

APPENDIX 4.—DEPARTMENT OF DEFENSE, OFFICE OF PUBLIC AFFAIRS,
WASHINGTON, D.C., APRIL 18, 1968, "STATUS REPORT ON INVESTIGATION
OF SHEEP DEATHS IN UTAH"

FOR THE PRESS:

Brig. Gen. William W. Stone, Jr., Office of Research and Laboratories, Army Materiel Command, has completed the initial phase of the Army's investigation into the cause of the death of the sheep in the Skull Valley area of Utah. His report is now undergoing technical review by scientists and staff officers in the Department of the Army.

This investigation was conducted at Dugway Proving Ground, and in Skull Valley and Rush Valley by technical teams from the proving ground, Edgewood Arsenal, U.S. Public Health Service, U.S. Department of Agriculture and Utah State Departments of Health and Agriculture. These teams operated independently but in a highly cooperative manner, exchanging all information obtained.

The Army investigations are continuing and its findings to date have not been conclusive as to the specific cause for the death of the sheep. The evidence pointing to Army involvement is as follows:

(a) Symptoms of an unknown sickness were reported as appearing on March 14, 1968, in the sheep at White Rock in Skull Valley, close to the eastern border of Dugway Proving Ground, and 27 miles east of the test site. By March 15, 1968, large numbers of sheep started dying at White Rock and in other herds of sheep further to the east in Skull Valley. The highest death rate was among the sheep at White Rock. The deaths in sheep occurred following a spray trial of a persistent chemical nerve agent from a high performance aircraft on March 13, 1968, at Dugway Proving Ground.

(b) Although there was a wind from the south-southwest at the time of the March 13, 1968, test, the wind shifted about 2 hours later and blew from the west. It can be postulated that any very small particles of agent remaining airborne could have been transported into the areas in Skull Valley and Rush Valley where sheep were later affected.

(c) There were scattered cumulus clouds in the general area at the time of the test and scattered rain showers developed during the early evening. One of these rain showers could have washed this airborne agent out of the air and deposited it on vegetation and the ground.

(d) Cholinesterase depression in the blood of affected Skull Valley sheep points toward exposure to an organophosphorus compound. Many common pesticides, the nerve agents, and some noxious plants can cause this depression.

Cholinesterase depression in the blood is the most sensitive indication of exposure to nerve agents or pesticides. This depression occurs at exposure levels well below those where there are visible or otherwise noticeable symptoms.

(e) Although symptoms of the affected sheep differed initially from those expected from past laboratory experience with other animals, continued feeding experiments with the agent have essentially reproduced the later symptoms found in the sick Skull Valley sheep.

(f) The total report indicates an extremely wide variety of possibilities as to what caused the sheep deaths; these have been explored and eliminated. There is no current evidence that the cause of death is to be found among poison plants, pesticides, or bacterial or viral infections.

(g) Since March 20, 1968, several hundred samples of water, soil, snow, vegetation, and wool from Skull and Rush Valleys have been analyzed looking for evidence that the agent has escaped from the proving ground: all these samples were negative. Recognizing that something had in fact killed the sheep and that it could have been the agent, a few very large samples of vegetation were collected by Dugway Proving Ground scientists from the White Rock area to obtain increased sensitivity. By April 10, 1968, this difficult analysis had proceeded in the proving ground laboratories and elsewhere to the point where it was con-

sidered possible that traces of a nerve agent or a similar organic compound were present in two extracts of samples collected in the White Rock area. Although there are still confirmatory tests to be completed in several laboratories on these and other samples, this is an indication that the agent could be present in an area where sheep died. Intensive collection of additional large samples in other areas where sheep died is now going forward. Confirmatory laboratory findings are also being sought from large samples sent to Edgewood Arsenal and the National Communicable Disease Center.

Since that date the National Communicable Disease Center, Atlanta, Ga., reports that their scientists have now isolated traces of an identical organophosphorus compound in snow, water, and grass, and in the blood, liver, and stomach contents of dead sheep in Skull Valley. It can be concluded that these compounds are related to the nerve agent samples provided by Dugway Proving Ground. Tests conducted to date at the Department of Agriculture Laboratories at Ames, Iowa, have not confirmed these findings.

Although the foregoing evidence points to the Army's involvement in the death of the sheep it is also clear that there are many questions still unanswered and which should be the subject of continuing investigation. For example:

(a) Why have sheep been affected seriously with no effect on humans whatsoever and only a slight cholinesterase depression in cattle and perhaps horses. The rodent population density before and after the test is unchanged. Apparently the sheep were affected by eating contaminated vegetation. However, to obtain the sheep deaths observed, from the small amount of agent that current data indicate could have gotten to Skull and Rush Valleys as a result of the March 13 test, the sheep by some as yet unknown mechanism must have become highly sensitized to the agent. The opinion that the deaths were caused by a combination of factors, of which the agent was only one, has been orally expressed by many of the investigators, Army and otherwise.

(b) As long as the possibility exists that the Army may have been involved, the existing safety procedures at the Dugway Proving Ground Laboratories need to be reviewed by an unbiased group. In this regard the Department of the Army has proposed the formation of a Federal interagency committee to conduct such a review. This proposal suggests the participation of representatives of the U.S. Department of Health, Education, and Welfare; Department of the Army, Fish and Wildlife Service, Department of the Interior, U.S. Department of Agriculture, Utah State Division of Health, Utah State Department of Agriculture, National Aeronautics and Space Administration and representatives from private agencies with special capabilities. This proposal is currently under consideration by the Department of Defense.

There is no evidence of any hazard to humans in the area.

APPENDIX B

SAFETY ANALYSES AND FIELD EVALUATIONS PROGRAM "SAFE" (SUMMARY)

A. Program SAFE was developed in response to recent events associated with the death of sheep in the area adjacent to Dugway Proving Ground. The program combines the continued investigation of the sheep deaths and includes a plan whereby the possibility of any future tests having effects beyond the Dugway boundary is reduced to a minimum. The program consolidates, in a single plan, all aspects of toxicology, ecology, meteorology, test technology, test area surveillance and control, disaster and evacuation control, public relations, and related matters bearing on safe operations. The plan, at present, covers a 5-year period (1969-1975) at an estimated cost of \$14 million. The scope is broad and provides for flexibility. It addresses both immediate and long-range problems. The program is viewed as dynamic, and changes as required can be accommodated as dictated by scientific findings. The program developed incorporates recommendations by personnel investigating the sheep incident including representatives of the U.S. Public Health Service, U.S. Department of Agriculture, the Utah Department of Public Health and the Department of Defense.

B. Program SAFE represents a combination of both current and new projects. Current ecology and epidemiology efforts will be expanded to include toxicology studies with animals, plants, soil and ground water. From both the research and operations aspects, the present Deseret Test Center meteorological program will be increased and expedited to fill current knowledge gaps. Test technology will be expanded to provide improved test concepts and methodology. New surveillance efforts will include peripheral sampling to monitor the boundary and adjacent areas of Dugway Proving Ground and to provide an alarm in the remote event some material should pass beyond the reservation. Improved disaster plans will be developed and tested.

APPENDIX C

Concurrences :

Dr. WILLIAM H. STEWART,
Chairman.

Dr. JAMES B. DEWITT,
Dr. WARREN C. SHAW,
Dr. LOUIS C. LAMOTTE, Jr.,
Mr. DAVID R. WALDRON,
Dr. LESTER MACHTA,
Dr. J. H. WILLS,
Col. HERSCHEL E. GRIFFIN,
Dr. G. D. CARLYLE THOMPSON,
Mr. HOWARD M. TRUSSELL,
Executive Secretary.