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Statement of Arjun Makhijani on Setting Cleanup Standards to Protect Future Generations

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Cleanup of nuclear weapons sites contaminated with long-lived radionuclides and management of long-lived wastes would pose daunting technological and institutional problems even if the very best science were used consistently. For instance, the half-life of plutonium-239 is over 24,000 years, which is unimaginably long in terms of the history of human institutions. Further, creating credible methods to estimate radiation doses thousands of years hence with reasonable confidence has been a challenge for the creativity and technical ability of scientists. That job is far from done but a great deal of careful work has resulted in a framework for approaching that task that is persuasive and reasonable under most circumstances, including those that involve sites contaminated with plutonium, such as the Department of Energy's Rocky Flats Plant near Denver.

As my colleague, Sriram Gopal, will describe, that approach to protecting people far into the future involves assuming that any institutional controls that we may put in place today will lapse with time, that institutional memory will not endure for such long periods, and that people may live on the land, farm it and use the water on it not knowing that it was contaminated. If a cleanup or waste management program can be devised to protect self-sufficient farmers, then the rest of the population would also be protected. This general approach was developed by scientific advisory bodies, notably the International Commission on Radiological Protection, as well as by governmental authorities, such as the U.S. Atomic Energy Commission and its successor agency, the U.S. Department of Energy (DOE). For instance, the DOE used this approach in the 1980s to evaluate options for the management high-level wastes

at its Hanford site. Using the subsistence farmer approach for setting standards makes scientific sense because it minimizes a large number of the uncertainties (though not all of them) that are associated with estimating the impact of contamination on people's health far into the future.

Despite the history of the subsistence farmer approach and the strong scientific basis for using it, the DOE is embarked on a process of setting standards for cleanup at its Rocky Flats nuclear weapons plant that could result in unprecedented levels of plutonium being left at the site. While it has not made a final determination, as Dr. LeRoy Moore of the Rocky Mountain Peace and Justice Center will explain, it is likely to use the impending designation of the site as a wildlife refuge to set standards for how much plutonium and other radioactive materials will be left on site after it has been declared cleaned up. Residual radioactivity in the soil could affect people in the future in a variety of ways, including breathing resuspended plutonium or other radioactive particles during windstorms and using contaminated water, which can become polluted both by runoff into surface water and transport of contaminants into groundwater as rainwater percolates down. Amercium-241 is a radionuclide of special concern in regard to water pathway doses.

In other words, the DOE is set to abandon a prudent, established method for estimating radiation doses to future generations in favor of one that can be used to rationalize far higher levels of residual radioactivity in the soil. Labeling a contaminated site as a wildlife refuge does not adequately protect health and the environment since we cannot forecast site uses far into the future, nor guarantee that the designation will not change.

The DOE has used widely differing levels of residual radioactivity in the soil in its cleanup operations and guidelines. At Johnston Atoll in the Pacific, the soil was cleaned up to a level of 17 picocuries per gram. The initial proposal for Rocky Flats was almost 40 times as high. An independent scientific task force set up to look into the issue in detail recommended that the DOE adopt a standard of 35 picocuries per gram, but, even though it admittedly did not consider the issue of groundwater doses in detail.

Our evaluation of the matter has led us to recommend that DOE should consider levels for residual radioactivity in the range of 1 to 10 picocuries of plutonium per gram of soil. This is not without official precedent. For instance, the preliminary remediation goal at DOE's Lawrence Livermore National Laboratory in California for industrial uses is 10 picocuries per gram. For residential uses, it is 2.5 picocuries per gram. Our evaluation indicates that if groundwater pathway doses are taken into account, that a choice in the 1 to 3 picocuries per gram range would be more appropriate.

I want to stress that federal safe drinking water standards in effect today are a hundred times less strict in regard to plutonium than the State of Colorado's standards for surface water purity. Further, we have looked into the question of how federal safe drinking water standards for plutonium and other transuranic elements were set in comparison to standards for most radionuclides. We have concluded that the plutonium standards are based on obsolete methods of calculation and result in radiation doses over a 100 times bigger to the critical organ (the bone surface in the case of plutonium and americium) than permissible for most radionuclides (most beta emitters) under the same safe drinking water rules.

There needs to be better protection of the public from residual plutonium in the soil than would likely be provided by the course the DOE is on now. It would also be judicious to assume that future safe drinking water standards for plutonium and americium will reflect the best science that we know today rather than obsolete models.

Proponents of designating contaminated sites as wildlife refuges have pointed out that higher levels of contamination keep people away, allowing wildlife to flourish. Yet, radiation causes genetic mutations, some of which are harmful. Even if individual wildlife specimens are healthy, it does not guarantee the health of species in the long-term.

Cost is often cited as a factor in setting more lax standards. But the Department of Energy has historically chosen to use waste management methods that have been expedient in the short-term but turn into far more costly and difficult problems of cleanup in the long-term. Not doing the job of cleanup right in the first place allows contamination to spread both through the forces of weather and, it is becoming increasingly apparent, by fauna that pass through the site but do not stay on it. Expedient solutions may appear cheaper now but have been a central part of the reason that the United States is faced with immense cleanup costs in its nuclear weapons complex today. I urge the Department of Energy to adopt the subsistence farmer approach to setting cleanup standards throughout the nuclear weapons complex including Rocky Flats. It is the scientifically sound approach to use and it is far less likely to result in future damage of a kind that could cause future loss of trust, heartache, and expenditure should problems crop up.