

Ground Source Heat Pumps

A regulators perspective

Dr John Aldrick

HO Water Resources Regulation Manager

Environment Agency Policy on Renewables



The Agency strongly supports the Government's targets for the use of renewable energy. (10% - 2010, 20% - 2020)

BUT

The Agency recognises both **potential benefits & environmental impacts** of some renewables

eg Ground Source Heat Pumps, Hydropower

The Agency seeks to work constructively with industry to balance the benefits/impacts of renewables

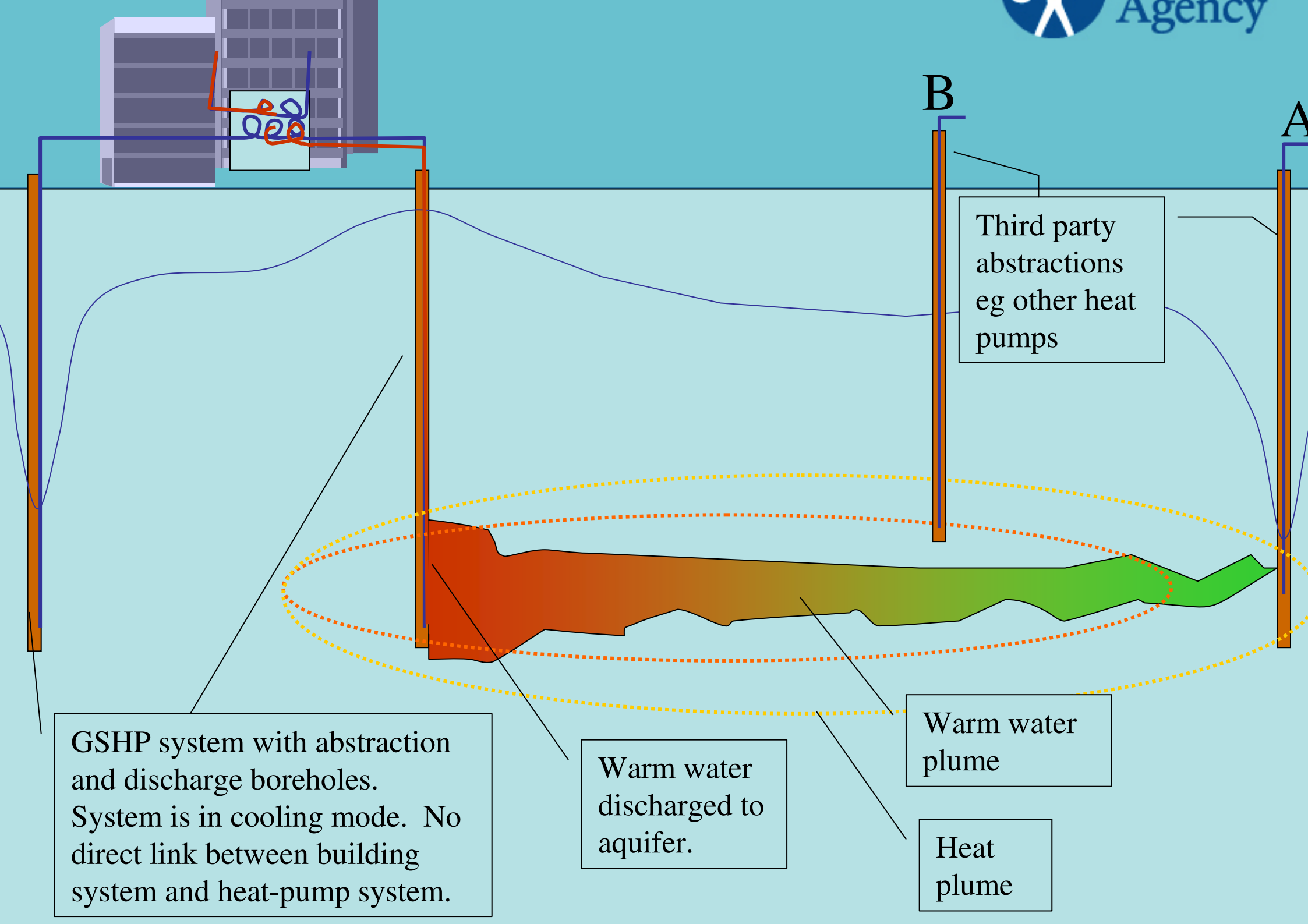
GSHP - What are the problems?

Exploitation of heat not covered directly in legislation

- Impact on the environment
- Impact on others
- Heat as a pollutant

What are the controls

- Abstraction licences
- Discharge consents



B

A

Third party abstractions
eg other heat pumps

GSHP system with abstraction and discharge boreholes. System is in cooling mode. No direct link between building system and heat-pump system.

Warm water discharged to aquifer.

Warm water plume

Heat plume

Agency regulatory regime

Strong legislative and environmental constraints which guide us

eg Water Resources Act 1963, 1999 Water Act 2003

Water Resources permit

- Abstraction Licence/sec 158 agreement

Discharge consent

GSHP may require both WR and Discharge permit

- Most GW abstractions only have WR permit

Controls - abstraction

Abstraction licence (open loop)

- Must have a permit if abstraction $>20\text{cu.m/d}$
- Volumes specified
- Time limited licence – normally 12 years
- Need to link abstraction & discharge permits
 - conditions or sec 158 agreement (especially where resources are under stress)
- Presumption of renewal
 - Continued need, environmental impact, efficiency
- Environmental Assessment

Controls - discharge

Discharge consent

- Heat is a potential pollutant
- Heat not in legal definition of pollution
- Temperature conditions can be put on discharge consent
- Volume not usually specified (but may require monitoring where linked to abstraction permit)

Control of pollution

Pollution

- Construction issues
 - Drilling through contaminated land
 - Cross connecting aquifers
- Operation issues
 - Loss of refrigerant

Works notice WR or GW

Issues

Thermal interference

- Impact on others
- Cyclic heating/cooling
- Groundwater modelling of thermal plumes
- Monitoring of temperature/plume

Legal issues

- Legislation not designed for GSHP
- When things go wrong?

Do we need to do anything?

- No problem – no legislation change
- 40 years to remove some WR exemptions
- Improve guidance?
- Improve modelling?
- Improve science?
- Very specialist technical area – mainly urban sites
- Mostly London?

Similarity to Hydropower

- ‘Good Practice Guide’ being developed by EA/Hydropower Working Group
- Aims to :
 - provide Agency/developers with a consistent approach, common language and practical advice
 - clarify the Agency position and promote awareness
- But it won't :
 - answer all your Hydropower development issues
- Agency Hydropower Manual(2003) available on website

Environmental site list audit

- Checklist indicates factors that need to be considered

Red boxes need further work

Notes provide further guidance

Water Resources

Conservation

Chemical/physical water quality

Biological Water quality

Fisheries

tick box		A Water Resources Checklist
YES	NO	
		Is the scheme non-consumptive i.e. will 100% of any water abstracted be returned to the water course from which it was taken?
		Is the scheme being built on existing infrastructure?
		Will the turbine be placed directly within the weir / water course rather than in a separate channel?
		Is there a flow-depleted channel?
		Is there a flow-depleted weir?
		Is it intended to increase the height of the impoundment?
		Do surveys reveal any existing abstractions, including unlicensed ones, which will be derogated by the proposal? (1)
		Is there an EA gauging station in the depleted reach or nearby that is likely to be affected by the scheme?

Applicants should expect the Agency to:

- Provide clear guidance on the licensing process
- Highlight key issues for environmental assessment
- Have an understanding of ground source heat pumps
- Provide information it has available
- Be consistent
- Provide timely responses, with explanations

Applicants should not expect the Agency to:

- collect and analyse supporting data
- carry out the environmental assessment
- accept inadequate data or assessments
- give a binding view based on incomplete information
- design the scheme
- contravene its statutory duties

the applicants to:

- to know their site, its environment and their objectives for the scheme (background)
- consider and design their proposals carefully
- consider options/alternatives
- make early contact with the Agency and continue such throughout the process
- appreciate the legislative and other constraints
- provide quality, focused environmental assessments
- provide appropriately detailed plans and drawings to support any applications