EXHIBIT 4
DATE 2/1/05
HB 399

Rep. Debby Barrett
444-4725

Wintertime Cloud Seeding:
Positive Evidence for Snowpack Enhancement

Arlen Huggins
Desert Research Institute
Reno, Nevada, USA

The modification of winter cloud systems through cloud seeding efforts has been nearly continuous in the mountainous areas of the western U. S. for nearly 50 years. Evidence for its success in creating additional snowfall in targeted watersheds has been compiled for nearly as long. The early efforts to quantify the impacts of cloud seeding were hampered by the lack of refined measurement techniques that are available now. However, the indications of precipitation increases, on the order of 5-15%, that were found in these early programs were later verified in carefully controlled experiments in the 1980's and 1990's where the details of the seeding effects could be measured from cloud to ground. State agencies, irrigation districts and power companies have been satisfied enough with these results to maintain cloud seeding programs as a routine part of their efforts to increase water supplies for agriculture, drinking water, power generation and recreation.

Two of the largest power companies in California, Pacific Gas and Electric (PG&E) and Southern California Edison, have the two longest uninterrupted cloud seeding programs in the United States. They have also monitored these programs at their own expense for decades. One of the first studies on wintertime cloud seeding to show positive results that were statistically significant came from the analysis of a PG&E data set in 1969. A later study by Southern California Edison in 1999, which made use of much more sophisticated measurement techniques, produced similar results that placed an economic value on the added water from cloud seeding at $10 million for additional hydroelectric generation alone.

The success of these two specific programs (and several others) has lead to a growth in programs in the western U. S., most recently by Idaho Power in the mountains of south central Idaho. The newer programs have benefited from the design and procedures developed by their predecessors. Many of the seeding techniques, seeding materials and monitoring procedures are now relatively standard across projects throughout the mountainous west. In fact, the American Society of Civil Engineers in the U. S. now publishes a handbook on the procedures and methods for developing and evaluating cloud seeding programs. None of the groups funding these cloud seeding efforts do so on blind faith. All have in place some type of program for evaluation and assessment. Provided such care is taken in the development of a cloud seeding program, there should be every reason to expect positive results from its implementation.

California
Power Companies