Regulation of GSHP and WSHP Schemes

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Topics

- Ground heat collection systems
- Who regulates drilling?
- Some drilling risks – and why Regulation is required
- Borehole Open Loop Regulation
- ‘Water Source’ Heat Pump Regulation

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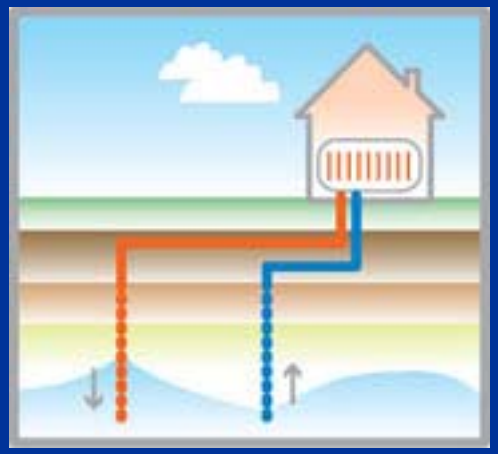
Ground source collection systems & current regulation



EA regulates all schemes water resource and permitting laws

EA not involved, (too many and low or no impact)

EA not involved. Potential involvement with large schemes via planning

'WSHP' EA involved with larger schemes

Regulation & Drilling

- Environment Agency WR32 -3 Consent to drill?
  - *Only for Open loop*
- If nobody is 'regulating' a closed loop scheme there may be nobody to tell you about potential hazards! Do you know what you are drilling through?
- Large closed loop schemes may be 'picked-up' by the Environment Agency or Water Companies via the planning process
- Coal Authority notification
- BGS notification for boreholes > 15m

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Drilling can be a hazardous pastime!

- Water, Electricity, Gas, Sewers
- Power cables
- Train tunnels
- Communications cables
- Fibre Optics (££millions!)
- National Grid for Fuel/Oil
- Mines, coal mines, mine gas, methane, carbon dioxide, mine water
- Caves
- Uncontrolled Artesian flow…….

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One reason for Regulation; Uncontrolled flow = Criminal activity

Trying to find a borehole under a lake of artesian overflow, after a driller had “done a runner”

Driller in the process of “doing a runner”. Bath (artesian) hot springs!

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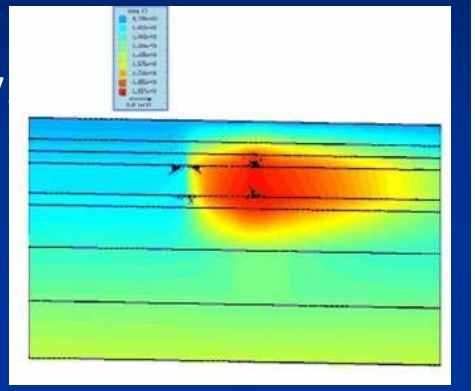
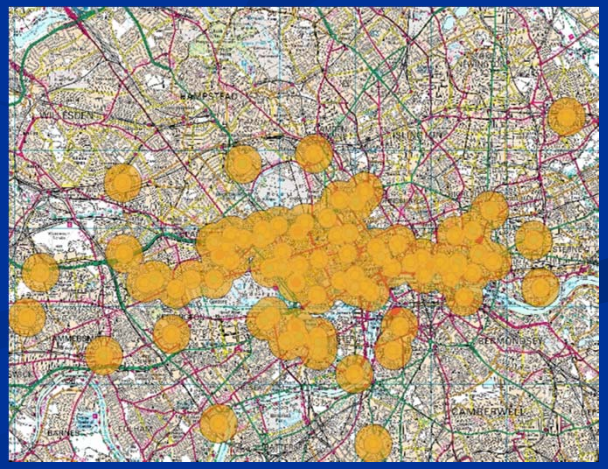
Regulation & Thermal 'pollution'

- Water Framework Directive; heat is not a pollutant, but can cause pollution, if a risk scenario is present.
- Unbalanced systems heat or cool the ground continually
  - Different issues with a river, canal or lake
  - Environment Agency preference for ≈balanced systems
  - High density of GSHP systems in urban areas
  - Thermal plume will move off-site = 'Someone else's problem'!



- Large closed loops in aquifers may produce a thermal plume
- Potential impact on;
  - Ecology , temperature change, water quality
  - Other GSHC schemes – Beneficial or not?
  - Screening; salmon, eels,
  - Installations with river and/or flood defence
  - Flood risks



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Open Loop systems

- Open loop Drilling & operation is REGULATED ACTIVITY
  - Smallest of numbers installed – BUT largest in terms of system size
- Open loop falls into 2 different regulated areas; Abstraction and Discharge
- Open loop requires monitoring, maintenance and attention throughout operating lives
- Closed loop boreholes are '*drill, install, cover & forget*'
- Open loop; Expertise required;
  - Hydrogeology, Thermogeology, Geochemistry, Drilling, Testing, Regulation……

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Open Loop Regulation; Abstraction

- Abstraction: Application to the EA WR32-3
  - Water features survey to identify other nearby boreholes and vulnerable water features
  - Obtain consent to drill and test-pump
  - Drill and pump within Environment Agency consent requirements
  - Interpretation of test pumping and drilling data
  - Issue above with abstraction licence and environmental (discharge) permit applications.
- Entire process may require 9 – 12 months
- Licence is time limited 6 – 12 years. Renewal for another 12 years

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Open Loop Regulation, Discharge

- Between Abstraction and Discharge, groundwater (or river water) becomes an '*effluent*' – and is regulated as such
- Need Environmental Permit (Discharge Permit).
  - Flow rates
  - Water quality
  - No chemicals added
  - Monitoring, maintenance & record keeping
- Closed loop needs none of the above
  - But, beware of fluid spills, flood risks, river users, fish, marine life

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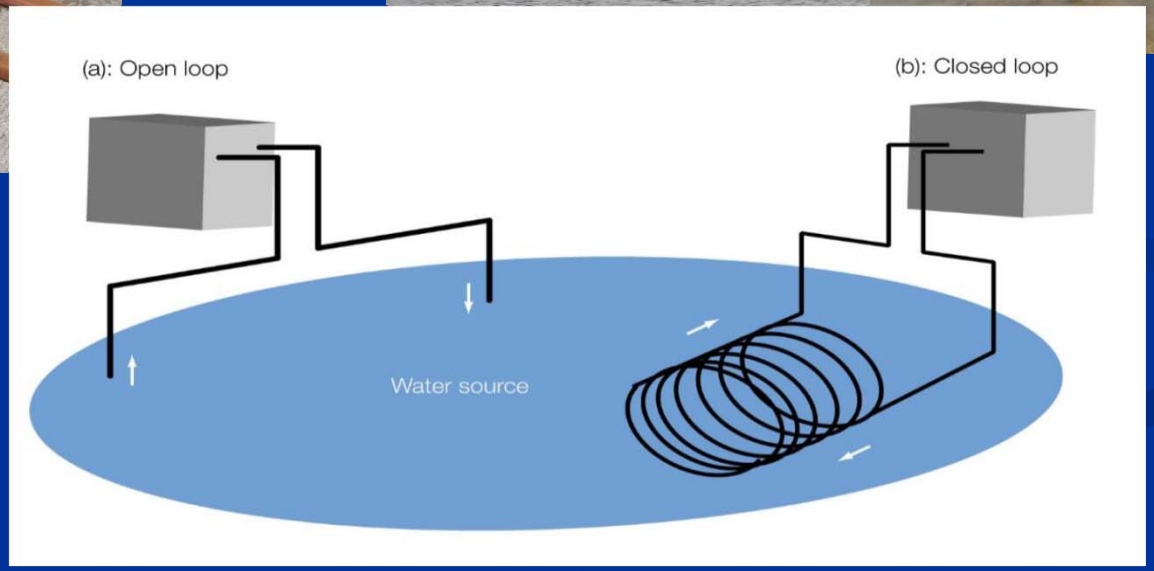
WSHPs open/Closed loop

Intake structures for closed loop & open loop

(Thanks to CIBSE, GCore, GIEnergy Ltd and Kevin Byrne)



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Water Source Heat Pumps Regulation

- Open loop WSHP system is regulated slightly differently to a borehole open loop system
  - Abstraction licence (Water Resources Act 1991, as amended)
  - Discharge Permit (Environmental Permitting Regs 2010)
- Closed loop – not regulated – but EIA often required
- Land & riparian rights owner, interest groups, boating, angling etc
- Leakage of closed-loop fluid = Potential criminal activity and enforcement action
- Planning permission, Flood defences?
- Canals and Rivers Trust might also be involved

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WSHP Application Process

EXEMPTION FOR SINGLE DOMESTIC PROPERTIES

- Small WSHP systems for a single domestic property;
  - Water abstracted and returned to same river/stream
  - No chemicals are discharged
  - The property is not used for any commercial purpose
  - An abstraction of more than 20m^3/day will require an abstraction licence
  - Must notify the Environment Agency of the scheme and supporting information for exemption

STANDARD RULES; SR2012 No2

- Simpler than a 'Bespoke application'
- Systems between 20m^3/day and 1000m^3/day
  - No chemical discharge
  - Delta-T from inlet to discharge <8°C
  - Outlet temperature does not exceed 25°C
  - Abstraction and discharge to/from same water body
  - NOT ponds, lakes (no inflow, or too small – *liaise with EA*)
  - Not within 500m upstream of SSSI or other protected sites
  - Not within 200m of another heating/cooling discharge
  - Volume of discharge not to exceed river Q95
  - No discharge allowed where salmon spawn

Bespoke Permits

- For all systems that do not comply with Standard rules, or single domestic property requirements
- Permit is written specifically for the scheme
- Land ownership details & Abstraction licence required
- Environmental assessment – scope entirely dependent on scheme size & sensitivity of location
  - Impact assessment might be very involved and technically challenging, involving heat & hydraulic modelling & ecology impacts
- Abstraction/discharge rate details, peak, daily, annual
- Method of abstraction
- Screening details (very important! See EA Best Practice Guide)
- Monitoring/management arrangements

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Forms & time limits

- All forms and guidance notes available from
  - www.gov.uk/government/publications/
- Feasibility stage; pre-application and discussion with EA
- Application form Part-A, About You
- Application form and guidance notes Part B8
- Part F2 – money! (The charge for abstraction and discharge application will depend on the size of the scheme).
- When the licence/permit is issued there will be a time limit
- Normally between 6 and 18 years – and then renewal of 12 years.
- You can apply for a Long Duration Licence of 24 years;
  - Additional information & business case required.

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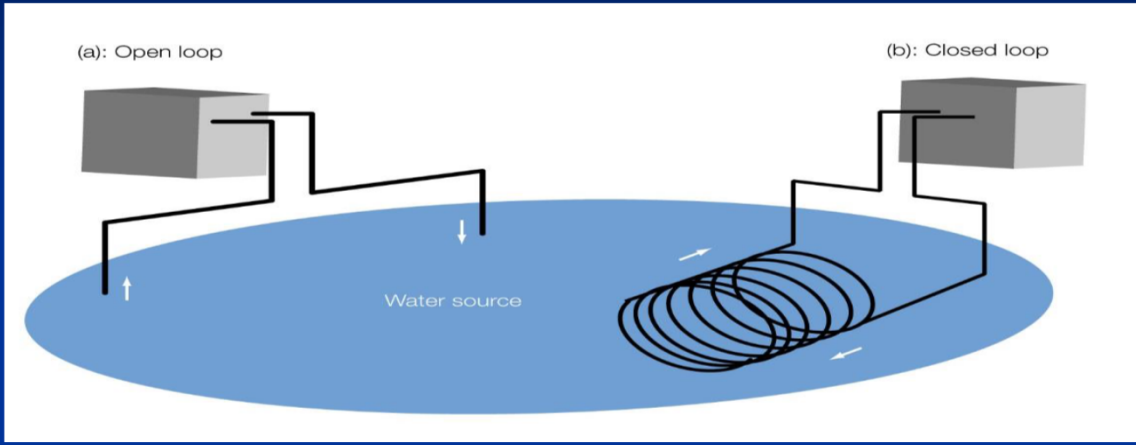
Thank you!



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GSHP association