Groundwater protection policy for Scotland

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Environmental policy 19

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A Overarching policy

A1 Background

A1.1 Introduction

About this Policy

A1.1.1 Groundwater is a valuable resource in Scotland where there are an estimated 30,000 private supplies. Many of these represent the only or main water supply to households and small businesses, particularly in rural areas. Groundwater is also used as a source for public water supply and by industries such as breweries, distilleries and mineral water producers and it is essential for irrigation in some agricultural areas. Groundwater maintains wetlands and river flow during dry spells and is vital to the maintenance of their rich ecology and biodiversity. However, it is not visible, is often poorly understood and its value is underestimated as a consequence.

A1.1.2 In short, groundwater is an invaluable resource which must be managed in a sustainable way to maintain and enhance its contribution to social, economic and environmental welfare. However, it is a resource that can be damaged, sometimes irreversibly, by pollution and over-abstraction.

A1.1.3 European and national legislation requires that pollution must be prevented and that the groundwater resource is managed in a sustainable way. In terms of statutory guidance on sustainable development[1], it is clear that SEPA must adopt the precautionary principle where appropriate, take account of costs and benefits, consider impacts on biodiversity, not unnecessarily constrain economic development and assess, understand and minimise the impacts of emissions on health.

A1.1.4 SEPA has a leading role in the protection of groundwater but we share this responsibility with other organisations. For example, the local authority is responsible for the identification of contaminated land and for land use planning.

A1.1.5 This policy aims to provide a sustainable future for Scotland's groundwater resources by protecting legitimate uses of groundwater and providing a common SEPA framework to:

- protect groundwater quality by minimising the risks posed by point and diffuse sources of pollution;
- maintain the groundwater resource by authorising abstractions and by influencing developments, which could affect groundwater quantity.

A.1.1.6 The policy consists of this overarching policy section together with – and supported by – activity specific sections. The overarching section provides background information and is followed by SEPA's overall policy objectives which are in bold type. The supporting sections identify mechanisms to achieve the overarching policy statements referring to specific aspects of groundwater protection.

A1.1.7 This policy is intended for internal and external audiences, including planning authorities, developers, industry and others with an interest in groundwater in Scotland.

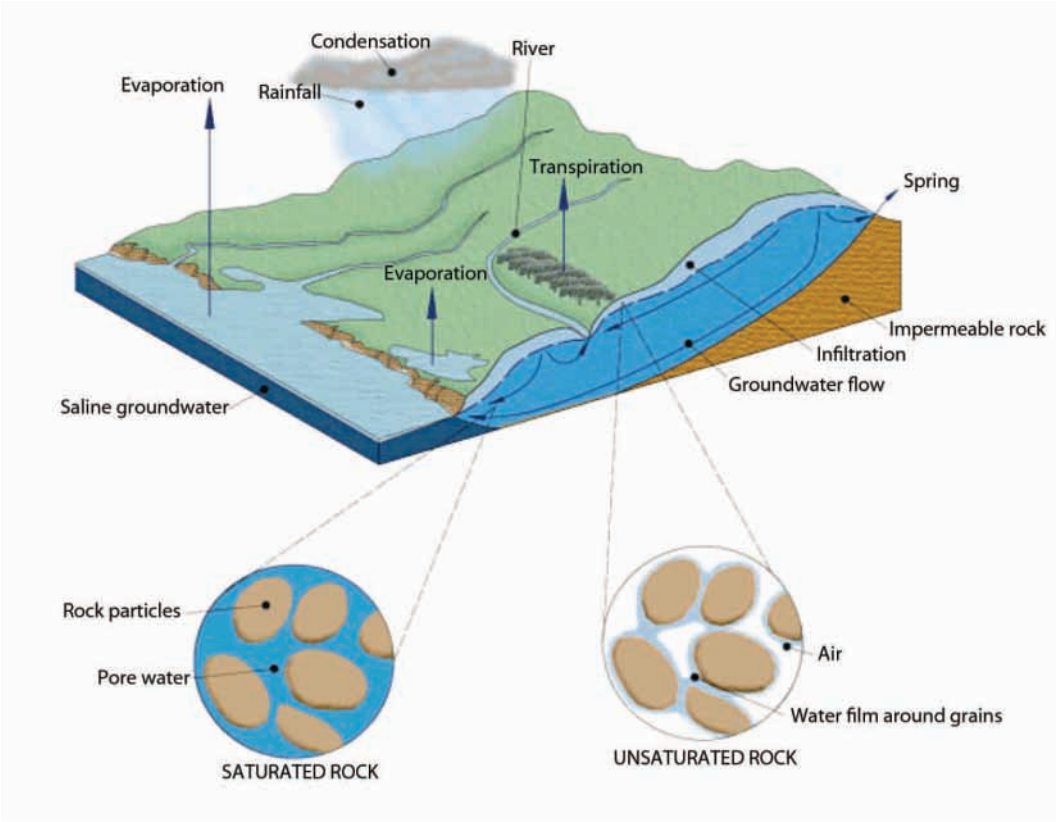
A1.1.8 This policy recognises that soil is an important factor in groundwater protection. However, soil itself also requires protection and this is reflected in SEPA's Land Protection Policy (Policy 54).

Why we should protect groundwater

A1.1.9 The term groundwater refers to all water which is below the surface of the ground in the saturated zone and which is in direct contact with the ground or subsoil. The saturated zone is where all the cracks in the rock and all the spaces between the grains of rock or within the soil are filled with water. The upper limit of the saturated zone is usually referred to as the water table. The zone above the water table where pore spaces contain both vapour and water is known as the unsaturated zone.

[1]The Scottish Environment Protection Agency (SEPA) and Sustainable Development, December 2004.

Figure 1: A groundwater system: saturated and unsaturated zones



A1.1.10 The protection of groundwater from the impact of human activity is important because:

- groundwater is an important source of water;
- groundwater moves slowly through the ground so the impact of human activities may not be quickly recognised. Once polluted, groundwater is often very difficult and very expensive to clean up, even after the source of the pollution has been removed;
- groundwater provides baseflow to surface water systems, allowing streams and rivers to flow in dry weather, and is often important in supporting wetlands and their ecosystems;
- agricultural, industrial and other human activities pose risks to groundwater quality and quantity.

Legislation protecting groundwater

A1.1.11 This policy delivers the requirements of existing legislation to protect groundwater.

A1.1.12 Historically, the main European legislation concerned with groundwater quality protection has been the Groundwater Directive (80/68/EEC). The Groundwater Directive includes two lists of polluting substances which, based on toxicity, persistence, and potential for bioaccumulation, are categorised into either list I or list II. List I substances are deemed to have the higher polluting potential. The key requirements of this directive are that:

- entry of list I substances to groundwater must be prevented;
- pollution of groundwater by list II substances must be prevented;
- where there is a risk of the entry of list I substances to groundwater or the pollution of groundwater by list II substances then a discharge may only be authorised subject to prior investigation.

A1.1.13 The Groundwater Directive was transposed in the UK by the Groundwater Regulations 1998.

A1.1.14 The Water Framework Directive (2000/60/EC) represents the first comprehensive framework for the protection and management of the water environment. The directive's requirements with respect to groundwater include:

- the creation of management units for groundwater known as groundwater bodies and the classification of these bodies into either good or poor status dependent on anthropogenic effects on their quantitative and qualitative properties;
- to ensure that no deterioration in status occurs;
- to restore bodies of groundwater at poor status to good status where this is technically feasible and does not entail disproportionate cost;
- to prevent or limit the entry of pollutants to groundwater;
- to identify and reverse any significant and sustained upward trends of pollutants in groundwater;
- to introduce control regimes for abstraction and for diffuse sources liable to cause pollution.

A1.1.15 The Water Framework Directive also contains a requirement to protect certain groundwater bodies used for the abstraction of drinking water "with the aim of avoiding deterioration in their quality in order to reduce the level of purification treatment required in the production of drinking water".

A1.1.16 The Water Framework Directive provides for the repeal of the Groundwater Directive (80/68/EEC) in 2013 and a daughter directive (2006/118/EC) has been made under the Water Framework Directive, providing similar controls to the Groundwater Directive. Rather than referring to list I and list II substances and applying only to these, the Groundwater Daughter Directive applies to all pollutants and refers to hazardous and non-hazardous substances (as does the Water Framework Directive). However, categorisation of these substances into hazardous or non-hazardous is still based upon toxicity, persistence and potential for bioaccumulation.

A1.1.17 As well as giving details on preventing and limiting inputs of pollutants to groundwater the new Groundwater Daughter Directive provides further details on criteria for assessing good groundwater status and for the identification of significant and sustained upwards trends and the starting points for trend reversal.

A1.1.18 The Water Framework Directive's requirements have been transposed into Scottish law through the Water Environment and Water Services (Scotland) Act 2003. This establishes the administrative structures by which management of the water environment will be achieved.

A1.1.19 The Water Environment (Controlled Activities) (Scotland) Regulations 2005 were introduced under the 2003 Act to specify the control regimes for discharges to, abstractions from and impoundments and engineering activities affecting the water environment. They came into force on 1 April 2006, superseding the Groundwater Regulations 1998 which were withdrawn in Scotland. Diffuse pollution controls, in the form of General Binding Rules (GBRs) came into force on 1 April 2008.

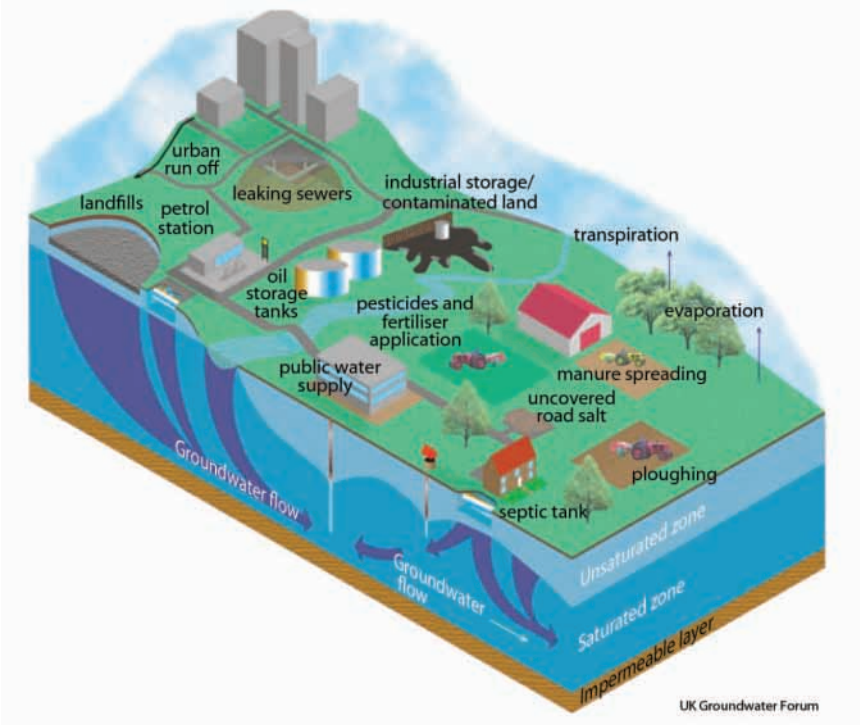
A1.1.20 SEPA has now delineated groundwater bodies in Scotland and identified those groundwater bodies which are considered to be at risk of failing to meet good status because of pollution or over-abstraction. We are developing a robust and representative sampling network for both groundwater quantity and chemical quality in order to monitor the status of groundwater in Scotland and are classifying Scotland's groundwater bodies. This will allow the risk of groundwater failing to meet good quantitative and chemical status to be assessed and the status of the groundwater to be described.

A1.2 Threats to groundwater

The risk of pollution

A1.2.1 Both point source pollution (eg from septic tank effluent, spillages or leaks, landfill leachate etc) and diffuse pollution (eg from application of organic or inorganic fertilisers or pesticides to land) are a threat to groundwater quality. Historically, most of the identified contamination problems have been associated with point source pollution. More recently it has been increasingly recognised that diffuse sources cause significant pollution of groundwater.

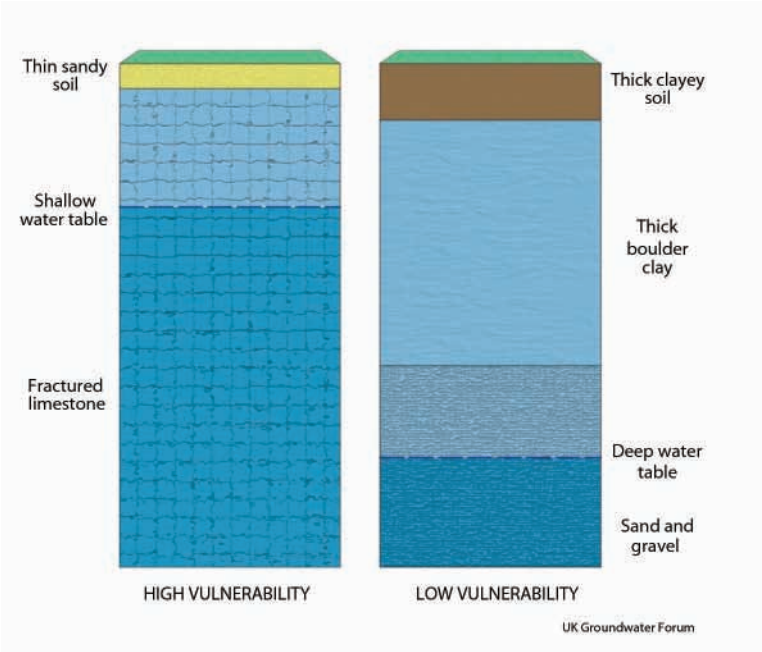
Figure 2: Threats to groundwater



A1.2.2 Not all groundwater is equally vulnerable to the risk of pollution from a given activity. The natural characteristics of soil and rocks control the ease with which a potentially polluting source or activity can affect groundwater. The factors which together define the vulnerability of groundwater are:

- presence and nature of overlying soil;
- presence and nature of superficial or drift deposits (for example, glacial and river deposits that overlie bedrock);
- nature of strata and associated hydrogeological characteristics;
- depth of unsaturated zone.

Figure 3: Groundwater vulnerability



A1.2.3 The presence of rapid flow paths, such as field drains or flow within fissures or fractures in rocks or in the soil can increase the risk of pathogens and other pollutants reaching groundwater and sensitive receptors such as associated surface waters. A common problem is direct access of polluted waters down a borehole. This is usually because the borehole is poorly protected, constructed and sited.

A1.2.4 The presence of impermeable ground cover such as concrete can prevent pollutants reaching groundwater. However, this can promote run-off and so measures need to be taken to protect surface waters from becoming contaminated.

A1.2.5 Once pollutants have percolated vertically down to the water table they will generally be transported laterally by groundwater flow. Flow rates will vary with the type of rock and the hydraulic gradient (slope of the water table). The rate at which pollutants are transported from the source will also then be variable.

A1.2.6 Different pollutants will break down or be removed from groundwater at different rates, depending on both the characteristics of the pollutant and the natural conditions. Although biological contaminants, such as pathogens, tend to die off or be filtered out fairly rapidly, persistent chemicals such as the hydrocarbons in fuel may take many decades to break down. Persistent pollutants therefore have the potential to be transported over much greater distances and can therefore affect greater volumes of water.

A1.2.7 The risk to groundwater quality will be dependent on additional factors to groundwater vulnerability and the persistence of the pollutant, including contaminant loading and any preventative measures that may be in place.

A1.2.8 Preventative measures that can reduce the risk of pollution include:

- engineered measures such as the installation of an artificial liner to a landfill site to reduce the potential for leakage of leachate or the construction of bunds around storage tanks;
- the introduction of management systems that can reduce the likelihood of any leaks or spillages,eg automatic monitoring of leachate or tank levels;
- the implementation of contingency planning should a spill occur eg plans to prevent the spillage entering drains and soakaways;
- good land management practice;
- strategic planning measures such as targeting activities or types of development away from sensitive locations eg location of landfills on low permeability drift deposits.

Groundwater that is more vulnerable to pollution will need more stringent preventative measures to ensure its protection.

The risk of over-abstraction

A1.2.9 Over-abstraction of groundwater occurs when abstraction exceeds the replenishment of available groundwater resource. Over-abstraction can lead to saltwater or other intrusion in to an aquifer, reduction of flows in rivers and detrimental impacts to ecosystems which are dependent on groundwater. Over-abstraction can also impair or dry up neighbouring wells or boreholes used for water supply.

A1.2.10 Groundwater abstraction (eg for the dewatering of quarries or for spray irrigation of crops) lowers the water table and can locally change the flow direction of groundwater. Near the coast, the change in flow direction can draw saltwater into the fresh groundwater, a problem known as saline intrusion. A similar problem can arise inland, away from the coast where a body of groundwater is adjacent to polluted or mineralised water.

A1.2.11 The impact of abstraction will be dependent on hydrogeological factors (the response of the system to the abstraction and the importance of that resource to associated surface waters or wetlands) and other factors (eg the rate of abstraction or the proximity of other users). For a given abstraction, certain environments will be more susceptible than others.

A1.2.12 Surface water courses often receive discharges of effluents such as treated sewage. A reduction in the groundwater contribution to surface water courses due to groundwater abstraction will lead to a reduction in dilution and can therefore lead to a decrease in the surface water quality.

A1.2.13 Preventative measures that can reduce the risk of widespread or local impacts of over-abstraction include:

- reducing the quantity abstracted;
- changing the abstraction rate or pattern of abstraction (such as abstracting at a lower rate but for a longer period);
- changing the location of the abstraction e.g. siting the borehole further away from a sensitive receptor;
- abstracting from several shallow boreholes rather than one deep one (eg to prevent saline intrusion in sensitive locations).

Groundwater that is more susceptible to over-abstraction will need more stringent preventative measures to ensure its protection.

A2 Policy statements

A2.1 Groundwater objectives

General objectives for groundwater

A2.1.1 SEPA will address groundwater protection in the context of sustainable development, taking account of social and economic factors where appropriate. We will base our decision making on available sound science, taking a long term view, adopting a risk based approach and using the precautionary principle when necessary.

A2.1.2 SEPA will work to protect and restore groundwater in Scotland. If the regulatory powers that we have at our disposal are insufficient then we will seek to use our influence using non-regulatory tools to achieve this end.

A2.1.3 SEPA will, where we have control over an activity that may affect groundwater, use a risk-based approach to ensure that the controls imposed are proportionate to the level of risk. Regulated activities will be subject to appropriate inspections and monitoring to ensure groundwater is adequately protected.

A2.1.4 SEPA will seek to ensure that water use in Scotland is sustainable. The concept of sustainable water use means that activities should be compatible with the long-term protection of water resources. This will ensure the protection of dependent ecosystems and the availability of good quality groundwater.

A2.1.5 SEPA will seek to secure restoration of groundwater bodies which are at poor status because of over-abstraction or pollution where it is technically feasible and would not entail disproportionate cost. Our main focus, however, is to prevent pollution and over-abstraction through effective protection.

Objectives for improving our understanding of groundwater

A2.1.6 By December 2009, SEPA:

- developed a coherent and comprehensive overview of the status of groundwater quality and quantity in Scotland;
- produced the first river basin management plans for the Scotland and Solway Tweed river basin districts. These describe how water bodies (including groundwater bodies) will be managed, and describe a programme of measures for each.

Objectives for groundwater quantity

A2.1.7 SEPA will seek to ensure that there is a sustainable balance between abstraction, the water needs of dependent ecosystems and surface waters and the recharge of groundwater.

A2.1.8 SEPA will encourage the efficient use of groundwater to improve preservation of the available resource.

A2.1.9 SEPA will seek to prevent changes in flow direction of groundwater resulting from groundwater abstractions where these may lead to unacceptable changes in groundwater quality as a result of intrusion of water of a different chemical composition.

A2.1.10 SEPA will prepare water resource management strategies for groundwater that is subject to significant environmental pressures arising from abstraction.

A2.1.11 SEPA will seek to ensure that new abstractions do not compromise the resources available to existing abstractors.

Objectives for groundwater quality

A2.1.12 SEPA will seek to maintain the quality of groundwater such that there is:

- no harm to human health, including harm by pathogens;
- no harm to the quality of aquatic ecosystems or terrestrial ecosystems dependent on groundwater;
- no impairment or interference with amenities or other legitimate uses of the environment;
- no entry of list I (hazardous) substances and no pollution by other pollutants in compliance with the Groundwater Directive (80/68/EEC), the Groundwater Daughter Directive (2006/118/EC) and the Water Framework Directive and national legislation which implements it;
- no deterioration in status of the water environment and no significant damage to aquatic ecosystems;
- a progressive reduction of discharges of contaminated groundwater via baseflow of groundwater into surface waters of priority substances and cessation or phasing out of discharges of priority hazardous substances into surface waters via the groundwater pathway.

A2.1.13 The Scottish Government has identified as Drinking Water Protected Areas groundwater bodies used for the abstraction of water for human consumption which provide more than 10m^3/day as an average or serve more than 50 persons. SEPA will meet the Water Framework Directive requirement to protect groundwater in Drinking Water Protected Areas as defined by the Scottish Government.

A2.1.14 SEPA will work towards achieving compliance with the objectives and standards of other areas designated as protected by EC legislation.

A2.1.15 SEPA will work to identify and reverse significant and sustained upward trends in the concentration of any pollutants in groundwater in order to reduce the pollution of groundwater.

A2.2 Mechanisms for achieving the groundwater objectives

A2.2.1 SEPA will use the powers we are granted under national legislation to protect and restore groundwater subject to pollution or over-abstraction. These include regulatory powers to control activities and our role as a statutory or non-statutory consultee to other agencies involved in environmental regulation.

A2.2.2 SEPA will develop river basin management plans to set out the environmental objectives for Scotland's water bodies and programmes of measures to achieve these objectives.

A.2.2.3 SEPA recognises that the planning system is an essential mechanism for groundwater protection. We will promote this protection by liaising with planning authorities and the Scottish Government to make sure that, as far as possible, geological and hydrogeological factors are taken into account when formulating national planning policy, preparing development plans and determining individual development management applications.

A.2.2.4 Particular activities may be subject to guidelines and codes of practice, which will have varying degrees of statutory force. SEPA will, wherever possible, use its influence to ensure the principles of groundwater protection are incorporated into such codes and guidance.

A2.2.5 SEPA recognises that liaison with other organisations with responsibility for environmental management (for example Scottish Natural Heritage, Scottish Water, local authorities and the Scottish Landowners Federation) and industry is key to groundwater protection.

A2.2.6 SEPA will provide advice to the Scottish Government with the intention of achieving improvements in legislation, regulation or guidance and will work in partnership with others to achieve improvements to the groundwater environment.

A2.2.7 SEPA considers that the primary responsibility for groundwater protection rests with any person, company or organisation that is carrying out an activity that poses a threat to groundwater. Education and guidance are, therefore, seen as essential mechanisms to improve groundwater protection.

A3 Related information

A3.1 All SEPA Policies can be accessed on the SEPA website.

A3.2 Policy 5: Enforcement.

A3.3 Policy 54: Land Protection Policy.

A3.4 Characterisation and impact analysis required by article 5 of the Water Framework Directive – Scotland river basin district.

A3.5 Characterisation and impact analysis required by article 5 of the Water Framework Directive – Solway Tweed river basin district.

A3.6 *Controlled Activities Regulations – A Practical Guide*.

A3.7 River basin management plans for the Scotland and the Solway Tweed river basin districts.

B Interaction with the planning system

B1 Background

B1.1 This section of the policy considers how SEPA can effectively engage with the land use planning system in relation to groundwater issues. The planning system provides an opportunity for development proposals to identify opportunities, constraints and solutions and for SEPA to interact with planning authorities, other key agencies, and developers. We can seek to achieve our environmental objectives by raising concerns which are appropriate material planning considerations and identifying measures to address these concerns. The planning system should not be used to achieve objectives more properly achieved under other legislation or regulation, however we can influence:

- planning applications that require regulatory control by us which may have significant implications for groundwater;
- environmental outcomes of planning applications that fall outside the scope of our regulatory controls.

B1.2 It is crucial that SEPA proactively works at an early stage with the development planning process to promote sustainable outcomes via a plan-led system. For development management (formerly development control), engagement at the pre-application and planning application submission stages provides an opportunity for us to influence the likely form of development in more detail.

B1.3 In practice there are three levels at which SEPA can influence environmental outcomes through the planning system, national policy and advice, development plans and development management, as further outlined below.

B1.4 National planning policy and advice, produced by the Scottish Government, consists of:

- the National Planning Framework (NPF2) which is now statutory and provides a context for development plans and development decisions including the identification of key infrastructure needs;
- the consolidated Scottish Planning Policy (SPP), which provides clear statements of Scottish Government policy on nationally important land use issues and other planning matters, supported where appropriate by the National Planning Framework. The consolidated SPP replaces existing SPPs and National Planning Policy Guidance, although these will remain in force until the final SPP is published in late 2009;
- circulars, which also provide statements of Scottish Government policy and contain guidance on policy implementation through legislative or procedural change;
- Planning Advice Notes (PANs), which provide advice and information on technical planning matters.

Statements of Scottish Government policy contained in the NPF2, the SPP and in circulars may be material considerations to be taken into account in development plan preparation and development management. SEPA advises and influences the Scottish Government in the production of these documents where appropriate, although not all circulars and PANs are subject to consultation.

Statements of Scottish Government location specific planning policy such as The West Edinburgh Planning Framework have the same status in decision making as the SPP.

B1.5 The Planning etc (Scotland) Act 2006 introduced primary legislative provisions to support a modernised system in Scotland and reaffirm its plan-led nature. The act places considerable emphasis on early engagement in the development planning process and requires planning authorities to exercise their development planning functions with the objective of contributing to sustainable development. The new provisions for development planning are now in force, and the old framework of structure and local plans is currently being replaced with strategic development plans (in the four largest city regions) and local development plans (across the country). This will focus efforts on major areas of growth and will create a single tier of plan across large parts of the country.

B1.6 Development plans contain policies designed to promote the economic, social, physical and environmental wellbeing of an area, and allocate sites for specific land uses. Planning applications must be determined in accordance with the development plan unless there are material considerations that indicate otherwise. As a key agency under the act SEPA has a duty to co-operate with development planning authorities to ensure effective integration of policy objectives and investment programmes. Early engagement allows our interests to be fully considered when plans are formulated so that we can support development proposals at the planning application stage, and our planning service has recently been reprioritised to ensure full and early engagement at all stages of development planning.

B1.7 Within the development management process, individual applications for planning permission are largely determined by a planning authority (see above) and can either be approved, approved with conditions or refused. SEPA is a statutory consultee for planning applications that fall within the scope of the Schedule 5 (1) of the Town and Country Planning (Development Management Procedure (Scotland) Regulations and the Environmental Impact Assessment (Scotland) Regulations 1999 (as amended). We are also a consultee at the discretion of individual planning authorities with regard to other types of planning applications. Our representations on planning applications and appeals are a material consideration, although not necessarily an overriding one.

B1.8 To assist with streamlining the planning process, and in line with the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009 which aim to make the planning system more proportionate, SEPA now focuses site specific advice in development management where it can add best value in terms of enabling good development and protecting the environment. Planning authorities have therefore been requested to consult SEPA in line with guidance note LUPS-GU09 Advice on how and when to consult SEPA. For small-scale development proposals standing advice will be provided except where a potential significant threat to groundwater is highlighted in the consultation.

B1.9 SEPA is a consultee under the planning system in relation to:

- development management consultations as set out in SEPA guidance note LUPS-GU09 *Advice on how and when to consult SEPA*;
- all applications subject to The Environmental Impact Assessment (Scotland) Regulations 1999 (as amended) and other environmental impact assessment regulations;
- applications under the Electricity Act 1989 Section 36 for power generation and Section 37 transmission line applications subject to Environmental Impact Assessment;
- the Town and Country Planning (Hazardous Substances) (Scotland) Regulations 1993 as amended by the Planning (Control of Major-Accident Hazards [CoMAH]) (Scotland) Regulations 2000 for CoMAH sites. This allows the potential impacts on groundwater from major accidents (such as Buncefield) to be taken into account.

B1.10 The content of river basin management plans is a material planning consideration, and groundwater risks identified through the river basin management planning process will need to be taken account of in preparing strategic and local development plans and determining development management applications.

B2 Mechanisms for achieving the groundwater objectives

B2.1 This section considers how the groundwater objectives specified in the overarching policy will be delivered.

Scottish planning policy and advice

B2.2 When SEPA submits a response to draft Scottish planning policy or is engaged in formal discussions with the Scottish Government to inform the review of national policy and advice, we will ensure that the protection of groundwater is included as appropriate.

B2.3 SEPA will seek to ensure that groundwater protection is appropriately considered within any emerging model policies for development plans set out in the Scottish planning policy.

Development planning

B2.4 SEPA will aim to influence the preparation of development plans so that planning authorities have regard to the potential risks to groundwater in formulating and finalising policies, site allocations and development proposals.

B2.5 SEPA will seek to ensure that development plans:

- acknowledge areas which SEPA has designated as particularly vulnerable or at significant risk of groundwater pollution;
- require that proposals avoid or sufficiently mitigate any impacts on groundwater in or adjacent to such vulnerable or at risk areas without significantly increasing the risk of groundwater pollution elsewhere (particularly where such proposals will not be subject to SEPA regulatory control).

Development management

B2.6 Representations or objections by SEPA will be made on planning grounds and will not seek to duplicate specific environmental protection controls.

B2.7 If a proposed development will be regulated by SEPA, we will seek to provide local authorities with a view on whether we consider the proposal is capable of being authorised. Such an opinion will be based on the information available to us at the planning stage and is without prejudice to the final determination of any regulatory authorisation.

B.2.8 Where the applicant does not wish to submit the information required to establish environmental consent, SEPA considers it to be the applicant's commercial risk if a licence or permit is subsequently refused which necessitates a return to planning.

We will only require information at the planning stage which is essential to assess whether any impact on groundwater affects the principle of the development going ahead in a land use planning context. This risk will be highlighted in our response to the planning authority.

B2.9 Where groundwater is not controlled by environmental regulation, SEPA may request that planning conditions be attached to any planning permission granted to mitigate risk to groundwater or that modifications are made to the proposals. If a proposal is considered to pose a significant risk to groundwater and SEPA considers that this cannot be offset by appropriate mitigation/modifications to the initial proposals, we may object to the granting of planning permission.

B2.10 SEPA will seek to ensure that risks to groundwater are addressed within environmental impact assessments, where these are required by planning legislation.

B2.11 When consulted on a planning application, SEPA will work with the planning authority to agree on appropriate wording of conditions and will encourage best practice for groundwater protection.

B2.12 When planning and one or more means of environmental regulation applies to a proposal and the applicant wishes to submit the information required to establish consent, SEPA will, as far as practicable, co-ordinate our input from planning and regulatory perspectives in line with advice set out in the *PAN 51 Planning, Environmental Protection and Regulation*.

Protocols between SEPA and planning authorities

B2.13 SEPA will work in partnership with planning authorities to try to ensure that, where we are consulted under Schedule 5 (1) of the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008 and in accordance with guidance note LUPS-GU09 *Advice on how and when to consult SEPA*, we will take part in pre-application discussions where there is likely to be a significant risk to groundwater. This is so that, if necessary, appropriate mitigation measures can be incorporated into the site layout or be conditioned.

B2.14 SEPA will seek to be consulted, on a non-statutory basis, at pre-application and planning application submission stages where a proposed development is of a type not specified in Schedule 5 (1) of the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008, but is likely to pose a significant risk to groundwater.

Strategic environmental assessment

B2.15 In exercising our role as a consultation authority, SEPA will seek to ensure that risks to groundwater are sufficiently addressed in the scoping and environmental reporting stages of strategic environmental assessment.

B3 Related guidance

B3.1 The Scottish Planning Policy (SPP) and National Planning Policy Guidance (NPPG) series are currently being consolidated into one document. The policies currently set out in SPPs and NPPGs will remain in force until replaced by the new SPP in 2009. A list of current SPPs and Planning Advice Notes and the draft consolidated SPP is available from the Scottish Governments planning website at: www.scotland.gov.uk/Topics/Built-Environment/planning

B3.2 SPPs provide detailed policy guidance on thematic issues that are most likely to be relevant to the consideration of groundwater issues, including:

- SPP 1: The Planning System;
- SPP 2: Economic Development;
- SPP 3: Planning for Housing;
- SPP 4: Planning for Minerals;
- SPP 6: Renewable Energy;
- SPP 7: Planning and Flooding;
- SPP 10: Planning and Waste Management;
- NPPG 14: Natural Heritage (under Review);
- SPP 15: Planning for Rural Development;
- SPP 16: Opencast Coal.

B3.3 Planning Advice Notes (PANs) which are most likely to be relevant to the consideration of groundwater issues include:

- *PAN 33: Development of Contaminated Land;*
- *PAN 38: Housing Land (Revised 2003);*
- *PAN 45: Renewable Energy Technologies;*
- *PAN45 Annex: Planning for Micro Renewables;*
- *PAN 50: Controlling the Environmental Effects of Surface Mineral Workings;*
- *PAN 51 (Revised 2006): Planning, Environmental Protection and Regulation;*
- *PAN 58: Environmental Impact Assessment;*
- *PAN 60: Planning for Natural Heritage;*
- *PAN 61: Planning and Sustainable Urban Drainage Systems;*

- *PAN 63: Waste Management Planning;*
- *PAN 64: Reclamation of Surface Mineral Workings;*
- *PAN 69: Planning and Building Standards Advice on Flooding;*
- *PAN 79: Water and Drainage.*

B3.4 The pollution prevention and control guidelines, published by SEPA and available on the NetRegs website that are most relevant to groundwater are:

- *PPG02 Above ground oil storage tanks;*
- *PPG03 The use and design of oil interceptors;*
- *PPG04 Disposal of sewage where no mains drainage is available;*
- *PPG06 Working at construction and demolition sites;*
- *PPG07 Fuelling stations: construction and operation;*
- *PPG20 Dewatering underground ducts and chambers.*

C Waste management

C1 Background

C1.1 Introduction

C1.1.1 This section of the policy is specifically concerned with the protection of groundwater from waste management activities. SEPA is the principal waste regulation authority for Scotland, although we share responsibility with local authorities for dealing with fly-tipping. The disposal of effluent is dealt with in Section G, the management of agricultural wastes (other than to landfill) is covered in section D and waste from mines and quarries is covered in section H.

C1.1.2 Under the planning system, SEPA is a statutory consultee with regard to:

- development plans (which may include policies and land-use allocations for waste management facilities);
- certain planning applications (including those for development which consist of or includes the use of land for the deposit of any kind of refuse or waste, including slurry or sludge).

SEPA is also a consultee at the discretion of individual planning authorities with regard to other planning applications for new development (which may include waste management activities).

SEPA also advises and influences the Scottish Government in the production of Scottish Planning Policy (SPPs), circulars and Planning Advice Notes (PANS), a number of which relate to waste.

C1.1.3 The objective of waste legislation is to ensure that waste is recovered or disposed of without endangering human health and without using processes or methods which could harm the environment. Domestic waste legislation transposes the requirements of European Union Directive 75/442/EEC on waste (as amended by 91/156/EEC and adapted by 96/350/EC). Agricultural wastes being landfilled on farms are included under controls imposed by the Landfill (Scotland) Regulations 2003 (as amended).

C1.1.4 Waste management activities include:

- the keeping, treatment and disposal of waste;
- the transfer/transport of wastes from one place to another;
- the treatment of wastes to reduce their quantity, hazardousness, and/or facilitate their handling or disposal;
- the disposal of waste (eg in landfills and incinerators);
- the remediation of contaminated sites;
- waste recovery operations such as metals reclamation and the application of waste (eg pot ale, paper pulp etc) to land under the terms of an exemption from waste management licensing (exemptions are listed in Schedule 3, Waste Management Licensing Regulations 1994 [as amended]).

C1.1.5 The following key legislation is relevant to SEPA's regulatory function with respect to waste.

- Part II of the Environmental Protection Act 1990 (as amended) establishes statutory requirements intended to ensure that waste is handled, kept, treated, and disposed of without harm to the environment or human health in accordance with the Waste Framework Directive (Council Directive 75/442/EEC).
- The Waste Management Licensing Regulations 1994 (as amended) set out the detail of the waste management licensing system. Conditions may be set in licences for the purposes of protecting groundwater at licensed waste management sites. Schedule 3 of the 1994 Regulations (as amended) also sets out the specific terms of certain exemptions from waste management licensing which can only be carried out if the proposed activity is undertaken in such a way that it will not pose a risk to, amongst other things, groundwater, in accordance with the relevant objectives stated in Schedule 4 of the regulations.
- The Pollution Prevention and Control (Scotland) Regulations 2000 (as amended), made under section 2 of the Pollution Prevention and Control Act 1999 (as amended), establish the permit requirements for activities falling within the descriptions set out in Schedule1 of these regulations. Conditions may be set in permits for the purposes of protecting groundwater.
- The Landfill (Scotland) Regulations 2003 (as amended). These regulations implement the specific technical requirements of the Landfill Directive (1999/31/EC) with respect to landfill sites. They include specific provisions for the protection of groundwater.
- The Water Environment (Controlled Activities) (Scotland) Regulations 2005. Under the regulations a Waste Management Licence and a Pollution Prevention and Control permit are deemed to be a CAR authorisation. Where a person carries out an exempt waste activity, which is also a controlled activity, and this exemption has been registered with SEPA, that person shall be deemed to be authorised under the controlled activities regulations subject to conditions and except in relation to impoundments and engineering works in surface waters.

C1.2 Threats to groundwater

C1.2.1 The risk to groundwater will vary with the nature of the waste management activity (storage, transfer, recovery, treatment or landfill) and the nature of the waste.

C1.2.2 As the vulnerability of the groundwater varies with the hydrogeological setting, the location of the activity will to some extent determine the level of risk. Landfills are often developed in voids in the ground: this generally reduces the natural protection from pollution offered by the overlying strata and soils to groundwater and the waste may be placed in close proximity to the water table.

C1.2.3 Made ground (land which has been artificially built-up) often allows rapid shallow flow. Waste storage, disposal or treatment on made ground may therefore increase the vulnerability of associated surface water to pollution in addition to increased groundwater risks.

C1.2.4 The characteristics of the waste and its polluting potential will influence the risk from the activity. These characteristics include the toxicity, biodegradability and the mobility of pollutants in soil and groundwater.

C1.2.5 Both technical measures and management techniques can be used to reduce the risk from a particular activity. Technical measures include the use of impermeable working areas for transfer of waste, engineered barriers in landfills and surface water drainage design. Management techniques include the use of environmental management systems, procedural work systems and working plans.

C1.2.6 Waste management activities and the facilities designed to handle wastes may impact principally on groundwater quality, but can also impact on groundwater quantity eg by affecting groundwater flow direction or recharge rates. This section of the policy should be read in conjunction with the groundwater protection policy sections on the storage and handling of chemicals (which includes wastes) (Section F), construction and excavation (Section H) and abstraction and resource management (Section E).

C2 Mechanisms for achieving the groundwater objectives

C2.1 This section considers how the groundwater objectives specified in the overarching policy will be delivered.

C2.2 SEPA, by use of its full range of regulatory powers, will seek to ensure that waste management activities do not cause adverse impacts to groundwater.

Waste management licensing and permitting

C2.3 When considering applications for new facilities or where waste management licences or permits already exist:

- SEPA will ensure that appropriate assessments of risk to groundwater associated with waste management activities are carried out so that well-informed decisions can be made;
- where the nature of operations change to the extent that the validity of previous risk assessments is called into question, SEPA will seek a rigorous re-assessment of risks taking into account any such operational changes;
- SEPA will require appropriate monitoring to assess the impact that the operations will have or is currently having on groundwater;
- SEPA will seek to ensure that appropriate technical (eg engineered working areas) and management precautions are taken to deal with the risks associated with waste management activities;
- SEPA will normally require an unsaturated zone beneath the engineered liners of new non-hazardous and hazardous landfills and phase extensions to existing non-hazardous and hazardous landfills. Where there is no unsaturated zone we will require an unequivocal demonstration, as part of the risk assessment, that amongst other things: 1) groundwater is prevented from entering landfilled waste 2) that inputs of list I substances into groundwater and pollution of groundwater by other pollutants is prevented and 3) that the integrity of the engineered liners can be maintained;
- SEPA will discourage the use of unsustainable engineering practices such as actively lowering the natural water table or actively maintaining reduced water table levels in the long term.

C2.4 Where licence or permit applications do not include sufficient detail to assess the impact the site would have on groundwater or associated receptors SEPA will:

- with respect to an application under the Waste Management Licensing Regulations 1994 (as amended):
  - return the application as not being duly made outlining reasons for return;
  - return the application as not being duly made and advise applicant by letter of additional requirements before the application can be considered to be duly made, stating time period for return of information;
  - reject the application where necessary to prevent pollution of the environment, harm to human health or serious detriment of the amenities of the locality.
- with respect to an application under the Pollution Prevention and Control (Scotland) Regulations 2000 (as amended) either:
  - return the application as not being duly made;
  - serve a notice on the applicant requiring that they provide such further information as specified in the notice within a specified period for the purpose of determining the application. If the applicant fails to provide the required information within the specified period, the application shall be deemed to have been withdrawn.

Development management

C2.5 SEPA will use our role as a statutory consultee in respect of development plans to seek to ensure that risk to groundwater is considered in drafting planning policy and designating sites for new waste management facilities.

C2.6 Where insufficient information has been submitted with a planning application involving a waste activity for SEPA to determine the impact the proposal will have on groundwater, SEPA planners will lodge an objection on the basis of a lack of information. If this information is provided later, we will reconsider our objection request. On reviewing any future information provided we may have significant concern that the proposals will adversely affect groundwater and may therefore maintain our objection to the planning proposals on this basis.

C2.7 When consulted on planning applications for developments involving a waste activity and requiring a regulatory authorisation, SEPA will seek to provide local authorities with a view on whether the proposal is "capable" of being authorised in line with the guidance in *PAN 51 Planning, Environmental Protection and Regulation* (revised 2006). Such an opinion will be based on the information available to us at the planning stage and is without prejudge to the final determination of any regulatory authorisation.

C2.8 If a planning application involving a waste activity is exempt from authorisation, SEPA may request that the local authority include a planning condition requiring appropriate mitigation to deal with risk to groundwater form part of any planning permission granted.

C2.9 Where SEPA considers that the potential risk to groundwater posed by a planning proposal cannot be mitigated, SEPA planners may lodge an objection in respect of the proposals and recommend that planning permission is refused.

Influencing

C2.10 SEPA will work in partnership with local authorities, landowners, site operators and other stakeholders to prevent the pollution of groundwater from fly-tipping. Fly-tipping is an offence under the Environmental Protection Act 1990 (as amended) and both SEPA and local authorities are responsible for enforcement.

C2.11 SEPA will promote best practice in the operation and design of waste management facilities in order to protect groundwater.

C3 Related guidance

SEPA has produced a large amount of guidance associated with waste management which can be found at various locations on the SEPA website (www.sepa.org.uk). Guidance for some of the more common activities can be found at: www.sepa.org.uk/water/water_regulation/regimes/groundwater/waste.aspx

D Agricultural activities

D1 Background

D1.1 Introduction

D1.1.1 This section of the policy outlines SEPA's role in protecting groundwater from pollution caused by agricultural activities. The abstraction of groundwater, including for agricultural use, is covered in Section E of this policy.

D1.1.2 Agricultural practice covers all activities that can occur on a farm or croft and includes activities such as slurry spreading, chemical and waste storage, silage making and waste pesticide disposal. SEPA recognises that many of these activities may impact the quality of groundwater.

D1.2 Controlling legislation

D1.2.1 SEPA has powers under the following legislation to regulate certain agricultural activities.

- The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003 set minimum standards for the construction of all new, substantially enlarged or substantially reconstructed installations for silage or slurry.
- The Water Environment (Oil Storage) (Scotland) Regulations 2006 set requirements for the storage of oil in above ground oil storage tanks;
- The Sludge (Use in Agriculture) Regulations 1989 (as amended), regulate the spreading of sewage sludges when applied to agricultural land.
- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended). These regulations require that groundwater abstractions and activities that are likely to cause groundwater pollution be subject to a system of authorisation. The Water Environment (Diffuse Pollution) (Scotland) Regulations 2008 have been introduced. This amends the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended) adding General Binding Rules for diffuse pollution. SEPA may also issue an enforcement notice to control any unintentional releases of substances which are likely to cause pollution of the water environment eg a notice may be issued to repair a leaky sheep dipping facility.
- The Pollution Prevention and Control (Scotland) Regulations 2000 require certain pig and poultry rearing installations to obtain a permit from SEPA.
- The Waste Management Licensing Regulations 1994 (as amended) require land managers to register an exemption to carry out certain activities.
- The Landfill (Scotland) Regulations 2003 (as amended) now include controls for agricultural landfills.
- The Waste (Scotland) Regulations 2005 bring agricultural waste under the same regulatory regime as other commercial activities.

D1.2.2 Under the Water Environment and Water Services (Scotland) Act 2003, SEPA is responsible for leading and coordinating river basin planning in Scotland. River basin management planning is a strategic decision-making process that integrates the management of land and water in river basin districts. It aims to improve and support sound and sustainable water management to deliver the requirements of the Water Framework Directive. River basin management planning also tries to balance environmental, social and economic needs in river basin districts. Measures addressing diffuse agricultural pollution are detailed in the river basin management plan for the Scotland and the Solway Tweed river basin districts, available on our website at: www.sepa.org.uk/water/river_basin_planning.aspx

D1.2.3 The Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2003 are enforced by the Scottish Government and set conditions for farm practice aimed at reduction of nitrate pollution in nitrate vulnerable zones. SEPA is responsible for the monitoring of groundwater in relation to these Regulations.

D1.2.4 Under the planning system, SEPA is a statutory consultee with regard to certain planning applications (including those for development which consists of, or includes the use of land for the deposit of any kind of refuse or waste, including slurry or sludge).

D1.2.5 SEPA is also a consultee at the discretion of individual planning authorities with regard to other planning applications for new development (which may include agricultural buildings or activities).

D1.2.6 SEPA, along with other SEARS partners, influences most other practices, such as slurry spreading, sheep dipping and chemical storage by encouraging good practice as defined by codes of good practice and other guidance. The most relevant code to agriculture is the (then) Scottish Executive *Code of Good Practice for the Prevention of Environmental Pollution from Agricultural Activity* (known as the PEPFAA code). This code identifies the principal risks involved with agricultural practice and offers practical guidance to avoid pollution.

D1.2.7 The reform of the common agricultural policy (CAP) now links single farm payments to statutory management requirements which include compliance with the Groundwater Directive via the Water Environment (Controlled Activities) (Scotland) Regulations 2005 and the Sludge (Use in Agriculture) Regulations 1989 (as amended).

D1.3 Threats to groundwater

D1.3.1 Agricultural practices can pose several threats to groundwater, although the degree of risk will vary with the vulnerability of the groundwater to pollution and the nature of the activity. Key threats arise from:

- improper storage of chemicals eg the storage of diesel without a bund – further information on the storage and transfer of chemicals can be found in Section F of this policy;
- seepage from livestock units – for example woodchip corrals for over-wintering cattle can increase the risk to groundwater as the soils are removed and cattle density is high;
- overflow from effluent or slurry tanks that are poorly managed or do not provide adequate storage capacity;
- fertiliser, pesticide and slurry use that does not properly take crop requirements or soil characteristics into account;
- the failure to adequately collect and contain all drips, splashes and run-off when dipping sheep and leakage from poorly maintained dipping facilities;
- unauthorised spreading of waste sheep dip or waste pesticides to land;
- the spreading of waste to land that does not meet the requirements of Schedule 3 of the Waste Management Licensing Regulations 1994 (as amended);
- the disposal of waste in non-authorised farm landfills as this can result in seepage of pollutants through the soil;
- inappropriate drainage facilities that allow farm effluents to drain to soakaway rather than being collected and contained;
- seepage of farm run-off into groundwater via poorly sited, constructed or protected boreholes and wells;
- access by grazing livestock to springs, wells and boreholes;

- abstraction of water for irrigation or stock watering. Impacts from abstractions are dealt with in Section E of this policy.

D1.3.2 Areas with permeable sub-soils may be particularly at risk of groundwater pollution. Nutrients can leach to groundwater from fertilisers and slurry applied to land or pesticides applied to crops or land. These contaminants may then migrate to associated surface water, terrestrial ecosystems or abstractions, in turn putting them at risk.

D1.3.3 The risk from the majority of these threats will be minimised by following the appropriate code of practice eg the PEPFAA code.

D2 Mechanisms for achieving the groundwater objectives

D2.1 This section considers how the groundwater objectives specified in the overarching policy will be delivered.

D2.2 SEPA will work with our SEARS partners to develop a single rural service and seek to effectively deliver customer benefit and environmental improvements in rural areas.

Using regulation

D2.3 SEPA will apply regulatory controls to protect groundwater from pollution risk and groundwater abstractions. The level of control will be proportional to the level of risk posed by the activity.

D2.4 SEPA will serve a notice of refusal for requests to register exempt activities under paragraph 7 and 9 (as defined in Schedule 3 of the Waste Management Licensing Regulations 1994 (as amended)) or serve a notice of removal for activities already registered under this paragraph if we believe that waste will be or is being recovered using processes or methods which will result in harm to groundwater.

Planning and consultation

D2.5 Agriculture buildings and operations are usually considered "permitted development" in terms of land use planning (Town and Country Planning [General Permitted Development] [Scotland] Order 1992 [as amended]) and as such do not require planning permission. Therefore SEPA will not be consulted as part of the planning process.

D2.6 When responding to consultations on the storage of chemicals under the Food and Environment Protection Act 1985, SEPA will object to the establishment of facilities that pose a serious risk to groundwater unless satisfactory mitigating measures can be agreed.

D2.7 SEPA will use the river basin management planning process with the aim of securing measures to achieve good status, subject to cost and technical feasibility.

Farm inspections

D2.8 SEPA will work with our SEARS partners to promote adherence to general binding rules, codes of practice and relevant guidance during farm inspections.

Influence and liaison

D2.9 If a notifiable disease outbreak occurs requiring a large cull of livestock, SEPA will work in partnership with our multi-agency partners (including our SEARS partners) with the aim of affording the appropriate level of protection from carcass burial (where this is permitted by relevant legislation) and the use and disposal of disinfectants.

D2.10 Where SEPA has no role in directly controlling activities that may pose a risk to groundwater, we will use influence and persuasion to seek to prevent pollution of groundwater.

D2.11 SEPA will provide advice, guidance and training to our SEARS partners on the development and implementation of rural development contracts. These contracts provide funding for land managers to mitigate diffuse pollution, amongst other things.

D2.12 SEPA will work with the farming community either directly or through our SEARS partners to promote best practice. We will seek to influence the revision of existing codes of practice, such as the PEPFAA code and other relevant guidance, to ensure that the risks to groundwater are considered.

D3 Related guidance

D3.1 *Prevention of Environmental Pollution From Agricultural Activity: Code of Good Practice*, Scottish Executive, 2005 (new draft in preparation).

D3.2 *Prevention of Environmental Pollution From Agricultural Activity: Code of Good Practice. Dos and Don'ts Guide*, Scottish Executive, 2005.

D3.3 *Pesticides: Code of Practice for Using Plant Protection Products in Scotland*, Scottish Executive, January 2007.

D3.4 *The 4 Point Plan – Straightforward Guidance for Livestock Farmers to Minimise Pollution and Benefit Your Business*, SE/SEPA/SAC/NFU Scotland/SNH/WWF Scotland/FWAG Scotland/ 2nd Edition, 2004.

D3.5 *Sheep Dipping Code of Practice for Scottish Farmers*, *Crofters and Contractors*, SEPA.

D3.6 *Pollution Prevention Guideline 2: Above ground oil storage tanks*, SEPA.

D3.7 *Code of Practice for Installers, Owners and Operators of Underground Storage Tanks (and Pipelines)*, SEPA.

D3.8 *Farm Soils Plan. Protecting Soils and Income in Scotland*, Scottish Executive, December 2005.

D3.9 Code of Practice for the Agricultural Use of Sewage Sludge (1996) Department of The Environment (to be revised).

D3.10 *The Water Environment (Controlled Activities) Regulations 2005 - A Practical Guide*, SEPA, March 2008.

E The control of groundwater abstractions and resource management

E1 Background

E1.1 Introduction

E1.1.1 Groundwater resources are essential to many individuals, companies and communities to provide water for drinking, agriculture and industry. It is a common misconception that in Scotland water supplies are generally plentiful, and that groundwater abstractions do not cause environmental problems.

E1.1.2 This section of the policy is concerned with the control of groundwater abstractions and resource management. The SEPA website contains guidance, which explains how we process abstractions for both surface water and groundwater sources.

E1.2 Legislative background

E1.2.1 The Water Framework Directive (2000/60/EC), through the Water Environment and Water Services (Scotland) Act 2003, requires SEPA to estimate the groundwater resources available throughout Scotland and to identify where there is a risk of over abstraction. Groundwater resources are protected by the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended).

E1.2.2 In summary SEPA's current powers and duties regarding abstraction control are:

- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended) control abstraction from the water environment. Abstraction includes the construction or modification of any means by which water may be removed from the environment. Authorisation is by means of general binding rules, registration or licence.
- An application for authorisation must be made to SEPA to:
  - abstract more than 10m^3/day unless the abstraction does not exceed 150m^3 in any period of one year and the purpose of the abstraction is to test the yield of the borehole, determine the hydraulic properties of the aquifer or to sample the water quality;
  - to drill and test pump and boreholes intended for abstraction of >10m^3/d unless the works are intended to abstract less than 150m^3 in any period of one year and the purpose of the abstraction is to test the yield of the borehole, determine the hydraulic properties of the aquifer or to sample the water quality.

Applications to abstract groundwater for the purpose of dewatering or extracting geothermal energy are not required if carried out in line with the appropriate general binding rule.

- SEPA is a statutory consultee under the Environmental Impact Assessment (Scotland) Regulations 1999 (as amended) which apply to projects that require planning permission (Part II), certain trunk road projects (Part III) and drainage works (Part IV).
- SEPA is also a statutory consultee under the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008 for certain planning applications set out under schedule 5 of the regulations. This includes development which consists of or includes fish farming and mining operations as these may involve groundwater abstraction.
- In addition, SEPA is a key agency during the preparation of development plans (which may include policies and proposals relating to the water environment) under The Town and Country Planning (Development Planning) (Scotland) Regulations 2008. Key agencies have a duty to co-operate in the preparation of development plans.

E1.3 Threats to groundwater

E1.3.1 Water resources are finite and hence there is a need to manage groundwater resources effectively to ensure that there is a sustainable long-term balance between;

- the recharge of the groundwater;
- the amount of naturally discharging groundwater required to support river flows and loch levels, their own dependent ecosystems and dependent terrestrial ecosystems;
- the amount of water abstracted.

E1.3.2 The impacts of over abstraction have been described in the overarching section of this policy (Section A).

E1.3.3 Activities such as forestation or the construction of large areas of impermeable material can reduce the amount of recharge to groundwater. Recharge can be maintained by mitigation initiatives such as some Sustainable Urban Drainage Systems (SUDS) which return water to the ground rather than transferring it away from the development area. Further information on SUDS can be found in Section G of this policy.

E2 Mechanisms for achieving the groundwater objectives

E2.1 This section considers how the groundwater objectives specified in the overarching policy will be delivered.

E2.2 SEPA will work to ensure the delivery of the groundwater quantitative status objectives of the Water Framework Directive, as specified in the overarching policy, through the use of our powers under the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended).

E2.3 Taking into account the technical feasibility, economics and social circumstances SEPA will use the abstraction control regime, water resource management plans and stakeholder agreements to achieve good quantitative status and to ensure that no status deterioration occurs.

E2.4 If risk based assessment for authorisation for groundwater abstraction suggests that the abstraction may have a significant impact upon the water environment, SEPA may require further investigative work to be undertaken. Where that work is not carried out or the results demonstrate that the potential impact would result in exceedence of standards, we will refuse the application unless it can be demonstrated that there is overriding public interest and/or the benefits to society in preventing achieving good status or status deterioration are outweighed by the benefits to human health, human safety or to sustainable development.

Planning and consultation

E2.5 SEPA will use its role as statutory consultee, with regard to development plans, to seek to ensure that risk to groundwater is taken into account in the drafting of policies relating to water resource management.

E2.6 If a planning application involving an abstraction also requires authorisation under the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR) SEPA will seek to provide local authorities with a view on whether it considers the proposal capable of being authorised in line with the guidance in *PAN 51 Planning, Environmental Protection and Regulation* (revised 2006). Such an opinion will be based on the information available to us at the planning stage and is without prejudice to the final determination of any regulatory authorisation.

E2.7 If a planning application involving an abstraction requiring authorisation under CAR does not contain sufficient detail to determine if the activity is capable of being authorised, SEPA will object to the planning proposal on the basis of lack of information. If this information is later provided, we will reconsider our objection.

E2.8 SEPA will promote the use of Sustainable Urban Drainage Systems (SUDS) to mitigate against the reduction in groundwater recharge resulting from new developments, where these do not pose a risk to groundwater quality.

E3 Related guidance

E3.1 *Hydrometric determinations -- Pumping tests for water wells -- Considerations and guidelines for design, performance and use*, International Organisation for Standardisation. Publication number 14686.2003, 2003.

E3.2 *Keeping it Safe: Is your private water supply safe?* Scottish Executive, 2002.

E3.3 SEPA guidance on abstraction regulation.

F The storage and handling of chemicals

F1 Background

F1.1 Introduction

F1.1.1 This section of the policy is specifically concerned with protecting groundwater during the storage and handling of chemicals, including hydrocarbons and waste chemicals. SEPA has a key role in ensuring that groundwater quality is protected by enforcing relevant legislation and influencing good practice.

F1.2 Legislative background

F1.2.1 SEPA has powers and duties under the following legislation which are relevant to the storage and handling of chemicals:

- Pollution Prevention and Control Regulations (Scotland) 2000 (CAR) and the Waste Management Licensing Regulations 1994 (as amended) – Conditions may be set in authorisations relating to the storage and handling of chemicals;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 as amended – SEPA can serve an enforcement notice to stop or control an activity which is causing or is likely to cause:
  - a significant adverse impact on the water environment;
  - a direct or indirect discharge into groundwater of any substance listed in Schedule 2 of CAR.

SEPA may also specify in the notice the steps to be taken by the responsible person to prevent, mitigate or remedy the adverse impacts of the activity;

- Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003 – these refer to all new, substantially enlarged or substantially reconstructed facilities used for the storage of agricultural fuel oil and for facilities where SEPA identifies a significant risk of water pollution;
- Part II of the Environmental Protection Act 1990 (as amended) establishes statutory requirements intended to ensure that waste (including waste chemicals) is handled, kept, treated, and disposed of without harm to the environment or human health. These include a system of waste management licences which allow SEPA to place conditions on the operation of waste management facilities and a statutory duty of care for persons dealing with waste intended to prevent the escape of waste and ensure that only persons authorised to handle waste are entitled do so;
- The Control of Major Accident Hazard Regulations 1999 applies to the storage of dangerous substances, as defined by the Chemicals (Hazard Information and Packaging for Supply) Regulations 1996, above a defined threshold. Operators coming within the scope of the Regulations must prepare and put in place management plans to address all potential impacts to human beings and the environment from escape of the substance. The operator must submit these proposals to the competent authorities for review. SEPA is joint competent authority with the Health and Safety Executive on these regulations.

F1.2.2 Under the planning system, SEPA is a statutory consultee with regard to certain planning applications such as the storage of mineral oils and their derivatives. We are also a consultee at the discretion of individual planning authorities with regard to other planning applications for new developments, some of which may include the storage and handling of chemicals.

F1.2.3 Planning authorities are also required to consult SEPA with regard to applications for hazardous substances consents (which may include the storage and handling of chemicals).

F1.2.4 The Water Environment (Oil Storage) (Scotland) Regulations 2006 for above ground oil storage facilities on industrial, commercial and institutional (residential and non-residential) premises aim to protect the water environment from accidental loss or spillage of oil. The regulations also apply to waste oil storage facilities.

F1.3 Threats to groundwater

F1.3.1 The storage and transfer of chemicals carries a risk of spillages and leaks. Groundwater is at risk of pollution if the chemical is mobile and if there is a route of entry. The best way to protect groundwater is to prevent leaks and spills. In such an event however, appropriate containment and collection can still prevent groundwater contamination.

F1.3.2 Risk to groundwater can arise as a result of:

- faults arising at the design and construction stage of a development which can lead to structural failure of infrastructure at a later date;
- a lack of appropriate working areas or inappropriate drainage facilities;
- poor operational practice, such as a lack of adequate maintenance while a facility is operational;
- as a result of unacceptable decommissioning works, particularly for underground storage tanks and pipe work.

Underground storage and transfer of chemicals

F1.3.3 The storage of chemicals in underground storage tanks and the transfer through underground pipe work poses a particular risk to groundwater: leaks may not be easily identified and may continue undetected for long periods of time. Sub-water table storage tanks or pipe work pose an extreme risk to groundwater as there is no potential for reduction of chemicals before they enter groundwater.

F1.3.4 Poor design of an underground facility can cause a serious risk to groundwater once the site is commissioned. Some sub-surface environments are corrosive to metal and concrete foundations, particularly on brownfield sites. Differential settlement as a result of poor ground preparation or failure of foundations can cause structural failure of the tank or failure of joints in pipe work. Heavy plant can cause structural failure, particularly of pipe work, due to vibration.

F1.3.5 During decommissioning of underground storage facilities, leakage or release of chemicals could occur as a result of either deliberate or accidental release during dismantling and removal of tanks and pipe work. Once decommissioned, some tanks and pipe work containing chemicals are left in situ leaving a potential risk to groundwater.

F2 Mechanisms for achieving groundwater objectives

F2.1 This section considers how the groundwater objectives specified in the overarching policy will be delivered.

Using regulation

F2.2 SEPA will use its full range of regulatory powers to deliver the quality objectives specified in the overarching policy. In particular, SEPA will seek to ensure that there is no entry of list I substances and no pollution of groundwater by other pollutants associated with the storage and handling of chemicals.

Responding to planning applications

F2.3 Where insufficient information has been provided in support of an application for SEPA to determine the impact the proposal will have on groundwater, SEPA planners will lodge an objection on the basis of a lack of information. We will reconsider our objection request if this information is later provided. On reviewing any future information provided we may have significant concern that the proposals will adversely affect groundwater and may maintain our objection to the planning proposals on that basis.

F2.4 Where a planning application involving the storage or transfer of chemicals also requires authorisation under a regulatory regime, SEPA will seek to provide local authorities with a view on whether it considers the proposal "capable" of being authorised in line with the guidance in *PAN 51 Planning, Environmental Protection and Regulation* (revised 2006). Such an opinion will be based on the information available to us at the planning stage and is without prejudice to the final determination of any regulatory authorisation.

F2.5 If a planning application involving the storage or transfer of chemicals is not covered by regulations, SEPA may request that the local authority include a planning condition requiring appropriate mitigation to deal with risk to groundwater form part of any planning permission granted. If SEPA considers that the potential risk to groundwater posed by a planning proposal cannot be mitigated, our planners may lodge an objection in respect of the proposals and recommend that planning permission is refused.

Influencing practice

F2.6 SEPA will encourage those who store and handle chemicals, including hydrocarbons to follow established good practice (such as SEPA's Code of Good Practice for the Installers, Owners and Operators of Underground Storage Tanks (and Pipe work)) as well as encouraging the production of site-specific contingency plans for incidents involving spillages.

F2.7 Where SEPA does not have direct control over the activity SEPA will raise any concerns about potential impacts of chemical storage on groundwater that become apparent whilst visiting sites.

Design and construction recommendations

F2.8 In considering the design, construction and commissioning of developments which include chemical storage facilities SEPA recommends the following.

General storage recommendations

- Any storage tank, whether above or below ground, should be of sufficient strength and structural integrity that it is unlikely to burst or leak under ordinary use.
- Storage containers should have a minimum design life of 20 years.
- Where list I substances are being stored, the tank should be double skinned.
- All above-ground storage tanks are bunded in accordance with SEPA guidance.
- All above-ground oil storage tanks should be constructed in accordance with the Water Environment (Oil Storage) (Scotland) Regulations 2006.
- Areas where the transfer and handling of chemicals is to occur should have an impermeable surface.
- The drainage system should be designed to enable the containment of spillages of chemicals for appropriate disposal or treatment.
- Drainage systems should be designed in consultation with SEPA and Scottish Water and should meet the requirements of the Technical Standards for compliance with the Building (Scotland) Act 2003.

Underground storage recommendations

- The *SEPA Code of Good Practice for Installers, Owners and Operators of Underground Storage Tanks (and Pipes)* should be followed.
- Underground storage tanks should not be located below the water table.
- For the underground storage of list I substances, a means of detecting a loss of the chemical – such as a leak detection system or other monitoring – should be incorporated.
- Underground pipe work used for transferring chemicals must be fit for purpose and care must be taken to ensure joints are correctly formed and sealed and are only located where they may be examined.
- When underground pipe work is to be in areas where heavy machinery is operational the pipe work should be flexible to prevent fracture caused by vibration.
- Underground storage, tank and pipe work handling, ground preparation and installation procedures should be subject to appropriate supervision and quality control to ensure the future integrity of the facility.

- Integrity testing, based on pressurising tanks and pipe work, should be carried out to detect any leaks or faults before a facility is brought into service.
- The potential for the corrosion of metals and the potential for deterioration of below ground concrete in foundations should be considered when designing the site, especially in brownfield sites where such corrosive substances are more likely to be present.

Operational recommendations

F2.9 During the operational stage of storing or handling chemicals, SEPA recommends that:

- adequate measures are taken to prevent unauthorised access and that pumps and valves are closed or locked when not in use;
- a regular maintenance and inspection programme is effected;
- staff are adequately trained and appropriate procedures are implemented to ensure the safe transfer and handling of chemicals;
- appropriate procedures are implemented to ensure any maintenance works are carried out, avoiding accidental damage to tanks and associated pipe work and preventing the accidental loss of chemicals during repair work;
- emergency procedures are implemented, staff are adequately trained in their use and appropriate spill kits are in place;
- depending on the environmental sensitivity of the site and the nature of the chemical being stored, an appropriate system of leak detection (ranging from automatic leak detection systems to integrity testing) should be considered as part of an environmental risk assessment for the facility;
- SEPA is contacted in the event of a leak or spillage which may lead to pollution.

Decommissioning recommendations

F2.10 During decommissioning of underground storage facilities, SEPA recommends that tanks and pipe work should be removed from the ground, ensuring that any remaining product is safely removed first. If that is not possible then any residual chemicals must be removed from the tanks and pipe work and tanks should be filled with either a sand and cement slurry, hydrophobic foam or foamed concrete.

F3 Related guidance

Pollution Prevention Guidelines (PPGs) are a series of notes produced by SEPA in conjunction with the Environment Agency of England and Wales and the Northern Ireland Environment Agency. Each PPG is targeted at a particular industrial sector or activity and aims to provide advice on statutory responsibilities and good environmental practice. The following are those most closely linked to the prevention of groundwater pollution:

F3.1 *PPG 02: Above ground Oil Storage Tanks*

F3.2 *PPG 08: Safe storage and Disposal of Used Oil*

F3.3 *PPG 18: Managing Fire Water and Major Spills*

F3.4 *PPG 22: Dealing with Spillages on Highways*

F3.5 *PPG 26: Storage and Handling of Drums and Intermediate Bulk Containers*

F3.6 *Code of Practice for the Installers, Owners and Operators of Underground Storage Tanks (and Pipelines)*, SEPA, 2006.

G Direct and indirect discharges to groundwater

G1 Background

G1.1 Introduction

G1.1.1 This section of the policy outlines SEPA's role with regard to the control of:

- direct discharges to groundwater, for example down a borehole or via a poorly designed infiltration system (also known as a soakaway) which discharges directly to the saturated zone;
- indirect discharges to groundwater, where effluent percolates through the soil and strata before reaching groundwater for example via infiltration system to the unsaturated zone or the disposal of trade effluent to land.

It covers the disposal of sewage, trade effluent and surface water (runoff from urban areas). The prevention of leaks and spills is covered in Section F, the disposal of waste pesticides and treatment of land with waste is covered in Section D and leachate within landfills in Section C.

G1.2 Legislation and regulation

G1.2.1 SEPA must ensure compliance with the Groundwater Directive (80/68/EEC) and the Water Framework Directive (2000/60/EC). The key objectives of these directives relevant to discharges to groundwater are:

- to prevent the entry of list I substances to groundwater;
- to limit the input of list II substances and other pollutants so as to prevent pollution;
- if there is risk of entry of list I substances to groundwater or the pollution of groundwater by list II substances then the discharge may only be authorised subject to prior investigation;
- to prevent deterioration of the status of all groundwater bodies;
- to reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity;
- the prohibition of direct discharges to groundwater subject to the following exemptions:
  - re-injection into the same aquifer of water abstracted for geothermal purposes;
  - injection of water containing substances resulting from oil drilling or mining back into the geological formations from which oil or other substances have been abstracted or where the geological formation is naturally permanently unsuitable for other purposes;
  - re-injection of pumped water from mines and quarries or associated with the construction or maintenance of civil engineering works;

- injection of natural gas or liquefied petroleum for storage purposes into geological formations where there is an overriding need for security of gas supply, and the injection is such as to prevent any danger of future deterioration in the quality of receiving water;
- construction, civil engineering and building works and similar activities on, or in the ground which come into contact with groundwater;
- discharge of small quantities of substances for scientific purposes for characterisation, protection or remediation of water bodies;
- injection of carbon dioxide streams for storage purposes into geological formations which for natural reasons are permanently unsuitable for other purposes, provided that such injection is made in accordance with Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide or excluded from the scope of that directive pursuant to its Article 2(2).

G1.2.2 SEPA is the principal regulator of discharges to groundwater and land. It has powers to control such discharges under the following legislation.

- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended) give SEPA powers to control discharges to prevent pollution.
- The Waste Management Licensing Regulations 1994 (as amended) give SEPA the power to set conditions to prevent pollution from sites controlled by a Waste Management Licence.
- The Pollution Prevention and Control (Scotland) Regulations 2000 give SEPA the power to set permit conditions to protect groundwater for sites which are controlled under a Pollution Prevention and Control permit.

G1.2.3 The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended) require that surface water discharges from developments constructed after 1 April 2006 must be drained to a Sustainable Urban Drainage System (SUDS) or equivalent to avoid pollution of the water environment, unless:

- the development is a single dwelling;
- the discharge is to a coastal water.

G1.2.4 Building control authorisation will also be required for the construction of a full soakaway for sewage discharges. Any sewage disposal system should be installed in accordance with Section 3 of the technical handbook which provides guidance on achieving the standards set in the Building (Scotland) Regulations 2004.

G1.2.5 Under the planning system, SEPA is a statutory consultee with regard to:

- development plans (which may include policies on private foul drainage and Sustainable Urban Drainage Systems [SUDS]);
- certain planning applications, including those for development which consists of or includes the carrying out of building or other operations or use of land for the retention, treatment or disposal of sewage and effluent.

G1.2.6 SEPA is also a consultee at the discretion of individual planning authorities with regard to other planning applications for new developments (which may include discharges to groundwater and discharges via infiltration systems to land).

G1.3 Threats to groundwater

G1.3.1 Direct discharges will not be subject to reduction of pollutants before entry into groundwater. A direct discharge to groundwater is therefore an activity which carries a high risk of pollution. Direct discharges, with the exception of the exemptions listed in G1.2.1, are prohibited.

G1.3.2 The level of risk posed by an indirect discharge (such as via an infiltration system) within the unsaturated zone will depend on:

- the characteristics of the discharge (such as the volume, concentration and nature of the pollutant);
- the purifying properties of the soils and sub-soils (the soil and unsaturated layer beneath provide natural protection to the groundwater and can reduce the concentration of pollutants by a variety of physical, chemical and biological reactions);
- the depth to the water table (the further the point of discharge is from the water table, the more attenuation of pollutants is possible).

G1.3.3 The most common discharges to infiltration systems are of treated sewage effluent. Sewage effluent can pose a risk to human health from pathogens and chemical contaminants and has the potential to pollute groundwater. In general, pathogens rapidly reduce in concentration with distance from the discharge as a result of physical, chemical and biological processes. Sewage effluent also contains significant concentrations of polluting substances, such as ammonia.

G1.3.4 The cumulative effects of phosphorous and nitrate (produced by oxidation of ammonia) from many small septic tank discharges may result in groundwater pollution and cause significant impacts on surface waters.

G1.3.5 Discharge of effluent from industrial and commercial premises (trade effluent) to land occurs less frequently and the effluent content varies widely. The risk of pollution depends on the nature of the discharge, the nature and concentration of the pollutant and the vulnerability of the groundwater.

G1.3.6 Surface water run-off from urban areas can contain a variety of pollutants including oil, heavy metals, sediment and organic matter and therefore poses a risk to receiving waters, including groundwater. SEPA promotes the use of Sustainable Urban Drainage Systems (SUDS) to treat and dissipate surface water runoff from urban areas to reduce the risk of pollution. SUDS may be constructed to allow infiltration or prevent it. Where SUDS involve infiltration there is a potential for groundwater to be impacted by the surface water discharge. The level of impact will depend on the design of the system and the nature of the drainage area. For example, a SUDS dealing with roof water alone will exert a low risk and is unlikely to contain substances in concentrations high enough to cause groundwater pollution. On the other hand, a SUDS serving an industrial estate will have a higher risk due to the possibility that substances may be present in run off in sufficient quantities to cause groundwater pollution.

G2 Mechanisms for achieving the groundwater objectives

G2.1 This section considers how the groundwater objectives specified in the overarching policy will be delivered.

G2.2 SEPA will seek to ensure that discharges containing polluting substances are subject to prior investigation and, where appropriate, prior authorisation.

G2.3 When consulted by the planning authority on applications which involve a proposed discharge to groundwater SEPA will:

- request further information where there is insufficient detail to assess the impact which the proposal will have on groundwater;
- seek to provide the Local Authority with a view on whether the proposal is "capable" of being authorised under CAR as recommended by *PAN 51 Planning, Environmental Protection and Regulation* (revised 2006) where this is appropriate;
- inform the applicant that an application is required for any relevant authorisation.

G2.4 SEPA will use its role as statutory consultee with regard to development plans to seek to ensure that risk to groundwater is taken into account when policies on private foul drainage and SUDS are drafted.

Regulating direct discharges to groundwater

G2.5 SEPA will, in accordance with the requirements of the Water Framework Directive, use its full range of regulatory powers to prevent direct discharges of pollutants. Authorisation may however be considered for the activities listed in G1.2.1, subject to relevant prior investigation.

Regulating indirect discharges to groundwater – sewage effluent discharges

G2.6 When authorisation is sought for sewage discharges to a full soakaway SEPA will require a prior investigation to be undertaken by the developer. For small discharges (less than 15 population equivalent (PE) the assessment done to achieve building control authorisation will serve as the prior investigation.

G2.7 For discharges greater than 15PE SEPA will assess the prior investigation information submitted and decide whether the discharge can be made without causing groundwater pollution and the level of treatment which will be required.

G2.8 SEPA will encourage appropriate maintenance of on-site waste water treatment systems and sewers.

Regulating indirect discharges to groundwater – industrial and commercial effluent discharges (trade effluent)

G2.9 Under the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended), discharges of effluents from industrial and commercial activities to land must be authorised. SEPA will require a prior investigation to assess the risk of pollution from such discharges. These will only be authorised where they do not allow the entry of either list I substances or pollution by other pollutants.

Regulating indirect discharges to groundwater – surface water discharges

G2.10 SEPA will adopt a risk-based approach when assessing the risk of surface water discharges using infiltration from new developments to ensure that the Groundwater and Water Framework Directives are complied with.

G2.11 SEPA considers that, as a minimum, the following sites will require a prior investigation as part of a CAR simple licence [if required – see the Water Environment (Controlled Activities) (Scotland) Regulations 2005, Practical Guide] or planning consultation process to be carried out by the developer for proposals for SUDS which utilise infiltration serving the following types of development:

- brownfield sites;
- industrial sites (an industrial estate would normally include marshalling yards, lorry parks and distribution depots including ports, but does not include developments of a single small unit, business parks or retail parks;
- petrol stations.

G2.12 SEPA will use the planning process to seek to ensure that the SUDS serving low risk sites are designed accordingly and that applicants who are proposing developments in high risk sites are aware that they must apply to us for a Licence.

G2.13 SEPA will work with Scottish Water and others in the Sustainable Urban Drainage Scottish Working Party (SUDSWP) to ensure that the protection of groundwater is adequately provided for in any guidance material or design standards.

G3 Related guidance

G3.1 Policy and Supporting Guidance on Provision of Waste Water Drainage in Settlements, SEPA Position Statement, SEPA, 2006.

G3.2 Further information on sustainable urban drainage can be found on SEPA's website and on the Scottish Government website.

G3.3 The Building (Scotland) Regulations 2004, Scottish Buildings Standards Technical Handbook Section 3.9 - Private wastewater treatment systems - infiltration systems, Scottish Government.

H Construction and excavation

H1 Background

H1.1 Introduction

H1.1.1 This section of the policy outlines SEPA's role with regard to the control of construction and excavation activities. Inappropriately located or inadequately controlled construction and excavation activities can have an adverse impact on either or both the quality and quantity of groundwater and dependent ecosystems and surface water features.

H1.1.2 The term 'construction and excavation' covers a wide range of activities which cannot all be covered in detail. However, some of the main construction and excavation activities which have the potential to significantly impact on groundwater include:

- mining and quarrying;
- landfill engineering (further information on landfill issues is provided in Section C of this policy);
- excavation of large and/or deep foundations;
- contaminated land remediation (further information on contaminated land issues is provided in Section I of this policy);
- the construction of tunnels, cuttings, retention walls or other below ground structures such as piling, grouting or cut-off walls;
- the drilling of boreholes (further information on the drilling of abstraction borehole is detailed in section E);
- construction of above ground buildings;
- large scale drainage activities.

The abstraction of groundwater from boreholes or excavations for the purpose of dewatering is covered in section E.

H1.2 Legislation and regulation

H1.2.1 SEPA has limited powers to control pollution which may result from construction and excavation activities under the following legislation.

- Waste Management Licensing Regulations 1994 (as amended). For sites regulated under Waste Management Licensing SEPA has the power to set licence conditions to protect groundwater.
- The Pollution Prevention and Control (Scotland) Regulations 2000 (PPC). For sites which are regulated under the PPC regulations SEPA has the power to set authorisation conditions to protect groundwater.

- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended). In certain situations SEPA has the ability to serve enforcement notices to control or prevent activities which may result in the entry of polluting substances into groundwater. The direct discharge of pollutants into groundwater as a result of construction or maintenance work on or in the ground which come into contact with groundwater are controlled by general binding rules. The construction of boreholes for the purpose of abstraction requires an application for authorisation. The drilling of boreholes not intended for the purpose of abstraction are covered by general binding rules.

H1.2.2 Under the planning system, SEPA is a statutory consultee with regard to:

- development plans (which may include policies on mining and quarrying);
- certain planning applications (including those for development which consists of or includes mining operations).

SEPA is also a consultee at the discretion of individual planning authorities with regard to other planning applications for new development (which may include construction and excavation eg quarrying).

H1.3 Threats to groundwater

H1.3.1 There are a variety of threats that construction, excavation and associated activities can pose to groundwater including these detailed below:

Mining and quarrying and the backfilling and storage of spoil materials

H1.3.2 Exposure to air changes the chemistry of some materials, which may result in increased leaching of contaminants. For example spoil removed from coal mines often produces ferruginous water after being exposed to the atmosphere. To prevent leachate from these materials polluting surface waters and groundwaters the spoil materials need to be appropriately stored and backfilled.

Dewatering activities and the subsequent rebound of groundwater

H1.3.3 Construction and excavation activities, especially mining and quarrying, may involve working below the natural water table. Groundwater may therefore be abstracted in order to artificially lower the level. This can result in a reduction in flow to dependent surface waters and terrestrial ecosystems as well as potentially impacting other groundwater users.

H1.3.4 Once dewatering ceases, groundwater will generally recover to its original level. In the case of coal and some other metaliferous mining activities, contaminants such as iron and sulphate can be 'flushed' into groundwater as the water table recovers. This can result in contamination of aquifers and the breakout of contaminated minewaters at ground level causing pollution of surface waters.

Drilling and development of boreholes

H1.3.5 Inappropriate drilling and design of a borehole can create a preferential flow path for groundwater to flow between two previously separate groundwater units. In some cases, such as in contaminated land investigation and remediation, this can result in deterioration in the quality of previously uncontaminated groundwater.

Construction of below ground structures

H1.3.6 The creation of voids or the backfilling of materials into a void can result in a change to the permeability and porosity of the aquifer. The creation of below ground structures, for example the construction of a low permeability wall can cause an alteration to the groundwater flow direction and result in changes to the groundwater levels. This may impact on dependent surface water features and terrestrial ecosystems.

Drainage systems

H1.3.7 Large-scale drainage systems can result in alteration to the groundwater level or flow direction by the creation of preferential pathways along which groundwater can easily flow. If that results in a reduction in groundwater levels then it could impact on surface waters or other groundwater dependent features such as wetlands.

Construction of above ground structures

H1.3.8 Construction, modification or demolition of housing, industry or other infrastructure can result in:

- changes in recharge to groundwater, particularly where roof drainage is discharged to surface waters;
- a risk of pollution to groundwater through the discharge of pollutants into groundwater either intentionally or through leaks and spills or through the mobilisation of pollutants in contaminated land.

Use and storage of fuels and other substances

H1.3.9 The storage, use and transfer of chemicals, including hydrocarbons, from equipment used in engineering activities can have the potential to result in polluting substances entering groundwater. Storage and transfer of chemicals is detailed in Section F of this policy.

Blasting and physical disturbance of the aquifer

H1.3.10 Construction and excavation activities, including blasting, can cause geological instabilities. This can especially be an issue where old mine workings are present close to or under the site because they can potentially collapse. If they do collapse then an alteration in groundwater flow direction can result, due to blockage of underground drainage channels which in some cases may cause problems such as surface discharge of historically contaminated minewaters. Increased permeability can result from physical disturbance, including blasting.

H2 Mechanisms for achieving the groundwater objectives

H2.1 This section considers how the groundwater objectives specified in the overarching policy will be delivered.

H2.2 SEPA will use our full range of regulatory powers to seek to ensure that construction and excavation activities, including quarrying and mining, do not result in adverse impacts on the water environment.

Using planning

H2.3 SEPA will use its role as statutory consultee with regard to development plans to seek to ensure that the risk to groundwater is taken into account in the drafting of policies on large scale excavation activities, such as mining and quarrying.

H2.4 SEPA will recommend that planning applications for large-scale excavation activities which are to be carried out below the natural ground level, such as mines and quarries, should include as a minimum the following information.

- An assessment of the impact which the operations will have on groundwater quality and levels. Where appropriate this should include background groundwater chemistry and a description of the hydrogeological setting including the local geology and a diagram, supported by site-specific data to indicate the relationship between the base of the site and the groundwater table, interaction with surface waters and identification of sensitive receptors such as wetlands or groundwater abstractions.
- For activities such as the operation of open cast coal mines, which have the potential to produce ferruginous or other poor quality leachate, a risk assessment to predict the likely leaching potential of any relevant geological materials.
- Details of any measures which may be required to prevent the entry of list I substances into groundwater or pollution of groundwater by other pollutants from spoil storage, backfilling or from other activities accompanied by an assessment of the effectiveness of the proposed measures.
- For sites which will be excavated below the water table, involve lowering groundwater levels and are not covered by a general binding rule, an assessment should be made as to the magnitude and radius of influence of any dewatering operations and the possible impact this may have on surface waters, dependant ecosystems and other water users.
- Details of monitoring which is to be put in place to assess the impact the operations are having on the environment.

- Details of an operational review procedure to implement changes identified as being necessary from the monitoring regime.
- For activities which include blasting, account should be taken of the effect that this would have on any structures, such as mine shafts, and any resulting impacts on groundwater levels. In mining areas an assessment as to whether this may result in the surface discharge of historically contaminated groundwater should be made.
- If appropriate, contingency plans and mitigation measures should be agreed within planning controls to deal with any possible impacts.
- For activities such as open cast coal mines where the site is dewatered for the duration of its working life, an assessment of the impact of the subsequent groundwater rebound is required. The assessment must include consideration of predicted groundwater quality, point of discharge to surface waters, appropriate mitigation measures and the effectiveness of the proposed measures.

H2.5 Where insufficient information has been submitted in support of a planning application involving excavation, mining and quarrying for SEPA to determine the impact the proposal will have on groundwater, our planners will lodge an objection on the basis of a lack of information. SEPA will reconsider its objection request if this information is provided later. On reviewing any future information provided we may have significant concern that the proposals will adversely affect groundwater and may maintain our objection to the planning proposals on this basis.

H2.6 When consulted on planning applications for developments involving excavation, mining and quarrying and requiring a regulatory authorisation, SEPA will seek to provide local authorities with a view on whether the proposal is "capable" of being authorised in line with the guidance in *PAN 51 Planning, Environmental Protection and Regulation* (revised 2006). Such an opinion will be based on the information available to us at the planning stage and is without prejudice to the final determination of any regulatory authorisation.

H2.7 Where a planning application involving excavation, mining and quarrying is exempt from authorisation, SEPA may request that the local authority includes a planning condition requiring appropriate mitigation to deal with risk to groundwater form part of any planning permission granted. If we consider that the potential risk to groundwater posed by a planning proposal cannot be mitigated, our planners may lodge an objection in respect of the proposals and recommend that planning permission is refused.

H2.8 In certain circumstances, where an activity is likely to result in a clear and serious risk of entry into groundwater of list I substances or pollution of groundwater by other pollutants or, SEPA will control or prevent the activity by use of its powers under Regulation 28 of the Water Environment (Controlled Activities) (Scotland) Regulations 2005.

Best practices

H2.9 SEPA will liaise with the Coal Authority and mine operators in order to influence the management of abandoned mines and rebounding groundwater associated with historic mine workings.

H2.10 SEPA will recommend that borehole drilling methods and installation details in sensitive locations, such as on contaminated ground, are designed in order to minimise the risk of creating a preferential flow path through which contaminants can migrate.

H2.11 SEPA will promote best practice in the operation and design of construction and excavation activities in order to protect groundwater.

H2.12 SEPA will seek to influence the production of guidance for construction and excavation activities such as mines and quarries.

H3 Related guidance

H3.1 *Mineral Extraction: Code of Practice for the Owners and Operators of Quarries and other Mineral Extraction Sites* (2006) SEPA. Following the revocation of the Groundwater Regulations 1998, the Scottish Government has withdrawn their Code of Practice for Owners and Operators of Quarries and other Mineral Extraction Sites. With the permission of the Scottish Government, SEPA has reviewed and reissued the code and, whilst no longer statutory, it includes current good practice and a section on the assessment of risks from the storage and backfilling of material excavated from opencast coal sites. Information on how to comply with the requirements of the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended) is also included.

H3.2 *PAN 50: Controlling the environmental effects of surface mineral workings*, Scottish Executive.

H3.3 *Guiding small businesses through Environmental Regulation. Construction Sector Guidelines*, NetRegs.

I Contaminated land

I1 Background

I1.1 Introduction

I1.1.1 This section of the policy is specifically concerned with protecting groundwater from land affected by historic chemical contamination. By carrying out its legislative duties and influencing good practice, SEPA has a key role to play in protecting groundwater from contaminated land. The prevention of leaks and spills of chemicals during storage and handling which may lead to new contamination is covered in Section F and the production of waste is covered in section C.

I1.2 Legislation and regulation

I1.2.1 SEPA has powers and duties under the following legislation which are relevant to contaminated land:

- Part IIA of the Environmental Protection Act 1990. Local authorities are the lead authority in relation to contaminated land. However, they have a duty to consult SEPA where they identify land as contaminated on the basis of causing water pollution and when considering the seriousness of that pollution. If contaminated land has been designated as a special site we have a duty to ensure that land contamination is assessed, addressed and managed. This may include both addressing any ongoing or likely pollution of groundwater and restoring waters that have been polluted by the contaminated land.
- Waste Management Licensing Regulations 1994 (as amended) and the Pollution Prevention and Control (Scotland) Regulations 2000 (as amended). The remediation of contaminated land sites may require to be licensed under these regulations.
- The Water Environment (Controlled Activities) (Scotland) Regulations 2005. Under the regulations SEPA may serve an enforcement notice on the owner of land which is causing pollution of the water environment. We will only pursue this course of action in cases where remediation would not be undertaken under the provisions of Part IIA or the Town and Country Planning regime

I1.2.2 Under the planning system, SEPA is a statutory consultee with regard to:

- development plans, which may include policies on contaminated land;
- certain planning applications, which may include development of land contaminated due to previous use.

SEPA is also a consultee at the discretion of individual planning authorities with regard to other planning applications for new development (which may include development of land contaminated due to previous use).

I1.3 Threats to groundwater

I1.3.1 Land which is affected by contamination may adversely impact groundwater if the contaminants find their way into groundwater. The risk of groundwater contamination is increased where the contaminant is mobile, by virtue of its solubility in water or its viscosity, and if there is a pathway to groundwater. Having entered groundwater, the impact of a chemical will depend on its toxicity and persistence. Some contaminants are therefore more likely to impact on groundwater than others.

I1.3.2 Not all groundwater is equally vulnerable to the risk of pollution as discussed in the overarching policy (Section A in this document). The natural characteristics of soil and rocks and the depth to groundwater control the likelihood of groundwater pollution.

I1.3.3 Contaminated land investigation activities, including the drilling of boreholes, can pose a threat to groundwater by creating preferential pathways. Contaminated land and groundwater remediation may also pose a threat to groundwater because it may move or increase the mobility of contaminants.

I2 Mechanisms for achieving groundwater objectives

I2.1 This section considers how the groundwater objectives specified in the overarching policy will be delivered.

Regulation

I2.2 SEPA will use its full range of regulatory powers to ensure that land remediation does not result in adverse impacts on groundwater.

I2.3 At special sites SEPA will ensure the protection and remediation of groundwater is carried out to an appropriate standard that is reasonable taking into account the seriousness of the pollution and the costs of remediation.

I2.4 At special sites where land contamination is resulting in groundwater pollution, SEPA will seek to ensure that either the source of the contamination is addressed or that the pathway to groundwater is broken. We will seek to ensure that the pollution itself is addressed where it is technically feasible and would not entail disproportionate cost.

Working with stakeholders

I2.5 SEPA will promote a co-operative approach between us and other stakeholders, notably the local authority as well as industry and landowners.

I2.6 SEPA will input into local authority contaminated land inspection strategies, providing information regarding priorities for groundwater protection and groundwater quality data or other hydrogeological information where available.

I2.7 SEPA will work with local authorities in relation to land contamination. This includes contamination addressed within Part IIA and planning, as well as outside these regulatory controls. We will provide information and advice to the local authority when consulted, as well as raising concerns where remediation proposals do not deliver an acceptable standard of groundwater protection.

I2.8 SEPA will seek to ensure that appropriate assessments of risks to groundwater associated with land contamination are carried out. This will enable well-informed decisions to be made regarding appropriate action. These assessments should consider:

- contaminant concentration, toxicity, mobility and persistence within the geological and hydrogeological context of the site;
- whether the land contamination needs to be treated or removed or whether the pathway to groundwater needs to be broken;
- whether action needs to be taken to remove, address or manage the pollution that has already been caused to groundwater.

Planning issues

I2.9 SEPA will use its role as statutory consultee with regard to development plans to seek to ensure that risk to groundwater is taken into account in the drafting of policies on contaminated land.

Promoting good practices

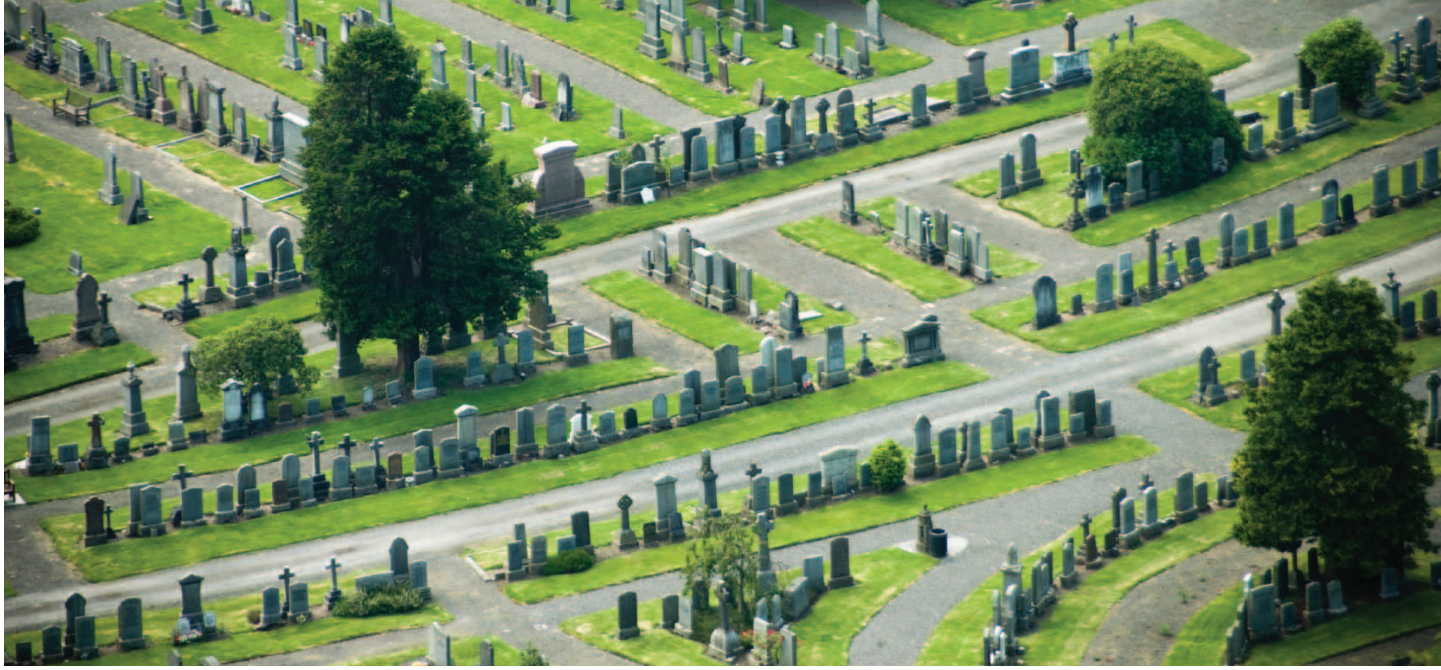
I2.10 SEPA will promote best practice to all those involved with assessing and addressing land contamination to ensure that groundwater pollution is considered in an informed, appropriate and acceptable manner.

I3 Related guidance

I3.1 SEPA guidance on contaminated land issues can be found on the SEPA website and includes:

- *Water Pollution arising from Land containing Chemical Contaminants*, SEPA, 2001.
- *Contaminated Land Provisions. Part IIA, Environmental Protection Act 1990: An overview of part IIA for Appropriate Persons*, SEPA and COSLA, 2001.

I3.2 Additional guidance on the assessment and management of contaminated land has been produced by the Environment Agency, DEFRA, the Scottish Government and other stakeholders.



J Cemetery development and green burial

J1 Background

J1.1 Introduction

J1.1.1 This section of the policy outlines the risks to groundwater and the protective measures that can be taken to reduce the risks from cemetery developments and green burial. The burial of corpses and their subsequent degradation may pose a risk of pollution of groundwater. Whilst SEPA recognises the sensitivity associated with burial sites, we also have a duty to ensure the protection of groundwater and is the enforcing authority for The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended).

J1.1.2 Under the planning system SEPA is a statutory consultee with regard to:

- development plans (which may include policies and land use allocations for cemeteries);
- certain planning applications (including those for development which consists of or includes the use of land as a cemetery).

SEPA is also a consultee at the discretion of individual planning authorities with regard to other planning applications for new development (which may include burial). Planning permission is not, however, required for private, non-commercial burial nor the burial of a limited number of individuals on their own land.

J1.1.3 Burial outwith a site covered by the Burial Grounds (Scotland) Act 1855 in private grounds is known as "green burial". Under the Environmental Protection Act 1990, such burial may constitute a nuisance within the meaning of the act if it could be demonstrated that it was conducted in a manner which was offensive or injurious to health. The local authority, as the regulating authority, has responsibility for public health relating to such burials.

J1.2 Threats to groundwater

J1.2.1 Half of all human burials involve some embalming using formaldehyde. Formaldehyde is a biocide with toxic and carcinogenic properties and is also highly corrosive. It is a polluting substance and as such its input to groundwater must be limited in order to prevent pollution.

J1.2.2 The degradation of human corpses normally takes 10 -12 years and it is estimated that more than half the pollutant load leaches within the first year and that the load then halves again in each successive year. The degradation process rate is, however, dependent on microbial decay, which is itself influenced by soil conditions and burial practice (eg depth of burial and coffin construction).

J1.2.3 The degradation process results in organic break down products including ammoniacal nitrogen. Ammoniacal nitrogen is a polluting substance and can have a detrimental effect on groundwater and any associated surface water systems.

J1.2.4 Pathogens or organisms harmful to human health may be present. The survival and transport of pathogens is dependent on the characteristics of the pathogen (eg size and shape) and on the physical conditions (eg pH, temperature and the nature of the soil and underlying rocks). In general, pathogens die-off naturally and rapidly reduce in concentration with distance from the grave as the conditions are not conducive to survival.

J1.2.5 Cemetery developments may be sited on land which has previously been drained for agricultural use. Such drainage systems can provide a rapid pathway for pollutant transport.

J2 Mechanisms for achieving the groundwater objectives

J2.1 This section considers how the groundwater objectives specified in the overarching policy will be delivered.

J2.2 SEPA will deal with enquiries in a sensitive manner.

J2.3 SEPA recognises that the burial of corpses is an activity which may lead to the input of polluting substances into groundwater. In the event of a clear and serious risk to groundwater being identified as a result of burial at a cemetery or private burial ground, SEPA will prevent or control the activity using it's powers of enforcement under regulation 28 of the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended).

J2.4 SEPA recommends that bodies should not be buried:

- within 250 metres of any spring, well or borehole used as a source of drinking water;
- within 50 metres of any other spring, well or borehole;
- within 50 metres of any watercourse;
- within 10 metres of any field drain.

J2.5 In respect of the burial sites SEPA recommends:

- there should be no standing water in the bottom of the burial pit when first dug (this assessment should not be carried out when raining);
- there should be no sand or gravel at the bottom of the burial pit;
- there should be at least one metre of subsoil below the bottom of the burial pit;
- the burial pit should be deep enough to give at least one metre of covering soil.

J2.6 When consulted on planning applications for cemeteries or green burial sites, SEPA will, where appropriate, request measures which mitigate any identified adverse effects on groundwater to be either incorporated into a planning application or into a planning condition. If this is not possible and we consider that unacceptable adverse effects cannot be mitigated, we will object to the planning application.

J2.7 SEPA will request further information if planning applications for cemeteries or green burial sites do not contain sufficient detail to assess the impact that the proposal would have on groundwater. If this information is not forthcoming, and we have significant concern that the development will adversely affect groundwater, then we will object to the planning application.

J2.8 SEPA will use its role as statutory consultee with regard to development plans to seek to ensure that risk to groundwater is taken into account in the designation of areas for siting new cemeteries.

J2.9 When consulted on planning applications for cemeteries SEPA will seek to ensure that an appropriate risk assessment is undertaken to identify potential problems. Please note that meeting the minimum criteria specified above does not negate the need for a risk assessment.

Green burials

J2.10 SEPA recommends that the body should not be embalmed and should be contained in a biodegradable coffin or shroud. Any wood used in the coffin should be untreated.

J2.11 SEPA recommends that landowners maintain the following records and keep them with property deeds:

- the date(s) on which the burial took place;
- the location(s) where the burial has taken place;
- the number of bodies buried;
- a field plan indicating the location of burial sites.

J2.12 SEPA recommends that the local authority (Environmental Health and Planning Departments) should be contacted prior to green burial to ensure there are no statutory nuisance or planning issues.

J3 Related guidance

There is currently no good practice guidance relating to this section of the policy. Any new guidance will be available on the SEPA website at www.sepa.org.uk

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