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Wyoming Department of Environmental Quality
200 West 17th Street, Suite 200
Cheyenne, Wyoming 82002

RE: Comments for DEQ – WQD Proposed Chapter 12 Rules and Regulations, March 4, 2020
Draft

To Whom it May Concern:

Thank you for the opportunity to present comments on the March 4, 2020 draft of the proposed DEQ – WQD Chapter 12 Rules and Regulations. It is expected that there are many comments on these proposed rules from engineers, geologists, and others in Wyoming. The practitioners of public water system design have the responsibility to provide our citizens and visitors with safe and reliable sources of water. The vast majority of the practitioners understand the impacts of their design and take the responsibility very seriously. They also have great care and pride in their work. The promulgation of new, onerous rules based on one or a few projects with significant issues will unnecessarily burden the citizens of our State.

Many years of experience have led to some practices, especially in the design and construction of water supply wells, that do not fit neatly into a set of rules that were developed by committees in parts of our country. It is critically important to remember that many of the public water systems in Wyoming are not municipalities or large water districts but are smaller systems that may serve only 25 people. It is understood that the responsibility of providing safe drinking water is no less important for the “mom and pop” store or campground than it is for a large city. However, it is very important when promulgating new rules to consider the economic impact of those rules and to weigh the benefit versus the cost. The comments below are specific to sections of the draft rules, but the process of forming new rules and changing existing rules needs to consider the practicality of requirements, the costs of obtaining additional information, and the level of uncertainty that is acceptable. The Safe Drinking Water Act follows this practice when considering new or changing existing primary drinking water standards and our regulations need to also strike a similar balance or there will be many unintended and catastrophic consequences to both large and small public water systems.

My comments refer to sections of the proposed rule by the line number of the left side of the draft rules and regulations. However, an over-arching comment is that there are multiple conflicts, mis-used terms, and other concerns.

Lines 294 to 296. This section asks for specific yield of the well. Specific yield refers to the amount of water that can be drained from a unit volume of porous aquifer media. Specific yield cannot be determined from pump testing of confined aquifers and is meaningless for non-sandstone aquifers. Was the intended term “specific capacity”? That would make sense since the previous information requires the pumping rates and water levels, which are the basis of calculation of the specific capacity.

Lines 487 to 521. Much of the data requested in these requirements should not go on plans and profiles but be contained in text with supporting figures. The “The well test method and allowable tolerance.” does not specify what test is being requested. In line 477 and through other portions of the document the term “drill hole” is repeatedly used. This is not a commonly accepted term for a hole created for the construction of a water supply well. The commonly accepted term is “borehole”.

Lines 523 to 573, Wells to be enhanced with acid. To date there have been no documented issues with acid enhancement projects in Wyoming, where the integrity of the cement seal was intact and the waste water was properly disposed. The majority of wells that are the targets of acid enhancement will not be located near other wells in the same formation and impacts are highly unlikely. Obtaining information required in the proposed rules could require the drilling of multiple monitoring wells to sufficiently demonstrate that “faults” do not propagate upward into overlying formations. This is not likely for wells in the Madison Limestone and/or Paleozoic Aquifer because of thick sequences of shale that confine them. Furthermore, analysis of the cement integrity of wells already abandoned or existing domestic wells is not feasible.

Testing of water quality from wells that have been enhanced with acid at multiple locations shows that impacts to the fracked formation are minimal and if present are short lived. This includes projects at Dayton, the Bighorn Basin, Newcastle, and the Powder River Basin. When considering new rules, it should be realized that the volumes of acid used to enhance wells is usually small. A normal volume of acid is 15,000 to 20,000 gallons (2,000 to 2,700 cubic feet) of acid with additional water injected with the acid to displace it into the formation. Conducting a cement bond log on a well to be enhanced with acid and identifying nearby wells that could be potentially impacted are reasonable requirements, but many of the other requirements are burdensome and costly and not needed in most cases.

The basis of requirement of (iv) starting on Line 555 is unclear. If voids in a well are filled with lost circulation material and cement can be successfully installed, why would that have an impact on the success of an acid enhancement and preventing migration of acid? In the case of the new City of Gillette Madison wells, there are measures that could have been taken to reduce the lost circulation conditions, but no Wyoming contractors were found to be qualified to complete the project in the pre-bidding process. This speaks to earlier comments regarding experience being used in design and construction of water wells that does not fit neatly into regulations developed by committees.

Lines 937 to 941. What is “a properly protected submersible pump”? Why is necessary to pull a well casing in from a well in a building? Or is this requirement referring to the pump column pipe, which is completely different than well casing? If the casing can be pulled out of a well, then it most likely is not sealed properly and the well should not be a public water supply source.

Line 946 to 947. How does a well “complete testing and maintain records”? This should be reworted.

Lines 949 to 955. This requirement should have more flexibility. It is very difficult most of the time to predict a well yield and drawdown and the rule as written could fail to identify hydraulic boundaries or the effects of other pumping wells. In the case of wells drilled and tested by the Wyoming Water Development Commission, test wells are pumped for a period of seven days which provides much more definitive and defensible data in most cases. It is not our intention to propose requiring week-long tests on all public water supply wells, but the rule should provide an option for having the test pumping rate be the design rate if the test is of sufficient duration.

Lines 961 to 982. This requirement is onerous and unnecessary for many projects. It is also not possible to perform on some public water supply wells. The definition of “mineralized water” as water having a total dissolved solids (TDS) concentration greater than 500 mg/L is very problematic. Across much of Wyoming water with a TDS of less than 1,000 mg/L is considered good water and is used by both private landowners and municipalities. The secondary drinking water standard for TDS for a public water supply source is up to 1,000 mg/L. The rule will also be difficult to implement and enforce because there is frequently no data to identify the presence of shallow groundwater, much less the quality of that water. This water is not identified because of drilling methods, such as mud rotary, which is required to hold the borehole open. Frankly, use of

500 mg/L as a water quality threshold and requiring bond logs of wells that penetrate water bearing intervals for wells in which cement was successfully placed appears to be based on paranoia and results in unnecessary project costs. The motivation of making this a requirement should be considered and if it is caused by one highly publicized project then the requirement is probably not needed, when the issue should have been addressed in that project.

Another issue with this requirement is shallow public water supply wells with low demands, such as campgrounds, stores, small businesses, etc., can be completed with PVC casing. Bond logging is not effective on PVC wells.

Several years ago DEQ-WQD considered this very issue over use of lite cement and the tendency of lite cement to not show good bonding on steel casing. Yet in many applications the use of lite cement is warranted and minimizes the risk of failed cement installation. The DEQ-WQD came to the conclusion that the use of lite cement is appropriate and bond logs were not required to the extent that this proposed rule attempts.

If DEQ-WQD is concerned about the integrity of well seals then it is recommended that staff go into the field to observe the cement installation process and if there are concerns with specific projects, then the seal should be witnessed. Other states, such as Utah, require witnessing of cement seal installations for public water supply wells. If issues arise with the installation of the cement then a bond log is appropriate. A blanket requirement for bond logs is expensive and mostly unnecessary regulatory over-reach and the use of bond logs should be left to the discretion of qualified, experienced professionals.

Line 1051 to 1052. The height of the well casing for this classification of wells (and all public water supply wells) should be consistent with the EPA rule of the wellhead being extended at least 12 inches above a finished slab or floor or 18 inches above ground level. Since public water systems using groundwater are routinely inspected for compliance with EPA rules, the DEQ-WQD requirements should match.

Line 1062. The finished height of the well casing should match EPA rules.

Line 1083. The term “gravel pack” should not be used. Gravel is rarely, if ever, appropriate for use in construction of public water supply wells. Filter pack is a more appropriate term.

Lines 1093 to 1094. This requirement is not consistent with text in Lines 1367 to 1368.

Lines 1101 to 1112. This requirement appears to suggest that a well with artificial filter pack should be or could be developed prior to installation of an annular seal. If this is done then the filter pack can be displaced, moved, or settled. Additional filter pack would need to be installed in the well, which conflicts with the requirement found in Line 1099. In some instances, such as when filter pack bridges in the annular space, well development prior to installation of the well seal is beneficial.

Line 1107 indicates a filter packed well can have as little as 10 feet of cement seal, which is contradictory of SEO rules and regulations, and can lead to the introduction of shallow poor quality water, which contradicts earlier requirements of these proposed rules in regard to sealing out “mineralized” water.

Line 1160. The use of the term “driven” is out of place here. The majority of wells completed in limestone and sandstone wells are not driven.

Lines 1181 to 1188. What is the definition of “strata” and what is the intention regarding this requirement? As written, a strict interpretation of the proposed rule requires “every aquifer or strata be sealed off”. This means the well cannot yield water because all of the water bearing strata are

sealed. There are concerns that DEQ-WQD is trying to create regulations that will require limiting completion of public water supply wells to a single water bearing interval, such as one sandstone. If the intention of this rule is to limit the number of water-bearing intervals that can be screened within an aquifer then it is in direct conflict with Wyoming water rights law, which requires that a well fully penetrate an aquifer to be adequately constructed. A well that does not fully penetrate the target aquifer has no standing for filing a complaint for protecting a senior water right.

Lines 1240 to 1243. This section appears to be out of context with the rest of Chapter 12. The intent of the rule is to construct a public water supply well, not convey a generic liquid. What is the relevance of an “injection/recovery rate”? If the intent of the rule is to be able to withdraw a designed pumping rate, then that is what the rule needs to state. If the rule is attempting to address casing strength during construction then it should also state that the casing needs to have sufficient strength to withstand installation of the annular seal.

Lines 1354 to 1357. The use of lead packers is not acceptable for a public drinking water supply well and contradicts the text in the next section of the proposed rules.

Lines 1367 to 1368. The stricken text in Line 1363 gave the option of selection of screen slot size based on “sieve analysis and/or gravel pack materials”. Other sections of these proposed rules allow for selection of screen size based on filter pack size. Again, local experience and success with public water supply well design is often more suitable than a rule written by a committee. Deleting the word “or” and requiring sieve analyses for selection of screen opening sizes does not account for many conditions. If a well is constructed in granite, but uses a screen to ensure borehole integrity, what will a sieve analysis reveal regarding grain size when the cuttings are finely ground? If a sandstone is competent, then a natural pack is often suitable and design should be based on entrance velocities rather than grain size.

If a sieve analysis is required, then most well construction projects in sedimentary rocks are doomed to drilling a test boring prior to construction of a production well because samples must be collected, the sieve analysis run and results reported, then screens must be ordered to fit the sieve analysis. This process will, in most cases, take between 4 and 6 weeks to complete. Over that period of time most boreholes will not stay open and a second hole will be required. Well construction will also be needlessly complicated by having differing screen and filter pack sizes for various intervals. This would then prevent compliance with the earlier requirement that filter pack be installed in one continuous operation, and so forth. There are certainly applications where sieve analyses are needed, such as alluvial wells, and there are rare formations in which various screen sizes could be beneficial. It should be left to the experienced design professional to determine when a sieve analysis is needed for screen slot size selection.

Lines 1370 to 1372. How is “adequate specific capacity” determined? This is an ambiguous requirement and needs to be reworded.

Lines 1381 to 1383. This is poorly worded, since every approvable screen is artificial. Furthermore, this requirement is likely intended to apply to non-homogenous unconsolidated formations and should say so.

Lines 1385 to 1389. The 2-inch annual seal space requirement has been an item of contention for many years and has resulted in the issuance of many variances granted by the DEQ-WQD. The requirement needs to be modified to be consistent with AWWA guidelines that allow for a smaller annular space when the annular seal is replaced by pressure grouting or what some call the “Haliburton Method”.

Lines 1412 to 1414. The 2-inch annual seal space requirement has been an item of contention for many years and has resulted in the issuance of many variances granted by the DEQ-WQD.

The requirement needs to be modified to be consistent with AWWA guidelines that allow for a smaller annular space when the annular seal is emplaced by pressure grouting or what some call the “Haliburton Method”. Most experienced well design professionals in Wyoming argue that the 2-inch annular space requirement should not apply to the couplings to prevent needless expense.

Lines 1425 to 1427. Commercially available centralizers constructed of steel can be tack welded to steel casing. A common, successful practice is to place centralizers across couplings to prevent them from moving. This requirement is another example of trying to apply general rules to all public water supply wells. It is not advised that centralizers be welded to PVC casing. It would be prudent to revise this requirement to state that centralizers or guides be securely fastened to the casing to prevent movement during installation.

Lines 1432 to 1435. This requirement indicates that the well casing is to extend up a particular distance above a finished floor or concrete apron. The use of concrete aprons around wells is generally unnecessary and counterproductive. Additionally, EPA no longer requires them for public water supply wells. Concrete aprons are not needed because the annular space seal must already be protective of the well and a properly contoured ground surface will direct surface water drainage away from the wellhead. Concrete aprons also move with frost conditions and result in conduit seal failure, even when using expansion fittings, exposing the well to significant risk of contamination. Concrete aprons provide preferred burrowing sites for rodents which then directs surface water flow back to the wellhead.

Lines 1437 to 1439. It is recommended that the first line be reworded to state, “Where a well is located in a building, the floor surface”. Wells with pitless unit completions are often located outside of the “wellhouse”.

Lines 1461 to 1466. The word “or” in line 1462 needs to be replaced with “and” to include both drilling mud and the finer fraction of the filter pack (not gravel pack). There is a significant disconnect in the underlined text that raises alarm. Chemical conditioning is frequently performed on wells without the use of “blasting”. This proposed requirement must be extensively reworded.

Lines 1473 to 1474. Use of a wooden plug may be effective in temporarily capping a water well but it is an outdated practice that has the potential to introduce organic contaminants into a well. This requirement needs to be revised.

Lines 1516 to 1518. The requirement indicates a check valve is to be installed “in the casing” where a submersible pump is used. This and subsequent sections of the Chapter should define the pipe that conveys water from the pump to the ground surface and indicate that the check valve be in this pipe, not in the “casing”. Commonly used terms include pump column pipe, drop pipe, etc.

Lines 1524 and 1525. Isn’t the primary purpose of a water line discharging to atmosphere in the wellhouse piping to allow the well to be pumped to waste? An additional benefit is to allow the well pumping rate to be checked. This requirement is similar to the requirement in Lines 1533 to 1534 and they could be combined and the text revised to provide the intended emphasis.

Lines 1555 to 1556. The heading of this and subsequent sections may need revision. It is confusing how disinfection of the well is related to the subheadings that follow.

Lines 1575 to 1576. The requirement of installation of a check valve in “the well casing” is already stated in Line 1517.

Lines 1593 to 1596. It is agreed that each well needs to have an accurate flow meter to collect production data. However, the proposed rule states the meters are required for “testing”. Is that

really the intended purpose? The proposed rule also requires a separate meter capable of measuring the total wellfield discharge. This appears to be repetitive and potentially onerous. It is in the best interest of a water system to have accurate flow meter records and maintain flow meters; therefore, total discharge should be calculated from individual flow meters. It is inevitable that flow meters will lose accuracy over time but requiring a wellfield master meter could result in additional inaccurate readings. The range of production from a wellfield will have significant variations in flow conditions that may not be accurately recorded by a single large meter. Education of public water system operators regarding flow meter maintenance may be a better solution to obtaining accurate wellfield meter readings and result in cost savings.

Lines 1598 to 1601. The reason for and intent of this requirement for observation wells is unclear. Is this regarding former production wells that are converted to observation wells? An introduction to this requirement would help clarify the conditions to which it is to apply.

Lines 1603 to 1606. Abandonment of public water supply wells or test wells should be included in Chapter 12 or in Chapter 26 or the rules should be consistent.

In summary, there are many issues with the March 4, 2020 draft of the Chapter 12 Rules and Regulations. Most of the comments in this letter address well design issues because that is our main area of expertise and practice. Chapter 12 covers many topics, which requires a wide range of knowledge and experience to adequately promulgate rules. To simplify and streamline the rule adoption process, it is suggested that these proposed rules not be adopted and that the DEQ-WQD retain the services of experienced design and construction professionals to assist with drafting meaningful, workable rules. Those professionals should have a wide range of experience that spans the State of Wyoming because of the varying successful strategies used, especially with groundwater development.

Respectfully Submitted,



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