

MINUTES - NORTH DAKOTA ATMOSPHERIC RESOURCE BOARD

APRIL 11, 2018

Chairman Tom Tupa called a telephone conference call meeting of the Atmospheric Resource Board to order at 9:30 a.m. CDT, April 11, 2018.

ROLL CALL

Roll call was taken. Members present were Tom Tupa, Hank Bodmer, David Monson, Garland Erbele, Kyle Wanner and Rob White.

Others present were Darin Langerud, Director; Kelli Schroeder, Business Manager; Mark Schneider, Chief Meteorologist; Daniel Brothers, Meteorologist; John Paczkowski, Assistant State Engineer, State Water Commission (SWC); Neil Brackin, Weather Modification International (WMI); and Lance Gaebe, ND Weather Modification Association.

MINUTES

Mr. Bodmer requested a correction to the last paragraph on page 1 of the November 16, 2017 minutes. In sentence that begins "The next day, he was informed by Mr. Neshem that the Commission voted 5-0 to suspend...", he requested the vote be corrected to 4-0 as one commissioner was absent.

IT WAS MOVED BY MR. ERBELE, SECONDED BY MR. BODMER, AND CARRIED ON A VOICE VOTE TO APPROVE THE MINUTES OF THE NOVEMBER 16, 2017 MEETING AS CORRECTED.

FINANCIAL STATUS REPORT

Ms. Schroeder reviewed the financial status report for the period ending February 28, 2018.

In response to a question from Mr. Monson, Mr. Langerud said that the federal fund authority has been carried for some time and we have had occasions where we've been able to apply for federal grant funding which fits into this category. We are not aware of any federal funds that are available currently. Those funds are only used for research, not operations. There is no dependence on those funds for any operational purposes.

In response to a question from Mr. Bodmer, Ms. Schroeder said that the \$191,776.88 county funds under revenue is the amount of county funds the board has received since July 1, 2017. Most of the 2017 North Dakota Cloud Modification Project (NDCMP) county funds arrived before July 1, 2017 and would therefore be included in the previous biennium's financial statement.

In response to a question from Mr. Tupa, Mr. Langerud responded that Federal funding has, in the past, been used to pay for research related to the program, however there

are no Federal funds currently available to request. The last time we received Federal grants was from the Bureau of Reclamation in 2004-2005. The Bureau currently doesn't have any funds set aside for this purpose.

IT WAS MOVED BY MR. MONSON, SECONDED BY MR. BODMER, AND CARRIED ON A VOICE VOTE TO ACCEPT THE FEBRUARY 28, 2018 FINANCIAL REPORT AS DISTRIBUTED.

2018 WEATHER MODIFICATION PERMIT APPLICATIONS & PUBLIC COMMENT

Mr. Langerud informed the Board that we published notice as required by statute for two consecutive weeks in the county newspapers in the target and adjacent counties in late February and early March with regard to the permit applications received from WMI. There was a 20-day period for the public to comment following the publication. With the last publishing date being March 9, 2018, the comment period ended March 29, 2018. Forty-eight comments were received during that time and provided in the board packets. In the board packet, Mr. Langerud provided and reviewed a summary of the comments, categorized by type of comment.

In response to a question from Mr. Tupa, Mr. Langerud said that the Board has been using the term "buffer zone" since he began working for the Board in 1991 and likely before. In the North Dakota Century Code (NDCC), it is included in what is referred to as the operations area.

In response to a question from Mr. Bodmer, Mr. Langerud noted that there were 48 total comments. In his summary, if the person listed multiple issues, they were counted once for each issue type. District 2 had a total of 15 comments.

Member Bobb Brewer arrived to the meeting at 9:50 a.m.

Mr. Tupa said that it appeared there were a handful of credible comments. He noticed that while they were critical of the project, none cited any valid scientific arguments in opposition to the project.

Mr. Langerud reviewed his recommendation to the board for District 1 as follows. *"Director recommends the Board approve the permit for the District 1 target area. In consideration of public comment, the Director recommends the buffer zone, 10 statute miles in width, external to the target area to the north and east be excluded from the operations area. Further, it is recommended that Woodberry township in Slope County, which is surrounded by the Slope townships participating in the program, be included in the operations area."*

In response to a question from Mr. Tupa, Mr. Langerud noted that on the map provided with his recommendation, the red area is the buffer zone that he recommends excluding from the operations area. This will affect the project area but not in terms of funding. It may reduce the number of flight hours being flown, though that would be minimal.

In response to a question from Mr. Tupa, Mr. Brothers noted that we have some rain gauge observers in that buffer zone. However, it would take many years of data to see how removing this buffer zone may affect the project.

In response to a question from Mr. Bodmer, Mr. Langerud agreed that the buffer zones to the east of the target area are rarely used because wind direction doesn't generally bring storms in from the east. Losing these downwind operations areas will have minimal effects to the project.

MR. BREWER MOVED TO ACCEPT THE DIRECTOR'S RECOMMENDATION FOR DISTRICT 1 AS OUTLINED IN HIS SUMMARY AND APPROVE THE WEATHER MODIFICATION PERMIT FOR DISTRICT 1 FOR WEATHER MODIFICATION, LLC, OF FARGO, ND. SECONDED BY MR. ERBELE. ALL MEMBERS VOTED AYE. THERE WERE NO NAY OR ABSTAIN VOTES AND NO ABSENCES. MOTION CARRIED 6-0.

Mr. Langerud reviewed his recommendation to the board for District 2 as follows. *"Director recommends the Board approve the permit for the District 2 operations area as publicly noticed. This includes the five-county target area and the 10 statute-mile buffer zone surrounding the target area in adjacent North Dakota counties. Public concern raised regarding funding is a local issue as referenced earlier in this document. Concerns over the science and benefits of the program do not align with the independent evaluations of the NDCMP."*

In response to a question from Mr. Bodmer, Mr. Langerud indicated that the recommendation for District II is to continue operating as we have in the past.

In response to a question from Mr. Tupa, Mr. Langerud agreed that the use of the downwind buffer zones is minimal.

In response to a question from Mr. Tupa, Mr. Bodmer indicated that their area will be fine with this decision. He feels that there is a lot more support than opposition for the program in Ward County.

MR. BODMER MOVED TO ACCEPT THE DIRECTOR'S RECOMMENDATION FOR DISTRICT 2 AS OUTLINED IN HIS SUMMARY AND APPROVE THE WEATHER MODIFICATION PERMIT FOR DISTRICT 2 FOR WEATHER MODIFICATION, LLC, OF FARGO, ND. SECONDED BY MR. MONSON. ALL MEMBERS VOTED AYE. THERE WERE NO NAY OR ABSTAIN VOTES AND NO ABSENCES. MOTION CARRIED 6-0.

NORTH DAKOTA CLOUD MODIFICATION PROJECT

Budget

Mr. Langerud reported on meetings with the district weather modification authorities in January. Budget details were reviewed at the District 2 meeting with options to deal with the Ward County reduction in funding. The group chose the option most similar to last

year, which included 6 aircraft, the radar in Stanley and all personnel required to operate. With the reduction in Ward County funding, the other counties agreed to increase their funding by 3.5%. Further, the counties agreed to apply \$75,000 in carryover funds from the 2017 project. The amount of seeding material needed was reduced because less was expended last year than expected due to the drought. Flight hours were also reduced from 630 to 600 hours. In District 1, the project is essentially the same as last year with a 3.5% funding increase from Bowman County.

County contracts

With permitting done, we will now focus on getting the county contracts prepared and signed.

WMI contracts

ARB is in the 3rd year of its 3-year agreement with WMI for aircraft and pilots. Providing counties choose to go forward with the program in 2019, we will begin working on procurement for a new contract. The procurement process follows State Procurement Office rules of advertising and notice through the state procurement website. Absent another contractor indicating they wish to bid, ARB would enter into negotiations with WMI.

Mr. Brewer left the conference call at 10:10 a.m.

In response to a question from Mr. Tupa, Mr. Langerud indicated there are two other companies in North America that do this work and have aircraft. However, each company has only one aircraft. Therefore, they cannot bid on our eight-aircraft project unless they would rapidly increase their fleet.

Staffing

Ms. Schroeder reported on having seven applicants for the nine intern co-pilot positions with the possibility that one may choose to drop out. Efforts will continue towards recruiting, including attending the UND SAMA Career Fair in April.

In response to a question from Mr. Tupa, Mr. Langerud noted that the airplanes operated in this program are not required to have two pilots. So, WMI's captains can perform the operations under FAA rules, solo. However, we prefer to have a co-pilot for additional safety and workload sharing. The airline industry is dynamic right now. There is a huge group of pilots hitting retirement age and airlines are hiring any pilot that has the minimum number of flight hours required by FAA for air transport pilot certification. There were 19 pilot students in the applied weather modification class and only six of those applied. Those students who didn't apply are staying at UND to flight instruct and earn more flight hours. They can get more flight hours doing that than working on the NDCMP.

To attempt to overcome this issue, we may encourage the students we hire who are also certified flight instructors to do flight instructing on off-hours in the communities

they are located. To enhance this opportunity, we may begin working with the local airport boards to setup a process where the airport board could advertise flight instruction opportunities. This would not be able to begin until 2019 due to timing.

In response to questions from Mr. Erbele, Mr. Langerud indicated that 1,500 hours is the usual requirement for pilots to qualify for the airlines. However, in some situations, there may be agreements between UND and some airlines that allow the airline to accept pilots with 1,200 hours due to the curriculum setup. There are other flight schools, but we do not have a Memorandum of Understanding (MOU) with them, as we do with UND. They also do not have weather modification coursework.

Mr. Wanner suggested changing the MOU with UND so that those who take the class have preference but others from UND can also apply.

In response to a question from Mr. Erbele, Mr. Langerud indicated he believes there are around 1,500 student pilots at UND. The coursework is not as critical to the students in regards to flying the aircraft. However, it is very important in regards to flying the planes in relation to the weather they are dealing with. There have been captains from WMI who do not have that coursework. In such cases, additional training is done by the contractor prior to the project.

In response to a question from Mr. Monson, Mr. Langerud indicated that Ms. Schroeder has been in contact with prior interns or prior students in the class. However, those attempts have fallen through for recruitment.

In response to a question from Mr. Tupa, Mr. Langerud indicated that our intern co-pilots are paid by the hour. They are paid for more than flight time, including administrative work, mixing chemical, doing inventory, and other tasks to earn work hours. We cannot pay them a flat salary rate due to requirements of the Fair Labor Standards Act, as they are non-exempt employees.

Mr. Schneider reported on meteorologist hiring. We typically receive 15-30 applicants for each set of meteorologist position types advertised. As of yesterday, we were able to secure our 3 radar meteorologists. This week, Mr. Schneider and Mr. Brothers will conduct interviews for intern meteorologist positions.

Housing

Mr. Schneider reported on housing opportunities for the 2018 project. We maintain a document of potential housing options and leave it to the staff to choose and finalize their housing.

In response to a question from Mr. Tupa, Mr. Schneider indicated he isn't seeing any change in housing options in Williston due to the recent uptick in oil patch activity.

Seeding agent and supplies procurement

Mr. Schneider reported that chemical bids are complete. Due to the drought and limited seeding activity last summer, we have a large flare inventory and did not need to purchase additional flares for this year. The bidding process is done for the rest of the chemical and should be received in the next month.

In response to a question from Mr. Tupa, Mr. Schneider indicated that the chemical with the shortest shelf-life is about two years. We make sure the oldest chemical is used first to minimize shelf-life issues.

COOPERATIVE OBSERVER NETWORK UPDATE

Mr. Brothers reported that there was net drop of three observers in the network. Our current total number of observers is 500. He reported that the Bismarck area is now about five inches of snowfall below average and will likely catch up to average soon.

In response to a question from Mr. Tupa, Mr. Brothers believes the rest of the drought areas are in a similar situation – slightly below average snowfall.

Mr. Monson suggested that the North Dakota State University (NDSU) research stations may be a good source of long-term precipitation data. Perhaps their data could be compared to our data and used to validate the downwind precipitation claims that the public are mentioning in the public comment period for the weather modification permit process.

Mr. Langerud noted that to his knowledge, we have not done any analysis using the data from the NDSU research stations. There have been studies using the National Weather Service (NWS) cooperative observer data, which numbers around 130 observers throughout the state. There has also been a study that has looked at ARB Cooperative Observer Network (ARBCON) data. This was a study done in 2005 by Eric Wise that looked at the effects of rainfall from seeding in the target area, downwind and with upwind control areas. Mr. Langerud indicated he has had discussions with Dr. David Delene at UND, and one of his Master's students is planning to do an analysis of rainfall using ARBCON data. This project would utilize the same methodology as the 2005 study by Wise, which included a 27-year period of data for that study. This study would include a 40-year period of data for analysis. We are hoping it will be started early this summer and have results by spring of 2019. Mr. Langerud offered to talk to the student's advisor and ask if incorporating the NDSU research station data might enhance that analysis. Perhaps that is something that can be used as a long-term control since the record of those stations would pre-date a lot of the ARBCON stations, which go back to 1977.

Mr. Langerud also mentioned that the Appropriations and Information Technology Divisions of the SWC are working on a remote monitoring system. The original genesis of this is to be able to remotely monitor ground water levels around the state. This incorporates a computer board that has the ability to collect data from a variety of different sensors. It has a modem that would connect to a cellular network and transmit that data directly to our database here in Bismarck. Mr. Langerud has been participating in the discussions and development of the project. We are looking at the possibility of

incorporating other sources of data such as temperature and pressure data that already come with the water monitoring levels, as well as the possibility of incorporating precipitation gauges. There are varying types of gauges being considered including something as simple as a tipping bucket gauge to measure summer precipitation or sensors that use acoustic methodologies to measure the sound of drops and snowflakes hitting a metal sensor, and others that use short-wave radar that measure precipitation rates. There are other types of data that could be collected as well including wind, humidity data, solar information, soil temperature and moisture data. There is almost an endless variety of types of data that this system can accommodate and transmit. We are looking at this option to augment the existing data that we are collecting from ARBCON volunteers. This could potentially be used in the future for doing more evaluation and analysis of the NDCMP.

In response to a question from Mr. Tupa, Mr. Langerud indicated that it may be possible to ask some of our current ARBCON volunteers to have this sensor setup on their site. In this case, instead of a cellular connection, they could possibly get the data wirelessly transferred to a module that would be inside their homes and connect to their WIFI to transmit the data back to us. In this case the volunteer can have access to that data directly on their computer.

Mr. Langerud noted that the SWC believes it can get the cost down to less than \$300 per device. The cost of the sensors would be in addition to the datalogger and would depend on the location of the logger and purpose of the deployment. Development and testing is currently ongoing.


Mr. Tupa mentioned that he saw a story on the news last night featuring Mr. Langerud talking about the Bowman radar and how it fills the NWS coverage gap in that area. For those people who are opposed to the NDCMP, they may not realize the peripheral benefits offered by ARB, such as the Bowman radar. Mr. Tupa said that Mr. Langerud's report was well done.

Mr. Monson mentioned that budgeting for state agencies should be starting soon for the 2019-2021 season. He recommends getting anything that is really desired into the Governor's Budget. Mr. Erbele noted that they've gotten notifications that budget guidelines are coming in the next couple of weeks.

Mr. Langerud also discussed a final tool expected soon from a scientist at the National Center for Atmospheric Research (NCAR). An algorithm is being developed using radar data from the Minot NEXRAD NWS radar. It will be doing an analysis of hail – on the ground and also in the clouds – including where it's occurring and getting an idea of size categorization of the hailstones. We hope to be able to use this tool over a period of time looking at the differences in hail location, hailfall and hail size spectra in seeded clouds on the cloud seeding project in Ward and Mountrail Counties versus areas downwind where clouds are not seeded. We're hopeful that tool will help us better evaluate the effectiveness of hail suppression seeding into the future. ARB staff will run through the data every fall after the convective season is over and start compiling cases year to year. We will get a presentation from the researcher at the Weather Modification Association annual meeting in Colorado in a few weeks. We hope to take delivery of the tool shortly thereafter.

In response to a question from Mr. Tupa, Mr. Langerud believes this will be implemented late this fall using the 2018 data.

Being no further business, the meeting adjourned at approximately 10:48 a.m.



TOM TUPA
CHAIRMAN



MONTE HININGER
SECRETARY

Transcribed by Kelli Schroeder