Thank you for your comments on the Water Quality Rules and Regulations Chapter 12-EQC Hearing. Your comments have been received.

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Water Quality Rules and Regulations Chapter 12-EQC Hearing

Attachment(s):
Chapter 12 Revision Comments 5-8-20.pdf

f(i) Information on the geology of the area, including:

f(i)(A) Known or potential faults, fractures, springs, karst features (such as sinkholes and other similar features) within a one (1) mile radius of the proposed well

This is one will be hard to address with the limited information typically available. Plus, I see this as the one item that is most likely to shut down an acid program. I have a gut feeling that the WDEQ personnel are going to view all fractures/faults etc. as being a negative due to the potential of being in communication with other wells. Or even worse, if a new well drops into a fracture but you have no knowledge of how the fracture is oriented or the aerial extent will WDEQ shut the project down until you can address their questions. What will this do to the project: 1) cost to perform additional studies/geophysical logging (if possible); 2) time to stop and perform the additional work and/or the worst 3) shut down the acid job altogether forcing the Owner to drill other test holes hopefully finding a well that does not need stimulation or in a worse case scenario shutting down the whole project altogether. The drilling of additional vertical wells will increase the potential for contamination of the aquifer.

f(i)(B) Faults and fractures that may extend from the acidized zone into overlying and underlying geologic formations and a description of any measures that will be taken to ensure that the acidized solution does not migrate into any of those geologic formations

This is another area that we will be hard pressed to come up with definitive data on the orientation and extent of faults. This could be another avenue used by WDEQ to shut down the stimulation projects. I say this because everyone knows that WDEQ is going to side on the very very conservative side, so if you can't adequately alleviate there concerns with the limited data available to us then the stimulation program is going to be denied. End result, the project will require additional vertical wells to be drilled to meet the system demands. This will increase the cost of the project, expose the aquifer to a higher potential for contamination (more holes, more access for contaminants) and this will increase the length of time for the project.

f(ii) For wells developed within a radius of one (1) mile of existing wells, applicants shall submit plans that analyze the risk and mitigation measures to be taken to prevent impacts to those wells. The submitted plans shall include the risk and mitigation measures for any potential effects to each existing well

f(iii) Existing information on the location of other wells (such as water supply, oil and gas, mineral development wells) within a one (1) mile radius of the proposed well, including any wells that intercept the acidized zone, and for wells that intercept the acidized zone:

> ***(A) An analysis of whether or not those wells that intercept the acidized zone have been properly plugged and abandoned;***
>
> ***(B) An analysis of whether or not those wells have been properly cased and cemented; and***

(C) A description of what measures will be or have been taken to prevent the acidized solution from migrating vertically in the annular space or casing of the existing wells into overlying or underlying geologic formations;

Researching oil and gas data will probably not be that difficult, however, I have found that the web site often time does not have all of the sundry information listed indicating how the well was abandoned or even the CBL logs. This could take some time to visit the Oil and Gas office to rummage through paper copies. Also, some of this data with respect to the proper plugging and abandonment and the integrity of the cement job does not exist or may not be available.

The private side (or even the municipal) is even more scary. Until very recently most municipal wells have not had a CBL run on them so there is no way of knowing how adequate the cement job is. This is even worse on the domestic/livestock wells. The data on the SOC's just does not provide the detail of information that we need to say that there is an adequate annular seal on these type of wells. Also, most of the data gathered at the time that these wells were constructed were not performed with the potential for future acid jobs to be performed in the area. Therefore, if a CBL was performed on a well it may have been performed within a couple of days of the cement job. In the case of wells cemented with light cement, this CBL may show a marginal quality, when in fact it may provide a perfectly good seal.

Again, a proposed mitigation program will be reviewed subjectively which could lead to numerous revisions (time/cost).

From the Owner's perspective – I don't know how they will handle this with respect to consulting fees. I see them very open-ended almost needing to be on a time and material basis and I don't know if many clients will be able to afford this which again will mean the project will probably not meet the desired production goals.

f(iv) A description of the borehole drilling phase and what measures will be taken to minimize the introduction of lost circulation materials into aquifers when encountering under-pressured geologic formations or other factors that may lead to a loss of circulation;

This could lead to a fight between the consultant and the well driller with respect to additional time and costs that the driller may incur if LCM use is limited and he gets stuck in the hole or has a lot more cost in time and mud materials to regain circulation than if he had used more LCM than what the submitted drilling program allowed. What happens if we have to violate the plan submitted to WDEQ to save the well, will they not permit the well?

I can also see the cost of the drilling bids increasing as the consultant tries to write a spec that will not sound too onerous to the drillers.

I can see a much increased cost to do projects here. If you encounter zones that you can't circulate, you may be required to set yet another casing string just above the aquifer, which would have the well diameters starting much larger to begin with in the plan rather than trying to stay with the plan and fighting lost circ. We now just try and limit the use of non degrading things such as sawdust or cotton seed hulls and only use things like flocele or mica. I can't imagine that this would be a concern in the aquifer. Maybe they need to be less broad and continue on like we do and just say something like the limitation of certain products.

Standards - What are the regulatory criteria to which these "discussions" should be addressed? For example, the implication of asking about what measures will be taken to ensure against the migration of lost circulation material f, IV suggests there is a requirement that lost-circulation material migration into aquifers be minimized. Is that the case?

f(v) A description of the acid injection process and the measures that will be taken to ensure that injection pressures do not create fractures in the overlying and underlying geologic formations and through which the acidized solution may migrate.

Who is going to review the calculations for this. It is not like we are the oil and gas folks with a library of data on the mechanical properties of the different formations to start to analyze the fracture patterns etc. This probably isn't that big of a deal since most of the time the fracture pressures of an acid job are not that extreme, however, coming up with the data to show WDEQ that even at these lower pressures the potential for creating fractures is minimal. I am sure there is data out there from the oil/gas industry but I am betting most of this is going to be proprietary.

Standards - What are the regulatory criteria to which these "discussions" should be addressed? For example, the implication of asking about what measures will be taken to ensure against the migration of acidizing solutions (f(v)) suggests that there is a prohibition on the migration of such solutions. Is that the case?

F(vi) A description of the volume and content of the acid and any other chemical compounds to be used during acidizing activities, including the management of the acid and chemical compounds prior to acidizing and final disposition of any acid, water, or chemical mixtures recovered from the well after acidizing activities are completed

This is, essentially, the only proposed change the Chapter 12 that can adequately be describe in detail to address WDEQ's permit requirements that are not subjective in nature.

f(vii) A description of the measures that will be or have been taken to ensure that the recovery of the acidized solution is of sufficient duration and volume to eliminate the potential for acidic impacts to other wells completed within the injection zone

Who decides what is a sufficient duration and volume. By what parameters are we to base these measures on? Return to pre-acid water quality conditions? Monitor the quality pre- and post- acid enhancement at nearby wells and who determines that these nearby wells should be monitored?

(viii) A description of the methods to be performed to establish the placement and integrity of the annular seal and casing prior to acidization of the well.

This is too open ended. It will result in numerous submittals as WDEQ reviews and rejects or asks for more information on the methodology submitted. WDEQ should take the time to specify what at a minimum will be required. Will this be beyond the current requirements of requiring the 2-inch annular space around the casing be cemented? If they are looking for a CBL on what basis will the integrity of the annular seal be judged?

Other sections (e.g. Section 9 (b)(iii)(B)(IX)(2); Chapter 26, Sec. 6(c) and 9(c)) refer to sealing materials other than “cement”. How are these to be accommodated with respect to verification of sealing characteristics?