



North Dakota Geological Survey Subsurface Section Organizes and Hosts 2nd Successful Multi-Day Core Workshop Event

Timothy O. Nesheim

During the week of August 9-13, the subsurface section of the North Dakota Geological Survey (NDGS) organized and hosted its second multi-day Williston Basin Core Workshop. Held in Grand Forks, North Dakota at the Wilson M. Laird Core and Sample Library, the purpose of the workshop was to bring together geologists and engineers interested in better understanding the stratigraphy and sedimentology of the various formations that comprise the Williston Basin.

Registered attendance for the event totaled 60 attendees plus 10 presenters and supporting staff, with presentation content spanning five total days. Attendees consisted of 22 petroleum geologists and engineers from 7 different operating companies, 16 staff members from two separate consulting companies, and 24 attendees from government/academic institutions. Presenters included a combination of several retired/semi-retired geologists (David Petty, Bob Lindsay, and John Hohman, Riley Brinkerhoff - Wasatch Energy, John Lake - Lake Consulting, and Anthony Sarnoski - Luff Exploration), and NDGS staff members (Jeff Bader and Tim Nesheim). A similar core workshop was previously held by the NDGS in October 2019 (Nesheim, 2020).

Monday-Tuesday and Thursday-Friday consisted of identical two-day core workshop sessions, which covered four main topics.

1) The Bakken and Three Forks Formations which combine to be the most prolific oil play in the state. 2) The Mississippian Madison Group, which contains more than a dozen distinct stratigraphic reservoir intervals that have combined to produce more than 4.5 billion barrels of oil equivalent across the entire Williston Basin. The Madison Group reservoirs combine to be the 2nd most hydrocarbon productive interval in the Williston Basin and may have the potential as a Bakken-like resource play (Nesheim, 2021a). 3) Additionally, the Deadwood Formation was covered by two separate guest presenters as the Deadwood is currently being evaluated for CO₂ sequestration and is also a source for deep geothermal electricity generation (Nesheim, 2021b). 4) The Inyan Kara Formation was also covered, which is the primary unit for produced water injection/disposal (Bader, 2016). Core workshop groups were split into groups of 20 attendees or less to enhance the up-close exposure to core samples.

Each presentation began with an introductory PowerPoint presentation followed by a hands-on walk through of one or more cores of the formation of interest (figs. 1-3). Each presentation typically wrapped up with several minutes or more of questions and discussion. Core samples for all presentations were available throughout the week, allowing attendees to revisit and review various cores of interest. Through the anonymous post-workshop



Figure 1. Photograph of John Lake (right) guiding core workshop attendees through a complete core of the Deadwood Formation, a unit that is currently being developed for deep geothermal electricity generation in southeastern Saskatchewan and evaluated for CO₂ sequestration within North Dakota.



Figure 3. Photograph of Bob Lindsay explaining the reservoir facies of the Mission Canyon Formation (Mississippian Madison Group) from the Little Knife Field

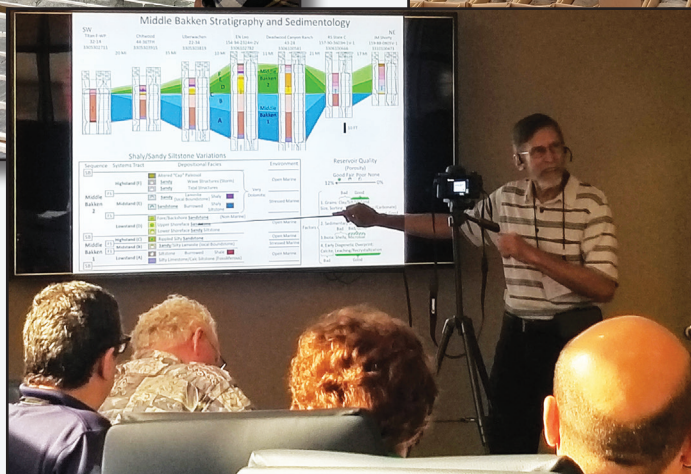


Figure 2. Photograph of John Hohman going through his PowerPoint presentation on the Middle Bakken Formation stratigraphy and sedimentology.

questionnaire, 95% of the polled attendees ranked the overall quality of the core workshop as "Very Good to Excellent," and 90% ranked the organization of the workshop as "Very Good to Excellent."

Additionally, a one-day course on core logging was run on Wednesday, intermediate of the two-day core workshop sessions allowing attendees of either session to extend their stay and attend. Retired geologist Bob Lindsay spent the morning rotating between an instructional PowerPoint presentation and showing attendees various core examples. By the afternoon, attendees began logging their own core samples with assistance from Bob Lindsay and several of the other workshop presenters. More than half of the 60 core workshop attendees also registered and participated in the one-day core logging course.

Each core workshop presentation, as well as Bob Lindsay's one-day core logging course, was recorded and is currently being edited for an eventual virtual core workshop. Multiple prospective attendees expressed interested in the workshop but were not able to attend largely due to Covid-related travel restrictions. The recorded and edited presentations will preserve knowledge for future generations.

The next multi-day Williston Basin Core Workshop event is tentatively planned for early June of 2023, which will be held in conjunction with the Rocky Mountain Section (RMS-AAPG) annual meeting planned in Bismarck-Mandan. We have already begun planning for the 2023 Core Workshop.

REFERENCES

- Bader, J. W., 2016, The Dakota Group of the Williston Basin: an Important Geologic Unit for Produced Water from Oil and Gas Development in North Dakota: North Dakota Department of Mineral Resources, Geo News, v. 43, no. 1, p. 11-15.
- Nesheim, T. O., 2020, Review of the 2019 Williston Basin Core Workshop: Grand Forks, North Dakota: North Dakota Department of Mineral Resources, Geo News, v. 47, no. 1, p. 13.
- Nesheim, T. O., 2021a, Re-examining the Madison Petroleum System within the Williston Basin: Rocky Mountain Association of Geologists (RMAG), Outcrop, v. 70, no. 8, p. 12-22.
- Nesheim, T. O., 2021b, The Deadwood Formation: A Potential Stratigraphic Unit for CO₂ Sequestration: North Dakota Department of Mineral Resources, Geo News, v. 48, no. 1, p. 11-13.