DESIGN AND EVALUATION OF RANDOMIZED WINTERTIME CLOUD SEEDING AT HIGH ELEVATION

DONALD L. EBERLY and LEWIS H. ROBINSON
PACIFIC GAS AND ELECTRIC COMPANY

1. Introduction

Silver iodide crystals have been released in a controlled test on the Lake Almanor watershed in northeastern California to determine the effects of seeding wintertime Pacific storms. The Lake Almanor watershed has an average elevation between 5000 and 6000 feet. It encompasses the headwaters of the North Fork of the Feather River and is situated among mountain peaks. The highest of these is Lassen Peak at 10,467 feet elevation.

In designing the test, provisions were made for subdividing periods of precipitation into categories with similar temperature and wind patterns. It was reasoned that silver iodide seeding should not be equally effective in all weather situations and, as others are now beginning to realize [1], [2], the problem is in isolating the kinds of weather where increases in precipitation are possible and conversely the conditions where precipitation might even be decreased.

In the preliminary work on the test design, emphasis was placed on obtaining definitive answers on the effectiveness of cloud seeding as quickly as possible. This report describes the operation, outlines the details of the test, and describes the analysis of the data collected in 1963, the first year of the test.

2. Description of burners

Silver iodide is releasable from six different sites. The sites are located at or near mountain tops (7000 feet $\pm$) on the southeast, south, and west sides of the watershed. Equipment at a burner site includes the burner, a programmer and controls, the radio receiver, battery power, instrument shelter, propane fuel, and a supply of chemical. The burners are remote, operated by radio from the Caribou Powerhouse located about 12 miles south of Lake Almanor.

The burner consumes a 4.5 per cent solution of silver iodide in acetone at the rate of 0.17 gallons per hour, equivalent to 27 grams of silver iodide. Each gram produces approximately 10^{15} crystals [3] of silver iodide ranging in size from about 0.01 to 0.2 microns. The threshold temperature where silver iodide begins to act as an ice nucleus is $-4°$ C. At $-10°$ C there are approximately 1.4×10^{14}