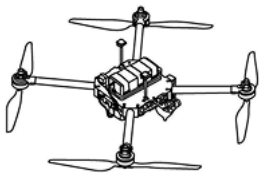


RAINMAKER

To: Iowa House Judiciary Subcommittee on HF 2640
From: Greyson Gee, Rainmaker Technology Corporation
Subject: HF 2640 Written Testimony
Date: 3/17/26

Chair Westrich, Senator Knox, and Senator Taylor,

Thank you for the opportunity to provide written testimony on HF 2640. I wish to provide context around cloud seeding, providing clarification that may be helpful as the committee considers the language and scope of this measure.

Cloud seeding is a **long-established** precipitation enhancement technique, not a climate-altering or geoengineering practice. It has been researched, regulated, and transparently conducted in the United States for over 70 years. The practice involves introducing very small quantities of substances—most commonly silver iodide or sodium chloride—into existing clouds to encourage precipitation that would not otherwise fall naturally. Cloud seeding does not alter temperature, sunlight, or climate systems. It does not create clouds or storms, and it cannot produce precipitation in clear skies. Its effectiveness depends entirely on the presence of suitable atmospheric conditions, namely, clouds.

The materials used in cloud seeding are introduced in extremely small quantities and have been the subject of extensive scientific review by federal agencies, academic institutions, and state regulators. These reviews have consistently found no demonstrated adverse impacts to human health, wildlife, or the environment.

Importantly, cloud seeding operates entirely within the normal atmospheric processes already occurring. It does not inject materials into the stratosphere, does not block sunlight, and does not attempt to modify the Earth's energy balance. It is categorically different from proposed or theoretical geoengineering concepts such as stratospheric aerosol injection (SAI) or solar radiation modification (SRM), which aim to influence global climate. The U.S. Government Accountability Office, in its December 2024 technology assessment of cloud seeding (GAO-25-107328), specifically recommended that policymakers promote awareness of the distinction between cloud seeding and geoengineering, noting that the public may not fully understand how the two differ.

Nine states currently operate cloud seeding programs—California, Colorado, Idaho, Nevada, New Mexico, North Dakota, Texas, Utah, and Wyoming—in accordance with state law and under federal reporting requirements established by the Weather Modification Reporting Act of 1972. These programs are conducted transparently, in partnership with state and local water agencies, and are subject to regulatory oversight at both the state and federal level.

With this context in mind, I ask the committee to consider whether including cloud seeding alongside geoengineering and other potentially polluting emissions accurately reflects its scientific classification and regulatory treatment.

Exempting cloud seeding or focusing legislation specifically on geoengineering, as states such as Wyoming and Arizona have pursued, would help ensure the bill remains focused on the specific activities and concerns it is intended to address.

Additionally, as Iowa faces increasing drought risk and growing pressures on water supplies, it would seem imprudent for this legislature to prohibit an innovative technology that could serve as a tool, among many, for water supply management in a future climate that is uncertain at best, and certainly more challenging at worst.

Attached to this document are various informational one-pagers which provide further context on our technology. I submit these as part of my written testimony.

I appreciate the committee's careful consideration of these issues and thank you for the opportunity to testify. If there are any questions about my testimony, please reach out at the provided email address. Thank you.

Silver Iodide Safety: A Well-Established Fact

Silver iodide (AgI) is a mineral commonly used in **glaciogenic cloud seeding**, a technology that disperses AgI into clouds to stimulate snowfall. Multiple U.S. states today use cloud seeding to augment winter snowpack, supporting critical applications like drinking water, agriculture, and power generation.

Despite these benefits, significant misunderstandings about cloud seeding and AgI persist. For example, AgI is often confused with free silver ions (Ag^+) that are dangerous to aquatic life. Such misinformation has hindered water-stressed communities from accessing cloud seeding as a water management tool.

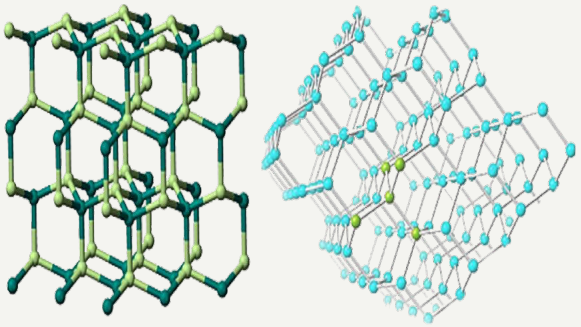
The bottom line: AgI cloud seeding is safe for human health and the environment.

Eight decades of research have shown no evidence of harm to either human health or the environment from AgI used in cloud seeding. AgI is insoluble, non-bioavailable, and non-bioaccumulative, making it unlikely to have any significant impact on human biology. Past cloud seeding programs have resulted in AgI concentrations close to natural background levels and far below the U.S. EPA's recommended limits.

Why use silver iodide (AgI)?

AgI is an effective seeding mineral due to its molecular structure. It mimics the shape of ice, providing a surface to which water molecules can freeze, eventually growing ice crystals large enough to precipitate.

Without AgI, ice formation in clouds is inefficient — and as a result, most clouds do not produce snow but instead evaporate and disappear. However, using AgI, glaciogenic cloud seeding can induce snowfall within minutes to an hour, enhancing local precipitation by up to 15%.



Above: AgI (left) mimics the lattice structure of ice (right), making it an especially effective seeding mineral.

70+ years of research on AgI safety:

After decades of peer-reviewed research, there is no evidence that AgI from cloud seeding has adverse impacts on human health or the environment. Held together by a stable covalent bond, AgI tends to stay in an inert, solid form in soil and sediments instead of dissolving in water. Neither bioavailable nor bioaccumulative, AgI does not generally enter the bloodstream or build up in the tissues of living organisms.

Further, only small amounts of AgI (typically 1 kg dispersed over hundreds of square kilometers) are needed to produce vast quantities of precipitation. Thus any AgI entering the environment is highly diluted. Concentrations of AgI measured downstream from long-term seeding campaigns are barely distinguishable from natural background levels: A 1995 study† in the Sierra Nevada mountains measured post-seeding AgI at 0.002–0.4 ppb, very close to natural levels of 0.002 ppb.

Silver content in drinking water is monitored by the U.S. EPA, which has issued a secondary (recommended) maximum contamination level of 100 ppb. This is much higher than AgI concentrations resulting from cloud seeding today.

† *Warburton et al., 1995. How the transport and dispersion of AgI aerosols may affect the detectability and seeding effects by statistical methods. Journal of Applied Meteorology. 34:1929-1941.*

RAINMAKER

We're on a mission to end water scarcity.

Across the United States, more than 80 million people suffer from drought. Essential systems that sustain life—drinking water, food production, and power generation—are under strain, threatening the security and resilience of our communities.

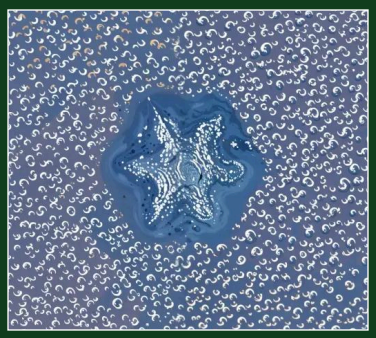
Rainmaker's mission is to use proven, dependable technologies to fight water scarcity. In doing so, we secure not only our own future but also the beauty and abundance of our natural world.

How Cloud Seeding Works

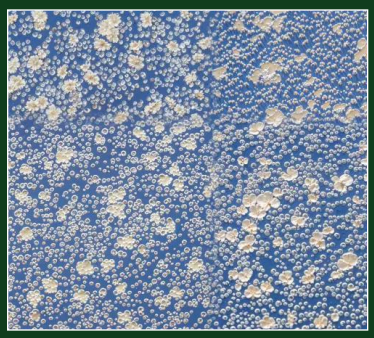
Cloud seeding is a technology that uses silver iodide (AgI) to increase precipitation (rain or snow) from clouds. Most frequently, it takes place in cold, mountainous clouds in the wintertime. AgI acts as an ice nucleating particle, catalyzing the formation of ice crystals, which continue to grow until they are large enough to fall as precipitation.

Done with precision, cloud seeding can safely boost the freshwater supply available to farmland, communities, and ecosystems.

01 **Delivery**
Cloud seeds are released within clouds to encourage droplet or ice crystal growth.



02 **Attraction**
Small water droplets are attracted to the cloud seeds and condense or freeze onto them.



03 **Accretion**
Condensed droplets or ice crystals grow in a "snowball effect," attracting other droplets.

04 **Precipitation**
Once they grow large enough, the droplets or ice crystals fall as rain or snow.

Water where it's needed.

Freshwater supply. Cloud seeding boosts surface and groundwater, stabilizing drinking water and supporting industrial applications.

Agriculture. With more water for irrigation, farmers achieve higher yields and avoid the severe economic harms associated with drought.

Ecosystem restoration. More precipitation and runoff support riparian and aquatic habitats, creating long-term beauty and abundance.

How do we know it works?

Past researchers lacked the observational and computational tools to prove that cloud seeding works. But recent innovations have catapulted the field into a new era.

SNOWIE, a project of the National Center for Atmospheric Research in 2017, was the first to integrate new technologies into a rigorous scientific study. This included advanced radar and aircraft strafing, producing a distinctive zig-zag pattern. This made anthropogenic changes easy to spot.

Researchers obtained an unambiguous seeding signature, proof of cloud seeding's effect. Dispersion of a small amount of AgI yielded **+571 acre-feet of precipitation** over Idaho's Payette River basin, enough to fill 282 Olympic-sized swimming pools.

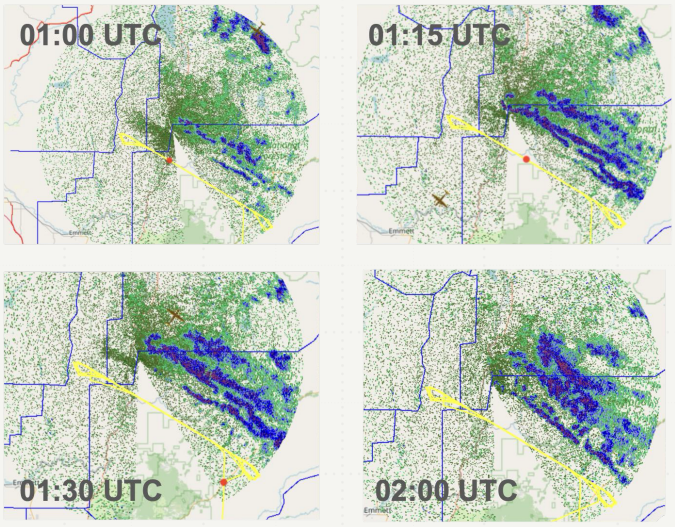


Image from https://catalog.eol.ucar.edu/maps/snowie

Rainmaker is the first company to build on the successful validation approach of SNOWIE, developing a modern, integrated, and effective solution to water scarcity for communities across the U.S.

Rainmaker's Tech Stack

Advanced Radar Validation

Radar systems provide precise data on atmospheric water, allowing us to identify seeding opportunities and directly measure the impact of our operations.

Weather Resistant Drones

Traditional operations rely on manned aircraft. Our in-house drones provide better observational data and maximum operational flexibility at lower cost.

AI Weather Modeling

AI modeling systems integrate multiple weather data sources to make increasingly accurate calculations of cloud seeding conditions and outcomes.

Sustainable Cloud Seeds

We are rethinking the fundamentals of cloud seeding at the microphysical level to develop more effective cloud seeds tailored to specific climates.

Is cloud seeding safe?

Yes. After nearly eight decades of extensive research on cloud seeding across more than 50 countries, **there is no evidence of harm to human and environmental health.**

Only a small amount (~50 grams) of AgI is dispersed over hundreds of square miles in any given operation. Measurements of multi-year seeding campaigns have found AgI concentrations 6-8 orders of magnitude below the EPA's thresholds for drinking water safety (100mg/L) and health of aquatic organisms (1.4mg/L).

Does cloud seeding steal water?

No. Decades of research show **no evidence that cloud seeding reduces precipitation** in nearby areas. Only 10% of the water vapor in the atmosphere is precipitated in a given storm system. Cloud seeding taps into the remaining 90% of the total water budget.

Does cloud seeding cause floods?

No. Studies from the National Center for Atmospheric Research indicate that a cloud seeding operation only produces < 1 inch of precipitation. **Rainmaker has strict suspension criteria** in the case of oncoming storms or floods, coordinating closely with weather experts and local government agencies. We continuously collect local data to evaluate operational safety.