

Rocky Mountain Peace and Justice Center

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October 20, 2004

Chief, Program Evaluation
Records and Information Services Branch
Agency for Toxic Substances and Disease Registry (ATSDR)
1600 Clifton Road, NE (MS E-32)
Atlanta, GA 30333

RE: Comments on ATSDR Public Health Assessment for the Rocky Flats
Environmental Technology Site: A Badly Flawed Document

Dear Sir or Madam:

Thank you for the opportunity to comment on ATSDR's Public Health Assessment for Rocky Flats. This letter comes from health-care professionals, scientists, and persons long involved in environmental and public-health issues related to Rocky Flats.

Introduction to comments

In commenting on this report, we make no attempt to provide a comprehensive review or critique. Rather, we deal with selected topics, arranged under the following headings:

1. Summary of the ATSDR report and our conclusions about it
2. Positive features of the report
3. General comment on sources
4. Bias and untruth at the heart of this assessment
5. Children and other high-risk groups
6. Wildlife, humans, and genetic issues
7. On-site food consumption and long-term site use
8. Synergistic and cumulative effects of exposure
9. Sampling and monitoring issues
10. Off-site releases of plutonium: Distance from the site
11. Off-site releases of plutonium: Riddles
12. Off-site releases of plutonium: Quantity and toxicity
13. Worker health studies and exposure standards
14. Health studies of local residents
15. The secrets hidden in the grand jury documents
16. Errors of fact (a partial list)
17. A questionable recommendation
18. Resources not considered by ATSDR
19. Conclusion

1. Summary of the ATSDR report and our conclusions about it

The purpose of the ATSDR assessment is to find out if people who live or work near Rocky Flats are being or can be exposed to hazardous substances released from the facility and, if so, whether the exposure is harmful and should be stopped or reduced. The report says, in sum, that, though hazardous substances have been released from Rocky Flats, adverse health effects have not resulted.

However, our analysis of the ATSDR report, set forth in more detail below, shows that the ATSDR report is based on several flawed assumptions which make its methodology scientifically indefensible and that, in addition, it has failed to include several important concepts and sources of information. We urge ATSDR to redo its study, taking these comments into consideration.

2. Positive features of the report

- ATSDR distinguishes data based on measurements from data derived from modeling and prefers the former to the latter.
- ATSDR acknowledges the enormous uncertainties that exist regarding contaminants released from Rocky Flats.
- ATSDR provides very helpful information for Rocky Flats workers who may have been exposed to contaminants in the workplace.

3. General comment on sources

ATSDR says that it relied on the best data available and that it consulted with knowledgeable persons and groups from the local community. We applaud ATSDR's use of the invaluable data from the Rocky Flats dose reconstruction study, though we will indicate, especially in section 12 below, crucial information presented by the dose reconstruction researchers which ATSDR fails to use. Further, as is noted in our comments, there are many pertinent reports, studies, and articles that ATSDR has totally ignored. Additionally, despite ATSDR claims of having consulted with the affected public, no one from ATSDR consulted with any of the signers of this letter, many of whom have long been actively involved in issues related to Rocky Flats. In section 18 below we present a long list of significant sources we have used that ATSDR has not utilized.

4. Bias and untruth at the heart of this assessment

The essence of ATSDR's approach is its method of "comparing the environmental concentrations of site-related contaminants to health-based comparison values. Comparison values are derived from the scientific literature concerning exposure and health effects" (p. 23).

The just-quoted reasonable sounding statement is immediately followed by words that express a bias and introduce untruth into ATSDR's purportedly scientific process: "Most of the comparison values used have large safety factors built into them so that . . . environmental concentrations of a contaminant that are lower than their corresponding comparison values are generally considered to be safe and not expected to cause harmful health effects." (p. 23)

These followup words indicate ATSDR's bias and erroneous assumption. The bias that is introduced, particularly with respect to radioactive contamination, is ATSDR's assumption that at very low levels of exposure no harm results. Stated differently, ATSDR evidently assumes that there is a threshold of exposure (the "health-based comparison value") below which adverse health effects do not occur.

The statement that certain levels of contamination are "generally considered to be safe" is fallacious. In fact, all U.S. and international radiation exposure standards are based on the scientifically grounded principle that there is no such thing as a safe dose of ionizing radiation, a principle recently reaffirmed by the National Council on Radiation Protection and Measurements (NCRP). ATSDR therefore, without explanation or justification, directly contradicts the foundation of U.S. exposure standards. The report's conclusions are therefore flawed.

On page 1 of this report ATSDR states its general conclusion regarding contaminants released from Rocky Flats that "past, current and future exposures are below levels associated with adverse health effects." Words like this appear again and again in this report, vitiating its claim to scientific integrity. Only exceedingly rarely (as on p. 79) is the language qualified at all to say that contaminants released from Rocky Flats pose "no *apparent* public health hazard" (emphasis supplied). Exposure standards are always standards for what is permitted, not for what is safe. One does not expect a federal agency dealing with matters of public health to overlook this fundamental truth.

5. Children and other high-risk groups

The ATSDR report acknowledges that children are especially vulnerable to hazardous substances, as likewise are the elderly and the ill (pp. ii, 74-75). Yet it operates on the flawed assumption that even for these high-risk groups exposures below a particular level (that of the comparative value) have no adverse

health effect. This fallacy renders the conclusions about health effects for children and other high risk groups scientifically untenable.

6. Wildlife, humans, and genetic issues

ATSDR refers to a 1992 analysis that found small deposits of plutonium in the bodies of seven deer from Rocky Flats, which were examined (p. 35). Genetic specialist Dietard Tautz articulates a “genetic uncertainty principle” according to which genetic harm to animals with very low-dose radiation exposures may not show up until the passage of several generations, by which time nothing can be done to correct the problem (Tautz). What Tautz points to for animals seems to correspond closely to “genomic instability” among humans exposed to very low doses of alpha radiation from plutonium taken into the body (Khadim, Edwards). ATSDR shows no sign of interest in these issues.

7. On-site food consumption and long-term site use

ATSDR assumes no future consumption of locally grown food at Rocky Flats (p. 16). However, two previous scientific studies have acknowledged that this assumption is not scientifically defensible. The independent Rocky Flats Radionuclide Soil Action Level study funded by DOE and undertaken by Risk Assessment Corporation calculated action levels based on the scenario of a hypothetical resident rancher who ate locally grown food (*RAC*). Also, the Institute for Energy and Environmental Research recommended that the site be cleaned to the level of a subsistence farmer living on the site and eating home-grown food (*IEER*). The resident rancher and subsistence farmer scenarios were proposed not because anyone knows how people will live at Rocky Flats in the future but precisely because no one knows. Cleaning the site in accord with either of these scenarios would provide the maximum long-term protection of the public health.

ATSDR supports the decision of DOE and the regulators to clean the site only to the level required to protect a wildlife refuge worker, as if Rocky Flats will continue to be a wildlife refuge for as long as plutonium in the environment remains dangerous (a quarter-of-a-million years), as if the site will remain unchanged by human or non-human actions, and as if the institutional controls DOE says it will put in place at the site will not fail. However, a National Academy of Sciences study says such controls should be expected to fail (Leschine). In favoring a short-term solution to a long-term problem, ATSDR fails utterly to address long-term public health concerns.

8. Synergistic and cumulative effects of exposure

The ATSDR report never addresses the topic of synergistic effects of exposure to several contaminants, though a member of the public asked that they do so (p. 24). The issue of cumulative effects of multiple exposures is also not dealt with in this report except in a dismissive way when it says exposure to low-dose radiation from Rocky Flats is insignificant since it is small by comparison to background radiation (p. 76). Dr. Edward Martell, the NCAR radiation specialist who broke the story of harmful radiation releases from Rocky Flats after the 1969 fire, recognized that natural background radiation itself could be harmful. It thus is irresponsible to increase the burden of potential harm by adding radiation from human sources when we ought to do our best to reduce or eliminate the danger (Martell).

9. Sampling and monitoring issues

ATSDR refers to soil sampling done by DOE along the property line in which the highest deposits of plutonium it found measured 10 picocuries per gram in the top two inches of soil (p. 36). Not only is no documentation provided, sampling from the top two inches is not a surface sample. ATSDR fails to point out that the DOE does not report the concentration in the top one centimeter – that is, in soil that is likely to be resuspended by wind?

ATSDR examined data from CDH soil sampling for the period from 1970 until 1990 (pp. 36-37). No mention is made of the fact that CDH changed its sampling practice during this period, taking deeper and deeper samples as the years passed, thereby diluting the samples and producing results that made it appear as if there was a steady reduction in plutonium concentrations in soil east of the Rocky Flats site (Jones and Zhang).

Sampling or monitoring is at best an imperfect science. Meteorologist W. Gale Biggs argues that air sampling for Rocky Flats has always been deficient for several reasons, including that most plutonium particles released from the site, especially those that moved into the off-site environment, were too small to be captured by the air monitoring devices used at the site and thus were never measured. Moreover, due to the alpha-recoil effect, particles tend to decrease in size and increase in number (Biggs).

10. Off-site releases of plutonium; Distance from the site

ATSDR cites an EPA assertion that at a distance of 2 to 3 miles east of the site boundary plutonium and americium concentrations return to background (p 36).

P. W. Krey of the Atomic Energy Commission sampled for plutonium from Rocky Flats throughout the Denver area in the mid-1970s. He found plutonium with the Rocky Flats signature as far as 30 miles east of the facility. Not until he was as far away as Brighton and Fort Lupton (respectively 35 and 40 miles from Rocky Flats) was he unable to verify the presence of plutonium released from Rocky Flats (Krey). ATSDR makes no mention of Krey.

11. Off-site releases of plutonium: Riddles

ATSDR says that the dose reconstruction study concluded that routine plutonium releases from Rocky Flats were “essentially comparable” to background deposits of plutonium in the Denver area from atmospheric testing of bombs (p. 47). Adding the quantity from routine releases to that from bomb tests thus roughly doubles the amount of plutonium to which Denver-area residents are exposed. These amounts are very small, which doesn’t mean they are inconsequential. Of course some residents also received additional quantities of plutonium released in the major accidents at the facility.

ATSDR says exposures resulting from the 1957 fire were minimal (p. 47). ATSDR evidently did not contact the RAC scientists who did the dose reconstruction study to get the results of their development of a dose calculator for the 1957 fire. This device would make it possible for persons living or working in the Denver area at the time of the 1957 fire to get an estimate of their possible exposure to plutonium released during the fire. Though RAC completed this project, CDPHE terminated the work before the device could be made available to the affected public, thereby depriving exposed people of this invaluable tool. At the same time, CDPHE in effect abolished the Health Advisory Panel, the group responsible for oversight of all aspects of the dose reconstruction study, including creation of the dose calculator.

12. Off-site releases of plutonium: Quantity and toxicity

ATSDR’s Table 3 (p. B-6) presents estimated plutonium emissions from Rocky Flats in gigabecquerels, a term it does not explain. One gigabecquerel is the quantity of any radioactive material that emits radiation at the rate of 1 billion disintegrations (releases of radiation) per second. According to Table 3, the estimated total quantity of plutonium released from Rocky Flats is 895.86 gigabecquerels. This amounts to almost 900 billion disintegrations or releases of radiation per second. Neither in its text nor in notes to Table 3 does ATSDR explain this. The report thus obscures rather than reveals the magnitude of the plutonium released from Rocky Flats.

Further, though the purpose of this report is to assess health risks to offsite populations, ATSDR never presents estimates for how much plutonium was released to the *offsite* environment. Krey estimated that between 1952 and 1972 about 11.4 curies of plutonium were released from Rocky Flats, with 3.4 curies going off the site (Krey). In information widely circulated to the public, RAC, the scientific group that completed the dose reconstruction study, estimated that total offsite releases of plutonium during production years ranged from 4.8 to 51.3 curies (CDPHE).

Though there is great uncertainty about exact totals, the amount released offsite according to these estimates is large. To get a sense of how large, it helps to realize that cleanup standards for Rocky Flats are established not in terms of curies but of picocuries; surface soil is being cleaned to 50 picocuries per gram of soil. One picocurie is 1 trillionth of a curie, or 1 thousand billionths of a curie.

One curie represents 37 billion disintegrations or releases of radiation per second. Multiplying 4.8 and 51.3 curies by 37 billion reveals that, according to RAC's estimates, plutonium released to the offsite environment emits between 176.6 billion and 1.9 trillion bursts of alpha radiation each second. After the passage of 24,400 years (plutonium's half-life), the alpha bursts per second will be reduced by half. After a quarter-of-a-million years (ten half-lives), these emissions will not have ceased but will be reduced by a factor of approximately a thousand. ATSDR does not present this information.

RAC also estimated that by weight offsite plutonium releases ranged from 66 to 704 grams (CDPHE). Most of this was released as very small particles, many of them too small to be captured in the air monitors (Biggs) but not too small to be inhaled, ingested, or otherwise taken into the body. A single microgram of plutonium is "a potentially lethal dose" (Cotton and Wilkinson, p. 1102). One microgram is 1/millionth of a gram. One ounce contains 31.1 grams, or 31.1 million micrograms. Particles of plutonium weighing 10 or less micrograms can be inhaled. Dr. Harvey Nichols of the University of Colorado found that tiny radioactive particles released from Rocky Flats wafted great distances before being brought to the surface by falling snow (Nichols). According to the aforementioned RAC estimates, between 66,000,000 and 704,000,000 micrograms of plutonium were released to the off-site environment. This information is absent from ATSDR's report.

Plutonium released into the offsite environment will not harm anyone unless it is inhaled, ingested, or otherwise taken into the body. Once inside the body it may cause harm. Several recent studies point to potential adverse health effects, including genetic instability, from a single plutonium particle taken into the body (Khadim, Hei, Zhou). The Committee Examining Radiation Risks of Internal Emitters, consisting of British government and independent scientists, has concluded that plutonium may be many times more dangerous than indicated by current radiation exposure standards (Edwards). The ATSDR report makes no reference to these matters.

13. Worker health studies and exposure standards

Though not required to deal with issues of worker health, the ATSDR report contains a brief summary of the epidemiological study of Rocky Flats workers sponsored by NIOSH and CDPHE and completed in 2003. When this study was released, lead researcher James Rutenber said its results suggest that radiation exposure standards for workers may not be sufficiently protective (*Boulder Daily Camera*, April 18, 2003).

ATSDR makes no reference to Gregg S. Wilkinson's 1987 study of Rocky Flats workers exposed to plutonium. He found an excess of various cancers among exposed by comparison to non-exposed workers, including some whose dose was as low as only 5% of DOE's standard for permissible lifetime plutonium exposure, the lowest level Wilkinson's instruments could measure (Wilkinson). This study is relevant for off-site populations, because it suggests adverse health effects at very low levels of exposure, precisely the sort of thing ATSDR continually indicates does not happen.

14. Health studies of local residents:

ATSDR summarizes Carl Johnson's highly controversial 1981 epidemiological study indicating that incidence of certain cancers was higher among people living near Rocky Flats than among those who live further away. The work typically (and erroneously) regarded as the definitive refutation of Johnson is Crump's 1987 study, also discussed by ATSDR. Crump duplicated Johnson's results, then concluded that what he found was due not to exposure from Rocky Flats but to distance from the State Capitol (pp. 71-73). However, ATSDR chose not mention an important work that reveals the flaws in Crump's work.

In 1996 epidemiologist Richard W. Clapp of Boston University, former head of the Massachusetts Cancer Registry, produced an epidemiological report on Rocky Flats for an upcoming court case (Clapp). His report is not mentioned by ATSDR, although at the time he wrote it he was doing ATSDR-supported research on health effects of emissions from U.S. nuclear facilities. Clapp's study makes two points important for present purposes. First, he presents a blistering critique of Crump's flawed methodology.

Second, he revisits the issue of health effects among those who live closest to Rocky Flats. He concludes that “the most recent data are indicative of an ongoing health effect and support the need for surveillance of the incidence of cancer and other diseases on a continuing basis in the exposed communities.”

The kind of surveillance Clapp proposes has never taken place. Indeed, there has never been any direct health study of off-site individuals whose health may have been affected by exposure to contaminants released from Rocky Flats.

ATSDR finally summarizes a Colorado Cancer Registry study that purports to show that people near Rocky Flats have no higher incidence of cancer than those who live elsewhere in the Denver area (p. 73). Radiation specialist Bernd Franke dissects the flawed methodology of this report and concludes that “it appears that the study design was chosen to calm people down, for public relations purposes, rather than for any real scientific reason” (Franke).

The Rocky Flats Community Needs Assessment conducted by the University of Colorado Health Sciences Center School of Nursing in 1996 recommended that DOE support prospective (rather than retrospective) community-based epidemiological studies in the communities affected by Rocky Flats (Brown). The Community Needs Assessment was not reviewed by ATSDR, nor were any of the authors interviewed.

15. The secrets hidden in the grand jury documents

The Ambushed Grand Jury (The Apex Press, 2004), a non fiction account of the grand jury investigation of criminal conduct by DOE and its Rocky Flats contractor, Rockwell, shows that the government used the Rocky Flats grand jury investigation not to prosecute the principal environmental crimes committed at Rocky Flats but to cover them up by sealing the evidence in a vault in the Denver federal courthouse (McKinley and Balkany). Those involved in the ongoing citizen investigation of these issues agree with the lead FBI investigator, Special Agent Jon Lipsky, that the boxes of documents locked in that vault in Denver contain evidence of contaminants released to the environment off as well as on the Rocky Flats site – information not known to the public, not known to the regulators, and certainly not known to ATSDR. Efforts are being made to get the sealed documents released to the public and the regulators. ATSDR’s report cannot be considered complete without this crucial information pertinent to its Rocky Flats public health assessment.

16. Errors of fact (a partial list)

- The report refers repeatedly (as on p. 65) to “closure” of Rocky Flats in 1989. Production halted in 1989 because it could not be done safely or within the law. But the next two years were spent on unsuccessful efforts to get back into production. In 1992 DOE finally changed the mission from production to cleanup.
- ATSDR says “oxides of plutonium are extremely insoluble in water and would not have been a hazard from ingestion” (p. 77). ATSDR does not mention or apparently consider that the ICRP has recently upgraded the danger of ingestion of plutonium, particularly for infants and children.
- ATSDR says migration of plutonium in surface water is unlikely (p. 77). This is refuted by the site’s *Report on Soil Erosion and Surface Water Sediment Transport Modeling*, August 2000 (AME),
- A passage on p. 13 refers to discharges from the industrial area since 1941; the facility began operation in 1952.

17. A questionable recommendation

ATSDR recommends that any decision to allow public access to any part of the site after closure be “carefully reviewed” (p. 79). This recommendation is not helpful, given that the ATSDR report itself is so fundamentally flawed. A re-working of the report, taking these comments into consideration, would provide a more useful tool for the US Fish and Wildlife Service which will make the decision about public access. The report in its current state is not useful and is potentially harmful, due to the extent of its inaccuracy

18. Resources not considered by ATSDR

The following list consists of resources referred to in our comments but not utilized by ATSDR. All the items listed were generated well before the September 2, 2004, date of the ATSDR report.

- AME, Report on Soil Erosion and Surface Water Sediment Transport Modeling for the Actinide Migration Evaluation at the Rocky Flats Environmental Technology Site, August 2000.
- W. Gale Biggs, Emissions and Monitoring of Plutonium from Rocky Flats, March 7, 1996.
- N. J. Brown et al, *Rocky Flats Community Needs Assessment Final Report*, Denver: UCHSC School of Nursing. 1996.
- CDPHE, Summary of Findings: Historical Public Exposures Studies on Rocky Flats, August 1999.
- Richard W. Clapp, Epidemiology Report on Rocky Flats, November 13, 1996.
- F. Albert Cotton & Geoffrey Wilkinson, *Advanced Inorganic Chemistry* (2nd ed., N.Y.: Interscience Publishers, 1966).
- Rob Edwards, "Plutonium cancer risk may be higher than thought, *New Scientist*, July 18, 2004 (www.nwescientist.com).
- Bernd Franke to Caron Balkany, letter dated December 2, 2002.
- Tom K. Hei, "Mutagenic Effects of a single and an exact number of alpha particles in mammalian cells," *Proceedings of the National Academy of Sciences*, 94 (April 1997).
- ICRP Publication 72, Part 5, Compilation of Ingestion and Inhalation Dose Coefficients (1996).
- IEER, Setting Cleanup Standards to Protect Future Generations: The Scientific Basis of the Subsistence Farmer Scenario and Its Application to the Estimation of Radionuclide Soil Action Levels for Rocky Flats, December 2001 (www.ieer.org)
- Richard A. Jones and Yiming Zhang, "Spatial and Temporal Analysis of the Rocky Flats Soil Plutonium Data," CDPHE, September 19, 1994.
- M. A. Khadim et al, "Transmission of Chromosomal Instability after Plutonium Alpha-Particle Irradiation," *Nature*, 355 (February 1992).
- P. W. Krey, "Remote Plutonium Contamination and Total Inventories from Rocky Flats," *Health Physics*, 30 (February 1976).
- Tom Leschine et al, Long-Term Institutional Management of U.S. Department of Energy Legacy Waste Sites (Washington: National Academy of Sciences, 2000).
- Edward A. Martell, interviewed, Frontline, "Secrets of a Bomb Factory," PBS, October 26, 1993.
- Wes McKinley and Caron Balkany, *The Ambushed Grand Jury* (N.Y.: The Apex Press, 2004).
- NCRP Report 136, Evaluation of the Linear-Nonthreshold Dose-Response Model for Ionizing Radiation (2001).
- Harvey Nichols, "Particulate Transport at Rocky Flats," prepared for Rockwell International, March 4, 1977.
- RAC, Final Report for Radionuclide Soil Action Level Oversight Panel, Risk Assessment Corporation, February 2000.
- Deithard Tautz, "A Genetic Uncertainty Problem," *Trends in Genetics*, 16 (November 2000).
- Gregg S. Wilkinson et al, "Mortality among Plutonium and Other Radiation Workers at a Plutonium Weapons Facility," *American Journal of Epidemiology*, 125 (1987).
- Hongning Zhou et al, "Radiation risk to low fluences of alpha particles may be greater than we thought," *Proceedings of the National Academy of Sciences*, 98 (December 4, 2001).

19. Conclusion

We believe the above comments demonstrate that the ATSDR Public Health Assessment for Rocky Flats is so deeply flawed that it is a discredit to the agency that produced it and that it provides no useful service to the affected public or to decision-makers, such as the U.S. Fish and Wildlife Service. We urge ATSDR to redo this study in accordance with our comments.

If there are questions about any aspect of our comments, please contact LeRoy Moore at the address or telephone number given at the head of this letter. Sign-ons to this letter were collected electronically. Institutional affiliations are given for identification purposes only.

Sincerely,

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