

**MassDEP Underground Injection Control (UIC)
Registration Requirements
Ground Source Heat Pump (GSHP) Wells**

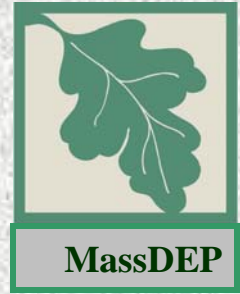
By

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MassDEP – Drinking Water Program

UIC Registration of GSHP Wells



- **Any well receiving return flow or system bleed from an open-loop system**
- **All closed-loop and Direct Exchange (DX) wells**

Note: UIC registration is required for all the above unless a Groundwater Discharge Permit is required

History of UIC GSHP Well Regulations



- **May 1982 – MassDEP requires UIC registration of GSHP wells**
- **1986 – EPA confirms state UIC programs’ ability to regulate closed-loop (including DX) GSHP wells as Class V wells**
- **2003 – MassDEP issues a GSHP fact sheet**
- **Late 2007 – MassDEP begins process to develop GSHP well guidelines**
- **Early November 2008 – MassDEP anticipates adopting GSHP guidelines**

Development of GSHP Guidelines



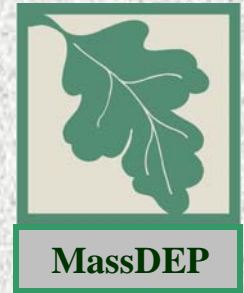
- **MassDEP UIC Program solicited input from other MassDEP programs/bureaus and other state agencies regarding cross-program and inter-agency issues**
- **GSHP guidelines workgroup formed to provide recommendations and comments on draft guidelines**

GSHP Guidelines Workgroup



MassDEP solicited workgroup membership from the following:

- Well Drillers and representatives of the MGWA**
- Heat Pump manufacturers and local distributors**
- HVAC contractors**
- Designers of Heat pump systems**
- Representatives of MA Health Officers**
- Representatives of Local Water Suppliers**
- Representatives of the IGSHPA and the CGC**
- Representatives of State Agencies**



Issues Addressed During Guidelines Development

- Groundwater Discharge Permit regulations - current & proposed**
- Water Management Act – open-loop (>100,000 gpd)**
- MA DCR – Well Driller’s Board – DX well drillers**
- Coordination with local Boards of Health - Private Well Regulations**
- Plumbing Regulations (PWS/Private) – Cross-Connection (local)**
- Mechanical Regulations – closed-loop / heat pumps**
- Installations in Wetlands and Surface Water /Bleed /Pond loops**
- Water testing requirements for open-loop systems**

GSHP Guidelines Schedule



- **Draft Guidelines released for public comment and posted on the DEP Web site:**
<http://www.mass.gov/dep/water/laws/uic.htm>
- **Comments & questions were due on 10/14/08**
- **Anticipated Release of Guidelines Early November 2008**

Post Guidelines Release Tasks



- **Review additional additives to closed-loop and DX systems in the order that they are/were submitted**
- **Review new technologies as submitted to MassDEP**
- **Review exceedances of secondary drinking water standards**
- **Revise GSHP guidelines as needed**

Draft GSHP Guidelines



Wells currently excluded from UIC registration:

Open Loop

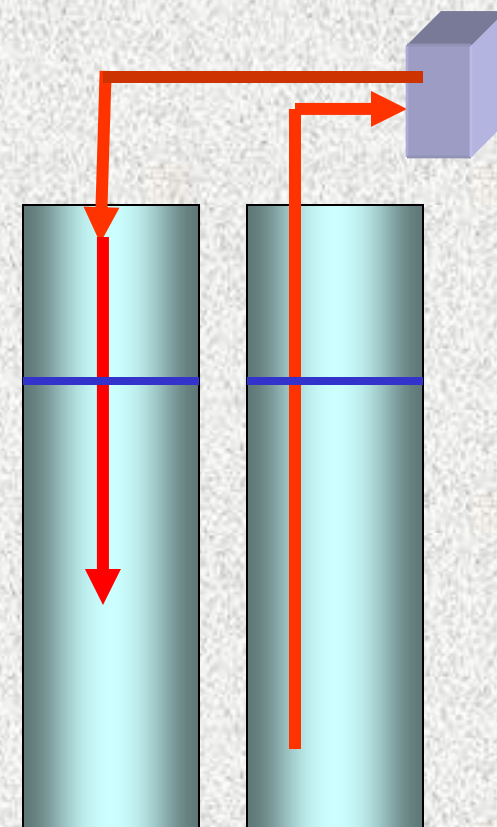
- raw water exceeds primary drinking water MCLs (may require a GWD permit)
- any chemical addition requires a GWD Permit

Open or Closed Loop Systems

- drawing water from a PWS system (other than make-up fluid)

DWDX (Deep Well Direct Exchange) System

ANY TECHNOLOGY (or additive) NOT DISCUSSED SPECIFICALLY IN THE GUIDELINES

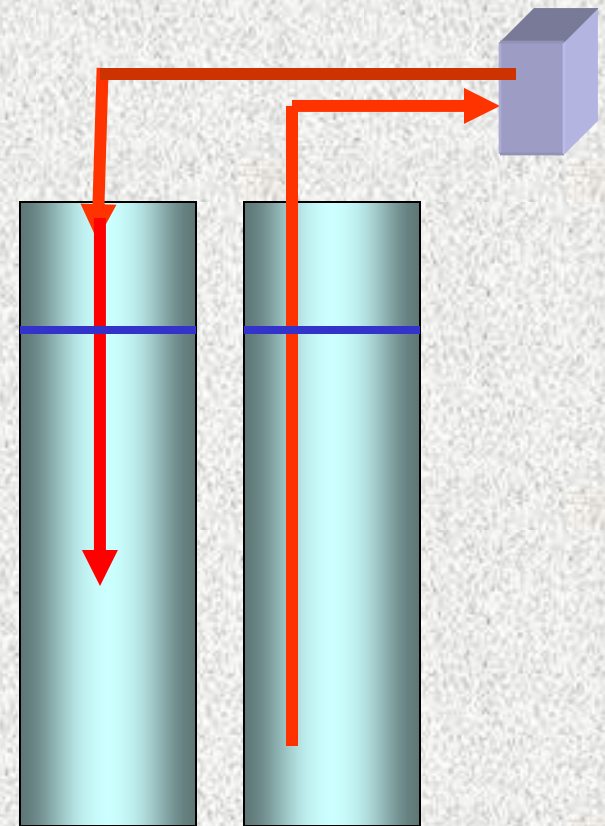


Draft GSHP Guidelines



Construction Issues:

- **Setbacks from other MassDEP regulated activities**
- **Bleed Water - must provide or apply for approval**
- **Construction Dewatering - must provide or apply for approval**
- **Well installer must be a DCR Registered Well Driller**
- **Proper well installation, grout & additives (guidance)**
- **Working within Wetland / Wetland boundaries**



Draft GSHP Guidelines



Other Issues:

- **Dual use as a Private drinking water well**
 - cross connection device prior to the heat pump
 - discharge below the groundwater table
 - Board of Health approval for Pvt. Well (including GSHP Well if required) by the local community

- **Make-up water from PWS**
 - requires approval from PWS
 - cross connection at PWS connection to building and 2nd device just prior to GSHP heat exchanger

- **Meet all local requirements - local requirements do not supercede MassDEP regulations and MassDEP UIC registration does not supercede local requirements**

Draft GSHP Guidelines: Setback Distances



If the open-loop well is also a private water supply well then all standard setback distances apply

All others:

- **25 feet from potential sources of contamination including but not limited to:**
 - septic tanks/fields
 - lagoons
 - livestock pens
 - oil or hazardous materials storage tanks
- **10 feet from property boundary**

Closed-loop and DX wells:

- **50 feet from private drinking water wells**

Draft GSHP Guidelines: Allowable Additives



- **Open-loop: no chemical additives allowed under UIC registration (permit required)**
- **Closed-loop: food grade propylene glycol and food grade lubricating oils**
- **DX: R-22, R-407A, and R-410A refrigerants and food grade lubricating oils**

Draft GSHP Guidelines: Grouting Requirements



- **Open-loop:** see MassDEP *Private Well Guidelines*
- **Closed-loop:** Due to concerns associated with the expansion/contraction of plastic tubing, high solids bentonite slurry grout required at:
 - confining layers
 - bedrock/overburden contact
 - 5-foot near-surface seal
- **DX:** Same grouting requirements as closed-loop but a cement-based grout may be used in place of bentonite slurry grout

Draft GSHP Guidelines: Other Requirements



- **All GSHP wells: leak detection and emergency shut-offs**
- **Open-loop: backflow prevention prior to heat exchanger (if also connected to potable water system)**
- **DX: cathodic protection (some exceptions)**

Draft GSHP Guidelines: Open-Transfer Well



Open-Transfer Well: > 5% of return and/or system bleed is discharged to a different aquifer.

These wells require the submittal of a justification statement with the UIC registration package.

MassDEP UIC Contacts



For GSHP UIC Registration:

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MassDEP UIC Web site:

<http://www.mass.gov/dep/water/laws/uic.htm>



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