Table of Contents | Remediation Wells

REPORTING REQUIREMENTS

DEFINITIONS

SPECIFIC REQUIREMENTS

Chapter 1 | Who can construct remediation wells?

Well Construction

Any person who constructs or closes a remediation well must:

- be a qualified well driller (QWD), or
- work under the direct supervision of a QWD or a qualified professional QP (P.Eng or P.Geo) who has competency in the field of hydrogeology or geotechnical engineering.

This requirement does not apply to a person excavating a well or closing an excavated well not more than 15 m (50 ft) deep. However, the well construction or closing standards still apply.

Note: An owner may deactivate his / her own well.

"direct supervision" means:

- Confirming in advance the supervisory relationship and methods of communication.
- The supervisor has considered the hydrogeological and drilling conditions likely to be encountered.
- The supervisor is aware of all actions taken by the supervised person.
- The supervisor has the ability to provide directions at appropriate stages throughout the activity, and does so.
- The supervisor is able to appraise the work.
- The supervisor is ultimately responsible for the work completed.

In some cases this may require physical presence by the supervising person on the site at all times when work is in progress.

If you are not registered and need information on how to get registered, please refer to Tab 8 Registration.

CHAPTER 2 | SURFACE SEALING OF REMEDIATION WELLS

What is a surface seal?

A seal prevents contaminants from being transported to the aquifer along the length of the casing.

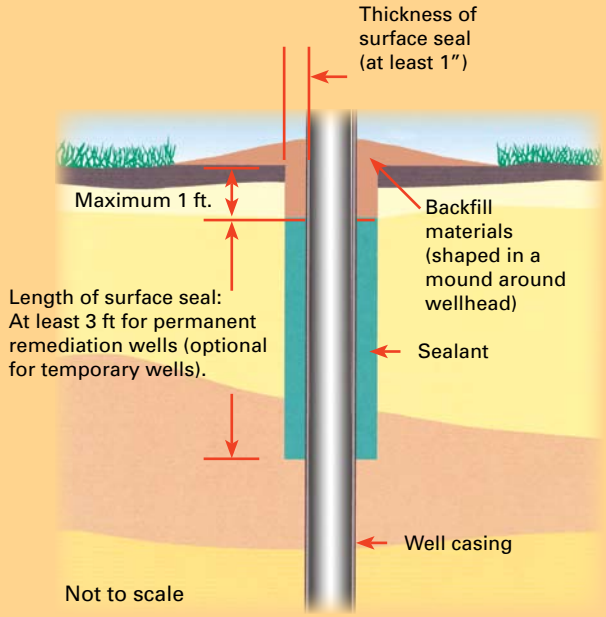

Figure 1. Surface seal in the outermost annulus of the well for remediation wells.

For drilled wells, the best way to install a surface seal is to drill first with an oversized casing to the appropriate depth and to backfill with an adequate sealant when the surface casing is pulled.

Note: If a temporary casing is used to install the surface seal, then the size and length of the temporary casing should be reported in the comments section of the well construction report.

What can be used to seal a well?

A proper sealant

A sealant is a non-toxic commercially available material or a mixture of materials including:

- bentonite clay
- bentonite clay and water mixture
- bentonite clay and sand and water mixture
- neat cement grout
- sand cement grout
- concrete grout

TECHNICAL SPECIFICATIONS OF SURFACE SEALS

- The surface seal must be completed with an appropriate sealant and must meet the following minimum specifications:

1. The length of the surface seal of a permanent (>90 days) remediation well must be at least 3 feet long, unless a qualified professional who has competency in the field of hydrogeology or geotechnical engineering or an engineer (MOE) confirms in writing that a lesser length will not significantly increase the risk of a contaminant entering the well or aquifer. For temporary remediation wells, surface seals are optional (recommended).
2. The sealant must be at least 1 inch thick (including wall thickness of the surface casing if the casing is left in place).
3. If the surface casing is installed with a drive shoe, or an annulus is created during installation, the surface casing must be removed and the seal completed between the production casing and the geologic formation.
4. If a surface casing can not be removed to allow the seal to be completed between the remaining casing and the geologic formation:
    - the area directly around the surface casing must be excavated and sealed as in Figure 2 with 3 ft of sealant to completely seal the area.
    - the next outermost annulus must also be sealed as in Figure 2 to at least the length specified in (1) - Subject to this last requirement, any open annular space between multiple well casings must be effectively capped or sealed.

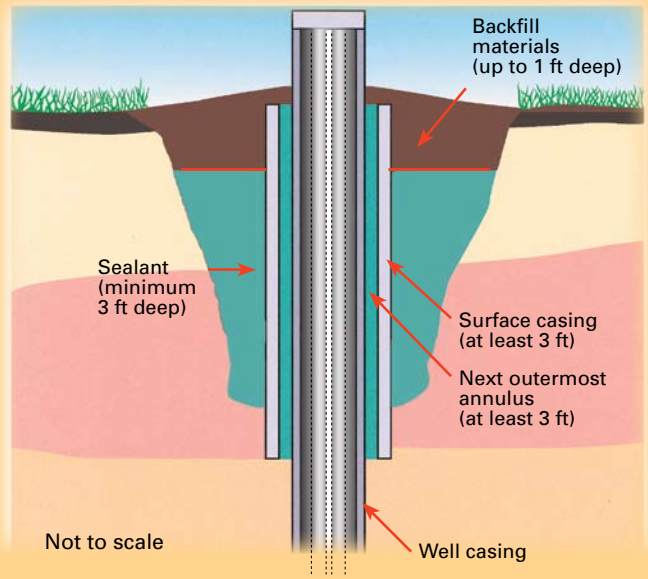

Figure 2.
Surface seal in the outermost annulus and next to the casing (when the surface casing is not removed).

MAINTENANCE OF SURFACE SEALS ON NEW WELLS

- Owners of permanent remediation wells must ensure the integrity of the seal is maintained and that any annular space that may develop around the well is resealed by a QWD.

ALTERATION OF EXISTING WELLS

If altering a well impairs the integrity of the existing surface seal or creates a visible annular space, the QWD must restore the seal and make sure the annular space is sealed.

Table 1. Roles and Responsibilities

Driller	Owner	Qualified Professional (P.Eng or P.Geo)
Complete a new well with an effective and permanent surface seal according to minimum specifications If any alteration impairs seal integrity, ensure seal integrity is restored	Ensure that the integrity of the surface seal is maintained and that any annular space that develops is resealed	Can provide alternative specifications for length of surface seal and recommending a surface seal in cases where a surface seal is not normally required.

Chapter 3 | Wellheads

Wellheads

SPECIFIC REQUIREMENTS FOR PROTECTING WELLHEADS

- For remediation wells, the casing must extend at least 12 inches above ground or above the floor of the well sump, well pit or pump house.
- The immediate ground area around a new remediation well, or an existing well altered after October 31, 2005, must be graded so water does not pond around the wellhead.
- New well sumps and well pits must be designed, constructed and maintained so as to convey water away from the wellhead.
- Thermoplastic casing must be completely protected from damage and material breakdown at the ground surface.

Chapter 4 | Well Caps and Well Covers

A well cap, or a well cap and cover, must be installed for all remediation wells.

Definition

- Well cap – secure, vermin-proof cap or lid that prevents direct and unintended or unauthorized access to the interior of the production casing
- Well cover – secure, vermin-proof cover, lid or structure that prevents direct and unintended or unauthorized access to the well

SPECIFIC REQUIREMENTS FOR WELL CAPS OR COVERS

Well covers must be used for all remediation wells that are completed below the ground surface as shown in Figure 3.

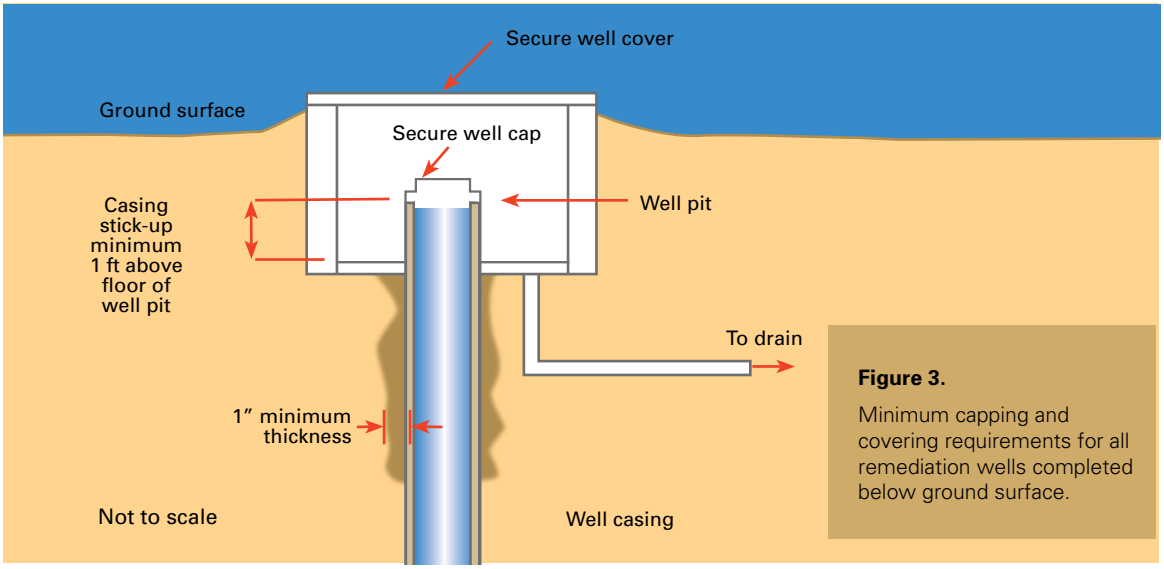

Figure 3.
Minimum capping and covering requirements for all remediation wells completed below ground surface.

- A person who installs a well cap or well cover for a well must:

  (a) use a commercially available or manufactured well cap or well cover, or

  (b) fabricate a suitable and adequate well cap or well cover.
- A welded steel plate may be used as a well cap on a well with a steel casing that has yet to be put into use.
- If there is an annular space between well casings, the annulus must be capped or covered with a permanently installed water-tight well cap or well cover.

Chapter 5 | Well Identification

Well identification plates are not required for remediation wells.

Chapter 6 | Temporary wells and change of use of a well

Purpose:

To specify when remediation wells must be closed.

REQUIREMENTS

Temporary remediation wells must be closed within 90 days and in accordance with the Regulation.

If a temporary remediation well remains open for more than **90 days**, then the person responsible for the well or the well owner must ensure:

- A professional hydrogeologist or geotechnical engineer provides written confirmation that the well may remain open for a further 90 days, without impairing the quality of ground water in the aquifer or posing a threat to human health or public safety, or
- The well is made permanent by meeting the minimum standards set out in the Regulation for that class of well, or
- The well is closed in accordance with the Regulation, after the 90-day extension.

The Regulation does not permit further extensions of 90 days.

Change of use:

When the use of a well or purpose of a well is changed (e.g., from a remediation to a monitoring well), the well owner must ensure that the well meets the minimum standards for that new use or purpose.

Chapter 7 | Well Operation

Purpose:

To set out the rules regarding well operation, so as to prevent contamination of the well or significant adverse impacts to the aquifer.

REQUIREMENTS

A person must not operate a well in a manner that causes or is likely to cause a significant adverse impact on the quality of the ground water in that aquifer, or on existing uses of the ground water by any well drawing water from that aquifer.

CHAPTER 8 | PROHIBITION ON INTRODUCING FOREIGN MATTER INTO A WELL

Purpose:

To set out rules to prohibit the introduction of foreign materials into wells.

REQUIREMENTS

A person must not introduce or allow to be introduced into a remediation well any of the following

- Refuse,
- Carcasses,
- Human or animal waste,
- Pesticides or fertilizers,
- Material, natural or otherwise, from construction or demolition,
- Flood debris and flood waters,
- Contaminants in an amount or manner that might cause a significant adverse impact on the quality of the ground water or on the existing uses made of the ground water from the well.

ENGINEER'S ORDER TO REMEDIATE OR MITIGATE

An engineer (MOE) may order a person to stop introducing deleterious substances that impact the well and the groundwater.

If the engineer cannot ascertain who introduced the substances, the engineer may make the order against the owner of the well or the owner of the land.

GOVERNMENT ACTION AT THE EXPENSE OF THE PERSON TO WHOM AN ORDER IS ISSUED

If a person to whom an order is issued fails to comply, and the comptroller or regional water manager considers that the failure may result in harm or damage to ground water, the comptroller or regional water manager can authorize the government or another person to take actions to comply with the order, at the expense of the person to whom the order is made.

Chapter 9 | Well Deactivation

Objective of deactivating a well: To ensure that the well does not compromise the sanitary integrity of the aquifer or pose a safety risk.

Difference between deactivation and closure:

- Deactivation: take the well temporarily out of service
- Closure: take the well permanently out of service by filling in the well with backfill and sealant

BASIC REQUIREMENTS TO DEACTIVATE A WELL

If a remediation well is not used for five years the owner must ensure it is deactivated or closed. This does not, however, apply to existing wells that are actively maintained with the intent of future service.

DEACTIVATING A WELL MEANS

- making the well available for inspection; and
- maintaining the well in a safe and sanitary condition.

Where the owner of the land on which a well is located does not know who owns the well, the owner of the land must ensure the applicable deactivation requirements are met.

WHO MAY PERFORM A WELL DEACTIVATION?

A QWD, a QWPI or a QP, or any person under the direct supervision of a QWD, a QWPI, a QP or the owner of the well may deactivate a well.

Chapter 10 | Well Closure

BASIC REQUIREMENTS TO CLOSE A WELL

If a well has been deactivated or has not been used for 10 years, the owner must ensure that it is closed.

These rules do not however apply to existing wells that are actively maintain with the intent of future service.

Where the owner of the land on which a well is located does not know who owns the well, the owner of the land must ensure the applicable closing requirements are met.

WHO MAY PERFORM A WELL CLOSURE?

- a QWD, or
- a person working under the direction of a QWD or a qualified professional with competency in hydrogeology or geotechnical engineering.

However, this does not apply to wells less than 5 m (15 feet) deep nor to excavated wells less than 15 m (50 feet) deep.

REQUIREMENTS

- The well must be filled throughout its depth with sealants and backfill materials and a closure plug as set out in Figure 4 and Table 2.
- All equipment and instrumentation in the well must be removed if practicable.
- Well casings may be left in place.
- Ensure that the well is completely filled so as to prevent lengthwise movement of liquids within the well or annular space surrounding the casing or between casings.
- Every attempt should be made to seal off water bearing zones, if known, to prevent mixing of ground water.

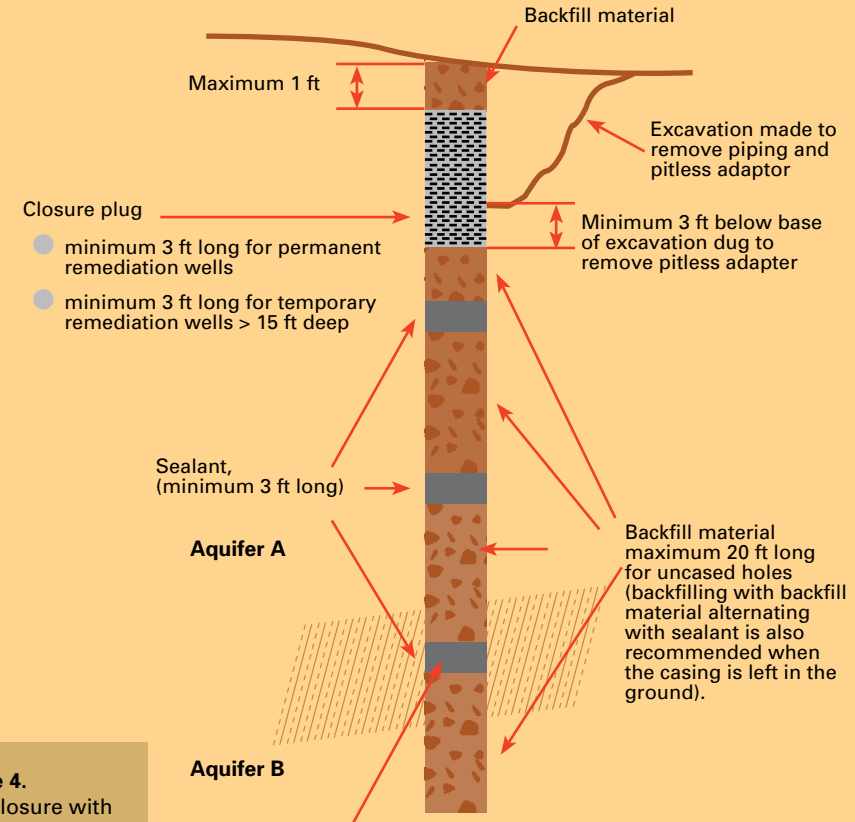

Figure 4.
Well closure with sealants, backfill materials and closure plug.

Not to scale

Table 2. Well Closure for remediation wells

Class of well	Sub-class of well	Method of drilling	Orientation of well	Closure plug required?		Minimum length of closure plug required (in feet)		Does a well closure report need to be completed?	Does a well closure report need to be submitted or retained?
				Hole depth ≤ 15 ft	Hole depth > 15 ft	Hole depth ≤ 15 ft	Hole depth > 15 ft		
Remediation	Temporary (≤ 90 days)	Drilling	Vertical	Optional	Required	Not specified	3 V	No	Not applicable
		Drilling	Horizontal	Optional	Required	Not specified	3 V	No	Not applicable
		Driving	Vertical	Optional	Required	Not specified	3 V	No	Not applicable
		Jetting	Vertical	Optional	Required	Not specified	3 V	No	Not applicable
		Excavating	Vertical	Optional	Required	Not specified	3 V	No	Not applicable
	Permanent (> 90 days)	Drilling	Vertical	Required	Required	3 V	3 V	Yes - see Schedule 4	Retain
		Drilling	Horizontal	Required	Required	3 V	3 V	Yes - see Schedule 4	Retain
		Driving	Vertical	Required	Required	3 V	3 V	Yes - see Schedule 4	Retain
		Jetting	Vertical	Required	Required	3 V	3 V	Yes - see Schedule 4	Retain
		Excavating	Vertical	Required	Required	3 V	3 V	Yes - see Schedule 4	Retain

Explanation

Optional : A closure plug is not required, but is recommended.

3 V :
V = Variance The length of the closure plug must be at least 3 feet, unless a qualified professional who has competency in the field of hydrogeology or geotechnical engineering or an engineer under the Water Act confirms in writing that a lesser length will not significantly increase the risk of a contaminant entering the well or aquifer. In wells to be closed, the closure plug should extend a minimum 3 feet below the base of any excavation dug to remove any piping.

Retain : Keep a copy of the well closure report at least 5 years and make it available on request.

Note: If it is not desirable to have the closure plug exposed at the ground surface, the closure plug may extend to within 1 foot of the ground surface to allow for 1 foot of backfill materials but must still have a total length at least equal to that specified in the Table.

SCHEDULE 4

REQUIREMENTS FOR WELL CLOSURE REPORTS FOR PERMANENT REMEDIATION WELLS

1. The well closure report must provide:

   (a) name and mailing address of the well owner;

   (b) site address, legal description or PID (parcel identifier) of the property on which the well is located;

   (c) geographic coordinates (UTM or latitude and longitude) for the well recorded to accuracy of within 10m but as accurate as possible;

   (d) location map sketch or location description;

   (e) method of closure;

   (f) if applicable, an attached a copy of the written confirmation of any alternative specifications, and the alternative specifications, of the engineer or qualified professional;

   (g) details of the closure showing the depths, types and amounts of sealant and backfill material;

   (h) name and address of person completing the work;

   (i) name and address of the person supervising completion of the work;

   (j) date of commencement and date of completion of the work.

REPORTING REQUIREMENTS

The person responsible for closing a permanent remediation well must complete a well closure report in accordance with Schedule 4 and retain it for a period of 5 years.