

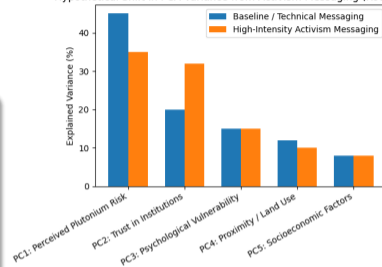
Rocky Flats radiophobia: ingredients, \simeq verbatim from ChatGPT

From large survey of many aspects of beliefs, ‘principal component analysis’ finds and ranks a **small** number of variables (or linear combos) that account for **most** of the variability in responses to a specific question. EG: **What are predictors of radiophobia according to principal component analysis?** ChatGPT response [based on Fukushima, other incidents, but **not** Rocky Flats survey]:

Rocky Flats-specific components (ChatGPT knows a lot about Rocky Flats context)

- **PC1 Perceived plutonium risk:** Fear of Pu inhalation; cancer/genetic damage beliefs; ‘hot particle’ narratives; confusion between soil activity and dose. **Why it dominates:** Rocky Flats anxiety is plutonium-centric and persists decades after operations ended, unlike short-lived reactor accidents.
- **PC2 Trust in institutions:** distrust of DOE/EPA/CDPHE; belief cleanup was inadequate or fraudulent; perceived suppression of data; conflict between official risk communication and activist claims. **Rocky Flats-specific feature:** This component is *larger* here than in Fukushima PCA studies because secrecy and adversarial cleanup politics are central.
- **PC3 Psychological vulnerability:** baseline anxiety; PTSD-like traits; ‘somatization’; prior health fears. **Interpretation:** Radiophobia amplifies pre-existing psychological vulnerability rather than arising independently.
- **PC4 Proximity and land-use meaning:** Distance from site; wind-direction narratives; recreational vs. residential framing; school/Refuge/housing controversy. **Key insight:** This component reflects symbolic proximity, not dose. People far away but socially engaged can [display this].
- **PC5 Socioeconomic & demographic context:** Education level; income; home ownership; family status

Hypothetical Shift in PCA Variance from Activism Messaging (Rocky Flats)



What this means

- Measured plutonium activity would explain little variance, while perceived risk + institutional distrust explain most. Radiophobia near Rocky Flats is a socio-cognitive phenomenon, not a dosimetric one
- Activist messaging tends to shift attention from “How dangerous is Pu?” to “Why should we trust anyone saying it’s safe?”.
- Activism messaging increases correlation among: distrust of DOE/EPA; belief in data suppression; suspicion of cleanup standards; moral framing (“cover-up”, “sacrifice zones”)

Key takeaways from PCA (and ChatGPT knows a lot about Rocky Flats)

Activist messaging shifts focus from plutonium to ‘system is lying’

- “Fear of plutonium” has become “belief the system is lying”
- Policy logic “If we measure dose accurately and show it’s low, opposition should fall” FAILS. Instead, “Any evidence produced by institutions is suspect by definition”: data quality becomes irrelevant; uncertainty is treated as proof of harm; precaution replaces proportionality; no amount of measurement reduces [suspicion].

This is why Rocky Flats policy debates do not converge, despite decades of sampling.

- School district bans & access restrictions: **Observed pattern:**
 - Decisions justified by “safety concerns”.
 - But no dose-based threshold is ever articulated
 - Policies are: Symbolic, reputationally defensive, insensitive to quantitative risk.

This is a litigation-avoidance equilibrium, not a safety calculation.

- Once PC2 dominates: (i) Agencies cannot ‘win’ by producing data; (ii) every new study is framed as self-serving; (iii) risk communication backfires

In fact this is a **feedback loop**, and gives rise to a *stable attractor*

A stable attractor in the context of Principal Component Analysis (PCA) refers to a low-dimensional point or region in the PCA state space where system trajectories converge and remain, representing a stable, equilibrium state.

ChatGPT concludes: **The uncomfortable but accurate conclusion:** Rocky Flats is governed today less by environmental health science than by trust-collapse risk management. And PCA gives a clean, non-ideological way to show why.