COMMONWEALTH of VIRGINIA

Ame W. Owens
Director

Department of Health Professions
Perimeter Center
9960 Mayland Drive, Suite 300
Henrico, Virginia 23233-1463

www.dhp.virginia.gov
PHONE (804) 367- 4400

TO: The Honorable Glenn Youngkin
Governor of the Commonwealth of Virginia

The Honorable Robert D. Orrock
Chairman, House Committee on Health, Welfare, and Institutions

The Honorable Louise L. Lucas
Chairman, Senate Committee on Education and Health

FROM: Corie E. Tillman Wolf, J.D.
Executive Director, Virginia Board of Funeral Directors and Embalmers
Virginia Department of Health Professions

DATE: December 7, 2022

RE: Report on the regulation and implementation of alkaline hydrolysis as a means for final disposition in the Commonwealth

Pursuant to Ch. 191 of the 2022 Acts of Assembly, the Virginia Board of Funeral Directors and Embalmers convened a workgroup to study the regulation and implementation of alkaline hydrolysis as a means for final disposition in the Commonwealth. Workgroup members included agency representatives (Virginia Department of Health, Virginia Department of Environmental Quality, and Virginia Department of Health Professions), a local representative from the Hampton Roads Sanitation District, board members, and regulatory experts in the impacted areas.

The resulting recommendations of the Workgroup outline a statutory and regulatory structure that protects public health and safety by ensuring that alkaline hydrolysis facilities and operators are safe to practice, that decedent remains are handled appropriately and respectfully, and that any potential environmental impact will be appropriately addressed through regulation and oversight. The recommendations provide a viable model for how to accomplish implementation of such legislation, if enacted, in a practical and pragmatic manner.

I am pleased to present to you the attached report from the Alkaline Hydrolysis Workgroup. Should you have any questions or need additional information, please do not hesitate to contact me at corie.wolf@dhp.virginia.gov or (804) 367-4424.

Virginia Board of Funeral Directors and Embalmers

SB129 – Report on How to Regulate and Implement the Process of Alkaline Hydrolysis

Virginia Department of Health Professions

12-7-2022

Preface

The Virginia Board of Funeral Directors and Embalmers (Board) of the Virginia Department of Health Professions submits this report in response to the legislative mandate in Chapter 191 of the 2022 Acts of Assembly, which directed the Board to convene a workgroup to study how to regulate and implement the process of alkaline hydrolysis in the Commonwealth. The mandate requires the Board to submit its report "to the Chairmen of the Senate Committee on Education and Health and the House Committee on Health, Welfare and Institutions on or before November 1, 2022."

Workgroup Members and Staff

Blair Nelsen, FSL
Member, Workgroup Chair
Virginia Board of Funeral Directors and Embalmers

Ryder Bunce, PE
SWIFT Technical Service Engineer
Virginia Department of Health

Deborah DeBiasi
Guidance and Regulation Coordinator, Water Permitting
Virginia Department of Environmental Quality

Marcia Degen, PhD, PE
Environmental Technical Services Manager
Division of Water and Wastewater Services
Virginia Department of Health

William T. Gormley, MD, PhD
Chief Medical Examiner
Virginia Department of Health

Barbara Kemmis, CAE
Executive Director
Cremation Association of North America

Mike Martin
Chief of Pretreatment and Pollution Prevention
Hampton Roads Sanitation District (HRSD)

Mike Nicodemus, FSL
Vice President for Cremation Services
National Funeral Directors Association

Richard R. Sikon, FSL, MLA
Operational Director, Virginia State Anatomical Program
Virginia Department of Health

J. Frank Walton, FSL
Member, Virginia Board of Funeral Directors and Embalmers
Program Director, Funeral Services
Tidewater Community College

J. Michael Williams, FSL
Member, Virginia Board of Funeral Directors and Embalmers

Corie E. Tillman Wolf, JD
Executive Director
Virginia Board of Funeral Directors and Embalmers

Kelley Palmatier, JD
Deputy Executive Director
Virginia Board of Funeral Directors and Embalmers

Sarah Georgen
Licensing and Operations Manager
Virginia Board of Funeral Directors and Embalmers

Erin Barrett, JD
Senior Policy Analyst
Virginia Department of Health Professions

Greer Peacock
Policy Intern
Virginia Department of Health Professions

Table of Contents

Executive Summary

During the 2022 Session, the General Assembly directed the Virginia Board of Funeral Directors and Embalmers (Board) to study how to regulate and implement the process of alkaline hydrolysis in the Commonwealth. Specifically, the Board was directed to convene a workgroup consisting of relevant stakeholders to determine the following:

(i) regulatory and statutory changes needed to legalize, implement, and regulate the process of alkaline hydrolysis in the Commonwealth;
(ii) necessary qualifications to enable a person to engage in the practice of alkaline hydrolysis;
(iii) proper standards for the operation of a facility containing a pressure vessel for alkaline hydrolysis; and
(iv) proper requirements for licensure as an owner or operator of such a facility.

The workgroup was further tasked with considering "any necessary environmental precautions and safety measures to ensure proper (a) regulation and implementation of the alkaline hydrolysis process and (b) regulation and inspection of facilities where alkaline hydrolysis is conducted in the Commonwealth." (Ch. 191, 2022 Acts of Assembly)

In July and August 2022, the Board convened a workgroup to compile recommendations regarding the statutory and regulatory structure needed to support the implementation and appropriate oversight of alkaline hydrolysis as a means of disposition of human remains. The Workgroup made four recommendations:

1. Inclusion of alkaline hydrolysis as an accepted means of final disposition of human remains in the Code
2. Definition of "alkaline hydrolysis" as a separate and distinct process within the Code, using broad terminology
3. Creation of a regulatory structure for alkaline hydrolysis that appropriately reflects and accounts for both the differences and similarities in the processes for alkaline hydrolysis and cremation
4. Inclusion of licensure/registration requirements for alkaline hydrolysis facilities or operators that include appropriate consultation, authorization, and/or permitting from state and local wastewater treatment authorities and/or health departments.

Background and Charge of Workgroup

Senate Bill 129, as introduced during the 2022 General Assembly Session, initially sought to add alkaline hydrolysis to the existing definition of cremation found in Title 54.1 of the Code. A number of issues and concerns were raised during legislative committee meetings. The bill as enacted by the General Assembly (Ch. 191, 2022 Acts of Assembly) directed:

> *That the Board of Funeral Directors and Embalmers (the Board) shall convene a work group consisting of relevant stakeholders to determine the (i) regulatory and statutory changes needed to legalize, implement, and regulate the process of alkaline hydrolysis in the Commonwealth; (ii) necessary qualifications to enable a person to engage in the practice of alkaline hydrolysis; (iii) proper standards for the operation of a facility containing a pressure vessel for alkaline hydrolysis; and (iv) proper requirements for licensure as an owner or operator of such a facility. In conducting its study, the work group shall provide opportunity*

for public participation and consider any necessary environmental precautions and safety measures to ensure proper (a) regulation and implementation of the alkaline hydrolysis process and (b) regulation and inspection of facilities where alkaline hydrolysis is conducted in the Commonwealth. The Board shall report the results of such study to the Chairmen of the Senate Committee on Education and Health and the House Committee on Health, Welfare and Institutions on or before November 1, 2022.

The Board convened stakeholders for two meetings—July 14, 2022, and August 12, 2022— to develop recommendations regarding the statutory and regulatory structure needed to support the implementation and appropriate oversight of alkaline hydrolysis. Workgroup members included agency representatives (Virginia Department of Health, Virginia Department of Environmental Quality, and Virginia Department of Health Professions), a representative from the Hampton Roads Sanitation District (HRSD), board members, and regulatory experts in the impacted areas.

What is Alkaline Hydrolysis?

The Cremation Association of North America (CANA)[1] defines alkaline hydrolysis as a process that "uses water, alkaline chemicals, heat, and sometimes pressure and agitation, to accelerate natural decomposition, leaving bone fragments and a neutral liquid called effluent." The resulting liquid byproduct, or effluent, is then disposed of or discharged into the receiving wastewater treatment and disposal system in accordance with relevant laws, regulations, and ordinances. The remaining bone fragments are dried and pulverized into powder or granulated remains, similar to ashes resulting from a flame cremation process.

Alkaline hydrolysis is viewed as an alternative to burial and cremation as a means of disposition of human remains. The process is described as "bio-friendly," with less carbon emissions than flame-based cremations and less overall use of fuel, with the potential for more-nutrient rich, organic byproducts. Unlike traditional or flame-based cremation, alkaline hydrolysis is a water-based process sometimes referred to as "water cremation." While both flame and water processes result in a similar end product that may be returned to families as ashes ("cremains") or pulverized bone fragments ("hydrolyzed remains"), the elements, machinery, and waste products of these two processes are rather different.

The alkaline hydrolysis process most often occurs in a commercial alkaline hydrolysis unit, with a sealed chamber that contains the human remains and the liquid for the process—water and alkaline chemicals—either potassium hydroxide (KOH) or sodium hydroxide (NaOH) or a combination thereof. The chamber contents are then subject to heat (up to 302°F), pressure, and/or agitation for a period of time—anywhere from three to sixteen hours—depending upon the machinery and heat/pressure used and body mass of the decedent. The breakdown products resulting from the alkaline hydrolysis process are in liquid form with a higher pH level that requires neutralization before release into the wastewater system.[2]

While recently recognized as a "new" or "cutting-edge" form of disposition offered by funeral service providers to families, the alkaline hydrolysis process itself is not a new process. Alkaline

[1] Cremation Association of North America, "Alkaline Hydrolysis,"https://www.cremationassociation.org/page/alkalinehydrolysis (accessed May 20, 2022).
[2] Ibid.

hydrolysis has been used as a method for disposition for lab animals, biohazardous materials, and anatomical specimens since the 1990s.[3]

Current Means of Disposition in Virginia

Currently, alkaline hydrolysis is not an approved or otherwise authorized means of disposition of human remains by Virginia Code or by regulation. Virginia Code § 32.1-309.1 defines "disposition" as "the burial, interment, entombment, cremation, or other authorized disposition of a dead body permitted by law."[4] Provisions related to the disposition of human remains after anatomical donation or gift refer only to burial, interment, or cremation as means of disposition.[5] The Code provisions related to vital records define "final disposition" as "burial, interment, cremation, removal from the Commonwealth or other authorized disposition of a dead body or fetus."[6] Finally, the statutory definitions within the purview of the Board of Funeral Directors and Embalmers refer only to burial or cremation.[7] (Appendix A)

Interstate Comparisons

The acceptance or legality of alkaline hydrolysis as a means of disposition of human remains varies by state. According to CANA, 23 states currently allow the use of alkaline hydrolysis by law or regulation, although only 15 of those states have facilities that perform the process.[8]

There is no singular model for how alkaline hydrolysis has been defined, implemented, or regulated across jurisdictions. Where states have legalized alkaline hydrolysis, the means and extent of the regulation of the process varies widely–from using a broad definition of cremation that encompasses the use of a thermal or chemical-based process, to separately defining and regulating alkaline hydrolysis as a stand-alone process. Appendix C provides additional detail regarding how alkaline hydrolysis is defined and regulated in other states.

The states that have implemented a more detailed or prescriptive regulatory structure for the alkaline hydrolysis process have included provisions that reflect certain differences between flame-based cremation and the water-based alkaline hydrolysis process. Appendix D provides a state comparison of specific language utilized in these more prescriptive jurisdictions to address certain aspects of the process that vary from the flame-based cremation process, including handling of wastewater emissions, requirements for alkaline hydrolysis units, appropriate containers for human remains, and the treatment of any remaining residue from the process.

Environmental Considerations

Workgroup members identified and discussed a number of considerations related to the potential impact of effluent, as well as the use and storage of alkaline chemicals, on wastewater treatment and septic systems of varying size and capacity.

---

[3] Richard Sikon, "Alkaline Hydrolysis," Presentation. Alkaline Hydrolysis Workgroup Meeting, Henrico, Virginia, July 14, 2022.
[4] Va. Code Ann. § 32.1-309.1.
[5] Va. Code Ann. §§ 32.1-301, 32.1-291.14.
[6] Va. Code Ann. § 32.1-249.
[7] The statutes of the Board of Funeral Directors and Embalmers are contained in Title 54.1, Chapter 28 of the *Code of Virginia*.
[8] Cremation Association of North America, "Alkaline Hydrolysis," https://www.cremationassociation.org/page/alkalinehydrolysis (accessed May 20, 2022).

Public Wastewater Systems

The alkaline hydrolysis process results in effluent with higher pH levels, higher biochemical oxygen demand (BOD) and nutrient loads, and higher viscosity than typical domestic wastewater. How, when, and in what volume these discharges are made into a wastewater system can have a significant impact on systems of varying size and capacity—whether a high capacity municipal system, or a lower capacity regional or rural system. For example, moderate discharges into higher capacity systems at peak hours may have little impact on the overall system, as the effluent and its organic or nutrient components would be diluted significantly. Moderate discharges into low capacity systems at off-hours, however, may have a significant impact on material flow and increase the likelihood of system failure, where less overall fluid volume and flow is available to dilute the concentration of the effluent chemicals.

In addition, emissions with a high pH level, particularly with a pH greater than 12.5, may trigger regulatory provisions related to the discharge of hazardous waste. Neutralization of such highly alkaline emissions prior to discharge into the wastewater system, such as through a neutralization process inherent in certain commercially manufactured alkaline hydrolysis units, likely would be required to address concerns about the caustic nature of the chemicals emitted.

Although the Virginia Department of Environmental Quality oversees adherence with state and federal requirements for water quality, local wastewater treatment authorities are vested with the authority to implement those requirements at the system-level. Each individual wastewater system is different; there is no one model for how effluent discharges would be most efficiently and safely received by local wastewater treatment authorities. Consequently, individual wastewater treatment plants would need to determine compatibility of the alkaline hydrolysis process through their local permitting and authorization process.

Septic Systems

Concerns related to the discharge of effluent from the alkaline hydrolysis process further extend to the impact of such discharge into on-site septic systems that are common in more rural areas of the Commonwealth. For septic systems, the discharge of materials with high organic and nutrient content may impact the overall functioning of the system, including the ability of the septic drain field to absorb and break down the organic contaminants and potentially corrosive chemicals.

While not necessarily prohibited by existing regulations under the purview of the Virginia Department of Health, the emissions are not recommended for septic systems without additional feasibility studies to address advanced treatment and/or the use of a pump and haul mechanism to mitigate against high-impact discharges. In addition, the ongoing health of the septic field(s) would require continuous monitoring to avoid any potential systematic failure.

Because the effluent discharges may impact local systems differently—whether public wastewater or private septic systems—there was a strong consensus among workgroup members that any facilities that implement alkaline hydrolysis systems obtain authorization and/or permits from state and local wastewater treatment authorities and health departments as appropriate. Specific workgroup recommendations in this area are discussed in more detail below.

Workgroup Recommendations

Workgroup members made recommendations in four general areas related to disposition, definition, regulatory structure, and environmental considerations. Each of these recommendations is discussed below and further summarized in Appendix E.

1. Inclusion of alkaline hydrolysis as an accepted means of final disposition of human remains in the Code

Workgroup members agreed that, in order to regulate and implement the process of alkaline hydrolysis, alkaline hydrolysis would need to be included as an accepted means of final disposition of human remains in the Code. Where provisions related to "final disposition" or "disposition" currently appear in Title 32.1 of the Code (authorization by the Chief Medical Examiner, vital records, and anatomical donations), the term "alkaline hydrolysis" should be added as a means of disposition in addition to burial and cremation, as appropriate.

2. Definition of "alkaline hydrolysis" as a separate and distinct process within the Code, using broad terminology

Workgroup members agreed that the term "alkaline hydrolysis" should be defined as a separate and distinct term within the Code (See Virginia Code §54.1-2800). To avoid creating a definition that is too specific or too related to a commercially-trademarked process, the Workgroup members agreed that using broad, scientific terminology was advisable.

After a comparison of definitions from other jurisdictions, Workgroup members recommended the following definition:

> *"Alkaline hydrolysis" is a means of final disposition by reduction of a dead human body to essential elements through a water-based dissolution process using alkaline chemicals, heat, agitation and/or pressure to accelerate natural decomposition.*

Workgroup members agreed that any related statutory or regulatory definitions could be developed with the assistance of Board staff, as necessary.

3. Creation of a regulatory structure for alkaline hydrolysis that appropriately reflects and accounts for both the differences and similarities in the processes for alkaline hydrolysis and cremation

Workgroup members agreed that any statutory or regulatory structure for alkaline hydrolysis should be developed in such a way as to capture both the differences and similarities between alkaline hydrolysis and cremation. While alkaline hydrolysis is appropriately defined and treated as a stand-alone process, there are areas where the existing statutory and regulatory process for cremation can be mirrored. Likewise, there are other areas where more prescriptive language related to alkaline hydrolysis would be appropriate given the difference in the science, mechanics, and potential impacts of the process. (Table 1)

Table 1 – Recommendation 3 – Mirrored (Existing) vs. New Statutory and Regulatory Provisions for Alkaline Hydrolysis

Mirror cremation statutes and regulations	New statutory and regulatory provisions

• Disposition of remnants from process; also abandoned or unclaimed
• Identification of remains and authorization of next of kin prior to process
• Medical Examiner (ME) authorization for process/method of disposition
• Refrigeration of remains pending process
• Documentation and record keeping
• No commingling of human and animal remains
• Safe, respectful handling of remains
• Casket not required for alkaline hydrolysis process
• Basic application requirements for registration of either facility
• Board-approved training program for operators of units
	• Definition of "alkaline hydrolysis"
	• Definitions, as appropriate, for related terms including alkaline hydrolysis container, alkaline hydrolysis unit, alkaline hydrolysis facility, hydrolyzed remains
	• Board authority to inspect alkaline hydrolysis facilities
	• Requirements for registration of alkaline hydrolysis facilities (environmental)
	• Requirements for alkaline hydrolysis units – commercially manufactured and professional engineering certification and/or testing as appropriate
	• Appropriate alkaline hydrolysis containers for transport, storage, process – to include containers that enclose the body, are easily hydrolysable, and are resistant to leakage or spillage
	• Requirements for disposal of waste from alkaline hydrolysis process
	  • Wastewater effluent
	  • Undissolved tissue or residue in unit – cleaning after each process to prevent commingling of human remains
	• Posting of relevant permits and approvals

Appendix B provides an additional breakdown of statutory and regulatory considerations for implementation of the alkaline hydrolysis process, including the current statutes that set forth means of final disposition, definitions, the Board's authority, and registration requirements for crematory operators.

4. Inclusion of licensure/registration requirements for alkaline hydrolysis facilities or operators that include appropriate consultation, authorization, and/or permitting from state and local wastewater treatment authorities and/or health departments

Workgroup members agreed that inclusion of a recommendation to address the potential environmental concerns related to wastewater discharge was a necessary component for the appropriate regulation and oversight of the alkaline hydrolysis process.

Specifically, the workgroup recommended that any regulatory structure include licensure and/or registration requirements for alkaline hydrolysis facilities or operators that include appropriate consultation, authorization, and/or permitting from state and local wastewater treatment authorities and/or health departments:

(1) to minimize the potential for adverse environmental impact;
(2) to ensure the use of appropriate equipment or units that discharge effluent into wastewater or septic systems; and
(3) to ensure the proper and safe storage and handling of caustic chemicals that may impact wastewater and storm systems if leaked or spilled.

Appendix A – Current Statutory and Regulatory Provisions for Cremation - Virginia

Code of Virginia – Title 54.1, Chapter 28	
Provision	**Notes**
§ 54.1-2800. Definitions.	Defines “cremate,” “cremator,” **“**crematory,” “crematorium”
§ 54.1-2803. Specific powers and duties of Board.	Authorizes Board to regulate funeral practice and to inspect crematories and their operations
§ 54.1-2806. Refusal, suspension, or revocation of license, registration, or courtesy card.	Basis for Board denial of applications and/or disciplinary sanctions for registration holders
§ 54.1-2807. Other prohibited activities.	Cremation prohibited without permission of Office of the Chief Medical Examiner (OCME)
§ 54.1-2808.1. Disposition of cremains.	Provisions for disposal of unclaimed cremains
§ 54.1-2808.2. Identification of unclaimed cremains of veterans and eligible dependents.	Provisions for identification and disposal of unclaimed cremains of veterans and eligible dependents
§ 54.1-2811.1. Handling and storage of human remains.	Provisions related to handling, refrigeration, and transport of remains
§ 54.1-2814.1. Registration as a cremator.	Requirement for registration of cremator; authority to Board to prescribe procedures for registration
§ 54.1-2818.1. Prerequisites for cremation.	Cremation prohibited without permission from OCME and visual identification of the deceased
§ 54.1-2818.3. Applications for registration required.	Requirement for application for registration of crematory
Board Regulations - 18VAC65-20-10 et seq.	
Provision	**Notes**
18VAC65-20-10. Definitions	Defines “cremation container,” “cremation urn,” “cremation vault”
18VAC65-20-60. Accuracy of information.	Address of record provisions
18VAC65-20-70. Required fees.	Fees for registration, renewal, reinstatement, facility changes
18VAC65-20-120. Expiration dates.	License and registration expiration dates
18VAC65-20-130. Renewal of license; registration.	Renewal of licenses and registrations
18VAC65-20-140. Reinstatement of expired license or registration.	Reinstatement of licenses and registrations
18VAC65-20-435. Registration of crematories.	Requirements for registration of crematories – management, training, registration, and licensure
18VAC65-20-436. Standards for registered crematories or funeral establishments relating to cremation.	Provisions related to authorization to cremate, standards for cremation, handling of human remains, recordkeeping
18VAC65-20-500. Disciplinary action.	Practices considered unprofessional conduct
18VAC65-20-581. Refrigeration requirements.	Provisions for maintenance of bodies in refrigeration

Appendix B: Statutory and Regulatory Considerations

Area	Issue(s) for Consideration	Relevant Statutes/Regulations (Current)	Agency	Notes – July 14, 2022	Notes – August 12, 2022
Final Disposition of Human Remains	• Definition of disposition • Authorization for disposition by alkaline hydrolysis	See §§ 32.1-309.1, 32.1-309.3	VDH/OCME	*AH included as means of disposition;* *Same process as cremation*	*References to Title 32.1 are complete*
Disposition of Human Remains – Anatomical Donation or Gift	• Definition of disposition • Inclusion of alkaline hydrolysis as means of disposition	See §§ 32.1-301, 32.1-291.14	VDH/OCME/ Anatomical Program	*AH included as means of disposition; same authorization process as cremation*	*References to Title 32.1 are complete*
Death Certificates – Record of Disposition	• Definition of "final disposition"	See § 32.1-249	VDH/OVR	*AH included as means of disposition*	*References to Title 32.1 are complete*
Board - Definitions	• Stand-alone definition of alkaline hydrolysis vs. include in cremation • General term vs. specific term	See § 54.1-2800	BFDE	*Consensus re: stand-alone definition; additional discussion necessary re: recommended definition*	*Definition recommended by workgroup*
Board – Inspection of facility	• Board authority to regulate/inspect AH facilities	See § 54.1-2803	BFDE	*Mirror language related to cremation as appropriate*	*Inspection process to include evidence of ongoing compliance with wastewater and environmental regulations*
Board – registration of alkaline hydrolysis provider	• Application process, requirements • Services to public = establishment license	See § 54.1-2814.1, 18VAC65-20-435	BFDE	*Mirror cremation statutes and regulations as appropriate; additional requirements for AH facilities related to water emissions*	*Application process to include evidence of permit/authorization from local or state wastewater treatment utility or health department*
Board – required training for AH provider/staff	• "Board approved" training on alkaline hydrolysis and/or listing of providers • Other required training	See § 54.1-2814.1, 18VAC65-20-435	BFDE	*Mirror cremation statutes and regulations as appropriate*	*Board-approved training specific to alkaline hydrolysis process*

Area	Issue(s) for Consideration	Relevant Statutes/Regulations (Current)	Agency	Notes – July 14, 2022	Notes – August 12, 2022
Board – requirements for AH facilities	• Commercially made units • Pressure units or other • Compliance with DEQ, local, VDH	See 18VAC65-20-436	BFDE	*Preliminary discussion re: vessels – recommendation for commercially manufactured vessels; additional discussion at second meeting*	*Utilize "unit(s)" rather than "vessel(s)"; agreement re: commercially made units, also with professional engineering certification or testing as necessary*
Board – prerequisites for alkaline hydrolysis	• Authorization for disposition • Identification of remains • Container for remains • Refrigeration • Documentation and recordkeeping • No combo human/animal • Safe, respectful handling of remains	See §§ 54.1-2818.1, 54.1-2811.1, 18VAC65-20-436	BFDE	*Mirror cremation statutes and regulations as appropriate and/or incorporate alkaline hydrolysis into existing statutory/regulatory structure as appropriate* *Container requirement – appropriate for transport/appropriate for AH process*	*Recommendation re: definition of "alkaline hydrolysis container" to include coverage of remains, hydrolysable, and resistant to spillage or leakage*
Board – disposition of hydrolyzed remains	• Abandoned or unclaimed hydrolyzed remains	See §§ 54.1-2808.1, 54.1-2808.2	BFDE	*Mirror cremation statutes and regulations as appropriate*	
Board - requirements for disposal of AH waste	• Undissolved tissue? • Residue in AH Vessels (to avoid commingling of remains)	See 18VAC65-20-436, 18VAC65-20-590, § 54.1-2806(B)(18)	BFDE	*Mirror cremation statutes and regulations as appropriate; additional language related to residue – additional discussion*	*Additional language appropriate re: cleaning of residue between processes to prevent commingling*
Disposal of waste water – public sewer	• Requirements for discharge of effluent into public sewer system • Permitting and/or inspections? • Environmental concerns		DEQ/Local	*Assessment from/approval of local utility that they will accept waste water – submit proof of "permit or authorization from wastewater treatment authority" during application process; ongoing approval reviewed during inspections*	
Disposal of waste water – septic	• Requirements for discharge of effluent into septic systems		VDH	*Domestic wastewater vs. industrial wastewater*	*Discharge to septic not recommended, but not prohibited by current*

Area	Issue(s) for Consideration	Relevant Statutes/Regulations (Current)	Agency	Notes – July 14, 2022	Notes – August 12, 2022
	• Permitting and/or inspections? • Environmental concerns			*Submit proof of "permit or authorization from health department related to domestic water discharge" – additional discussion needed*	*regulations; facility would need permit/authorization from local or state health department to utilize septic, to include feasibility study or alternative removal system (e.g. pump and haul) prior to authorization; ongoing maintenance of septic health*
Storage and safe handling of chemicals	• Environmental concerns • Water Discharge/Safety concerns		VDH/DEQ/ Local	*Would this be covered by authorization/assessment process through local utility re: waste water emissions? Additional discussion*	*Permitting/authorization process would include; spillage concerns related to water and storm systems*

Appendix C - States that Allow/Recognize Alkaline Hydrolysis

I. States that Include process in definition/provisions for cremation; term "alkaline hydrolysis" not specifically used			
State	**Statute(s)/Regulation(s)**	**Definition of Process**	**Notes**
Colorado	Colorado Statutes § 12-54-102	(3) "Cremated remains" or "cremains" means all human remains recovered after cremation, including pulverization, that leaves only bone fragments that have been reduced to unidentifiable dimensions. (4) "Cremation" or "cremate" means the reduction of human remains to essential elements, the processing of the remains, and the placement of the processed remains in a cremated remains container. (4.3) "Cremation chamber" means the enclosed space inside of which human remains are cremated. (4.5) "Cremation container" means a container in which the human remains are transported to the crematory and intended to be placed in the cremation chamber. (4.7) "Cremationist" means a person who cremates or prepares for cremation human remains. (5) "Crematory" means a building, facility, establishment, or structure where human remains are cremated.	Process included in definition of cremation but not specifically named
Florida	Florida Statutes 497.005	(16) "Cinerator" means a facility where dead human bodies are subjected to cremation (21) "Cremated remains" means all the remains of the human body recovered after the completion of the cremation process, including processing or pulverization that leaves only bone fragments reduced to unidentifiable dimensions and may include the residue of any foreign matter, including casket material, bridgework, or eyeglasses that were cremated with the human remains. (22) "Cremation" means any mechanical or thermal process whereby a dead human body is reduced to ashes and bone fragments. Cremation also includes any other mechanical or thermal process whereby human remains are pulverized, burned, recremated, or otherwise further reduced in size or quantity. (23) "Cremation chamber" means the enclosed space within which the cremation process takes place. Cremation chambers covered by these procedures shall be used exclusively for the cremation of human remains.	Process included in definition of cremation but not specifically named

		(24) “Cremation container” means the casket or alternative container in which the human remains are transported to and placed in the cremation chamber for a cremation. …	
Georgia	GA Code 43-18-1	(5) “Cremation” means the reduction of the dead human body to residue by intense heat or any mechanical, chemical, thermal, or other professionally accepted process. Cremation also includes any other mechanical, chemical, thermal, or other professionally accepted process whereby human remains are pulverized, burned, recremated, or otherwise further reduced in size or quantity. (6) “Crematory” means any place where cremation is performed, other than a hospital, clinic, laboratory, or other facility authorized by the Department of Community Health for such purposes.	Process included in definition of cremation but not specifically named
Illinois	410 ICLS 18/5	"Cremated remains" means all human remains recovered after the completion of the cremation, which may possibly include the residue of any foreign matter including casket material, bridgework, or eyeglasses, that was cremated with the human remains. "Cremation" means the technical process, using heat and flame, or alkaline hydrolysis that reduces human remains to bone fragments. The reduction takes place through heat and evaporation or through hydrolysis. Cremation shall include the processing, and may include the pulverization, of the bone fragments. "Cremation chamber" means the enclosed space within which the cremation takes place. … "Cremation room" means the room in which the cremation chamber is located. "Crematory" means the building or portion of a building that houses the cremation room and the holding facility. "Crematory authority" means the legal entity which is licensed by the Comptroller to operate a crematory and to perform cremations.	Process included in definition of cremation
Kansas	Kansas Statutes 65-1760	(d) "Cremated remains" means all human remains recovered after the completion of the cremation of a dead human body, which may possibly include the residue of any foreign matter including casket material, bridgework or eyeglasses, that was cremated with the dead human body. (e) "Cremation" means the mechanical and/or other dissolution process that reduces human remains to bone fragments. Cremation includes the processing and usually includes the pulverization of the bone fragments. (f) "Cremation chamber" means the enclosed space within which the cremation of a dead human body is performed. Such chambers shall be used exclusively for the cremation of human remains.	Process included in definition of cremation but not specifically named

		(g) "Crematory" means a business premises that houses the cremation chamber and holding facility where dead human bodies are cremated. A crematory shall be maintained at a fixed and specific street address. (h) "Crematory operator" means a person who is engaged in, conducting or holding oneself out as engaged in or conducting, the business of cremation. (i) "Crematory operator in charge" means the licensed crematory operator who is responsible to ensure that the crematory's license is current and that the licensed crematory is in compliance with the laws and regulations of this state. Nothing in this definition shall relieve other persons involved with a cremation from complying with state and federal laws and regulations.	
Maine	10-144 CMR 227, Section 1	**Cremation**: The technical process, using direct flame and heat, or other process, that reduces human remains to bone fragments. The reduction takes place through heat and evaporation, or through other processes, including, but not limited to, chemical dissolution. Cremation includes the processing and usually includes the pulverization of the bone fragments.	Process included in definition of cremation but not specifically named
Missouri	20 CSR 2120-1.040; -2.071	(6) Cremated remains-the bone fragments which remain after the cremation process is completed. (7) Cremation-a final disposition of dead human remains; the mechanical process which reduces remains to bone fragments through heat, evaporation, and/or an alkaline hydrolysis chemical process. (8) Cremation box-a container into which cremated remains are placed. (9) Cremation chamber-the total functioning mechanical unit for the actual cremation process. (10) Cremation container-the container in which the human remains are delivered to the crematory area for cremation.	Process included in definition of cremation
II. States that use the term "alkaline hydrolysis" in statute/regulation			
Alabama	Code § 34-13-1 (2018)	(2) ALKALINE HYDROLYSIS. The technical process that reduces human remains to bone fragments using heat, water, and chemical agents. (14) CREMATION. The technical process, using heat, flames, or chemical agents, that reduces human remains to bone fragments. The reduction takes place through heat and evaporation. Cremation shall include the processing, and may include the pulverization, of the bone fragments.	Alkaline hydrolysis is defined, but included within provisions for cremation
Oklahoma	§ 59-396.2	14. "Cremation" means the technical process, using heat and flame, or heat and pressure, that reduces human remains to bone fragments. The reduction takes place	Alkaline hydrolysis included in definition of

	Title 235, Chapter 10, 235:10-1-2	through heat and evaporation, or through alkaline hydrolysis. Cremation shall include, but not be limited to, the processing and pulverization of the bone fragments. 15. ”Crematory” means a structure containing a furnace or alkaline hydrolysis vessel used or intended to be used for the cremation of human remains. The term includes a facility that cremates human remains through alkaline hydrolysis. "Cremation" means the technical process, using heat, that reduces dead human remains to bone fragments. The reduction takes place through heat and evaporation. The cremation process shall include, but not be limited to, the processing and pulverization of the bone fragments. "Cremation Chamber" means the enclosed space contained within a machine that has been duly manufactured for the sole purpose of cremating dead human remains within which the cremation is performed. "Cremation Container" means a casket or other container designed to transport a deceased human body and for placement in a cremation chamber during cremation.	“cremation,” but not otherwise defined
Connecticut	Code Ch. 385 § 20-207	(3) “Funeral directing” means the business, practice or profession, as commonly practiced, of (A) directing or supervising funerals, or providing funeral services; (B) handling or encasing or providing services for handling and encasing dead human bodies, otherwise than by embalming, for burial or disposal; (C) providing embalming services; (D) providing transportation, interment and disinterment of dead human bodies; (E) maintaining an establishment so located, constructed and equipped as to permit the decent and sanitary handling of dead human bodies, with suitable equipment in such establishment for such handling; (F) conducting an establishment from which funerals may be held; (G) engaging in consultations concerning arrangements for the disposition of human remains, including, but not limited to, arrangements for cremation or alkaline hydrolysis; (H) casketing human remains; (I) making cemetery and cremation arrangements; and (J) preparing funeral service contracts, as defined in section 42-200;	Alkaline hydrolysis included in definition of “funeral directing” but is not otherwise defined
Idaho	IDAPA 24.08.01 (-450, -452)	450. Funeral Establishment and Crematory Establishment. 04. Crematory Establishment. All crematory establishments shall be required to provide each of the following: a. Detailed information regarding each retort, specifically documenting that each retort and accompanying equipment is listed by an approved testing agency as listed in the Uniform Fire Code or in the case of alkaline hydrolysis, an appropriate purpose-built vessel with documented validation for sterilization; and …	Alkaline hydrolysis referenced in sections related to crematory establishments, but is not otherwise defined

		452. MINIMUM STANDARDS. 01. Reasonable Sanitation and Safety Required. No license will be issued to operate a funeral establishment or crematory unless it is apparent that the establishment or crematory can and will be operated in a reasonably sanitary and safe manner and that all pertinent federal, state, and local permits have been obtained when operating an alkaline hydrolysis retort.	
Vermont	26 VSA § 1211	§ 1211. Definitions (a) (1) "Crematory establishment" means a business registered with the Office conducted at a specific street address or location devoted to the disposition of dead human bodies by means of cremation, alkaline hydrolysis, or any other type of human reduction acceptable to the Director as established by the Director by rule.	Alkaline hydrolysis referenced in definition of "crematory establishment" but not otherwise defined
Minnesota	Minnesota Statutes 149A.02 et seq.	Alkaline hydrolysis. "Alkaline hydrolysis" means the reduction of a dead human body to essential elements through a water-based dissolution process using alkaline chemicals, heat, agitation, and pressure to accelerate natural decomposition; the processing of the hydrolyzed remains after removal from the alkaline hydrolysis vessel; placement of the processed remains in a hydrolyzed remains container; and release of the hydrolyzed remains to an appropriate party. Alkaline hydrolysis is a form of final disposition.	Minnesota has definition of alkaline hydrolysis and separate regulatory structure and licensure for the process
California	CA Code HSC § 7010.1 Title 16, Division 23, Sections 2310 et seq. of CA Code of Regulations	(a) "Hydrolysis" means the process by which the following two steps are taken: (1) The reduction of the body of a deceased person to its essential organic components and bone fragments by alkaline hydrolysis. "Alkaline hydrolysis" is a process using heat or heat and applied pressure, water, and potassium hydroxide or sodium hydroxide in a hydrolysis chamber. Adds "hydrolysis" and "hydrolysis facility" to regulations as a process separate from cremation; Adds licensure for hydrolysis facility	Regulatory changes became effective June 17, 2021 See full copy of regulations
North Carolina	GS § 90-210.136 21 NCAC 34C .01 et seq.	(a) The following definitions shall apply in this section: (1) Alkaline hydrolysis. – The technical process using water, heat, and other chemicals to destroy, dissolve, or reduce human remains to simpler or essential elements. (2) Hydrolysis container. – A container, other than a casket, designed to enclose human remains and made of suitable material to be easily destroyed during hydrolysis and to resist spillage and leakage. A hydrolysis container may be a cremation container or any other container that meets the requirements of this subdivision.	Alkaline hydrolysis is separately defined in Code, but is treated as cremation for purposes of existing regulations

		(3) Hydrolysis licensee. – A person or entity licensed to hydrolyze human remains and perform hydrolysis. (4) Liquid waste. – Any liquid remaining after hydrolysis that does not contain any trace elements of human tissue. … (c) Except as otherwise provided by this section, a license for the hydrolysis of human remains shall have the same requirements and fees as for the licensing of crematories under this Article. The hydrolysis of human remains shall be conducted in compliance with all requirements for cremation, and the licensee shall pay the same fees for monthly reports for each hydrolysis as crematories under this Article. …	
Nevada	NRS 451.617 NRS 451.607	"Cremation" means the technical process that reduces human remains to bone fragments by using alkaline hydrolysis or incineration. "Alkaline hydrolysis" defined. "Alkaline hydrolysis" means the: 1. Reduction of human remains to bone fragments through a water-based process of dissolution using alkaline chemicals and agitation to accelerate natural decomposition; and 2. Processing of the hydrolyzed human remains after their removal from the container in which the process of dissolution occurs.	Separate definition provided in Code, but process treated as cremation in regulations
Oregon	Oregon Administrative Rules 830-011-0000	(1) "Alkaline hydrolysis" is a final disposition process involving dissolution of human remains by placing the remains in a dissolution chamber containing water and chemical solution including potassium hydroxide or sodium hydroxide, or a combination of both, and introducing heat to break down the remains until bone fragments that may be pulverized and liquid remain. (2) "Alternative Disposition" Alternative disposition is a board-authorized method of final disposition of human remains other than burial, entombment, burial at sea, cremation or removal from the state, and includes dissolution. (3) "Alternative Disposition Facility" An alternative disposition facility is a facility containing equipment designed for the final disposition of human remains through alternative methods authorized by the board including, but not limited to, dissolution. (4) "Alternative Disposition Facility Authority" An Alternative Disposition Facility Authority is any person, partnership or corporation with a Certificate of Authority to operate a dissolution chamber or other alternative disposition equipment as authorized by the Board by rule. (10) "Cremated Remains" and "Alternative Disposition Remains" Cremated remains or alternative disposition remains are the remaining bone fragments after the act of cremation or alternative disposition is completed.	While certain requirements for crematory authorities encompass alkaline hydrolysis, there are certain separate requirements for "alternative disposition facility authorities" using alkaline hydrolysis (see full copy of rules)

	830-030-0000	(11) “Cremated Remains Container” and “Alternative Disposition Remains Container” A cremated remains or alternative disposition remains container is a container in which processed cremated remains can be placed and closed to prevent leakage. (21) “Dissolution” Dissolution includes, but is not limited to, alkaline hydrolysis. (22) “Dissolution Chamber” A dissolution chamber is a purpose-built vessel that is closed and sealed on all sides when human remains are placed inside and the dissolution process takes place. (23) “Dissolution Container” A dissolution container is the container, if any, in which human remains are placed for the purpose of placement in the dissolution chamber. (25) “Final Processing” Final Processing is the processing of bone fragments to an unidentifiable dimension following the cremation or dissolution process. (42) “Processed Cremated or Alternative Disposition Remains” As used in this chapter, processed cremated or alternative disposition remains are the result of pulverization, where the residual from the cremation or alternative disposition, such as dissolution, process is reduced to unidentifiable dimensions. (2) Alternative Disposition Facility Authorities must comply with the requirements in this division (Division 30) for the handling and tracking of human remains prior to, during, and after cremation as if the Alternative Disposition Facility Authority is a Crematory Authority, the alternative disposition remains are cremated remains and the dissolution chamber is a cremation chamber. (3) Alternative Disposition Facility Authorities using alkaline hydrolysis for dissolution must comply with the following requirements: (a) The Alternative Disposition Facility Authority must only employ a purpose-built vessel as a dissolution chamber. (b) Dissolution systems which operate above atmospheric pressure must only employ an American Society of Mechanical Engineers’ (ASME) certified pressure vessel as a dissolution chamber. (c) The dissolution system must use parameters of heat, time and solution circulation sufficient to achieve complete dissolution of all tissue remains. (d) The Alternative Disposition Facility Authority must ensure that the discharge liquid that is a byproduct of the dissolution process meets the facility’s sewage collection and treatment facility requirements regarding acceptable temperature and pH level.	
Utah	Utah Code 58-9-102	(1) "Alkaline hydrolysis" means a water-based dissolution process using alkaline chemicals, heat, and sometimes agitation or pressure that reduces human remains to a	Alkaline hydrolysis process defined, but also included

		liquid and to dry bone residue and includes the disposal of the liquid and the processing and pulverization of the dry bone residue. (2) "Alkaline hydrolysis chamber" means the enclosed space within which the alkaline hydrolysis process takes place and that is used exclusively for alkaline hydrolysis of human remains. (3) "Alkaline hydrolysis container" means a container: (a) in which human remains are transported to a funeral service establishment and placed in an alkaline hydrolysis chamber for resomation; and (b) that meets substantially all of the following standards: (i) able to be closed in order to provide a complete covering for the human remains; (ii) resistant to leakage or spillage; (iii) rigid enough for handling with ease; and (iv) able to provide protection for the health, safety, and personal integrity of crematory personnel. (4) "Authorizing agent" means a person legally entitled to authorize the cremation or the alkaline hydrolysis process of human remains. (10) "Cremated remains" means all the remains of a cremated body recovered after the completion of the cremation process, including pulverization which leaves only bone fragments reduced to unidentifiable dimensions and may possibly include the residue of foreign matter including casket material, bridgework, or eyeglasses that were cremated with the human remains. (11) "Cremation" means the technical process, using direct flame and heat, or a chemical process, that reduces human remains to bone fragments through heat and evaporation, or a chemical process, and includes the processing and usually the pulverization of the bone fragments. (12) "Cremation chamber" means the enclosed space within which the cremation process takes place and which is used exclusively for the cremation of human remains. (13) "Cremation container" means the container: (a) in which the human remains are transported to the crematory and placed in the cremation chamber for cremation; and (b) that meets substantially all of the following standards: (i) composed of readily combustible or consumable materials suitable for cremation; (ii) able to be closed in order to provide a complete covering for the human remains; (iii) resistant to leakage or spillage; (iv) rigid enough for handling with ease; and	with definition of cremation

		(v) able to provide protection for the health, safety, and personal integrity of crematory personnel. (14) "Crematory" means the building or portion of a building that houses the cremation chamber and the holding facility. (27) "Processing" means the reduction of identifiable bone fragments after the completion of the cremation or the alkaline hydrolysis process to unidentifiable bone fragments by manual means. (28) "Pulverization" means the reduction of identifiable bone fragments after the completion of the cremation or alkaline hydrolysis and processing to granulated particles by manual or mechanical means. (29) "Resomation" means the alkaline hydrolysis process.	
Washington	WAC 308-47-010	(1) "Alkaline hydrolysis" or "hydrolysis" means the reduction of human remains to bone fragments and essential elements in a licensed hydrolysis facility using heat, pressure, water and base chemical agents. (9) "Crematory authority, alkaline hydrolysis authority, or natural organic reduction authority" means the legal entity and their authorized representatives, licensed to reduce human remains through cremation, alkaline hydrolysis, or natural organic reduction. (10) "Effluent" means the liquid end-product following alkaline hydrolysis. (14) "Hydrolysis facility" means a structure, room, or other space in a building or structure containing one or more hydrolysis vessels, to be used for alkaline hydrolysis. (17) "Processing" is the removal of foreign objects from human remains following cremation, alkaline hydrolysis, or natural organic reduction and may include pulverization. (18) "Pulverization" is the reduction of identifiable bone fragments to unidentifiable dimensions by manual or mechanical means during or following cremation, alkaline hydrolysis, or natural organic reduction. (19) "Reduced human remains" means human remains after the reduction process. (20) "Reduction" means an accelerated conversion of human remains into bone fragments, essential elements, or soil by cremation, alkaline hydrolysis, or natural organic reduction. (21) "Reduction chamber" means the enclosed space in a crematory, alkaline hydrolysis vessel, or natural organic reduction facility in which the reduction process takes place. (22) "Reduction facility" means a crematory, or hydrolysis facility, or natural organic reduction facility that is solely devoted to the reduction of human remains.	See full section related to Cremation/AH/ Reduction

		(23) "Reduction facility operator" means the person(s) registered with the board who operates a crematory, alkaline hydrolysis equipment, or natural organic reduction facility. (24) "Residue" means the products that may unavoidably remain in the reduction chamber after manual cleaning techniques are performed. (25) "Shroud" means a leak resistant covering for human remains prior to alkaline hydrolysis, or natural organic reduction to ensure privacy and respectful handling of human remains.	
Wyoming	Code 33-16-502 33-16-530 et seq 035-6 Wyo. Code R. § 6-6	(iv) "Chemical disposer" means a licensed funeral service practitioner who is also licensed by the board as a person permitted to dispose of human remains by chemical disposition; (v) "Chemical disposition" means the process by which a deceased human body is reduced to a powder by use of materials other than heat and evaporation; (vi) "Chemical disposition facility" means any building or facility or part thereof engaging in the chemical disposition of human remains; --- Chemical disposition facilities using alkaline hydrolysis for chemical disposition must comply with the following requirements: (a) The licensed funeral service practitioner or funeral director shall use a purpose-built vessel as a dissolution chamber. (b) Chemical disposition systems which operate above atmospheric pressure shall use an American Society of Mechanical Engineers (ASME) certified pressure vessel as a dissolution chamber. (c) The chemical disposition system shall use parameters of heat, time, and solution circulation sufficient to achieve complete dissolution of all tissue remains. (d) The licensed funeral service practitioner or funeral director shall ensure that the discharge liquid that is a byproduct of the chemical disposition process meets the facility's sewage collection and treatment facility requirements regarding acceptable temperature and pH level.	Permit provisions for chemical disposers in 33-16-530 et seq.; see WY Administrative Rules Ch. 6, re: chemical disposers

Appendix D: State Comparisons – Definitions of Alkaline Hydrolysis

Minnesota

"Alkaline hydrolysis" means the reduction of a dead human body to essential elements through a water-based dissolution process using alkaline chemicals, heat, agitation, and pressure to accelerate natural decomposition; the processing of the hydrolyzed remains after removal from the alkaline hydrolysis vessel; placement of the processed remains in a hydrolyzed remains container; and release of the hydrolyzed remains to an appropriate party. Alkaline hydrolysis is a form of final disposition.

California

“Alkaline hydrolysis” is a process using heat or heat and applied pressure, water, and potassium hydroxide or sodium hydroxide in a hydrolysis chamber.

North Carolina

Alkaline hydrolysis. – The technical process using water, heat, and other chemicals to destroy, dissolve, or reduce human remains to simpler or essential elements.

Nevada

“Alkaline hydrolysis” means the:

1. Reduction of human remains to bone fragments through a water-based process of dissolution using alkaline chemicals and agitation to accelerate natural decomposition; and
2. Processing of the hydrolyzed human remains after their removal from the container in which the process of dissolution occurs.

Oregon

“Alkaline hydrolysis” is a final disposition process involving dissolution of human remains by placing the remains in a dissolution chamber containing water and chemical solution including potassium hydroxide or sodium hydroxide, or a combination of both, and introducing heat to break down the remains until bone fragments that may be pulverized and liquid remain.

Utah

"Alkaline hydrolysis" means a water-based dissolution process using alkaline chemicals, heat, and sometimes agitation or pressure that reduces human remains to a liquid and to dry bone residue and includes the disposal of the liquid and the processing and pulverization of the dry bone residue.

Washington

"Alkaline hydrolysis" or "hydrolysis" means the reduction of human remains to bone fragments and essential elements in a licensed hydrolysis facility using heat, pressure, water and base chemical agents.

Cremation Association of North America (CANA)

While CANA includes alkaline hydrolysis process in their general definition of cremation, CANA provides the following working definition of alkaline hydrolysis in their materials:

Alkaline hydrolysis is a water-based dissolution process for human remains that uses alkaline chemicals, heat, and sometimes agitation and/or pressure, to accelerate natural decomposition.

State Comparisons – Wastewater Emissions Language

California

Among other items, Hydrolysis Facility License applicants are required to provide (3) the permit to operate a hydrolysis facility issued by the local department of health and (5) an approval of a hydrolysis chamber issued by the State Department of Public Health

Minnesota

A licensed alkaline hydrolysis facility must consist of "a building or structure that complies with applicable local and state building codes, zoning laws and ordinances, and wastewater management and environmental standards…"

During the application process, the facility must submit "copies of wastewater and other environmental regulatory permits and environmental regulatory licenses necessary to conduct operations."

Oregon

The alternative disposition facility authority must ensure that the discharge liquid that is a byproduct of the dissolution process meets the facility's sewage collection and treatment facility requirements regarding acceptable temperature and pH level.

Wyoming

"The licensed funeral service practitioner or funeral director shall ensure that the discharge liquid that is a byproduct of the chemical disposition process meets the facility's sewage collection and treatment facility requirements regarding acceptable temperature and pH level."

State Comparisons – Vessel Language

North Carolina

Every hydrolysis licensee shall have the following: (1) a holding facility; (2) a commercially-manufactured hydrolysis unit…which meets the following minimum standards (A) a collection pan, tray….to minimize the commingling of hydrolyzed remains of one human remains with another and (B) approval by a testing company such as Underwriters Laboratory; and (3) a commercially-manufactured processor…made for the pulverization of cremated or hydrolyzed remains.

Oregon and Wyoming

"must only employ a purpose-built vessel as a dissolution chamber"…"Dissolution systems which operate above atmospheric pressure must only employ an American Society of Mechanical Engineers' (ASME) certified pressure vessel as a dissolution chamber."

State Comparisons – Containers

Minnesota

"Alkaline hydrolysis container" means a hydrolysable or biodegradable closed container or pouch resistant to leakage of bodily fluids that encases the body and into which a dead human body is placed prior to insertion into an alkaline hydrolysis vessel. Alkaline hydrolysis containers may be hydrolysable or biodegradable alternative containers or caskets.

North Carolina

"Hydrolysis container" – "A container, other than a casket, designed to enclose human remains and made of suitable material to be easily destroyed during hydrolysis and to resist spillage and leakage. A hydrolysis container may be a cremation container or any other container that meets the requirements of this subdivision."

Utah

Alkaline hydrolysis container means a container (a) in which human remains are transported to a funeral service establishment and placed in an alkaline hydrolysis chamber for resomation; and (b) that meets substantially all of the following standards: (i) able to be closed in order to provide a complete covering for the human remains; (ii) resistant to leakage or spillage; (iii) rigid enough for handling with ease; and (iv) able to provide protection for the health, safety, and personal integrity of crematory personnel.

Washington

"A hydrolysis facility or natural organic reduction facility must not accept or hold human remains unless the human remains are in a container or shroud that is resistant to leakage or spillage of bodily fluids."

State Comparisons - Residue

Minnesota

"Upon completion of the alkaline hydrolysis process, reasonable efforts shall be made to remove from the alkaline hydrolysis vessel all of the recoverable hydrolyzed remains and nonhydrolyzed materials or items. …"

"Every alkaline hydrolysis facility shall provide for there removal and disposition in a dedicated cemetery of any accumulated residue from any alkaline hydrolysis vessel, drying device, mechanical processor, container or other equipment used in alkaline hydrolysis. …"

North Carolina

"Any solid remains or residue remaining after hydrolysis shall be treated and disposed of as cremated remains under this Article. Disposal of liquid waste shall be subject to all applicable health and environmental laws and regulations."

Wyoming

"Upon completing the cremation or chemical disposition process, all residual of the cremation or chemical disposition process shall be removed from the cremation or dissolution chamber and the chamber swept clean. The residual remains shall be placed in a container or tray in such a way that will ensure against commingling with other cremated or chemically processed remains."

Alkaline Hydrolysis Workgroup Recommendations

1. Include alkaline hydrolysis as an accepted means of final disposition of human remains in the Code

2. Define "alkaline hydrolysis" as a separate and distinct process within the Code, using broad terminology that does not favor specific manufacturers or processes:

> *"Alkaline hydrolysis" is a means of final disposition by reduction of a dead human body to essential elements through a water-based dissolution process using alkaline chemicals, heat, agitation and/or pressure to accelerate natural decomposition.*

3. Create a regulatory structure for "alkaline hydrolysis" that appropriately reflects and accounts for both the differences and similarities in the processes for alkaline hydrolysis and cremation

3.A. Mirror cremation statutes and regulations related to the following:

- Disposition of remnants from process; also abandoned or unclaimed
- Identification of remains and authorization of next of kin prior to process
- ME authorization for process/method of disposition
- Refrigeration of remains pending process
- Documentation and record keeping
- No commingling of human and animal remains
- Safe, respectful handling of remains
- Casket not required for alkaline hydrolysis process
- Basic application requirements for registration of either facility
- Board-approved training program for operators of units

3.B. Include new statutory and regulatory provisions for the following:

- Definition of "alkaline hydrolysis" (See #2)
- Definitions, as appropriate, for related terms including alkaline hydrolysis container, alkaline hydrolysis unit, alkaline hydrolysis facility, hydrolyzed remains
- Board authority to inspect alkaline hydrolysis facilities
- Requirements for registration of alkaline hydrolysis facilities (see #4)
- Requirements for alkaline hydrolysis units – commercially manufactured and professional engineering certification/testing as appropriate
- Appropriate alkaline hydrolysis containers for transport/storage/process – to include containers that enclose the body, are easily hydrolysable, and are resistant to leakage or spillage
- Requirements for disposal of waste from alkaline hydrolysis process
  - Wastewater emissions of effluent
  - Undissolved tissue or residue in unit – cleaning after each process to prevent commingling of human remains
- Posting of relevant permits and approvals

4. Include licensure/registration requirements for alkaline hydrolysis facilities or operators that include appropriate consultation, authorization, and/or permitting from state and local wastewater treatment authorities and/or health departments:

(1) to minimize the potential for adverse environmental impact;

(2) to ensure the use of appropriate equipment or units that discharge effluent into wastewater or septic systems; and

(3) to ensure the proper and safe storage and handling of caustic chemicals and/or stored process effluent that may impact water or storm water systems if leaked or spilled