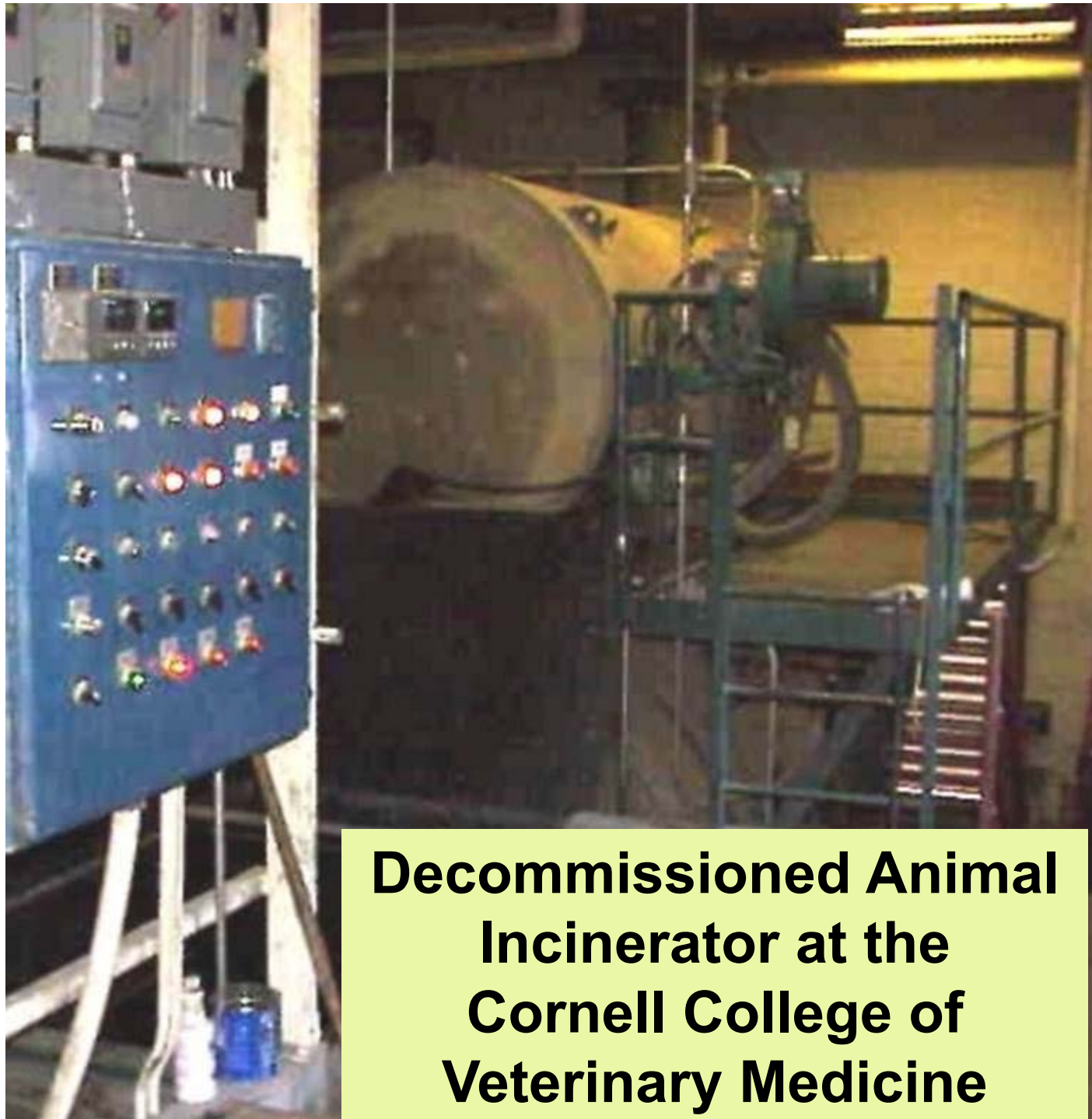


An aerial photograph of the Ithaca Area Waste Water Treatment Facility. The facility features several large, rectangular aeration basins with metal grates, several large circular clarifiers with green central columns, and various industrial buildings and pipes. The facility is surrounded by green grass and some trees.

ALKALYE DIGESTERS, HYDROLYSATE, AND TSE

**Ed Gottlieb, Industrial Pretreatment Coordinator
Ithaca Area Waste Water Treatment Facility;
May 16, 2014**

NACWA PRETREATMENT CONFERENCE



**Decommissioned Animal
Incinerator at the
Cornell College of
Veterinary Medicine**

DEFINITIONS

Prions (pree-ons) are self-replicating, misfolded proteins that are widely believed to be the cause of **transmissible spongiform encephalopathies (TSEs)**. TSE is a family of rare progressive neurodegenerative disorders that affect both humans and animals.

- **Animals**

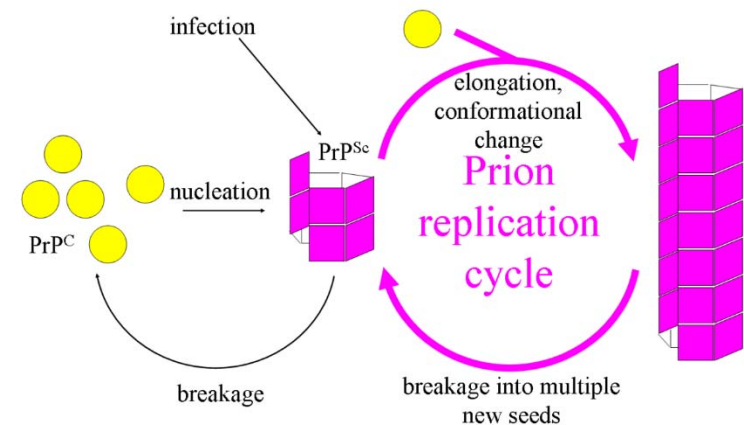
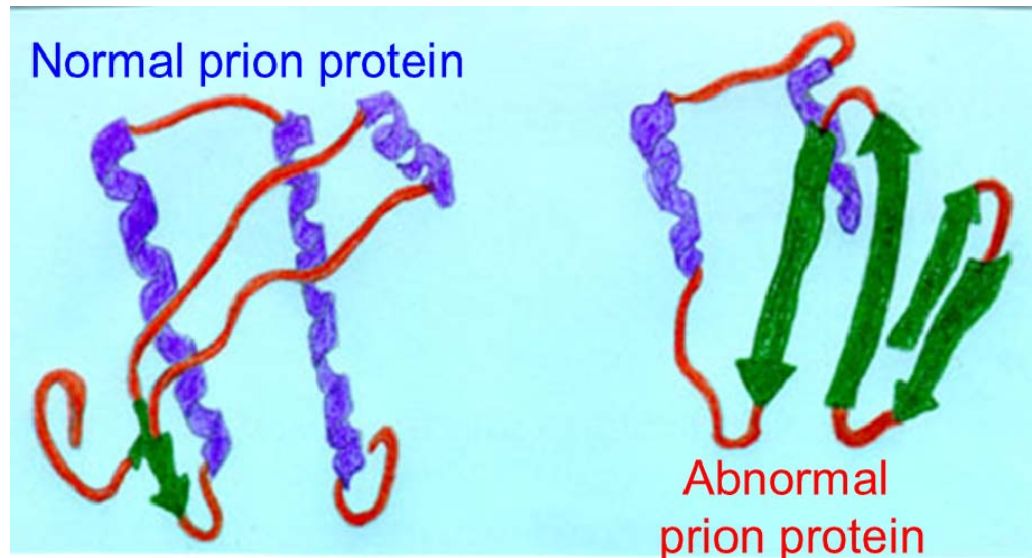
Cow	Bovine Spongiform Encephalopathy (BSE) commonly called, “Mad Cow Disease”
Deer	Chronic Wasting Disease (CWD)
Sheep	Scrapie
	Transmissible mink encephalopathy
	Feline spongiform encephalopathy
	Ungulate spongiform encephalopathy

- **Humans**

Creutzfeldt-Jakob Disease (CJD)
Gerstmann-Sträussler-Scheinker Syndrome (GSS)
Fatal Familial Insomnia
Kuru

Prions (PREE-ons) were named in 1982 by their discover, Nobel laureate Dr. Stanley B. Prusiner.

His memoir of the discovery , *Madness and Memory*, was published in May of 2014 by Yale University Press.

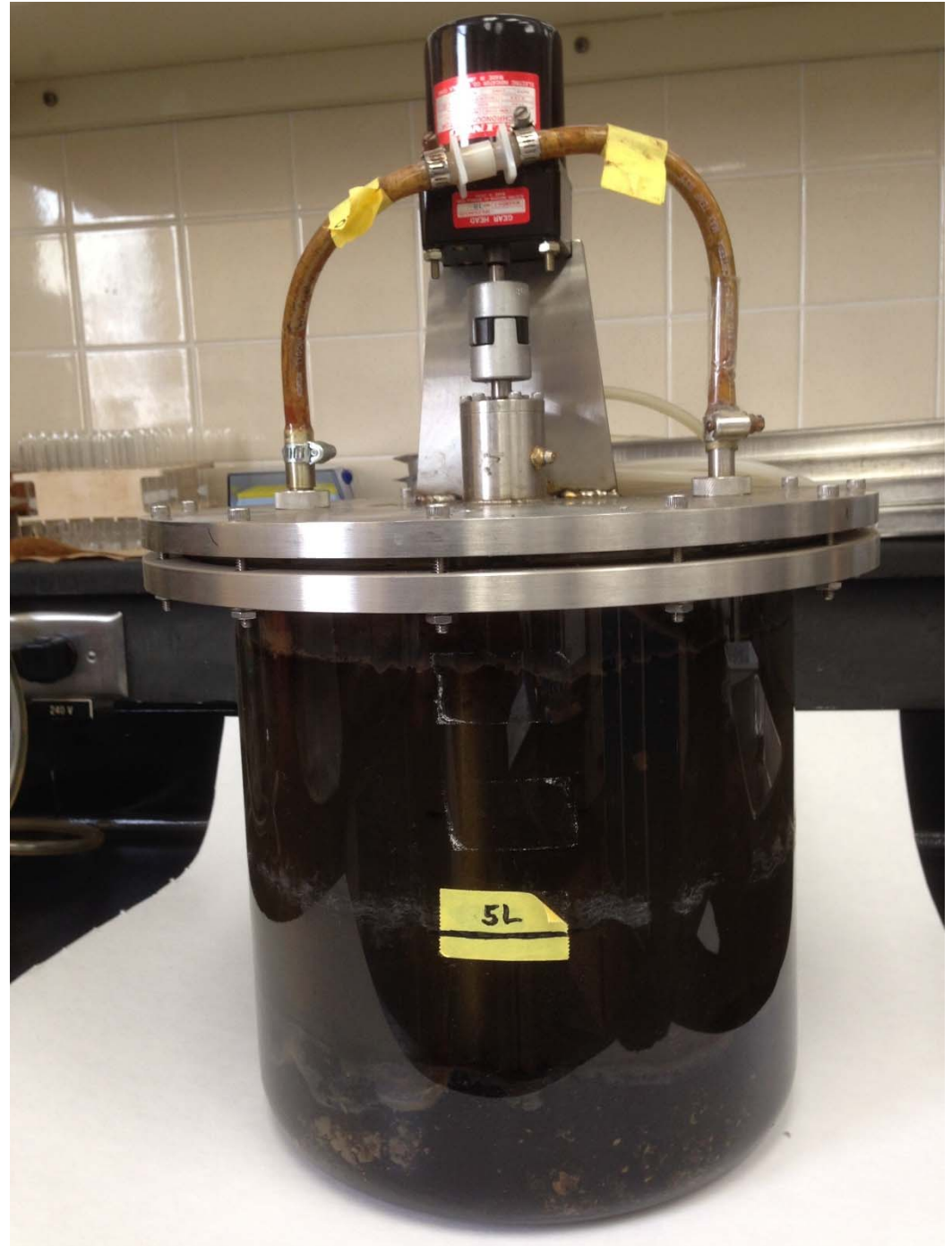


From Google images

Two years of meetings led to selection of alkaline hydrolysis to replace incineration at CCVM. The committee included local residents opposed to upgrading the incinerator.



**Bench Top
Experiment to
Determine if
Hydrolysate is
Compatible with
the IAWWTF
Digester**





CCVM's Digester Vessel in the Factory

**This is a
pressurized
unit that
operates at high
temperature**



CCVM Digester Installed



The Digester

- KOH, water, and heat
- 300F, 90psi, 6 hrs
- 5,000lb of carcass (max capacity) results in 3,500 gal effluent



2061 lbs



131 lbs



Biological Challenge Testing



Digester Challenge
Cornell Waste Management

Run # 236 / WMF 167

Run Date 6/21/2011 7:04 am

Weight 5000 lb

Incubation Start Date & Time 6/29/11

Day	Time	1A	1B	1C	2A	2B	2C
0	12:00pm	-	-	-	-	-	-
1	8:00pm	-	-	-	-	-	-
2	7:00pm	-	-	-	-	+	+
3	8:45am	-	-	-	-	+	+
4	weekend - Sunday						
5	Holiday - Monday						
6	10:30am	-	-	-	-	+	+
7	11:15am	-	-	-	-	+	+

Key: "+" = growth observed (color of growth media changes from purple to yellow)
"-" = no growth observed (color of growth media remains purple)

Certification of Results:
The results recorded here, in addition to the procedures used to perform the challenge test, are to the best of the undersigned's knowledge, accurate and in conformance with the Cornell College of Veterinary Medicine's GNYCRR Part 360 permit.

J. Paul 7/20/11
signature date
J. Paul Biosafety Engineer
printed name title

07/20/2011

Batch Data Report

Batch End: 11/23/2010

9:06:46 AM

Pass/Fail Status: Pass

Integrity Test:

Elapsed Time (minutes): 5

Fill:

Elapsed Time (minutes): 16

Water (gal): 558.3

Caustic (gal): 27

Steam (gal): 3.5

Warm Up:

Elapsed Time (minutes): 234

Warm Up Start Temp (F): 104.3

Sterilization:

Elapsed Time (minutes): 0

Start Time: 11/20/2010 11:15:08 AM

End Time: 11/20/2010 12:15:08 PM

Start Pressure (psi): 66.6

End Pressure (psi): 73.1

Start Temperature (F): 300.4

End Temperature (F): 308.3

Max Temp.(F): 314.8

Min Temp. (F): 300.4

Digestion:

Elapsed Time (minutes): 360

Start Time: 11/20/2010 12:15:08 PM

End Time: 11/20/2010 5:15:08 PM

Start Pressure (psi): 73.1

End Pressure (psi): 65

Start Temperature (F): 308.3

End Temperature (F): 306.1

Max Temp.(F): 315.8

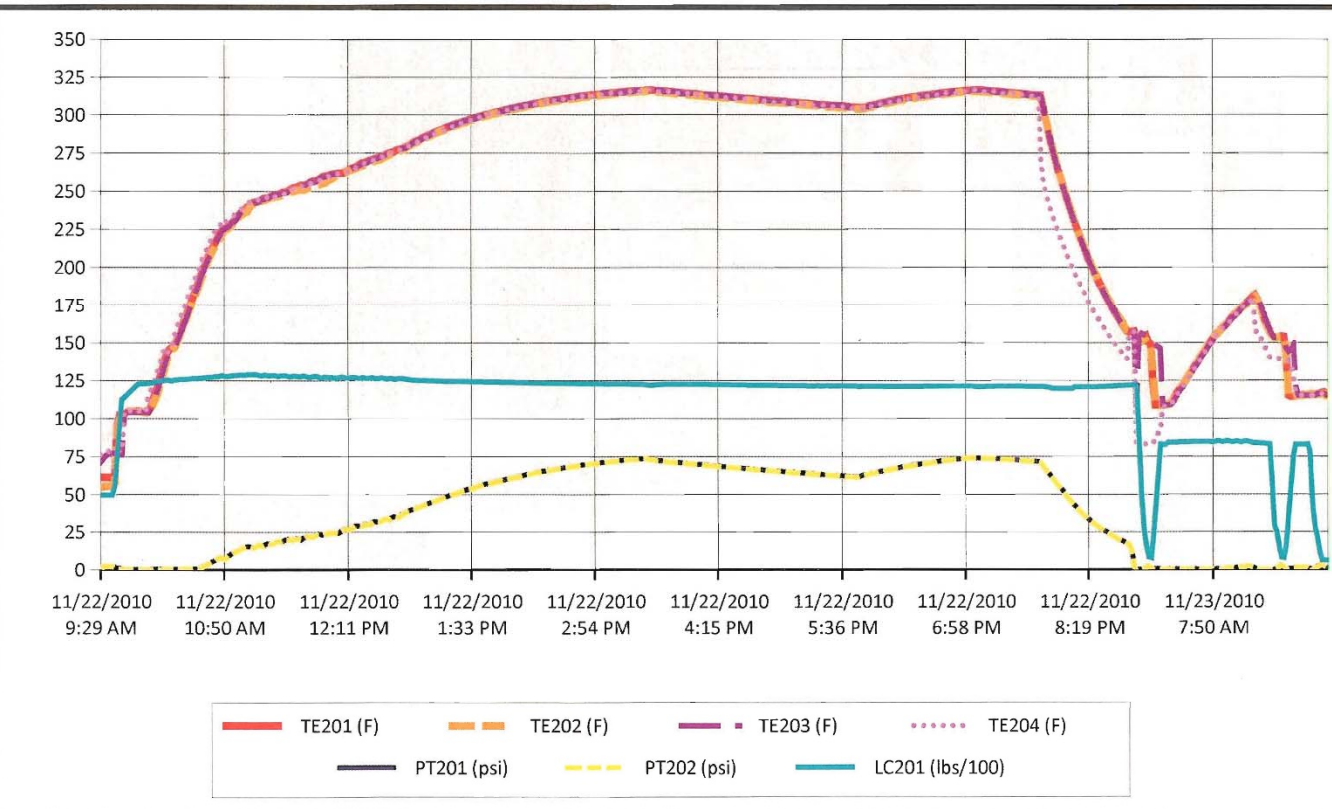
Min Temp. (F): 302.8

Cool Down:

Elapsed Time (minutes): 56

Start Temperature (F): 309

End Temperature (F): 157



pH:

Elapsed Time (minutes): 6

1st Drain:

Elapsed Time (minutes): 11

DrainTemperature (F): 155

Hot Rinse:

Elapsed Time (minutes): 68

Start Temperature (F): 0

End Temperature (F): 180

Hot Rinse Fill Water (gal): 667

Rinse Cool Down:

Elapsed Time (minutes): 11

Start Temperature (F): 180

End Temperature (F): 156

2nd Drain:

Elapsed Time (minutes): 10

DrainTemperature (F): 156

Cold Rinse:

Elapsed Time (minutes): 16

Cold Rinse Fill Water (gal): 667

Final Drain:

Elapsed Time (minutes): 11

DrainTemperature (F): 118

Odor Control:

Elapsed Time (minutes): 2

Comment:

OP Setpoints:

Temperature (F): 300

Sterilize Time (minutes): 60

Digest Time (minutes): 360

Caustic Inject (%.): 21

Fill Water (%): 125

Steam (%): 25

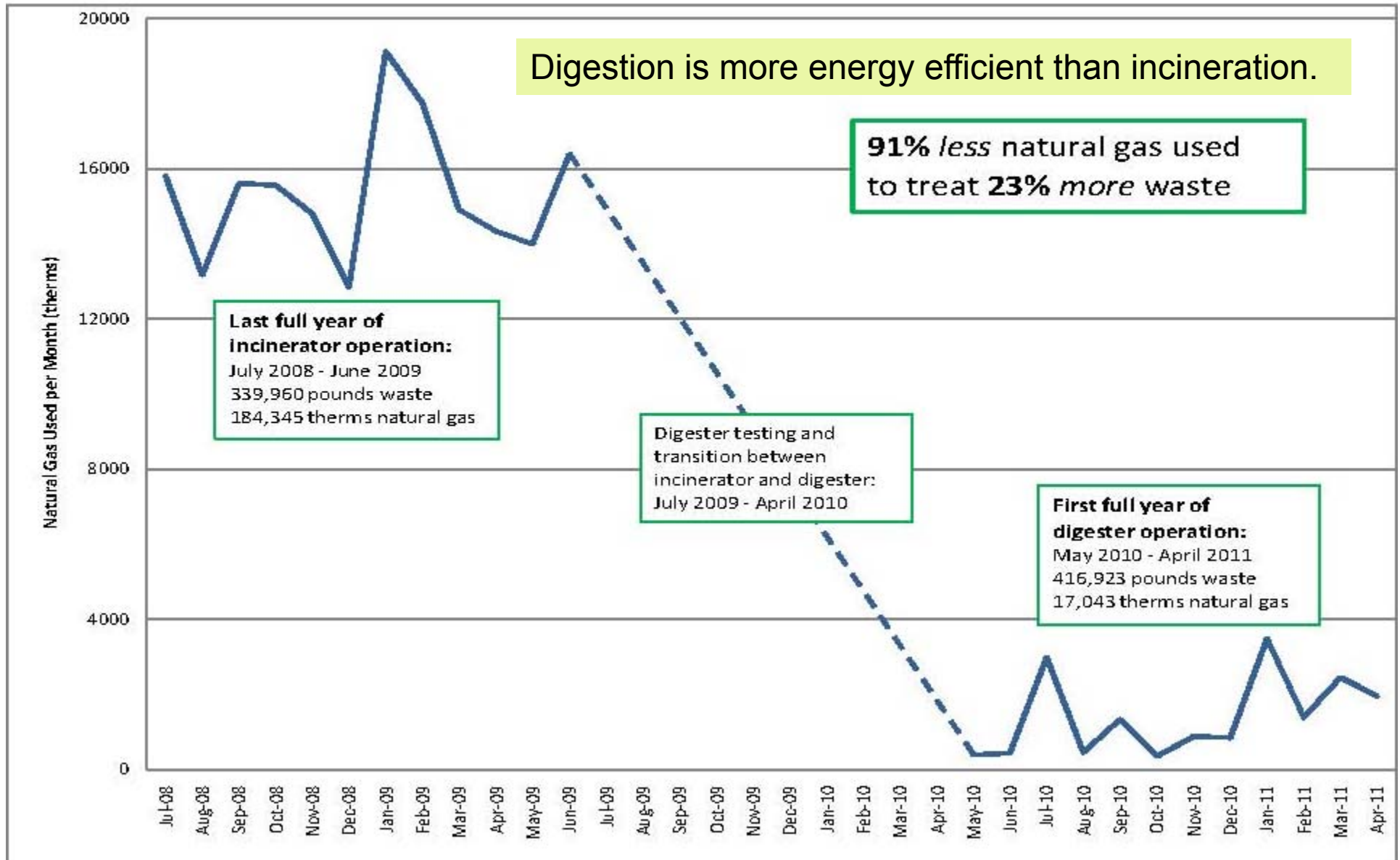
Cooldown Temp(F): 160

Rinse Water (gal): 150

Hot Rinse Temp(F): 160

Initial Load(lbs) 4926.2

Every batch is certified digested.



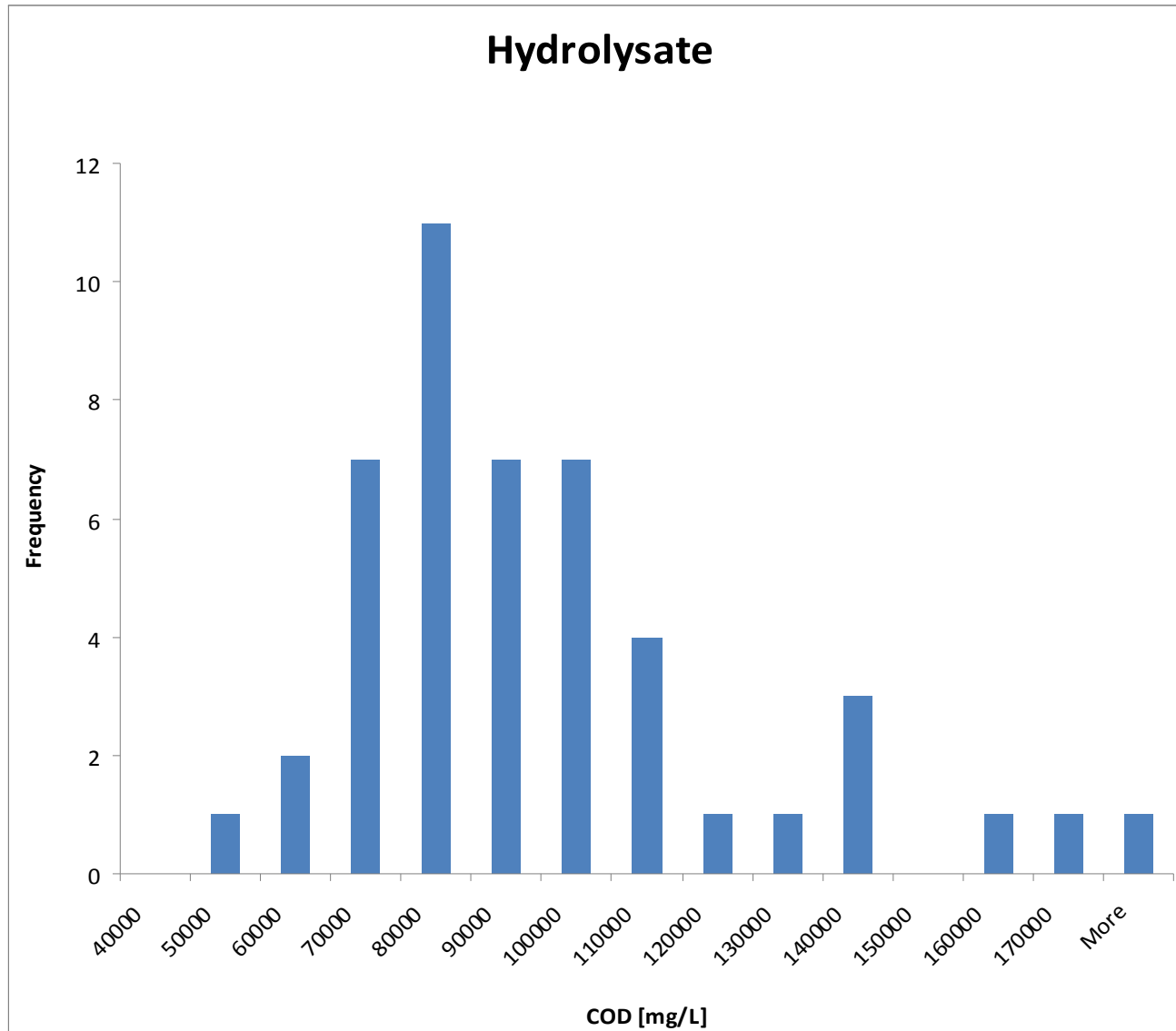
Hydrolysate being loaded for delivery to the IAWWTF, where it is slowly fed to the anaerobic digester.



Highest readings occurred when the amount of tank rinse water was accidentally reduced. Average, excluding 5 wks of high #'s =

COD = 81,425

BOD $(\text{COD} * 0.56) = 45,601$



**Data from
previous 12
months;**

48 samples

(some samples were
composites of two
deliveries)

**Average COD =
91,328**

**Average BOD
 $(\text{COD} * 0.56) =$
51,146**

**Max. COD =
202,415**

**Max. BOD =
113,352**

Feed to the IAWWTF Digester

Estimated yield of biogas in cubic feet per day

- Treatment Process Residuals

(14,000 pounds of volatile solids per day) = 100,000

- Trucked Waste Substrates of note:

CCVM Digester Hydrolysate = 30,000

Greek yogurt whey = 8,000

Septage = 50,000

Grease = ?

Total Cubic Feet of Biogas / Day (approx.) 200,000



**Codigestion of Hydrolysate Increases
Biogas Production = \$**

Bio-Response Solutions, Inc.

These units operate at lower temperatures,
for longer durations,
at atmospheric pressure.



PET 250 Digester

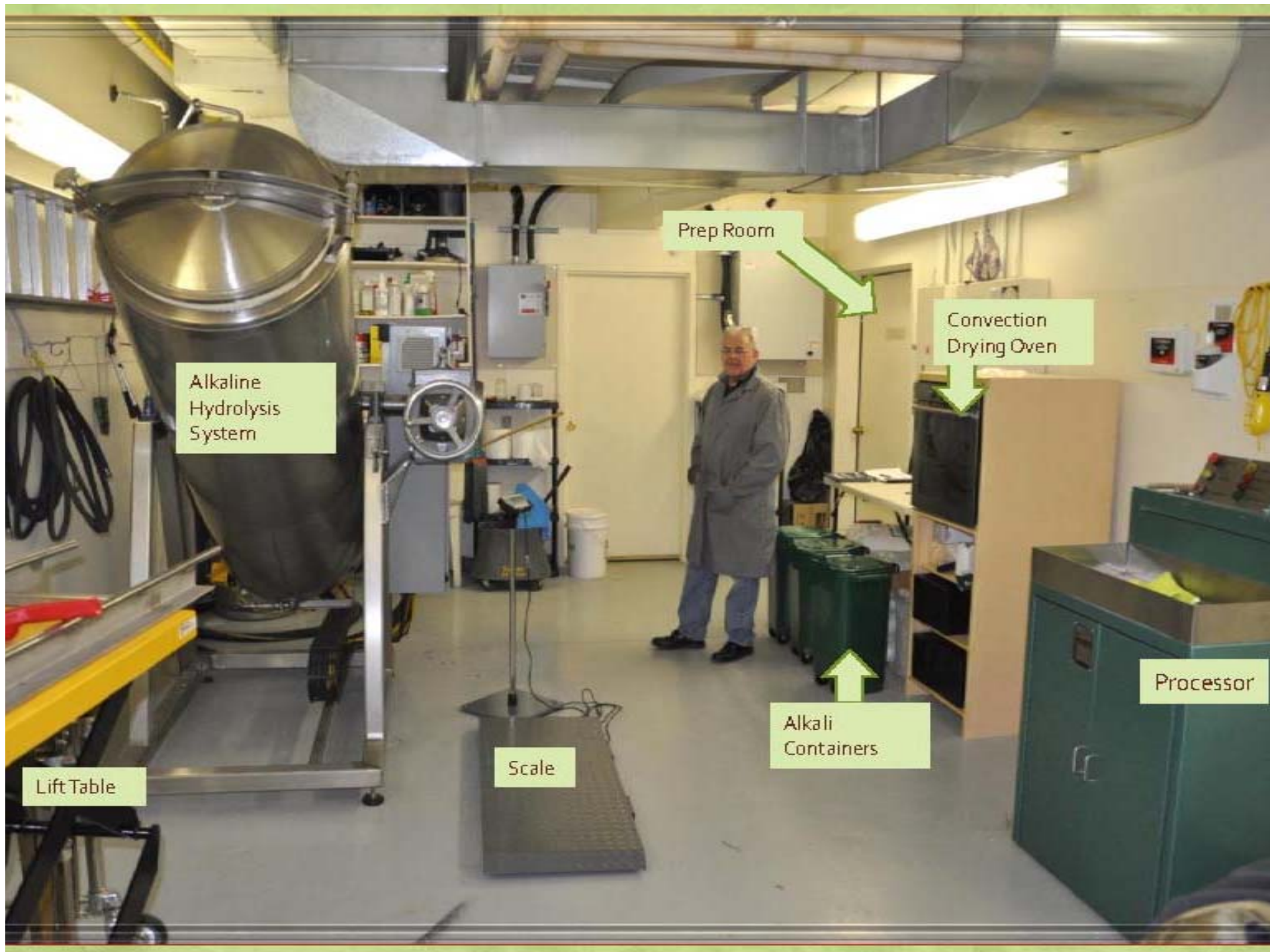


PET 400 Digesters



**Portable Low-Temp Unit;
Residual from a 2200 lb. load;
multiple animals.**

2008 test conducted in Maryland for regulators.



Alkaline
Hydrolysis
System

Prep Room

Convection
Drying Oven

Processor

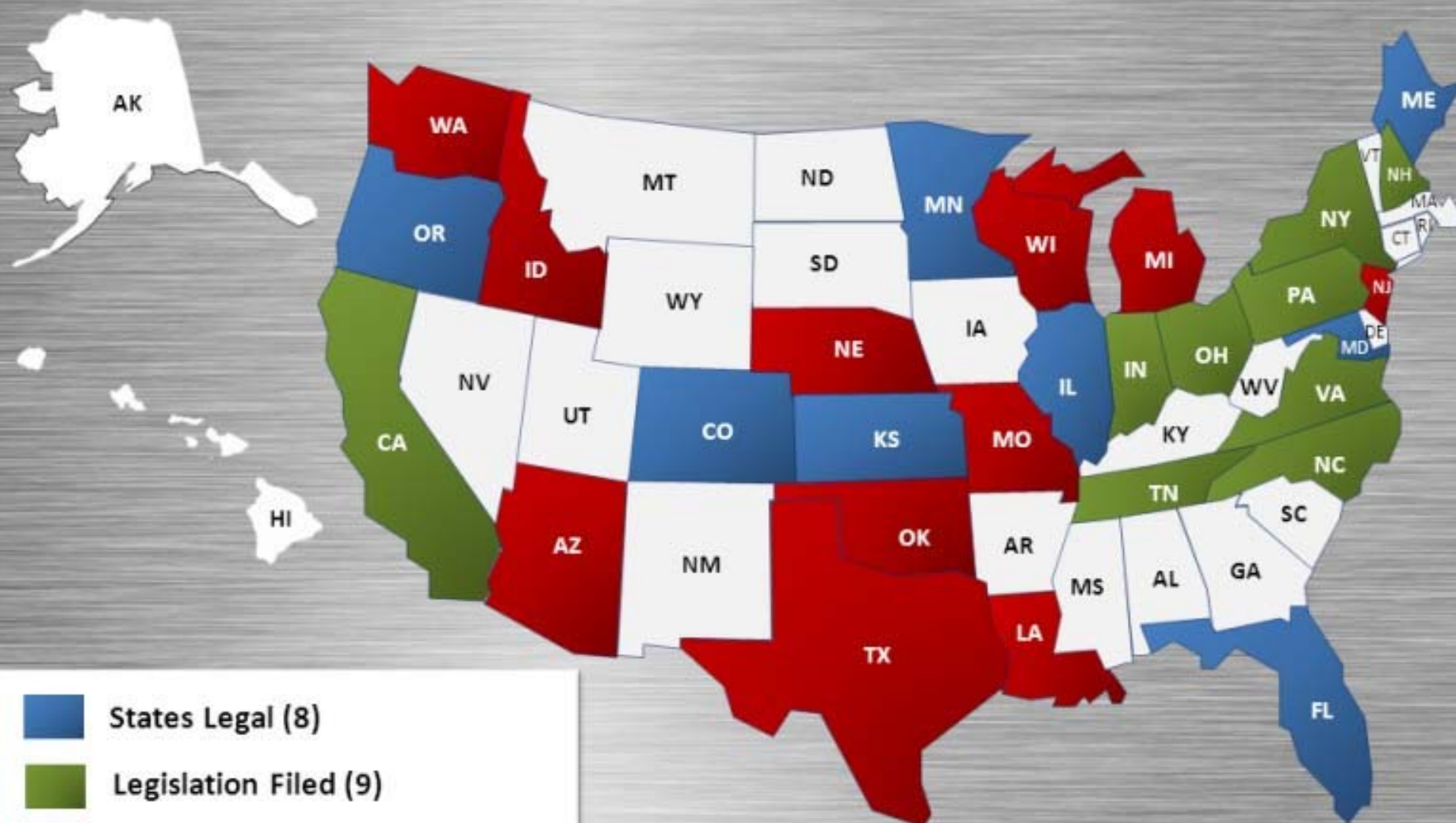
Alkali
Containers

Scale

Lift Table



Legislative Activity 2009 - 2013



- States Legal (8)
- Legislation Filed (9)
- Agency & Industry Interest (11)

Hydrolysate and FOG

An aerial photograph of a cemetery garden. The garden features several large, colorful flower beds in shades of red, pink, white, and purple. A large, dark green evergreen tree stands prominently in the center. The garden is bordered by a green lawn and a winding stone path. The overall scene is well-maintained and vibrant.

Using EPA 1664, hydrolysate tests very high in FOG. However, it is highly miscible and does not cause blockages. If your local limits include a fixed numerical limit for FOG, consider changing to a BMP based requirement.

Will cemeteries soon be watered with dilute hydrolysate?

An aerial photograph of the Ithaca Area Waste Water Treatment Facility. The facility features several large, rectangular aeration basins arranged in a grid-like pattern. To the left of the basins are two large, circular clarifiers. The facility is surrounded by green grass and some trees. A road and a parking lot are visible in the foreground.

ALKALYE DIGESTERS, HYDROLYSATE, AND TSE

**Ed Gottlieb, Industrial Pretreatment Coordinator
Ithaca Area Waste Water Treatment Facility**

**525 3rd Street, Ithaca, N.Y. 14850
egottlieb@cityofithaca.org**

May 16, 2014

NACWA PRETREATMENT CONFERENCE