

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

**OCTOBER 27, 2008**

Chairman Henry Bodmer called the meeting of the North Dakota Atmospheric Resource Board to order at 1:30 p.m., October 27, 2008 in the Lower Level Conference Room, State Office Building, Bismarck, ND.

## ***ROLL CALL***

Roll call was taken. Members present were Henry Bodmer, Bobb Brewer, Ervin Opsal, David Hagert, John Bollingberg, and Steven Weber.

Others present were Darin Langerud, Director; Mark Schneider, Chief Meteorologist; Kelli Schroeder, Business Manager; Hans Ahlness, Weather Modification, Inc. (WMI); Jay Sandstrom, Mountrail County Weather Modification Authority; and Mike Dwyer, North Dakota Weather Modification Association.

## ***MINUTES***

**IT WAS MOVED BY MR. BOLLINGBERG, SECONDED BY MR. OPSAL, AND CARRIED ON A VOICE VOTE TO APPROVE THE MINUTES OF THE MARCH 31, 2008 MEETING AS DISTRIBUTED.**

## ***FINANCIAL STATUS REPORT***

Ms. Schroeder reviewed the financial status report for the period ending September 30, 2008. There were no further questions.

## ***BUDGET FOR 2009-11 BIENNIUM***

Mr. Langerud noted that the Governor's guidelines for the 2009-11 biennium budget requests were to be 100% of the current biennium budget for general fund. Mr. Langerud submitted a budget for 100% of general, federal and special funds that are currently appropriated for the Board.

In the current biennium, the Board has not received federal funding. However, it has in the past for research through the Bureau of Reclamation. The federal funding appropriation gives us the authority to receive up to 1.5 million dollars of federal funds during the biennium for research purposes.

There is some uncertainty relating to funding for the upcoming biennium due to measures on the ballot. These measures could affect the permanent oil trust fund and income tax receipts.

## **2008 NORTH DAKOTA CLOUD MODIFICATION PROJECT (NDCMP)**

### **Cost Summary**

Ms. Schroeder reviewed the cost report for the 2008 NDCMP.

There was discussion relating to chemical being over budget. This was primarily due to silver iodide and higher silver prices. Silver iodide cost was 78.3% higher than last year.

Further discussion centered on purchasing chemical at different times in hopes of buying the chemical at its lowest price. County contracts are not usually signed until later in the spring. We could accelerate the buying process, but with the risk that a county might not participate. We typically have a good idea about county participation after we meet with the authorities in January.

In response to a question relating to flight hours being under budget, Mr. Langerud explained that the aircraft lease costs are fixed. The flight hour costs are directly proportional to the number of hours we operate.

The final note on items over budget was under buildings, equipment, utility and insurance. We purchased a standby generator for the Stanley radar, which we applied to this category.

### **NDCMP RADAR UPGRADES**

#### **Stanley auxiliary power unit (APU)**

Mr. Langerud reported that our previous generator in Stanley had been in use for 10 years. We had problems with it last year. The power coming out was surging, which the computers weren't handling well. Interstate Diesel looked at the generator and felt it was the mechanical governor causing problems. However, there isn't a good fix for it. We replaced the unit with another that has an electronic governor, which provides more stable power.

## **2008 ND CLOUD MODIFICATION PROJECT (continued)**

### **Seeding agent usage / inventory**

Mr. Schneider reviewed the chemical inventory for the 2008 NDCMP. 135 kg of silver iodide was used for this season. This is close to average for the past 5 years. Page 26 of the Final Operations Report contains a table displaying this data for the past 5 years.

Dry ice usage this year was 2,319.19 pounds. Again, page 26 of the Final Operations Report contains a table displaying this data for the past 6 years. Considerable reduction in dry ice usage for the past 2 years has been attributable to more efficient use of dry ice and also a switch from ½ inch pellets to ¼ inch pellets last summer. Even with decreasing the amount of dry ice usage by ½ or even ⅓ from previous years, you still get more ice nuclei with the ¼ inch pellet than the ½ inch pellet. Additionally, there was

less rain enhancement seeding opportunities, which also contributes to less dry ice usage.

Based on current inventory, we will probably order 200 units of dry chemical next year, as compared to 150 units last year. This should keep the inventory high enough in case of a year with more seeding opportunities.

Mr. Schneider reviewed flare inventory. More burn-in-place flares were used this year. We could purchase additional flares should there be excess funding left over at the end of the biennium.

Generally, excluding silver iodide, we saw approximately a 10% increase in chemical cost compared to last year. The cost increase was mainly due to higher transportation costs. Due to the large inventory that we were able to start the 2008 season with, we only purchased 150 units of silver iodide. In a typical year, we would purchase 300 or 350 units.

### **Generator performance**

Mr. Schneider reviewed generator performance. The average failure rate over the last 5 years is 3.9%. In 2008, there was 4.9% failure. This is not unusually high. According to the contract, penalty for generator failure does not start until the failure rate reaches 10%.

There has been significant improvement in generator performance in the last decade. This is largely due to WMI re-engineering the generators and the Board moving to a seeding solution with less sodium perchlorate. This reduced the amount of dissolved solids in the solution, allowing it to burn more easily. The change did not have a negative impact on the performance of the solution in producing ice nuclei.

### **Intern Programs**

Ms. Schroeder reviewed the intern program. This year, there were 9 intern pilots and 3 intern meteorologists. The 3<sup>rd</sup> meteorologist position was added to provide forecasting experience from the Bismarck office. All interns rotated through each of the three locations.

Ms. Schroeder visited the field locations in early June. All seemed to be going well. In early August, Ms. Schroeder and Mr. Schneider visited the field locations to review performance evaluations and intern program evaluations.

With the intern program evaluations, the interns are asked for suggestions to improve the program. This year, as in the last, the main request was for the Board to secure housing for project personnel due to the housing shortage and high housing costs.

The Board and University of North Dakota are trying to promote the pilot internship by letting the students know that they have the opportunity to participate in the internship if they complete both – fall and spring – weather modification classes. The pilot internship

program is solely funded through state funds. In fact, that cost is not even reflected on the cost report presented earlier.

There was discussion regarding intern pay and hours. Mr. Langerud requested a 100% budget as directed by the governor, but in that, he planned for an increase in intern pay totaling around \$8,000 for the biennium.

Further discussion centered on whether the low pay was reducing the number of applicants. It is felt that is not the case for pilot interns, as they are doing the internship for experience and logged flight hours. It may be the case for intern meteorologists, as this only provides them experience. Most meteorology interns are from out of state and often have travel expenses to get here as well. All interns can apply for college credit for the internship, but then they are also required to pay tuition to the colleges.

### **Aircraft Operations**

Mr. Langerud reviewed the flight log data on pages 29 through 32 of the Final Operations Report. WMI put a flare rack on the District I Cessna 340 to provide more flexibility to the District at a relatively modest cost. They only asked that when it was used for cloud top seeding, we pay a modified cloud-top flight hour rate. There were a few instances where we were able to use the cloud top seeding in 2008.

Mr. Langerud reviewed the contract clause, which requires aircraft to be operational. He noted that there were seven incidents reviewed this year where aircraft were unable to launch due to mechanical issues, the pilots were unable to fly for other reasons other than safety, or having to leave a seeding mission earlier than normal due to mechanical issues. He recommended taking 3 penalties in the amount of \$2,678.70 for the incidents on June 14 with Seed 2, July 19 with Seed 2, and July 23 with Seeds 4 and 5.

Mr. Ahlness explained in further detail what happened on each instance.

**MR. BREWER MOVED TO ENFORCE ONE PENALTY FOR THE JULY 23<sup>RD</sup> ISSUE WITH SEEDS 4 AND 5 IN THE AMOUNT OF \$892.90. THE MOTION WAS SECONDED BY MR. BOLLINGBERG. MEMBERS MR. BREWER, MR. OPSAL, MR. HAGERT, MR. BOLLINGBERG AND MR. WEBER VOTED AYE. THERE WERE NO NAY VOTES. THE MOTION CARRIED.**

At approximately 3:00 p.m., Mr. Bollingberg had to leave. A quorum remained.

### **Contractor's Final Report**

Mr. Ahlness reviewed the contractor's Final Operations Report.

**MR. BREWER MADE A MOTION TO AUTHORIZE THE FINAL CONTRACT PAYMENT TO WEATHER MODIFICATION INC. IN THE AMOUNT OF \$74,293.10. SECOND BY MR. OPSAL. MEMBERS MR. BREWER, MR. OPSAL, MR. HAGERT, AND MR. WEBER VOTED AYE. THERE WERE NO NAY VOTES. MOTION CARRIED.**

***ELECTION OF OFFICERS***

Mr. Bodmer called for nominations for offices.

**MR. BREWER MOTIONED TO LEAVE ALL OFFICES AS IS, CEASE NOMINATIONS AND CAST A UNANIMOUS BALLOT. SECOND BY MR. OPSAL. ROLL CALL VOTE WERE AYES: MR. BREWER, MR. OPSAL, MR. HAGERT, AND MR. WEBER. THERE WERE NO NAYES. MOTION CARRIED.**

**MR. BODMER NOMINATED MR. HAGERT FOR SECRETARY-TREASURER OFFICE. SECOND BY MR. BREWER. ROLL CALL VOTES THAT WERE AYES: MR. BREWER, MR. OPSAL, MR. HAGERT, AND MR. WEBER. THERE WERE NO NAYES. MOTION CARRIED.**

At approximately 3:30 p.m., Mr. Brewer had to leave. A quorum no longer existed.

***POSSIBLE CHANGES / UPGRADES FOR 2009 NDCMP***

***Turbo-prop top-seeding aircraft and change task of the Minot top-seeder***

Last year the staff and District II weather modification authorities discussed transitioning from a Cessna 340, which is a piston-engine twin for cloud-top seeding, to a turbo-prop cloud-top seeder. There is interest among the authorities in doing that. From a budgetary standpoint, it looks feasible. We are under contract yet with WMI for one more year of our three-year contract, which is priced for twin-engine piston airplanes. There is the possibility that could be amended if WMI has equipment available.

If we would be able to work out an amendment to our contract and the aircraft is available, the Williston Cessna 340 would be swapped out for a turbo-twin and the Minot airplane would be transitioned to more of a base-seeder. It also could be a hybrid cloud-base seeder, like we have in Bowman -- a Cessna 340 without the ice hopper, but with flare racks and capability of high altitude operations -- yet more dedicated to flying cloud-base. It appears that we could make this change without increasing the total cost.

***Proposed expansion of Air Force Powder River Training Complex***

Mr. Langerud mentioned the proposed expansion of the Air Force Powder River Training Complex. This expansion would increase the training area 3 times the current size. The Air Force is asking for airspace from 500 to 60,000 feet above ground level. This expansion could possibly affect our cloud seeding efforts in District I.

The Air Force had scoping meetings and will have to do an environmental impact study. We took the opportunity to collect information on their plans and submitted a letter to the Air Force listing our concerns. Other interested parties did the same, such as North Dakota Aeronautics Commission. WMI expressed concerns at a scoping meeting in Bowman this summer.

### ***Housing for temporary personnel***

Mr. Schneider reviewed housing issues in Stanley, Williston, Watford City, and Bowman. He spent time this spring trying to find housing for the temporary employees to secure. He has found it works best to try tracking down apartments and then passing on contact information to temporary employees to make a decision on securing it. WMI also helped staff find housing.

## **ARB RESEARCH & EVALUATION EFFORTS**

### **Polarimetric Cloud Analysis and Seeding Test 2 (POLCAST2)**

Mr. Langerud reviewed the POLCAST2 operations. The randomized cloud seeding project that tested hygroscopic flares over northeastern North Dakota ran from June 9, 2008 through July 11, 2008 in cooperation with National Center for Atmospheric Research, University of North Dakota, WMI, and Ice Crystal Engineering. We hope this will be a long-term recurring research project in order to get significant statistical results. The project produced 7 seeded and 6 non-seeded cases.

### **Research Paper To Be Published**

There is going to be a paper published in the Journal of Applied Meteorology and Climatology entitled 'Preliminary Investigation of the Variability of Cloud Condensation Nuclei Concentrations at the Surface in Western North Dakota'. Dr. Andy Detwiler, South Dakota School of Mines & Technology is the lead author. Mr. Langerud and Tracey Depue, a former NDCMP meteorologist, are co-authors. The paper focuses on the surface measurements of cloud condensation nuclei spectra in Bowman and Stanley radars during the 2004 and 2005 seasons. Some of the work was done with funding from the Bureau of Reclamation.

### **NDCMP Economic Study update**

Mr. Langerud reported on a contract in place with Dr. Dean Bangsund and Dr. Larry Leistritz at North Dakota State University for an update of our publication, *Economic Evaluation of the North Dakota Cloud Modification Project*. The last study was done in 1998. The study will look at rainfall enhancement benefits and hail suppression benefits to crop development in the cloud seeding areas. It will also consider what the prospective benefit could be if the program was applied state-wide on the 8 most common crops grown in North Dakota including all varieties of wheat, barley, flax, sunflower, beans, corn, and canola. The study will be completed by year's end and be available for district planning meetings in January.

### **Congressional Legislation For Weather Modification Research**

Mr. Langerud reported that North American Interstate Weather Modification Council has been working on legislation to implement a federally funded weather modification research program with state funded cost share. As of today, none of the legislation put forth has passed. We'll keep working towards this end.

## **ARBCON UPDATE**

### **Growing season rainfall totals and grid maps**

Mr. Schneider distributed copies of precipitation maps and reported on the efforts of the Board's Cooperative Observer Network. He noted that 763 members signed up this year and 694 actually reported. Williams, McKenzie, Mountrail, Slope and part of Bowman counties all had rainfall deficits this year.

### **Status on online reporting**

Mr. Schneider noted that 74 observers reported online in 2007 and 105 observers reported online in 2008 – a 42% increase. Internet reporting is valuable, not only because it reduces the amount of work required in the agency, but also because it provides various groups access to more real-time rain measurements across the state.

### **Collaboration with the State Climatologist on CoCoRaHS**

Mr. Langerud reported on our partnership with the North Dakota State Climatologist to collaborate with his office on a system called Community Collaborative Rain, Hail and Snow Network (CoCoRaHS). This is a year-round precipitation-reporting network started by the Colorado State Climatologist. All reporting will be done via the Internet. The database is in Colorado, but we have access to it. We believe it will be complimentary to the ARBCON network because more people are requesting snowfall and snowpack data. North Dakota's participation in CoCoRaHS officially begins November 1<sup>st</sup>.

### **NDCMP RADAR UPGRADES (continued)**

Mr. Langerud noted that the Board has operated radars in Bowman and Stanley for the last 10 years or so. They used to be leased from WMI annually and were mobile thereby requiring setup and takedown yearly. The Board's radars became available from Government Surplus Property when the new National Weather Service Doppler radars were put in place. The Board purchased three, setting two up and keeping the third for spare parts.

Upon comparing actual cost versus calculated lease costs including 3% inflation, the Board has spent \$366,000 over the last 12 years maintaining the radars. Whereas, our calculated lease costs over the same amount of time would have been \$978,000.

Mr. Langerud briefed the Board on our recent Request For Proposal to upgrade the two radars by the beginning of the next project.

### **Evaluation of proposals for WSR-74C upgrades / timetable**

Mr. Schneider explained the benefits of upgrading our radar. Benefits include: being able to see the wind field in a storm; receivers have better sensitivity; remote control of radar and calibration; better software analysis ability for our office and the field meteorologists; enhanced data-sharing capabilities; and potential for reduced maintenance costs. Vaisala was the successful vendor. Notice of intent to award the bid was published October 21, 2008. There must be a 7-day period to allow for protest of the award. We expect to be signing the contract on November 4<sup>th</sup>, assuming there is no protest. The basic upgrade bid was \$353,200 for both radars. We have been fortunate enough to have enough state funds to pay for the upgrade – no county funds will be required.

Software will be placed at both radars and the Bismarck office so that we can operate the radar unmanned, if necessary. This could provide an additional benefit in that we would potentially be able to provide county emergency managers direct access to our data for little cost, without having to wait for the delayed Internet feed that we provide currently. This may be especially useful in southwest North Dakota where National Weather Service radar coverage is not great. County emergency managers could obtain a free license to receive our data and interact with it in a limited fashion. Dean Pearson has been talking with us about Bowman County Emergency Management testing this. Perhaps, with just a little county funding, we could partner with the counties April through September or all year.

Once the contract with Vaisala is signed, we will have a 1-year warranty. Near the end of that period, we will want to consider an extension for the warranty and also a support contract. Vaisala is from Helsinki, Finland. They purchased Sigmets Corporation -- a corporation with 30 years experience building radars and considered the standard in the field. We are working with the Boulder, Colorado Sigmets branch. They also have an office in Massachusetts.

The question was asked if the meteorologists would ever be based in Bismarck, due to the capability of running the radar remotely. Mr. Langerud indicated it would present an issue for radio communications with the pilots and weather watch responsibility would fall on pilots alone.

We will continue use of TITAN software, which can interface with the provided IRIS software. The upgrade will be a one-time purchase. But the system will be capable of receiving upgrades in the future should we be able to and desire to fund that.

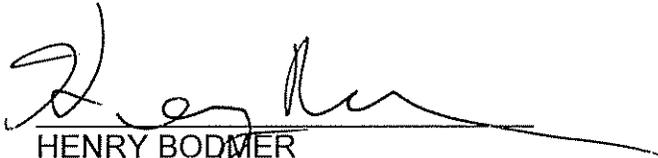
### **Development of TITAN products**

Mr. Schneider noted that TITAN is analysis and display software. With 10 years of project data on TITAN, he will be using the data to determine a storm climatology for the project areas and use that to increase the field meteorologists' knowledge during Ground School.

***ELECTRONIC RECORDKEEPING AND ARCHIVAL***

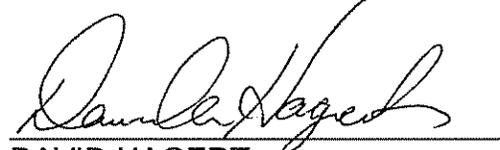
Ms. Schroeder reviewed progress on digitized minutes and plans to digitize and index a catalog of research reports that are stored in-house and at State Archives.

Being no further business the meeting adjourned at approximately 4:30 p.m.



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HENRY BODMER  
CHAIRMAN



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DAVID HAGERT  
SECRETARY-TREASURER

Transcribed by Kelli Schroeder