

- p. Portable fire extinguishers shall be tagged showing the date of last inspection, maintenance or recharge. Inspection and maintenance procedures shall comply with the latest edition of the National Fire Protection Association's publication NFPA 10.
- q. Personnel shall be familiarized with the location of fire control equipment such as drilling fluid guns, water hoses and fire extinguishers and trained in the use of such equipment. They shall also be familiar with the procedure for requesting emergency assistance as terrain and location configuration permit. Installation shall be consistent with provisions of NFPA 58, "Standards for the Storage and Handling of Liquefied Petroleum Gases".

#### **606B. AIR AND GAS DRILLING**

- a. Drilling compressors (air or gas) shall be located at least one hundred twenty five (125) feet from the wellbore and in a direction away from the air or gas discharge line.
- b. The air or gas discharge line shall be laid in as nearly a straight line as possible from the wellbore and be a minimum of one hundred fifty (150) feet in length. The line shall be securely anchored.
- c. A pilot flame shall be maintained at the end of the air or gas discharge line at all times when air, gas, mist drilling, or well testing is in progress.
- d. All combustible material shall be kept at least one hundred (100) feet away from the air and gas discharge line and burn pit.
- e. The air line from the compressors to the standpipe shall be of adequate strength to withstand at least the maximum discharge pressure of the compressors used, and shall be checked daily for any evidence of damage or weakness.
- f. Smoking shall not be allowed within seventy-five (75) feet of the air and gas discharge line and burn pit.
- g. All operations associated with the drilling, completion or production of a well shall be subject to the Colorado Air Quality Control Act, 25-7-101, C.R.S.

#### **607. HYDROGEN SULFIDE GAS**

- a. When well servicing operations take place in zones known to contain at or above one hundred (100) ppm hydrogen sulfide gas, as measured in the gas stream, the operator shall file a hydrogen sulfide drilling operations plan (United States Department of the Interior, Bureau of Land Management, Onshore Order No. 6, November 23, 1990).
- b. When proposing to drill a well in areas where hydrogen sulfide gas in excess of one hundred (100) ppm can reasonably be expected to be encountered, the operator shall submit as part of the Form 2, Application-for-Permit-to-Drill, a hydrogen sulfide drilling operations plan (United States Department of the Interior, Bureau of Land Management, Onshore Order No. 6, November 23, 1990).
- c. Any gas analysis indicating the presence of hydrogen sulfide gas shall be reported to the Commission and the local governmental designee.

#### **608. COALBED METHANE WELLS**

**a. Assessment and monitoring of plugged and abandoned wells within one-quarter (1/4) mile of proposed coalbed methane (CBM) well.**

- (1) Based upon examination of the Commission and other publicly available records, operators shall identify all plugged and abandoned (P&A) wells located within one-quarter (1/4) mile of a proposed coalbed methane (CBM) well. The operator shall assess the risk of leaking gas or water to the ground surface or into subsurface water resources, taking into account plugging and cementing procedures described in any recompletion or P&A report filed with the Commission. The operator shall notify the Director of the results of the assessment of the plugging and cementing procedures. The Director shall review the assessment and take appropriate action to pursue further investigation and remediation if warranted and in accordance with Colorado Revised Statute 34-60-124(4)(A).
- (2) Operators shall use reasonable good faith efforts to obtain access to all P&A wells identified under Rule 608.a.(1) above to conduct a soil gas survey at all P&A wells located within one-quarter (1/4) mile of a proposed CBM well prior to production from the proposed CBM well and again one (1) year and thereafter every three (3) years after production has commenced. Operators shall submit the results of the soil gas survey to the Director within three (3) months of conducting the survey or advise the Director that access to the P&A wells could not be obtained.

**b. Water well sampling.**

- (1) If a conventional gas well or P&A well exists within one-quarter (1/4) mile of a proposed CBM well, then the two (2) closest water wells within a one-half (1/2) mile radius of the conventional gas well or the P&A well shall be sampled ("Water Quality Testing Wells"). If possible, the water wells selected should be on opposite sides of the conventional gas well or the P&A well not exceeding a one-half (1/2) mile radius. If water wells on opposite sides of the conventional gas well or the P&A well cannot be identified, then the two (2) closest wells within a one-half (1/2) mile radius of the conventional gas well or the P&A well shall be sampled. If two (2) or more conventional wells or P&A wells are located within one-quarter (1/4) mile of the proposed CBM well, then the conventional well or the P&A well closest to a proposed CBM well shall be used for selecting water wells for sampling.

If there are no conventional gas wells or P&A wells located within a one-quarter (1/4) mile radius of the proposed CBM well, then the selected water wells shall be within one-quarter (1/4) mile of the proposed CBM well. In areas where two (2) or more water wells exist within one-quarter (1/4) mile of the proposed CBM well, then the two (2) closest water wells shall be sampled. If possible, the water wells selected should be on opposite sides of the proposed CBM well. If water wells on opposite sides of the proposed CBM well cannot be identified, then the two (2) closest wells within one-quarter (1/4) mile radius shall be sampled. If two (2) water wells do not exist within a one-quarter (1/4) mile radius, then the closest single water well within either a one-quarter (1/4) mile radius or within a one-half (1/2) mile radius shall be selected.

If no water well is located within a one-quarter (1/4) mile radius area as described above or if access is denied, then a water well within one-half (1/2) mile of the proposed CBM well shall be selected. If no water wells meet the foregoing criteria, then sampling shall not be required. If the Commission has already acquired data on a water well within one-quarter (1/4) mile of the conventional well or the P&A well, but it is not the closest water well, then it shall be given preference in selecting a water well to be tested.

- (2) The "initial baseline testing" described in this section shall include all major cations and anions, total dissolved solids (TDS), iron, manganese, selenium, nitrates and nitrites, dissolved methane, field pH, sodium adsorption ration (SAR), presence of bacteria (iron

related, sulfate reducing, slime, and coliform), and specific conductance. Hydrogen sulfide shall also be measured using a field test method. Field observations such as odor, water color, sediment, bubbles, and effervescence shall also be included. The location of the water well shall be surveyed in accordance with Rule 215.

- (3) If free gas or a dissolved methane concentration level greater than two (2) milligrams per liter (mg/l) is detected in a water well, gas compositional analysis and stable isotope analysis of the methane (carbon and deuterium) shall be performed to determine gas type. If the test results indicate biogenic gas, no further isotopic testing shall be done. If the test results indicate thermogenic or a mixture of thermogenic and biogenic gas, then the operator shall submit to the Director an action plan to determine the source of the gas. If the methane concentration increases by more than five (5) mg/l between sampling periods, or increases to more than ten (10) mg/l, the operator shall notify the Director and the owner of the water well immediately.
- (4) Operators shall make a good faith effort to conduct initial baseline testing of the selected water wells prior to the drilling of the proposed CBM well; however, not conducting baseline testing because access to water wells cannot be obtained shall not be grounds for denial of an Application for Permit-to-Drill, Form 2. Within one (1) year after completion of the proposed CBM well, a "post-completion" test shall be performed for the same analytical parameters listed above and repeated three (3) and six (6) years thereafter or in accordance with the requirements of field rules developed pursuant to Rule 608.f. If the methane concentration increases by more than five (5) mg/l between sampling periods or increases to more than ten (10) mg/l, the operator shall prepare an action plan to determine the source of the gas and notify the Director and the water well owner immediately. If no significant changes from the baseline have been identified after the third test (i.e. the six-year test), no further testing shall be required. Additional "post-completion" test(s) may be required if changes in water quality are identified during follow-up testing. The Director may require further water well sampling at any time in response to complaints from water well owners.
- (5) Copies of all test results described above shall be provided to the Commission and the water well owner within three (3) months of collecting the samples. The analytical data and surveyed well locations shall also be submitted to the Director in an electronic data deliverable format.

**c. Coal outcrop and coal mine monitoring.**

- (1) If the CBM well is within two (2) miles of the outcrop of the stratigraphic contact between the coal-bearing formation and the underlying formation, or within two (2) miles of an active, inactive, or abandoned coal mine, the operator shall make a good faith effort to obtain the access necessary to survey the outcrop or mine prior to drilling the CBM well to determine whether there are gas seeps and springs or water seeps that discharge from the coal-bearing formation in the area.
- (2) If a gas seep is identified during the survey, then its location and areal extent shall be surveyed in accordance with Rule 215 and the concentration of the soil gas shall be determined. If possible, a sample of gas shall be collected from the seep for compositional analysis and stable isotope analysis of the methane (carbon and deuterium). Thereafter, the operator will inspect the gas seep, survey its areal extent, and measure soil gas concentrations annually, if access can be obtained. The operator shall submit the results of the outcrop or mine monitoring to the Commission and the landowner within three (3) months of its completion of the field work. The analytical data shall also be submitted to the Director in an electronic data deliverable format.

- (3) If a gas seep is identified during the survey, the Director shall advise the landowners, local government, Colorado Geological Survey (CGS), and the Colorado Division of Reclamation, Mining, and Safety (DRMS), as appropriate, of the findings. In collaboration with state, local, and private interests, the CGS, DRMS, and the Commission may elect to develop a geologic hazard survey and determine whether the area should be recommended to be designated as a geologic hazard in accordance with Colorado Revised Statute 34-1-103 and 24-65.1-103.
- (4) If the CBM well is within two (2) miles of the outcrop of the stratigraphic contact between the coal-bearing formation and the underlying formation, the operator shall survey the outcrop, review publicly available geologic and hydrogeologic data, and interview landowners to identify springs or water seeps that discharge from the coal-bearing formation.

If such a water feature is identified, then the operator shall survey its location and areal extent in accordance with Rule 215, measure the flow rate, photograph the feature, and collect and analyze a water sample in accordance with Rule 608.b.(2). Thereafter, the operator will inspect, survey the areal extent of, and measure the flow rate of the spring or water seep annually, if access can be obtained. The operator shall submit the results of the spring or water seep monitoring to the Commission and the landowner within three (3) months of its completion of the field work. The analytical data shall also be submitted to the Director in an electronic data deliverable format.

- d. **Prior to producing - static bottom-hole pressure survey.** Prior to producing the well, the operator shall obtain a static bottom-hole pressure test on at least the first well drilled on a government quarter (1/4) section. The survey shall be conducted by either a direct static bottom-hole pressure measurement or by a static fluid level measurement. The data acquired by the operator and a description of the procedures used to gather the data shall be reported on a Bottom Hole Pressure, Form 13, and submitted with the Completed Interval Report, Form 5A, filed with the Director. After reviewing the quality of the static bottom-hole pressure data and the adequacy of the geographic distribution of the data, or at the request of the operator, the Director may vary the number of wells subject to the static bottom-hole pressure survey requirement. If an application for increased well density or down spacing is filed with the Commission, then additional testing may be required.
- e. **Bradenhead testing.** Upon completion of any well, and on wells presently completed, the operator shall equip the bradenhead access to the annulus between the production and surface casing, as well as any intermediate casing, with approved fittings to allow safe and convenient determination of pressure and fluid flow. This rule shall apply to all wells, regardless of function, completed for CBM production or below the coal-bearing formation. All wells capable of production, injection, or observation shall be tested by the operator for pressure and flow, with results submitted to the Director on a bradenhead test report, Form 17, and to other applicable regulatory agencies. Bradenhead tests shall be performed on all wells on a biennial basis. Remedial requirements shall be determined by the appropriate regulatory agency. The bradenhead testing requirement shall not apply if the operator demonstrates to the satisfaction of the Director annular cement coverage greater than fifty (50) feet above the base of surface casing and zonal isolation is confirmed by reliable evidence such as a cement bond log or cementing ticket indicating that the height of cement coverage is fifty (50) feet above the base of the surface casing, and zonal isolation is confirmed by two consecutive bradenhead tests preceded by a minimum shut-in period of seven (7) days each.
- f. **Locally specific field orders.** The provisions of this Rule 608 may, with the Director's approval, be modified or superseded on a basin, region, or county specific basis by field orders developed by the Commission in consultation with affected parties, including operators, county governments, and other state or local agencies, taking into account the goals of the 600-Series Rules and particular local geologic and operational conditions. In addition, the operator or other affected

party shall have the right to file an application with the Commission to develop field orders for the basin, region, or county that modify the Rule 608 requirements as provided herein, which application shall set forth an explanation of good cause for the development of such orders.