

Casing Policy (1)

All Conductor casing will have a cement seal at the surface preventing the possibility of any ground water contamination and will remain in the well if not pulled prior to the Surface casing cement job.

All Surface casing will be set at a depth of 300 ft. up to 800 ft. 50 feet below the lowest known fresh water aquifer with class A cement **only**. Casing will have an external collapse pressure rating great enough to handle the hydrostatic pressure of a class **A** cement from the casing shoe to surface and Internal pressure rating to handle any anticipated down hole pressures. Cement must have a minimum 500 psi compressive strength and have a minimum 8 hour wait prior to drilling the shoe out. An Annular type blowout preventer will be installed for emergencies, but casing will not be used as pressure **control**. Surface casing will **only** be used to protect fresh water aquifers. No casing shoe shall be drilled until a cement seal has been secured between the Surface casing and the well bore (Annular fill up with cement on cement basket installed on surface casing below conductor pipe) preventing any ground water contamination. When Gel or water circulates back to surface but no cement returns are received then a 25 foot trimming pipe must be used and cement must be brought back to surface.

An intermediate string of casing will be set prior to the drilling into any known oil and gas producing zone. Casing must have an internal pressure rating of 3000 psi. Casing must be cemented from casing shoe to surface. Casing string must be deep enough to prevent underground blowout from anticipated bottomhole pressures. Casing must have an external collapse pressure rating to handle cement design from casing shoe to surface. Cement must have 500 psi compressive strength and have a minimum 12 hour wait prior to drilling the shoe out. All cement and casing designs will be presented on a specifications sheet with Permit Application for approval. Copy of Cement tickets will be kept on location to be viewed by inspector until drill rig is removed. In unknown or over pressured conditions a 5000 psi rating on casing, will apply.

A copy of all cement tickets will be attached to the well history, tickets should include all volumes and pressures of job from start to finish.

To insure adequate annular space for cementing the following chart should be followed.

| Casing Size | Minimum Hole Size |
|----------------------------------|--------------------|
| Up to 7" Outside Diameter (O.D.) | Casing O.D. + 1 ½" |
| More than 7" O.D. | Casing O.D. + 2" |
| More than 10 ¾ " O.D. | Casing O.D. + 3" |

Blowout Prevention Policy (1)

All wells shall be equipped with a minimum of the following equipment and shall be attached to the Intermediate casing and shall conform to the API specification for wellhead equipment:

(a) A double ram blowout preventer, including pipe and blind rams, and an annular-type blowout preventer or other equivalent control system as approved by the supervisor or authorized

Comment [s1]: In most cases Class A only is what will be used, and in all cases Class A will be used with other additives used to achieve a good cement job. The object is to get cement seal with 500psi compression strength. The operator should be responsible to get that done. Many of the potential additives will increase the time past 8 hours

Comment [s2]: This is not a safety issue. If the casing collapses then the well will not be drilled.

Comment [s3]: This should read "Annular type Divertor" It will be required to set an intermediate string before encountering any producing formations so a BOP is not necessary, especially is it can't be used for pressure control.

representative of the supervisor. A 3000 psi working pressure Orbit or Safety valve may be substituted as a blind ram.

(b) Accessible controls both on the rig floor and at a safe remote location of at least 50 feet from wellhead.

(c) An Annular choke valve

(d) A drill pipe or Air head valve capable of pump truck

Connection

(e) A flow line of the proper size and working pressure, must be installed in a straight line to pit and must be anchored properly.

(f) Blowout prevention equipment that has a rated working pressure of 3000 psi. In unknown or expected higher pressures a 5000 psi working pressure will be required.

(2) The blowout preventers shall be installed above ground level. No cellar shall be deeper than 3 feet and must be paneled or encased and kept in working order. The entire control equipment shall be in good working condition at all times. All outlets, fittings, and connections on the casing, blowout preventers, choke manifold, and auxiliary wellhead equipment that may be subjected to wellhead pressure shall be of a material and construction that will withstand the anticipated pressure. Must be fireproof. The lines from outlets on or below the blowout preventers shall be securely installed, anchored, and protected from damage.

(3) Blowout preventers, accumulators, and pumps shall be certified as operable under the product manufacturer's minimum operational specifications. Certification shall include the proper operation of the closing unit valving, the pressure gauges, and the manufacturer's recommended accumulator fluids. Certification shall be obtained through an independent company that tests blowout preventers, stacks, and casings. Certification shall be required annually and shall be posted on the rig floor. In addition to the primary closing system, including an accumulator system, the blowout preventers shall have a secondary system. A combination of any 2 of the following secondary closing systems is acceptable:

(a) Electric-operated pump.

(b) Air-operated pump.

(c) Hand-operated pump.

(d) Nitrogen-operated pump.

Blowout preventer rams shall be of a proper size for the drill pipe being used or production casing being run in the well or shall be variable-type rams that are of the proper size range.

(4) Blowout prevention equipment and intermediate casing shall be tested to a pressure of 1,500 psi at surface for not less than 30 minutes, before drilling the plug on the intermediate casing, and at other intervals as approved or requested by the supervisor. If, at the end of 30 minutes, the pressure shows a drop of 10% or more from the original test pressure, the casing shall be condemned until the leak is corrected. A pressure test demonstrating less than a 10% pressure drop after 30 minutes is proof that the condition has been corrected. A record of each test, including test pressures, times, failures, and each mechanical test of the casings, blowout preventers, surface connections, surface fittings, and auxiliary wellhead equipment shall be entered in the logbook, signed by the driller, and kept available for inspection by the supervisor or authorized representative of the supervisor. The Site Coordinator must be present for pressure test.

(5) No pre existing well may be deepened without a (MIT) mechanical integrity test of 1,500 psi with no more than 10% loss of pressure in 30 minutes, must be witnessed by inspector.

Comment [s4]: I feel the Orbit or Safety Valve should substitute for Blind and pipe ram except in wells deeper than 7,000' or in extremely sensitive areas.

Comment [s5]: This connection does not need to be on the air head. Should be at or below the BOP.

Comment [s6]: Not sure that there is a manufacturer's minimal operational specifications in most cases. Should be certified as operational by the independent company who will use IPAA specs.

Comment [s7]: Should say "deepened to producing zones with anticipated pressures higher than what is existing in the well.

(6) A gas buster and flare System shall be in place at a minimum of 100 ft. from the wellhead before drilling into any known gas or oil producing zone.

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