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Operational aspects of cloud seeding are covered next. Key project personnel include meteorological staff, pilots specifically trained in cloud seeding, a director of operations, and support personnel. Decision-making requires close coordination and communication among these and others, such as local weather officials. Safety considerations include protection of personnel from hazards related to microwave radiation, seeding agents and dispensers, severe weather, and aircraft safety. In addition, operators must monitor for conditions that warrant suspension of operations, such as flooding, severe weather, avalanche conditions, or full reservoirs.

The final section briefly addresses evaluation of cloud seeding projects.

Although much knowledge is to be gained over the long term from project evaluation, a strong evaluation requires target areas to be randomly seeded or not, so as to develop two unbiased classes of storms for comparison. Unfortunately, most sponsors of cloud seeding projects want to maximize the immediate benefits and not forego any opportunity to enhance precipitation, thus randomized programs are rare. Alternative approaches are to compare the target area to a nonseeded control area, or to compare storm measurements from within and outside of the project area prior to and during the project to see if the relationship changed during the seeding program. Both direct and indirect measurements are used for evaluation. Direct measurements include precipitation and radar data, whereas

indirect measurements may include crop yield changes, stream runoff data, or chemical analyses using various tracers.

The document concludes with a glossary of terms and an extensive list of references. Although anyone seriously considering initiating a cloud seeding project would need to consult with trained scientists and practitioners as to the feasibility and cost of the method in the desired area, *Standard Practice* provides water managers and others with a strong base of information about how the process works, decisions that would need to be made, and other important considerations.

See *American Society of Civil Engineers, 2004. Standard Practice for the Design and Operation of Precipitation Enhancement Projects, ASCE/EWRI 42-04.*

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