

Alkaline hydrolysis (‘water cremation’) regulation in Scotland

A Scottish Government Consultation

August 2023

Table of Contents

Ministerial Foreword	3
Responding to this Consultation	5
Introduction	7
What is alkaline hydrolysis?	8
Previous consultation on new methods of disposal including alkaline hydrolysis	10
What we are consulting on now	10
Regulation and oversight of alkaline hydrolysis	11
Sustainability considerations.....	17
Health and safety of alkaline hydrolysis.....	18
Availability of alkaline hydrolysis in other countries	18
Consultation Questions	20
Impact Assessments	24

Ministerial Foreword

Bereavement can be emotionally overwhelming and being able to engage with the practical issues and funeral arrangements can be very difficult. However, it is something everyone is likely to experience at some stage in their life, whether it's the death of a family member, a loved one, or a friend. Having confidence in the care and dignity given to our loved ones, along with the compassionate and professional treatment of those bereaved, can go some way to alleviating that distress. The rare instances where this does not happen satisfactorily can have long-standing impacts on people.

This is why we need to ensure we get the right policy and legal frameworks in place.

Therefore, as Minister for Public Health and Women's Health, I am pleased to launch the Scottish Government's collection of consultations on burial, inspection, funeral director licensing, and alkaline hydrolysis (an alternative to burial and cremation). These consultations seek views on the Scottish Government's proposals for regulations for all four of these topics, which are to be made under the Burial and Cremation (Scotland) Act 2016 ('the 2016 Act').

The 2016 Act fulfils our commitment to implement recommendations made by the Burial and Cremation Review Group (2007), the [Infant Cremation Commission](#) (2014) and the [National Cremation Investigation](#) (2016). The regulation proposals set out in the consultations on burial, inspection and funeral director licensing are key to realising the necessary detail, protection and processes envisaged by the 2016 Act. With your help, we can ensure the right policy and legal frameworks are in place. We can ensure that regulation is fair and proportionate and achieves the aim of protecting the deceased, setting minimum standards of care in the sector, supporting consistency of service and establishing a statutory regulatory function to monitor compliance with the 2016 Act and its codes of practice. In this way, we can provide everyone with greater confidence in the funeral sector in Scotland and promote continual improvement.

We are also taking this opportunity to attain public views on alkaline hydrolysis. When consulting on the 2016 Act we were aware that alternative methods of body disposal, which could sit alongside burial and cremation, were in development. Responses to the Bill consultation showed there was public support for the introduction of new, environmentally friendly alternatives in Scotland. This included alkaline hydrolysis which is already in use in some countries including Ireland, Canada and the USA.

The [Cremation \(Scotland\) Regulations 2019](#) updated how cremation is regulated and introduced revised and updated application forms and registers. It also set out the procedure for the handling of ashes. It is proposed that similar statutory requirements will apply to alkaline hydrolysis.

It is important that we ensure that regulations for any new methods are fit for purpose. So this consultation sets out the ways in which we propose alkaline hydrolysis should be governed and the safeguards which we consider should be put in place to help ensure the high standards that the public can expect with burial and

cremation will apply to alkaline hydrolysis. We have also set out areas where the wider legislative framework is well established in order to set out a fuller picture of what providers will be required to comply with in order to offer alkaline hydrolysis.

Our proposal is that alkaline hydrolysis would be an additional choice for people interested in exploring possible alternatives. We are not suggesting it replaces or displaces traditional methods in any way. It is a matter of choice for the individual and we absolutely recognise that many people will not consider it suitable for them or aligned with their beliefs.

Whilst many parts of the 2016 Act and associated regulations are already in place, I recognise that delays caused by the COVID-19 pandemic have impacted progress on the implementation of the remainder of the 2016 Act. I hope that the publication of these consultations demonstrates the progress made since then, working closely with the sector and other stakeholders, and the Scottish Government's continued commitment to developing these important regulations.

I am proud that Scotland is leading the way when it comes to funeral sector regulation. Scotland is the first UK nation to pursue a statutory regulatory regime for the funeral sector. In the Competition and Markets Authority's (CMA) [final report](#) on their funerals market investigation, they recognised Scotland's leadership in this area, and made recommendations to England, Northern Ireland and Wales to establish an inspection and registration regime, as a first step to the establishment of a broader regulatory regime for funeral services, "mirroring the approach taken in Scotland".

I appreciate we are seeking a wide variety of views from the public and from those working in the funeral sector in these consultations. I therefore invite you to respond to any or all of the consultations in this collection and thank you for taking the time to consider our proposals.

Your responses will help shape our next steps.

Jenni Minto MSP
Minister for Public Health and Women's Health

Responding to this Consultation

We are inviting responses to this consultation by 17 November 2023.

Please respond to this consultation using the Scottish Government's consultation hub, Citizen Space (<http://consult.gov.scot>). Access and respond to this consultation online [here](#). You can save and return to your responses while the consultation is still open. Please ensure that consultation responses are submitted before the closing date of 17 November 2023.

If you are unable to respond using our consultation hub, please complete the [Respondent Information Form](#) to:

Burial & Cremation, Anatomy and Death Certification Team
Scottish Government
3 East
St Andrew's House
Edinburgh, EH1 3DG

Handling your response

If you respond using the consultation hub, you will be directed to the About You page before submitting your response. Please indicate how you wish your response to be handled and, in particular, whether you are content for your response to be published. If you ask for your response not to be published, we will regard it as confidential, and we will treat it accordingly.

All respondents should be aware that the Scottish Government is subject to the provisions of the Freedom of Information (Scotland) Act 2002 and would therefore have to consider any request made to it under the Act for information relating to responses made to this consultation exercise.

If you are unable to respond via Citizen Space, please complete and return the Respondent Information Form included in this document.

To find out how we handle your personal data, please see our privacy policy: <https://www.gov.scot/privacy/>

Next steps in the process

Where respondents have given permission for their response to be made public and after we have checked that they contain no potentially defamatory material, responses will be made available to the public at <http://consult.gov.scot>. If you use the consultation hub to respond you will receive a copy of your response via email.

Following the closing date all responses will be analysed and considered along with any other available evidence to help us. Responses will be published where we have been given permission to do so. An analysis report will also be made available.

Comments and complaints

If you have any comments about how this consultation exercise has been conducted, please send them to the contact address above or at burialandcremation@gov.scot.

Scottish Government consultation process

Consultation is an essential part of the policymaking process. It gives us the opportunity to consider your opinion and expertise on a proposed area of work.

You can find all our consultations online: <http://consult.gov.scot>. Each consultation details the issues under consideration, as well as a way for you to give us your views, either online, by email or by post.

Responses will be analysed and used as part of the decision making process, along with a range of other available information and evidence. We will publish a report of this analysis for every consultation. Depending on the nature of the consultation exercise the responses received may:

- indicate the need for policy development or review
- inform the development of a particular policy
- help decisions to be made between alternative policy proposals
- be used to finalise legislation before it is implemented

While details of particular circumstances described in a response to a consultation exercise may usefully inform the policy process, consultation exercises cannot address individual concerns and comments, which should be directed to the relevant public body.

Introduction

1. The Scottish Government wants to ensure that all those who have died are treated with the utmost dignity and respect. Death, burial, cremation and related topics are very emotive subjects. There are also ethical, faith, social and cultural dimensions to caring for the deceased. This consultation seeks to balance clarity of language around the alkaline hydrolysis process with the objective of ensuring that the subject matter is treated with care, respect and sensitivity.
2. Throughout this consultation, some of the language used is necessarily technical and may seem clinical. This has been done intentionally to avoid ambiguity in describing alkaline hydrolysis and to ensure accuracy in the development of a potential legal framework around the process.
3. This consultation is seeking views on proposals to regulate alkaline hydrolysis as a method of disposal of human remains in Scotland. Archbishop [Desmond Tutu's](#) decision to choose alkaline hydrolysis has increased awareness about the process. Alkaline hydrolysis can also be known by other terms, including water or liquid cremation, flameless cremation, green cremation and bio-cremation as well as by trade names. For the purposes of this consultation, we are using the term alkaline hydrolysis.
4. The Burial and Cremation (Scotland) Act 2016 ('the [2016 Act](#)') provides a modern, comprehensive legislative framework for burial and cremation. Many of the 2016 Act's provisions are rooted in recommendations made by various review groups, particularly the Infant Cremation [Commission](#) and the Burial and Cremation [Review Group](#).
5. Section 99 of the 2016 Act enables Scottish Ministers to make regulations to extend the application of the 2016 Act to encompass new methods of disposal of human remains. The proposals to regulate alkaline hydrolysis discussed in this consultation aim to provide people in Scotland with a possible alternative choice to burial and cremation. In addition, the proposals aim to provide reassurance as it is intended that this alternative choice will be subject to the same oversight, requirements and conditions as cremation is, as set out in the Cremation (Scotland) [Regulations](#) 2019.
6. Furthermore, this consultation discusses other, pre-existing requirements that would apply to processes associated with alkaline hydrolysis as it involves the water environment. River Basin Management Planning aims to improve Scotland's water environment to good ecological and chemical status and protect it if already at good status. Any direct or indirect (i.e. to land rather than to drain) liquid discharge to the water environment from an alkaline hydrolysis process would require an authorisation from the Scottish Environmental Protection Agency (SEPA) under the Water Environment (Controlled Activities) (Scotland) Regulations 2011.
7. In relation to any potential impacts of alkaline hydrolysis, there are already well established regulatory mechanisms and planning processes in place to enable

high-quality development and ensure efficient use of land, while protecting natural resources. They aim to achieve economic growth while reducing emissions and respecting the quality of environment, place and life. The planning system will consider the provision of the most appropriate methods and technologies in order to protect the environment and public health. For new industrial developments all plans should promote resource efficiency and the minimisation of waste. **(Question 1)**

What is alkaline hydrolysis?

8. Alkaline hydrolysis is a method of disposal of human remains using hot water with the addition of potassium hydroxide, or sodium hydroxide, or a mix of both. The body is wrapped in a silk or woollen shroud, or other biodegradable material, before being placed into a pressurised chamber and heated to up to 150 °C. The Cremation Association of North America report that the body rapidly reduces to bones, any medical implants and sterile [DNA-free liquid](#). The [report](#) by The Health Council of the Netherlands sets out the alkaline hydrolysis process:

“Alkaline hydrolysis is a chemical process in which the body of a deceased individual is first placed in a steel pressure vessel. Once the vessel has been closed, water and potassium hydroxide are added. The vessel is then pressurised and the water is heated. The maximum temperature varies from about 100 to 150 degrees Celsius, depending on the type of system being used, and the pressure. The combined action of heat, water, and potassium hydroxide, causes the body’s organic substances to dissolve in the liquid. This fully automated process takes two to ten hours, depending on the temperature and on the weight of the body to be processed. In addition to heating the liquid, a complete cycle involves various cooling and rinsing steps.

There are three types of residual material:

- The bones. These are dried and ground into a white powder, which consists largely of calcium. As with cremation ashes, this powder can be given to the next of kin.
 - Any prostheses, fillings, and medical devices. These can be collected and disposed of.
 - The liquid used during hydrolysis. This effluent, which has a volume of approximately 1,500 litres, consists of water, potassium hydroxide, and the dissolved organic substances (sugars, amino acids, salts, and fatty acids). The effluent has a high pH, and contains no DNA or RNA. The pH is reduced to less than 10 by adding sulphuric acid.” (page 18)
9. After the process is complete and the bones and any implants removed, the remaining liquid is cooled before being moved to a treatment tank. The liquid produced as a result of alkaline hydrolysis is slightly alkaline (around 9 – 10.5 on the pH scale). It includes compounds such as sugars, amino acids and fatty acids, nitrogen, phosphorus, and potassium hydroxide. It contains no genetic material (RNA or DNA). Addition of acid may be required to make the liquid less alkaline (reduce the pH) before disposal.

10. The bones left at the end are soft and porous and are ground into a powder, also referred to as “ash”. This secondary process is the same as is used during cremation, although the ash is a lighter colour. The “ashes” can then be returned directly to the family of the deceased, collected by the funeral director on behalf of the family, or otherwise disposed of in a way agreed with the alkaline hydrolysis provider. Medical implants, such as pacemakers or metal implants can be recovered and recycled, as happens with cremation.
11. Once the bones and any implants are removed, the remaining liquid (which is made up of a variety of organic and inorganic materials) would need to be disposed of by the operator. One option is for the liquid to be disposed of by being released to drain as happens following the embalming process (subject to consent from Scottish Water). Supporters of alkaline hydrolysis have suggested that the liquid can also be considered for alternative, sustainable disposal options including use in a green space or a garden of remembrance (subject to consents from relevant authorities). (Question 2)
12. The Netherlands report gives some alternative examples of how the remaining liquid might be dealt with. These are methods which may become available in Scotland, subject to the outcomes of the consultation and further development of the next steps.

“there may be alternatives to discharging the effluent into the sewer system. For example, the effluent can be treated locally, immediately after completion of the alkaline hydrolysis process. When using a purification method that preserves nutrients (such as anaerobic purification), the locally purified effluent can be used to fertilise fields, commercial forests, or places of remembrance, for example. Depending on the wishes of the next of kin and the facilities available at the funeral company, some of the processed effluent could be given to the next of kin. Another option would be to use the effluent directly (i.e. without first treating it) as a fertiliser. A third processing method is to transport the effluent by road tanker to a sludge digester, where it would be used to produce biogas.” (page 18)

13. Any organisation proposing to offer alkaline hydrolysis will need to detail in their planning application to the local authority how they intend to dispose of the liquid and demonstrate that they have obtained the relevant consents from Scottish Water or SEPA.

Funeral services

14. Opting for alkaline hydrolysis does not necessarily alter the type of funeral service which may be arranged. A full funeral service, post-funeral gathering (such as a wake) or any other cultural or religious ceremonies would still be possible and subject to the wishes of the deceased and their next of kin.
15. Although a traditional coffin may be used for the funeral service, a coffin is not used during the process itself. Instead, as noted above, the body will be wrapped in a biodegradable material, such as a silk or wool shroud. The person making

the funeral arrangements would be able to discuss the options for what would happen to a coffin used as part of the service with the funeral director or provider.

Previous consultation on new methods of disposal including alkaline hydrolysis

16. When [consulting](#) on the 2016 Act, we were aware that new methods of disposal of human remains were at varying stages of development around the world. We asked whether respondents agreed that the 2016 Act should include a provision for Scottish Ministers to regulate new techniques in the same way as burial and cremation when they become viable. Of the 135 who [responded](#) to this question, 81% agreed, 7% disagreed and 12% didn't know.
17. A few respondents commented that allowing alternatives to traditional burial or cremation will encourage innovation and could ease the pressure on burial grounds by reducing demand.
18. Consultation responses were also in favour of introducing additional, new, more environmentally friendly procedures. As a result, the Scottish Government included provision in the Bill to allow for regulation of any new methods of body disposal in the same way as we are regulating burial and cremation. This led to section 99 of the 2016 Act which provides for the 2016 Act to apply to new ways of disposing of human remains.
19. In the comments in response to the question in the Bill consultation, there was strong support for the introduction of alkaline hydrolysis. Comments included the need for careful consideration of any environmental impact, that codes of practice for any new method should be produced and that a code of practice for new methods should at least be provided for in the Bill. The environmental impact will continue to be considered as the regulations are developed and will be informed by the consultation responses. A strategic Environment Impact Assessment will be carried out.
20. The 2016 Act provides for codes of practice for burial, cremation and funeral directors. We propose that a similar code of practice would be developed for alkaline hydrolysis.

What we are consulting on now

21. This consultation discusses proposals for the introduction of regulation of alkaline hydrolysis following the favourable responses to the earlier consultation. The intention of this consultation is to seek views on how alkaline hydrolysis is proposed to be regulated, including in relation to requirements to comply with the 2016 Act and requirements that may be included in related regulations made under the 2016 Act. The consultation also seeks views on potential codes of practice and guidance as well as on a proposal for oversight by the Scottish Government Inspectors of Burial, Cremation and Funeral Directors. For clarity, we have also set out the responsibilities of other organisations which have a regulatory role in ensuring the safe operation of alkaline hydrolysis.

Regulation and oversight of alkaline hydrolysis

22. Extending the application of the 2016 Act to alkaline hydrolysis is one of a number of regulatory frameworks that will collectively ensure that the process is safe and that it appropriately protects public health. It will be for those intending to offer alkaline hydrolysis to ensure they have complied with all relevant legislation and to be able to demonstrate this before being able to operate.
23. It is proposed that once operational, providers will be required to work on an ongoing basis in accordance with the requirements of the 2016 Act and related regulations, all other relevant legislation, and any codes of practice and guidance.
(Question 3)

Scottish Water

24. As set out above any operator will be required to identify how they intend to deal with the liquid produced and obtain consent from the relevant authority before commencing operations. For example, where the intention is to release the liquid to public sewer, Scottish Water would need to grant trade effluent consents as well as oversee and monitor the liquid from alkaline hydrolysis. This requirement is set out in [section 26](#) of the Sewerage (Scotland) Act 1968. Scottish Water, rather than SEPA, will be the regulator where consent is granted for a discharge of the liquid to the drain.

Scottish Environmental Protection Agency (SEPA)

25. SEPA is responsible for dealing with any issues relating to the protection of the environment. They would regulate discharge of the liquid to the environment, rather than the public sewer, from alkaline hydrolysis should that be the method appropriate to the location of the facility. SEPA have advised that discharge to the water environment would only be considered where there is no public sewer available.
26. It will be for each operator to liaise with SEPA and Scottish Water and agree which method of dealing with the liquid is most appropriate for the location. The operator will then need to ensure that they have obtained the necessary consents in order to make their planning application to the local authority.

Local authorities

27. Any person or business intending to offer alkaline hydrolysis will first need to acquire premises or adapt existing premises to house the equipment. Generally a planning application will need to be submitted to the relevant planning authority for the area where the premises are/will be situated. The planning application process will consider whether the proposed development is appropriate in terms of its location, visual impact, impact on local infrastructure such as access and transport links, etc. Applications may also be subject to Environmental Impact Assessments if required as part of the planning process. Statutory consultees, which could for example include SEPA, Scottish Water, Scottish Natural Heritage

or the Health and Safety Executive may also be asked to comment depending on the specific circumstances of the development.

The Burial and Cremation (Scotland) Act 2016

28. As noted above, the 2016 Act provides a modern, comprehensive legislative framework for burial and cremation. It allows Scottish Ministers to develop measures related to the whole of the funeral sector, including licensing funeral directors; developing codes of practice; and inspecting and regulating the practices and procedures of burial authorities, cremation authorities and funeral directors. It is appropriate that those offering alkaline hydrolysis should be subject to the same level of scrutiny and record keeping requirements.

Opening a facility providing alkaline hydrolysis

29. It is proposed that operators of premises that will offer alkaline hydrolysis will be required to go through a procedure similar to the procedure that applies when a new crematorium is to be opened (section 59 of the 2016 Act). In addition to acquiring planning permission the operator will be required to give the Inspector of Burial, Cremation and Funeral Directors notice of their intention to open. It is proposed that they will need to demonstrate to the Inspector that they have obtained all necessary consents. Section 59 states that no applications for cremation can be accepted until the Inspector has consented. The alkaline hydrolysis regulations will require the same consent from the Inspector to operate alkaline hydrolysis facilities. (Question 4)

30. It is possible that funeral directors or cremation authorities will install alkaline hydrolysis equipment in existing premises. In order to do so they will need to comply with the same obligations as any provider setting up a new facility and ensure that all regulatory requirements are complied with. This includes giving notice to the Inspector.

Regulating the process – the Cremation (Scotland) Regulations 2019

31. It is our view that this process should be regulated in a very similar way to cremation. This means that alkaline hydrolysis procedures would be subject to the same legislative requirements and regulations which apply to cremation as set out in 2016 Act and the Cremation (Scotland) [Regulations 2019](#) ("the 2019 Regulations").

32. It is proposed that the operators, premises and the process itself will also fall within the scope of the wider funeral sector inspection regime which is being developed under the 2016 Act. Any operators of alkaline hydrolysis would be subject to ongoing inspection in the same way as cremation authorities.
(Question 5)

Management plan

33. The 2019 Regulations require each cremation authority to:

- prepare and maintain a management plan for each crematorium for which it is the cremation authority. The plan should contain at least the minimum detail set out in regulation 2, including:
 - operating procedures
 - contingency plans
 - maintenance of equipment.
- Retain applications for cremation for at least 50 years.
- Keep a register of all cremations.

34. We propose that operators offering alkaline hydrolysis should also be required to have a management plan for each alkaline hydrolysis facility they operate/ control in the same way as cremation authorities. The plan should set out the procedures and processes which enable the premises to run effectively. This is because much of the process including applications, record keeping, registers and operation of the facility/equipment are similar.

35. One of the key reasons for development of the 2016 Act and the 2019 Regulations was the need to ensure that accurate records of the process and the handling of ashes are kept. It seems equitable that the same requirements should apply to alkaline hydrolysis.

36. The management plan should include details of working practices and procedures, including, for example:

- the name, address and contact details of the alkaline hydrolysis facility, including email;
- the procedures for:
 - carrying out of alkaline hydrolysis;
 - dealing with any sudden increase in demand;
 - dealing with applications in an emergency;
 - operation and servicing of all equipment used in the process;
 - disposal of ashes (such as return to family);
 - disposal of effluent;
 - Other regulatory requirements (such as Scottish Water or SEPA) and what procedures are in place to meet these;
 - review of the management plan: and
 - resilience plan for continuity of business.

37. We have not suggested what the format of the management plan should be, and it will be for operators to decide what is appropriate for their premises. We are of the view that a period of six months from regulations coming into force will be sufficient time to have a plan in place. **(Question 6)**

Maintenance and operation of equipment

38. A manufacturer has advised that training on the use of alkaline hydrolysis equipment would be made available when they install the equipment, and additional training can be provided during routine maintenance and servicing. If the technology is introduced, we intend to require that the operator ensures that staff are trained in the operation of the equipment used, similar to the

requirements in the 2019 Regulations for cremation authorities. Cremation authorities are obliged to ensure that staff are provided with training in the operation of crematorium equipment and that it is recorded in the management plan. We suggest it should be a requirement for all training undertaken to be recorded in the management plan to ensure that written records are prepared and maintained.

Applications

39. Part 3 of the 2016 Act sets out who can make arrangements for burial or cremation. It is proposed that this will also apply for any new procedures introduced under section 99. The 2019 Regulations set out the statutory application forms which must be submitted in order to carry out a cremation in Scotland. We intend to develop similar statutory forms for alkaline hydrolysis. The application forms will clearly set out the details of the deceased, the applicant, the additional forms that should accompany an application (such as the Certificate of Registration of Death) and what is to happen to any remains (ashes). **(Question 7)**

Joint alkaline hydrolysis

40. Joint cremation is an option under the 2019 Regulations. The 2019 Regulations make provision in relation to the cremation of: the remains of two adults; the remains of one adult with one or more than one child, still-born child or fetus; or the remains of more than one child, still-born child or fetus. We understand that it is possible for two individuals to be processed at the same time using alkaline hydrolysis, at the discretion of the operator. This might only be requested rarely and would only be done where the premises/equipment can facilitate it and there are no other operational restrictions. As with cremation, where a joint alkaline hydrolysis procedure is to take place, it is proposed that an application form for each individual will be required and should be registered individually in the alkaline hydrolysis register (see below) and recorded as individuals who are processed together.

Shared alkaline hydrolysis

41. The 2019 Regulations provide for the shared cremation of pregnancy losses where the applicant is a health provider. Due to the way that alkaline hydrolysis is carried out, where the body is removed from any container and nothing can be put in alongside the body, we are of the view it would not be appropriate to offer alkaline hydrolysis for shared cremation of pregnancy losses.

Young children and stillborn babies

42. In countries where alkaline hydrolysis is available it has been used for adults and children over four years old. We have been informed that current providers are unlikely to offer alkaline hydrolysis for children under the age of four or stillborn babies. This is primarily because, while it is possible to perform the process, it is highly unlikely that there would be any “ashes” at the end to return to parents. It

would ultimately be a decision for each provider whether they wish to offer alkaline hydrolysis for young children and stillborn babies and if offered, the informed consent of parents in relation to the process and likely outcome would be key.

43. Should alkaline hydrolysis be regulated, we would propose to create application forms for adults, children and stillborn babies in a similar way as has been done for cremation. These would ensure clarity, openness and transparency in relation to the process. The lack of ashes in the case of children under the age of four or stillborn babies would need to be made absolutely clear in guidance to accompany the application forms. It would also be made clear in the accompanying guidance that it would not be possible for any mementos to be put in beside an infant or stillborn baby. Following discussion with the provider and being informed that there would be no ashes, it would be for the parents to decide whether alkaline hydrolysis is their preferred option based on their own values, attitudes and beliefs.
44. One of the main drivers for the 2016 Act was ensuring that what happened to the ashes following the cremation of an infant, stillborn baby or pregnancy loss would be accounted for. We are of the view that a lack of ashes should not exclude parents from being able to choose alkaline hydrolysis based on an informed understanding of the process and its implications. It would be imperative that it be made clear to parents before applying for alkaline hydrolysis, as well as recorded on the application form, that there would be no ashes from alkaline hydrolysis of an infant or stillborn baby. **(Question 8)**

Deaths investigated by the procurator fiscal

45. Where the Crown Office and Procurator Fiscal Service (COPFS) has investigated a sudden or unexplained death, COPFS must issue a Form E1 giving permission for cremation to take place. The Form E1 is currently only required for cremation (and not for burial) as cremation means the body is no longer available for future examination. The intention is that, where the Crown Office has investigated the death, a form similar to a Form E1 will be required before alkaline hydrolysis can take place because the body is also destroyed by this process. **(Question 9)**

Handling of ashes: notices and time periods for collection of ashes

46. The 2019 regulations set out the requirements for cremation authorities and funeral directors in relation to how they ensure that the instructions of the applicant for cremation are complied with. It is proposed that similar duties to comply with requirements related to the handling and disposal of ashes from alkaline hydrolysis processes (including requirements to give written notice to applicants when ashes are available for collection and time periods for the collection of ashes) should be applied to alkaline hydrolysis providers.

Disposal of ashes

47. Sections 51 – 56 of the 2016 Act sets out responsibilities of cremation authorities and funeral directors in relation to handling ashes. These procedures were

brought in to ensure that the instructions (on the cremation application form) for what is to happen to the ashes are carried out and that accurate records are kept. For example, section 51 states that the cremation authority must take steps to ascertain the ways in which ashes are to be dealt with before carrying out the cremation, so it is clear whether the ashes are to be collected, who can collect them or if they are to be disposed of by the cremation authority.

48. There are then duties on cremation authorities and funeral directors in relation to returning ashes and what their options are if ashes are not returned or collected. At set points both must contact the applicant to make them aware what is happening with the ashes, when they can be collected and what will happen if they are not collected. Our intention is that alkaline hydrolysis operators will be required to comply with similar handling and record keeping requirements in relation to the handling of ashes. **(Question 10)**

Alkaline hydrolysis registers

49. The 2016 Act provides that cremation authorities must prepare and maintain cremation registers, setting out information about cremations carried out in the crematorium. The contents of the cremation registers are set out in the 2019 Regulations and it is appropriate for the alkaline hydrolysis registers to contain the same or very similar information. There are registers for whole bodies and for body parts. The information held includes:

- Unique reference number
- Date of cremation of body or date of cremation of body part and of remainder of body
- Name of deceased
- Sex of deceased
- Date of birth
- Date of death
- Funeral director
- Information on the dispersal of ashes

(Questions 11-12)

50. There is also a cremation register for stillbirth and pregnancy losses. The information held includes:

- Unique reference number
- Date of cremation
- NHS number
- Name (if given)
- Details about applicant
- Information on the dispersal of ashes (including if none were recovered)

51. It is considered appropriate that providers of alkaline hydrolysis are required to maintain a register if they offer alkaline hydrolysis for stillborn babies. **(Question 13)**

Duty of local authority to arrange funerals

52. Section 87 of the 2016 Act states that a local authority must arrange a funeral where “it appears that no arrangements are being made”. This may be because there are no relatives or because there are no funds to meet the funeral costs. Local authorities currently can arrange a burial or a cremation, with cremation being the most commonly used method. Should alkaline hydrolysis become available, it is proposed that it could be an alternative method available to local authorities when arranging a burial or cremation under section 87. **(Question 14)**

Sustainability considerations

53. There have been some studies conducted to examine the environmental impact of alkaline hydrolysis compared with burial or cremation. However, it is important to note that the evidence base in this area is limited and that the following is not a comprehensive review of the evidence.

54. The [report](#) from the Health Council of the Netherlands found that available research suggested that alkaline hydrolysis compared favourably to both burial and cremation on three markers of sustainability:

- reduced use of finite resources;
- fewer harmful emissions; and
- reduced use of available space.

55. Crematoriums are currently regulated under the Pollution Prevention and Control (Scotland) Regulations 2012 and so any emissions produced must be made in compliance with a permit which is granted and regulated by the Scottish Environment Protection Agency (SEPA).

56. Scottish Water has previously discussed with SEPA the liquid produced by alkaline hydrolysis and how it should be disposed of. We understand that SEPA's preference is that the liquid should discharge to a public sewer where a connection is feasible. However, SEPA are also of the view that the liquid may be suitable for putting directly into the water environment (rivers, etc.) following treatment and controls via their usual licencing regime. SEPA considered that the liquid from alkaline hydrolysis may be suitable for discharge via an infiltration system and biosolids containing its residues would be suitable for direct spreading to land.

57. Scottish Water has also noted the amount of liquid produced by alkaline hydrolysis. Based on information available, the volume of liquid from a single cycle of alkaline hydrolysis is around 2000 litres.

58. The associated strength of the liquid – as determined by Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) – is very high. In the water industry the standard figure for expressing the average BOD load for one person in one day is 60g. On this basis the load of the liquid from one cycle of the alkaline hydrolysis

process is estimated to be around 1250 times that amount (75 kg). In broad terms, these measurements mean that the liquid has a high organic content.

59. As noted above, any prospective provider would need to detail how they intend to deal with this liquid.
60. The 2016 Act and any regulations made under it do not in themselves have an environmental impact. However the proposals will enable a new method of disposal to become available in Scotland. We therefore intend to develop a Strategic Environmental Assessment (SEA) at the same time as we develop the regulations. (Question 15)

Health and safety of alkaline hydrolysis

61. Alkaline hydrolysis requires the storage, use and disposal of the chemicals used in the process. We have been informed by a manufacturer that the equipment itself has many safety measures built in. It would be for those proposing to offer alkaline hydrolysis to undertake a thorough risk assessment in line with health and safety legislation.
62. The [Health and Safety at Work etc. Act 1974](#) is the primary piece of legislation covering occupational health and safety in the UK. As is the case with any business, any company seeking to offer alkaline hydrolysis would be required to comply with the 1974 Act, and would be subject to regulation by the Health and Safety Executive.
63. Current manufacturers have stated that the liquid is collected, treated and released without any contact by the operator. The operator has no requirement to be in contact with the liquid prior to PH reduction in a sealed tank.
64. The [report](#) by The Health Council of Netherlands described an odour as a result of the alkaline hydrolysis process as being persistent and unpleasant. However, [a study by Yorkshire Water](#), in which five processes were carried out in 2019 in Sheffield did not mention any odour issues.

Availability of alkaline hydrolysis in other countries

65. According to the [Cremation Association of North America](#), there are active practitioners of alkaline hydrolysis in 15 states of the United States of America, and 5 provinces of Canada (where the National Collaborating Centre for Environmental Health published a [report on alkaline hydrolysis](#) in April 2023), while another 8 US states have legalised the process.
66. The Dutch Government commissioned the Health Council of the Netherlands to assess the admissibility of new techniques of body disposal, including alkaline hydrolysis. They [found](#) that that alkaline hydrolysis compares favourably to burial and cremation with respect to sustainability and complies in principle with their three tests for assessing new techniques of disposing of the deceased: safety, dignity and sustainability.

67. The review included both qualitative and quantitative market research and environmental comparisons with flame cremation and burial. However, the Council also noted that the technical specifications of alkaline hydrolysis would have to be further examined before it could potentially be authorised for public use.

68. We understand that alkaline hydrolysis is also available in different areas in Australia, Mexico and South Africa.

(Question 16)

Consultation Questions

Question 1 - Do you think that the Scottish Government should introduce regulations to allow the use of alkaline hydrolysis as a method of disposal of human remains in Scotland? Please also provide the reason for your answer. (see para 3 – 7)

Yes
No
Don't know
No view/ comment

Comments:

Question 2 - Have the sustainability claims made by manufacturers influenced your response to Question 1? Please provide details. (see para 11)

Yes
No
Don't know
No view/ comment

Comments:

Question 3 - Assuming that alkaline hydrolysis is to be allowed, should it be regulated in a similar manner as cremation? (see para 22 – 23)

Yes
No
Don't know
No view/ comment

Comments:

Question 4 - Do you agree that the same procedure as applies to opening new crematoriums should apply to opening alkaline hydrolysis premises? (see para 29)

Yes
No
Don't know
No view/ comment

Comments:

Question 5 - Should alkaline hydrolysis operators be subject to inspection in the same way as cremation authorities? (see para 32)

Yes
No
Don't know

No view/ comment

Comments:

Question 6 - What information do you think should be included in a management plan by a provider of alkaline hydrolysis? (see para 33 – 37)

Comments:

Question 7 - Do you agree that there should be statutory application forms similar to the cremation application forms? (see para 39)

Yes

No

Don't know

No view/ comment

Comments:

Question 8 - Do you have any views on the provision of alkaline hydrolysis for children under age 4 and for stillborn babies (even though no ashes are likely to result)? (see para 42 – 44)

Yes

No

Don't know

No view/ comment

Comments:

Question 9 - Do you have any comments on extending the requirement for a Form E1 (as applies when the body is released for cremation by COPFS) to alkaline hydrolysis? (see para 45)

Yes

No

Don't know

No view/ comment

Comments:

Question 10 - Do you agree that operators of alkaline hydrolysis (and funeral directors) should be required to comply with the same requirements and timescales for handling of the remains as they are for ashes following cremation? (see para 47 – 48)

Yes

No

Don't know

No view/ comment

Comments:

Question 11 - Do you agree that the content of the statutory cremation register for bodies should be replicated for alkaline hydrolysis? Please add any comments on what you think should be different and why. (see para 49)

Yes

No

Don't know

No view/ comment

Comments:

Question 12 - Do you agree that the content of the statutory cremation register for body parts should be replicated for alkaline hydrolysis? Please add any comments on what you think should be different and why. (see para 49)

Yes

No

Don't know

No view/ comment

Comments:

Question 13 - Do you agree that the content of the statutory cremation register for stillborn babies should be replicated for alkaline hydrolysis? Please add any comments on what you think should be different and why. (see para 50 – 51)

Yes

No

Don't know

No view/ comment

Comments:

Question 14 - Section 87 of the 2016 Act provides that where a person dies or is found dead within a local authority area, and no arrangements are being made for them to be buried or cremated, the local authority must make the arrangements. In these cases, should the local authority be able to use alkaline hydrolysis where it is available? Please provide reasons for your answer. (see para 52)

Yes

No

Don't know

No view/comment

Comments:

Question 15 - As noted in the consultation, supporters of alkaline hydrolysis have claimed that the liquid could be considered for sustainable disposal, such as fertilizer. If relevant consents are obtained, do you have any views on whether this should be an option? (see para 53 – 60)

Yes

No

Don't know

No view/ comment

Comments:

Question 16 - Do you have any other comments on the regulation and use of alkaline hydrolysis which you wish to share? (see para 53 – 60)

Comments:

Impact Assessments

As we develop the regulatory scheme proposed in this consultation we will carry out impact assessments. The aim of these assessments is to identify issues that may affect some groups more than others and to consider how we will address these issues. The assessments also explore what impacts the proposed regulations will have on matters such as privacy, equality, child rights and wellbeing and business.

The questions on the potential impacts of the proposals are broken down in line with the formal assessments carried out by the Scottish Government, which are:

- Compliance with ECHR
- Equality Impact Assessment
- Child Rights and Wellbeing Impact Assessment
- Fairer Scotland Duty Assessment
- Islands Community Impact Assessment
- Data Protection Impact Assessment
- Business and Regulatory Impact Assessment
- Strategic Environmental Assessment

We recognise that the proposed reforms will have a much greater impact in some areas than in others and that the proposals may have a minimal or no impact in some areas.

When answering the questions, if your comments relate to a specific proposal, it would be helpful if you could set this out when describing any impacts which you think should be considered.

Human Rights

The [Human Rights Act 1998](#) incorporated the [European Convention on Human Rights \(ECHR\)](#) into UK law. It means that public authorities, such as the Scottish Government, must not act in a way that is incompatible with the rights set out on the ECHR. It is therefore vital that we consider how the proposals will impact on human rights.

Question 17: Do you have any views on the potential impacts of the proposals in this consultation on human rights?

Equalities

The [Public Sector Equality Duty](#) requires the Scottish Government and other public bodies when they are exercising their functions to have due regard to the need to:

- eliminate unlawful discrimination, harassment, victimisation and other conduct prohibited by the [Equality Act 2010](#)
- advance equality of opportunity between people who share a relevant protected characteristic and those who do not

- foster good relations between people who share a relevant protected characteristic and people who do not share it.

For the purposes of the Public Sector Equality Duty, a 'relevant protected characteristic' means age, disability, gender reassignment, pregnancy and maternity, race, religion or belief, sex and sexual orientation.

The Equality Act 2010 sets out nine protected characteristics: age; disability; gender reassignment; marriage and civil partnership; pregnancy and maternity; race; religion or belief; sex; and sexual orientation. The Public Sector Equality Duty includes a requirement for the Scottish Government and other public bodies to have due regard to the need to eliminate unlawful discrimination, harassment, victimisation and other conduct prohibited by the Equality Act 2010.

Question 18: Do you have any views on the potential impacts of the proposals in this consultation on equalities and the protected characteristics set out above?

Children's rights

The [UN Convention on the Rights of the Child \(UNCRC\)](#) is an international treaty which sets out the fundamental human rights of all children. [Part 1 of the Children and Young People \(Scotland\) Act](#) places a duty on the Scottish Ministers to (a) keep under consideration whether there are any steps which they could take which would or might secure better or further effect in Scotland of the UNCRC requirements and (b) If they consider it is appropriate to do so, take any of the steps identified by that consideration.

All new legislation and policy that is developed by the Scottish Government must consider the impacts on the rights and wellbeing of children up to the age of 18.

Question 19: Do you have any views on the potential impacts of the proposals in this consultation on children and young people as set out in the UN Convention on the Rights of the Child?

Fairer Scotland Duty

The [Fairer Scotland Duty](#) came into force on 1 April 2018 and places a legal responsibility on named public bodies, including the Scottish Government, to actively consider how they can reduce inequalities of outcome caused by socio-economic disadvantage when making strategic decisions.

This means that as well as considering the impact on people with protected characteristics, the Scottish Government must consider how any proposals will impact on people depending on their economic background. For example, if proposals would have a specific impact on people with low incomes or who live in a deprived area.

Question 20: Do you have any views on the potential impacts of the proposals in this consultation on socio-economic inequality?

Island Communities

[Section 7 of the Islands \(Scotland\) Act 2018](#) states that a relevant authority – which includes the Scottish Ministers – must have regard to island communities when carrying out its functions.

Scotland's islands face particular challenges around distance, geography, connectivity and demography, so it is important that this is considered when developing legislative proposals. It is also important that we ensure the islands receive fair and equitable treatment and that policy outcomes are tailored to their unique circumstances.

Question 21: Do you have any views on potential impacts of the proposals in this consultation on communities on the Scottish islands?

Data protection and privacy

Data protection and privacy impact assessments help the Scottish Government to assess the risks of proposed legislative changes that are likely to affect the way in which personal data is used.

Question 22: Do you have any views on the potential impacts of the proposals in this consultation on privacy and data protection?

Business

A Business and Regulatory Impact Assessment (BRIA) is used to analyse the costs and benefits to businesses and the third sector of any proposed legislation or regulation, with the goal of using evidence to identify the proposal that best achieves policy objectives while minimising costs and burdens as much as possible.

Question 23: Do you have any views on the potential impacts of the proposals in this consultation on businesses and the third sector?

Environment

In Scotland, public bodies, including the Scottish Government, are required to assess, consult on and monitor the likely impacts that their plans, programmes and strategies will have on the environment. This helps to better protect the environment, aims to ensure that any development is sustainable, and increases opportunities for public participation in decision-making.

Question 24: Do you have any views on the potential impacts of the proposals in this consultation on the environment?



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