MARK-UP

RULE B-9: DRY GAS WELL PLUGGING METHODS AND PROCEDURES

a) Definitions:

1) "Cased Well" means a well in which production casing has been set and cemented.

2) "Cement" means a class A or H neat cement with a minimum weight of 14.5 pounds per gallon, unless the cement contains additives which improve the ability of the cement to provide necessary protection and which maintains a minimum compressive strength of 500 PSI after 72 hours.

3) "Circulation Method" means placement of cement used in plugging a well by circulating cement by positive pressure displacement through tubing set at a specified depth in the well.

4) "Dump Bailer Method" means placement of cement used in plugging a well by using a dump bailer on a wire line.

5) "General Oilfield Waste" means oily rags, chemical containers including any unused chemicals, oil filters and gaskets, used motor oil, lubricating oils, hydraulic fluids, diesel fuels, paint and solvent wastes and other similar wastes generated during drilling, completion, production, workover and plugging activities and which are not exempt from the provisions of Subtitle C of the Federal Resource Conservation Recovery Act of 1976.

6) "Mud" means only a fresh-water based drilling mud with a minimum weight of 9 pounds per gallon with a minimum viscosity of 45 seconds using API Full Funnel Method. Mud may contain water (fresh or brine), Bentonite, Attapulgite or other additives if they do not reduce the weight or viscosity below the required minimum.

7) "Plugging Fluid Waste" means plugging fluids, including cement, that are generated from the well during plugging activities.

8) "Uncased Well" means a well in which production casing has not been set or is set, but not cemented.

b) Uncased Wells

1) Uncased wells shall be plugged when required by General Rule B-7.

2) Notice of the plugging of uncased wells shall be given to the Commission Regional Office where the well is located, in accordance with General Rule B-7. Following initial notice to the Commission Regional Office, additional requirements concerning the well plugging operation, may be given to the Permit Holder or the Permit Holder's authorized representative.

3) Uncased wells where intermediate casing has been set, shall be subject to all the required plugging time frames for uncased wells and the applicable plugging requirements for cased wells in (c) below with respect to the protection of freshwater and oil and gas zones.

4) Plugging Requirements

A) The uncased well bore shall be filled with mud from the total depth of the well to the base of the surface casing prior to commencing plugging operations.

B) Any zones which have been productive of oil and or gas occurring in wells within ½ mile of the uncased well, shall have a one hundred (100) foot cement plug placed above each such correlated interval in the uncased well.

C) A zone which contains any amount of hydrogen sulfide gas, or any other zone within the well which does not contain hydrogen sulfide gas, but hydrogen sulfide gas is present within the same zone within any well within one-half (1/2) mile, shall be covered, at a minimum, with a cement plug from one hundred (100) feet below to one hundred (100) feet above the zone or with a greater amount of cement sufficient to shut-off and control the flow of hydrogen sulfide gas.

D) If surface casing has been set to a depth of at least five hundred (500) feet in the well, a one hundred (100) foot cement plug shall be placed, utilizing the circulation method, from a depth of fifty (50) feet below the base of the surface casing, or from the depth of any deeper freshwater well within ½ mile of the dry hole, and extending fifty (50) feet into the cemented surface casing.

E) If surface casing has not been set to a minimum depth of five hundred (500) feet in the well, a cement plug shall be placed, from a depth of at least five hundred (500) feet or from the depth of any deeper freshwater well within one-half (½) mile of the dry hole, extending to fifty (50) feet into the cemented surface casing.

F) Any zones not covered by the surface casing plug specified above, which produced water during the drilling or subsequent plugging operations, shall be covered at a minimum, with a cement plug from fifty (50) feet below to fifty (50) feet above the zone or a greater amount of cement sufficient to shut-off the flow of water.

G) A cement plug shall be placed from a minimum depth of fifty (50) feet to a depth of three (3) feet below the surface of the ground and the casing cut off three (3) feet below the ground surface, or deeper if surface use conditions indicate, and a plate welded onto the top of the casing and the remaining wellbore filled with soil and leveled in such manner as not to interfere with soil cultivation or surface use.

5) In the case of lost tools or stuck drill pipe, every reasonable attempt should be made to recover the tools or drill pipe, at least to a depth of the required surface casing plug, and the required surface casing plugs placed as required above. In the event the lost tools or stuck drill pipe cannot be recovered from a depth below the required depth of the surface casing plug, the Director may vary the plugging requirements of this subparagraph and specify alternative plugging requirements. In determining whether to approve and in selecting an alternative plugging requirement, the Director shall consider the potential for damage to fresh water, the depth of the lost tools or equipment in relation to the depth of fresh water zones, well construction characteristics, and the potential for upward migration of wellbore fluids into the fresh groundwater.

c) Cased Wells

1) Cased wells shall be plugged when required by General Rule B-7.

2) Notice of the plugging of cased wells shall be given to the Commission Regional Office where the well is located, in accordance with General Rule B-7.

3) Plugging Requirements

A) The wellbore shall be filled with mud from total depth of the well to the base of the surface casing prior to commencing plugging operations.

B) Cast iron bridge plugs may be set above the lowermost perforated interval or between perforated intervals prior to filling the wellbore with mud, in which case the wellbore need only be filled with mud from the top of the uppermost cast iron bridge plug to the base of the surface casing prior to commencing plugging operations.

C) If using the circulation method, a cement plug of not less than one hundred (100) feet in length, shall be placed from fifty (50) feet below, or total depth if well bore did not extend to a point fifty (50) feet below, and extend across the perforated interval, to a point fifty (50) feet above each perforated interval.

D) If using the dump bailer method, a cast iron bridge plug, shall be placed inside the cemented portion of the production casing, immediately above each perforated interval, with each bridge plug covered with a minimum of ten (10) feet of cement. In the alternative a cast iron bridge plug may be placed over the lower most perforated interval and the wellbore casing filled with cement to a point fifty (50) feet above the top of the uppermost perforated interval, provided the production casing/wellbore annulus is filled with cement to a point fifty (50) feet above the uppermost perforated interval.

E) If cement is not present on the outside of the production casing at the location of each required cement plug, specified in F), G) and H) below, cement shall be placed on the outside of the production casing in the production casing/wellbore annulus from a point fifty (50) feet below, or total depth if the well bore did not extend to a point fifty (50) feet below,

and extending across the required interval to be plugged, to a point fifty (50) feet above each required interval to be plugged. However, the Director may approve alternative, but equally protective, placement of cement plugs, openhole devices or plugging materials when necessary due to well construction limitations.

F) Any zones not covered by the surface casing ~~plug specified below~~, which produce water during the plugging operation or are known to be significant water producing formations or which are known to be over-pressured, shall be covered at a minimum, with a cement plug from fifty (50) feet below to fifty (50) feet above the zone or a greater amount of cement sufficient to shut-off the flow of water. The Director may approve alternative, but equally protective, plugging materials or other open-hole devices sufficient to shut-off the flow of water.

G) If surface casing has been set to a minimum depth of five hundred (500) feet in the well, a one hundred (100) foot surface casing cement plug shall be placed, on the outside and inside of the production casing if production casing is not removed, from a depth of fifty (50) feet below the base of the surface casing, or from the depth of any deeper freshwater well within ½ mile of the wellbore, and extend fifty (50) feet into the cemented surface casing.

H) If surface casing has not been set to a minimum depth of five hundred (500) feet in the well, a cement plug shall be placed, on the outside and inside of the production casing, if production casing is not removed, from a depth of at least five hundred (500) feet or from the depth of any deeper freshwater well within ½ mile of the well bore and extend fifty (50) feet into the cemented surface casing present in the wellbore. However, if it can be demonstrated that no freshwater bearing zones are present below the existing surface casing set in the well, the Director may approve an alternative surface casing plug extending from fifty (50) feet below the existing surface casing and extending fifty (50) feet into the cemented surface casing present in the wellbore.

I) A cement plug shall be placed inside the casing, at the surface of the ground, ~~from a minimum depth of 50 feet~~ to a depth of three (3) feet below the surface of the ground and the casing cut off three (3) feet below the ground surface, or deeper if surface use conditions indicate, and a plate welded onto the top of the casing and the remaining wellbore filled with soil and leveled in such manner as not to interfere with soil cultivation or surface use.

4) Foreign Material Prohibited

A) Except for an unavoidable loss of drilling and logging tools, production equipment or the presence of damaged casing obstructing the wellbore, placing or lodging any material or substance, in an unplugged well to either fill or bridge the hole for the purpose of avoiding proper plugging procedures is prohibited.

B) Foreign materials which have been placed in the hole shall be removed before plugging operations are commenced.

5) Plugging A Bridged Well

A) When a well becomes obstructed because of the loss of drilling or logging tools or producing equipment, which would be impractical to remove, the Director may vary the plugging requirements of this subparagraph and specify alternative plugging requirements.

B) In determining whether to approve and in selecting alternative plugging requirements, the Director shall consider the time and cost of removing lost tools or equipment, the potential for damage to fresh water, the depth of the lost tools or equipment in relation to the depth of fresh water zones, well construction characteristics, and the potential for upward migration of wellbore fluids into the fresh groundwater.

d) Horizontal Well Plugging Procedures

1) For an uncased well, the plugging procedures shall be in accordance with sub-paragraph (b) above with the exception that (i) the production interval plug shall be placed at the beginning of the well curve "kick-off point" and the required cement placed or extend above that point, and (ii) oil-based drilling mud may be used to fill the horizontal lateral of the wellbore up to the "kick-off point" provided the "kick-off point" is below any known fresh groundwater.

2) For an cased well, the plugging procedures shall be in accordance with sub-paragraph (c) above with the exception that (i) the production interval plug shall be placed at the beginning of the well curve "kick-off point" and the required cement placed or extend above that point, and (ii) oil-based drilling mud may be used to fill the horizontal lateral of the wellbore up to the "kick-off point" provided the "kick-off point" is below any known fresh groundwater.

3) If a vertical "pilot hole" is drilled below the well curve "kick-off point", and the pilot hole encountered another producing interval in the vertical pilot hole below the "kick–off point", a one hundred (100) foot cement plug shall be placed above each such correlated interval encountered in the vertical pilot hole, prior to drilling the horizontal portion of the well, unless approval has been granted to produce the other interval encountered in the pilot hole in accordance with applicable general rules or order of the Commission. Additionally, the Director may approve alternative forms of zonal isolation based on the productive potential of the isolated zone.

4) Well-site clean-up shall be in accordance with sub-paragraph (e) below.

e) Well Site Clean-Up

1) When plugging a well, the permit holder shall provide at least one (1) pit as described in subparagraph e) 2) below, or leak free, above ground, portable container into which plugging fluid wastes shall be deposited.

2) Plugging pits, shall be constructed with sufficient capacity to contain all plugging fluid wastes within the pits, and maintained in a manner that reasonably prevents overflow during plugging operations. Plugging pits shall be used only for the temporary storage of plugging fluid wastes, and shall not be used for the disposal of general oilfield wastes.

3) All general oilfield wastes generated during plugging activities shall be temporarily stored in on-site containers, and shall be removed from the site at the conclusion of plugging activity. General oilfield wastes shall not be disposed of through on-site burial or in plugging pits.

4) All plugging pits shall be filled and graded within thirty (30) days after conclusion of plugging activities, unless an extension has been granted by the Director. All plugging pits shall be closed allowing no subsidence or leakage of fluids, and where applicable, with sufficient compaction to support agriculture or forestry machinery.

5) All production equipment, concrete bases, machinery, and equipment debris shall be removed from the site.

6) Any drilling rat holes shall be filled with mud to a depth of ten (10) feet below the surface, at which point a cement plug shall be placed from ten (10) feet to three (3) feet below ground level and leveled to the surface with soil.

(7) Any other excavations shall be filled and the overall well site graded or contoured to prevent erosion.

f) Alternative plugging methods maybe authorized by the Director, provided the same or equal level of protection for the freshwater and oil and gas zones can be maintained.