

Aerosolization of all Wastewaters



AerosoliZLD®
www.aerosolization.com
Patents: # 8,926,792
8,990,057
9,526,209
14,519,163
14,671,366
Trademark #50509668

AEROSOLIZATION OF ALL WASTEWATERS

Presenter: Mr. Kelly K. Houston

**Beyond Science and Decisions:
From Problem Formulation to Risk Assessment**

February 26 & 27, 2019
Texas Commission on Environmental Quality Austin, Texas

Workshop Co-Chairs:

Mark S. Johnson, US Army Public Health Center

Kimberly White, American Chemistry Council

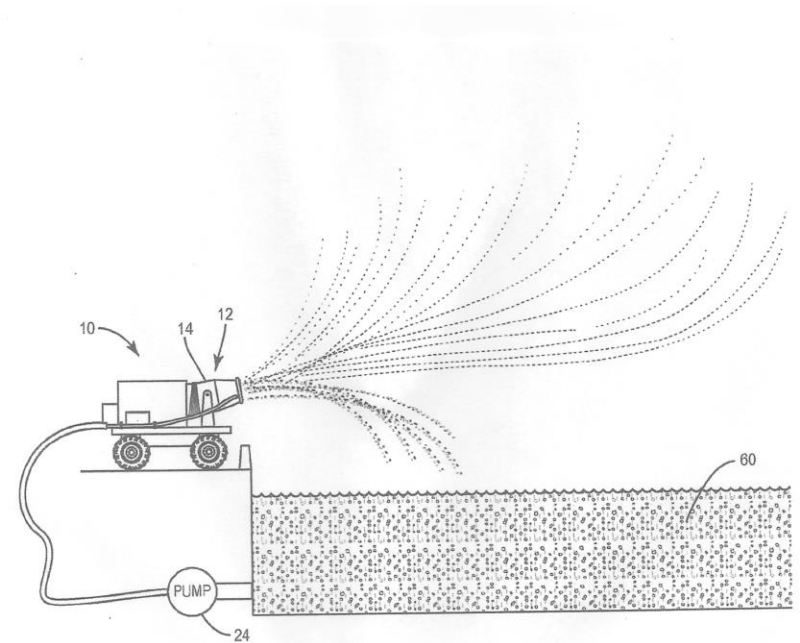


FIG. 3

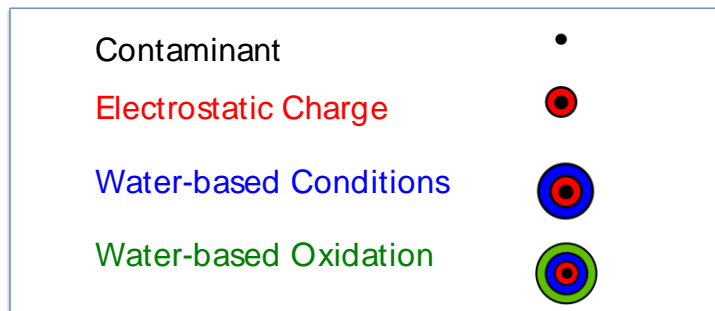
Phone: 704-756-5494
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Aerosolization's Past and Present

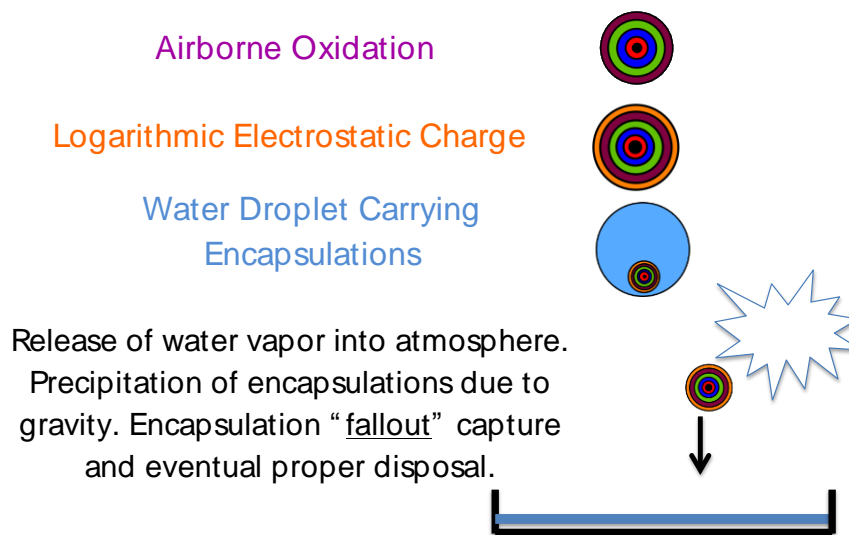
- Since the 1880's until the late 1970's, the world's militaries and scientific communities had assumed that Aerosolization would be an effective way of spreading chemicals and biologicals. US DoD confirmed that it would not. (USAMRRID Ft. Detrick, MD)
- Natural processes cannot be overcome: Initial electro-static charges, waterborne oxidation, airborne oxidation, much more powerful electro-static charges, and gravity—basic scientific principles taught in middle school.
- Govt. studies and reports since the early 1980's have suggested that chemicals and/or biologicals that must start from a highly dried “talcum like” powder and are additionally very highly “processed” or “prepared” or “weaponized” particles could “disseminate” over a larger area. This is dissemination.
- Dissemination (dry) is the opposite of Aerosolization (wet).

Aerosolization

Kelly Houston, Patent Cluster Holder



Aerosolization System Introduced



Aerosolization of All Wastewaters

- AEI, LLC has reverse-engineered the known science to greatly enhance: safety, controllability, predictability, effectiveness, efficiency, universal application for all wastewaters and site specific expandability with remote operations.
- More air and/or more water = more oxidation and thus more encapsulations and a shorter “fall out” distance.
- The science is universal for all chemicals and all biologicals and would be even more greatly enhanced through further experimentation/testing/physical measurement in real time and with universally recognized protocols.
- Large volumes of water vapor are released after the 5 separate and natural encapsulation processes. Remote operation and drone testing will provide further safety over existing environmental and personal safety precautions.

Aerosolization's Controllability



Aerosolization's Predictability



Aerosolization's Safety

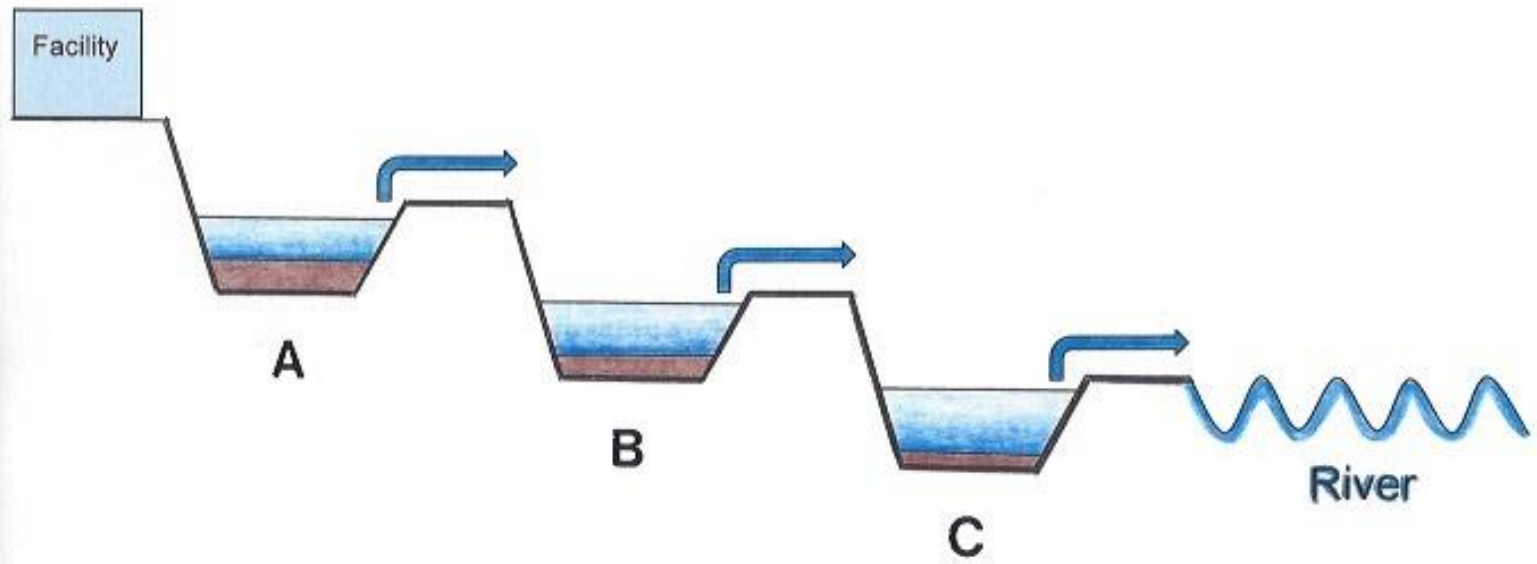


Aerosolization PHASE 1

- Aerosolize only “permitted discharges” for a continual and voluntary “Zero Liquid Discharge-ZLD” outcome for participants.
- Ask all public and private sector NPDES and “Spray field” permit holders to voluntarily participate.
- Request that EPA give guidance ASAP.

PHASE 1 Questions

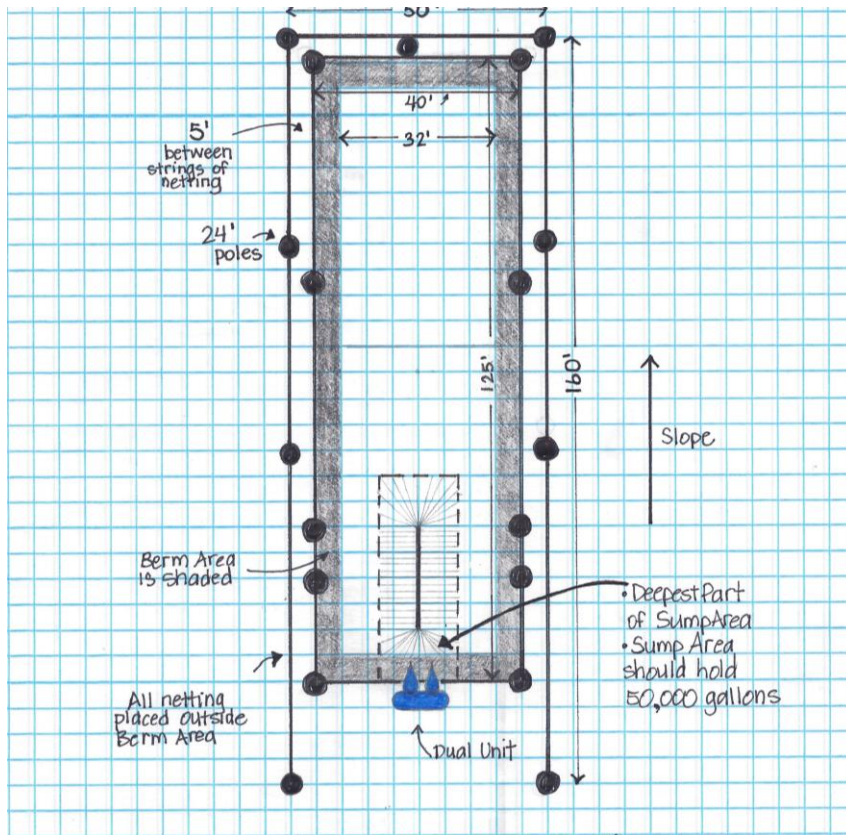
- What steps or processes would you suggest to additionally reduce the risk to the environment ? (Aerosolizing said “permitted discharge only” water using remote control and in a remote location of the site)
- What steps or processes would you suggest to additionally reduce the risk to people on the site in Phase 1? (Aerosolizing said “permitted discharge only” water using remote control and in a remote location of the site away from any people)
- What monitoring data would you like to gather from Phase 1?
- How long should Phase 1 be conducted to collect publishable results?
- How many different types of wastewater should be considered in Phase 1?
- Which types of wastewater would you like to see monitored in Phase 1?



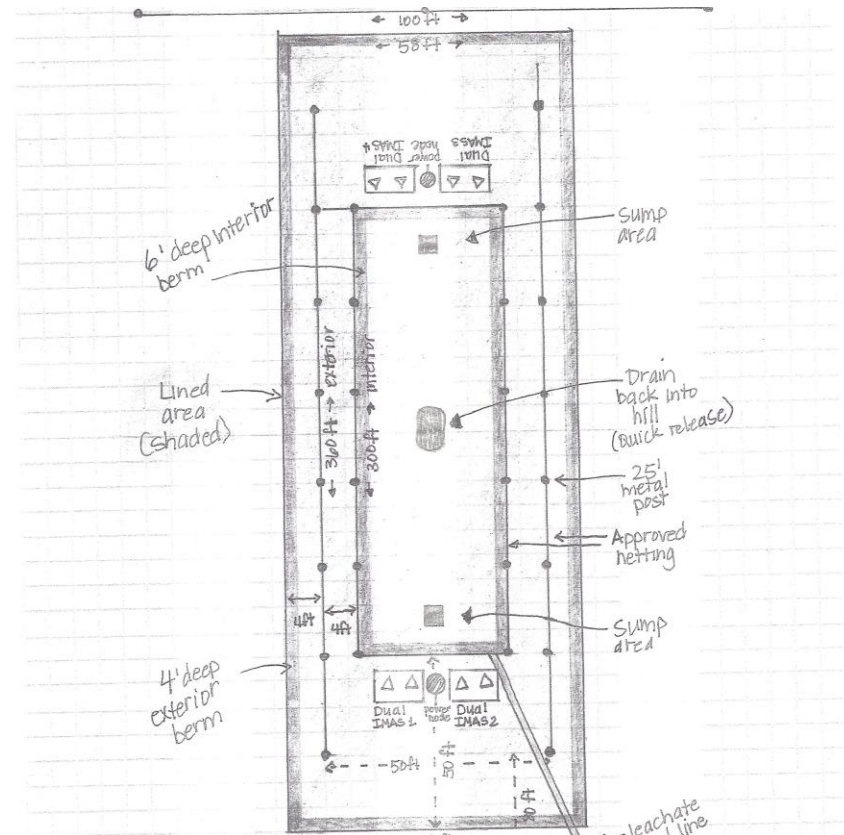
Flow-Based Wastewater System

Aerosolization PHASE 2- Enhancements

Phase 2 "100K GPD" design



Phase 2- "600 GPD" design

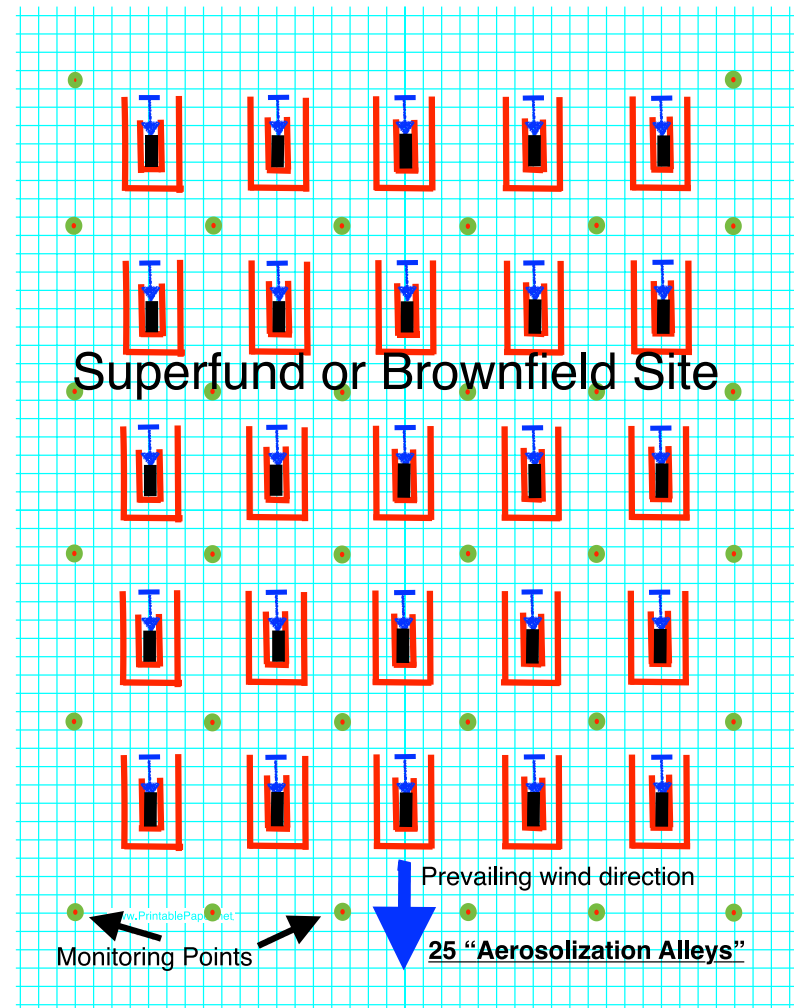


PHASE 2 Questions

- What steps or processes would you suggest to additionally reduce the risk to the environment in Phase 2?
- What steps or suggestions would you make to additionally reduce the risk to people on the site in Phase 2?
- What monitoring data would you like to gather from Phase 2?
- How long should Phase 2 be conducted to collect publishable results?
- How many different types of wastewater should be considered in Phase 2?
- Which types of wastewater would you like to see monitored in Phase 2?
- What should be the standardized, siting, layout, design and safety considerations for an “Aerosolization Alley”?
- Can this standardized “Aerosolization Alley” siting, layout, design be safely used for any type of wastewater or family of wastewater? If not, why?

Aerosolization PHASE 3-Enhancements

- Initiate contaminant-specific testing for additional safety and controllability.
- Use secure sites where ambient conditions are known and testing “Aerosolization Alleys” are fixed for long term multi-contaminant testing with universally accepted protocols for international peer review requests.
- Publish tested “aqueous solutions” that further enhance encapsulations along with operational “best practices”.



Phase 3 Questions

- What steps or processes would you suggest to additionally reduce the risk to the environment in Phase 3?
- What steps or suggestions would you make to additionally reduce the risk to people on the site in Phase 3?
- What monitoring data would you like to gather from Phase 3?
- How long should Phase 3 be conducted to collect publishable results?
- How many different types of wastewater should be considered in Phase 3?
- Should all wastewaters be tested or can families of chemical and biological wastewaters be characterized?
- Which types of wastewater (or wastewater families) would you like to see monitored in Phase 3?
- What should the standardized, siting, layout, design and safety considerations be for an “Aerosolization Alley” mass testing/monitoring project?
- Can this standardized “Aerosolization Alley” siting, layout, design be safely used for mass testing/monitoring of any type of wastewater or families of wastewater? If not, why?
- What flocculants would you like to see tested? Example- Chemical flocculants that cause coalescence in mining water, animal processing, oil/gas produced water or industrial effluent are known and specific to each industry.
- What amendments would you like to see tested? Example- Adding dairy proteins or avian processing proteins or bovine processing proteins would clump/encapsulate various types of chemicals more thoroughly than other types of proteins. Here a biological wastewater has a safety and controllability value to a chemical wastewater producer.

Aerosolization's Background



North Carolina Department of Environment and Natural Resources

Division of Waste Management

Dexter R. Matthews

Director

SOLID WASTE SECTION

May 7, 2013

Pat McCrory
Governor

John E. Skvarla, III
Secretary

Mr. Matthew Cheek

Hodges, Harbin, Newberry & Tribble, Inc.
3920 Arkwright Road, Suite 101
Macon, Georgia 31210

Subject: Leachate Evaporation – Demonstration
Foothills Environmental Landfill, Permit No. 1403-MSWLF-1998
Caldwell County, DIN 18910

Dear Mr. Cheek;

When last we spoke on the subject of leachate evaporation at the Foothills Landfill I requested an operations plan be developed for the demonstrated process. Since that time the Solid Waste Section (Section) has received other similar requests and has developed the basics of an operations plan outline for application of leachate to landfill surfaces (below).

General

1. Facility must comply with all federal, state and local ordinances.
2. Leachate must be applied in a manner that does not threaten public health or the environment.
3. It is the Facility's responsibility to ensure leachate and its constituents do not contaminate groundwater, surface water, and off liner soils.

Operation

1. The Plan must contain a complete equipment list and detailed operator instructions.
2. The Plan must contain a map of areas to be sprayed.
3. Leachate must be applied on areas of the landfill that are lined.
4. There may be no runoff of leachate from sprayed areas.
5. Leachate must not be applied on standing water.
6. Leachate must be applied only on well-maintained areas with established vegetation. The only exception is the limited application on areas where vegetation is being established.
7. Leachate must not be applied at night or when vision is restricted (i.e. fog).
8. Leachate must not be applied in a manner that causes it to be applied on unlined areas of the facility. No over spray.
9. Leachate application is not allowed during or immediately after precipitation events.
10. Leachate must not be applied to closed portions of the landfill.
11. Soil on which leachate has been sprayed must remain in the landfill, it may not be removed from and/or stockpiled off the lined landfill.

Application on Side Slopes

12. During application an operator must attend the equipment at all times, and have communications with other onsite personnel, in case of spills or other emergencies.
13. The area being sprayed must be monitored constantly to prevent over application and runoff.
14. Leachate application is not allowed in areas where leachate seeps are evident.

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Roy Cooper, Governor
State of North Carolina

GOVERNOR ROY COOPER OBJECTIONS AND VETO MESSAGE:

House Bill 576 AN ACT TO (1) REQUIRE THE DEPARTMENT OF ENVIRONMENTAL QUALITY TO APPROVE AEROSOLIZATION OF LEACHATE AND WASTEWATER FROM A LINED SANITARY LANDFILL FOR THE DISPOSAL OF MUNICIPAL SOLID WASTE LANDFILL, IN CERTAIN CIRCUMSTANCES; (2) ALLOW THE DEPARTMENT TO APPROVE AEROSOLIZATION OF LEACHATE FROM UNLINED LANDFILLS; AND (3) PROVIDE THAT AEROSOLIZATION OF LEACHATE OR WASTEWATER THAT RESULTS IN A ZERO-LIQUID DISCHARGE AND IS NOT A SIGNIFICANT AIR CONTAMINATION SOURCE DOES NOT CONSTITUTE A SOURCE THAT REQUIRES CERTAIN PERMITS.

In this bill, the legislature exempts particular technologies that could potentially better ensure the health and safety of people and the environment. Scientists, not the legislature, should decide whether a patented technology can safely dispose of contaminated liquids from landfills. With use of the word "shall," the legislature mandates a technology winner, limiting future advancements that may provide better protection.

Therefore, I veto the bill.


Roy Cooper
Governor

The bill, having been vetoed, is returned to the Clerk of the North Carolina House of Representatives on this the 30th day of June, 2017, at 4:56pm for reconsideration by that body.

RECEIVED

JUN 30 2017
4:56pm

James White

The Capitol Building, Raleigh, NC 27602
Mail: 20301 Mail Service Center, Raleigh, NC 27699-0301
Phone: (919)814-2100

Request for the ARA

- “Scientists, not the legislature, should decide whether a patented technology can safely dispose of contaminated liquids”

NC Governor Roy Cooper 6/30/2017
4:56pm



Summary

Phase 1- Aerosolize a facility's existing "permitted discharge" to deliver a "zero liquid discharge" on that facility's site.

Phase 2- If voluntarily participating facilities prefer to add the additional protections offered by an engineered "Aerosolization Alley", what would be the best and safest design, features and site placement to Aerosolize their "permitted discharge water" on their own site?

Phase 3- In the future, if a voluntarily participating private/public sector wastewater producer or federal, state or local regulator would like to, perhaps, remove existing treatment steps, or perhaps Aerosolize a yet to be characterized "emerging contaminant", they can send some standardized volume of a wastewater to an EPA approved "testing facility".