



**m i n d s**

[www.engineering.sdstate.edu/~physics/wx\\_minds/index.htm](http://www.engineering.sdstate.edu/~physics/wx_minds/index.htm)

**President's Message**  
By Larry Browning

Hope all is well with you this year. It may seem like a long time since our last meeting, but everyone was still at work. Joanne had scheduled a meeting for March so we skipped the February meeting in favor of meeting in Brookings with the Civil Air Patrol. That's why it has been a while.

I have several things to report to you. First the officers are the same as last year thanks to some fast talking and willingness to help. That is to say Joanne Anderson is Vice President, Brian Karstens is Treasurer, and Tim Masters is secretary for 2003. Thanks to all of you for your help. Also Mike Dirksen puts our newsletter together and Bryan Ruby is our web master. These are all valuable to our organization. I want to emphasize that none of these jobs should be a burden. I feel part of our purpose is to provide a chance for us to get together and socialize, learn something new, and have a good time without anyone being unduly inconvenienced. There are a lot of us willing to help if someone feels that their job has gotten to be too big - just let someone know. Also, I hope everyone keeps this in mind next year when it comes time to select new officers. And don't forget, dues are due at the next meeting.

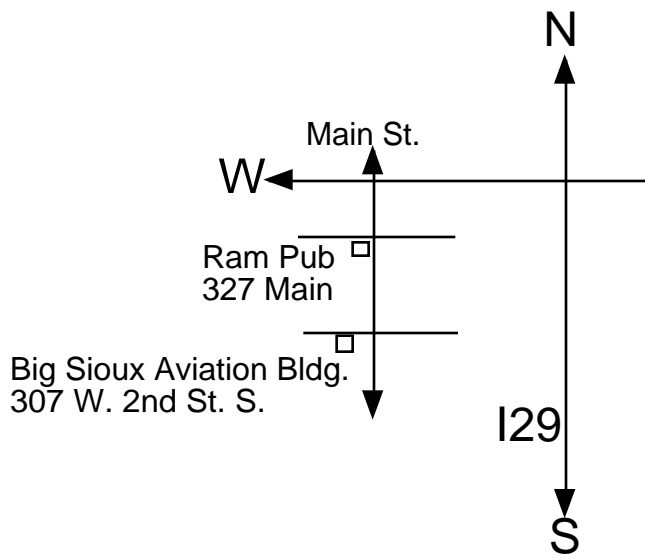
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**Weather MINDS**

Minnesota - Iowa - Nebraska - DakotaS

**Weather MINDS**  
**meeting Thursday,**  
**March 13, 2003**  
**5:30 PM at Ram Pub restaurant**  
**for dinner (map below) then 7:00**  
**PM at the Big Sioux Aviation**  
**Bldg. in Brookings.**

Speakers at the March WxMINDS meeting will be members of the Civil Air Patrol in Brookings. They will have the CAP Color Guard doing a Flag Ceremony and then talk on how weather effects their search and missions and the equipment they use during their missions.



The science fairs are coming up. Mitchell is Tuesday, March 25, and Brookings is Friday, March 28. If you are interested in judging, let us know. I believe Art Umland is planning on judging at both, and Tim Masters is also planning on judging at Brookings. We can discuss this at our March meeting. Also, we had hoped to order AMS caps for the winners but when I contacted AMS they did not have any (although they hope to have some in the future). After consulting everyone I could think of by e-mail, I ordered umbrellas for prizes. I hope that's OK. They should be here by our next meeting.

I talked to Julia Berg a little while ago. She called to let us know about a public talk by astronaut Karen Nyberg in Aberdeen on March 4. If you have any questions, or you just want to say "Hi" to Julia, she can be reached at: julia.berg@noaa.gov.

Hope to see all of you soon.  
Larry



## **Weather MINDS Minutes November 12, 2002** **By Tim Masters**

At our last meeting at 7 pm on November 12, 2002, Weather MINDS hosted Dr. Charles H. Ullery in the library at the National Weather Service Office in Sioux Falls, South Dakota. Dr. Ullery is an Extension Specialist and Professor of Biosystem Engineering at South Dakota State University in Brookings. He gave a presentation titled "OFFSET: Model for Estimating Odor Control Setback Distances for Livestock Operations." OFFSET (Odor For Feedlots Setback Estimation Distance) is a computer model that uses dispersion software to simulate dispersion of airborne odors.

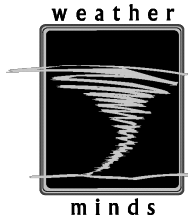
First, he discussed the causes of odor from feedlots. What people complain about are the volatile organic compounds, ammonia, nitrogen heterocycles, and sulfur compounds that are brought about by the farm buildings, storage buildings, and land application practices on these large operations. Most of these odors come from the animals, feed, dust, pathogens, and flies associated with the farm. As these complex organic compounds react with odor producing bacteria, they form the volatile compounds that impact the health of surrounding neighbors both physiologically and psychologically. In the physiological category,

people have reported nausea, vomiting, and headaches, but the health impacts are poorly documented. Many people can have allergic reactions to the dust or bacteria produced. The only real laws that govern this are some loose toxicity standards that have been established for some of the gases released from these feedlots. These include NH<sub>3</sub>, H<sub>2</sub>S, CO<sub>2</sub>, CO, and CH<sub>4</sub>. In the psychological category, there have been numerous reports of fatigue, anger, and depression. These do not seem to get very far, because they are hardly documented at all.

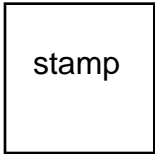
After identifying what causes the odors, Dr. Ullery talked about some of the factors and measurement tools for quantifying these compounds. Wind is a major factor affecting odor release and dispersion. As the wind blows over the source area, a plume is formed. The size of this plume is affected by the air temperature, wind speed, aerial topography, and atmospheric stability. Since there are computer models that can estimate the boundary of a certain threshold of this plume, the next steps are to determine that threshold and actually measure the chemicals. Generally, a 50% threshold is used. This means looking for the lowest amount that 50% of people can detect. Although there are instruments for measuring NH<sub>3</sub> and H<sub>2</sub>S, it is more difficult to determine how much will affect at least 50% of the people around. Some folks are more sensitive to these odors than others. Farmers that grew up with the stuff in the air all the time can hardly notice it, while acreage owners that recently moved out of the city complain about the smallest amounts.

Finally, after all the background information was presented, Dr Ullery displayed some of the input and results from using the OFFSET Model. The main calculation to make before running this model is the "Odor Emission Number". The formula for this is  $OEF = (OEN * EA * OCF) / 10000$ , where OEF is the Odor Emission Factor, OEN is the Odor Emission Number, EA is the area of the building or lot, and OCF is the Odor Control Factor. After some empirical studies were done to determine OEN for various types of buildings and animals, and more studies were done to find how good the OCF was for a variety of filters, the OEF was easy to compute. When the sum of the OEFs for an operation were plugged in, and a desired annoyance free probability was set, the model cranked out a minimum distance that the odor should not affect most people. It also showed how changing odor control practices can make a big difference.

Before the meeting was drawn to a close, we had a short election and didplanning for the future. Nobody ran for President, so Dr. Larry Browning held on to the role. For Vice President, Joanne wanted to step down, but she already has speakers lined up for three meetings. She will still be the Vice President this



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Mailing Label

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year, but will not be able to set up more meetings. Larry will come up with a speaker for November of 2003. Since our next meeting will feature the Civil Air Patrol in Brookings, we decided to move the next meeting to Thursday, March 13th, instead of the normal second Tuesday in February. Hopefully the weather will be good. Joanne also has activities for May and September.

The Treasurer position will remain in the hands of Brian Karstens. Hereported that we have \$155 in our account at the Sioux Falls Credit Union. Our annual dues of \$15 are coming up for the next meeting. Brian suggested that we try to have a membership drive at our March meeting at SDSU in Brookings. Perhaps we could get more members through the faculty and students. We could try putting an advertisement in the South Dakota Science Teachers Newsletter. He is also considering purchasing a new URL for our homepage. We could probably get WXMINDS.org for about \$7.50 per year. As a group, we did not decide anything about the homepage issue, but for now we will keep the SDSU web page.



As far as Secretary, Tim Masters will continue to take notes, if he is able to attend the meetings. His work schedule is getting hectic, and he is busy at home with a 1 year old son. Art Umland agreed to take care of making labels and mailing the newsletters. This will reduce some of Tim's responsibilities, and will probably make printing and sending information more timely. Mike Dirksen will still be the Editor, and Brian Ruby should be able to help keep up with the homepage.

