

**WELL CONSTRUCTION WORKSHOP DISCUSSION PAPER**  
**FOR**  
**THE DEVELOPMENT OF UPDATES TO THE DIVISION OF OIL, GAS, AND GEOTHERMAL**  
**RESOURCES WELL CONSTRUCTION REGULATIONS**

The Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) is undertaking a rulemaking to strengthen regulations related to well construction standards. This rulemaking effort will build upon the existing regulatory framework for well construction and address issues identified by the Division and other key stakeholders.

This document outlines DOGGR's current regulatory goals. The public and stakeholders are encouraged to provide input on how best to accomplish these goals. Following the regulatory goals are general survey questions to aid DOGGR in information and data-gathering. Suggestions about a specific regulatory approach, comments on regulatory goals, and answers to general discussion questions are most useful if they are supported by discussion of the benefits and costs associated with the approach. References to specific wells, published data, and research is highly encouraged.

**General Overview and Regulatory Goals**

The rulemaking will give particular attention to the full life of the well. It will encompass cementing and casing design; the isolation risks associated with active, idle, and previously abandoned wellbores; how to prevent and mitigate hazards associated with surface operations and geologic conditions; and construction requirements for non-hydrocarbon fluids. Once completed, the new regulations will require modernized wellbore design, life-of-well reporting and monitoring, and risk assessment and mitigation.

Regulatory Goals:

- Incorporating the best available science, codify best practices for well casing
- Incorporating the best available science, codify best practices for well cementing
- Minimize risk from well operations
- Minimize risks associated with wells to be abandoned
- Accurately assess the risk of wells previously abandoned
- Mitigate surface and subsurface well location hazards for life of well

Regulatory Goals Discussion:

**REGULATORY GOAL #1:**

***Incorporating the best available Science, codify best practices for well casing***

- **Casing setting depths**
  - Well control
  - Zonal isolation
- **Casing Specifications**
  - Grade
  - Material compatibility (NACE standards for corrosion resistance, etc.)
  - Thermal requirements
  - Connections (threading, etc.)
  - Quality control (testing)

Questions for discussion:

1. Are there valuable additional tests that should be considered in addition to current post-cementing tests in Section 1744.4 (such as surface hydrotesting)?
2. What methods should the Division use to evaluate wells drilled below protected water to evaluate when a groundwater protection string is appropriate?
3. Under what circumstances is intermediate casing(s) required (e.g., when necessary to address hazards, isolate hydrocarbon-bearing flow zones, ensure well control when drilling into higher pressure zones, loss circulation zones, or conserve and protect natural resources)?

**REGULATORY GOAL #2:**

***Incorporating the best available Science, codify best practices for well cementing***

- Dimensional requirements
- Specifications
- Water zone protection
- Compatibility requirements for non-hydrocarbon gasses
- Evaluation

Questions for discussion:

1. What is the length of cement required above the top of any hydrocarbon zone for zonal isolation?
2. Should the Division require cement across non-USDW water sands in some cases to reduce the incidence of casing leaks or to facilitate potential future de-watering of oil sands? If so, where should such a requirement be applied?
3. What should be the compressive strength requirements associated with casing cementing (e.g., waiting time to 500 psi to drill ahead)?
4. Are there alternatives to cement as a sealing material?
5. When should a cement evaluation log be required (e.g. if there were cement returns to surface, or shallower than to surface)?

### REGULATORY GOAL #3:

#### *Minimize risk from well operations*

- Reporting, especially lost circulation
- Utilizing subsurface and/or surface safety valves
- Using innovations such as coiled tubing and snubbing units during appropriate workover operations
- Ensuring integrity of producing wells capable of flow to surface
- Ensuring that rigs and well intervention equipment is appropriate to prevent damage to health, environment, and resources, including operation in an urban environment

#### Questions for discussion:

1. What testing is applicable after remedial cementing operations (i.e. casing hole squeeze, liner top squeeze, etc.)?
2. What well control equipment should be required for drilling and intervention beyond the BOP stack?
3. What volume of drilling fluid should be on site to ensure well control?
4. What regulations are necessary to ensure that innovative operations are performed safely?
5. What are the best practices available to minimize health risks to the public during normal drilling and workover operations in an urban environment?

### REGULATORY GOAL #4:

#### *Minimize risks associated with wells to be abandoned*

- How to best respond to casing collapse or damage
- When is casing removal justified?

#### Questions for discussion:

1. Abandonments may be compromised by casing damage and/or stuck tubing. What strategies would mitigate either the risk or the consequence of these problems?
2. Under what circumstances should a cavity shot or casing removal be required?
3. What other techniques would improve the effectiveness of future well abandonments?

**REGULATORY GOAL #5:**

***Accurately assess the risk associated with wells previously abandoned***

- **Standard abandonments**
- **Alternative abandonments**
- **Abandonments offsetting acid gas**

Questions for discussion:

1. What is the long-term fate of typical oilfield casing when properly abandoned with cement (inside and out)?
2. Is there evidence that geologic isolation by means of shale creep or sloughing is taking place? If so, what methods could be used to evaluate the probability of this occurring on wells abandoned in the past?
3. What is the long-term fate of cement and casing offsetting injection of acid gasses such as CO<sub>2</sub> and H<sub>2</sub>S? Is there data to evaluate how this may change with thermal cement at steam chest temperatures of 170 – 300 F?
4. What methods, if any, are available to predict cement channel formation in the presence of acids or acid gasses?

**REGULATORY GOAL #6:**

***Mitigate surface and subsurface well location hazards for life of well***

- **Seismic-related hazards**
- **Surface stability (landslides, etc.)**
- **Compaction and subsidence**

Questions for discussion:

1. How should identified geologic conditions be incorporated into construction requirements?
2. Under what circumstances is geotechnical slope stability analysis appropriate for a drilling location?

**General questions for discussion:**

1. Are there existing regulations which should be re-evaluated? If so, which regulation(s), what are the risks, and how can they be improved?
2. What practices and regulations need to be re-evaluated in consideration of life-of-well risks?
3. Are there current industry best practices that should be codified?
4. Are there additional goals or areas of inquiry the Division should consider regarding well construction?