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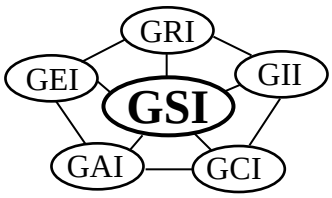

GSI White Paper #37

"Current Status (2018) of U.S. State Environmental Agencies Regarding Selected Landfill Liner and Cover Regulations"

by

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Current Status (2018) of U.S. State Environmental Agencies Regarding Landfill Liner and Selected Cover Regulations

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Background

In the United States, hazardous waste, municipal solid waste and certain other wastes are regulated under the Resource Conservation and Recovery Act (RCRA). Subtitle C of RCRA (for hazardous waste) was promulgated in 1982 and Subtitle D of RCRA (for municipal solid waste) was promulgated in 1991. These federal regulations are implemented by the individual state environmental agencies where the landfill is located and have been approved by the U.S. EPA. Currently, all 50 states have been granted authority to implement the regulations. These federal regulations set minimum technology guidance (MTG) but individual states can (and do) go beyond MTG at their own discretion. This is particularly relevant for materials such as geosynthetics, many of which were developed after enactment of the respective RCRA regulations. The usual mechanisms by which new materials are approved is by the justification, on a site-specific basis, that "technical equivalency" is achieved over requirements stipulated in existing regulations. After adequate performance, such alternative materials (and concepts) may eventually become part of an individual state's regulations. The GSI has been tracking this "moving status" by developing several reports, the most recent being…

"GRI's Third Survey of Solid waste Landfill Liner and Cover Systems:
Part I - USA Status"
February 27, 2007

A complimentary worldwide report is also available…

"GRI's Third Survey of Solid waste Landfill Liner and Cover Systems:
Part II - Worldwide Status"
October 24, 2007

Since publication of these reports there has been considerable activity on a bevy of geosynthetic materials and concepts, even on terminology, which sets apart many existing regulations from state-to-state within the practice of landfill liners and covers.

This White Paper presents results of a U.S. State Environmental Agency survey in which ten categories of questions were posed to individual state regulators. Results are included for thirty-eight states (76% return) for which we are extremely thankful. They (and the other 24%) have been sent this white paper as originally promised. It should be pointed out that some states are not allowed to answer surveys due to their agency's protocol. The ten itemized categories of questions are as follows:

Q1. How do your regulations refer to polymeric liners?

SMLs ☐ FMLs ☐ Geomembranes ☐

Q2. Regarding electrical leak location surveys (ELLS) are they…

required ☐ optional ☐ silent ☐

Q3. Regarding destructive seam sample frequency?

1 in 500 ft. ☐ other ____ silent ☐

Q4a. Are archived field samples of geomembranes required?

sheet ☐ seams ☐ silent ☐

Q4b. If archived materials are required, who stores them and for how long?

agency ☐ owner ☐ CQA ☐ Duration ___ yrs.

Q5. Regarding CQA final reports:

(a) Can they be filed electronically?	yes	☐	no	☐	silent	☐
(b) Who stores them?	agency	☐	owner	☐	CQA	☐
(c) Is there a storage time limit?	yes	☐	duration	☐	no	☐

Q6. Are geosynthetic clay liners (GCLs) allowed in your regs for the following locations?

primary liner ☐ secondary liner ☐ final cover ☐

Q7. Geosynthetic reinforced soil berms are being used to increase airspace at many landfills. Do your regulations address this topic?

yes ☐ no ☐ silent ☐

Q8. Do your regulations require "certified" CQA personnel?

yes ☐ no ☐ silent ☐

Q9. Do you require "accredited" laboratories for conformance testing?

yes ☐ no ☐ silent ☐

Q10. Do you require "certified" lab technicians to conduct the tests?

yes ☐ no ☐ silent ☐

Survey Answers

Q1 - The names for polymeric liners have varied over the years from pond liners-to-synthetic membrane liners-to-flexible membrane liners-to-geomembranes-to-geosynthetic barriers (polymeric). While this is a semantics issue to those involved, to outsiders it is confusing. In response to the question, the following was reported.

- 2 states (5%) use synthetic membrane liner (SMLs)
- 19 states (46%) use flexible membrane liners (FMLs)
- 20 states (49%) - geomembranes (GMs)

Q2 - The electrical leak location survey (ELLS) method has proven itself to be excellent in locating holes in geomembranes. We wanted to follow-up on White Paper #34 dated September 9, 2016 on this specific topic as to the current status of state environmental agencies.

- 3 states (8%) require its use
- 6 states (17%) list it as optional
- 27 states (75%) are silent on its use

Q3 - Stemming from the original recommendations by the U.S. EPA in the early 1980's of requiring one destructive geomembrane field seam test per 500 feet of the production seaming, we were interested to know the individual states requirement.

- 21 states (57%) continue to use 1 per 500 ft.
- 4 states (11%) have a different requirement
- 12 states (32%) are silent on this issue

Q4a - The issue of archiving samples of geosynthetic materials used in landfill construction represents a very real burden to someone who is accumulating materials. This question addressed the issue.

- 3 states (8%) require geomembrane sheet samples
- 4 states (11%) require geomembrane seam samples
- 31 states (81%) are silent in this regard

Q4b - Related to Q4a, if samples are required who actually stores them and for how long?

- 0 states require agency storage
- 6 states require owner storage
- 0 states require CQA storage
- 1 state designates the duration

Q5a - The size of a typical final report from a CQA organization to the permitting agency for a landfill cell for their approval is *simply enormous*. The question of electronically filing is often raised. The survey results on this issue follow.

- 15 states (40%) allow for electronic filing
- 8 states (22%) require paper filing
- 14 states (38%) are silent in this regard

Q5b - Still on the issue of CQA final report, this question addresses who stores the information? (Note that some states require dual or triplicate storage)

- 33 states (53%) store the documents themselves
- 25 states (40%) require the owner to store them
- 4 states (7%) require the CQA firm to store them

Q5c - Still with CQA final reports, this question asks about the duration of storage time.

- 8 states (22%) acknowledge that there is a storage limit time
- 5 states (14%) explicitly state the duration
- 23 states (64%) are silent on the issue

Q6 - Geosynthetic clay liners (GCLs) are used in landfill liner and cover systems generally being placed immediately beneath a geomembrane. In this manner, the two materials represent a composite liner. While states invariably allow their use, since it is generally beyond minimum technology guidance, this question focused on specifically where they are being used? (Note some states use them in multiple locations)

- 27 states (34%) use GCLs in the primary liner
- 27 states (34%) use GCLs in the secondary liner
- 25 states (32%) use GCLS in the final cover

Q7 - Historically, low height soil berms have been used at landfills to separate individual cells. Currently, the need for increased airspace (i.e., volume) requires these berms to become

quite large hence the need for the soil to be reinforced with geogrids or geotextiles. The state's perspective on "engineered landfill berms" was questioned.

- 2 states (6%) accept such berms
- 12 states (32%) do not accept such berms
- 23 states (62%) are silent on the issue

Q8 - The level of expertise of personnel performing CQA inspection varies considerably. One way to set a minimum proficiency level is to require such personnel to be certified and several such programs exist. The states were queried in this regard.

- 21 states (58%) require certified CQA personnel
- 4 states (12%) do not require certified CQA personnel
- 11 states (30%) are silent on the issue

Q9 - Geosynthetic samples are regularly sent to testing laboratories to determine if the project specification is met. There are accredited laboratories available and the state's requirement in this regard is of interest.

- 14 states (39%) require laboratory accreditation
- 6 states 17%) do not require laboratory accreditation
- 16 states (44%) are silent on the issue

Q10 - Regarding the geosynthetic testing laboratory's technician doing the actual testing, the issue of his/her certification has been raised. This last question addresses the issue.

- 6 states (16%) require lab technician certification
- 6 states (16%) do not require lab technician certification
- 25 states (68%) are silent on this issue

In summary, the individual questions allowed the state agency respondents little leeway in their answers and this generated many specific comments. They are as follows along with an appendix listing the individual tallies for all thirty-eight responding states.

- Alaska requires a quality assurance plan for liner installation, but the specifics are not outlined in regulations
- California Regional Board can request ELLS to show that unit does not leak
- California requires berms to be described in the technical design report
- California addresses laboratory procedures/personnel in the CQA plan
- Maryland uses ELLS when investigating problems
- Maryland regulations are silent on most items, however, the refuse disposal permit for sites requires most of the above
- Michigan policy is to store records for active life + 30 years
- Nebraska records are kept through the end of 30 years of post-closure
- New Jersey retains the CQA final report 30 years after closure
- New Jersey has approved several geosynthetic reinforced soil berms, however, they are not mentioned in regulations
- New York requires ELLS on upper and lower liner after drainage material is placed
- New York is silent on storage time, but usually storage time is life of facility including post closure
- North Dakota QCA reports are kept through post closure care. Guidelines require qualified QA inspectors
- Pennsylvania's regulations are silent on questions 2, 3 and 4, but have been developed based on guidance from GSI
- Texas keeps materials and reports through post closure period
- Texas allows GCLs as an additional layer of the liner system but it cannot be substituted for the required CCL
- Wisconsin has considered using GS reinforced soil berms for industrial sites on a case-by-case basis
- Wisconsin uses “qualified” instead of “certified” when describing CQA personnel

APPENDIX

	AL	AR	AZ	CA	DE	FL	HI	ID	IA	IL	IN	KY	LA	ME	MD	MI	MO	MS	MT	NE	NJ
1.How do your regulations refer to polymeric liners																					
FMLs		x	x	x			x	x	x							x		x	x	x	
Geomembranes	x			x	x	x				x	x		x	x	x		x				x
Synthetic liner/ membrane												x			x						
2.Electric Leak Location Survey (ELLS) are they																					
required																					x
optional						x			x				x				x		x		
silent	x	x	x	x (*)	x		x	x		x	x	x		x	x (*)	x		x		x	
3.Regarding destructive seam sample frequency																					
1 in 500 ft.		x				x		x	x		x	x	x			x	x		x		x
other				x		1,000 also															
silent	x		x		x		x			GSI				x	x			x		x	
4a. Are archived field sample required																					
sheet						x															
seams													x								
silent	x	x	x	x	x		x	x	x	x	x	x		x	x	x	x	x	x	x	x
4b. If required, who stored the materials and how long																					
agency																					
owner													x					x			
CQA																					
Duration																					
5a.Can CQA final reports be filed electronically																					
yes		x		x		x			x		x				x			x			
no			x							x		x	x			x	x		x	x	
silent	x				x		x	x						x							x
5b. Who stores the CQA final reports																					
agency		x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x
owner		x	x			x	x		x		x			x	x	x	x	x	x	x	
CQA									x								x				

	AL	AR	AZ	CA	DE	FL	HI	ID	IA	IL	IN	KY	LA	ME	MD	MI	MO	MS	MT	NE	NJ
5c. Is there a storage time limit for CQA final reports																					
yes							x				x	x							x	x (*)	x (*)
duration		x				x													x		
no			x	x				x	x	x			x	x	x	x (*)	x	x			
6. Are GCLs allowed in regs for the following locations																					
primary liner	x		x	x	x		x			x	x	x	x	x		x			x	x	x
secondary liner	x		x	x		x	x		x	x	x	x		x	x	x		x	x	x	x
final cover	x		x	x		x	x		x	x	x	x	x	x		x			x		x
7. Do regs address Geosynthetic reinforced soil berms to increase airspace in landfills																					
yes				x (*)																	
no		x	x			x			x				x				x			x	
silent	x				x		x	x		x	x	x		x	x	x		x	x		x(*)
8. Do your regs require "Certified" CQA personnel																					
yes		x	x	x	x				x	x	x	x		x		x		x			
no						x											x				
silent	x(*)						x	x				x			x				x	x	x
9. Do you require "accredited" labs for conformance testing																					
yes		x	x		x							**x**		**x**				**x**	**x**		
no				x (*)		**x**			**x**								**x**				
silent	x(*)						**x**	**x**		**x**	**x**	**x**			**x**	**x**				**x**	**x**
10. Do you require "certified" lab technicians to do testing																					
yes			x									x									
no				x		x			x								x				
silent	x(*)	x			x		x	x		x	x	x		x	x (*)	x		x	x	x	x

	NY	NM	ND	OH	OK	PA	RI	SD	TX	UT	VA	VT	WV	WI	WY
1.How do your regulations refer to polymeric liners															
FMLs		x	x	x		x		x	x	x	x				x
Geomembranes	x	x			x		x		x	x		x	x	x	
Synthetic liner/ membrane															
2.Electric Leak Location Survey (ELLS) are they															
required	x (*)													x	
optional										x					
silent		x	x	x	x	x (*)	x	x	x		x	x	x		x
3.Regarding destructive seam sample frequency															
1 in 500 ft.		x	x guide	x	x		x		x	x		x	x	x	
other	1/1000														x
silent						x (*)		x			x				
4a. Are archived field sample required															
sheet	x														
seams							x		x	x					
silent		x	x	x	x	x (*)		x	x		x	x	x	x	x
4b. If required, who stored the materials and how long															
agency															
owner	x						x		x	x					
CQA															
Duration	Life (*)														
5a.Can CQA final reports be filed electronically															
yes	x		x		x		x			x		x	x	x	
no															
silent		x		x	x	x		x	x		x				x
5b. Who stores the CQA final reports															
agency	x	x	x	x	x	x	x	x	x	x		x	x	x	x
owner	x	x	x	x	x	x		x	x	x	x		x		x
CQA								x					x		

	NY	NM	ND	OH	OK	PA	RI	SD	TX	UT	VA	VT	WV	WI	WY
5c. Is there a storage time limit for CQA final reports															
yes							x		x						
duration					x				x						
no	x	x	x (*)	x		x		x		x	x	x	x	x	x
6. Are GCLs allowed in regs for the following locations															
primary liner	x require	x	x	x	x	x	x	silent	x (*)		x	x	x	x	x
secondary liner	x		x		x	x	x	silent	x	x	x	x	x		x
final cover	x require		x	x	x			silent	x	x	x	x	x	x	x
7. Do regs address Geosynthetic reinforced soil berms to increase airspace in landfills															
yes													x		
no	x				x		x					x		x (*)	
silent		x	x	x	x	x		x	x	x	x				x
8. Do your regs require "Certified" CQA personnel															
yes	x	x				x		x	x	x	x	x	x	x	
no				x	x										
silent			x (*)				x								x
9. Do you require "accredited" labs for conformance testing															
yes			**x**			**x**	**x**			**x**		x	**x**	**x**	
no				**x**	**x**				**x**						
silent	**x**	**x**			**x**			**x**			x				**x**
10. Do you require "certified" lab technicians to do testing															
yes		x				x				x			x		
no				x	x										
silent	x		x		x		x	x	x		x	x		x	x