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Open Air Testing with Simulated Biological and Chemical Warfare Agents

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My name is Leonard A. Cole, and I teach science and public policy at Rutgers University in Newark. My research interests include biological and chemical warfare policies, and I have written in particular about testing done in the U.S. Army's biological defense program.

I appreciate your invitation, Senator Rockefeller, to testify about experiments involving simulated biological and chemical warfare agents. These agents, which the army calls simulants, are intended to mimic more lethal bacteria and chemicals that might be used in actual warfare.

As described in my book, Clouds of Secrecy, the army began a program in 1949 to assess the nation's vulnerability to attack with biological weapons. During the next 20 years, the army released simulant agents over hundreds of populated areas around the country. Targets included portions of Hawaii and Alaska, San Francisco, St. Louis, Minneapolis, New York City, Washington, D.C., Key West, and many other cities. The purpose was to see how the bacteria spread and survived as people went about their normal activities.

Evidence suggested that the tests may have been causing illness to exposed citizens. Nevertheless, as army spokesmen subsequently testified, the health of the millions of people exposed was never monitored because the army assumed that the bacteria and chemicals were harmless.

Vulnerability testing continues at Dugway Proving Ground, 70 miles from Salt Lake City. Several smaller communities are

closer to the base, and Dugway itself is home to hundreds of civilians and military personnel and their families. The stated purpose of the tests is to evaluate biological detector systems and protective gear.

Since tests involve spraying simulants outdoors, it is important to understand how much risk they pose to humans who are exposed. Official statements have not always been clear on this matter. A July 1993 news release by the Dugway Public Affairs Office indicates that "no specific safety controls or protection are required for testing with simulants." The statement implies, erroneously, that the simulants are harmless.

In fact, during 45 years of open air testing, from time to time the army has stopped using certain simulants for reasons of safety. In each instance the army belatedly recognized they could be causing disease and death, although such information had long been available in the medical literature. This was the case in the 1950s when it ceased using the fungus Aspergillus fumigatus as a simulant. The fungus had long been known to cause aspergillosis, a disease that can be fatal. Similarly, in the 1960s the army stopped using zinc cadmium sulfide, a chemical that had been known for years to cause cancer.

In the 1970s, the bacterium Serratia marcescens, a source of infections that can lead to death, was taken out of service as a simulant. And in the 1980s, dimethyl methylphosphonate, a chemical known as DMMP, was removed from use as a simulant because of its carcinogenic and other toxic potential. I understand that one of today's witnesses, Earl Davenport, was exposed to DMMP at Dugway in 1984 and may still be suffering health problems as a result.

Indeed, simulants now used at Dugway continue to pose risks. The chemical ethylene oxide, which is present in some of the mixtures used in outdoor spraying, is a known carcinogen. The bacterium Bacillus subtilis, while not generally seen as dangerous, is cited in medical textbooks as able to cause serious infections. In truth, any microorganism that seems harmless under some circumstances may cause illness under others.

Exposure to high concentrations of any microorganism can be critically dangerous to people in weakened conditions. The elderly, the very young, people with AIDS and others who have weakened immune systems are more susceptible to lifethreatening infections. Nevertheless, the army has not monitored the health of citizens who may have been exposed during its tests, while maintaining that its bacterial agents cause no harm.

In addition to people who are unwittingly exposed to the army's bacteria and chemicals, human research subjects may not be receiving appropriate information. A test at Dugway in November

1993, for example, raises important questions in this regard. The test was intended to assess the ability of chemical agents to penetrate protective clothing.

Test subjects wore special outergarments and were then sprayed with chemicals in simulated battle conditions. An army Environmental Assessment before the test indicated that some of the chemicals could be toxic. Yet the consent form that the subjects signed in advance of the test said nothing about any of the chemicals.

Subsequently, two of the test subjects said they were asked to sign another consent form sometime after the test had been completed. The second form described the chemicals. But having the subjects sign a consent form after an experiment, rather than before, makes little ethical sense. The procedure renders meaningless the notion of informed consent.

Finally, several physicians at the University of Utah Medical School in Salt Lake City continue to express concern about the tests at Dugway. They do not feel they have information that would enable them optimally to handle infections and complications that might be caused by the tests. Dugway officials have thus far not satisfied their concerns either about field tests involving simulants or indoor tests with highly pathogenic agents.

These are a few of the disconcerting issues associated with testing at Dugway. If such tests must continue, several policy suggestions seem appropriate:

--Inform people in the area before each test that they may be exposed to the army's biological and chemical agents.

--For a substantial period after each test, monitor the health of the exposed population.

--Provide comprehensive information in understandable language to human subjects before they participate in any test.

--Fully inform the neighboring medical community about the nature of each test and its possible medical complications.

--Above all, strive for safety, candor, and openness.