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STATEMENT OF DR. ALVIN C. GRAVES, DIRECTOR, TEST DIVISION, LOS ALAMOS
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JOINT TASK FORCE THREE

General Quesada has discussed the activities of Joint Task Force Three since its formation in 1949. He has discussed the scientific programs and the importance of some of the results. I should like to give you a few additional details.

It may appear to the uninformed that tests have been held in recent months at such a frequency that important results could not ensue. We are today, however, in the normal and desirable situation in which we are improving and extending the range and usefulness of our product at such a rate that frequent tests are a necessity. Test programs are constantly under discussion and the preliminary planning on new tests starts even before one series of tests is completed.

A successful test operation is a product of the combined efforts of the Atomic Energy Commission, the Armed Forces, and many laboratories of other specialized groups. The over-all scientific know-how available to a test organization is amazingly extensive. I can assure you that the test proposals for Greenhouse were subjected to detailed screening processes for both scientific value and economy and that the data will be most important.

The instrumentation for a carefully planned test program may provide for hundreds of experiments designed to give many cross-checks on important results. Primary measurements such as nuclear, thermal, and visual radiations and blast pressures as functions of time and distance, and total yield, are invariably measured in several ways. Although it is not desirable to discuss these experiments in detail, it is worthwhile to give you some idea of the way in which these experiments are done.

In some cases, special instruments set close to a burst must measure events which take place within a fraction of a millionth of a second and transmit the data to a safe place where it can be recorded before the detecting instruments are vaporized. The data are transmitted in some cases directly by cable and in other cases by radio links, and are recorded

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by high-speed oscilloscopes, magnetic tapes, photographic plates and other means. Some measurements depend on laboratory analyses of samples flown from Eniwetok to continental laboratories, such as Los Alamos, within thirty to forty hours after each test detonation. Other measurements depend on the use of high-speed cameras operating at speeds up to a million frames per second or more.

There is a wide variety of other types of instrumentation, including photocells, photomultipliers, ion chambers, and even such complicated instruments as mass and beta-ray spectrographs. The complexity of this instrumentation is the reason why we use tower shots instead of air-drop experiments, which might appear more realistic from a military standpoint.

The data from these experiments frequently require extensive computation, and the results from various systems of instrumentation must be cross-checked or actually combined before useful and reliable data are available. Perhaps this will give you some idea of why it takes so long to analyze data and obtain from experiments the type of information from which firm conclusions can be drawn.

Many of the results of Operation Greenhouse will remain highly classified; others will be declassified as further study indicates that benefits will accrue from such declassification. For example, it is certain that many experimental results will be of great value to civilian defense. I should like nothing better than to give these results at this time, but unfortunately we are still engaged in the process of analyzing data. In general, I may state that these results indicate continuing improvement in weapons design, and reflect the extensive program of development which the Los Alamos Scientific Laboratory has been carrying on with the aid of other laboratories and technical groups.

As to our progress toward the eventual development of thermonuclear weapons, you know that experiments were carried out which contributed to thermonuclear research. I cannot discuss these experiments in detail but I want to emphasize what Mr. Dean has said about the interpretations put on the authorized announcements on this subject. The official statements have been carefully considered and there is no basis for interpretations which go beyond the actual words of the Commission's releases. I may say that we have gained new information and understanding of the basic phenomena underlying thermonuclear reactions. Most of the experimental projects designed to give specific information in the field of thermonuclear research were so novel and complex that we would have been happy if only a few of them had worked. It is a remarkable tribute to the laboratories and other agencies that participated in this work that so much useful information was secured from these projects.

One of the Greenhouse tests was largely aimed at obtaining weapons effect data. It should be kept in mind, of course that when these tests were planned in 1949, the program was designed primarily for military defense purposes. There will, however, be a great deal of data useful in civil defense work. As soon as this information has been analyzed and given security review, it can be made available for public civil defense use. Both military and civil defense leaders, noting that there has been improvement in weapons design, must necessarily plan on the basis of weapons several times more powerful than the Hiroshima-Nagasaki, or nominal weapon. The Greenhouse program included test detonations of sufficient energy yield to permit checking or confirmation of the estimates and predictions as to the effects of these higher-power weapons.

For security reasons, we cannot release precise yield figures at this time, but we hope that the data obtained as to the effects of the detonation on dogs, swine and mice, and on structures, equipment and materials, will be made available in useful form and without too much delay to those responsible for the welfare and protection of the country.

In conclusion, I should like to express my appreciation to those military and civilian personnel whose efforts made Operation Greenhouse possible.