

MINUTES - NORTH DAKOTA ATMOSPHERIC RESOURCE BOARD

NOVEMBER 2, 2023

Chairman Christopher Theisen called a meeting of the Atmospheric Resource Board (ARB) to order at 1:30 p.m., November 2, 2023.

ROLL CALL

Roll call was taken. Members present were Christopher Theisen, District IV; Gail Yuly, District II; David Monson, District III; Jessica Magilke, District VI; Thomas Burke, District VII; 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; Abby Ebach, DWR Director of Public Policy; and Jody Fischer, Weather Modification International (WMI).

MINUTES

IT WAS MOVED BY MR. WANNER, SECONDED BY MR. BURKE, AND CARRIED ON A VOICE VOTE TO APPROVE THE MINUTES OF THE APRIL 12, 2023, MEETING AS DISTRIBUTED.

Steve Kemp, District I, joined the meeting at about 1:35 p.m.

FINANCIAL STATUS REPORT

Ms. Schroeder reviewed the financial status report for the period ending August 31, 2023. She noted that in the Operations and Research program line, most of the expenses are incurred from March through September.

Mr. Langerud noted that the operations program salaries are at 21%, while we are only 2 months into the biennium. However, we will not have additional expenses over the winter and early spring and this percentage will then come back in line.

REVIEW OF THE 2023 NORTH DAKOTA CLOUD MODIFICATION PROJECT (NDCMP)

Project Overview

Mr. Schneider reviewed operations of the 2023 NDCMP. He explained the new mission categorization “dual” purpose seeding which includes cloud seeding for hail suppression and rain enhancement at the same time. This change is only for clarification, it is not an operational change.

In response to a question, Mr. Langerud explained that he and Mr. Schneider visit each participating county at a fall or winter meeting to review the project.

Dr. Travnicsek requested the board let DWR know if they have ideas to improve communication. There were a lot of questions and a lot of misinformation passed around during this last legislative session.

In response to a question, Dr. Travnicsek indicated that the DWR has a presence on Facebook.

Mr. Langerud noted though that we do not advertise on that Facebook page when our staff will be at various county commission meetings. These meetings are publicly noticed by these county commissions. ARB staff also meets with all participating weather modification authorities in early February to plan the upcoming project. The authorities will give public notice for these meetings also if they expect to have a quorum present. Finally, our field staff also participate in outreach during the operational program, such as county fair booths and local club presentations.

Cost Summary

Ms. Schroeder reviewed the cost report for the 2023 NDCMP. She explained that the top seeding flight hours expense overage was offset by the reduced need to use base seeding aircraft. She also noted that the budget overrun in building and equipment, utilities, and insurance is largely due to replacement of a vinyl shed for chemical storage with a steel cargo container in Bowman and insurance valuation increases.

In response to a question, Ms. Schroeder didn't recall North Dakota Insurance Reserve Fund (NDIRF) mentioning increasing reinsurance rates. Our rates are billed on an annual basis starting July 1. We did a lot of valuation increases. The biggest portion of our

premium increase was due to being allowed to value our radars at actual replacement cost. Previously, the ND Insurance Department did not allow that when they were administering the State Fire and Tornado Fund.

Mr. Monson noted that he has heard re-insurance rates are increasing by 40% for some. Also, a re-insurer in Wisconsin went out of business. He said to expect insurance costs to increase greatly.

Seeding Agent Usage / Inventory

Mr. Schneider reviewed the ending chemical inventory and usage for the 2023 NDCMP.

In response to a question, Mr. Schneider noted that we ask our staff to mark a flare with a marker when the flares won't light. Then we ask them to try the flare again but in a different position on the flare rack. Only after that, the flares are considered a dud. The manufacturer (Ice Crystal Engineering) is great about standing behind their product and reworking the flares at no additional cost.

In response to a question, Mr. Schneider mentioned that there has been a little bit of supply chain issues. Acetone can really fluctuate in price. We have typically waited out the high prices before purchasing when possible.

In response to a question, Mr. Schneider noted that silver iodide typically doesn't have many issues related to shelf-life. Ammonium iodide does and we try to use it up within 1-2 years. The flare manufacturer encourages using older flares first. We try to keep flares no longer than 3-5 years, when dud issues increase.

Generator Performance

Mr. Schneider reviewed generator performance statistics – a percentage of generator failure versus hours of generator usage. In 2023, generators had a 4.89% failure rate. With base seeders having fewer flight hours in total, it was more difficult to correct the failure rate this year. Our 10-year average generator failure rate is 2.36%. Penalties only apply at a 10% failure rate or greater, which hasn't happened since the early 2000s when the seeding solution formulation had more salts and didn't burn as easily.

Intern Programs

Ms. Schroeder reviewed the internship final report for the 2023 NDCMP. As of the end of the 2023 project, we have trained 407 intern co-pilots and 73 intern meteorologists.

The intern co-pilots worked a total of 2,201.75 hours this year. The intern meteorologists worked 1,350.03 hours this year.

Ground School was held May 24th through 26th for our summer field staff. We also had guests from Argentina and South Korea during Ground School.

Mr. Schneider encourages the University of North Dakota (UND) to have their meteorology students apply for our internship positions. He is hopeful for next year as he has heard that a couple of meteorologists will be in the Applied Weather Modification class in the spring semester.

UND Weather Research and Forecasting (WRF) Numerical Modeling

Mr. Langerud reviewed the WRF numerical modeling effort agreement which expires at the end of April 2024. This effort supports numerical weather modeling in support of our forecasting operations for the NDCMP. There are also efforts to evaluate the WRF model being developed at UND.

ARB RESEARCH & EVALUATION PROGRAM

Hail Retrieval Algorithm (HRA)

Mr. Langerud noted that we rolled the WRF agreement into an assessment that utilizes the WRF model as a component of an evaluation, assessing how cloud seeding is impacting hail. This effort is utilizing an algorithm written by the National Center for Atmospheric Research (NCAR) a few years ago that looks at dual polarization radar signatures and determines the size of hailstones in the clouds being studied (seeded versus unseeded).

Mr. Schneider and Mr. Brothers are preparing the radar data, running it through some processes to get it ready for analysis. Then, UND graduate student, Lynnlee Rosolino, will do the evaluation.

REVIEW OF THE 2023 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 four cases reviewed with one penalty recommended for \$1,689.20.

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

Mr. Fischer briefed the board on operations this summer.

Ms. Schroeder indicated that the digital copy of the final report will be uploaded to our web site after the meeting. Paper copies will be mailed to the board as soon as we receive them.

In response to a question, Mr. Langerud noted that we have good working relationships with the airports and their boards in the field. It has worked well having our King Air at the Watford City location.

In response to a question, Mr. Langerud indicated he wasn't aware of any other aviation impacts to our program. To date, there have also been no conflicts in District I and the Powder River Military Operations Area.

IT WAS MOVED BY MR. WANNER AND SECONDED BY MS. PFAFF 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 the last couple of years. This winter, WMI is 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. However, they expect a larger project the following year in conjunction with UND.

In response to a question, Mr. Fischer indicated that their sample size for the research is very small so far.

ADMINISTRATIVE CODE UPDATES FROM THE PASSAGE OF HOUSE BILL (HB) 1072

Mrs. Ebach reviewed the passage of HB 1072 from the 2023 legislative session. With this, there were associated impacts in administrative rules. The first change is to section 89-07-02-14 Application for permit, number 13. The text ", as required by North Dakota

Century Code section 61-04.1-35" should be deleted because the referenced section has been removed from Century Code. The second change is to number 15(g)(5), removing the duplicated word "other."

The DWR is updating other chapters of Administrative Code related to bills that passed this past session. Publication will be December 1st to start the public hearing and comment process. To include this change inside the larger DWR packet, Mrs. Ebach is requesting this board's approval to move forward with these changes.

IT WAS MOVED BY DR. TRAVNICEK AND SECONDED BY MR. BURKE TO APPROVE THE PROPOSED CHANGES TO THE NORTH DAKOTA ADMINISTRATIVE CODE SECTION 89-07-02-14. THE MOTION CARRIED UNANIMOUSLY.

Mrs. Ebach noted that the tentative hearing will be January 29th at 1 p.m.

ARB RESEARCH & EVALUATION PROGRAM (continued)

Hail Retrieval Algorithm (HRA) (continued)

Mr. Brothers reported that he and Lynnlee feel like they have resolved problems they were having with programming this summer and are now making good progress running the data through the program.

WEATHER RADAR OPERATIONS

Mr. Langerud briefed the board on operations of the Stanley and Bowman radars.

The Stanley radar was brought back in service in May in preparation for the project and everything worked fine. At some point after that, it took a lightning strike which fried several components. In trying to solve the issue, other components were plugged in without success. A few low-noise amplifiers (LNAs) burned out and the radar was down all summer. The replacement LNAs just arrived in our office. The radar technicians expect to go to Stanley this weekend to test them right away before shutting the system down for the winter. Our field staff was able to continue working without the radar due to a software program that can ingest data from the NEXRAD radars in Deering and Glasgow and the Williams County radar at the Williston airport. However, we were not able to display our flight tracks on the web for public consumption.

Mr. Langerud informed the board that we requested \$1.8 million to replace the Bowman radar with a new system and the legislature granted the funds. The Request For Proposal (RFP) closed October 24th. Four proposals were received. Mr. Langerud, Mr. Schneider, and Mr. Theisen will evaluate the proposals. He expects they will have a decision made on which vendor is chosen sometime next week. They will then get the vendor under contract and get an Invitation For Bid (IFB) for a new tower for the radar to sit on. The new radar is expected to be up and running by the end of 2024.

In response to a question, Mr. Langerud noted that we will be using the current radar in Bowman throughout the 2024 operations project.

In response to a question, Mr. Langerud noted that in the future, we may be able to utilize existing infrastructure without running the Stanley radar with software that might become available soon. However, we are not at that point yet.

ARB COOPERATIVE OBSERVER NETWORK (ARBCON) REPORT

Growing season rainfall totals and grid maps

Mr. Brothers reported that we have 415 volunteer observers. 158 observers report precipitation online. There are 163 volunteers reporting at least periodic snow depths and, in most cases, daily snowfall reports. Mr. Brothers reported that our precipitation maps are available on our website.

Pushing Remote Sensors (PRESENS) – 2023 site deployment

Mr. Brothers 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 and has been modified with atmospheric sensors. There are a total of 33 sites with weather monitoring equipment, 19 of which were deployed in 2023. There are close to 500 PRESENS sites statewide. The DWR is currently working on a public facing database interface.

In response to a question, Mr. Langerud noted that the PRESENS system was built internally in partnership with Amber Waves, a company in Richardton, to scale it up for manufacturing.

In response to a question, Mr. Brothers indicated that DWR's Water Appropriations technician crew installs and does maintenance on the sites that he stakes.

Mr. Langerud noted that each of these units can accept up to 12 inputs. So, there is opportunity to add a variety of equipment.

Dr. Travnicek indicated that the DWR has budgeted for additional units and are currently calculating how many to order.

Mr. Theisen discussed possible synergies with other industries.

In response to a question, Dr. Travnicek said that the DWR would be open to accepting cost share funding from counties or others regarding these sites. She will gladly accept any ideas the board has surrounding this.

2024 MEETING SCHEDULE

Tentative dates for 2024 board meetings were discussed. The spring meeting will be tentatively scheduled for Thursday, April 11th. The fall meeting will be tentatively scheduled for Thursday, November 12th.

ELECTION OF OFFICERS

Mr. Theisen called for nominations or volunteers. All current officers agreed to serve again.

IT WAS MOVED BY MR. WANNER AND SECONDED BY MR. BURKE TO NOMINATE THE EXISTING SLATE OF OFFICERS (MR. THEISEN AS CHAIR; MRS. YULY AS VICE-CHAIR; AND MS. PFAFF AS SECRETARY). THE MOTION CARRIED UNANIMOUSLY.

Mr. Theisen thanked the officers for being willing to fulfil those roles.

INTERNATIONAL COLLABORATION WITH KOREA METEOROLOGICAL ADMINISTRATION

Mr. Langerud reviewed collaboration our staff has had recently with the Korea Meteorological Administration (KMA). Five of their staff attended our Ground School in 2023 and three stayed a few extra weeks to observe operations. They then asked Mr. Langerud and Mr. Schneider to come to South Korea for additional collaboration, fully paid for by the KMA.

He discussed their schedule in South Korea and an atmospheric cloud chamber that is 30 cubic meters in size, 2 stories high, that can go down in pressure to 30 millibars. In this cloud chamber, KMA will be doing testing of all types of seeding agents and other

scientific work. The United States has not had a chamber to do this kind of testing since the late 1990s. We may want to have some seeding materials tested there.

Both Mr. Langerud and Mr. Schneider presented information to KMA about our operational program and cloud seeding for enhanced precipitation, in general. KMA views our program as a long-functioning, successful project to learn from. They are hoping to get a Memorandum of Understanding in place to document the future collaboration. Next summer, KMA will be sending PhD level scientists to work with Dr. David Delene at UND and visit our operational program. They also will be sending additional personnel to our Ground School next year and in the field for the first couple of weeks of project.

OTHER BUSINESS

Mr. Wanner asked if there had been any more efforts to fill the board's vacant seat in District V. Mr. Langerud noted that they had a couple of potential board members, but they all fell through. We have no one else we know in the area. Because there are no weather modification authorities in that area, the Governor can appoint anyone who lives in the area.

In response to a question, Mr. Langerud indicated that the makeup of the board has been set in North Dakota Century Code since its inception in 1976.

In response to a question, Mr. Langerud indicated that there has not been analysis of the board setup to see if it is the best structure for today. Dr. Travnicsek indicated she has thought about that as well as what other states are doing. Mr. Wanner indicated that he feels this is worth discussing and making recommendations to the legislature. He would be interested to see what the original intent was when the board was created. Mr. Theisen agrees that this is something that should be considered and potentially be an agenda item for the spring meeting. He would like to see information on how the board was set up and what it may take to make a change and what changes are recommended. Dr. Travnicsek indicated that the agency will look into this and hire out if needed.

Mr. Langerud introduced our new board member, Steve Kemp, representing District I.

IT WAS MOVED BY DR. TRAVENICEK, SECONDED BY MR. WANNER, AND CARRIED ON A VOICE VOTE TO ADJOURN THE MEETING. Being no further business, the meeting adjourned at approximately 3:41 p.m.

Chris Theisen

11/25/2024

CHRIS THEISEN
CHAIRMAN

Rebekah Pfaff

12/3/2024

REBEKAH PFAFF
SECRETARY

Transcribed by Kelli Schroeder