
NEWS IN BRIEF

Compiled by Lorraine A. Manz, Editor



Geologists in the Public Eye

In this bicentennial anniversary year of the arrival of the Corps of Discovery in North Dakota it should come as no surprise that John Hoganson and Ed Murphy have once again had a very busy summer. The number of Lewis and Clark-related events they have participated in since the beginning of August totals more than a dozen. In addition to several interviews on local TV and radio they have attended book signings, led field trips, and delivered presentations on the "Geology of the Lewis and Clark Trail in North Dakota" and "Geological Observations made by the Lewis and Clark Expedition in North Dakota" to a number of audiences, including visitors to the Circle of Cultures Lewis and Clark Signature Event that took place on the University of Mary Campus near Bismarck from October 22-31 (see Ed's article on page 2).

Not all of Ed and John's public appearances have been related to the Lewis and Clark expedition. On August 6 John gave tours of the Stumpf Site Natural Area to youths in the Bismarck Police Department Program and on October 2 led a tour and fossil dig at the Pembina Gorge site for local Girl Scouts. In an interview broadcast on Prairie Public Radio on September 2, John discussed the *Archelon* turtle discovery described on page 20. The evolution of the horse exhibit at the new North Dakota Cowboy Hall of Fame in Medora (see page 14) is also the subject of much public interest. John talked about the exhibit on October 5 with Eloise Ogden of the Minot daily Press and again on October 12 with KFYZ TV and Prairie Public Radio.

In September Lorraine Manz gave presentations on North Dakota geology to about 180 7th grade students at the annual Williams County Eco-Ed camp. Also in September Lorraine participated in an Open Day at Harmon Lake nine miles north of Mandan. Harmon Lake will be the result of the construction of a dam, scheduled to be completed in 2005, across Otter Creek as part of a multi-million dollar new combination flood control, recreation, and economic development area.

Survey Participates in Plains CO₂ Reduction (PCOR) Partnership By Randy Burke

The North Dakota Geological Survey signed an agreement with the Energy & Environmental Research Center (EERC) in Grand Forks to serve dual roles as both a technical advisor and a research partner, in the Center's Plains CO₂ Reduction (PCOR) Partnership. Increasing interest by the public, industry and government in understanding the role of carbon dioxide (CO₂) in global warming encouraged the U.S. Department of Energy (DOE) to establish seven regional centers to study the issue in detail. North Dakota is one of eleven geopolitical partners in the PCOR Partnership region that includes two Canadian provinces (Figure 1).

The PCOR Partnership comprises a diverse group of parties interested in better understanding the technical and economic feasibility of capturing and storing emissions from fixed sources of CO₂ in the Great Plains. One of its primary goals is to assess and prioritize the opportunities for CO₂ sequestration in the region. This information will be used to study areas of technical, regulatory and environmental issues that may require work in order to proceed with implementing the best sequestration opportunities.

The Survey's role in PCOR is similar to what we provided the last four years to the International Energy Agency's Weyburn CO₂ Storage and Monitoring Project, which completes its Phase I this year. Because of the knowledge and experience gained by the Survey through participation in the Weyburn Project, the Survey was able to provide significant information to the PCOR Partnership efforts. PCOR intends to use the format of reservoir characterization published by Westport Resources geologist Ralph Nelms and myself as a template to interpret and catalogue data gathered from the other ten partners in the program (Nelms and Burke, 2004; Burke and Nelms, 2004a; and Burke and Nelms, 2004b).

At the recent Advisory Group meeting in Billings, Survey staff co-authored four of the seven papers currently prepared for the final DOE report upon the completion of Phase I of the PCOR project. The titles of the final drafts of the manuscripts are listed in the references. Project leader Ed Steadman is preparing for Phase II of the PCOR Partnership with plans to move the

program into a demonstration project in this region. Many aspects of a potential demonstration project were discussed by 39 members of the advisory group in attendance. The advisory group comprises a broad spectrum of stakeholders, including several representatives from federal and state government agencies, the electric power industry, the oil and gas industry, and environmental groups. A wide range of options for sequestration were discussed, including coal beds, saline aquifers, wetlands, croplands and oil reservoirs. The Survey contributed geologic insight to the discussion.

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Figure 1. Map illustrating the geopolitical entities in the PCOR partnership. (Courtesy of EERC).

Oil Plays Under Development in North Dakota By Randy Burke

After several years of success in Montana, the Mississippian, Madison Bakken Formation play is moving into North Dakota (see article in this issue by J. LeFever). One of the richest source rock beds in North America, the Bakken Formation, consists of three units in much of North Dakota: two black organic shale units separated by a silty dolomite unit. In the mid 1980's some success was found by horizontally drilling in the shale units, but today they are targeting the middle silty member. A number of wells have been permitted and drilled, but only a few are off of tight hole status. One initially tested over 200 barrels of oil per day. The information from this one, drilled by Continental Resources, recently became available to the public whereas most remain under confidential status. This play is expected to be widespread throughout much of the central-western portion of the State.

Two more Madison plays are beginning to develop: one in the Ratcliffe interval and another in the Frobisher Alida interval. The Ratcliffe play is in the lower portion of the section above the Midale. The Frobisher Alida play is in the Nesson carbonate unit of the Rival subinterval. Zinke and Trumbo Inc. is one of the primary players and they have completed several

wells, particularly in McKenzie County. Formen Butte and Camp Fields are where they had early success but many of the wells in this play are still on tight hole.

Another play getting legs is in the Devonian, Birdbear Formation in the Billings and Golden Valley counties region. There are at least five fields involved in this play including Roosevelt, Beaver Creek, Bicentennial, and Cooks Peak. Some of these new wells are producing at 200 to over 300 barrels of oil per day. F. & H. Petroleum Corporation is one of the leaders in this play.

These plays are being driven by a number of factors, but it is the application of technologies relatively new to the Williston Basin that is bringing some of the success. Some of these technologies include the refinement of horizontal drilling techniques, selecting where to cut windows through casing to tap into bypassed pay, and fracturing horizontal legs. A shortage of rigs, experienced field hands, and fracturing equipment are slowing progress. With refinements in horizontal drilling they are better able to stay in thin zones 1 to 3 feet thick such as some of those in the Birdbear. Many of the new zones being exploited are low permeability and lower porosity that did not make them good candidates for vertical bore holes, whereas horizontal boring hundreds to thousands of feet in the targeted zones can be economical. With oil prices anticipated to remain relatively high in the near future, these plays should continue for sometime.

There is some indication of renewed interest in gas exploration and development but not much information. Activity reports indicate Fidelity Exploration and Production Company and Wyoming Resources Corporation are having success with developing shallow gas resources in Bowman County. The increasing demand for natural gas and the rising cost to consumers has sparked an increase in inquires into shallow biogenic gas and geothermal resources.

New Name and New Sponsor Beginning 2005 Formerly the Williston Basin Horizontal Well Drilling and Petroleum Conference By Randy Burke

Continuing interest in exploration and development of oil and gas resources in the Williston Basin buoyed by record high prices for hydrocarbons drives the demand for our annual Petroleum Conference. Following the tradition of alternating the venue between Canada and the United States, the 2005 meeting will be held in Regina, Saskatchewan, April 26 and 27. Heretofore the conference will be known as the Williston Basin Petroleum Conference.

Christened the Horizontal Well Drilling Workshop upon conception in 1993 by Bill McClelland, North Dakota Geological Survey and Malcolm Wilson, Saskatchewan Industry and Resources, the meeting has been organized and sponsored by these two government agencies. Bill and Malcolm conceived the meeting as a forum to promote cross border exchange of knowledge of technologies that were being successfully used in the Williston Basin on one side of the border but not commonly used on the other side. Successful and widespread use of horizontal well drilling in the Canadian portion of the Basin was the primary technology targeted at that time. An informal workshop format was viewed as the best way to encourage the exchange of information. Also, this meeting was recognized as a regional meeting for those actively working in the Basin including field hands, land owners and smaller operators. Realizing that most operators and rig services personnel were idled by muddy terrain and roads in the late spring, this time of the year was selected in order to bring together the people that actually implement these new ideas. Success, expressed by a greater than expected attendance of over 200 people at the first meeting and extremely positive responses by participants, spurred on the next meeting. Over the years attendance increased to a maximum of 600 people in 1996 when much of the Canadian portion of the Basin experienced regulatory changes in deep reversion of drilling rights.

Over time the name changed to better reflect the tenor of the meeting as a conference more about new petroleum technologies deemed applicable in the Williston Basin and



Figure 1. Participants at Williston Basin Petroleum Conferences have ample time to discuss the data from the application of new technologies used in case studies.

not merely horizontal drilling technologies as that technology became better established in the U.S. portion of the Basin.

At a recent organizational meeting in Minot it was decided by Acting State Geologist Ed Murphy and the Petroleum Branch of Saskatchewan Industry and Resources Director Chris Gilboy, to bring another sponsor on board to help with organizational aspects of the meeting. Lynn Helms, Director of the Oil and Gas Division of the Industrial Commission has agreed to help us sponsor this meeting. With the recent reduction in the Survey staff over the last two years the Survey needed additional help with this task and are confident the engineering expertise of the North Dakota Oil and Gas Division will contribute to that part of our program.

Geochemical Mapping Survey of North Dakota: Status Report By Lorraine A. Manz

In 2003 the North Dakota Geological Survey (NDGS) Natural Resources Conservation Service (NRCS) and North Dakota State University (NDSU) entered into a cooperative effort with the US Geological Survey to conduct a statewide solid-phase geochemical study of North Dakota. This project is part of a nationwide effort to create a geochemical landscape for the continental US, Alaska and Hawaii that will provide a valuable source of statistically valid, unbiased, background information on a suite of more than 20 trace elements including arsenic and selenium. As of January 2004, 71% of the land area of the United States had sample coverage. Approximately three-quarters of the samples collected and analyzed are stream sediments. The remainder consists mostly of soils.

Sample collection in North Dakota commenced in the summer of 2003 and was completed in October 2004. Although the final count is not yet in, it is estimated that approximately 4000 soil samples have been collected, representing more than 700 individual sample sites. At each site, samples of surface soil and subsoil were collected using standard NRCS sampling methods. These were supplemented at approximately 10% of the sites with an additional set of substratum and surface subsamples.

To date 1416 analytical and 529 archival samples representing about 470 sites have been submitted to the USGS. The remainder is currently in storage at the NDGS offices in Bismarck awaiting inventory and cataloging prior to shipment.

The final data set, which is expected sometime during the first half of 2005, will be available from the North Dakota Geological Survey, and also from the National Geochemical Survey Database website at <http://tin.er.usgs.gov/geochem>.

For more information, comments, or questions on this project, contact Lorraine Manz at (701) 328-8000, e-mail: lmanz@state.nd.us.

Comings and Goings



Donna Bauer

On August 1st Donna Bauer joined the NDGS as its new office assistant and publications clerk. Donna is from Kenmare but moved to Bismarck a number of years ago to study at BSC where she earned an Associate's degree in Information and Computer Processing. Before joining the NDGS Donna worked for the Oil and Gas Division as a permitting office assistant, which meant that she was already a familiar face to many of us. We are very glad to have her on board.

Paul Diehl

After exactly twelve years with the NDGS Paul Diehl retired on July 31 to start his own consulting business. Paul joined the Survey on August 1, 1992 as a stratigrapher/petroleum geologist. During his time here he worked on a number of subsurface projects including the Lodgepole Formation and the Cedar Hills Oil Field. Paul will also be remembered for his

unparalleled involvement in the organization and coordination of most of the Williston Basin Horizontal Well & Petroleum Conferences, for which he received formal recognition earlier this year (*NDGS Newsletter* v. 31, no. 1, summer 2004).

Sheila Glaser

In August we bid farewell to Sheila Glaser who left the Survey to take up a position with the Burleigh County Auditor's Office as a real estate technician. Sheila was hired by the NDGS in 1997 as a compiler on the then newly-fledged soils digitization project. Since that time she has been responsible for the compilation or digitization of approximately 650 maps covering 25 North Dakota counties. An impressive tally indeed.

We wish Paul and Sheila every success in their new ventures.

Mass Movement Study in the Valley City Area By Fred Anderson

Preliminary inventory maps of mass movement features within the Valley City East and Valley City West 1:24,000 quadrangles were recently completed. Areas affected by landslides, soil creep, and other types of mass movement in the vicinity of the city of Valley City, North Dakota are depicted on these maps at a scale of 1:24,000. Areas of mass movement were mapped from 1997 1:40,000 scale aerial photography collected from the National Aerial Photography Program (NAPP) and field reconnaissance conducted during the 2004 field season. These maps are currently available as paper maps and digital files. To obtain more information about these products, contact Fred Anderson or Elroy Kadrmaz at (701) 328-8000.

NDGS and Theodore Roosevelt Medora Foundation will co-sponsor a public participation fossil excavation in July, 2005 near Medora By John W. Hoganson

Darrell Nodland, field inspector for the Oil and Gas Division of the Industrial Commission, discovered a fossil site on Theodore Roosevelt Medora Foundation land near Medora while inspecting an abandoned oil well location in the fall of 2003. Champsosaur (crocodile-like animal), turtle, fish and other bones were noted weathering out of a thin carbonaceous mudstone in the Paleocene (about 60 million years old) Bullion Creek Formation when I visited the site. The bone bed is extensive. The

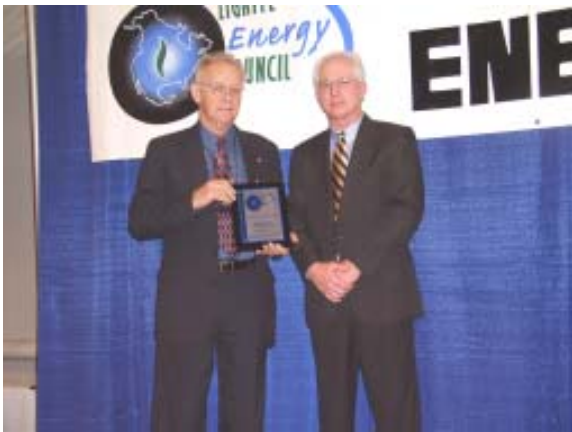


Champsosaur skeleton.

site was determined to be an ideal location for another public participation fossil dig similar to others that the NDGS has sponsored. After meeting with Randy Hatzembuhler, President of the Theodore Roosevelt Medora Foundation, we decided that the Foundation and NDGS would sponsor a public fossil dig at this site. This will be an 11 day long dig from July 15 through July 25, 2005. Preregistered participants will be charged a daily fee. Contact John Hoganson for more information (701) 328-8000 or Kathy Miller (TRMF) at 1-800-633-6721.

John Bluemle Receives Ambassador of Lignite Award By Ed Murphy

John Bluemle received the Lignite Energy Council's Ambassador of Lignite Award during the awards luncheon at their annual meeting held on October 28, 2004. During the presentation John Dwyer, President of the Lignite Energy Council, made the following remarks: *"Each year we present the Ambassador of Lignite Award to those individuals who have moved on to bigger and better things. Today, we have the privilege of honoring John Bluemle, former state geologist with the North Dakota Geological Survey. Dr. Bluemle has given so much of his time and talent to the state of North Dakota as state geologist. One of his extra duties you may not know about involved his service as a member of the Lignite Research Council from 1990 to his retirement in 2004. He also served on the executive committee for the LRC. John was instrumental in guiding the Lignite Research Council in becoming results-oriented and continuously promoted new lignite development. In 2002, the NDGS completed a reassessment of the lignite resources in North Dakota, the first such assessment in 50 years. This assessment is now being used by project developers as they look at new projects. This assessment is also important because we can now say with certainty that the state has over 25 billion tons of economically recoverable lignite. That's over 800 years of production at our current rate of slightly over 30 million tons per year. Finally, John has always made it a point to put science first. This has made him an invaluable contributor to the Lignite Research Council. For his years of service, for his many contributions to the LRC and industry, and for his patient and kind encouragement, we salute you, Dr. John Bluemle. It's a privilege to present you this "Ambassador of Lignite" plaque, honoring John for his long and distinguished career." The plaque reads: "In appreciation for your many years of dedicated service and expertise to the lignite industry."*



John Bluemle (left) receives the Ambassador of Lignite Award from Ron Harper, Lignite Energy Council Chairman. (Photo courtesy of the Lignite Energy Council.)

John P. Bluemle retired on June 30, 2004 after 42 years with the North Dakota Geological Survey, the last 14 as State Geologist. John was not only the third longest serving of North Dakota's twelve State Geologists, behind only A.G. Leonard (29 years) and W.M. Laird (28 years), but has more years of service than any current or former Survey employee. Although John's field of expertise is glacial geology, he authored reports on virtually every aspect of North Dakota geology. He mapped the surface geology of 22 counties in central and eastern North Dakota, almost half of the entire State. His report on the general geology of North Dakota, *The Face of North Dakota*, has gone through three editions since it first came out in 1977 and remains the most popular of all of the publications of the North Dakota Geological Survey. John is involved in a number of projects. He is in the process of completing the surface geology of 50 quadrangles and will co-lead a Friends of the Pleistocene