

NOAA FORM 17-4 (4-81)		U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		Form Approved OMB Control No. 0648-0025 Expires 05/31/2024	
<b>INITIAL REPORT ON WEATHER MODIFICATION ACTIVITIES</b>				Complete in accordance with instructions on reverse and forward one copy to: National Oceanic and Atmospheric Administration Office of Oceanic and Atmospheric Research 1315 East-West Highway, WWMC-3, Rm 11216 Silver Spring, MD 20910	
This report is required by Public Law 92-205; 85 Stat. 735; 145 U.S.C. 330b. Knowing and willful violation of any rule adopted under the authority of Section 2 of Public Law 92-205 shall subject the person violating such rule to a fine of not more than \$10,000, upon conviction thereof.					
<b>1. PROJECT OR ACTIVITY DESIGNATION, IF ANY</b> Mokelumne		<b>2. DATES OF PROJECT</b>			
<b>3. PURPOSE OF PROJECT OR ACTIVITY</b> Increase high-elevation snowpack and subsequent dry season runoff		a. DATE FIRST ACTUAL WEATHER MODIFICATION ACTIVITY IS TO BE UNDERTAKEN		11/01/2023	
		b. EXPECTED TERMINATION DATE OF WEATHER MODIFICATION ACTIVITIES		05/31/2024	
<b>4. (a) SPONSOR</b> NAME Pacific Gas & Electric			<b>4. (b) OPERATOR</b> NAME Same as sponsor		
AFFILIATION Same as above		PHONE NUMBER		AFFILIATION	
PHONE NUMBER		AFFILIATION		PHONE NUMBER	
STREET ADDRESS 300 Lakeside Drive			STREET ADDRESS		
CITY Oakland		STATE CA	ZIP CODE 94612	CITY	
STATE CA		ZIP CODE 94612	STATE	ZIP CODE	
<b>5. TARGET AND CONTROL AREAS (See Instructions)</b>					
TARGET AREA			CONTROL AREA		
LOCATION Central Sierra Nevada Range		SIZE OF AREA 170 SQ. MI	LOCATION Same as target area		SIZE OF AREA 170 SQ. MI
<b>6. DESCRIPTION OF WEATHER MODIFICATION APPARATUS, MODIFICATION AGENTS AND THEIR DISPERSAL RATES, THE TECHNIQUES EMPLOYED, ETC. (See Instructions)</b> Seven ground-based, high-elevation, radio-controlled, propane-acetone silver iodide and ammonia iodide seeding generators. Silver-iodide is dispensed at a rate of 21.5 grams per hour. Local wind and temperature data are obtained from a meteorological site on Mt. Reba.					
<b>7. LOG BOOKS</b> Enter name, affiliation, address, and telephone number of responsible individual from whom log books or other records may be obtained.					
NAME Neil C Flaiz					
AFFILIATION Pacific Gas and Electric Company			PHONE NUMBER (925) 222-0160		
STREET ADDRESS 3400 Crow Canyon Road, Room 151					
CITY San Ramon		STATE CA		ZIP CODE 94526	
<b>8. SAFETY AND ENVIRONMENT</b>					
YES		<input checked="" type="checkbox"/>	NO	Has an Environmental Impact Statement, Federal or State, been filed? If yes, please furnish a copy as applicable.	
<input checked="" type="checkbox"/>		YES	NO	Have provisions been made to acquire the latest forecasts, advisories, warnings, etc., of the National Weather Service, Forest Service, or others when issued prior to and during operations? If yes, please specify on a separate sheet.	
<input checked="" type="checkbox"/>		YES	NO	Have any safety procedures (operational constraints, provisions for suspension of operations, monitoring methods, etc.) and any environmental guidelines (related to the possible effects of the operations) been included in the operational plans? If yes, please furnish copies or a description of the specific procedures and guidelines.	
<b>9. OPTIONAL REMARKS</b> (See instructions. Use Separate Sheet).					
<b>CERTIFICATION:</b> I certify that all statements in this report on this weather modification project are complete and correct to the best of my knowledge and are made in good faith.			NAME OF REPORTING PERSON Neil C Flaiz		
AFFILIATION Pacific Gas and Electric Company			SIGNATURE <i>Neil Flaiz</i>		
STREET ADDRESS 3400 Crow Canyon Road, Room 151			OFFICIAL TITLE Senior Meteorologist		

CITY San Ramon	STATE CA	ZIP CODE 94526	DATE 10/17/2023	PHONE NUMBER (925) 222-0160
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**MOKELUMNE WEATHER MODIFICATION**  
**OPERATING INSTRUCTIONS**  
**2023-2024**

PG&E's meteorologists in Meteorology Operations and Analytics will direct the cloud seeding operations during the 2023-2024 winter season based on the specifications in Section I of this document and work procedure WP 349-13. The roles of all personnel involved in the Mokelumne Weather Modification Project are specified in Section II of this document.

**Section I**

The operation of the Mokelumne Weather Modification Project will be dependent on meteorological data obtained from various meteorological forecast models produced by PG&E Meteorology Operations in San Ramon, California as well as the Mt. Reba monitoring site located at the Bear Valley ski resort. Seeding operations will be done according to the following specifications:

**A. General Specifications**

- 1) Storms which meet the criteria as specified in Section B will be selected for a seed operation for a maximum of twelve hours. Seed orders may be less than twelve hours and no less than six hours at the discretion of the PG&E forecaster.
- 2) The silver iodide burners will be identified and operated by number as follows: 1- RTU#51 (Tamarack), 2 - RTU #52 (Hermit Springs), 3 - RTU #53 (Big Meadow), 4 - RTU #54 (Black Springs), 5 – RTU #55 (Little Beaver), 6 – RTU #56 (Shoofly), and 7 - RTU #57 (Osborne Ridge).
- 3) An actual seeding order will cover a maximum of twelve hours. Orders may be for less than a twelve-hour period at the discretion of the weather forecaster.
- 4) During the seed operation, the weather forecaster may cancel the operation if weather conditions no longer meet seeding criteria for a specific operating mode.  
  
A subsequent seed order may be initiated if the criteria as specified in Section B are met for any of the remaining operating modes.

**B. Seeding Criteria**

The following criteria are specified as limiting conditions for weather modification operations.

- 1) Seeding will not be started or will cease if underway when the freezing level over the watershed is above 8,500 feet MSL.
- 2) Seeding will not be started or will cease if underway when the average wind speed in the layer from 8,000 feet to the -10° C layer is > 48 knots
- 3) Seeding will not be started or will cease if underway when in the judgment of Mr. T Covich, Mr. T Orozco, Ms. A Zaccarin, Mr. R Motagally, Mr. K Richards, Mr. E Duffey, Mr. K Ericsson, and Mr. N Flaiz if abnormal runoff conditions or heavy snow loading on structures potentially exist in the watershed.
- 4) South storm seeding will be ordered when the most recent forecast model guidance and Mt. Reba wind direction is between 140 and 240 degrees, Mt. Reba temperature is less than 0 degrees C, and Oakland RAOB 700 mb wind speed is less than 50 knots. All burners will be activated for a south order (1- (Tamarack, 2 - Hermit Springs, 3 - Big Meadow 4 - Black Springs, 5 – Little Beaver, 6 – Shoofly, and 7 - Osborne Ridge).
- 5) Southwest storm seeding will be ordered when the most recent forecast model guidance and Mt. Reba wind direction is between 230 and 250 degrees, Mt. Reba temperature is less than 0 degrees C, and Oakland RAOB 700 mb wind speed is less than 50 knots. The burners operated for a southwest order are (1- (Tamarack, 2 - Hermit Springs, 3 - Big Meadow 4 - Black Springs, and 7 - Osborne Ridge). (Do not activate burners 5 and 6).
- 6) Westerly mode (NCPA) storm seeding will be ordered when the most recent forecast model guidance and Mt. Reba wind direction is between 240 and 280 degrees, Mt. Reba temperature is less than 0 degrees C, and Oakland RAOB 700 mb wind speed is less than 50 knots. The burners operated for an NCPA westerly mode order are numbers 1 (Tamarack), 2 (Hermit Springs), 3 (Big Meadow), 4 (Black Springs), and 7 (Osborne Ridge).
- 7) Northwesterly mode (NCPA) storm seeding will be ordered when the most recent forecast model guidance and Mt. Reba wind direction is between 280 and 340 degrees, Mt. Reba

temperature is less than 0 degrees C, and Oakland RAOB 700 mb wind speed is less than 50 knots. The burners operated for an NCPA northwesterly mode order are numbers 1 (Tamarack), 3 (Big Meadow), and 7 (Osborne Ridge).

## **Section II**

Successful operation of the Mokelumne Weather Modification Project depends on the coordinated actions of PG&E Meteorology Operations, Operators at Tiger Creek Powerhouse, and support personnel at Angels Camp. The roles of these personnel follow:

### **A. Seeding Procedures**

#### Weather Forecaster--PG&E Meteorology Operations

- 1) The weather forecaster will issue seeding instructions to the operators at Tiger Creek Operations Center.
- 2) All orders for silver iodide burner operations will be logged via email correspondence and on the cloud seeding order form in the space provided (Figure 1). All cancellations and the reason therefore must also be logged via email correspondence and on the cloud seeding order form.
- 3) The weather forecaster will be responsible for informing, Mr. T Covich, Mr. T Orozco, Mr. K Richards, Ms. A Zaccarin, Mr. R Motagally, Mr. E Duffey, Mr. K Ericsson, and Mr. N Flaiz of an approaching severe storm that could produce flooding or heavy snow loading on structures in or surrounding the Mokelumne watershed and/or downstream of the watershed.
- 4) The weather forecaster will be responsible for maintaining data files and completing the verification of cloud seeding form.
- 5) Weather forecaster availability during the weather modification season will be 0500 through 1500 PST with extension to later hours, as needed, during cloud seeding operations. These office hours will be maintained on both weekdays and weekends.

Forecaster Office Phone:

Company – 244-4630/4632

Outside - (925) 244-4630/4632

Powerhouse Operators--Tiger Creek Operations Center:

- 1) The Tiger Creek operator will control the silver iodide burners in accordance with the instructions received from the weather forecaster.
- 2) All instruction received from the weather forecaster will be logged on the form entitled, "Record of Cloud Seeding Operations," Figure 2. The original will be sent via electronic mail or company mail to Neil Flaiz, Meteorology Operations and Analytics, 6121 Bollinger Canyon Road, Bldg. Z1, San Ramon, CA 94583 on a weekly basis. A copy will be retained at the Tiger Creek Operations Center.

**B. Routine Equipment Service and Calibration**

Angels Camp personnel will be responsible for installing and servicing all seeding burners as needed based on burner diagnostic output from the Pi ProcessBook data screen.

**C. Routine Data Collection**

Angels Camp personnel will be responsible for collecting all pertinent burner operation data in accordance with the following schedule:

- 1) All burner maintenance logs (Figure 3) should be completed following each service visit.
- 2) A detailed operational summary of each seeder will be sent via electronic mail or company mail to Neil Flaiz, Meteorology Operations and Analytics, 6121 Bollinger Canyon Road, Bldg. Z1, San Ramon, CA 94583 on a weekly basis.

**D. Reporting**

PG&E Meteorology Operations will be responsible for data reduction, evaluation, and reporting. Reports as required by the State of California and the federal government will be completed and distributed to the following:

Tyler Covich

Tony Orozco

Kevin Richards

Evan Duffey

Annie Zaccarin

Raphael Mortagally

Neil Flaiz

Ken Ericsson

State - Department of Water Resources

Federal - National Oceanic and Atmospheric Administration  
Office of Oceanic and Atmospheric Research



**Figure 1**  
**CLOUD SEEDING ORDER FORM**  
**SEASON: 2023-2024**  
**WATERSHED: MOKELUMNE**

TIGER CREEK OPERATIONS CENTER: 8-841-2601 or 209-295-2601

Orders Issued To Tiger Creek Operations Center	Local Time		Remarks/Cancellations
	Start Date/Hour	Stop Date/Hour	
ORDER # _____			Issued By:
<input type="checkbox"/> S            140°-240°			Instructions given to:
<input type="checkbox"/> SW            230°-250°	_ / _ / _	_ / _ / _	Remarks:
<input type="checkbox"/> W             240°-280°			
<input type="checkbox"/> NW            280°-340°	_ : _	_ : _	
ORDER # _____			Issued By:
<input type="checkbox"/> S            140°-240°			Instructions given to:
<input type="checkbox"/> SW            230°-250°	_ / _ / _	_ / _ / _	Remarks:
<input type="checkbox"/> W             240°-280°			
<input type="checkbox"/> NW            280°-340°	_ : _	_ : _	
ORDER # _____			Issued By:
<input type="checkbox"/> S            140°-240°			Instructions given to:
<input type="checkbox"/> SW            230°-250°	_ / _ / _	_ / _ / _	Remarks:
<input type="checkbox"/> W             240°-280°			
<input type="checkbox"/> NW            280°-340°	_ : _	_ : _	
ORDER # _____			Issued By:
<input type="checkbox"/> S            140°-240°			Instructions given to:
<input type="checkbox"/> SW            230°-250°	_ / _ / _	_ / _ / _	Remarks:
<input type="checkbox"/> W             240°-280°			
<input type="checkbox"/> NW            280°-340°	_ : _	_ : _	



**FIGURE 2  
 RECORD OF CLOUD SEEDING OPERATIONS  
 ANGELS CAMP OPERATIONS CENTER**

Date: \_\_\_\_\_

Order Number	Code Order			Start		Stop		Order Received
	S	SW	NW	Date	Time	Date	Time	By

Code Orders	Angular Sector	Agl Burners Operated
South	150 deg. to 225 deg.	1-3-4-7
Southwest	226 deg. to 250 deg.	1-2-3-4-5-6-7
Northwest	251 deg. to 325 deg.	5-6

Order Number	Actual Start		Actual Stop		Remarks
	Date	Time	Date	Time	

**FIGURE 3  
SILVER IODIDE BURNER MAINTENANCE LOG**

SITE: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

1. PILOT LIGHTS: BURNING - YES \_\_\_\_\_ NO \_\_\_\_\_  
COMMENTS: \_\_\_\_\_

2. PILOT GENERATORS: NO LOAD VOLTAGE: \_\_\_\_\_  
COMMENTS: \_\_\_\_\_

3. ATOMIZER:  
PROPANE SIDE: OPEN \_\_\_\_\_ PLUGGED: \_\_\_\_\_  
SOLUTION SIDE: OPEN \_\_\_\_\_ PLUGGED: \_\_\_\_\_  
COMMENTS: \_\_\_\_\_

4. AGI SOLUTION: FLOWRATE \_\_\_\_\_ GPH  
PUMP RPM \_\_\_\_\_

5. PUMP MOTOR: FUNCTIONS - YES \_\_\_\_\_ NO \_\_\_\_\_

6. SOLUTION PUMP: TUBING CHANGED - YES \_\_\_\_\_ NO \_\_\_\_\_

\*7. AGI SOLUTION LEVEL IN TANK: BEGINNING INCHES OF LIQUID IN TUBE: \_\_\_\_\_  
SOLUTION ADDED: - YES \_\_\_\_\_ NO \_\_\_\_\_  
FINAL LEVEL IN TANK: \_\_\_\_\_ (INCHES)

8. PROPANE: TANK GAGE NO. 1 \_\_\_\_\_ NO. 2 \_\_\_\_\_  
TANK IN USE: NO. \_\_\_\_\_

9. 12 VOLT BATTERIES: VOLTS \_\_\_\_\_  
COMMENTS: \_\_\_\_\_

10. SOLAR PANEL: COVERED \_\_\_\_\_ OPEN \_\_\_\_\_  
VOLTAGE OUTPUT: \_\_\_\_\_

11. RADIO RECEIVER AND TIMER: ON SIGNAL RECEIVED - YES \_\_\_\_\_ NO \_\_\_\_\_  
OFF SIGNAL RECEIVED - YES \_\_\_\_\_ NO \_\_\_\_\_  
TIMER FUNCTIONS - YES \_\_\_\_\_ NO \_\_\_\_\_  
COMMENTS: \_\_\_\_\_

12. PRESSURE RECORDER: CHART DRIVE FUNCTIONS - YES \_\_\_\_\_ NO \_\_\_\_\_  
PEN INKING - YES \_\_\_\_\_ NO \_\_\_\_\_

13. SHUT DOWN DEVICE: OPERATING - YES \_\_\_\_\_ NO \_\_\_\_\_  
TIMER COUNT \_\_\_\_\_ SECONDS

14. SITE CONDITION AS LEFT: OPERATIONAL - YES \_\_\_\_\_ NO \_\_\_\_\_  
COMMENTS: \_\_\_\_\_

15. SPARE PARTS USED: \_\_\_\_\_  
\_\_\_\_\_

\* PLEASE CLEARLY NOTE:

- A. On the cloud seeding burner chart, the date and time the chart was placed ON and taken OFF the recorder.
- B. Beginning inches of AGI liquid in tube, and final level in the tank after solution added.