DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF WATER RESOURCES

Massachusetts Closure Guidance for Underground Injection Control (UIC) Wells (including shallow injection wells)

EFFECTIVE DATE: JULY 3RD, 2008

GUIDANCE #: BRP/DWM/DW/G04-3

PROGRAM APPLICABILITY

- **Bureau of Water Resources**
  - Underground Injection Control (UIC) Program
  - Ground Water Discharge Program

- **Bureau of Waste Site Clean-up Waste**
  - Remediation Program – Remediation Wells

SUPERSEDES GUIDANCE: Massachusetts Closure Requirements for Shallow Injection Wells (UICs) - December 1994

Approved by:

_____

Glenn Haas
Acting Assistant Commissioner
Bureau of Resource Protection

1.0 BACKGROUND

The Massachusetts Department of Environmental Protection, (hereinafter referred to as "MassDEP"), in cooperation with local and federal agencies, regulates discharges of fluids to protect the quality of ground and surface water resources used for drinking water and other purposes. The Underground Injection Control (UIC) Program regulates discharges of fluids having the potential to contaminate groundwater (310 CMR 27.00). Shallow injection wells are a subcategory of Class IV and V UIC wells. Injection wells include most subsurface leaching systems, with the exception of septic systems designed to serve single family homes or those designed to serve non-residential structures serving 20 persons or fewer used solely for sanitary wastewater disposal. In general septic systems properly permitted by the local Board of Health are exempt from the reporting requirements of 310 CMR 27.00. Common examples of shallow injection wells in Massachusetts are dry wells, septic systems, discharges from floor drains in industrial areas, leaching catch basins, and oil/water separators leading to a infiltration structures (some of these discharge types are banned unless a Ground Water Discharge permit is obtained from MassDEP). Floor drains themselves are not injection wells, however, they are a common point of entry to subsurface leaching systems, which *do* constitute Class IV or V injection wells.

The discharge of liquid wastes to the environment via shallow injection wells has been a source of contamination suspected in many cases of public drinking water supply well closures and a confirmed source of contamination of public drinking water wells in Massachusetts (see note below). The costs resulting from such contamination include possible public health problems and are both environmental and financial. To prevent migration of any contamination from an injection well is much less costly than to treat or to develop a new water sources. Prevention serves to protect people and the environment from long-term or irrevocable damage.

Pursuant to the MasssDEP UIC regulations cited above, the use of an underground injection well is prohibited where the potential exists for pollutants to enter it (e.g., by means of a floor drain or other means) and where the presence of the pollutants causes or is likely to cause a violation of any Massachusetts Drinking Water Regulation, or in the opinion of MassDEP adversely affects, or is likely to adversely affect, the health of persons.

With the exception of those discharges authorized under the Department's Ground Water Discharge Permit program, 314 CMR 5.00, MassDEP defines this prohibition as including the use of most Class IV or V injection wells with an indoor point of entry at facilities which use, store, or otherwise manage hazardous materials and/or wastes as defined in 310 CMR 30.000 and 310 CMR 40.0000. 314 CMR 5.05 identifies certain activities that are exempt from a ground water discharge permit under 314 CMR 5.00 but would be subject to the reporting requirements of the UIC program. Nevertheless, any proponent of a discharge at a UIC facility exempted under the Ground Water Discharge Program must file a UIC Registration form (BRP WS-06 http://www.mass.gov/eea/agencies/massdep/water/approvals/underground-injection-control-forms.html) with the UIC Program prior to initiating the discharge.

Note: Suspected UIC contamination of Public Water Supply wells in MA include: the Kane and Chestnut wells in Hudson, the Turnpike and Hartwell Road wells in Bedford, Wells # 1 and 2 in Groveland and the Ellis well in Norwood.

The owner or operator of a facility where an unauthorized injection well is located must immediately discontinue the unauthorized use of the injection well in accordance with 310 CMR 27.04 and 27.10. The use of a Class IV or V injection well may be discontinued by: sealing the floor drain(s) or other conduit which leads to it, connecting the drain(s) to a certified industrial wastewater holding tank or connecting to a municipal sewer system. Refer to section 7.0 of this document for additional guidance on discontinuance of an unauthorized use or on obtaining and submitting a permit, registration, certification or application.

2.0 APPLICABILITY

This guidance document applies to the closure of **all** unauthorized and authorized-by-rule Class IV or V shallow injection wells in Massachusetts. An authorized-by-rule well is a Class IV/V well for which a permit is not required from any MassDEP program. However, the owner or operator must submit a UIC Class IV/V registration form to the UIC program in order for that well to be authorized to discharge.

Most Class IV wells (wells that inject hazardous waste into or above the aquifer) are banned, with one exception: remediation wells that are approved under Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental, Response Compensation Liability Act (CERCLA) are authorized-by-rule and must also be registered with MassDEP as a Class IV well. Remediation wells can be Class IV or Class V wells based on the level of contaminants injected or the nutrient additive. There are two types of Class IV/V remediation wells; one type involves the application of "remedial additives" in a Class IV/V injection well and the other involves the "re-injection" of recovered and treated groundwater. Class IV/V wells authorized by the MassDEP's Waste Site Clean-up Program are authorized-by-rule and fulfill their registration requirement by submittal of the Remedial Monitoring Report (RMR) Form with MassDEP as a Class IV/V well. All closure procedures should be performed as specified in this document.

The information contained in this document is intended to be used as guidance and does not in itself create any substantive or procedural rights, enforceable by any party in any administrative proceeding with the Commonwealth. In addition to summarizing specific regulatory requirements, this document also provides guidance on what measures MassDEP considers acceptable to meet the general requirements set forth in the regulations. Parties using this guidance should be aware that there might be other acceptable alternatives for achieving compliance with such general regulatory requirements. Approval to use such alternatives must be obtained from the Department.

The regulatory citations provided throughout this document are not meant to be, and should not be relied upon as, a complete list of all applicable UIC regulatory requirements. Consult 310 CMR 27.00

3.0 GENERAL

The purpose of this guidance document is to outline the components of UIC closure as well as to alert the party undertaking that closure of potential responsibilities under the Massachusetts Contingency Plan (hereinafter referred to as "MCP"), MGL c.21E and 310 CMR 40.0000,

Massachusetts UIC Program (310 CMR 27.00) and Massachusetts Hazardous Waste Regulations (310 CMR 30.000).

Closure procedures discussed in this document include:

- filing of all appropriate forms;
- decommissioning an injection well;
- identifying, excavating, and managing contaminated materials encountered during the closure; and
- conducting confirmatory sampling in the footprint of the excavation.

If contamination by oil and/or hazardous material (OHM) is encountered in soil or groundwater, the provisions of the MCP and guidance provided by MassDEP's Bureau of Waste Site Cleanup (BWSC) policies are applicable. Under the authority of M.G.L. c. 21E, the MCP establishes specific requirements for providing notification to MassDEP and responding to releases of OHM to the environment. Assessment-only activities may be conducted without approval from MassDEP prior to notification under the MCP. Contamination discovered during the assessment phase must be reported to MassDEP in a manner consistent with the criteria presented in the MCP.

The MCP requires those who conduct response actions (e.g., Immediate Response Actions [IRAs], Release Abatement Measures [RAMs], Comprehensive Response Actions [CRAs]) to employ a **Licensed Site Professional (LSP)** to oversee assessment and cleanup actions and to document that such actions are performed in compliance with the MCP. LSPs are qualified professionals in assessment and cleanup activities who are licensed by the Commonwealth. Performance of a Limited Response Action (LRA) does not require the use of an LSP, except as specified under "Excavation and Management of Contaminated Soils" (section 6.3). A list of LSPs is available at: http://public.dep.state.ma.us/LSP_2/LSPsearch.aspx.

4.0 SAMPLING PROTOCOL

Sampling and analyses should be performed in accordance with the MCP guidelines and requirements. In particular, the provisions of "Environmental Sample Collection and Analyses" (310 CMR 40.0017) and the performance standards described in 310 CMR 40.0191 should be followed.

To ensure that all chemical analyses of samples taken as part of closure and assessment activities meet the quality control and performance standards for data used to support decisions under the MCP the analyses should meet the requirements for the applicable methods as specified. In MassDEP's *The Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols – WSC – 10 – 320* (hereinafter referred to as "Compendium)".

The MCP Analytical Methods in the *Compendium* use the sample preparation and processing protocols of commonly used EPA SW-846 and MADEP analytical procedures and articulate quality control provisions, performance standards, analyte lists, reporting formats, and other methodological elements. The *Compendium* can be found on the MassDEP website at: http://www.mass.gov/eea/agencies/massdep/cleanup/regulations/wsc10-320-compendium--quality-control-reqs.html . In certain limited circumstances, a laboratory can submit Quality

Assurance/Quality Control data for the analysis of chemicals to demonstrate proficiency under a performance based method option. Please contact MassDEP for advice on using this approach.

5.0 INITIAL CLOSURE ACTIVITIES

Procedures noted below in 5.1 and 5.2 must be performed in every case of shallow injection well closure.

5.1 Removal of Existing Sludge/Wastewater:

Prior to performing any other closure procedures outlined in this document, any existing sludge or wastewater from the Class IV or V well (e.g., dry well, oil/water separator or MDC trap, septic system, other structure) should be pumped and disposed of as discussed below.

MassDEP recommends that a sample of the sludge/wastewater be analyzed before disposal. The results of the sludge/wastewater sample should be used to pre-characterize the oil and/or hazardous material, which may also be present in the environment surrounding the injection well. Sludge/wastewater samples from the injection well should be analyzed for:

- volatile organic compounds
- petroleum hydrocarbons
- total metals;
- other parameters based on specific knowledge of oil and/or hazardous materials used, stored or disposed of at the site, and the site's general history.

For the appropriate methods refer to http://www.mass.gov/eea/agencies/massdep/cleanup/regulations/wsc10-320-compendium--quality-control-reqs.html.

As indicated by the results of these initial analyses, additional testing of the sludge/wastewater may be required to determine for disposal purposes whether the material is a hazardous waste under 310 CMR 30.000, the Massachusetts Hazardous Waste Regulations. A licensed hazardous waste hauler must transport hazardous wastes. Non-hazardous industrial wastewaters may be taken to a Wastewater Treatment Facility (WWTF). You must obtain prior approval from the WWTF prior to the delivery of the wastewater to their facility for disposal.

5.2 Separators

Separators (also known and used as oil/water separators, sand traps, gas traps, and “MDC traps”) should be cleaned and sludge/wastewater disposed of as noted above in section 5.1. Except in cases where the separator will remain in use **for non-UIC purposes** (e.g., the system will now be connected to a sewer line or to a certified holding tank), the separator should either be removed or backfilled with clean fill, sand, or gravel with both the inlet(s) and outlet(s) plugged with a permanent seal.

6.0 ADDITIONAL CLOSURE ACTIVITIES

Procedures outlined in sections 6.1 - 6.4:

- **must be performed** in cases in which MassDEP has issued a Notice of Noncompliance (NON) or enforcement order **specifically requiring these procedures to be performed**.
- **should be performed** as part of remedial actions in cases in which a known release or threat of release as defined in the MCP of OHM to the environment has occurred or exists. In these situations, all relevant requirements of the MCP and c.21E must be satisfied.
- **are recommended** by the MassDEP to be performed as best environmental management practices in all other cases.

6.1 Decommissioning of Class IV/V UIC System

After removal of the contents (see "Removal of Existing Sludge/Wastewater" (section 5.1)) of the Class IV or V well, the well should be decommissioned according to the following criteria. Remedial activities associated with contamination in the impacted leaching media are discussed in "Excavation and Management of Contaminated Soils" (section 6.3).

- Drywells/Cesspools: Excavate and remove the underground structure. All inlets to the system must be plugged.
- Septic Systems: Visually inspect the tank. Tanks that are watertight, without holes or cracks may be put back into service for sanitary waste only (no industrial or commercial process wastewater should be tied into the septic system) after they have been emptied and cleaned of all hazardous/industrial wastewater. The local Board of Health shall be notified if holes and/or cracks are identified in a system, including the tank(s), pipes or distribution box. Actions to remove the tank should be coordinated with the local Board of Health. The leachfields may be put back into use to receive sanitary wastewater if they are not contaminated or in failure. If they are contaminated or in failure a replacement field must be coordinated with the local Board of Health.
- Other Systems: Any other injection well system should also be excavated and removed, or have inlets and outlets sealed off. Decommissioning of monitoring wells must be done by a well driller certified by MassDEP Well Drillers Program following MassDEP regulations, which can be found at http://www.mass.gov/eea/agencies/massdep/water/regulations/310-cmr-46-00-3-certification-of-well-drillers-and-filing-of-well-completion-reports.html. Additional information on MassDEP's Well Drillers Program may be obtained on the Internet at: http://www.mass.gov/eea/agencies/massdep/water/drinking/well-drillers-program.html.
- The registered well driller must file a well completion report for both the installation and abandonment of the monitoring wells.

All excavation holes must be backfilled as noted under "Confirmatory Sampling" (section 6.4.A).

6.2 Samples Proximate to Point of Discharge

A minimum of two soil grab samples should be collected from different locations and analyzed in accordance with the following:

A. Each sample should be collected at, or below and within one foot of, the point of discharge to the ground;

B. Each sample should be screened for total organic vapors in headspace using a portable photoionization detector (PID) or flame ionization detector (FID) as described in Appendix II, "Jar Headspace Analytical Screening Procedure." These data should be expressed as total organic vapor in ppm (v/v) as benzene.

C. The samples should be analyzed using the applicable analytical methods as specified in MassDEP's *Compendium* as follows:

1.) VOCs: The sample with the highest headspace reading response or concentration in ppm should be analyzed for the presence of VOCs.
2.) Petroleum Hydrocarbons: Each sample should be analyzed for the presence of petroleum hydrocarbons using the guidance presented in *Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH and EPH Approach.*

D. Quality Assurance / Quality Control – The decisions made as part of a shallow well closure activity are dependent on the quality of the data generated as part of the investigation. Following well-established quality assurance (QA) and quality control (QC) procedures is essential for generating data that can be used confidently in decision making. MassDEP guidance: *Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Method (Compendium)s,* should be used. The data submitted to MassDEP, as part of a shallow well closure support package will be reviewed using the criteria described in the Compendium.

D. Each sample should be analyzed for the presence of metals and other parameters according to the corresponding criteria noted section 5.1.

6.3 Excavation and Management of Contaminated Soils

If contamination above an applicable MCP notification threshold is identified in the soil surrounding the injection well, response actions under the MCP are required to remediate the contaminated soil by soil excavation or other remedial methods.

MassDEP notification pursuant to the MCP may not be required, if the contaminated soil can be excavated and disposed of according to the Limited Removal Action (LRA) limits in 310 CMR 40.0318, The Limited Response Action (LRA) limits are:

- Not more than 100 cubic yards of soil contaminated solely by a release of oil or waste oil may be excavated.
- Not more than 20 cubic yards of soil contaminated by a release of hazardous material, or a mixture of oil or waste oil and hazardous material may be excavated.

- Notification to MassDEP is required if groundwater contamination above a notification threshold is encountered, or if any 2 or 72 hour notification criterion is triggered while conducting an LRA. Notification is also required if the removal action cannot be accomplished within the LRA volume limits specified above.

Excavated contaminated soils should be managed according to the MCP, the Massachusetts Hazardous Waste regulations, and related MassDEP Policies. Contaminated soils should be segregated from uncontaminated soils based on total organic vapor headspace readings and visual and olfactory observations and stockpiled separately. Soils contaminated with a listed hazardous waste or identified as exhibiting a characteristic of a hazardous waste are subject to the management and disposal requirements of 310 CMR 30.000. All excavated contaminated soil, including that generated as a result of an LRA, should be managed as set forth in 310 CMR 40.0030 and 310 CMR 30.000 in a manner that ensures the protection of health, safety, public welfare, and the environment. If temporary storage of contaminated soil is necessary, stockpiled soil should be placed on, and covered with, a polyethylene tarp (6-mil minimum thickness). Contaminated stockpiles that are to be managed off-site may not remain at the location any longer than 120 days.

Parties performing a LRA should note that, although a LSP is not required to perform the LRA, an LSP must nonetheless be employed if the Bill of Lading for soil management is to be used to manage soils generated by the LRA.

6.4 Confirmatory Sampling

A. Confirmatory Soil Samples

1. Once the contaminated soil has been excavated, separate soil grab samples should be taken from the bottom and sides of the excavation to characterize the levels of residual contamination in the remaining soils and determine whether additional remedial actions may be needed. These samples should be analyzed for the parameters identified by previous analyses.

2. Once all contaminated soil is excavated and confirmatory samples taken, the excavation should be backfilled with clean compacted fill. For safety reasons, no hole should be left open or unsecured overnight.

B. Follow Up

1. If the results of samples do not require notification under the MCP and there is no reason to suspect ground water contamination at or down gradient from the injection well, the following items "B.2" and "B.3" may be skipped.

2. If the results of the confirmatory soil samples are above an MCP notification threshold, the party undertaking the closure shall notify the BWSC at the appropriate MassDEP regional office and continue all further remedial activities in accordance with the MCP. **Note:** If excavation has been conducted as an LRA and the confirmatory sample analyses indicate that contamination exists above a notification threshold, the party conducting the

work may continue to remove soil as an LRA provided the action still falls under the volume and time limitations noted in section 6.3. If the activity cannot be concluded within the LRA limits, the party must notify MassDEP under the 120 Day notification requirements. Excavation may be continued as a Release Abatement Measure (RAM).

3. If there is reason to suspect groundwater contamination at or down-gradient from the injection well, the party undertaking the closure should conduct further sampling. If groundwater contamination above applicable Reportable Concentrations is confirmed, the party must notify (if notification has not already occurred) the Department's BWSC accordingly and continue all further remedial activities in accordance with the MCP.

7.0 SUBMITTALS TO MassDEP

7.1 Submittals to UIC Program:

- Complete UIC Pre-Closure Form at least 30 days prior to closure. (Appendix II)**.** If the shallow injection well has not previously been registered with the UIC Program send a copy of the Pre-Closure form to the UIC Program in Boston. If the facility owner or operator needs to close the well prior to the 30 days notice required by the Pre-Closure form, permission must be sought from the appropriate UIC staff. In the Appendix I is a list of Massachusetts's cities and towns with the address and telephone numbers for the four MassDEP regional offices and MassDEP's Boston office. Upon completion of the Class IV / V well closure, the owner or operator must submit a to the UIC Program in Boston. This form will establish the date of closure of the well (Appendix III).
- In cases where soil sampling and associated activities are required due to the issuance of an enforcement order from MassDEP's UIC program, the following must also be submitted to the UIC program:

    - a site plan with locations of floor drains or entry points to the Class IV/V well, treatment systems, points of discharge to the ground, screening and sampling locations, the boundaries of the excavated area; and
    - screening and analytical results.

Submittals of the Pre & Post-Closure Notification Forms should be made to UIC Program:

MassDEP Boston
One Winter Street – 5th Floor
Boston, MA 02108
Attn: UIC Program

Copies of the Pre-Closure Form should also be sent to: the local Board of Health and the public water supplier(s) in the area of discharge.

Questions on closures related to discharges covered by UIC Registration Program should be made to the UIC following:

BWR/DWP/UIC - Boston Office – 617-292-5859

Questions on the certification requirements if connecting to an Industrial Wastewater Holding Tank should be made to the following:

BWR Industrial Wastewater Holding Tank Program - (617) 556-1168

Questions on closures related to discharges covered by the Groundwater Discharge Program should be made to the Groundwater Discharge Program contacts in the appropriate Regional Office: (see contact information below):

Questions on closures related to discharges covered by the Waste Site Clean-up Remediation Program should be made to the Waste Site Clean-up Program contacts in the appropriate Regional Office: (see contact information below):

South East Regional Office (SERO)

BWR Ground Water Discharge Program - 508-946-2750
BWSC Site Management & Enforcement - 508-946-2862 (Remediation Wells)

North East Regional Office (NERO)

BWR Ground Water Discharge Program – 978-694-3215
BWSC Site Management & Enforcement - 978-694-3218 (Remediation Wells)

Central Regional Office (CERO)

BWR Ground Water Discharge Program - 508-767-2823
BWSC Site Management & Enforcement - 508-792-2805 (Remediation Wells)

Western Regional Office (WERO)

BWR Ground Water Discharge Program - 413-755-2218
BWSC Site Management & Enforcement - 413-755-2249 (Remediation Wells)

7.2 Submittals to BWSC and Record Retention:

Documentation associated with the closure of a shallow injection well should be submitted and/or retained as specified in the MCP.

Submittals to the Bureau of Waste Site Cleanup should be made at the appropriate MassDEP Regional office. Appendix I is a list of Massachusetts's cities and towns (indexed by regional jurisdictions), which provides the address and telephone numbers for the four regional offices and Boston.

All submittal forms and BWSC policies are available from the MassDEP Web site @ http://www.mass.gov/eea/agencies/massdep/cleanup/regulations/site-cleanup-policies-guidance.html.

APPENDICES:

I MassDEP List of MA Cities and Towns by Region
http://www.mass.gov/eea/agencies/massdep/about/contacts/

II. Jar Headspace Analytical Screening Procedure (attached)

III. http://www.mass.gov/eea/docs/dep/water/drinking/alpha/i-thru-z/uicjar.doc

III. UIC Pre-Closure Notification Form (WS-06)
Pre-Closure notices must be filed for any UIC Class IV/V well that the owner/operator plans to close] at least thirty days prior to closure. A waiver may be requested of MassDEP by the owner/operator of any or all of the thirty-day period. Any well that was closed (including prior to 9/13/02) that did not file a Closure Notification with the UIC program at MassDEP prior to 9/13/02 is required to submit the Pre-Closure Form even if the well(s) is now closed.
http://www.mass.gov/eea/agencies/massdep/water/approvals/underground-injection-control-forms.html

IV. UIC Post-Closure Notification Form
The UIC Post-Closure Form including all required attachments must be submitted to MassDEP within seven days following completion of closure of the UIC Class IV or V injection well(s), submit to the Department.
http://www.mass.gov/eea/agencies/massdep/water/approvals/underground-injection-control-forms.html#4

V. UIC Notice of Plumbing Inspector Approval to Seal Floor Drain –WS-1
If closure includes sealing a floor drain(s) than the owner/operator must have the local plumbing inspector signoff on the WS-1 form and should be attached to the UIC Post-Closure form.
http://www.mass.gov/eea/agencies/massdep/water/approvals/underground-injection-control-forms.html#4

VI. Q & A Summary for the Non-technical Reader
http://www.mass.gov/eea/agencies/massdep/water/drinking/shallow-injection-well-closure-q-and-a-summary-for-the-.html