

Solid Waste Industry Group

**Sanitation Districts of Los Angeles County
San Bernardino County Department of Public Works Solid Waste Division
Ventura Regional Sanitation District
OC Waste & Recycling
Rural Counties' Environmental Services Joint Powers Authority
Riverside County Waste Management Department
Salinas Valley Solid Waste Authority
Kern County Waste Management Department
Fresno County Public Works & Planning
Monterey Regional Waste Management District
League of California Cities
California State Association of Counties
Solid Waste Association of North America, California Chapters
City of Sunnyvale
City of Santa Cruz
Lassen Regional Solid Waste Management Authority
Waste Management
Republic Services
Waste Connections
Recology**

October 15, 2010

Mr. Watson Gin
Project Manager
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Dear Mr. Gin:

**CalRecycle's Proposed Best Management Practices (BMPs) for
Preparing Site-Specific Non-Water Quality Corrective Action Plans**

The Solid Waste Industry Group (SWIG) appreciates the opportunity to further comment on CalRecycle's guidance document for preparing site-specific non-water quality corrective action (CA) plans. The purpose of the CA plan is to estimate the cost of any non-water quality CA that may occur in the future as a result of a reasonably foreseeable catastrophic event. The extent of repairs (corrective action) that the landfill operator is to assume depends on the severity of the hypothetical catastrophe. CalRecycle has proposed catastrophes (causal events) so extreme and so improbable that they are not, by any

measure, “reasonably foreseeable.” The financial assurance regulations that were adopted by CalRecycle in 2009 mandate that the CA plans be based on what is “reasonably foreseeable” and site-specific. The signatories to this letter, which collectively represent the vast majority of the solid waste management infrastructure in California, find these causal events (presented in the guidance document as BMPs) unacceptable. We instead propose alternative BMPs for each causal event (summarized in Attachment 1 and discussed below).

Our previous comment letter dated October 4, 2010 focused solely on the seismic portion of the guidance document, proposing an alternative BMP for earthquakes that reflect the current standard of practice for evaluating seismic hazards for most civil and structural engineering design projects in California. This comment letter addresses all the remaining BMPs, which incorrectly assume that what is theoretically possible – no matter how improbable or remote – is reasonably foreseeable.

What is Reasonably Foreseeable?

Reasonably foreseeable is what is likely or can be predicted to occur in the not too distant future with some degree of certainty based on empirical, historical, or scientific evidence. It is not of such low probability that the chances of it occurring at any given moment are extremely remote, becoming speculative in nature. Any of the following criteria can be used to disqualify a causal event from being considered reasonably foreseeable:

- *Extreme Uncertainty in Quantification or Estimate is Questionable* – The event is so improbable and such an outlier that there is very poor accuracy or tremendous uncertainty in quantifying the impact. An example is the 1,000-year 24-hour storm, where in October 2007 the National Oceanic and Atmospheric Administration (NOAA) considered discontinuing the publication of 1,000-year precipitation frequency estimates because of the “severe uncertainty associated with computing such extreme events.”¹
- *Extremely Low Probability of Occurrence* – The severity of certain types of causal events (earthquakes, precipitation, and floods) is determined by the probability of such an event occurring in any given year. As the probability of it occurring approaches zero, however, the causal event is so improbable and so infrequent that it can no longer be considered reasonably foreseeable. It is instead considered an “extreme event” that is extremely unlikely to occur and too speculative to predict. For example, there is a 0.1 % chance of a 1,000-year 24-hour storm occurring in any given year. In other words, there is a 99.9% chance of it not occurring. Such a storm is considered an extreme event, not a reasonably foreseeable event. As another example, the Federal Emergency Management Agency (FEMA) defines an “extreme flood as a 0.2% chance of exceedance (500-year flood).”²

¹ 2008 California Extreme Precipitation Symposium, Presentation on Updating California Precipitation Frequency Estimates by the Chief of Hydrologic Science and Modeling Branch of NOAA

² 2007 California Extreme Precipitation Symposium, Presentation on Extreme Flood Concepts, An Historical Perspective, by a Senior Advisor for Institute for Water Resources, U.S. Army Corps of Engineers

- *Ignores Fact or Real Cases of Epic Catastrophic Events (in California)* – There are several real cases in which severe fires have impacted landfills. While these fires may have destroyed homes and structures, the damage to the landfill was minimal. Landfills often act as a firebreak given the significant surface area with dirt. For example, the fire that impacted Olinda Alpha Landfill in Orange County primarily damaged the landfill gas collection header pipes around the perimeter of the landfill. While it was one of the largest fires in Orange County’s history, about 20 percent of these landfill structures were lost or damaged. Assuming greater losses, as proposed in the guidance document, lacks credibility in face of historical facts or actual cases. Consequently, hypothetical causal events that are contradictory to fact cannot, by any measure, be considered “reasonably foreseeable.”

Proposed Alternative BMPs

The overall framework that we propose for developing site-specific non-water quality CA cost estimates is summarized in Attachment 1. SWIG proposes two tiers of evaluation for each causal event:

- *Landfill Design Requiring No Corrective Action Cost Estimate* – Should the landfill feature be designed to a standard above or sufficient to withstand a reasonably foreseeable causal event, then it will be assumed that no damage or a de minimus amount of damage would occur. Consequently, no non-water quality CA cost estimate would be required for that causal event.
- *Reasonably Foreseeable Causal Event Exceeding Class III Landfill Design Standard* – Should the landfill feature not be designed as stated above, then a non-water quality CA would be estimated based on a reasonably foreseeable causal event impacting the landfill that exceeds the existing Title 27 minimum design standard for Class III landfills. SWIG proposes a range of what is reasonably foreseeable for that causal event, which allows for the third party expert or consultant to determine what specific causal event is appropriate for the landfill given site-specific characteristics and hazards.

The following are the specific causal events/BMPs that we propose:

Precipitation

For rain events or precipitation, we propose a 24-hour storm with a return period ranging from 200 to 500 years as the reasonably foreseeable causal event. The third party consultant would determine the specific return period based on site-specific characteristics and hazards, some of which may include risk factors from the AB 2296 Study³. Should the landfill drainage system be designed to accommodate a storm event greater than a 500-year 24-hour storm, then no corrective action cost estimate would be required. This BMP framework is presented in the table below.

³ Study to Identify Potential Long-Term Threats and Financial Assurance Mechanisms for Long-Term Postclosure Maintenance and Corrective Action at Solid Waste Landfills, November 2007.

Existing Class III Design Standard	Reasonably Foreseeable Causal Event for which Corrective Action Costs are to be Estimated	Landfill Design Standard in which a Corrective Action Cost Estimate is Not Required
100-Year 24-Hour Storm	200 to 500 year 24-hour storm, depending on the results of a site-specific hazard analysis	Greater than 500-year 24-hour storm

CalRecycle staff proposes a 1,000-year 24-hour storm as the BMP primarily because the Central Valley Regional Water Quality Control Board (Regional Board) included the rainfall estimate of such a storm in the waste discharge requirements (WDRs) for a couple of Class II disposal facilities. These are not Class III municipal solid waste (MSW) landfills. Furthermore, according to a technical paper written by Dana Woodall and Jay Lund of the University of California, Davis, which was published in the Journal of Contemporary Water Research and Education, “the Central Valley level of protection standard is a rain event with a return period ranging from a 200 to 500 years.”⁴

A 1,000-year 24-hour storm is an extreme event where there is tremendous uncertainty in estimating the amount of rainfall. As stated above, in 2007, NOAA considered discontinuing the publication of 1,000-year precipitation frequency estimates because of the “severe uncertainty associated with computing such extreme events.” Consequently, just because a rainfall estimate of such a storm is included in a WDR it does not mean it is accurate or meaningful. A 1,000-year 24-hour storm is not a reasonably foreseeable causal event.

Site-specific characteristics need to be considered in the CA plans. In California, the average annual precipitation varies greatly across the state. Some regions have very arid climates while others are prone to wet weather. In a 2003 CalRecycle report⁵ the contractor (Geosyntec) found that about 75 percent of the 224 landfills surveyed are located in areas with an average annual precipitation of less than 20 inches. Only 8 landfills are located in areas with relatively high precipitation (50 inches per year or greater).

Flood

For floods, we propose a BMP framework where the reasonably foreseeable causal event is commensurate with the FEMA flood risk designation for the area where the landfill is located. For landfills located in an area designed by FEMA as low risk, the causal event would be a 100-year flood. This would not exceed the Class III design standard, so no corrective action cost estimate would be required. For landfills located in an area designated by FEMA as moderate risk, the causal event would be a flood with a return period ranging from 200 to 500 years. The third-party consultant would determine the specific return period based on site-specific characteristics and hazards, some of which may include risk factors from the AB 2296 Study. For landfills located in high flood risk

⁴ *Dutch Flood Policy Innovations for California*, by Dana L. Woodall and Jay R. Lund, published in Journal of Contemporary Waste Research & Education, Issue 141, Pages 45-59, March 2009

⁵ Landfill Facility Compliance Study Phase I Report – Results of Screening Analyses of 224 California MSW Landfills, 2003 CalRecycle Report written by Geosyntec under contract

areas, the causal event is a 500-year flood. If the elevation of the landfill is above the 500-year flood plain, then no corrective action cost estimate is required. It will be assumed that no damage or a de minimus amount of damage would occur. A 200-year flood would be used for undesignated FEMA areas. This BMP framework is presented in the table below.

Existing Class III Design Standard	Reasonably Foreseeable Causal Event for which Corrective Action Costs are to be Estimated	Landfill Design Standard in which a Corrective Action Cost Estimate is Not Required
100-Year Flood	<ul style="list-style-type: none"> • 100-year flood for landfills in areas designated by FEMA as low risk, so a de minimus amount of damage is assumed • 200-year flood for landfill in areas undesignated by FEMA • 200 to 500-year flood for landfills in areas designated by FEMA as moderate risk, depending on site-specific hazard analysis • 500-year flood for landfills in areas designated by FEMA as high risk 	Elevation of landfill is above the 500-year flood plain

CalRecycle staff proposes that a 500-year flood be the causal event. As indicated above, FEMA considers a 500-year flood an “extreme flood,” where in any given year there is a 0.2% chance of it occurring. This flood event should not be considered reasonably foreseeable. The causal event should instead be commensurate with the level of flood risk.

Our proposed BMP for floods exceeds current design standards. The 100-year storm is typically used for designing flood control protection from major storms and is the current design standard for Class III landfills under Title 27. In an October 7, 2008 presentation to the National Committee on Levee Safety, Dr. Gerry Galloway of the Water Policy Collaborative recommended that a 200-year flood be the standard of flood protection by 2030 in order to provide the “highest level of risk reduction feasible to existing urban areas.”⁶

Fire

For fires, we propose a BMP framework that is commensurate with the fire risk and reflective of real cases of epic catastrophic fires in California. As mentioned above, the fire that impacted Olinda Alpha Landfill in Orange County primarily damaged the landfill gas collection header pipes around the perimeter of the landfill. While it was one of the largest fires in Orange County’s history, only about 20 percent of these surface structures were destroyed or damaged. The BMP for catastrophic fires should be in line with these facts. Additionally, the California Department of Forestry and Fires (Cal Fire) and local

⁶ Background presentation to National Committee on Levee Safety
 (Hhttp://www.nfrmp.us/ncls/docs/Gerry_Galloway_History_of_Levees.pdfH)

agencies have developed hazard maps that show low, moderate, high, or very high fire risk zones. The zones are reflective of the fire risk. The table below presents the BMP framework we propose, which takes into consideration all the above.

Existing Class III Design Standard	Reasonably Foreseeable Causal Event for which Corrective Action Costs are to be Estimated	Landfill Design Standard in which a Corrective Action Cost Estimate is Not Required
Not applicable	<ul style="list-style-type: none"> • For landfills in areas designated as moderate risk, it will be assumed that 10% of the combustible surface structures within 100 feet of landfill perimeter⁷ are destroyed • For landfills in areas designated as high risk, it will be assumed that 20% of the combustible surface structures within 200 feet of landfill perimeter are destroyed • For landfills in areas designated as very high risk, it will be assumed that 30% of the combustible surface structures within 300 feet of landfill perimeter are destroyed 	For landfills in areas designated as low fire risk, no corrective action estimate is required

CalRecycle’s proposed BMP assumes that up to 80 percent of the combustible surface structures within 300 feet of the landfill cell boundaries would be destroyed. This level of destruction exceeds real cases of catastrophic fires impacting landfills in California. Furthermore, CalRecycle staff proposes a 20 percent contingency to replace surface structures even if the landfill is not located in any fire hazard zone. This is certainly not reasonably foreseeable.

Seiche

CalRecycle staff proposes that a seiche be a reasonably foreseeable causal event for a landfill that is located within ½ mile of a lake or bay. Given that the only known occurrence of seiche in California was during prehistoric times around Lake Tahoe, seiches are not reasonably foreseeable.

Tsunami

Tsunamis should only be a reasonably causal event if the landfill is located in tsunami inundation zone as designated by the California Department of Conservation or local emergency agency and the topography between the landfill and the coastline is not higher than the predicted wave height. This BMP framework is shown in the table below.

⁷ Permitted facility boundary

Existing Class III Design Standard	Reasonably Foreseeable Causal Event for which Corrective Action Costs are to be Estimated	Landfill Design Standard in which a Corrective Action Cost Estimate is Not Required
Not applicable	If the landfill is located in a tsunami inundation zone as designated by the California Department of Conservation or local emergency agency <u>and</u> the topography between the landfill and the coastline is not higher than the predicted wave height, then a tsunami is a potential causal event.	Landfill is not located in a tsunami inundation zone

Site-Specific Hazard Analysis

The financial assurance regulations that were adopted by CalRecycle allow for site-specific factors, hazards, or characteristics to be considered when developing the non-water quality CA cost estimate. Certain factors, such as immediate proximity to a fault and soils subject to liquefaction, increase the seismic hazard or risk for the landfill. The third party consultant preparing the CA plan should take this into account when selecting the specific return period for the potential earthquake impacting the landfill.

The risk factors contained in the AB 2296 Study, however, should not be the driving criteria for selecting a specific causal event or return period. It was the opinion of many stakeholders at the time that the AB 2296 risk factors were essentially worthless as a risk measurement tool. The risk factors were overly simplistic, unrelated to landfill integrity, not based on any engineering or science, and had no direct connection to a release or probability of CA.⁸

As indicated above, SWIG is proposing a CA estimation framework where the causal events that are used are both site-specific and reasonably foreseeable, and that they are commensurate with the risk level for that landfill. As currently proposed by CalRecycle, this is not the case. Your consideration of our proposed framework and specific BMPs is very much appreciated.

Yours very truly,

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⁸ See Sanitation Districts of Los Angeles County letter dated November 1, 2007 to Ms. Bobbie Garcia of CalRecycle on Draft Report to Identify Potential Long-Term Threats and Financial Assurance Mechanisms for Long-Term Postclosure Maintenance and Corrective Action at Solid Waste Landfills

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Attachment 1
Causal Event BMPs Proposed by SWIG

Type of Causal Event	Existing Class III Landfill Design Standard	Reasonably Foreseeable Causal Event for which Corrective Action Costs are to be Estimated	Landfill Design Standard in which a Corrective Action Cost Estimate is Not Required
Earthquake	Maximum Probable Earthquake (MPE) In 100 Year Period	For final refuse-fill slope or final cover systems not designed to the MCE, operators would evaluate the potential damage caused by a seismic event with a return period ranging from 200 to 475 years using the probabilistic method. The third party involved in developing the corrective action plan would determine the specific return period after evaluating all site-specific factors, some of which may include risk factors identified in the AB 2296 study.	Maximum Credible Earthquake (MCE): If the landfill's final refuse-fill slope or final cover systems are designed to the MCE, then no corrective action cost estimation or analysis is required.
Precipitation	100-Year 24-Hour Storm	200 to 500 year 24-hour storm, depending on results of a site-specific hazard analysis	Drainage capacity greater than 500-year 24-hour storm
Flood	100-Year Flood	<ul style="list-style-type: none"> • 100-year flood for landfills in areas designated by FEMA as low risk, so a de minimus amount of damage is assumed • 200-year flood for landfill in areas undesignated by FEMA • 200 to 500-year flood for landfills in areas designated by FEMA as moderate risk, depending on site-specific hazard analysis • 500-year flood for landfills in areas designated by FEMA as high risk 	Elevation of landfill is above the 500-year flood plain
Fire	Not applicable	<ul style="list-style-type: none"> • For landfills in areas designated as moderate risk, it will be assumed that 10% of the combustible surface structures within 100 feet of landfill perimeter are destroyed • For landfills in areas designated as high risk, it will be assumed that 20% of the combustible surface structures within 200 feet of landfill perimeter are destroyed • For landfills in areas designated as very high risk, it will be assumed that 30% of the combustible surface structures within 300 feet of landfill perimeter are destroyed 	For landfills in areas designated as low fire risk, no corrective action estimate is required

Tsunami	Not applicable	If the landfill is located in a tsunami inundation zone as designated by the California Department of Conservation or local emergency agency <u>and</u> the topography between the landfill and the coastline is not higher than the predicted wave height, then a tsunami is a potential causal event.	Landfill is not located in a tsunami inundation zone
Seiche is not a reasonable foreseeable event			