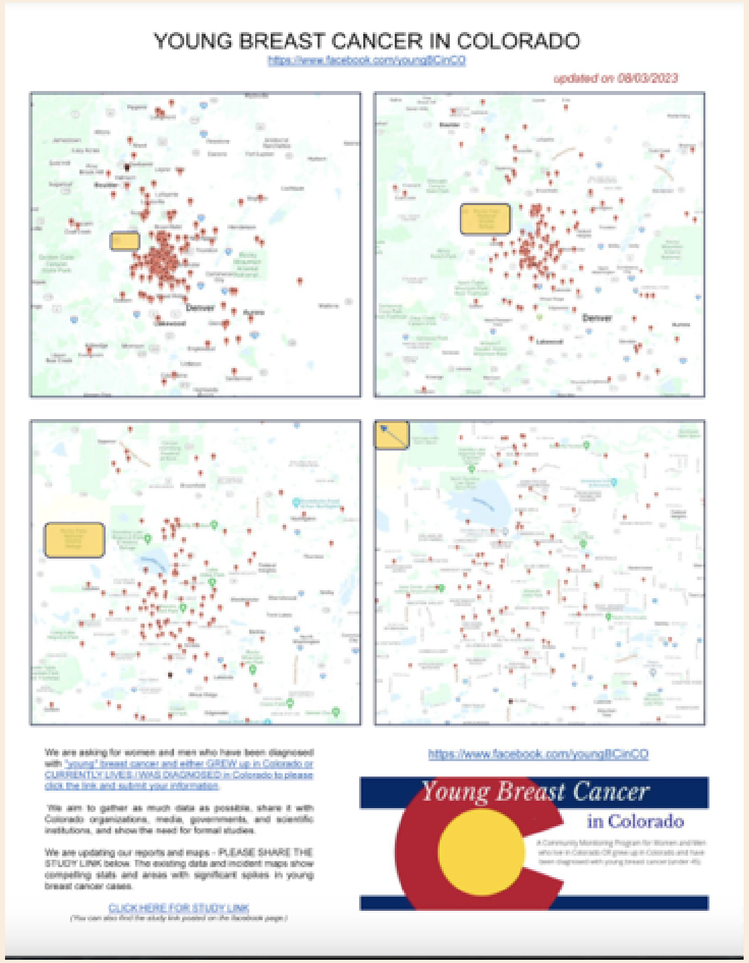
MSU HEALTH SURVEY GEO-PLOTS

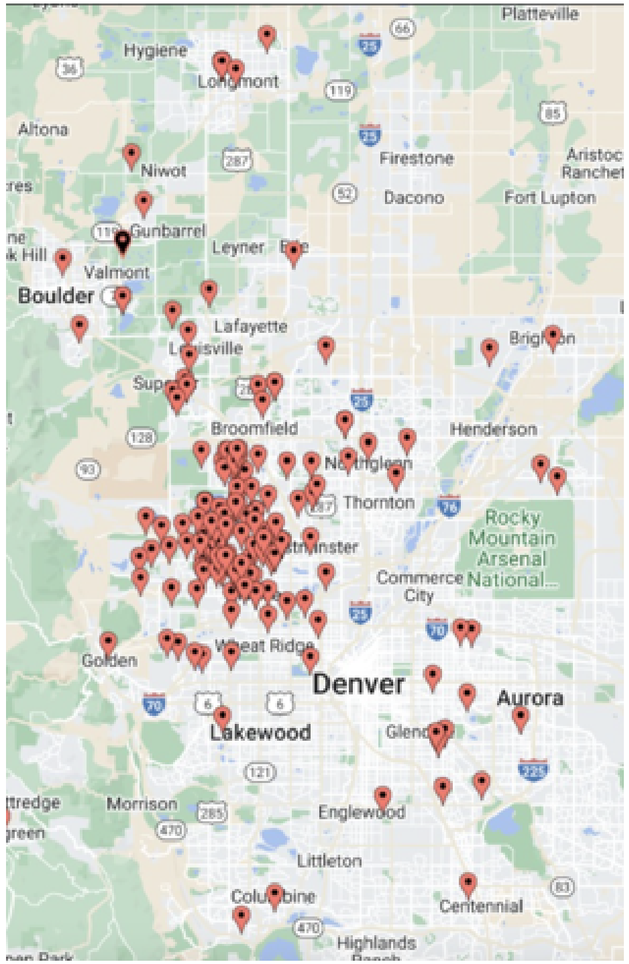


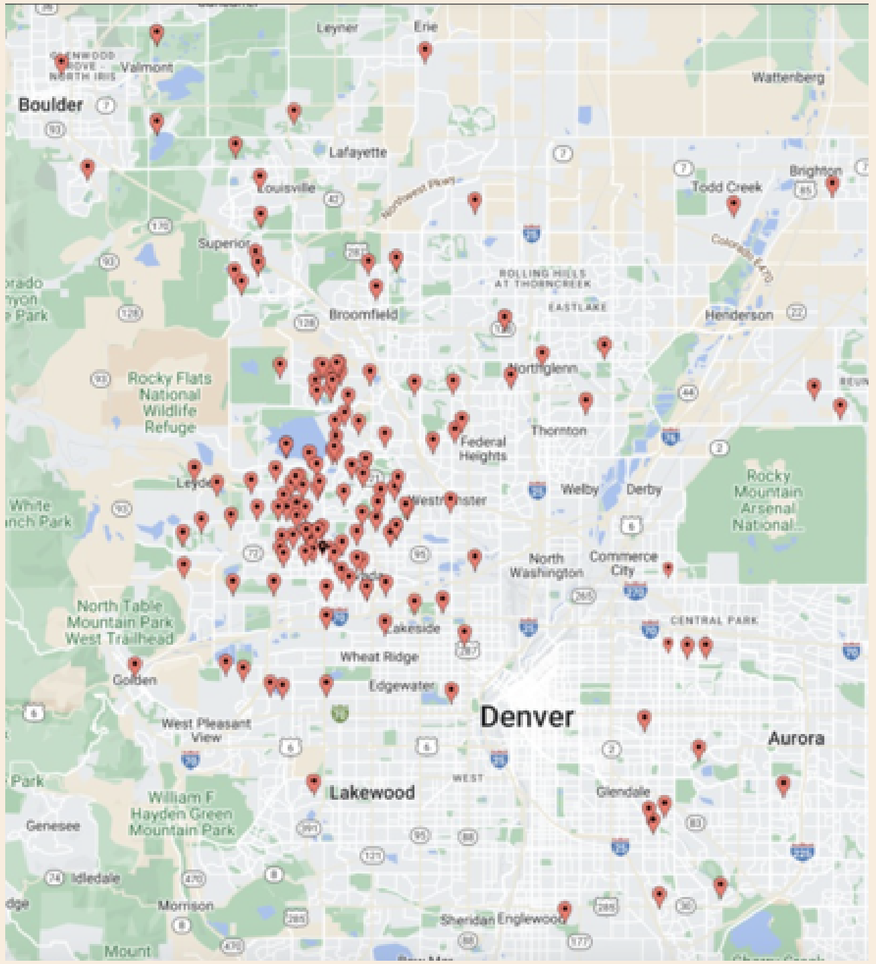


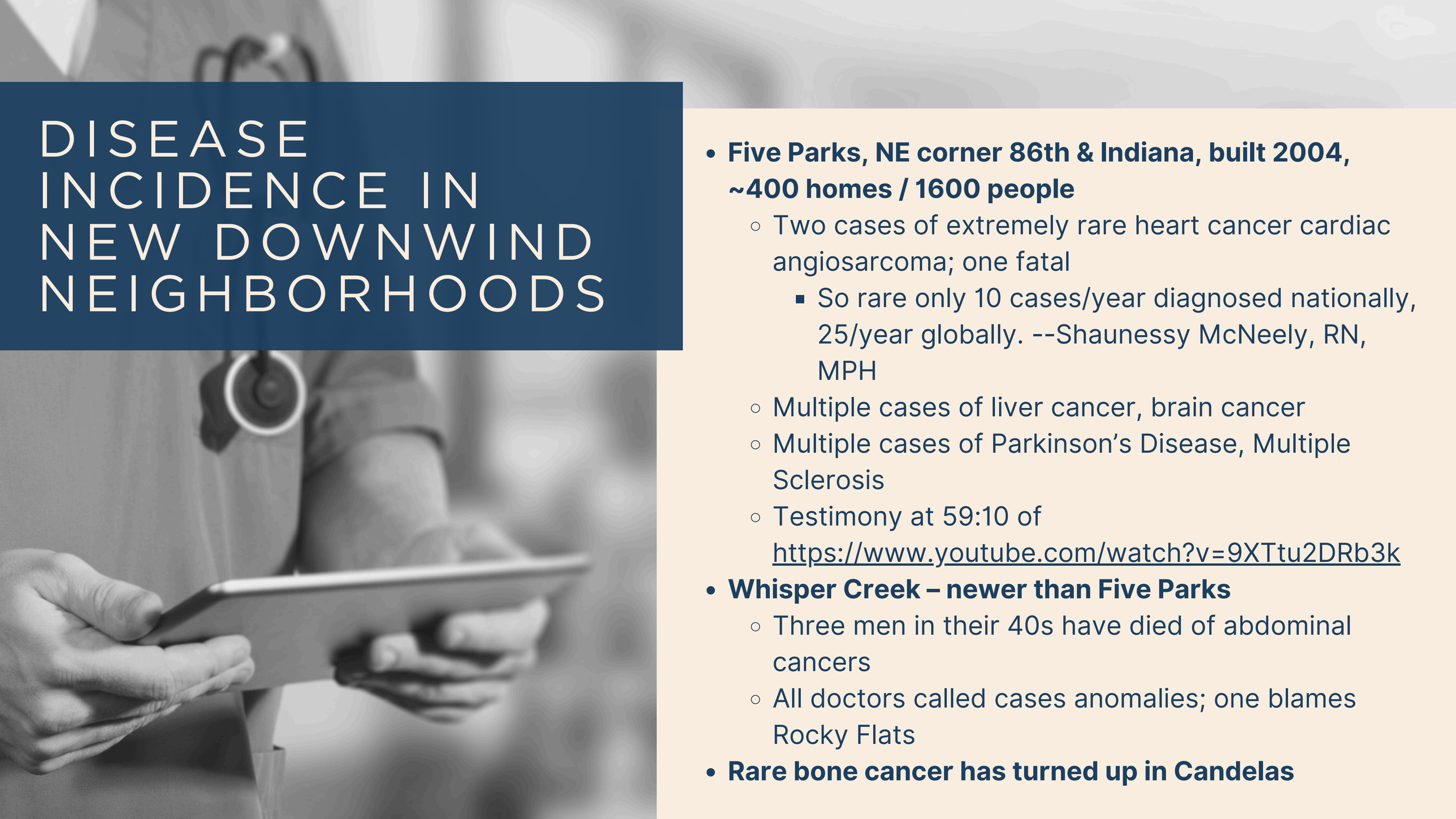
YOUNG BREAST CANCER IN COLORADO MONITORING PROGRAM

Self-Reporting Data Compiled by Brittany Kelly









DISEASE INCIDENCE IN NEW DOWNWIND NEIGHBORHOODS

- **Five Parks, NE corner 86th & Indiana, built 2004, ~400 homes / 1600 people**
  - Two cases of extremely rare heart cancer cardiac angiosarcoma; one fatal
    - So rare only 10 cases/year diagnosed nationally, 25/year globally. --Shaunessy McNeely, RN, MPH
  - Multiple cases of liver cancer, brain cancer
  - Multiple cases of Parkinson's Disease, Multiple Sclerosis
  - Testimony at 59:10 of https://www.youtube.com/watch?v=9XTtu2DRb3k
- **Whisper Creek – newer than Five Parks**
  - Three men in their 40s have died of abdominal cancers
  - All doctors called cases anomalies; one blames Rocky Flats
- **Rare bone cancer has turned up in Candelas**

BOULDER COUNTY COMMISSIONER MATT JONES' COMMENTS

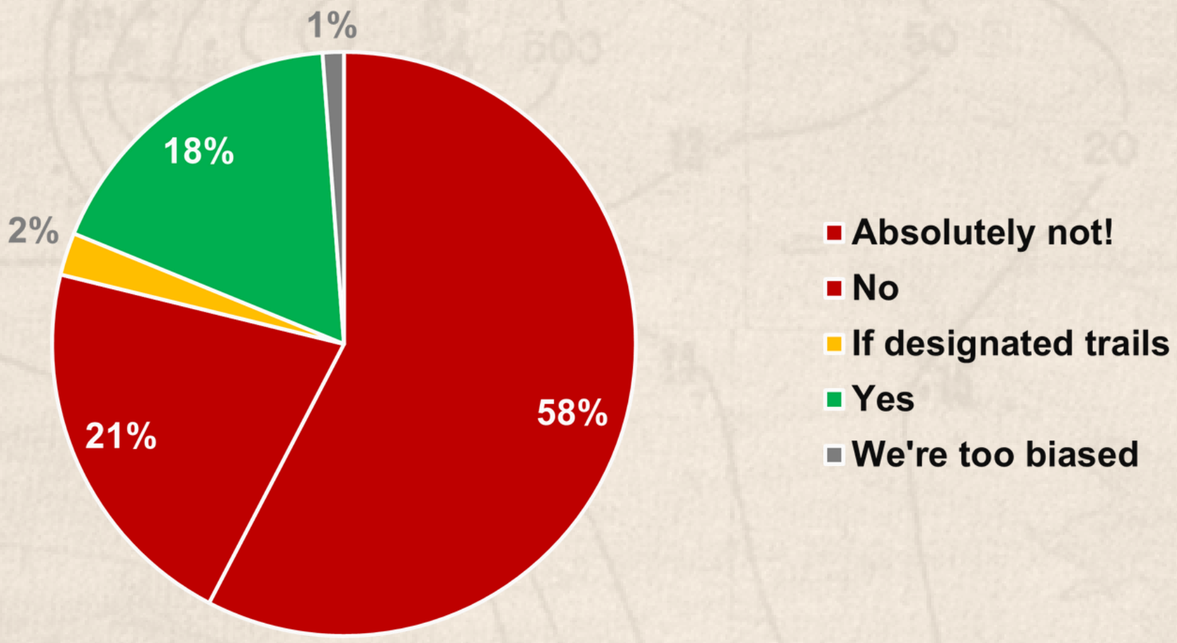
When casting a "no" vote on the IGA to participate in the FLAP grant partnership April 6th, 2021 (his comments start at 3:01:15 in the video).

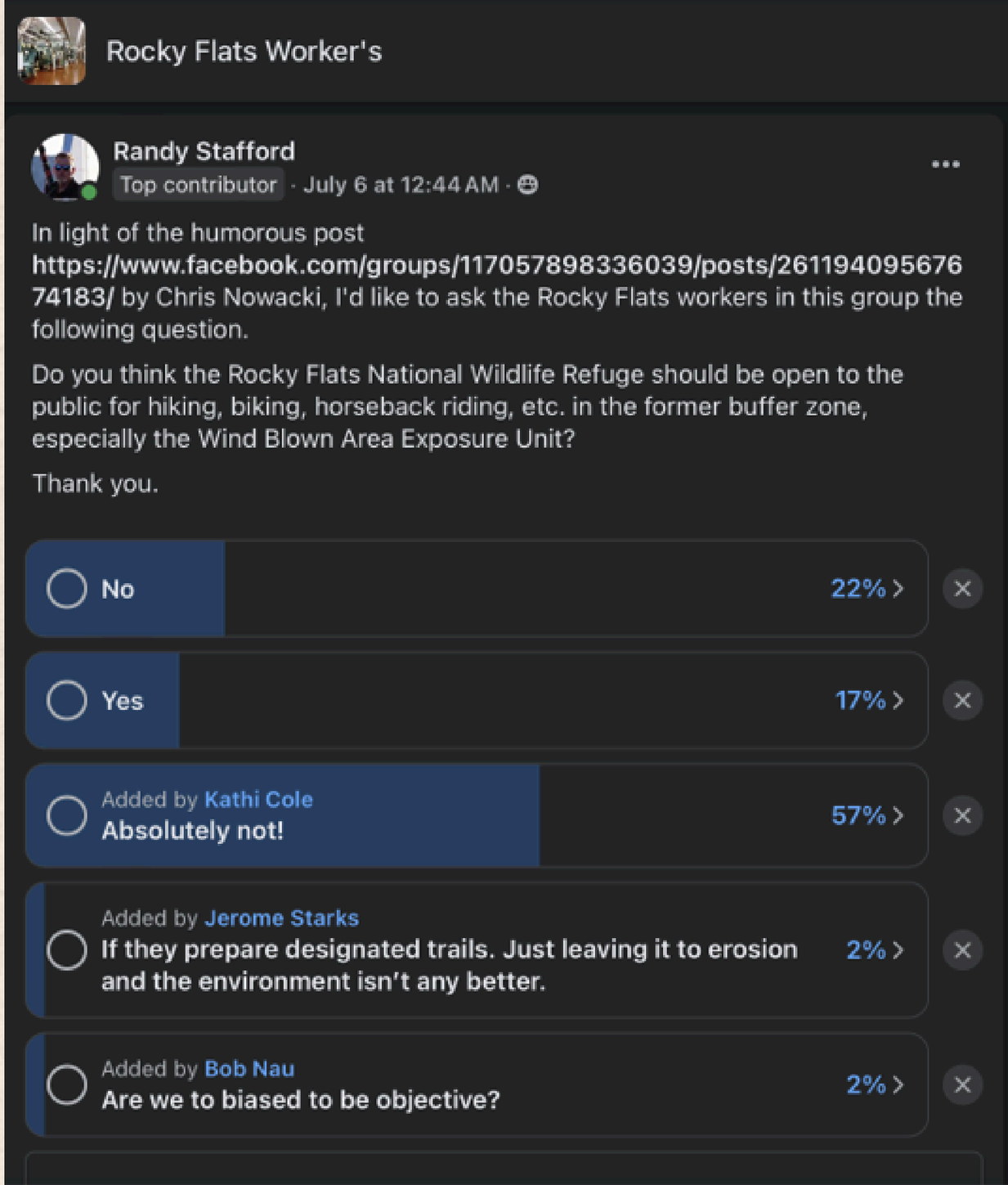
"I keep thinking about the health risks … 'acceptable limits' always kind of makes me nervous … I think about that 264 pCi/g finding and I'm sure there's probably more … I remember [Jefferson County Public Health Director] Dr. Mark Johnson saying he doesn't feel comfortable out there himself, or promoting the use … My life experience kicks in here, and that is I'm a double cancer survivor. The first [case] I got at 25 was thyroid cancer, which is a cancer caused by radiation. … Years later I was diagnosed with leukemia. … I wouldn't wish that on anybody. … Those standards are hypothetical. … I just don't want to be promoting use out there. On the off chance that someone gets cancer and they might have got it from there. … That's what's driving me – I know how it affects people."

ROCKY FLATS WORKERS POLL

“Do you think the Rocky Flats National Wildlife Refuge should be open to the public for hiking, biking, horseback riding, etc. in the former buffer zone, especially the Wind Blown Area Exposure Unit?”

Response Breakdown (n=85)





ALASKA MARITIME NWR MANAGER'S POSITION ON THE ISSUE

"You have hit a pet peeve of mine. The USFWS always was in the market for getting more land to put in refuges. However, **I felt we were dealing with the devil when looking at DoD or DoE lands.** Their idea was to do the minimum cleanup and then transfer to the USFWS. Liability went with the land, of course. **I always thought the land should be "cleaned up" and kept by the agency that screwed it up. They should be required to fence it and patrol it.** Of course, cleanup is the wrong term. We are really talking about risk assessment and how much can you reduce the risk. **One can never get it down to the same risk level that existed before contamination.**

I believe that land such as Rocky Flats should be cleaned up to the lowest risk, fenced, and patrolled to keep people out. It should not be transferred to another agency. These fenced plots of land would then become reminders to the public that they need to know what the government is doing on their lands with radiation, chemical and biological weapons testing, etc. **We don't need to put refuge signs around it since to most people that would indicate beautiful pristine lands and would be an attractive place to live next to. It is counter- productive. Like a playground built on an old dump."**

-- John L. Martin, USFWS (Retired). Alaska Maritime Wildlife Refuge Manager 1981-2001
including Amchitka, site of nuclear bomb testing, the only US precedent for refuge on nuclear site

YOUR LEGACY

- You are facing a question of moral responsibility.
- Do you want it to be your legacy to have sponsored a project that would encourage the public to recreate at one of the most contaminated sites in the world?
- Connecting the Rocky Mountain Greenway through Rocky Flats is simply not necessary. Why take the risk?
- Please follow the example of responsible governance set by Broomfield.
- Please do not exacerbate the existing problem.
- Please withdraw from the FLAP grant partnership.
- Please close Westminster lands to connections from Rocky Flats.