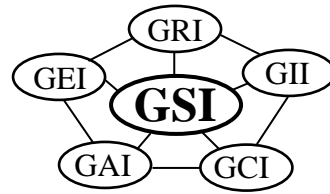


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GSI White Paper # 23

**U.S. State Environmental Agency Status with Respect To Reviewing
and Permitting Mechanically Stabilized Earth (MSE) Landfill Berms**

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U.S. State Environmental Agency Status with Respect To Reviewing and Permitting Mechanically Stabilized Earth (MSE) Landfill Berms

Many state departments across the country are being asked to approve permits for the construction of large mechanically stabilized earth (MSE) berms usually located at the perimeter of a specific solid waste landfill as shown below in the sketch and photograph.

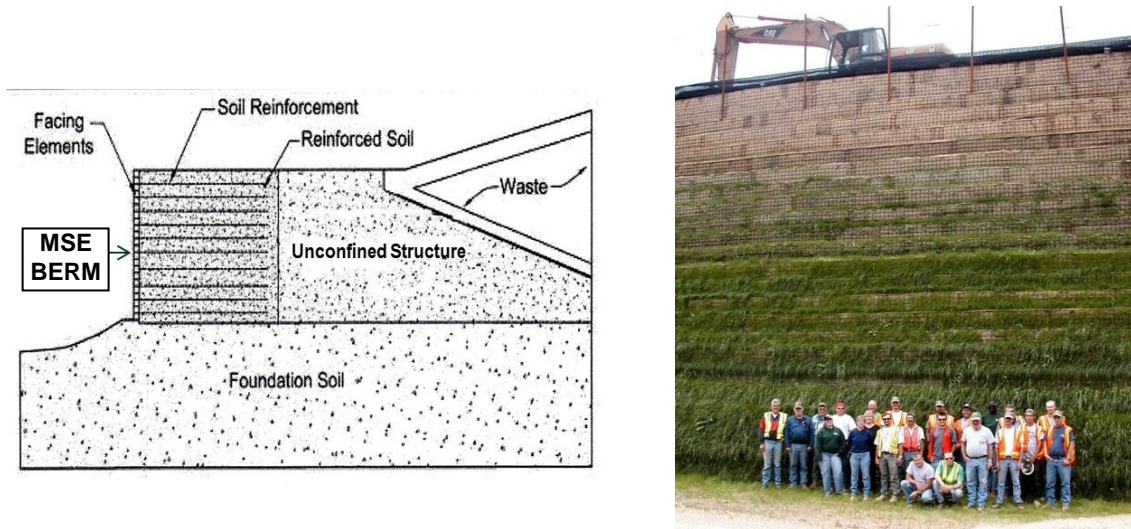


Figure 1 – Cross section and photograph of a MSE berm at a solid waste landfill.

While small landfill cell separation berms, per se, are included in most state solid waste regulations, the question often arises as to the size and details of the very large perimeter berms which is the current trend in landfilling practice.

The purpose of this survey is to assess the permitting situation within each state in the U.S.A. and to solicit opinions if we at GSI should get involved insofar as crafting agency guidelines as to how a generic set of plans and specifications should be presented and reviewed.

We are delighted to say (and thankful for) the 30 states that have responded to our survey. The information in Table 1 gives state-by-state responses and Table 2 summarizes the responses as to the nine questions asked.

Table 1 – State-by-State Responses to the Questions

<u>MSE Berms at Landfills Survey Responses</u>		AL	AZ	AR	CA	DE	FL	HI	IA	IL	IN	KY	ME	MD	MA	MI	MT	NE	ND	NH	NJ	NY	OH	OR	PA	RI	SD	TX	UT	VA	WA	WV	WI	WY	
1 A)	Have there been requests to review and permit landfill berms?	Yes	No	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	
B)	Have any landfill berms been permitted in your state?	No	No	No	Yes	Yes	Yes	No	Yes	No	No	No	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	No	Yes	No	Yes	No	No	No	No	
C)	Do you have guidelines to your review process?	Yes	No	No	Yes	No	No	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No	No	
2 A)	Is the activity of reviewing, permitting and inspection a separate and case specific item?	Yes	Yes	NA	Yes	Yes	Yes	-	No	-	Yes	-	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	NA	NA	Yes	Yes
B)	Are all the reviews done internally by your staff?	Yes	Yes	NA	Yes	Yes	No	-	No	-	Yes	-	Yes	Yes	No	-	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	-	Yes	Yes	NA	NA	Yes	Yes	
C)	Is there a specific individual or group involved?	No	No	NA	No	Yes	No	-	No	-	Yes	-	-	Yes	No	-	No	Yes	Yes	Yes	Yes	Yes	-	No	-	-	Yes	-	No	No	NA	NA	Yes	NO	
3 A)	Should GSI get involved in crafting MSE berm guidelines?	Yes	No	Yes	Yes	-	Yes	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	No	Yes	Yes	No	No	-	Yes	Yes	No	No	Yes	Yes	
B)	Are there specific aspects of MSE berms that need attention?	Yes	No	Yes	Yes	-	Yes	-	-	-	Yes	Yes	Yes	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	No	-	No	Yes	No	NA	Yes	Yes	
C)	Will you be willing to share your thoughts if we proceed?	Yes	Yes	Yes	Yes	Yes	Yes	-	-	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	-	Yes	Yes	Yes	-	Yes	Yes	No	-	-	Yes	Yes	No	Yes	Yes	Yes	

Table 2 - Summary of State Responses to Each Question

	MSE Berms at Landfills Survey Responses	Yes	No	N/A
1 A)	Have there been requests to review and permit landfill berms?	19	14	-
B)	Have any landfill berms been permitted in your state?	14	19	-
C)	Do you have guidelines to your review process?	8	25	-
2 A)	Is the activity of reviewing, permitting and inspection a separate and case specific item?	23	1	9
B)	Are all the reviews done internally by your staff?	20	4	9
C)	Is there a specific individual or group involved?	10	11	12
3 A)	Should GSI get involved in crafting MSE berm guidelines?	21	6	6
B)	Are there specific aspects of MSE berms that need attention?	20	4	9
C)	Will you be willing to share your thoughts if we proceed?	24	2	7

Regarding the three parts of Question #1; there has indeed been activity in this regard with respect to agency requests (58% yes), permitting (42% yes), and guidelines (24% yes) all being involved. Regarding the three parts of Question #2; there are case specific requests (70% yes), they are reviewed internally (61% yes), and they are reviewed by a specific individual or group within the agency (30% yes). Regarding the three parts of Question #3; should GSI get involved (64% yes), there are specific aspects of concern (61% yes) and would you be willing to share thoughts or concerns (72% yes).

Question 3B, “Are there specific aspects of MSE Berms that need attention?” is particularly interesting insofar as its response is concerned. The following specific concerns were raised by agency responders.

- Long term performance (the berm itself and also its facing)
- Stability of the berm, including seismic performance
- Construction requirements
- Design guidance
- Preparation of the berm’s foundation
- Internal and perimeter drainage
- Placement on a vertical angle and surcharge effects
- Penetrations within the reinforced zone
- Impact of leachate on MSE reinforcing materials
- Safety and maintenance after closure

Obviously, all of these concerns are valid items and targets for MSE Berm guidelines. In conclusion, the follow-up to this survey is presently being deliberated upon within GSI, its members, and its associate members.