

## **A dozen reasons why the Rocky Flats National Wildlife Refuge should remain closed to the public**

Prepared by LeRoy Moore, PhD, Rocky Mountain Peace & Justice Center, September 2016

After completion of the Superfund cleanup of the 6,500-acre site of the now closed Rocky Flats nuclear bomb plant, about three-fourths of the site (roughly 7 square miles) was removed from the Superfund list of most contaminated sites and transferred from the Department of Energy (DOE) to U.S. Fish & Wildlife Service (FWS) to operate as a Wildlife Refuge. DOE retained 1,309 acres (about 2 square miles) of more contaminated land that remains on the Superfund list and is surrounded by the Refuge.

**1. Long-term danger of plutonium** Plutonium 239, the contaminant of principal concern at Rocky Flats, has a half-life of 24,110 years. It remains dangerously radioactive for more than a quarter-million years. Any quantity left in the environment poses an essentially permanent danger.

**2. Plutonium's lethal quality** The alpha radiation emitted by plutonium cannot penetrate skin. But tiny particles inhaled or taken into the body through an open wound will lodge somewhere in the body. For as long as it resides in the body – typically for the rest of one's life – it bombards surrounding cells with radiation. The result may be cancer, a compromised immune system or genetic harm passed on to future generations.

**3. Hazardous in very small amounts** Plutonium particles of 10 microns or smaller can be inhaled. One micron is 1/millionth of a meter (a meter is 39.37 inches, slightly longer than a yard). For further comparison, the average diameter of a human hair is about 50 microns. Meteorologist W. Gale Biggs found that airborne particles at Rocky Flats “are probably smaller than 0.01 microns.” Researchers at Columbia University demonstrated that a single plutonium particle induces mutations in mammal cells. Cells receiving very low doses were more likely to be damaged than destroyed. Replication of these damaged cells constitutes genetic harm that can become cancer, and more such harm per unit dose occurs at very low doses than would occur with higher doses.

**4. Extent of contamination at Rocky Flats unknown** Fires, accidents, routine operations, and random dumping during production years released plutonium particles to the environment. The prevailing wind heads east and southeast, but it blows in all directions some of the time. Hence, plutonium was scattered across the whole of the nearly 10 square-mile site. No one knows the full extent of the contamination because this was not determined. The methods used to locate plutonium could have missed hot spots.

**5. The difference between the cleanup the public sought and what it got** In 1995 the single most widely supported cleanup recommendation from the public called for eventual cleanup to average background radiation levels from global fallout, with initial cleanup to go as far in this direction as current technology allows while the site becomes a research lab for development of technology to do better. Neither happened. Instead, the cleanup finally agreed to by DOE, EPA and the Colorado Department of Public Health and Environment (CDPHE) in 2003 allowed in the top 3 feet of soil a quantity of plutonium up to 1,250 times average background levels, with much more allowed in soil at a depth of 3 to 6 feet and no limit on the quantity of plutonium allowed in soil below 6 feet.

**6. Dollars and date, not public health, drove the cleanup** DOE and its contractor, Kaiser-Hill, made a secret deal with Congress to cleanup and close Rocky Flats by a fixed date for a fixed sum. Tailoring the cleanup to fit these limits, they rejected appeals from some in the public willing to seek more funds for a more thorough cleanup. Of the \$7 billion allotted to close the site by December 2006, no more than \$473 million (about 7%) could be spent on actual remediation of the environment. Kaiser-Hill received \$560 million for its work.

**7. Local people rejected both the cleanup and recreation at the wildlife refuge** Of the individuals and organizations that commented on the final Rocky Flats Cleanup Agreement adopted in June 2003, 85.6%

rejected the plan as inadequate, due mainly to the plutonium being left behind. 81% of those who commented on FWS plans to open the wildlife refuge to public recreation opposed the idea. These comments are part of the public record.

**8. Plutonium not stable in the environment** EPA and CDPHE claim that there is no pathway by which plutonium left in soil at Rocky Flats can reach human subjects. This is refuted by a 1996 study in which ecologist Shawn Smallwood shows that 18 species of burrowing animals present at Rocky Flats dig down to as much as 16 feet, constantly redistributing soil and its contents. In a wholly random way they bring buried plutonium to the surface where tiny particles can be transported near and far by the wind common at the site and made available to be internalized by unwitting humans. In any given year burrowing animals disturb 10 to 12% of surface soil on the site. Though this study was done in 1996, EPA and CDPHE ignored it when in 2003 they approved the final cleanup plan for Rocky Flats.

**9. The cleanup does not protect the most vulnerable, especially children** The “risk-based cleanup” at Rocky Flats was calculated to protect a wildlife refuge worker, that is, a physically active adult in good health. The cleanup was not designed to protect the very young, the very old, the infirm. FWS expects children to visit the wildlife refuge. The human child, without question, is the most vulnerable to plutonium exposure of all creatures, because a child is likely to stir up dust, to eat dirt, to breathe in gasps, or to scrape a knee or elbow, all ways of taking plutonium into the body. Once internalized, the material integrates with the child’s tissue development and wreaks havoc within the child’s body for the duration of her or his life. Playing with plutonium is a dangerous proposition.

**10. EPA and CDPHE mislead the public when they say Rocky Flats is “safe”** The National Academy of Sciences report on *Health Risks from Exposure to Low Levels of Ionizing Radiation* (2006) affirms that exposure to any level of ionizing radiation is potentially harmful. In 2004 British researchers concluded that cancer risk from exposure to very low doses of plutonium may be ten or more times more dangerous than allowed by existing official standards for permissible exposure.

**11. EPA and CDPHE oppose informed consent for visitors to the wildlife refuge** State Representative Wes McKinley was foreman of the grand jury that spent nearly 3 years reviewing evidence of alleged environmental lawbreaking at Rocky Flats collected by the FBI in its 1989 raid on the plant. 65 cartons of documents from this investigation remain sealed in the Denver federal courthouse; they were never examined by EPA and CDPHE, regulators of the Rocky Flats cleanup. McKinley is under court order not to reveal what he learned about conditions at Rocky Flats, but he objects to opening the wildlife refuge to the public. His efforts to get informed consent regarding risk at the refuge for potential refuge visitors were opposed by the very agencies that made no effort to determine whether the 65 cartons in the federal courthouse contain data pertinent to the Rocky Flats cleanup.

**12. Genetic effects of plutonium exposure are poorly understood** In a 2000 study Diethard Tautz said genetic effects of radiation exposure on a given species of wildlife may not show up until generations later when harm is irreversible. Ecologist Shawn Smallwood found that no study of genetic effects on wildlife has been done at Rocky Flats or any other DOE site. Any harm to wildlife at Rocky Flats will not be confined to the bounds of the site. Deer from the site have been shown to have plutonium in their bodies. Nobel Prize winner Hermann Muller, writing about humans in 1964, reached a conclusion very similar to that of Tautz, namely, that the effect of radiation exposure may not be apparent for several generations.

For documentation and more information, see Plutonium and People Don’t Mix at <http://www.rockyflatsnuclearguardianship.org/leroy-moore>