

MINUTES - NORTH DAKOTA ATMOSPHERIC RESOURCE BOARD

NOVEMBER 1, 2022

Chairman Casey Veil called a meeting of the Atmospheric Resource Board (ARB) to order at 1:30 p.m., November 1, 2022.

Mr. Langerud introduced our new board member, Jessica Magilke, representing District VI.

ROLL CALL

Roll call was taken. Members present were Casey Veil, District V; Gail Yuly, District II; David Monson, District III; Chris Theisen, District IV; Jessica Magilke, District VI; Thomas Burke, District VII; John Paczkowski for Dr. Andrea Travnicek, Department of Water Resources (DWR); Kyle Wanner, North Dakota Aeronautics Commission; and Rebekah Pfaff, North Dakota Department of Environmental Quality.

Others present were Darin Langerud, Director; Kelli Schroeder, Program Manager; Mark Schneider, Chief Meteorologist; Daniel Brothers, Meteorologist; Jody Fischer, Weather Modification International (WMI); and John Suter, ND Weather Modification Association (NDWMA).

MINUTES

IT WAS MOVED BY MR. WANNER, SECONDED BY MR. MONSON, AND CARRIED ON A VOICE VOTE TO APPROVE THE MINUTES OF THE APRIL 21, 2022, MEETING AS DISTRIBUTED.

FINANCIAL STATUS REPORT

Ms. Schroeder reviewed the financial status report for the period ending September 30, 2022.

REVIEW OF THE 2022 NORTH DAKOTA CLOUD MODIFICATION PROJECT (NDCMP)

Project Overview

Mr. Langerud reviewed operations of the 2022 NDCMP, calling attention to WMI's Final Report Executive Summary.

In response to a question, Mr. Langerud explained that there were a lot of rain enhancement suspensions early in the summer due to ground conditions being adequately wet or too wet in some cases. The local county weather modification authorities chose to suspend those activities; however, hail suppression activities continued throughout the summer.

Cost Summary

Ms. Schroeder reviewed the cost report for the 2022 NDCMP. The project came in \$31,751 under budget.

Mr. Schneider reviewed incidents that caused our radar maintenance and parts category to be overspent by \$1,029. There were a couple of instances where the radar technicians had to make extra trips to the field due to server issues and high voltage power supply and modulator failures. Considering the cost of most radar parts, this overage is very small.

Ms. Schroeder, Mr. Langerud, and Mr. Fischer explained the new spending categories related to fuel surcharge and relief pilots that we cost shared with WMI to cover intern pilot vacations.

Seeding Agent Usage / Inventory

Mr. Schneider reviewed the ending chemical inventory and usage for the 2022 NDCMP.

In response to a question, Mr. Schneider indicated that the dry chemicals used to get the silver iodide into solution degrade after several seasons. However, those are the cheaper chemicals to purchase. We do try to use the oldest stock first to minimize these issues. When flares are deemed to be duds, Ice Crystal Engineering replaces duds at no cost to us. Mixed chemical solution is carried over to the next season. We have tested its effectiveness and found no material difference between previously mixed and newly mixed solutions.

Generator Performance

Mr. Schneider reviewed generator performance. In 2022, generators performed well – 2.35% failure rate. Our 10-year average generator failure rate is 2.30%. Penalties only apply at a 10% failure rate or greater.

In response to a question, Mr. Fischer indicated that WMI focuses on preventative maintenance by conducting a lot training in May for their captains to learn about the operation of the generators, what can go wrong, and how to fix common issues and cleaning expectations. WMI has also built up a supply of spare parts with each aircraft so that staff can swap the part out and continue with seeding missions and return later to clean or fix the generator.

To put this in perspective, Mr. Langerud added that WMI's generator success rate is 97.7% which is really very good.

Intern Programs

Ms. Schroeder reviewed the internship final report for the 2022 NDCMP. As of the end of the 2022 project, we have trained 402 intern co-pilots and 70 intern meteorologists. Of note, there were 17 applicants for five intern co-pilot positions this year – a good pool of students.

Mr. Schneider reported that they received 20-30 applicants each for intern meteorologist openings and radar meteorologists. Meteorologist applications are accepted from around the United States, but they are hoping to receive more applications from UND students.

UND Weather Research and Forecasting (WRF) Numerical Modeling

Mr. Langerud reviewed the WRF numerical modeling effort, which has been used on the NDCMP for several years. This has been a collaborative effort to improve numerical modeling for Western North Dakota through a model that is available to academia. Improvements are being made periodically.

Mr. Langerud reported that UND is doing some assessment of the WRF model effectiveness in the work that is under contract. This assessment will be going on during our off-season. There is UND student involvement in the WRF modeling. It is available 24/7 during project.

ARB RESEARCH & EVALUATION PROGRAM

Hail Retrieval Algorithm (HRA)

Mr. Langerud reviewed the HRA project, which was started by a scientist at the National Center for Atmospheric Research using dual polarization radar data to look at convective clouds and determine where in those clouds hail is occurring and what the size spectrum of those hailstones are. We had a graduate student from UND (Kyle Pederson - former NDCMP Radar Meteorologist) create a workflow process for the evaluation of seeded and non-seeded cases. Now, we would like to take that workflow process and have another UND graduate student (Lynnlee Rosolino - also former NDCMP Radar Meteorologist) use it to run several seasons of data for evaluation to see if there are any indications of hail suppression seeding effects.

REVIEW OF THE 2022 NORTH DAKOTA CLOUD MODIFICATION PROJECT (NDCMP) continued

Aircraft Operations & Contractor's Final Report

Mr. Langerud reviewed his memo to the board regarding liquidated damages recommendations. There were three cases reviewed but no penalties were recommended.

IT WAS MOVED BY MR. THEISEN AND SECONDED BY MR. MONSON TO APPROVE THE DIRECTOR'S RECOMMENDATION RELATED TO LIQUIDATED DAMAGES AS PRESENTED. THE MOTION CARRIED UNANIMOUSLY.

Mr. Langerud recommended the board approve the final contract payment to WMI.

Mr. Langerud reported on public relations opportunities our staff had at field sites. In addition, he noted that WMI facilitated a tour of the NDCMP for a delegation from the South Korea Meteorological Administration. They are interested in starting an operational weather modification program. The tour included Fargo, Bismarck, and Bowman.

IT WAS MOVED BY MR. MONSON AND SECONDED BY MR. THEISEN TO ACCEPT THE CONTRACTOR'S FINAL REPORT AND APPROVE THE FINAL CONTRACT PAYMENT. THE MOTION CARRIED UNANIMOUSLY.

WMI FOG DISPERSAL RESEARCH PERMIT EXEMPTION

Mr. Fischer reported on WMI's fog dispersal research activities last year. There were no fog opportunities. This winter, WMI does not have an aircraft or staff to do the research. They are hoping to have some opportunities to do some fog dispersal research using a drone at Ice Crystal Engineering in Kindred, which they have approvals for. This will be done in conjunction with UND, if the opportunity presents itself.

WEATHER RADAR OPERATIONS

Mr. Langerud briefed the board on operations of the Stanley and Bowman radars. The Bowman radar's non-NDCMP operations and maintenance are funded by eight counties (six southwest ND counties, one county in South Dakota, and one county in Montana) contributing \$24,000 per year. The Bowman radar data goes directly to our website. It is also converted to Level 2 data format for National Weather Service (NWS) use as well.

Mr. Langerud mentioned ARB's radar service contract with PACH Services of Bismarck. This contract will be ending on December 31st and a Request for Bid will begin the process for the next contract.

Mr. Langerud noted that we have put in an optional budget adjustment request in the DWR budget to replace the Bowman radar, which has been operating in Bowman since 1997. The radar itself was a 1974 NWS service model which still has some original parts in operation. We have made intermittent upgrades, mostly on software. But it is getting close to needing to replace the system. The DWR budget goes through review at the Office of Management and Budget (OMB) before being reviewed at the Governor's Office where they will decide if it is included in the Governor's budget request.

In response to a question, Mr. Langerud estimated the optional request for radar replacement to be \$1.8 million. This would be a one-time cost, like infrastructure. He noted that there had been internal agency discussion this past year when ARPA funds became available, but the request did not get forwarded. One of the major motivations for the requested upgrade to a dual polarization radar is to improve assessment of the cloud seeding program. This adds data about what types of particles are in the cloud – liquid, frozen, etc.

Both Bowman and Stanley radars were upgraded in 2009 with Vaisala, a company from Finland. The upgrades allowed us to operate the radars remotely, which allowed us to run Bowman radar year-round. There have since been software upgrades, but not hardware. So those components are now 13 years old. If the optional budget

adjustment is approved by the Legislature, some parts of the Bowman radar will be kept for spare parts for Stanley and the remaining must be sent to ND Surplus Property.

ARB COOPERATIVE OBSERVER NETWORK (ARBCON) REPORT

Growing season rainfall totals and grid maps

Mr. Brothers reported that we have 456 active rainfall observers with 189 that have volunteered for snowfall reporting. 165 observers report precipitation online. Mr. Brothers reported that our precipitation maps are available on our website.

In response to a question, Mr. Brothers indicated that volunteer numbers are decreasing but very slowly.

Pushing Remote Sensors (PRESENS) – 2022 site deployment

Mr. Langerud reviewed the DWR's PRESENS remote sensor suite that was developed by the DWR's Water Appropriations division for groundwater and surface water remote monitoring, including the 14 sites with weather sensors as shown on the map provided in the packet. The DWR is currently working on a public facing database interface.

In response to a question, Mr. Langerud indicated that he is also working with North Dakota State University NDAWN network to collaborate on this project.

2023 MEETING SCHEDULE

Tentative dates for 2023 board meetings were discussed. The spring meeting will be tentatively scheduled for Wednesday, April 12th. The fall meeting will be tentatively scheduled for Thursday, November 2nd.

ELECTION OF OFFICERS

Mr. Veil indicated that he will be resigning from the board before the next meeting and asked the members to consider this during nominations.

IT WAS MOVED BY MR. WANNER AND SECONDED BY MR. MONSON TO NOMINATE MR. THEISEN AS CHAIR. THE MOTION CARRIED UNANIMOUSLY.

IT WAS MOVED BY MR. THEISEN AND SECONDED BY MR. PACZKOWSKI TO NOMINATE MS. YULY AS VICE-CHAIR. THE MOTION CARRIED UNANIMOUSLY.

IT WAS MOVED BY MS. YULY AND SECONDED BY MR. WANNER TO NOMINATE MS. PFAFF AS SECRETARY. THE MOTION CARRIED UNANIMOUSLY.

Being no further business, the meeting adjourned at approximately 3:15 p.m.

CASEY VEIL
CHAIRMAN

CHRIS THEISEN
SECRETARY

Transcribed by Kelli Schroeder