



6/30/2015

State Water Resources Control Board
Attn: Jeanine Townsend, Clerk to the Board
1001 I Street, 24th Floor
Sacramento, CA 95814



Via Email Only: commentletters@waterboards.ca.gov

RE: Comment Letter – Model Criteria for Groundwater Monitoring

Dear Board –

Thank you for the opportunity to submit comments on the “Draft Model Criteria for Groundwater Monitoring in Areas of Oil and Gas Well Stimulation” revised June 23, 2015. We appreciate the importance of protecting our states resources and allowing for the responsible development of those resources. The Termo Company is an 82 year old California based oil and gas producer with a proud history in the state of achieving both those goals. We are a family and employee owned independent company with operations in five counties in the state. We pride ourselves on our California roots.

While Termo engages in very few hydraulic fracture stimulations, we believe it is an important and safe tool to maximize resource production. As such we have concerns about the Model Criteria put forth by Water Resources Control Board. These are outlined below as both general and subject specific concerns.

We submitted comments on the previous Draft Model Criteria. We must emphasize that these criteria will place a huge, damaging financial burden on smaller oil and gas operators in the state (i.e. companies such as Termo that are not Chevron, Aera, CRC, or Linn). This will not only affect the bottom line of existing operations, but will also affect future plans to drill and produce in the state. We ask that you consider our previous comments which are reiterated below:

General Comments:

- The proposed criteria inordinately burden smaller oil and gas operations and producers that may have isolated single well operations.
- The proposed monitoring criteria, specifically the three well minimum for monitoring, will hamper exploration drilling and the discovery and development of future oil and gas resources in the state. These resources are essential to meeting our near-term and future energy needs if we are to avoid importing more crude oil into the state.
- Independent operators with scattered wells or small fields will be hurt greatly by these rules, since a field-wide monitoring program will neither be applicable or financially feasible for their operations. The state will effectively be preventing small companies from optimizing their production using stimulation by placing such a heavy cost burden on complying with regulations.
- Monitoring criteria will be very difficult for smaller operators wishing to stimulate 1 to 3 wells in an isolated area. For example, the use of 3 monitoring wells to stimulate 1 well will raise the

cost of the single well stimulation by approximately \$600,000 (assuming 3 wells to a depth of 1,000').

- Monitoring of multiple aquifer depths can be accomplished through a single wellbore using multi-chamber (multi-depth) completion within that single wellbore.
- A risk-based analysis and subsequent monitoring design should be allowed. For example, if the risk to groundwater comes from the zone of fracture stimulation, then the monitoring of the deepest protected aquifer should be sufficient.

Specific Comments:

2.0 Area Specific Groundwater Monitoring

- In the revised rules, the definition of an aquifer has been made *even broader* than in the first draft of rules. Again, we ask that the regulations actually allow for area specific groundwater monitoring and not just a blanket, cookie-cutter plan for every well.

2.1.1 Groundwater Monitoring Design

- Requiring an operator to drill three monitoring wells per aquifer for one stimulation is economically unfeasible. This requirement will raise the cost of a single stage one well stimulation by at least \$600,000 (assuming 3 wells to a depth of 1,000' to monitor a single aquifer zone). The state will effectively be preventing small companies from optimizing their production using stimulation by placing such a heavy cost burden on complying with regulations.
- The location of a monitoring well should be based on the hydrogeology of the aquifer rather than a cookie-cutter approach.
- Other methods of gaining data should be considered viable options for water monitoring. For example, radioactive tracers can give you a picture of the fracture dimensions after the job, confirming or denying the estimated fracture geometry and whether the fracture stayed in the intended zone. Calculating and plotting the net pressure during the actual stimulation will show the growth patterns and containment of the fracture. If it can be illustrated that the fracture stayed in the intended zone and was contained, the need for monitoring at the aquifer becomes much less important. The best data is the data we collect near the wellbore and the data collected during the stimulation activity itself.
- Vertical distance from the fracture to the lowest zone of fresh water should be a consideration when determining risk and water monitoring requirements. For example, if you are stimulating at a depth of 6,000 feet and the closest fresh water is at 1,000 feet, you have nearly a mile of rock separating your stimulation from fresh water. This scenario is much less risky than pumping a stimulation at 2,500 feet where fresh water is at 1,000 feet. Depth of stimulation, along with geology, should be a factor in determining the nature of the monitoring program.

Our primary concern with the Draft Model Criteria is the significant economic burden it places on the independent oil and gas production companies in the state. We do hope the Water Board will consider this burden and its role in potentially eliminating future jobs, tax revenue, and crude oil production as it implements the Groundwater Monitoring Criteria.

Again, thank you for this opportunity to provide feedback on this important issue. If you have any further questions, do not hesitate to contact Termo. We will continue to work with the Water Board and our industry partners on this issue and ensuring the safe and viable production of oil and gas in the state.

Sincerely -



Ralph Combs
Manager, Corporate Development



Christi Reid
Petroleum Engineer