

DEPARTMENT OF ENVIRONMENTAL QUALITY

OFFICE OF OIL, GAS, AND MINERALS

OIL AND GAS OPERATIONS

(By authority conferred on the supervisor of wells and the director of the department of environmental quality by section 61506 of 1994 PA 451, MCL 324.61506, sections 9 and 251 of 1965 PA 380, MCL 16.109 and 16.251, and Executive Reorganization Order No. 1991-22, MCL 299.13)

PART 1. GENERAL PROVISIONS

R 324.101 Application of rules.

Rule 101. These rules govern oil and gas operations in the state of Michigan and supersede all rules and regulations issued under the authority of Act No. 61 of the Public Acts of 1939, as amended, being §319.1 et seq. of the Michigan Compiled Laws, except for special well spacing and proration orders and determinations that have application to specifically designated areas throughout Michigan.

History: 1996 AACCS.

R 324.102 Definitions; A to M.

Rule 102. As used in these rules:

(a) "Act" means 1994 PA 451, MCL 324.101 to 324.90106.

(b) "ANSI" means the American national standards institute.

(c) "API" means the American petroleum institute.

(d) Aquifer means a geological formation, group of formations, or part of a formation that is capable of yielding a significant amount of water to a well or spring.

(e) "Authorized representative of the supervisor" means a department of environmental quality employee who is charged with the responsibility for implementation of the act or these rules.

(f) "Blowout prevention equipment" means a casinghead control device designed to control the flow of fluids from the well bore by closing around the drill pipe or production tubing or completely sealing the hole in the absence of drill pipe or production tubing.

(g) "Bottom hole" means the terminus of a wellbore.

(h) "Brine" means all nonpotable water resulting, obtained, or produced from the exploration, drilling, or production of oil or gas, or both.

(i) "Central production facility" means production equipment that has been consolidated at a central location that provides for the commingling of oil or gas production, or both, from 2 or more wells or production units of diverse ownership or from 2 or more prorated wells or production units.

(j) "Conformance bond" means a surety bond that has been executed by a surety company authorized to do business in this state, cash, certificates of deposit, letters of

PART 9. PLUGGING

R 324.901 Notification of intention to abandon and plug well.

Rule 901. A person shall not begin the plugging of a well until the permittee of a well has notified the supervisor or authorized representative of the supervisor of his or her intention to abandon the well and has received instructions for the plugging operation. The notification shall provide all of the information requested by the supervisor or authorized representative of the supervisor required to issue plugging instructions. The notification may also include any of the following information:

- (a) The present condition of the well.
- (b) Casing and sealing information.
- (c) The sizes and lengths of all casing strings.
- (d) The depths of the top of all principal formations.
- (e) The depths where oil, gas, and water were encountered.
- (f) The method to be used to tag plugs.
- (g) The proposed method for handling unusual or hazardous conditions.
- (h) The date of the last production or operation.

History: 1996 AACs.

R 324.902 Plugging instructions; methods and materials.

Rule 902. (1) The supervisor or authorized representative of the supervisor shall issue plugging instructions after receipt of notification pursuant to R 324.901. The plugging instructions shall specify all of the following information:

- (a) The type and amount of plugging material to be used.
- (b) The depths at which bridges are to be set.
- (c) The depths and lengths of cement plugs.
- (d) The amount of casing to be pulled.
- (e) Other requirements the supervisor determines are necessary for the proper plugging of the well.

(2) A permittee of a well shall ensure that all oil, gas, brine, and fresh water is confined to the strata in which the oil, gas, brine, and fresh water occur by using cement plugs or other plugs approved by the supervisor. A permittee of a well shall ensure that the well is plugged under static hole conditions at all times, unless otherwise approved by the supervisor or authorized representative of the supervisor.

(3) A permittee of a well shall ensure that each cement plug, except for the bottom hole plug required by subrule (5) of this rule, the plug to be set at the base of the surface casing required by subrule (6) of this rule, and the surface plug required by subrule (7) of this rule, is a minimum of 200 feet in length or contains 50 sacks of cement, whichever is the greater volume of cement, unless otherwise approved by the supervisor or authorized representative of the supervisor.

(4) A permittee of a well shall ensure that each cement plug, except for the bottom hole plug required by subrule (5) of this rule and the plug to be set at the base of the surface casing required by subrule (6) of this rule, is allowed to set undisturbed for a minimum of 1 hour and that the fluid level in the casing is continuously observed. If

the observed fluid level in the casing drops during the hour, then the cement plug shall be tagged to ensure that the plug is still in place before setting the next plug uphole. If the plug is found not to be in place, then the plug shall be reset.

(5) A permittee of a well shall ensure that the bottom hole cement plug is either:

(a) A minimum of 200 feet in length, is allowed to set undisturbed for a minimum of 4 hours, has reached a compressive strength of 100 psi or more, and is tagged to ensure that it is still in place before setting the next plug uphole; however, if the bottom hole cement plug in a dry hole drilled by rotary methods is a minimum of 400 feet in length and the fluid level in the hole is observed to remain static, then the bottom hole plug is not required to be tagged.

(b) A mechanical bridge plug or other approved bridge has been set and a minimum of 50 feet of cement has been placed on the bridge before setting the next plug uphole.

(6) A permittee of a well shall set the plug at the base of the surface casing using either of the following methods as approved by the supervisor or authorized representative of the supervisor:

(a) In static hole conditions, a cement plug shall be set at a minimum of 100 feet below the surface casing and shall extend a minimum of 100 feet into the surface casing. The cement plug shall be allowed to set undisturbed a minimum of 4 hours, shall have reached a compressive strength of 100 psi or more, and shall be tagged to ensure that it is still in place before setting the next plug uphole. If the plug is found not to be in place, then the plug shall be reset.

(b) A mechanical open hole bridge plug or other approved bridge shall be set a minimum of 100 feet below the surface casing. A cement plug shall then be placed on the mechanical open hole bridge plug or other approved bridge. The cement plug shall extend a minimum of 100 feet into the surface casing,

unless otherwise approved by the supervisor or authorized representative of the supervisor.

(7) A permittee of a well shall set a cement surface plug a minimum of 30 feet below the surface and within 5 feet of the surface, unless otherwise approved by the supervisor or authorized representative of the supervisor.

(8) If surface casing is not present, a permittee of a well shall set a mechanical open hole bridge plug or other approved bridge a minimum of 100 feet below the base of the glacial drift or 100 feet below the deepest fresh water stratum, whichever is the greater depth, and shall circulate cement to within 5 feet of the surface.

(9) A permittee of a well shall ensure that the surface pipe or conductor pipe abandoned with the hole is cut off at a point not less than 4 feet below grade, a 1/2-inch steel welded plate or another type of seal approved by the supervisor or authorized representative of the supervisor is placed across the top of the pipe or pipes, and the permit number of the well is permanently affixed to the plate or approved seal at the top of the well.

(10) A permittee shall file, within 60 days after plugging, the final plugging forms and certified copies of the service company records, which shall include all of the following information:

(a) The type of cement and number of sacks used, including the additives and percentages of the additives for each cement bridge plug.

- (b) The type and volume of plugging material used if other than cement.
- (c) The number of bridge plugs set in the hole and the depth and length of each plug.
- (d) Other materials left in the hole.
- (e) Service companies' records of cementing operations if requested by the supervisor or authorized representative of the supervisor.
- (f) All available graphics, if requested by the supervisor or authorized representative of the supervisor, showing the all of following information:
 - (i) Pumping.
 - (ii) Placement of cement.
 - (iii) Weights.
 - (iv) Times.
 - (v) Pump rates.
 - (vi) Other pertinent data dealing with the plugging operations.
 - (g) The amounts and type of mix water used for each sack of cement.
 - (h) The volume and types of spacers and flushes used.
 - (i) The operator's daily plugging records.
- (11) At a permittee's option, the well bore may be plugged from bottom to top with a material approved by the supervisor if the hydrostatic pressure of the material used is not allowed to exceed the fracturing pressure of the strata.

History: 1996 AACS.

R 324.903 Commencement of plugging operations.

Rule 903. (1) A permittee of a well shall commence plugging operations within 90 days after drilling completion or well completion as a dry hole, when the well has not economically produced or has not been utilized for its permitted use for more than 12 consecutive months, when a change of well status has not been granted, or when the permitted use has been suspended for more than 12 consecutive months. The supervisor may require, or a permittee may submit, proof that is necessary to determine if the well is being economically produced.

(2) After receiving a written request showing just cause why the well should not be plugged, the supervisor or authorized representative of the supervisor may grant temporary abandonment status pursuant to R 324.209 or require completion of the plugging operations.

(3) A permittee may petition the supervisor for a hearing to show cause why the well should not be plugged.

History: 1996 AACS.

R 324.904 Pulling of surface pipe and conductor pipe.

Rule 904. A permittee of a well shall ensure that surface pipe or conductor pipe is not pulled at a location, unless it is required by the supervisor.

History: 1996 AACS.

ANR Pipeline Plug and Abandonment of "Cased-Plugged" Monitoring Wells
 pursuant to meetings with Michigan Dept of Environmental Quality
 regarding Supervisor of Wells Instruction 1-2004

| Year | No. of Wells Plugged | Total Cost* | Avg. Cost per Well | Comments |
|-------|----------------------|--------------|--------------------|---|
| 2005 | 14 | \$587,777 | \$41,984 | All shallow wells; actual cost processed through AP for 2005 several deep wells in Winfield; actual costs for 2006 |
| 2006 | 12 | \$566,017 | \$47,168 | |
| 2007 | 20 | \$690,697 | \$34,535 | actual committed costs; several deep wells done |
| 2008 | 14 | \$766,384 | \$54,742 | 7 shallow, 7 deep |
| 2009 | 18 | \$893,775 | \$49,654 | 3 shallow, 15 deep |
| 2010 | 14 | \$555,106 | \$39,650 | 10 shallow, 4 deep |
| 2011 | 13 | \$789,668 | \$60,744 | 7 shallow, 6 deep |
| 2012 | 18 | \$894,474 | \$49,693 | 14 shallow, 4 deep |
| 2013 | 13 | \$912,943 | \$70,226 | 6 shallow, 7 deep |
| 2014 | 22 | \$1,349,820 | \$61,355 | 15 shallow, 6 deep, 1 extremely difficult |
| 2015 | 12 | \$1,164,300 | \$97,025 | 6 shallow, 6 deep |
| 2016 | 29 | \$1,070,400 | \$36,910 | 7 shallow, 3 deep (1 extremely difficult), 18 very shallow, 1 not owned by us |
| 2017 | 11 | \$1,188,200 | \$108,018 | 3 extremely difficult, 7 deep, 1 shallow |
| Total | 210 | \$11,429,561 | | remaining cost 2016 through 2017 \$2,258,600 |

Basis for forward cost projections:

- avg. shallow well plugging cost = \$40,000 (adjusted 09-02-09 based on experience)
- avg. very shallow well plugging cost = \$12,000 (water/vent wells at Goodwell)
- avg. deep well plugging cost = \$74,000 (adjusted 11-07-12 based on experience)
- avg. "extremely difficult" well plugging cost = \$120,000-\$125,000

11/10/15 - 2015 costs are expected total spend; 2016 are budget plan (see cell comments in B18 & C19)

| Remaining Cased Plugged Well as of 12-11-2015 | | | |
|---|-------------------|---------|---------------------|
| Year | Field | # wells | Est Cost |
| 2016 | Goodwell | 18 | \$ 68,900 |
| | Loreed | 4 | \$ 471,400 |
| | Austin | 7 | \$ 529,800 |
| | | | \$ 1,070,100 |
| 2017 | Austin | 4 | \$ 459,900 |
| | Goodwell | 1 | \$ 109,100 |
| | Loreed (@highway) | 5 | \$ 549,300 |
| | Reed City | 1 | \$ 69,900 |
| | | | \$ 1,188,200 |