NEW ZEALAND METEOROLOGICAL SERVICE

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STATEMENT ON ARTIFICIAL WEATHER MODIFICATION

The following notes are based on World Meteorological Organization (WMO) Technical Note 105, "Artificial modification of clouds and precipitation" by Morris Neiburger. They were prepared by the Secretary-General of the W.M.O. as a basis for further discussion of this subject at the forthcoming meeting of the Organization's Commission for Atmospheric Sciences, and are reproduced here for general information.

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DRAFT STATEMENT* ON ARTIFICIAL WEATHER MODIFICATION

General

1. Seeding of supercooled liquid clouds with dry ice or silver iodide will frequently modify their structure, and may transform them to ice clouds. Depending on circumstances this may cause the cloud to dissipate or to grow, and may lead to an increase or to a decrease in the amount of precipitation over that which would otherwise reach the ground. However, the exact nature of the circumstances leading to one or the other effect in most instances is not determinate a priori from present knowledge. The value of the consequences of being able to identify the circumstances and thereby to control the effects is so great that increased research is strongly needed. Furthermore, research into the fundamental microphysics and dynamics of clouds and precipitation must be fostered and accelerated, to enable the best possible planning and interpretation of weather modification experiments. Mathematical modelling with high-speed computers of the physical and dynamical processes in clouds is a promising tool for the development of potential weather modification techniques, their assessment, and their optimization to field applications.

2. Whenever weather modification experiments are conducted, it is imperative that they should be designed so that the results can be properly evaluated. Various randomization procedures are available for achieving this. Brief summaries of the current situation in the various applications of weather modification are given below.

Stimulation of precipitation

3. Of the many experiments conducted in this field few give significant positive results when subject to vigorous statistical examination. In view of these uncertainties and those expressed above the decision to undertake operational attempts to stimulate precipitation must be made in the awareness of the risk that the opposite results to those desired may occur.

Dissipation of supercooled fog

4. The dissipation of supercooled liquid fog is an exception to the uncertainty expressed above. It can be dissipated under conditions and by techniques which are known well enough to warrant operational use on aerodromes.

*Prepared by the Secretary-General of the World Meteorological Organization as a basis for discussion at the fifth session of the Commission for Atmospheric Sciences

Dissipation of warm fog

5. From the standpoint of airport operations the dissipation of warm fog is more important than the dissipation of the much less common supercooled fog. Numerous dispersion techniques have been attempted, but none has yet proved to be practical and economically successful, although recent experiments with hygroscopic materials and with helicopter downwash suggest that practical techniques for improving visibility in certain situations may become available for operational use.

Hail suppression

6. Attempts to prevent the occurrence of hail antedate cloud seeding. While various tests have shown both decreases and no effect (or even increases) in hail damage, operational efforts at hail suppression using silver iodide and lead iodide fired from artillery shells and rockets directed by radar have continued. Considerable success has been claimed in some countries and the method is being applied on an increasing scale.

Suppression of lightning

7. The suggestion that charge-separation and discharging of clouds could be affected by cloud seeding has much appeal for agencies responsible for conservation of forests and combating fires. Randomized projects investigated to date have been inconclusive.