



Environmental Monitoring Well Decommissioning

Site Professional Seminar
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Introduction

Monitoring well decommissioning is an important step in:

- completing phased Environmental Site Assessments
- site decommissioning
- close-out remediation monitoring

Introduction - NSEL Regulatory “triggers” may include

- Approvals under Activity Designation Regulations requiring GW monitoring (Municipal solid waste facilities etc.)
- close-out of sites under the Domestic Fuel Oil Spill Policy
- close-out of sites under the Guidelines for Management of Contaminated Sites (NS)
- completion of conditions for Ministerial Order

Fact Sheet

- Objectives

The objectives of environmental monitoring well decommissioning are to:

- 1) prevent surface water infiltration into an aquifer via the monitoring well,
- 2) to prevent the vertical movement or migration of contaminated water within a monitoring well/borehole to other aquifer zones and to
- 3) remove potential physical hazards.

Definitions

- Bentonite
- Clay
- Decommissioning
- Grout
- High solids bentonite grout
- Neat cement
- Pressure grout method

Methods

- 1) Remove pumping equipment
- 2) Measure and record total depth
- 3) Remove entire casing if feasible; or minimum 0.3 m below grade [Note: Where removal of casing may result in geologic formation collapse into the borehole, this should be accounted for in the decommissioning design]
- 4) Fill entire borehole/casing with grout by:
 - a) Pressure grout method
 - b) Hand placement method

Methods – Pressure Grout Method

- Placement of liquid grout slurries via tremie pipe from bottom of hole to the top
- Pump mix of neat cement, sand-cement or high solids bentonite grout
- Allow for grout settlement over time, by overfilling or later top-up

Methods – Hand Placement of Grout Materials

- Grout placement of dry, screened bentonite chips or pellets
- Requires skilled, careful installation to avoid premature swelling, adhesion, and bridging as grout falls through the water column to fill the casing/borehole
- Discretion advised on determining appropriate maximum depths to use hand methods

Methods – Hand Placement of Grout Materials

- In practice, can easily bridge when MW depths below Static Water Level are >6-10 metres (20-30 ft)
- If attempting > 200 ft (i.e. larger diameter MW) use only coarse grade or pelletized bentonite

Methods – Hand Placement of Grout Materials

- Dry screen all over a wire mesh screen to remove fine particles present in bags that can quickly swell when hydrated
- Pour no faster than manufacturer recommended rates
- Check periodically with weighted tape and/or chimney rods

Methods – Verification and Completion

- Volumes emplaced should closely match theoretical calculated borehole void volume
- Allow for approx. 0.3 m additional grout above casing (assuming 0.6 m cut-off)
- Top with 0.3 m compacted natural fill to grade and mound slightly

Methods

- After filling borehole with grout materials
- 5) Surface completion
- 6) Written submission with location and details of decommissioning
- 7) Other methods possible for non-typical conditions

Key Points

- Important to properly decommission monitoring wells to reduce potential for future site liability
- Effective methods, but require care and proper design

Reminders

- Obtain and review NSEL Fact Sheet on Environmental Monitoring Well Decommissioning - available soon at: www.gov.ns.ca/enla
- Account for eventual monitoring well decommissioning at the start of site investigations and throughout the process
- Monitoring well decommissioning is required to demonstrate close-out for certain regulatory processes

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Thank you !