Meeting Minutes of the Administration of Oil and Gas Committee of the
North Carolina Mining and Energy Commission
March 7, 2013
10:30 am – 12:30 pm

1. **Preliminary Matters** - Chairman Charles Holbrook
   Chairman Holbrook called the meeting of the Administration of Oil and Gas Committee to order at 10:30 am in the Ground Floor Hearing Room of the Archdale Building in Raleigh, NC. Chairman Holbrook read the relevant excerpt of the State Government Ethics Act, and asked Commission Members to consider whether or not they had conflicts of interest with respect to any items on the agenda. No conflicts were reported.

   The following personnel were in attendance for all or part of the meeting:
   Committee Members
   Charles Holbrook (Chairman)
   Dr. Vikram Rao
   Dr. Kenneth Taylor
   Jane Raymond Lewis
   Dr. Ray Covington

   Attorney General's Office
   Jennie Hauser (legal counsel)

   DENR Staff Member
   Trina Ozer, Department of Environment and Natural Resources (DENR) Secretary's Office
   Tracy Davis, Division of Energy, Mineral and Land Resources (DEMLR)
   Mell Nevils, DEMLR
   Walt Haven, DEMLR
   Katherine Marciniak, DEMLR
   Ryan Channell, DEMLR

   Others in Attendance
   Refer to the attached meeting sign-in sheets.

2. **Review and approval of minutes from the January 24, 2013 meeting**- Chairman Charles Holbrook
   Chairman Holbrook asked the Committee to review the minutes from the January 24, 2013 meeting. After reviewing, the Committee voted to unanimously approve the minutes.

3. **Background and Introductions**- Chairman Charles Holbrook
   Chairman Holbrook reminded everyone that during the last meeting, the Committee had decided to focus on regulation group (or "bucket") number 7: well construction and well integrity. He then

introduced Mr. Walter Johnston, an engineer with 40 years of experience who will be assisting the Committee with developing standards for well pad and pit construction.

4. **Well Construction Standards: Discussion and Proposals** – Chairman Holbrook and Walt Haven
Chairman Holbrook described the multi-layered approach needed for proper well construction and the associated pressure testing. He explained that the standards recommended by the American Petroleum Institute (API) should be the minimal framework standard used in North Carolina, but that higher standards should be required to address local conditions. Chairman Holbrook discussed the geological conditions of the Triassic basins and the "generic" drilling conditions expected. He stated that the Triassic Basins were old basins with low formation pressures and no documented hydrogen sulfide, thus making exploration and production less difficult than in other basins (i.e. U.S. Gulf Coast area).

Mr. Haven presented well construction standards from Ohio, Pennsylvania, Colorado, API, and the current requirements for North Carolina. He stated that well construction is complicated, but when done properly would be protective of the environment. Mr. Haven's well construction presentation included the following items:

a. Typical oil and gas well would have four strings of casing (conductor, surface, intermediate, and production) with one inch annulus between strings and each would be cemented to surface. Conductor casing would be set at approximately 80 feet (below land surface) or until auger refusal. Surface casing would be set 100 feet below the deepest fresh water aquifer or a minimum of 650 feet. Intermediate casing would be set at 1000 feet below ground surface or at depth to stabilize the borehole. Production casing might include attached perforated production liners and tubing.
b. Borehole and casing standards are prescriptive in some states but the goal in North Carolina should be performance based. Thus, construction rules would be written to explain the required completed condition of a well, as opposed to serving as a detailed regulatory task list. Drilling fluids that adversely impact geologic formations should not be used. Casing, centralizer, and hardware standards would be steel or other API approved materials. Standards throughout the rules would be referenced to the current and relevant API recommended practices, standards, or procedures.
c. Cement standards would be based on API criteria. Current 15A NCAC 05D rules for the state of North Carolina require cement to set for a minimum of 24 hours. The minimum set time for other states is 8 hours and/or a minimum compressive strength. Ohio requires 500 psi compressive strength for all cement.
d. Casing pressure testing for the current 15A NCAC 05D rules is not to exceed 1500 psi with a loss of more than 10% for a period of 30 minutes. Ohio and Colorado have set pressure testing according to API standards.
e. Formation integrity testing (FIT) is used to determine drilling mud weight and possible lost circulation zones. API standards would be utilized to complete these tests.
f. Tubing and packer standards need to accommodate well design criteria.
g. Blow out preventers (BOP) are used to keep the well under control.

h. Abandonment of vertical wells would require the entire string of production casing to be filled with cement. Production casing in horizontal wells would be cemented from a point within the production casing beneath the top of the oil or gas producing stratum. All abandonment operations would require 48 hour written notice to DENR.
i. Variance authority should be given to Energy Program staff for well construction, environmental/human health, site specific conditions, and technology barriers.
j. Dikes and faults in the Triassic basin may or may not require special provisions for drilling.
k. Wellhead configurations and requirements for fittings and flow lines needed to be addressed as a separate research and rule writing item.

Mr. Haven asked for recommendations related to well construction and setting surface casing at either 100 or 200 feet below the deepest fresh water aquifer. Chairman Holbrook & Dr. Rao stated the depth was not the important component, but that setting the casing shoe in competent bedrock was the critical issue. Thus, the Committee recommended that well construction rules should require setting surface casing into 100 feet of competent bedrock. Additionally, Chairman Holbrook and Dr. Rao added that intermediate casing should be utilized to isolate pressure zones or lost circulation zones and when used, should be set into at least 100 feet of competent bedrock. The Committee agreed that the objective of well construction would be to provide a minimum of two strings of casing to isolate underground sources of drinking water (USDW). However, achieving protection of groundwater would mostly depend on the proper cementing of casing. Chairman Holbrook and Dr. Rao also added that coal seams could be potential zones of formation instability and should be isolated using cement techniques.

Mr. Haven stated that equipment used should meet API standards and asked the Committee if specific API instructions should be referenced in the rule language or if a broader requirement stating the use of "the most current and relevant" API standards would suffice. Dr. Rao and Dr. Covington preferred the broader statement, requiring an operator to use the current version of API standards. Similarly, Mr. Haven explained that rules from some states provide detailed prescriptive language concerning the use of centralizers, while other states have performance based requirements in their rules for casing centering. The Committee agreed that the use of centralizers was important, but that the rules should provide the operator with the decision-making flexibility with respect to centralizer placement.

Mr. Haven discussed cement standards and the current 15A NCAC 05D rule requiring an operator to allow a minimum of 24 hours for cement setting. He talked about current cement additives and shorter curing times for cement. Dr. Taylor explained the rationale for the 24 hour waiting period was due to geophysical parameters. He explained that compressive strength was different from torque strength. He also suggested that at the time the current 15A NCAC 05D rules were written, the State wanted cement to cure for 24 hours, to allow it to reach proper torque strength before drilling continued. Chairman Holbrook stated that cement contractors should know the specifications of their cement and could recommend the appropriate waiting period. He discussed the issues related to improper cementing and British Petroleum's Deepwater Horizon blowout in the Gulf of Mexico and suggested that DENR establish an approved vendor list of cement companies. Dr.

Rao pointed out that a set timeframe or waiting period would not appropriate to establish in the rules, due to different types of cement being used by operators. He recommended following the practices of the three largest cement contractors and their specific product parameters. The Committee agreed that a cement bond log should be required after setting each string of casing. Dr. Covington asked Mr. Haven if DEMLR had a copy of API standards on hand for reference and Mr. Haven explained that the reference materials from API were costly to purchase and that DEMLR had some, but not all of the API materials. Ms. Hauser shared with the Committee that if API standards were referenced in the rules then a copy of the standards would have to be on hand and that DEMLR would need to purchase the material. The Committee determined that additional research would be needed to identify the difference, if any, between torque strength and compressive strength, with respect to cement. Dr. Rao stated that he would assist Mr. Haven with researching the recommendations from the major cement companies.

Dr. Rao, Dr. Taylor, and Chairman Holbrook discussed using API standards for pressure testing and casing integrity testing. Mr. Holbrook explained that Triassic Basin formations should not be "over pressured", but that casing strings should be cemented to the surface, nonetheless.

The Committee decided that tubing and packers should meet the most current and relevant API standards. Additionally, the Committee suggested that blowout prevention equipment (BOPE) should also meet API standards and that rules should be written to require proper use to prevent loss of well control. They also noted that the current 15A NCAC 05D rule language concerning performance-based requirements for using BOPE should be retained in the new set of well construction rules.

Well abandonment was discussed next, with Dr. Taylor suggesting that well classes be established to manage changes in well status. Chairman Holbrook remarked that several types of well classes, such as "dry", "abandoned", and "temporarily abandoned" should be considered. He added that a status of "temporary abandonment" might involve setting several 200-foot plugs to isolate specified borehole zones, as part of the temporary abandonment process. Nevertheless, this procedure would secure the well, while allowing an operator to re-enter a sealed, non-producing well at a later date. A well in the temporarily abandoned class could be completed with a Christmas tree and remain shut-in until market prices change or until necessary infrastructure would be place. Dr. Taylor asked how temporary abandonment should be classified to avoid operators from holding leases for non-productive wells. Dr. Rao, Chairman Holbrook, Dr. Covington, and Ms. Lewis-Raymond decided well classification and production status could be addressed during the permitting process. The Committee agreed with Mr. Haven's suggestions for abandonment of vertical and horizontal wells.

Mr. Haven asked the Committee who should have variance authority: DENR or the Mining and Energy Commission (MEC)? Dr. Rao responded by asking Mr. Haven for his opinion of this matter. Mr. Haven recommended that respective authority remain with DENR, to facilitate an efficient response to a variance request.

Dr. Taylor cautioned the Committee regarding the uses of variances and cited an example from the Arkansas Oil and Gas Commission (AOGC). He explained that AOGC addresses variance requests every two weeks due to Arkansas having implemented complicated field rules. Dr. Rao and Chairman Holbrook agreed that DENR should be the authoritative body to handle variance requests. Mr. Davis, DEMLR Director, reassured the Committee that variances would be reported to the Commission.

Mr. Haven asked the Committee for its opinions concerning the necessity or lack of need for writing specific rules to address drilling through dikes and faults. Chairman Holbrook stated that oil and gas drillers already know how to properly drill through dikes and faults and deal with such subsurface structures on a routine basis. Dr. Covington offered his agreement in this matter. Ultimately, the Committee agreed that specific rule language to address drilling operations for the penetration of dikes and faults was not needed.

5. **Public Comment**- Chairman Charles Holbrook
   No one from the audience signed up for the public comment period.

6. **Next Steps**- Chairman Charles Holbrook

   Chairman Holbrook directed DENR to write draft rule language for well construction standards (rule assignment grouping #7). Additionally, he asked staff to investigate how other states address and regulate geophysical surveys (seismic), pre-site activities, and notifications to landowners and emergency response personnel. Dr. Taylor mentioned the need to coordinate with Department of Transportation personnel to research rules related to seismic surveys.

7. **The Committee adjourned at 12:30 pm.**

DEMLR Staff contact for this Committee: Walt Haven, Energy Program Supervisor – NCDENR.