

# Environmental Concerns and Sociological Issues



Group picture for the POLCAST field project conducted in North Dakota to test effectiveness of hygroscopic flares.

# Environmental Impacts

- Many States require an environmental impact statement for any large activity that may change the environment.
- Project Skywater Environmental Impact Statement (EIS)
  - The Bureau of Reclamation completed work in 1977, which is one of the most complete EIS for a weather modification project.
  - The study examined a number of possible effects and a draft of the document was circulated to a number of organizations for additional comments.

# Effects of Silver Iodide (AgI)

- Silver iodide, like most silver compounds, is insoluble in water.
- Therefore, it is difficult to get silver iodide into the food chain or to get it absorbed into any living organism.
- The quantity of Silver Iodide released is also quite small relative to the project area; hence, the effects on the environment are small.

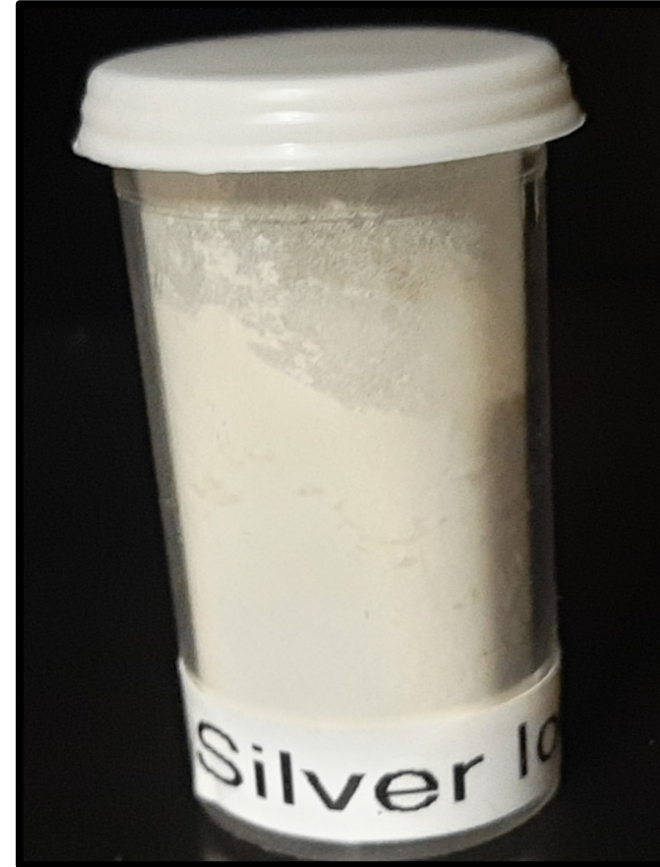
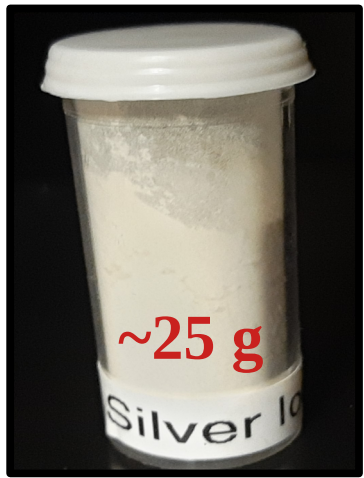


Image Credit:  
David Delene - 2023/01/24

# Silver Iodide (AgI) Released

Approximately AgI Amount in 150 gram Flare



Burn-in-Place flare sizes of 75, 100, 125, or 150 grams of pyrotechnics per flare. Image Credit: Iceflares.com

- Maximum 48 flares per flight
- 1,200 g (2.6 lbs) of AgI flight
- 7,200 g (15.9 lbs) of Seeding Material
- Max Take-off Weight King Air C-90
- 9,650 lbs
- Seeding Material is 0.1 % of take-off weight.

# Effects on Vegetation and Animals

- Project Skywater looked at the additional moisture on the natural vegetation.
- Different areas were affected differently, but the effects on the short term were small.
- The effects on animal life were less pronounced, but there would be changes possible, largely as a result of the vegetation changes.
- Effects tend to be a long term effect and not noticeable on the short term.

# **Erosion and Adverse Effects**

- Additional precipitation would result in additional runoff, especially in the case of winter programs.
- The additional runoff would cause more erosion, especially in mountainous terrain.
- Result in enhancement of an ongoing process.
- Some people will benefit more than others and some may find weather modification undesirable.
- Some examples are snow removal, loggers, and recreational industries.

# Sociological Issues

- Point of Discussion, Debate, or Dispute
- Matter of Wide Public Concern
  - Issues can blossom into problems.
  - For example, arguments, controversy, or fears.



Picture of presenters at the Conference on Prediction and Countermeasures of Climate Change on 29 October 2019 in Seoul, South Korea

# The Public:

## Not one Group with Common Interests

- Many groups of people with varying concerns (self, others), ideologies (progressive, conservative), needs and perceptions.
- Can be misinformed, driven by emotions, and fears.
- Certain groups, or people, can be very influential.





# Fears of Weather Modification Projects

- Economic Dis-benefit
- Life Threatening Developments
- Others Will Benefit and I Won't
- Loss of Civil Liberties
- Irreversible Environmental Impacts
- Divine Retribution



# Basis of Fears

- Most fears from misconceptions.
  - How the atmosphere works.
  - Toxicity of Silver Iodine.
  - Extent of possible effects.
- Uncertainty
  - How well does it work?
  - What might be done with the technology?
- Still a lot based on the early (1950s) optimism of the potential to modify the atmosphere.



Experience of Cloud Seeding in Mali, West Africa

# Social Concerns Encountered

- Mistrust of the government.
- Who owns the Atmosphere?
- Should weather modification be a viable weapon?
- Who is liable for negative outcomes and damages?
- Should there be stringent regulation?
- Need for rigid proof verse preponderance of evidence.
- What is the role of project evaluation?
  - Transparency and information are critical!

# Public Opinion

- Public is confused about weather modification – why?
  - Simultaneous research and operations.
    - Needs for weather modification aren't uniform.
    - Need for evaluation is critical.
- Public Views
  - About one-third (1/3) of people oppose for religious or natural beliefs.
  - Most people do not show much enthusiasm or interest.
  - Public perception, or individual perception, rules.

# Evaluation of Weather Modification

- Small changes are not obvious.
- Payers need to know if getting their money's worth.
- Who does the evaluation is important.
- Evaluation is key to maintaining programs.
- There are winners and losers on all projects!



# Factors for Deciding on a Program

- Safeguards
- Emergency Conditions
- Scientific Evidence
- Local Economic Benefit
- Cost-effectiveness
- Program Compensation
- Public Communication



Picture of presenters at the 2019 International Conference for Fine Dust in Seoul, South Korea.