April 2014

Technical Bulletin

Wells Regulation – Constructing New Test Holes & Dewatering Wells in Operation for No Longer than 180 Days

This technical bulletin is one in a series of seventeen [1] on well issues created for a person who:

- may have a new test hole [2] or dewatering well [3] constructed in the future, or
- currently owns a test hole or dewatering well.

The purpose of this technical bulletin is to:

- summarize the information found in the *Test Holes and Dewatering Wells – Requirements and Best Management Practices* manual published by the Ministry of the Environment, April 2014 **(hereon in referred to as the "Manual")** regarding the initial construction requirements for new test holes and dewatering wells that are scheduled to be in operation not later than 180 days**,** and
- present some construction steps that must be undertaken and materials that must be used to meet the requirements of Regulation 903 (Wells Regulation), as amended, made under the Ontario Water Resources Act.

Additional information on new well construction is provided in the *Wells Regulation – Completing the Structure of the New Test Hole or Dewatering Well* technical bulletin.

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[1] A list of the seventeen technical bulletins is shown in the Additional Information Sources section near the end of this technical bulletin.

[2] A "test hole" means a well that, (a) is made to test or to obtain information in respect of ground water or an aquifer, and (b) is not used or intended for use as a source of water for agriculture or human consumption, subsection 1(1) of the Wells Regulation, e-laws: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900903_e.htm

[3] A "dewatering well" means a well that is not used or intended for use as a source of water for agriculture or human consumption and that is made, (a) to lower or control the level of ground water in the area of the well, or (b) to remove materials that may be in the ground water, subsection 1(1) of the Wells Regulation, e-laws: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900903_e.htm

Choosing a Construction Method

Successful completion of a test hole or dewatering well depends on the use of equipment and materials that are appropriate for the environmental conditions and geological formations encountered at a site. It is important to consider the characteristics of the drill rig or other well construction equipment including the cutting action and any flushing medium (i.e., type of drilling fluid and its circulation path).

The construction method:

- should be able to penetrate the geological formation,
- should allow the person constructing the test hole or dewatering well to get representative samples of geological formation material, to identify the boundaries of permeable zones and contaminated zones,
- must allow for the proper recording of formations, including aquifers, encountered during construction,
- must not contaminate the groundwater or the environment, and
- unless otherwise exempt, must meet the requirements of the Wells Regulation.

In many cases, the same equipment is used to construct more than one test hole or dewatering well for a project. Where there is no risk of contamination, the equipment does not have to be cleaned after each test hole or dewatering well is constructed before it can be re-used. To reduce the risk of contamination, however, an effective plan for decontamination of the equipment will help prevent the following:

- introduction of contaminants from one site to another site,
- contamination of clean areas,
- cross-contamination between formations, including aquifers,
- cross-contamination of individual samples,
- equipment breakdown,
- accidental exposure of personnel to contaminants, and
- non-compliance with regulatory cleanup standards.

The following standards contain procedures for equipment decontamination:

- ASTM D5088 – 02(2008) – "Standard Guide for Decontamination of Field Equipment Used at Nonradioactive Waste Sites," (DOI:10.1520/D5088-02R08) [4]

[4] (DOI:10.1520/D5088-02R08) ASTM International, West Conshohocken, PA, www.astm.org

- ASTM D5608 – 01(2006) – "Standard Guide for Decontamination of Field Equipment Used at Low Level Radioactive Waste Sites," (DOI:10.1520/D5608-01R06) [5]

Table 6-1 in Chapter 6 of the Manual: *Constructing the Hole, Casing & Covering the Test Hole or Dewatering Well* provides methods, characteristics, advantages and disadvantages of various well construction systems in particular formations.

Table 6-2 in Chapter 6 of the Manual: *Constructing the Hole, Casing & Covering the Test Hole or Dewatering Well* provides some appropriate construction equipment, which is used in a particular environment and formation, to construct different types of wells.

Exemption – Depth of Well

The minimum well depth requirements found in the Wells Regulation do not apply to a new test hole or dewatering well.

The regulatory exemption regarding the depth of a test hole and dewatering well allows for well technicians, engineers and geoscientists to use their professional expertise to design and install test holes and dewatering wells on a case by case basis, according to the conditions at a particular site.

Casing, Well Screen and Annular Space

A test hole or dewatering well commonly has a casing and may also have a well screen.

A "casing" means pipe, tubing or other material installed in a well to support its sides, but does not include a well screen. Casing keeps the hole open, prevents overburden materials from entering the well and accommodates pumping equipment. Casing may also be used to seal off unwanted formations.

"Well screen" means a perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone.

"Annular space" means an open space between a casing or well screen and the side of a well, and includes space between overlapping casings within the well.

[5] (DOI:10.1520/D5608-01R06) ASTM International, West Conshohocken, PA, www.astm.org

If the person constructing the well installs a casing, or a casing with a well screen, in a test hole or dewatering well that is scheduled to be abandoned not later than 180 days after the completion of the well's structural stage [6], then the person constructing the well must ensure that the casing and well screen:

- are clean and free of contamination, and
- will not cause contamination of the water with which they are in contact.

Unlike water supply wells and longer term test holes or dewatering wells, it is not necessary for a person constructing a new test hole or dewatering well to use casing or well screen that is made of new material if the test hole or dewatering well is scheduled to be abandoned not later than 180 days after the completion of the well's structural stage.

For new test holes and dewatering wells, the person constructing the well must:

- use watertight casing,
- use only continuous sections of casing without holes, perforations or slots cut in the casing, and
- make a permanent watertight bond in any seam in a single length of casing.

The person constructing the new test hole or dewatering well must not create joints between two lengths of casing unless the joints:

- achieve a permanent, watertight bond, such as welded steel joints, and
- are made so that the jointed casing does not impair the quality of water with which it comes in contact.

[6] A well's structural stage is complete on the day on which the well is capable of being used for the purpose for which it was constructed but for, (a) compliance with section 15; (b) the installation of a pump; or (c) any alterations necessary to accommodate pumping, monitoring, sampling, testing or water treatment equipment, subsection 1(1) of the Wells Regulation, e-laws: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900903_e.htm.

If the casing is made of concrete, the person constructing the new test hole or dewatering well must:

- use concrete casings that are fully cured and commercially manufactured,
- properly align the concrete sections so that the joints are flush and the casing is centred, and
- join the sections of casing with a mastic sealing material that:
    - remains pliable and waterproof, and
    - is approved for potable water use by NSF International.

For a new test hole or dewatering well completed in overburden deposits (e.g. sand), the casing must extend from the water intake zone in the overburden to at least 40 cm (16″) above the highest point on the ground surface within a 3 metres (10 feet) radius from the outside of the casing after the ground surface is properly mounded and meets the surface drainage requirements. This measurement must be taken upon completion of the well's structural stage.

For a new test hole or dewatering well completed in a bedrock formation such as limestone or granite, the casing must extend from the bedrock to the same height described for a new overburden well.

Under certain circumstances, an exemption to the height of casing exists for:

- certain driven and jetted point test holes and dewatering wells, and
- all test holes and dewatering wells using a flush-mounted watertight commercially manufactured well cover.

For further information on the casing height exemptions see the *Wells Regulation – Completing the Structure of the New Test Hole or Dewatering Well* technical bulletin.

Unlike water supply wells, it is not necessary for the person constructing a new test hole or dewatering well to follow:

- the casing standards for material type and wall thickness established in the Wells Regulation,
- the casing length requirements, and
- the requirements to seal the bottom of the casing into bedrock.

It is not necessary to create an annular space for a new test hole or dewatering well as long as the new well is scheduled to be abandoned not later than 180 days after completion of the structural stage of the well.

If a person is constructing a new test hole or dewatering well that is scheduled to be abandoned not later than 180 days after the completion of the well's structural stage and that has an annular space, then the person constructing the well must ensure that any annular space that may be created, other than the annular space surrounding a well screen or sampling port, must be sealed to prevent any movement of water, natural gas, contaminants or other material:

- between subsurface formations by means of the annular space or
- between subsurface formations and the ground surface by means of the annular space.

For further information, see Chapter 6: *Constructing the Hole, Casing & Covering the Test Hole or Dewatering Well* and Chapter 7 of the Manual: *Annular Space & Sealing*.

If the person installs a multi-level test hole that is scheduled to be abandoned not later than 180 days after the completion of the well's structural stage, then the person constructing the well must meet the Wells Regulation casing, well screen and annular space requirements outlined in Chapter 8 of the Manual: *Multi-Level Monitoring Test Holes*.

Monitoring Wells Under the Records of Site Condition Regulation

There are additional well construction requirements for monitoring wells that are used in an assessment in support of a record of site condition for a property.

O. Reg. 153/04 [7] prescribes that the provisions of the Ontario Water Resources Act and of Regulation 903 of the Revised Regulations of Ontario, 1990 (Wells) made under that Act, that would apply to a test hole but for section 1.1, and subsections 13 (2), 14.1 (2), 14.2(3), 14.3 (2), 14.4 (4) and 14.5 (3) of that regulation, apply to a monitoring well installed for the purpose of,

- a phase one environmental site assessment; and
- a phase two environmental site assessment.

[7] Ontario Regulation 153/04 as amended made under the Environmental Protection Act, R.S.O. 1990, c. E. 19, e-laws: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_040153_e.htm

A monitoring well is considered a test hole. For clarification on the term "monitoring well" [8] in the Records of Site Condition regulation, see Chapter 2 of the Manual: *Definitions & Clarifications*, Table 2-2.

Implications for the Qualified Person

The qualified person [9] shall ensure that the phase one and phase two environmental site assessments (ESAs) are conducted in accordance with the requirements in O. Reg. 153/04 which include the requirements for monitoring well construction.

Implications for Casing, Well Screen and Annular Space for a New Well

With respect to casing, well screen and annular space size and filling, the above requirement in O. Reg. 153/04 means that, if a new test hole is constructed and is scheduled to be abandoned not later than 180 days after the completion of its structural stage, and is to be used as a monitoring well in an ESA being conducted in support of a record of site condition, then:

- casing and well screen must be new material and the exemption for certain test holes stated earlier in this technical bulletin does not apply,
- the annular space size and filling exemptions for a test hole stated earlier in this technical bulletin do not apply, and
- the annular space size and filling requirements for a test hole stated in the Wells Regulation and outlined in Chapter 7 of the Manual: *Annular Space & Sealing*, Table 7-1A and Table 7-1B do apply.

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[8] A "monitoring well" means a well that is a test hole as defined in Regulation 903 of the Revised Regulations of Ontario 1990 (Wells) made under the Ontario Water Resources Act, subsection 22(1) of Ontario Regulation 153/04 as amended made under the Environmental Protection Act, R.S.O. 1990, c. E. 19, E-laws - http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_040153_e.htm

[9] See the definition of Qualified Person in Chapter 2 *Definitions and Clarifications of the Test Holes and Dewatering Wells – Requirements and Best Management Practices* manual and section 5 of Ontario Regulation 153/04 as amended made under the Environmental Protection Act, R.S.O. 1990, c. E. 19, e-laws: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_040153_e.htm

Starting on July 1, 2011, amendments to O. Reg. 153/04 came into force and apply to phase two environmental site assessments (ESAs) conducted in support of records of site conditions (RSCs). For any such RSC submitted on or after this date, where a groundwater sampling method is to be used to characterize contamination or determine if the concentration of a contaminant is above, at or below an applicable site condition standard or standard specified in a risk assessment for the contaminant, the following requirements apply to the construction of a well:

- where a monitoring well is being used, well screens shall not exceed 3.1 m (10′) in length, based on the saturated length of the screen, and
- where petroleum hydrocarbons or light non-aqueous phase liquids may be present on, in or under a phase two property, sampling depth intervals, including screened intervals of monitoring wells, shall be positioned to intersect the water table.

Covering the Well During Construction

The Wells Regulation requires that whenever a test hole or dewatering well under construction is left unattended, including during a minor alteration or the installation of a pump, the person constructing the well must cover the upper open end of the test hole or dewatering well securely in a manner sufficient to prevent the entry of surface water and other foreign materials into the well.

Surface Drainage

The person constructing the well must ensure that the surface drainage is such that water will not collect or pond in the vicinity of the test hole or dewatering well.

Completing the Well, Well Record and Tagging

Information on well caps, well covers and mounding is provided in the *Wells Regulation – Completing the Structure of the Test Hole or Dewatering Well* technical bulletin.

Information on venting and pump installation is provided in the *Wells Regulation – Installing Equipment in a Test Hole or Dewatering Well* technical bulletin.

Information on completing and submitting a well record and tagging a test hole or dewatering well is provided in the *Wells Regulation – Well Record, Reporting & Tagging for a Test Hole & Dewatering Well* technical bulletin.

Notifications (Natural Gas)

Where a test hole or dewatering well is constructed and natural gas is encountered, the person constructing the well must immediately notify the well purchaser, the owner of the land on which the well is located and the Director under the Act of the condition.

To prepare for on-site specific conditions such as hazardous gas or contamination, see the best management practices and information found in the Encountering Contamination and Water Quality Problems section in Chapter 6 of the Manual: *Constructing the Hole, Casing & Covering the Test Hole or Dewatering Well*.

If a test hole or dewatering well produces natural gas, the well owner must immediately take action to ensure that the gas will not present a hazard. For further information on the appropriate action a well owner must take, see the Wells Regulation, the *Wells Regulation – Well Abandonment: When to Plug and Seal a Test Hole or Dewatering Well* technical bulletin and Chapter 16 of the Manual: *Well Abandonment: When to Plug and Seal a Test Hole or Dewatering Well*.

Exempted Wells & Shallow Works

The Wells Regulation exempts certain types of wells, such as a pond or trench, from the Wells Regulation and from the sections on licensing of the Ontario Water Resources Act that pertain to wells [10].

A person who constructs, maintains or abandons a shallow works that meets the conditions set out in section 1.1 of the Wells Regulation:

- is exempt from the sections on licencing of the Ontario Water Resources Act that pertain to wells, [11] and
- need only meet the requirements found in section 1.1 of the Wells Regulation.

The shallow works exemption contained in section 1.1 of the Wells Regulation does not apply to a monitoring well that is constructed as part of a phase one or two environmental site assessment for a record of site condition [12].

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[10] Sections 36 to 50 of the Ontario Water Resources Act, R.S.O. 1990, c. O. 40, e-laws: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o40_e.htm

[11] Sections 36 to 50 of the Ontario Water Resources Act, R.S.O. 1990, c. O. 40, e-laws: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o40_e.htm

See the *Wells Regulation – Understanding a Well, Test Hole and Dewatering Well* and *Wells Regulation – Shallows Works* technical bulletins for further information.

Water Supply Wells

Certain licensing and construction requirements for water supply wells are different from the requirements for test holes and dewatering wells as defined by the Wells Regulation. For further information on the requirements for water supply wells see the *Water Supply Wells – Requirements and Best Management Practices* manual, published by the Ministry of the Environment, December 2009 and the Wells Regulation.

Additional Information Sources

The seventeen technical bulletins on test holes and dewatering wells are:

- Wells Regulation – Understanding the Meaning of Well, Test Hole and Dewatering Well
- Wells Regulation – Shallow Works Test Holes & Dewatering Wells
- Wells Regulation – Exempted Activities Performed on Wells, Including Test Holes & Dewatering Wells
- Wells Regulation – Test Hole and Dewatering Well Licensing
- Wells Regulation – Licensing (Class 5) for Individuals who Perform Tests on Wells
- Wells Regulation – Site Considerations & Initial Planning for Test Holes & Dewatering Wells
- Wells Regulation – Constructing New Uncased Test Holes & Dewatering Wells in Operation for No Longer than 30 Days
- Wells Regulation – Constructing New Test Holes & Dewatering Wells in Operation for No Longer than 180 Days
- Wells Regulation – Constructing New Test Holes & Dewatering Wells
- Wells Regulation – Constructing New Multi-level Monitoring Test Holes
- Wells Regulation – Completing the Structure of the New Test Hole or Dewatering Well
- Wells Regulation – Flowing Test Holes & Dewatering Wells
- Wells Regulation – Test Hole & Dewatering Well Maintenance

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[12] Ontario Regulation 153/04 as amended made under the Environmental Protection Act, R.S.O. 1990, c. E. 19, e-laws: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90e19_e.htm

- Wells Regulation – Well Record, Reporting & Tagging for a Test Hole & Dewatering Well
- Wells Regulation – Test Hole & Dewatering Well Repairs & Alterations
- Wells Regulation – Well Abandonment - When to Plug & Seal a Test Hole or Dewatering Well
- Wells Regulation – Well Abandonment - How to Plug & Seal a Test Hole or Dewatering Well

These technical bulletins are available on Ontario.ca.

Further information on constructing a test hole or dewatering well that is scheduled to be abandoned not later than 180 days after completion of the well's structural stage can be found in Chapter 6: *Constructing the Hole, Casing & Covering the Test Hole or Dewatering Well*, Chapter 7: *Annular Space & Sealing* and Chapter 8: *Multi-Level Monitoring Test Holes* of the Manual.

A copy of the *Test Holes and Dewatering Wells – Requirements and Best Management Practices* manual can be obtained on Ontario.ca.

A copy of the Ontario Water Resources Act, Regulation 903 as amended made under the Ontario Water Resources Act (Wells Regulation) and other regulations can be obtained from the e-Laws website at www.e-laws.gov.on.ca.

The publications are also available by calling the Publications Information Centre at 1-800-565-4923 or (416) 325-4000.

For further information about wells, contact the Wells Help Desk at 1-888-396-9355 (Well) or the nearest Ministry of the Environment office listed in the blue pages of the telephone directory.

Notice: This bulletin is being provided for information purposes only and is not intended, nor should it be construed as providing legal advice in any circumstances. The applicable environmental legislation, including the following, should be consulted.

- ***Ontario Water Resources Act, R.S.O. 1990, c. O. 40***
- ***R.R.O. 1990, Regulation 903 (Wells) as amended made under the Ontario Water Resources Act, R.S.O. 1990, c. O. 40***
- ***Ontario Regulation 153/04 as amended made under the Environmental Protection Act, R.S.O. 1990, c. E. 19***

Legislation and regulations change from time to time so it is essential that the most current versions be used.

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