

## **MINUTES - NORTH DAKOTA ATMOSPHERIC RESOURCE BOARD**

### **NOVEMBER 8, 2018**

Chairman Tom Tupa called a meeting of the Atmospheric Resource Board to order at 1:31 p.m., November 8, 2018.

#### ***ROLL CALL***

Roll call was taken. Members present were Tom Tupa, Monte Hininger, Hank Bodmer, Casey Veil, Kyle Wanner, and Rob White.

Others present were Darin Langerud, Director; Kelli Schroeder, Business Manager; Mark Schneider, Chief Meteorologist; Daniel Brothers, Meteorologist; Jody Fischer and Michael Willette, Weather Modification International (WMI); and Keely Torgerson and Lance Gaebe, ND Weather Modification Association (NDWMA).

#### ***MINUTES***

**IT WAS MOVED BY MR. WANNER, SECONDED BY MR. BODMER, AND CARRIED ON A VOICE VOTE TO APPROVE THE MINUTES OF THE APRIL 11, 2018 MEETING AS DISTRIBUTED.**

#### ***FINANCIAL STATUS REPORT***

Ms. Schroeder reviewed the financial status report for the period ending September 30, 2018.

#### ***REVIEW OF THE 2018 NORTH DAKOTA CLOUD MODIFICATION PROJECT (NDCMP)***

##### **Project overview**

Mr. Langerud provided the board with a review of the 2018 NDCMP.

##### **Cost Summary**

Ms. Schroeder reviewed the cost report for the 2018 NDCMP. Both districts were under budget.

In response to a question from Mr. Tupa, Ms. Schroeder indicated that any line item that is over-budget can be offset by line items that are under-budget. We strive to keep the project totals under-budget.

### **Seeding Agent Usage / Inventory**

Mr. Schneider reviewed the ending chemical inventory and usage for the 2018 NDCMP.

David Monson arrived at 1:47 p.m.

### **Generator Performance**

Mr. Schneider reviewed generator performance. In 2018, generator performance came in at a record low of 0.90%. There is a graph on page 27 of the contractor's final report provided by WMI showing the 10-Year Generator Failure rate.

In response to a question from Mr. Tupa, Mr. Fischer indicated that our low generator failure rates are partially luck as machine parts occasionally break. WMI also conducts a lot of training on the generators before project starts and also at Ground School. Mr. Langerud noted two big changes during his tenure. First, the chemical formation was changed which helped improve the reliability of the solution to burn. Also, there were plumbing changes made to the equipment in the late 1990s, as Mr. Fischer mentioned. Those things, along with the focus on training, have improved the average failure rate (in the 1990s it was 16.5% and now averages 2.5%).

### **Intern Programs**

Ms. Schroeder reviewed the internship final report and activities for the 2018 NDCMP. As of the end of the 2018 project, we have trained 379 intern co-pilots and 59 intern meteorologists. She noted that qualifications for the pilot internship were loosened a bit this year due to low participation from pilots in the Applied Weather Modification class. Of 16 pilots in the class, only 6 applied for the internship. Therefore, we decided to open the internship up to other University of North Dakota (UND) student pilots who have or would soon have their multi-engine ratings. In the end, we hired 5 students from the Applied Weather Modification class and 4 others who had not taken the class.

Going forward, this will likely have to continue. Students who are in the Applied Weather Modification class or who have taken it in the past will be given preference in hiring. We will also continue efforts towards improving awareness of the program.

Mr. Wanner noted that the Freshman and Sophomore classes are larger at the University right now also. This is expected to continue, so the shortage of pilots may ease in a few years.

In response to a question from Mr. Tupa, Ms. Schroeder indicated that recommended changes from interns are considered and utilized whenever possible.

### **UND Weather Research and Forecasting (WRF) Numerical Modeling**

Mr. Langerud reviewed the WRF numerical modeling project. We are working on this project with UND Atmospheric Sciences division, mostly supporting student wages. UND is running mesoscale numerical weather forecast models on the domain in western North Dakota, specifically focused on forecasting for the operational summer cloud seeding project. There have been improvements of the modeling over this time.

### **Aircraft Operations & Contractor's Final Report**

Mr. Langerud reviewed his memo to the board regarding liquidated damages recommendations.

**IT WAS MOVED BY MR. WANNER AND SECONDED BY MR. HININGER TO APPROVE THE DIRECTOR'S RECOMMENDATION FOR LIQUIDATED DAMAGES IN THE AMOUNT OF \$1,535.20 TO BE APPLIED TO THE FINAL PAYMENT AS PRESENTED. THE MOTION CARRIED UNANIMOUSLY.**

Mr. Fischer indicated that their biggest challenge is pilot retention. They had one captain return with previous experience as captain. Three pilots were previous interns. The remaining 4 captains were new to weather modification. WMI is doing a significant amount of training to get everyone up to speed in time for project.

Mr. Fischer continues to recruit previous interns and also student pilots from Minnesota State University Mankato. Even though the Mankato students do not have the option to take a weather modification class, they end up with significantly more multi-engine hours than students at UND.

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

### **ISSUES FOR NDCMP 2019**

#### **Results of vote to continue weather modification in Burke County**

Mr. Langerud noted that Burke County Commission set up a 4-year trial cloud seeding program, which ran the last 4 summers. Then they planned to put the question of a permanent program to a vote. On Tuesday, the Burke County ballot measure to make their weather modification authority permanent failed by 4 votes, as it appears at this time. There are still a few more than 50 absentee ballots that have not been returned. So, there is a possibility that this could change.

Ms. Torgerson spoke with the Burke County Auditor this morning. The canvassing board will meet next Tuesday at 1 p.m. The ballot count will be final at that point.

In response to a question from Mr. Tupa, Ms. Torgerson indicated she was not aware of an effort to recount the ballots. Ms. Schroeder noted that the regulations for automatic recount indicate the vote must be within 0.25%. In this case, a recount would not be automatic.

Mr. Bodmer thought that this measure should have passed; however, he thought the public relations effort wasn't effective. He talked to a commissioner in the county and there was no talk about the weather modification ballot measure. Wind tower projects were more of a concern to residents. He also found a lot of people he talked to did not know about the measure.

Mr. Bodmer confirmed that the NDWMA sent out three mailings to residents in Burke County. He felt that mailings aren't as effective as public meetings and advertisements in the newspapers.

In response to a question from Mr. Tupa, Mr. Langerud indicated that if the measure remains defeated, Burke County will not be in the operations area next year and the local funding will cease as well. Burke County contributed \$47,600 in 2018.

Mr. Bodmer believes Ward County will be out of the project in 2020 also. The weather modification authority will be up for renewal at that time and he expects it will not be renewed. In addition, Ward County has also drastically cut the budget for weather modification for 2018 and 2019. He said the Ward County weather modification budget is less than 0.002% of the county budget.

In response to a question from Mr. Bodmer, Mr. Langerud said that in 2000 Williams County had a vote on weather modification in which 80% of the voters approved the permanent authority. Bowman County just voted in 2016 to continue the program, in which 70% of the voters favored the program.

Mr. Langerud noted that when a temporary authority is approved, the local water resource board takes on the duties of weather modification oversight during the 4-year period. He also noted that our office was not involved in lobbying for this measure. It is a local issue to decide upon.

Mr. Tupa asked Mr. Langerud to let the board know what the final results of the Burke County vote are after canvassing is completed.

In response to questions from Mr. Wanner, Mr. Bodmer indicated that he feels the opposition to this program in Ward County will be seeking to end funding for the program statewide. Mr. Langerud also indicated that he and Dr. David Delene from UND presented information at a public meeting held by the Ward County Farm Bureau and Extension Service. Mr. Schneider and Mr. Langerud also meet with each county commission after every project.

Mr. Bodmer indicated that the Ward County Weather Modification Authority, before the next resolution is due, is planning to get a listing of all the voters from the auditor's office. They will mail a letter explaining the benefits of weather modification asking the voters to sign an enclosed postcard in support of a county commission resolution to renew the authority for 5 more years which the authority will collect.

In response to a question from Mr. Hininger, Ms. Torgerson noted that the Burke County mailing was modeled after the Williams County mailing from 2010.

#### **Project planning and funding changes**

Mr. Langerud noted that once we know the final result in Burke County, we will have a better idea of what is required for planning. We meet with the authorities in January every year to plan for the upcoming project. At that meeting, we will have a draft budget to discuss with them.

#### **New contract for aircraft services**

Mr. Langerud reported that we have now finished the 3-year agreement with WMI for aircraft services. We will begin the procurement process so that we can get negotiations going for a new 3-year contract.

#### **Radar technician services**

Mr. Langerud indicated we are on our second year of a contract for radar technician services. Next fall, new contract negotiations will begin again.

### ***ARB RESEARCH & EVALUATION PROGRAM***

#### **Development of a polarimetric radar hail detection algorithm**

Mr. Langerud reported that we have the polarimetric radar hail detection algorithm code created by Dr. Paul Kucera, a study with a scientist from the National Center for Atmospheric Research (NCAR). This algorithm will integrate radar data from the Minot NEXRAD radar to discern where hail occurred based on this algorithm. We are doing a conversion of the code in our office to make it work better with our systems. Mr. Schneider has been downloading data from the National Centers for Environmental Information which has provided us a number of case days for our inventory. In the next few weeks, we will begin running this data through the algorithm.

We will run this tool every year after our season is over on the Minot raw data. It will give graphical information on where the hail occurred and what the size of the hail was that occurred in those locations. Over a period of time, we'll be able to get a significant number of seeded cases and non-seeded cases and then compare the statistics for the two areas to see if there is a difference in the amount and size of hail that has fallen from seeded and non-seeded clouds.

### **UND precipitation analysis of the NDCMP**

We have an agreement with UND through Dr. David Delene for a graduate student to do an evaluation of rainfall data from our volunteer rain gauge network spanning 43 years, looking at the effects of the NDCMP. This is a follow-on to a study done at UND by a graduate student in 2005 using a 27-year period of data. The final report is expected next summer.

### **North Dakota State University (NDSU) economic impact study of the NDCMP**

We have contracted with NDSU for an update to the economic study, which has been happening generally on a 10-year basis. This study will utilize the same methodology as the 2009 report, looking at incorporating what effects would be expected from increasing rainfall at 5% and 10% and corresponding reductions in crop-hail loss ratio of 45%, which the studies of our program have shown. It will benchmark what the economic results of the NDCMP are expected to be, looking at the period 2008-2017. The results are expected to be ready near the end of February; however, we expect a summary of key findings in time for legislative hearings.

Mr. Tupa indicated these research projects will provide good, current research data.

In response to a question from Mr. Bodmer, the figure of 45% reduction in crop-hail losses came from a study looking at 13 years of crop-hail insurance data, which was published in a scientific, peer-reviewed journal.

## **LEGISLATIVE SESSION**

### **2019-21 Budget**

Mr. Langerud noted that the Governor's budget guidelines came out this past summer. For the State Water Commission, it included a 10% cut in funding and 5% reduction in staff. He reviewed the budget information that was provided in the board meeting packets.

In response to a question from Mr. Tupa, Mr. Langerud indicated that the budget cuts will prevent us from giving salary increases for our temporary staff. There are areas where cuts are being made to operating, grants and research and development in addition to salaries and wages.

In response to a question from Mr. Wanner, Mr. Langerud indicated that we did not submit an optional budget.

Mr. Langerud noted that we are not anticipating legislation specific to our division, outside of the budget bills. However, we will monitor submitted legislation.

Mr. Monson suggested that during the legislative session we may want to stress that besides the benefit of increased rain and reduced hail, there is a huge benefit to UND's pilot and meteorologist students. If cuts are made to this program, costs for UND will

also go up. In addition, there are benefits to the communities the students are stationed in as they have to rent housing and purchase food, etc.

Mr. Langerud noted that he has also asked the scientist doing the economic benefit study to capture the benefits of these types of things as well.

Mr. Hininger indicated that this program has been a huge benefit to the Williams County area.

Mr. Tupa said that we need a list of all of the ancillary benefits this program provides to the State of North Dakota in the event that there is a movement in the session to defund the program.

### ***BOWMAN RADAR OPERATIONS***

Mr. Langerud briefed the board on radar operations in Bowman. Eight counties in southwestern North Dakota, eastern Montana and northwest South Dakota are sponsoring running the radar outside of NDCMP months. The counties are splitting the cost to run the radar for 8 months. The data displays on our website and updates every 5 minutes. The Bowman radar page has the most hits of all pages on the SWC website.

### ***2018 ARB COOPERATIVE OBSERVER NETWORK (ARBCON) REPORT***

#### **Status Report and Growing Season Rainfall Totals and Grid Maps**

Mr. Brothers provided the board with the June 2018 percent of normal rainfall map and April through September 2018 percent of normal rainfall map. He reported that we have 493 rainfall observers and 204 snow observers. Online reporting is at 168 observers.

#### **ARBCON mobile application**

Mr. Langerud informed the board about a new mobile application we have started to work on. It will primarily be for our volunteer observers and will allow precipitation reports to be submitted including rain, hail, and snow. There will also be precipitation maps, so the user will be able to view or review their own data. They will also have access to the Bowman and Stanley radar data through the application.

We are also hoping to be able to gain public reports of severe weather, primarily hail reports, to add to the hail data we have. We also would like to allow the user to take a picture of the hail and have the mobile software measure the hail in the photo. This is new technology that isn't quite yet perfected. This technology should improve in the near future.

In response to a question from Mr. Tupa, we are hoping to have this application developed before the end of the current biennium. Also, this product should be updated by SWC staff once delivered.

**SWC Pushing Remote Sensors (PReSens) – remote data collection**

Mr. Langerud reviewed the PReSens project that the SWC is currently working on to provide real-time water level and stream gage data. However, virtually any sensor can be connected including water level pressure transducers, soil moisture and temperature sensors, and various other atmospheric data instruments. Cooperation with SWC and other agencies could lead to more information for our precipitation network.

**2019 MEETING SCHEDULE**

Tentative dates for 2019 board meetings were discussed. The spring meeting will be tentatively scheduled for Thursday, April 11<sup>th</sup> via conference call. The fall meeting will be tentatively scheduled for Thursday, October 24<sup>th</sup> in Bismarck.

**ELECTION OF OFFICERS**

**IT WAS MOVED BY MR. BODMER AND SECONDED BY MR. HININGER TO CEASE NOMINATIONS AND CAST A UNANIMOUS BALLOT FOR MR. TUPA AS CHAIR. THE MOTION CARRIED UNANIMOUSLY.**

Mr. Tupa called for nominations for Vice Chair and Secretary.

**IT WAS MOVED BY MR. BODMER AND SECONDED BY MR. WANNER TO CEASE NOMINATIONS AND CAST A UNANIMOUS BALLOT FOR THE CURRENT VICE CHAIR (MR. VEIL) AND SECRETARY (MR. HININGER). THE MOTION CARRIED UNANIMOUSLY.**

Mr. White made note of other potential precipitation data sources such as the NDAWN network and the Agricultural Experiment Stations.

Mr. Tupa thanked Mr. White for his service and congratulated him on his upcoming retirement at the end of the month.

Being no further business, the meeting adjourned at approximately 3:42 p.m.



TOM TUPA  
CHAIRMAN



MONTE HININGER  
SECRETARY

Transcribed by Kelli Schroeder