

STATE OF COLORADO

Colorado Water Conservation Board Department of Natural Resources

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TO: Colorado Water Conservation Board Members

FROM: Joe Busto, Watershed & Flood Protection Section
Susan Schneider and William Stenzel, AGO

DATE: March 5, 2012

SUBJECT: **Agenda Item 30, March 20-21, 2012 Board Meeting**
Weather Modification Rules and Regulations Update

John Hickenlooper
Governor

Mike King
DNR Executive Director

Jennifer L. Gimbel
CWCB Director

Introduction

The CWCB staff is in the process of drafting new rules and regulations for weather modification programs in Colorado for promulgation in May by the Executive Director of the Department of Natural Resources ("Director"), in consultation with the CWCB. An Advisory Committee of subject matter experts was formed to provide input to Staff on the proposed rules. In January, the Director and the board reviewed the draft rules, approved a formal rulemaking hearing in May, and appointed Casey Shpall as the hearing officer.

Background

The General Assembly required the Executive Director to promulgate new weather modification rules by July 1, 2012. The rules remove previous references to annual licensing, as required by the legislature. Also, the draft rules require weather modification operators to demonstrate that they are adequately qualified pursuant to the application and public hearing processes. Rule 19, "the evaluation rule," requires operators or permit holders to evaluate the weather modification program periodically.

Based on feedback from the Board at the January meeting, Rule 19 was modified to require scientific evaluation. The Advisory Committee provided feedback that there is a significant fiscal impact of requiring these evaluations. Staff revised the rules to allow the evaluation to occur in a manner appropriate to the permit holder or operator. The General Assembly reviews the weather modification rules every seven years under the statutes' "sunset provision." During the sunset review of 2010, a key comment was that there was no evaluation process to determine whether the weather modification programs were working, and Rule 19 was put in place to address this. The Department of Regulatory Agencies must also review the program and determine whether the regulations are too stringent or onerous to the regulated community.

Staff Recommendation

This is an informational item for discussion purposes, and no board action is requested.

DEPARTMENT OF NATURAL RESOURCES

**COLORADO WEATHER MODIFICATION RULES
AND REGULATIONS**

June 30, 2012



RULES AND REGULATIONS FOR COLORADO WEATHER MODIFICATION

DEPARTMENT OF NATURAL RESOURCES

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RULES AND REGULATIONS FOR COLORADO WEATHER MODIFICATION

- Rule 1.** **Title:** The previous Colorado Weather Modification Rules and Regulations were adopted August 1, 1986, and are amended here under the same title (referred to herein collectively as the “Rules” or individually as “Rule”). These Rules supersede the August 1, 1986 Rules.
- Rule 2.** **Authority:** Section 36-20-107(1), C.R.S. (2011), empowers the Executive Director of the Department of Natural Resources (“Director”) to promulgate rules necessary to effectuate the purposes of the Weather Modification Act of 1972 (the “Act”). Section 36-20-107(3)(a), C.R.S. requires the Director to ensure that all rules established pursuant to the Weather Modification Act of 1972 are up to date and consistent with the Act. The Director may delegate to the Director of the Colorado Water Conservation Board, or another designee, the authority to administer the Act, to issue permits, and to regulate weather modification activities permitted pursuant to the Act pursuant to section 36-20-108(3)(b) C.R.S. (2011).
- Rule 3.** **Purpose and Scope:**
- A. **Purpose.** The purpose of these Rules is to provide regulation of and standards for weather modification in Colorado in accordance with the legislative declaration provided by the Act, section 36-20-101, C.R.S. (2011), and pursuant to the legislative direction provided by section 36-20-107(3)(a). Rules for regulation of weather modification operations are of statewide concern to the State of Colorado and the Department of Natural Resources. The State of Colorado, through the Colorado General Assembly, recognizes the economic benefits that can be derived for the people of Colorado from weather modification, while minimizing possible adverse effects through implementation of proper safeguards and collection of accurate information. The Colorado General Assembly authorized the Director to issue permits applicable to weather modification operations pursuant to the Act, section 36-20-108(1), C.R.S. (2011). This direction is intended to ensure that weather modification operations implement proper safeguards and provide accurate information on operations.
- B. **Scope.** These Rules apply to all weather modification operations in the State of Colorado, including, but not limited to, those by individuals, corporations, local government agencies, regional government agencies, state government agencies, Indian tribes, and federal government agencies.
- Rule 4.** **Definitions:** These Rules adopt the defined terms provided by section 36-20-104, C.R.S. (2011) of the Act. Further terms are defined as provided herein.
- Rule 5.** **Application for a Permit:**
- A. **Application for Permit.** An application for a weather modification permit must be submitted at least 45 days before the beginning date of proposed weather modification operation.

B. **Requirements for Operator.** The qualifications, education, and experience of any prospective Operator to engage in weather modification operations must be demonstrated to the Director pursuant to section 36-20-112(1)(g), C.R.S. (2011). An application for a permit must therefore include evidence of one of the following:

- (1) A minimum of four years of field experience in the management and control of weather modification operations or research; and
- (2) A degree in engineering, the physical sciences, or meteorology; or
- (3) Certification by the Weather Modification Association as a Certified Operator; or
- (4) Other training and relevant experience that the Director accepts as indicative of sufficient competence in the field of weather modification to engage in weather modification activities.

At least one such Operator shall be available at all times and days during weather modification activities for immediate consultation by the Director.

C. **Modification of Permit.** The Director may revise the terms of a permit if the operator is first given notice and opportunity for a hearing on the need for a revision and the Director determines the revision is necessary to protect the health or property of any person or to protect the environment. While the Director may only issue one active permit for activities in any geographic area if two or more projects may adversely interfere with each other, the Director may issue more than one permit for activities in any geographic area if one of the permits becomes inactive due to a project sponsor's termination of a contract with a permit holder and the cessation of weather modification operations.

D. **Permit Fee.** A permit application or renewal must include the appropriate application or renewal fee designated by the Director pursuant to section 36-20-113, 114, C.R.S. (2011), as set forth in a policy discussed at a Board meeting and published on the Board website. The application fee is required of all applicants, including persons employed by commercial firms, government and non-profit agencies and should be sufficient to pay the direct costs of reviewing the permit application, holding public hearings and monitoring the Permitting Program.

E. **Commercial Fee.** Applicants for commercial weather modification operations must also pay a Commercial Fee. The amount of this Commercial Fee is 2% of the yearly contract between the permit holder and the operation sponsors. If the permit holder and operation sponsor are the same, then the Commercial Fee is 2% of the operation's yearly budget. The Commercial Fee shall be paid at the beginning of each operational season. The Commercial Fee compensates for permitting, regulatory compliance and environmental monitoring functions performed by the Director or his or her designee. The Director may waive the Commercial Fee in extraordinary circumstances.

Rule 6. Required Information and Proof of Financial Responsibility:

A. **Required Information.** The weather modification permit application must include the following information:

- (1) A description of the objectives of the proposed weather modification operation; and
- (2) The specific time period for the operation; and
- (3) A written description and map identifying the specific target area and the area reasonably expected to be affected by the operation; and
- (4) A description of how the operation will be carried out, including, but not limited to, the location of the office, weather data used, aircraft types, seeding devices and material, seeding rates; and
- (5) How the proposed operation is designed to provide economic benefit to the target area (applicable to commercial operations only); and
- (6) How the proposed operation is reasonably expected to benefit both persons living in the target area and the people of Colorado; and
- (7) How the proposed operation is scientifically and technically feasible; and
- (8) How the proposed operation is designed for developing the knowledge and technology of weather modification (applicable to research and development operations only); and
- (9) The potential risks that the proposed operation could cause, such as harm to land, water, people, health, safety, property and the environment, and the adequate safeguards proposed for use by the operator to prevent harm; and
- (10) How other weather modification operations and research projects (if any) could be affected adversely by the proposed operation; and
- (11) The significant expected negative ecological impacts which may result from the operation, such as how precipitation patterns could be altered, how increased runoff would affect erosion, and the environmental impacts of any chemicals utilized in the operation; and
- (12) Provide scientific literature and documentation that the proposed form of weather modification is viable and likely to produce the intended effect.

B. **Proof of Financial Responsibility.** The application must also furnish proof of financial responsibility adequate to meet obligations reasonably likely to be attached to or result from the proposed weather modification operation as required by section 36-20-112(c), C.R.S. (2011). Proof of financial responsibility may be shown by any of the following:

Evidence of a liability policy of at least \$1 million, or five times the value of the weather modification operation, whichever is greater, including proof that the insuring company is authorized to do business in Colorado, and a cancellation clause with a 30-day notice to the Director.

Above these minimum requirements above, Applicants should consider maintaining liability insurance against the effects of weather modification operations, also called consequential loss insurance, which is not normally a part of ordinary liability insurance.

- Rule 7. Publication of Legal Notice of Intent:** Applicants for a weather modification permit must publish a legal notice or notices of intent to modify weather in the counties to be affected by the weather modification operations, and/or any other newspapers required by the Director, including regional newspapers, pursuant to section 36-20-112(e), C.R.S. (2011) and in accordance with the timeline provided by section 36-20-104(7). The target area is defined as the area in which the operator desires to produce effects. Counties which may reasonably be expected to be affected by the operation include, at a minimum, those counties that are adjacent to the county (or counties) containing the target area. Applicants must use a form for legal notices approved by the Director. Affidavits provided by newspaper publishers, radio or television station managers, or sheriffs are sufficient proof of publication.
- Rule 8. Evaluating Permit Applications:** The Director shall evaluate applications for compliance with the criteria provided by section 36-20-112, C.R.S. (2011) and may grant, deny, or grant the application with additional terms and conditions.
- Rule 9. Hearing Required:**
- Hearing Prior to Permit Issuance.** A public hearing is required prior to issuance of a weather modification permit pursuant to section 36-20-112(e), C.R.S. (2011) and held in accordance with section 36-20-108(3)(b). The Director or his or her designee will record the hearing, and will consider public input, as well as all other information presented at the hearing to evaluate applications.
- Rule 10. Duration of Permits:** Permits shall be granted for a maximum of one calendar year, except for ground-based winter cloud seeding, which may have a duration of five years, and may be renewed for five years and/or ten years, pursuant to section 36-20-108(1), C.R.S. (2011). Permits granted for one calendar year may be renewed on an annual basis for four additional calendar years providing the permitted weather modification operation has not materially changed and the permit holder has satisfied all record keeping and reporting requirements.
- Rule 11. River Basin Notification Required:** The permit holder must notify the local National Weather Service weather forecast office, Colorado Avalanche Information Center (“CAIC”), and the County emergency managers, CSU Colorado Climate Center, and other agencies in the target area(s) as requested by the Director prior to each season of weather modification operations. Permit holder must document notification in annual reports.

Rule 12. Yearly Operational Plan Required: The permit holder must submit an annual Operational Plan to the Director. The Operational Plan must include the following information:

- (1) A map depicting the target area and weather modification equipment locations; and
- (2) An unlocked spreadsheet including the latitude and longitudinal directions of each weather modification equipment location; and
- (3) Evidence of compliance with the notifications required by Rule 11; and
- (4) The Operator's current contact information; and
- (5) Declaration of the weather modification operational suspension criteria; and
- (6) Acknowledgement of the Director's suspension criteria to be followed during the year.

Rule 13. Reports: The Director requires the permit holder to maintain and submit the following reports pursuant to section 36-20-117, C.R.S. (2011):

- A. **Daily Log:** The permit holder must maintain a current, daily log shall at the operation office. This log must be made available for inspection by the public. The daily log must use the form provided by the Director, attached as Form WM4 to these Rules. The daily log must include the date, time of each period of operations, rate of dispersion of seeding agent and total amount of seeding agent dispersed. The Director encourages automated logging of operations over manual logging of operations.
- B. **Annual Reports:** The permit holder must compile annual reports in accordance with section 36-20-117(3), C.R.S. (2011). The permit holder must provide the Director with a written annual report that evaluates the weather modification operation within 60 days of concluding its operations season.
- C. **Additional Record-Keeping for Aircraft-Based Operations:** In addition to the above record-keeping requirements, any person conducting a weather modification operation with an operational or target area that includes any part of Colorado that employs aircraft must record and maintain the following information:
 - (1) The date; and
 - (2) Time period (in minutes); and
 - (3) Rates of dispersion for seeding agent for each flight; and
 - (4) Total amount of seeding agent dispensed;
 - (5) Description of each flight track logged in such a manner as to allow a complete and accurate reconstruction of the run and identified at the beginning and ending of each

flight by radial and distance from a standard reference point, ground fixes in statute miles from a nearby town or landmark, or geostationary positioning system (“GPS”) location; and

(6) Other information required by the Director.

Rule 14. Weather Modification Activities Subject to Applicable Permitting and Regulation:

Permit holders are subject to all applicable local, state, and federal permitting and regulation. Permit holders should be aware that all cloud seeding operations must be reported to the National Oceanic and Atmospheric Administration.

Rule 15. Modification of a Permit and Best Management Practices: The Director may revise a weather modification permit in accordance with section 36-20-115, C.R.S. (2011), including the addition or a revision based on best management practices, operational criteria, or as otherwise necessary to protect the health or property of any person or to protect the environment. The permit holder may request a hearing regarding permit revisions pursuant to section 36-20-112(e), C.R.S. and held in accordance with section 36-20-108(3)(b).

Rule 16. Compliance with American Society of Civil Engineers Standard Practices: The Director may require permit holders to comply with applicable American Society of Civil Engineers Standard Practices documents to design, operate, and evaluate weather modification operations.

Rule 17. Suspension of Weather Modification Operations:

Winter Ground Based Programs

A. **Snow Water Equivalent Thresholds.** Weather modification activities must be suspended at any time the snowpack water equivalents exceed the following: 175% of average on December 1st, 175% of average on January 1st, 160% of average on February 1st, 150% of average on March 1st and 140% of average on April 1st. The Director or his or her designee will determine where and how snowpack water equivalents are to be measured, including at selected “SNOTEL” sites. The Director or his or her designee may permit weather modification activities to continue in a portion of the operation target area where snowpack water equivalents are below these suspension criteria percentages, if the operation will not impact the target area where snowpack water equivalents are above these suspension criteria percentages. These thresholds are designed to keep the seeding effect to within the realm of natural variability of the local climate as measured at each SNOTEL station.

B. **Avalanche Hazard Levels.** Weather modification operations may be suspended by the Director due to high avalanche hazard levels, and must be suspended by the permit holder due to extreme avalanche hazard levels, as determined by the Colorado Avalanche Information Center (CAIC). The CAIC works in coordination with the Department of Transportation and National Weather Service to determine avalanche hazard levels. The permit holder must monitor CAIC avalanche hazard levels, and coordinate with the

Director and CAIC to determine whether suspension of operations is warranted by high avalanche hazard levels.

C. **National Weather Service Forecasts.** The permit holder must suspend weather modification operations when the National Weather Service forecasts the following conditions for the target area:

- (1) A storm that will produce unusually heavy precipitation or severe weather conditions in the operations area; or
- (2) A warm winter storm for snow above 8,000 feet elevation that may result in local flooding; or
- (3) Potential flood conditions, including a National Weather Service flash flood warning or a forecast of excessive runoff.

D. **Summer Programs Aerial Based Programs**

The permit holder must suspend summer aerial operations when the following conditions are in the target area:

- (1) The National Weather Service has Issued a Flash Flood Warning
- (2) Storms are producing a funnel cloud or tornado
- (3) The Operational meteorologist sees any condition that warrants temporary suspension of the program.

E. **Summer Ground Based Hail Cannons**

Hail cannon operations effects are confined to a small localized area directly over the target area.

- (1) Operations are confined to forecasts and observations of heavy rain and hail tracking directly toward and over the target area.
- (2) Hay bales, sound engineering tests, and sound suppression mechanisms may be required as mitigation measures.

Rule 18. Suspension of Weather Modification Operations by Emergency Managers: Emergency managers may require the immediate temporary suspension of weather modification operations for any reason.

Rule 19. Weather Modification Evaluations: The Director desires to promote continuous research, development, and evaluation of permitted programs. Permit holders shall submit periodic evaluation proposals to the Project Sponsors. Periodic is defined as at least once during a five-year permit or twice during a ten-year permit. A periodic evaluation should be outside of the normal annual reporting methods. Evaluations that are peer reviewed and published in journals can count as “independent” evaluations. What follows is a list of data and types of studies recommended for use by the Director.

A. The following are examples of data for evaluations:

- (1) Standard meteorological data from surface weather stations, radar and other remote sensing data, cloud physics data, streamflow data, SNOTEL and snow course data, hail pad data, upper air data, modeling simulations, trace chemistry data from snow sampling, ice nucleus data

B. The following are examples of types of evaluations:

- (1) Predictive and/or diagnostic cloud modeling;
- (2) Modeling of transport and diffusion of seeding material;
- (3) Airflow, temperature, and liquid water measurements in the target area;
- (4) Target versus control analysis of precipitation or snow water;
- (5) Trace chemistry analysis in snowpack to assess targeting;
- (6) Precipitation gauges comparisons;
- (7) Aircraft cloud microphysical studies;
- (8) Plume tracking of cloud seeding aerosols or tracers;
- (9) Analysis of precipitation from existing projects that employ a randomized design in their seeding operations; or
- (10) Other evaluations outlined in various published documents related to the conduct of weather modification projects.

Rule 20. Weather Modification Advisory Committee.

A. **Formation of Weather Modification Advisory Committee:** Pursuant to section 36-20-108, C.R.S. (2011) the Director may create a weather modification advisory committee. Members of this committee shall be appointed by the Director, and serve for a period of time as determined by the Director.

B. **Duties of the Weather Modification Advisory Committee:**

- (1) Advise the Director on applications for weather modification permits; and
- (2) Advise and make recommendations concerning legislation, policies, administration, research, and other matters related to cloud seeding and weather modification activities to the Director; and
- (3) Other duties as determined by the Director.

Rule 21. Procedure for granting emergency permits. Notwithstanding the foregoing, the Director may except weather modification operations from these requirements, and others, as provided by section 36-20-109, C.R.S. (2011), including for activities of an emergency nature for protection against fire, frost, hail, sleet, smog, fog, or drought. The procedure for issuing an emergency permit is as follows:

- A. A permit may be granted on an emergency basis through the waiving of one or more of these rules when evidence is presented that clearly defines the situation as an emergency.
- B. Upon presentation of evidence satisfactory to the Director that an emergency condition exists or may reasonably be expected to exist in the very near future that may be alleviated or overcome by weather modification activities, the Director shall issue a permit for those activities.
- C. Within 10 days after the granting of an emergency permit, and if the permittee desires to continue the permitted weather modification activities, the permittee shall publish a legal notice of intent to modify weather as provided by Rule 7 herein. In addition to the requirements of Rule 7, the permittee shall describe the objectives of the emergency action, the success to date, and the future plans under the permit. The Director will evaluate whether to revoke the emergency permit, modify it, or permit its continued operations as soon as is practical after the public hearing on the weather modification activities.

Rule 22. Severability: If any portion of these Rules is found to be invalid, the remaining portion of the Rules shall remain in force and in effect.

Rule 23. Effective Date: June 30, 2012.

DRAFT

To: Division Directors, Deputy Directors, Senior Administrative Staff
Executive Director's Office
DEPARTMENT OF NATURAL RESOURCES

From: Mike King, Executive Director
DEPARTMENT OF NATURAL RESOURCES

Date: July 1, 2012

Subject: Administrative Order DNR 12-___
Weather Modification Act Responsibilities

The Colorado Department of Natural Resources Administrative Order DNR 12-___, regarding the Weather Modification Act Responsibilities, is attached. This administrative order is effective the date signed and shall remain in effect until revised or rescinded.

ADMINISTRATIVE ORDER

NUMBER: DNR 12-__

DATED: July 1, 2012

THE DEPARTMENT OF NATURAL RESOURCES AND ITS DIVISIONS

Weather Modification Act Responsibilities

Pursuant to sections 24-1-107 and 36-20-108(3)(b) C.R.S. (2012), I hereby delegate to the Director of the Colorado Water Conservation Board the responsibilities and authority vested in the Executive Director of the Department of Natural Resources pursuant to section 36-20-101, et seq., C.R.S. (2012).

It is my intention that this delegation of authority and responsibilities is consistent with the continuation of the exercise of those responsibilities and authority by the Director of the Colorado Water Conservation Board since the original designation in 1987.

Effective Date: July 1, 2012

MIKE KING

DATE

Executive Director

Colorado Department of Natural Resources

DRAFT 3-7-12

POLICY NUMBER: _____

SUBJECT: WEATHER MODIFICATION FEES COLLECTED

EFFECTIVE DATE: July 1, 2012

POLICY: The Weather modification permit application fee is set at \$300. The commercial fee is 2%.

PURPOSE: The purpose of the Colorado Weather Modification Permit Application Fee is for the CWCB to set a fee that is sufficient to pay the direct costs of reviewing the permit application, holding public hearings and monitoring the Permitting Program. § 36-20-113, C.R.S. (2012). The Executive Director of Natural Resources has continuously delegated the authority to the CWCB Director to administer the Colorado Weather Modification Permitting Program since 1987. The CWCB Director has one staff member dedicated to issuing permits, holding hearings, and monitoring activities for public health and safety. Staff also ensures permit holders are financially responsible, that there is accurate annual reporting, and an adherence to suspension criteria as a condition of continued validity of the permit. The Attorney General's Office also participates in the permitting process.

APPLICABILITY: This Policy is applicable to all applicants seeking a Colorado Weather Modification Permit that will conduct ongoing operations in Colorado.

PROCEDURE: The Procedure for getting a Colorado Weather Modification Permit is described herein. The applicant will submit an application to the CWCB Director with the required \$300 fee to review the application. If the applicant meets the minimum requirements to hold a permit in Colorado outlined in the Colorado Weather Modification Rules and Regulations, then a hearing will be held in or near the intended target area. The Notice of Intent will advertise a public hearing for two weeks prior to conducting the public hearing. The Notice of Intent must be approved by the CWCB and the Attorney General's Office prior to publication. Copies of the application and other hearing materials will be made available to the public prior to or, at a minimum, at the public hearing. The public hearing will be recorded by the CWCB staff. The CWCB staff, in consultation with the Attorney General's Office, will catalog all written and oral materials received from the public hearing process and develop a record of decision. The determination in the record of decision will be to deny, approve, or approve with terms and conditions a weather modification permit and will be submitted to the CWCB Director. The CWCB Director may or may not sign a Colorado Weather Modification Permit. A Colorado Weather Modification Permit cannot be issued by CWCB staff without the Director's signature. Applicants are encouraged to be proactive and allow at least two months from submittal of application for a final decision by the CWCB Director.

Applicants for commercial operations must also pay a Commercial Fee if a Colorado Weather Modification Permit is issued. The amount of this Commercial Fee is 2% of

the yearly contract between the permit holder and the project sponsors. If the permit holder and project sponsors are the same, then the Commercial Fee is 2% of the operations' yearly budget. The Commercial Fee shall be paid at the beginning of each operational season. The Commercial Fee compensated for permitting, regulatory compliance, and environmental monitoring function performed by the Director or his or her designee. The Director may waive the Commercial Fee in extraordinary circumstances.

Approved by the CWCB
March __, 2012 Board Meeting
Agenda Item # ____