Public Health Department

Cathy A. Raevsky, Director
Mark A. Lundberg, M.D., M.P.H., Health Officer

Environmental Health
202 Mira Loma Drive
Oroville, California 95965

T: 530.538.7281
F: 530.538.5339

buttecounty.net/publichealth

Water Well Advisory Group
-AGENDA-

Tuesday, January 10, 2017
Tahoe Room at 202 Mira Loma Drive in Oroville
3:00-5:00 p.m.

I. Preliminary Items

A. Call to Order
B. Roll Call and Determination of Quorum
C. Introduction of Guests
D. Review of Meeting Notes from December 12, 2016 (Attachment "A")
E. Agenda Review
F. Public Comments and Input

II. Action Items

A. Fee Study and Proposed New Fees
Discuss and make recommendations

B. Well Construction Manual (Attachment "B")
Discuss and make recommendations

C. Potability Testing for New Wells
Discuss and make recommendations

III. Non-Action Items

IV. Agenda Preparation for Next Meeting

V. Adjourn

Public Health Department

Cathy A. Raevsky, Director
Mark A. Lundberg, M.D., M.P.H., Health Officer

Environmental Health
202 Mira Loma Drive
Oroville, California 95965

T: 530.538.7281
F: 530.538.5339

buttecounty.net/publichealth

Attachment "A"

Water Well Advisory Group
-Minutes-

Monday, December 12, 2016
Tahoe Room at 202 Mira Loma Drive in Oroville
3:00-5:00 p.m.

I. Preliminary Items

A. Call to Order

Ron called the meeting to order at 3:03 p.m.

B. Roll Call and Determination of Quorum

Tom Kruse, David Moench, Ron Stilwell, Reed Rankin (alternate), John Riley, Eddy Teasdale, and John Scott were present.

A quorum was established.

C. Introduction of Guests

Charlotte Walters, Paul Thao, and Brad Banner from Environmental Health attended the meeting in support of the group.

D. Review of Meeting Notes from November 17, 2016

The meeting notes from November 17, 2016 were reviewed by the group and accepted as written by consensus.

E. Agenda Review

No changes were proposed for the agenda.

F. Public Comments and Input

There was no public comment.

II. Informational Non-Action Items

A. Fee Study Update

Brad explained the process used for development of updated fees and explained that a meeting would be set up in January for a presentation by County Administration of the proposed new fees.

III. Action Items

A. Proposed Changes to the Well Construction Manual

1. Brad reviewed the work that was completed at the November 17, 2016 meeting, noting that the Manual would still need to go to the Board of Supervisors for adoption.

   a. The group recommended adoption of the following sections of the Manual:

      - Purpose and Development of Manual
      - Recommended Use of Concrete Slabs
      - Continuous Pour of Concrete Slab with Concreate Seal
      - Use of Bentonite as Annular Seal Material in Vegetated Areas
      - Use of Bentonite as Annular Seal Material in Arid Areas
      - Screened Well Vents
      - Reduced Setback to Watertight Septic Tank

   b. The group tabled consideration of the following sections of the Manual:

      - Well Installation in Areas Subject to Flooding
      - Free Fall Placement of Bentonite Chips for 50-Foot Annular Seal in Hard Rock Wells

   c. The group did not have time to consider the following sections of the Manual:

      - Process for Development of Performance Standards
      - Reduced Well Setback to leach Field in hard Rock Geology

2. Well Installation in Areas Subject to Flooding

   a. Brad noted that the only alternative currently allowed in lieu of extending the well casing 3 feet above the flood elevation is to use a pitless adapter. Brad stated that the proposed new section would allow other methodologies or devices that meet the listed criteria.

   b. The group agreed that pitless adapters need vents and is therefore not watertight and shouldn't even be listed as an alternative to an extended well casing.

   c. The group voiced strong support for the inverted, screened vent with check valve developed by David.

   d. Brad expressed concern that the device needs to be looked at by a third party licensed professional to assure that the device will continue to work over the long term.

e. The issue of possible corrosion of the aluminum was brought up.

f. David said that he had one of the units in use at his own home for a year, so it could be looked at for problems caused by corrosion.

g. Eddie said that he is a "licensed professional" and would review the unit from David's house that has been in use and write a third-person review.

h. John Scott made a motion to table further review of this item until the next meeting. John Riley seconded the motion and the motion passed unanimously.

3. Process for Development of Performance Standards

a. Brad explained that:

i.) "**Prescriptive**" standards require the well driller to do things a specific way when specific conditions exist. Bulletin 77-90 are prescriptive standards. Prescriptive standards allow requirements to be consistently and predictably applied, but cannot account for all the local conditions encountered by well drillers. An example of a prescriptive standard is the requirement for a 50-foot seal if the well is closer than 100 feet to a drainfield.

ii.) "**Performance**" standards are more flexible because they allow the well driller to propose alternatives that provide an equivalent level of protection to that of the prescriptive standards. For example, when a 100-foot setback cannot be maintained between a well and a drainfield, a performance standard might allow the well to have an annular seal placed to a depth less than 50 feet provided the well is sealed at least 5 feet into consolidated material.

b. The group discussed the procedures and conditions applied to performance standards specified in this section of the Manual.

c. Brad stressed that well drillers were not obligated to propose performance standards as alternatives to the prescriptive standards in Bulletin 74-90, but if the well driller opted for performance standards, the division would expect the requirements outlined in this section of the Manual to be followed, including:

i.) A written proposal and justification by the well driller for the proposed alternative

ii.) The ability to perform an inspection during critical well construction processes

iii.) Written verification by the well driller that the performance standard was met

iv.) Follow up water analysis, if appropriate

d. David expressed concern that the requirements for proposing and using a performance standard (as listed above) are too time consuming and difficult for the well driller.

e. John Scott made a motion to recommend adoption of this section as written. Eddy seconded the motion, and the motion passed 5-1, with David opposing the motion.

4. Reduced Well Setback to Leachfield in Hard Rock Geology

a. The group discussed the proposed performance standard for drilling wells where a 100-foot setback to the drainfield cannot be maintained. This section provides the property owner with three alternatives:

i.) 50-foot annular seal

ii.) Report by certified hydrogeologist, or

iii.) Annular seal with a minimum depth of 20 feet and placed at least 5 feet into consolidated material

b. The group discussed the requirements that must be followed if the third option, listed above, is utilized by the well driller. This led to a discussion of whether, for performance standards, the division can or should require the well to be constructed during the week so that a seal inspection can take place during the work week rather than over a weekend.

c. David suggested that, as a well driller, it is so important to be able to drill wells without restricting when the well is drilled, that he would be willing to pay overtime to staff in order to have a weekend well construction inspected.

d. Staff pointed out that the seal inspections are important and that the well driller can always opt to put in a 50-foot seal if the well must be constructed over a weekend.

e. John Riley made a motion to recommend adoption of this section. David seconded the motion, and the motion passed unanimously.

5. Free Fall Placement of Bentonite Chips for 50-Foot Seal in Hard Rock Well

a. The group did not want this section restricted to hard rock wells.

b. The question of whether the chips could be dropped through water or mud was discussed.

c. The group decided that before acting on this section, it wanted to receive more information and advice from Ron Peterson, Baroid Industrial Drilling Products.

d. Tom made a motion to remove the restriction of this section to hard rock wells and to table further discussion of this section. John Riley seconded the motion and the motion passed unanimously.

B. Potability Testing for New Wells

1. The group discussed the appropriate time in the development permitting process for water testing to be required. David stated that potability should be required as a condition for building permit issuance and that the building code already requires potable water as a condition for permit issuance.

2. John Riley made a motion to table this item until the next meeting. John Scott seconded the motion and the motion passed unanimously.

IV. Agenda Preparation for Next Meeting

A. The next meeting will include a presentation of new fees based on countywide fee study that has been completed and follow up on the tabled items.

B. The next meeting will start at 3:00 p.m. on January 10, 2017 in the Tahoe Room

V. Adjourn

The meeting adjourned at 5:15 p.m.

Butte County PUBLIC HEALTH

Public Health Department

Environmental Health
202 Mira Loma Drive
Oroville, California 95965

Cathy A. Raevsky, Director
Andy Miller, M.D., Health Officer Officer

T: 530.538.7281
F: 530.538.5339

buttecounty.net/publichealth

Water Well Advisory Group

Sign-In Sheet

Date: December 12, 2016 **Location:** Tahoe Rm, 202 Mira Loma Dr., Oroville

Name	Company	Email
Ron Stilwell	North State Drilling	wellguy33@gmail.com
Eddy Tepsdale	Kennedy / Jenks	Eddy Tepsdale @KennedyJenk.com.
Hoot Kruse	Kruse Drilling Co.	krusedrilling@comcast.com
Reed Rankin	Rankin Pump	
John Scott	Public Member	john_lewis_scott@msn
John P. Riley	Precision pump & well drilling	precisionpump@comcast.net
Charlotte Walters	BCEH	cwalters@buttecounty
Paul Thao	BCEH	pathao@sbcglobal.net
David Moence	David + Son Drilling	

Public Health Department

Cathy A. Raevsky, Director
Mark A. Lundberg, M.D., M.P.H., Health Officer

Environmental Health
202 Mira Loma Drive
Oroville, California 95965

T: 530.538.7281
F: 530.538.5339

buttecounty.net/publichealth

Attachment "B"

Draft Edits Updated for January 10, 2017

Table of Contents

Purpose and Development of Manual 8
R~~equirement of~~Recommended Use of Concrete Slabs 9
Continuous Pour of Concrete Slab with Concrete Seal 11
Use of Bentonite as Annular Seal Material in Vegetated Areas 12
Use of Bentonite as Annular Seal Material in "Arid Areas" 13
Screened Well Vents 14
Well Installation in Areas Subject to Flooding 15
Reduced Well Setback to Watertight Septic Tank 17
Process for Development of Performance Standards 19
Reduced Well Setback to Leach Field in Hard Rock Geology 21
Free Fall Placement of Bentonite Chips for 50 Foot Annular Seal in Hard Rock Well 23

Purpose

- Clarify the purpose of the Manual in applying the Bulletins to local conditions
- Note that variations from the water code are not applicable in the Chico Nitrate Compliance Area or for public water systems without state agency approval

Purpose and Deve

~~T~~his manual has been established as required b order to provide local interpretation and guidance in the application of Bulletins 74-81, its supplement 74-90, and future revisions and supplements. ~~Provisions in the manual are developed by the Division in collaboration with the Well Drillers Advisory Group (WDAG).~~ As stated in the General Introduction of Bulletin 74-90:

> T~~he WDAG~~Standards in Bulletin 74-81 and this supplement (Bulletin 74-90) do not ensure proper construction or function of any type of well. Proper well design and construction practices require the use of these standards together with accepted industry practices, regulatory requirements, and consideration of site conditions.

Provisions in the manual are developed by the Division in collaboration with the Water Well Advisory Group (WWAG). This group incorporates the experience of local well drillers in developing well construction plans for the area's geological formations. The WWAG is an informal association of well drillers and other interested engineers and contractors who are involved in the design and construction of domestic water systems in Butte County. The ~~WDAG~~WWAG meets a minimum of twice a year for the purpose of assisting the Division in enforcing Butte County Code Chapter 23B in a manner that maintains and enhances the protection of public health, is user-friendly for both the public and contractors, and addresses the practical conditions encountered in the field by well drillers.

~~The Division is responsible for establishing meeting agendas, providing needed meeting logistical support, and maintaining meeting records.~~

R~~equirement of~~

Notes:

1. For wells constructed within the boundaries of the Chico Nitrate Compliance Area, any code interpretation or performance standard specified in the Manual that varies from the requirements of Bulletin 74-81, Bulletin 74-90, or requirements previously specified by the Central Valley Regional Water Quality Control Board (Water Board) must be approved by the Water Board.
2. For wells constructed be sources of water for public water systems, any code interpretation or performance standard specified in the Manual that varies from the requirements of the California Drinking Water Standards must be approved by the Central Valley Regional Water Quality Control Board.

Purpose

- Modify current requirement to make concrete slabs and recommendation and not a mandate

Recommended Use of Concrete Slabs

Regulatory Requirement and Rationale

Bulletin 74-90 Section 10.A. states: "A concrete base or pad, sometimes called a pump block or pump pedestal, shall be constructed at ground surface around the top of the well casing and contact the annular seal… the base shall extend at least two feet laterally in all directions from the outside of the well boring, unless otherwise approved by the enforcing agency…the base shall be a minimum of 4 inches thick."

The purpose of concrete slabs is to protect the well casing from accidental damage and to prevent surface water from ponding over a shrunken bentonite seal and possibly contaminating the aquifer.

Concerns

A concrete slab around the well casing is required by Bulletin 74-90. Concern has been expressed that concrete slabs should not be mandated as a requirement for giving a Water Well Construction Permit a final approval and certification of completion. The rationale for and against mandating concrete slabs is provided below.

~~Reasons have been considered for why concrete slabs may not be desirable. They may cover the ground surface immediately over a shrunken bentonite seal, obscuring the problem and preventing the addition of more bentonite to resolve the problem, while at the same time being ineffective at preventing the intrusion of surface water.~~

~~Reasons have also been considered for why concrete slabs should be required as part of the building permit process rather than at the time of well construction. Well construction may take place some time before the property owner proceeds with their building project, and therefore occurs before construction contractors begin working the site but also might thereby interfere with the construction of a future well house.~~

Analysis

~~The potential benefits outweigh potential concerns about the requirement of well slabs. The~~***Rationale for Requiring Slabs***

Well slabs, though small at approximately 30 inches x 30 inches, potentially provide ~~an adequate~~a degree of protection of the well seal from ponding surface water~~,~~ as the seal shrinks when drying, from erosion of the bentonite, or ~~the~~from disturbance of the bentonite through weathering or vandalism.

~~A~~lthough the slabs prevent future addition of bentonite to fill the space created by shrunken bentonite, in practice well drillers seldom return to wells to add bentonite and instead the well seals remain exposed to the weather. ~~The slabs do not prevent the construction of well houses with larger slabs.~~

Delaying slab construction until the property owner constructs the home, could mean that parcels developed for future sale with only septic systems and wells could remain in the vacant condition for many months or even years prior to construction of the house.

~~When wells are constructed not as part of an overall building project, they may be expected to be on the parcel for a period of time without a building. These wells in particular need the added protection of a well pad at the time of construction approval. A well that is constructed in conjuction with permits for a building may more legitimately have the installation of there pad delayed until the building is ready for occupancy approval.~~

Rationale for Not Requiring Slabs

Reasons have been considered for why concrete slabs may not be desirable. They may cover the ground surface immediately over a shrunken bentonite seal, obscuring the problem and preventing the addition of more bentonite to resolve the problem, while at the same time being ineffective at preventing the intrusion of surface water.

Construction of slabs may more appropriately be considered the homeowner's responsibility to construct as part of their building and parcel development process. Well construction typically takes place sometime before the property owner proceeds with their building project, and therefore occurs before construction contractors begin working the site and might thereby interfere with the construction of a future well house.

In addition, well slabs prevent future addition of bentonite to fill the space created by shrunken bentonite, while soil beneath the slab is subject to erosion, thereby limiting the slab's usefulness in preventing the introduction of surface water into the annual space around the well casing.

Well drillers and associated industry representatives, as well as an active member of the public, met on September 1, 2016 in a well-attended meeting of the Well Driller's Advisory Group and reached a consensus that the current well slab requirement for Water Well final approval should be replaced by an advisory to the homeowner and no longer be considered a mandate. The group pointed out that well slabs were not requirement in a number of surrounding counties.

Conclusion

~~The Division will continue to require concrete slabs for wells. The Division will continue to specify that slabs extend 18 inches laterally in all directions outside the well boring. To help mitigate concerns that the well slab should not be considered part of the well construction process, the Division's Well Compliance Certificate has been modified to distinguish between well construction activities and the slab construction activity to clarify that slab construction is the property owner's responsibility.~~

Based on the information provided, the Health Officer will recommend, rather than require, concrete slabs for wells. .

Purpose

- Refer to EH as "health officer" to be consistent with the terminology used in the Ordinance
- Allow WDAG to identify exceptions where construction of the concrete base should be poured at the time as placement of the seal

Continuous Pour of Concre

Regulatory Requirement and Rationale

Bulletin 74-90 Section 10.A. states: "Where cement-based annular sealing material is used, the concrete base shall be poured before the annular seal has set, unless otherwise approved by the enforcing agency."

The intent of this requirement is to have a base that is an integral part of the annular seal.

Concerns

Some settling may occur after placement of annular seals, including concrete, cement, and bentonite materials. Cement can have issues with shrinkage.

Analysis

Immediate placement of the cement base will not result in a superior seal and base installation in many cases; it is often preferable to pour the slab after the seal has been placed and set.

Conclusion

The ~~Division~~Health Officer will continue to approve the current practice of allowing construction of the cement base subsequent to seal placement~~.~~

Purpose
- Split two policies and added provision referring to Manual.

Use of Bentonite as Annular Seal Material

U~~se~~ in Vegetated Areas

Regulatory Requirement and Rationale

Bulletin 74-90, Section 9.D.3, states: *"Bentonite clay shall not be used as a sealing material if roots from trees and other deep rooted plants might invade and disrupt the seal, and /or damage the well casing. Roots may grow in an interval containing a bentonite seal depending of surrounding soil conditions and vegetations."*

Concerns

This requirement is vague and could be misapplied to preclude use of bentonite from any vegetated area that would include the majority of well sites were it is utilized.

Analysis

Well drillers and staff concur that there have been no known problems with roots growing in bentonite at vegetated well sites.

Conclusion

The current practice of allowing the use of bentonite in vegetated areas at the discretion of the well driller will continue unless otherwise specified in the Manual.

Purpose

- Split two policies and added provision referring to Manual.

Use of Bentonite as Annular Seal Material in "Arid Areas"

Regulatory Requirement and Rationale

Bulletin 74-90, Section 9. D.3., states: ~~"~~"Unamended bentonite clay seals shall not be used where structural strength of the seal is required, or where it will dry. Bentonite seals may have a tendency to dry, shrink, and crack in arid and semi-arid areas of California where subsurface moisture levels can be low…."

Concerns

This requirement could be interpreted to preclude use of bentonite from use as an annular seal material in much of Butte County.

Analysis

Well drillers and staff concur that there have been no known problems with shrinkage and/or drying of bentonite products designed and marketed for use as annular seal materials, when mixed and placed in accordance with manufacturer's directions.

Conclusion

The current practice of allowing the use of bentonite products designed and marketed for use as annular seal materials at the discretion of the well driller will continue~~. Bentonite~~ and bentonite based seal materials ~~shall~~must be mixed and placed in accordance with manufacturer's directions, ~~and applicable County standards~~unless otherwise specified in this Manual or by the Health Officer.

Purpose
- Changed reference from Environmental Health to Health Office for consistency with Ordinane.

Screened Well Vents

Regulatory Requirement and Rationale

~~B~~ulletin 74-81 Section 10.E. states:

"Air vents are also (in addition to requiring them for community water systems) recommended for other types of wells except those having jet pump installations requiring positive pressure (which cannot have a vent)."

~~B~~ulletin 74-81 Section 10.A. states:

"Access openings designed to permit the entrance or egress of air or gas (air or casing vents) shall terminate above the ground and above known flood levels and shall be protected against the entrance of foreign material by installation of down-turned and screened "U" bends."

Concerns

Members of the Water Well ~~Drillers~~ Advisory Group strongly recommend screened vents for all wells.

Analysis

Both knowledgeable well drillers and pump installers state that well vents are needed to assure proper pump operation.

Conclusion

E~~nvironmental health~~The Health Officer will require screened pump vents constructed according to the specifications described above.

Purpose

- Cleaned up language for clarity and provided for specific alternatives to be described.

Well Installation in Areas Subject to Flooding

Regulatory Requirement and Rationale

Butte County Code~~,~~ (BCC) Chapter 23B-9c Flood Protection, states:

> "Whenever possible, wells shall be located outside of any area subject to flooding. If it is not possible to locate a well outside of a flood area, the well casing shall extend three (3) feet or more above the one hundred (100) year flood elevation. Within "areas of special flood hazard," as defined in section 26-29 of this Code, for which flood elevations have been established, the casing shall terminate three (3) feet or more above the established one hundred (100) year flood elevation. The health officer may accept an approved watertight "pitless adapter" as a means to provide flood protection for an individual well to serve a single-family residence~~. (Ord. No. 3272, § 1, 6-25-96)~~."

Concerns

When it is not possible to locate a well outside of a flood area, the code specifies only two alternatives: (1) Extend the well casing at least three feet above the one hundred year flood elevation, or (2) Install an approved watertight "pitless adapter" for single family residences.

Well drillers indicate that both of these alternatives are problematic.

Extending well casings high into the air makes the wells difficult to access and service, and flood maps are not always accurate. On the other hand, pitless adapters are often not watertight.

Analysis

The intent of BCC Chapter 23-Bc is~~ clearly~~ to protect the aquifer from contamination from floodwater. The Chapter attempted to offer an alternative to ~~extended~~extending well casings into the air for wells that will serve single family residences by allowing pitless adapters. It can be assumed that it was not the intent of the Chapter to exclude other watertight construction features or backflow prevention methodologies that are equal or more effective than watertight pitless adapters.

Conclusion

When is not possible for wells serving single family residences to be drilled outside of areas subject to flooding, the ~~Environmental~~ Health ~~Director~~Officer may consider approval of other backflow prevention devices and methodologies that provides protection equal to or greater than the "watertight pitless adapter" referenced in the code. Consideration of these methodologies or devices will be based on the following considerations:

~~Consideration of these methodologies or devices will be based on the following criteria:~~

1. Is the proposal based on sound technical and scientific principles?
2. Is the proposal supported as feasible and effective by the Water Well ~~Drillers~~ Advisory Group?
3. If the proposal is a mechanical backflow prevention device, has there been third-party review by a ~~mechanical engineer~~licensed professional to help assure that the device will provide dependable, long term service as intended?

~~Future cleanup language for this code section will be proposed in the future.~~

The following alternatives have been reviewed and are approved:

- ----

Purpose

- New policy so that current setback requirements are specifically allowed in the Manual.

Reduced Well Setback to Watertight Septic Tank

Regulatory Requirement and Rationale

Bulletin 74-90 Section 8.A. identifies a "watertight septic tank" as a "Potential Pollution or Contamination Source" with a minimum setback of 100 feet. Section 8.A. also states:

> "Lesser distances than those listed above may be acceptable where physical conditions preclude compliance with the specified minimum separation distances and where special means of protection are provided. Lesser separation distances must be approved by the enforcing agency on a case-by-case basis."

Bulletin 74-90 Section 9.2.requires a 50 foot deep annular seal when a 100 foot setback from a potential source of pollution or contamination cannot be maintained.

The reason behind the requirement is that when a 100 foot minimum setback cannot be maintained, a deeper annual seal will mitigate the concern by providing the well with greater protection from pollution originating for a leaky septic tank.

Concerns

There are many small parcels that have been approved in the past that cannot meet a 100 foot setback to the septic tank. Requiring mitigation, such as a 50 foot seal, to allow a reduced setback would add significant cost to construction of the well.

Analysis

In the 25 years since Bulletin 74-90 was written, there has been a consensus among regulators that a 50 foot setback to watertight septic tanks is adequately protective and more appropriate given the majority of parcel configurations. A 50 foot setback to a watertight septic tank applied by surrounding counties.

In addition, local regulations for onsite septic systems, including the regulations adopted in Butte County, require a 50 foot rather than 100 foot setback from wells to watertight septic tanks and a 50 foot setback has been recognized in Butte County for many decades.

Finally, septic tank standards were significantly upgraded for Butte County in 2010, requiring monolithic poured 1,500 gallon tanks and watertight testing after tank installation, greatly minimizing any risk of future tank leakage.

Based on these considerations, after review by staff, and after consultation with the Water Well Advisory Group on September 1, 2016, the consensus is that the current practice of requiring a minimum setback of 50 feet to a watertight septic tank is adequately protective of water quality should remain in place.

Conclusion

The minimum setback from a well to a watertight septic tanks will continue to be 50 feet without requiring a 50 ft seal, unless otherwise specified by the Health Officer.

Purpose

- Establish a process for considering performance standard in lieu of the prescriptive standards in the Bulletins.
- The intent is to make sure that the performance standard alternatives are clearly identified ahead of time, tracked during construction, and verified after construction.
- The responsibility is on the well driller to show that the performance standard applied has been as successful as the prescriptive standard being replaced.

Process for Developmen

Regulatory Requirement and Rationale

Bulletin 74-90 is a guidance document develop
as a supplement to Bulletin 74-81 to serve
agencies. The bulletin was developed in colla
the scientific community, regulators, and we
provide sound technical guidance needed by l
an effective well permitting program and se
across the State of California.

Concerns

Rigid adherence to the requirements of Bulleting 74-90 does not allow limitations inherent to the Bulletin to be addressed.

The General Introduction to Bulletin 74-90 acknowledges that the standards it contains "are not necessarily sufficient for local conditions" and may require local agencies to adopt stricter standards. The General Introduction goes on to state: "In some cases, it may be necessary for a local enforcing agency to substitute alternative measures or standards to provide protection equal to that otherwise afforded by DWR standards."

Bulletin 74-90 is a 25 year old document that has been described by staff of the authorizing agency (DWR) as being a "guidance" document and a "work in progress" and "currently undergoing revision." So while it is clear that Bulletin 74-90 is built on sound science and strong technical grounds, a degree of flexibility is needed to allow current industry standards in construction practices and materials to be considered for approval in addition to the specific standards contained in the bulletin.

Analysis

The requirements in Bulletin 74-81 and Bulletin 74-90 are considered prescriptive minimum standards. They are minimum standards because local conditions may require application of more restrictive standards. They are prescriptive standards because they specify requirements that must be followed based on geological conditions and materials used in the well construction process.

Prescriptive requirements are restrictive because they do not allow alternative approaches that may be equally or more effective than the prescriptive requirements in achieving the same desired outcomes. In contrast to prescriptive standards, **performance standards** allow alternative approaches to be used provided they are demonstrated to achieve the same outcomes as envisioned by the prescriptive standards

Conclusion

Performance standards should be considered by the Health Officer when the outcomes anticipated to result from adherence to the provisions in Bulletin 74-90 are expected to be met or exceeded by the proposed alternative measures. The procedure for proposing an alternative to a requirement in Bulletin 74-90 based on performance is as follows:

1. The applicant or the applicant's agent will submit a proposed alternative to the Health Officer and justify the proposal in writing. Justification could include, but is not limited to:
    a. Discussion of other jurisdictions, including those outside of California, where the alternative has been shown to be effective
    b. Technical information from the manufacturer
    c. Studies showing the effectiveness of the alternative
    d. Reports from registered professionals, such as engineers or geologists
    e. Technical review and recommendation by the Water Well Advisory Group
2. The Health Officer will review the proposed alternative and the documentation provided by the applicant or the applicant's agent. The Health Officer may take one or more of the following actions:
    a. Approve use of the alternative
    b. Approve only limited use of the alternative on a trial basis
    c. Specify conditions under which the alternative is utilized, including but not limited to verification after installation that the alternative has functioned as intended
    d. Deny use of the alternative until further justification is provided
3. The licensed well driller will construct the well utilizing the alternative following the conditions specified by the Health Office and in a manner that allows the Health Officer to verify that the conditions are being met
4. The license well driller will provide written documentation that the conditions specified by the Health Officer for use of the alternative have been met
5. The Health Officer will approve the construction of the well upon receipt of the following:
    a. Completed Water Well Report
    b. Completed disinfection statement
    c. Written documentation verifying that the conditions specified for issuance of the Water Well Construction Permit were met

Purpose

- Apply the policy on Performance Standards to the proposal to seal into hardrock in lieu of utilizing a 50 ft seal.

Reduced Well Setback to Leach Field in Hard Rock Geology

Regulatory Requirement and Rationale

Bulletin 74-90 Section 8.a. identifies a "subsurface sewage leaching field" as a "Potential Pollution or Contamination Source" within a minimum setback of 100 feet. Section 8.A. also states:

> "Lesser distances than those listed above may be acceptable where physical conditions preclude compliance with the specified minimum separation distances and where special means of protection are provided. Lesser separation distances must be approved by the enforcing agency on a case-by-case basis."

Bulletin 74-90 Section 9.2. requires a 50 foot deep annular seal when a 100 foot setback cannot be maintained from a potential source of pollution or contamination.

The reason behind the requirement is that when the 100 foot minimum setback cannot be maintained, a deeper annual seal will mitigate the concern by providing the well with greater protection from pollution originating from a leaky septic tank.

Concerns

The requirement for a 50 foot seal to mitigate an unavoidable reduction in setback to a leach field where the minimum 100 foot setback cannot be maintained adds significantly to the well's cost of construction when methods of mitigation proposed by the licensed well driller other than a 50 foot seal could provide equal or better protection of the aquifer from contamination.

Analysis

A proposed performance standard for a well to be sited between 50 and 100 feet from a leach field is to seal the annular space to a minimum depth of at least 20 feet and at least 5 feet into consolidated, non-fractured hardrock.

This proposed alternative was discussed on September 1, 2016 at a well-attended meeting of the Water Well Advisory Group. The consensus of the group was that the propsed alterative would be equally or more protective of the aquifer than the 50 foot seal required in Bulletin 74-90. No contradictory information concerning this alternative was introduced by regulators attending the meeting, provided that the consolidated hardrock was known to be non-fractured. The licensed well drillers attending the meeting stated that they could recognize the presence of consolidated hardrock formation by the difficulty of their drill rigs to penetrate the material and could recognize the absence of fractures by the back pressure present during the drilling process.

Conclusion

Whenever the prescriptive minimum 100 foot setback to a leach field can be maintained, a reduction in setback will **not** be approved by the Health Officer unless under exceptional

circumstances. However, when the prescriptive minimum 100 foot setback to a leach field cannot be maintained but a 50 foot or greater setback is proposed, the licensed well driller has the following alternative options:

1. Placement of a 50 foot seal as specified in Bulletin 74-90
2. Submitting a report by a certified hydrogeologist or an engineering geologist stating that, based on geological conditions, the reduced setback will be adequately protective
3. Propose at least 5 feet into consolidated, non-fractured hard rock formation with a total minimum depth annual seal of 20 feet.

The procedure required by the Health Officer to verify that the proposed Alternative #3 performance standard listed above was adhered to will be as follows:

1. The licensed well driller or California registered PE or PG will submit the proposed alternative sealing depth and rationale with the Water Well Construction Permit application
2. The Health Officer will issue the Water Well Permit based on the proposed alternative provided the well driller agrees to the following conditions for permit issuance:
    a. Allow the Health Officer perform a seal inspection, unless the inspection is waived by the Health Officer
    b. Upon completion of the well, provide the Health Officer with a written statement verifying that the seal extended into consolidated, non-fractured hard rock formation and that any site specific conditions and requirements of the Health Officer, if specified, were followed
    c. Upon completion of the well, if required by the Health Officer, sample the well for total and fecal coliform and for nitrates, and will provide the Health Officer with results of the sample by an accredited laboratory
3. The Health Officer will approve the construction of the well upon receipt of:
    a. Water Well Report
    b. Disinfection statement
    c. Written statement by the well driller that stating the depth of the seal and verifying the depth that the seal extended into consolidated, non-fractured hard rock formation
    d. Water sample results, if required, verifying that the water is potable

Purpose

- Apply the policy on Performance Standards to the proposal to seal to 50 ft depth with the 3/8 inch bentonite chips

Free Fall Placement of Bentonite Chips for 50 Foot Annular Seal in Hard Rock Well

Regulatory Requirement and Rationale

Bulletin 74-90 Section 9.F.4. states in part: "Annular sealing materials shall not be installed by freefall unless the interval to be sealed is dry and no deeper than 30 feet below ground surface."

The reason for this restriction is concern that the material used for sealing may form a restrictive dam between the side of the boring and the well casing in a condition known as "bridging." This conditions can result in portions of the annular space not being sealed.

Concerns

Placement of a cement seal is considerably more time consuming and costly than placement of a bentonite seal. A newer innovation for sealing the annular space around a well casing is the use of 3/8 inch bentonite chips. Because of the size and weight of the bentonite chips, it has been reported that they can be successfully dropped and allowed to free fall into a 2 inch annular space in clean bored hardrock wells to greater depths than currently allowed under Bulletin 74-90.

Analysis

The use of the 3/8 inch bentonite chips for sealing the annular spaces around wells was extensively discussed at the well-attended September 1, 2016 Well Drillers Advisory Committee meeting. Guests at the meeting included two representatives from Baroid Industrial Drilling Products. The consensus of the well drilling and industry representatives at the meeting was that 3/8 bentonite chips can be effectively placed by free fall to depths exceeding the restriction specified in Bulletin 74-90, even when water is entering the annual space before or during placement of the chips.

Given this level of comfort with free fall placement of the 3/8 inch the bentonite chips by the well drilling profession, it appears to be highly unlikely that any problems with "bridging" would be experienced when the chips are applied to a 50 foot depth in hard rock wells with clean bores.

Conclusion

Use of 3/8 inch bentonite chips installed by free fall may be used for sealing the annular space up to a 50 foot deep for wells drilled into hard rock geological formations, provided the following conditions are met:

1. The Health Officer will require, as a condition for construction approval of the well, the following information provided in writing by the licensed well driller:
    a. Statement verifying their intent to install 3/8 chips by free fall to a specified depth provided the well bore is clean and constructed into a hard rock formation

b. Agreement to schedule the well construction so as to allow the Health Officer to perform the seal inspection, unless the inspection is waived by the Health Officer

2. The Health Officer will approve the construction of the well upon receipt of:

a. Water Well Report

b. Disinfection statement

c. Written statement by the well driller that verifying that, based on comparison of the anticipated and actual amount of chips that were used, the seal depth was achieved without "bridging"

d. Water sample analytical results, if sampling was required, verifying that the water is potable