

Financial Assurances Postclosure Maintenance Workshop
With AB 2296 Consulting Group
March 10, 2008

(rev. 4/25/08)

Discussion Paper Regarding the 1st Survey of Other States' Postclosure Maintenance Period

Code of Federal Regulation, Title 40, Section 258.61 (Subtitle D) states:

(a) Following closure of each Municipal Solid Waste Landfill (MSWLF) unit, the owner or operator must conduct post-closure care. Post-closure care must be conducted for 30 years, except as provided under paragraph (b) of this section.

(b) The length of the post-closure care period may be: (1) Decreased by the Director of an approved State if the owner or operator demonstrates that the reduced period is sufficient to protect human health and the environment and this demonstration is approved by the Director of an approved State; or (2) Increased by the Director of an approved State if the Director of an approved State determines that the lengthened period is necessary to protect human health and the environment.

In an effort to provide comparison data for the Phase II draft regulations workshops, Financial Assurances Section staff administered a survey to all 50 states. Two questions were asked regarding their business practice on postclosure maintenance.

Most state websites provided sufficient information to locate and contact the proper technical expert in the solid waste or environmental department. State responses were received from managers of the solid waste departments and/or technical experts, i.e., professional engineers. An e-mail contact list has been established and will be maintained and used periodically in future surveys.

Survey Questions:

1. Under Subtitle D, each state is authorized to shorten or lengthen the post-closure care period less than 30 years, or more than 30 years, as approved by the State Director. Has your state decreased or increased the post-closure care period of any Subtitle D municipal solid waste landfills in your state?
2. If so, what criteria did you use to make the determination?
 - 50 states participated in the survey
 - 47 states have not changed the 30-year care period
 - Three states have changed the 30-year care period as follows:
 - Nebraska decreased the period of one MSWLF to 18 years
 - *Reduced the postclosure period for a landfill that closed in 1998. Landfill provided modeling to calculate the travel time for any possible contamination to reach the groundwater. Modeling was based on an EPA model and was completed back in 1996 or 1997.*
 - Tennessee increased the period of one MSWLF to 50 years
 - *The landfill has 50 years postclosure period after the landfill is capped. No other information available at this time.*
 - California increased the period of two MSWLFs to 100 years
 - *The increased postclosure period is due to the Mega size of the landfills.*

Other Responses:

Six states are currently considering criteria to increase or decrease the postclosure maintenance period: Indiana, Minnesota, Nebraska, Ohio, Utah, and Virginia. Draft documents are currently being prepared for the states of Indiana, Minnesota, Utah, and Virginia and will be considered "guidelines" not official mandates. Wisconsin has extended its financial assurance demonstration requirements to 40 years.

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Discussion Paper regarding Results of Group Exercise for Postclosure Maintenance vs. Corrective Action

At the March 10, 2008, Postclosure Maintenance Workshop participants were requested to delineate whether certain items should be considered postclosure maintenance or corrective action. In making their choices, participants were to be guided by the following working definitions which were from the recently completed *Study to Identify Potential Long-Term Threats and Financial Assurance Mechanisms for Long-Term Postclosure Maintenance and Corrective Action at Solid Waste Landfills (Study)*.

- **“Postclosure Maintenance (PCM)”** means all activities undertaken at a closed solid waste management unit to maintain the integrity of containment features and to monitor compliance with applicable performance standards. PCM is performed regularly or periodically to deal with routine wear and tear of containment features. It does not include repairs of containment features damaged as a result of major events, such as floods, stormwater runoff, earthquakes, or fires; nor does it include repairs of containment features damaged due to mismanagement, defective materials, poor design, improper installation, or inadequate maintenance.
- **“Corrective Action (CA)”** means activities undertaken at an active or closed solid waste management unit needed to remediate a known release that has occurred to the environment, or activities that would need to be undertaken at an active or closed unit to restore the integrity of damaged containment, gas extraction, and drainage features. CA can include non-routine repairs, such as repairing covers and drainage systems damaged as a result of major events, such as floods, stormwater runoff, earthquakes, or fires; as well as repairs of containment features damaged due to mismanagement, defective materials, poor design, improper installation, or inadequate maintenance.

Although current regulations only require financial assurances for water quality related corrective actions, the working definitions take into account that CA is not limited to only what is required for financial assurances. The purpose of the group exercise was to attempt to narrow the discussion as to what items should be considered PCM and what items should be considered CA. The tally results are included as Attachment 1.

The results of the group exercise cannot be considered definitive for a number of reasons including, but not limited to:

- The workshop participants were heavily weighted toward operators and did not necessarily represent an accurate cross-section representation of all stakeholders.
- The participants were asked to “vote” during the workshop which only allowed for a few minutes to make selections.
- The participants were only allowed to choose either postclosure maintenance (PCM) or corrective action (CA) and could not consider a “what if” scenario.
- The listed items were nonspecific and participants used various assumptions to determine their voting.

Although the results of the “voting” are not definitive, some general impressions can be garnered. Many of the items were overwhelmingly in one column or the other. Moreover, the one or two votes that were in the other column in these instances could potentially be explained by the above reasons. However, some items had a more pronounced division. Moreover, the voting results for other items appear to be counterintuitive.

While the installation of a ground water (GW) cleanup system was unanimously considered to be a CA, the repair and/or replacement of that system had a split vote. The difference in the voting could be explained by whether the participant was considering a known or reasonably foreseeable CA. For a known CA, the repair/replacement costs are known and could be incorporated into PCM. A reasonably foreseeable CA has unknown costs that would be more likely to be included as a CA.

One of the counterintuitive results was for landfill gas (LFG) control. While it was almost unanimous that a GW cleanup system installation was a CA, it was almost unanimous that a LFG control system was PCM, not CA. This may possibly be explained because the majority of the participants represented either large landfill operators and/or were from areas where local air districts had strict LFG control standards. In these instances, installation of a LFG control system is essentially automatic and is primarily installed prior to final closure of a landfill. However, in many areas of the state and for smaller landfills, the installation of a LFG control system is not required unless LFG migration is an issue. Because of this dichotomy, different approaches may be necessary depending upon the location and size of landfill. Larger landfills and landfills located in certain air districts would include LFG control system costs in closure and PCM estimates; while smaller landfills may need to include LFG control costs in CA estimates rather than PCM estimates.

Another counterintuitive result was for fire damage. There was a significant split in the voting for both surface and subsurface fires. It could appear that those participants that voted for fire damage as PCM consider landfill fires (both surface and subsurface) to be an expected occurrence and be planned for.

Two other areas with divergent voting results were for drainage system replacement and LCRS replacement. One possible reason for the split vote could be the assumptions used by the participants (e.g., expected lifetimes of the items). These results may need further analyses and discussion.

Based on the group exercise, the results can be classified into three (3) categories:

1. Items with unanimous consensus.
2. Items with only a few divergent opinions, and
3. Items that have varying opinions.

As follow-up to the group exercise, California Integrated Waste Management Board (CIWMB) staff intend to address the results in the following manner:

1. Consensus – No further discussion necessary.
2. Divergent Opinion – Allow minority opinions to explain their reasoning.
3. Varying Opinions – Have further discussion at later working meetings.

The attached Tally Results indicate which items are within each category.

Attachment: Tally Results

ATTACHMENT 1

WHAT IS IT?

ITEM	PCM	CA	CATEGORY ¹
<i>Site Security</i>			
Fence – Repair	17		1
Fence – Replacement	17		1
<i>Ground Water</i>			
GW Monitoring Well – Repair	16		1
GW Monitoring Well – Replacement	17	1	2
GW Cleanup – Installation		17	1
GW Cleanup – Repair	4	13	3
GW Cleanup – Replacement	3	14	3
<i>Landfill Gas</i>			
LFG Monitoring Well - Repair	15		1
LFG Monitoring Well - Replacement	13	2	2
LFG Control - Installation	12	1	2
LFG Control – Repair	13	2	2
LFG Control - Replacement	9	5	3
<i>Drainage/Erosion Control</i>			
Drainage System - Repair	15		1
Drainage System – Replacement	9	6	3
Erosion Control/Grading	12	1	2
Flood Damage < design storm	13	1	2
Flood Damage > design storm	2	11	2
<i>Final Cover</i>			
Final Cover – Repair	16	1	2
Final Cover – Replacement			
FML	1	11	2
GCL	1	11	2
Comp C	1	11	2
Soil (ET/WB)	1	11	2
<i>Slope Stability</i>			
Slope Deformation – non earthquake	12	1	2
Slope Deformation < design EQ	11	1	2
Slope Deformation > design EQ	1	11	2
<i>LCRS</i>			
LCRS – Repair	12	1	2
LCRS - Replacement	5	9	3
<i>Fire Damage</i>			
Surface Fire	9	4	3
Subsurface Fire	6	6	3

¹ 1. Items with unanimous consensus. 2. Items with only a few divergent opinions. 3. Items that have varying opinions.



**Financial Assurances, Postclosure Maintenance, Corrective Action, and Fund Model
Working Meeting with AB 2296 Consulting Group**

April 28, 2008

Discussion Paper regarding Options/Methodologies for Classifying Landfill Potential Threats

The purpose of this discussion paper is to delineate various options California Integrated Waste Management Board (Board) staff may consider for classifying landfill potential threats.

Solid waste landfills may pose a potential environmental threat indefinitely due to the necessity for ongoing maintenance of closed facilities and for corrective actions. The Board regulates California's solid waste disposal facilities, whether currently receiving waste, closing after reaching capacity, closed according to modern standards, or historically closed prior to the 1980s. In all there are an estimated 1,756 disposal sites within the Board's regulatory purview. Of those, 282 were operational on or after January 1, 1988, when State of California requirements for solid waste landfill financial assurances (FA) and closure went into effect as a result of Assembly Bill 2448, (Eastin, Chapter 1319, Statutes of 1987).

Assembly Bill (AB) 2296 (Montañez, Chapter 504, Statutes 2006) required the Board to conduct a study that would, in part, define conditions that potentially affect solid waste landfills and that could cause potential long-term threats to public health and safety and the environment;

In order to satisfy this requirement a Risk Screening Methodology (RSM) was developed as a "high-level" screening tool to compare potential for corrective actions at landfills. The RSM was never intended to be a site-specific detailed risk assessment. The purpose was to develop a method to compare landfills to each other, i.e., a relative ranking, rather than an absolute measure of risk for any site. The score for any particular landfill does not represent the level of risk but only its relative potential for corrective action when compared to other landfills. Therefore, a high score does not mean that a particular landfill is an imminent threat. It is only that when compared to a landfill with a lower score, the higher-score landfill would appear to have a greater "potential" for corrective action.

The intent was to relate the relative threat of corrective action to factors that do or potentially can affect a landfill's impact on public health and safety and the environment. These factors are not the risks themselves, but are instead those factors that govern the presence and extent of risks to the environment or public health and safety. Given the complexity of modern landfills and the number of avenues of potential impact, many factors can be identified that govern the extent and degree of landfill impacts. The applicable factors could easily number 100 or more. Although many factors were considered for the RSM, the number of factors was limited so that the RSM would not be overly cumbersome or complicated. The factors chosen for the RSM were those for which the necessary data would be readily available and quantifiable. These factors were also those that when combined would give a reasonable representation of the relative potential for corrective action taking into consideration siting, design, and receptor factors. The siting and design factors represent the relative potential for damage or impact that may occur, while the receptor factors represent what population may be impacted. The combination of these factors

represents the relative potential for a corrective action at a landfill. Some examples of factors include seismic conditions, hydrology, landfill design and operating conditions, and proximity of human populations and sensitive habitats to landfills.

Although various uses of the RSM have been contemplated, at this time there is no specific use of the RSM that has been determined. The RSM can be a useful tool to make a high-level evaluation of a landfills relative potential to impact public health and safety and the environment. Other possible uses include: (1) estimating potential corrective actions for use in the pooled fund model; (2) setting fee structure and amount for the pooled fund to encourage progress of environmental controls; (3) potential for disbursement priority if a pooled fund is developed with limited resources (incapable of handling all expected needs); and (4) determining priority for increased Board staff inspections. Depending upon the intended use of the RSM, Board staff would consider alternative factors and/or scoring criteria for the RSM.

As an alternative to the RSM, a risk management approach similar to that utilized by insurance agencies could be developed. While this approach would be more landfill specific and would likely consider more parameters than the RSM approach, a risk management analysis would be much more expensive. While the RSM would be virtually cost-free (all necessary information is readily available and the calculation is non-complex), the risk management approach would cost approximately \$30,000 to \$50,000 per facility as insurance agencies have estimated in FA Study. An even more detailed analysis would be a risk assessment. Risk assessments are normally conducted once a release (leachate and/or gas) has occurred and the potential impact to receptors needs to be determined. The result of the risk assessment is then used to determine cleanup levels and any deed or development restrictions that may be needed based on the cleanup level. This type of analysis may cost more than \$100,000 per facility.

Since the use of the RSM tool is unknown at this time, more costly approaches are not justified. RSM provides a general overview of the relative potential for corrective action while not being burdensome or costly. If a more definitive need for a true risk analysis becomes necessary, more robust methods could be applied at that time.

**Financial Assurance Postclosure Maintenance, Corrective Action and Fund Model
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Discussion Paper Regarding Financial Assurance Postclosure Maintenance Fund Model Scenarios

Staff of the Cleanup Closure and Financial Assurances Division developed potential scenarios of pooled funds and identified the relationship of the current financial demonstrations with the alternative pooled funds. At the March 10, 2008 workshop, attention was focused on various aspects of postclosure maintenance and the potential uses of a pooled fund. In developing the various scenarios combining individual responsibility of the owner/operator, individual financial assurance demonstrations, and potential pooled fund options to create an overall demonstration of long-term assurance to the State that closed facilities will be properly maintained until the disposed waste no longer poses a threat to human health and the environment, many combinations of financial instruments can be combined together.

Staff identified five broad categories of these combinations (including the current state of financial assurances as option #1) and polled the participants in the workshop regarding their individual comfort level with each of the scenarios. Each participant was allowed three votes total, and instructed that they could distribute their votes as they desired – all on one scenario, or scattered among the options. The options available were:

1. The current state – no pooled fund, individual financial assurance demonstration valued for the first 30 years of postclosure maintenance and individual operator responsibility covering the entire postclosure maintenance needs of the closed facility;
2. An increased individual financial assurance demonstration providing a level of assurance to perpetually fund for the care of the closed facility;
3. An individual financial assurance demonstration of a reduced amount, but maintained until the waste no longer poses a threat, along with a pooled fund as a backstop assurance that care will continue if the individual operator has financial difficulties;
4. The current 30 year financial assurance demonstration and individual operator responsibility, coupled with a pooled fund as a secondary assurance (after the individual operator responsibility); and
5. The current 30 year financial assurance demonstration coupled with a pooled fund as the primary source of funds after the initial 30 years, eliminating the individual operator responsibility.

The participants chose option # 2, the increased level of individual financial assurance with no pooled fund in the greatest numbers and closely following was option #3, the individual financial assurance with a pooled fund only as a backstop assurance. A very minimal response was given to option #4, the pooled fund as a secondary assurance, and no participant was comfortable with option #5, the choice of utilizing the pooled fund as the primary source of funds for the ongoing care and maintenance of closed landfills.

All participants identified their individual concern that the choices they were asked to make did not have very clear costs associated, making the decision difficult on their part. All participants also identified their reluctance to participate in a situation of making payments to a pooled fund that they believed, on an individual basis, they may be unlikely to be able to participate the receipt of monies from at a later time.

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Discussion Paper Regarding a Reasonable Contingency for Postclosure Maintenance Cost Estimates

This discussion is based on the authority in Public Resources Code 43501 that provides for an increase in the initial closure and postclosure maintenance (PCM) cost estimates to account for cost overruns due to unforeseeable circumstances, and to provide a reasonable contingency. The dialogue for adding a reasonable contingency has been presented to the AB 2296 Working Group and other stakeholders during workshops, Committee and Board presentations. The Board directed staff to include the consideration of a reasonable contingency in Phase II of the rulemaking for financial assurances for long-term PCM at solid waste landfills.

PRC 43501 Requirement

(A) The owner or operator has prepared an initial estimate of closure and PCM costs.

(i) The board shall adopt regulations that provide for an increase in the closure and PCM cost estimates to account for cost overruns due to unforeseeable circumstances, and to provide a reasonable contingency comparable to that which is built into cost estimates for other, similar public works projects.

AB 2296 reconfirmed the Board's need to obtain accurate cost estimates for reasonable costs the Board may incur and to include a reasonable contingency requirement on the submitted estimate. In addition, prior discussions regarding the Board's ability to review estimates submitted have identified the need to receive accurate submittals of the true costs of completing projects. Inclusion of a regulatory requirement to include a reasonable contingency on PCM cost estimates will greatly assist the Board in these efforts.

Existing Regulations Requiring a Contingency

The reasoning for requiring a contingency in current regulations can be found in the Final Statement of Reasons (June 1990) for the closure of municipal solid waste landfills. The final statement of reasons states:

Contingency allowances are added to the total capital costs to account for circumstances, such as construction delays, inclement weather, etc., which would result in increased closure costs. Contingency allowances typically range from 15% – 25 % of the total. This regulation requires operators to increase the total

estimated cost of closure by a factor of 20% to account for construction cost over-runs for unforeseen events that may increase the cost of closure.

Reasons for Requiring a Contingency for Postclosure Maintenance

Funding shortfalls most likely will be due to insufficient cost estimates on which financial assurances are based. Despite all the regulatory precautions, cost estimates may turn out to be less than the true costs encountered during the lengthy PCM period. A reasonable contingency is intended to cover PCM funding shortfalls, including those due to inadequate or incomplete cost estimates and cost over runs. Typical reasons why cost estimates are too low, inadequate, or incomplete include the following:

- some necessary activities/steps and required resources omitted in cost estimate
- numbers of units and unit costs for necessary activities/steps underestimated
- cost over-runs
- optimistic assumptions about PCM
- indirect costs omitted
- costs not fully-loaded (i.e., not full costs)
- inadequate or zero contingency
- did not anticipate factors such as severe weather, labor issues, and similar material adverse events

One of the financial assurances scenarios discussed at the postclosure workshop on March 10th was an extended demonstration with a perpetual capability or contingency value added to the estimate as an option. If a contingency option were required under this scenario the costs associated with PCM activities would be increased by the contingency percentage adopted in regulations.

During Phase I workshops commenter's suggested that a 20% contingency was too high and that its applicability to postclosure costs may not be appropriate. They further suggested that contingencies are more appropriate to short-term capital costs associated with closure activities and not long-term (30+ years) maintenance projects. A couple of alternatives to a flat 20% contingency were suggested:

- Add a contingency of 20% on all capital costs associated with PCM and a lesser contingency on other PCM cost.
- A contingency (<20%) appropriate for the types of cost incurred during the PCM period.
- The need for a contingency may be reduced if there is a statewide pooled fund that covers PCM.

Board staff is still in the process of surveying other states regarding required contingencies for postclosure maintenance. The survey results will be compiled and shared as they become available.

CORRECTIVE ACTION COMPARISON

<u>LOW COST CA</u>			<u>MEDIUM COST CA</u>			<u>HIGH COST CA</u>		
No. of Occurrences	Issues	% of LOW	No. of Occurrences	Issues	% of MED	No. of Occurrences	Issues	% of HIGH
38	Ground Water Issues	48	72	LFG Migration	51	50	Ground Water Issues	77
10	Slope Failure	13	47	Ground Water Issues	34	4	Liner Issues	6
8	LFG Migration	10	7	Surface Water	5	3	LFG Migration	5
5	Fire Sub-Surface	6	4	Waste Boundary Issues	3	2	Surface Water	3
3	Waste Boundary Issues	4	3	Liner Issues	2	2	Slope Failure	3
3	Fire	4	2	Slope Failure	1	1	Waste Boundary	2
3	Erosion	4	1	Sed Pond Washed Out	1	1	Legal Issues/early closure	2
2	Litter	3	1	Ponding/settling	1	1	Drainage	2
2	Liner Issues	3	1	Erosion	1	1	Class II Waste Pit	2
2	Daily Cover high Se	3	1	Cover	1	1		
1	Surface Water	1	1	Condensate	1			
1	Illegal Dumping	1						
1	Earthquake Fault/increased monitoring	1						
1	Cover	1						
80		102	140		101	65		102
		Does Not Add to 100% Due to Rounding				Does Not Add to 100% Due to Rounding		

<u>TOTAL CA</u>		
No. of Occurrences	Issues	% of TOTAL
135	Ground Water Issues	47
83	LFG Migration	29
14	Slope Failure	5
10	Surface Water	4
9	Liner Issues	3
8	Waste Boundary Issues	3
5	Fire Sub-Surface	2
4	Erosion	1
3	Fire	1
271	(285 Total)	95

