

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT
Air Pollution Control Division/Stationary Sources Program

INTER-OFFICE COMMUNICATION

TO: Stationary Sources Program Staff, Local Agencies, and Regulated Community
FROM: Matthew S. Burgett, P.E.
DATE: July 3, 2012
RE: **PS Memo # 12-01 – PCS Calculation Procedures**

**Petroleum Contaminated Soils (PCS) at Landfills:
Emission Estimation Procedures**



**Colorado Department
of Public Health
and Environment**

PS Memo # 12-01 – PCS Calculation Procedures

This document establishes the Division's approach to estimating emissions at landfills that accept a considerable amount of petroleum contaminated soils (PCS). This document does not apply to land treatment facilities (i.e. landfarms) that accept PCS.

The term "petroleum contaminated soils" refers to soils contaminated by leaking storage tanks and spills, as well as soils impacted by oil and gas operations.

The Division has developed this calculation procedure to provide landfills with an approved method to estimate emissions from PCS at landfills. This memo should provide clarity on a Division-approved method to calculate PCS emissions at landfills, and also allow for expedited review of landfill applications involving PCS. This Division-approved method may not be the only acceptable way for a landfill to quantify PCS emissions. Landfills wanting to estimate PCS emissions using an alternative method (e.g. a mass balance approach) should work with the Division's permit engineers on a case-by-case basis.

Questions on these procedures may be addressed to the CDPHE Air Pollution Control Division at:

Main phone: (303) 692-3150
comments.apcd@state.co.us

Other Resources:

Air Quality Control Commission Regulations:
<http://www.cdphe.state.co.us/regulations/airregs/index.html>

EPA's AP-42, *Compilation of Air Pollutant Emission Factors*
<http://www.epa.gov/ttn/chief/ap42/index.html>

The Landfill Gas Emissions Model (LandGEM)
<http://www.epa.gov/ttn/chief/efpac/esttools.html>

APCD Compliance Test Manual
<http://www.cdphe.state.co.us/ap/down/comp.pdf>

Hazardous Materials and Waste Management Division Solid Waste and Materials Management Program's Petroleum Contaminated Soil Management (under revision at this time)
<http://www.cdphe.state.co.us/hm/sw/swpubs.htm>

Colorado Oil and Gas Conservation Commission's 900 Series Exploration and Production Management Rules
http://cogcc.state.co.us/RR_Docs_new/rules/900Series.pdf

PCS at Landfills:

The Colorado Air Pollution Control Division (Division) believes EPA’s Landfill Gas Emission Model (LandGEM) does not appropriately estimate landfill gas emissions when the landfill accepts considerable amounts of petroleum contaminated soils (PCS) and the standard LandGEM defaults are used. The background document for AP-42 Section 2.4 (EPA/600/R-08-116, September 2008) discusses the potential for increased non-methane organic compound (NMOC) emissions due to high NMOC concentrations in these situations. In addition, AP-42 identifies higher concentrations of specific pollutants at landfills that practice co-disposal. Co-disposal is identified in AP-42 as landfills that accept, or have accepted, non-residential wastes. The Division believes it is appropriate to allow landfills that accept a considerable portion of PCS to use the co-disposal defaults when using LandGEM to estimate total landfill gas emissions (including emissions from PCS) for permitting purposes. Note: the default concentrations for NMOC as specified in the final New Source Performance Standards (NSPS) and Emission Guidelines rules must be used for purposes of compliance with those rules. The Division’s PCS calculation procedures do not modify the requirements found in NSPS WWW.

The Division will allow the use of the co-disposal default values for use in LandGEM, or site-specific testing (e.g. Tier II, EPA Method 25C), to determine the appropriate landfill gas pollutant emissions for landfills that accept a considerable amount of PCS in any calendar year. The specific co-disposal values are identified in Table 1 below. Table 2 summarizes additional LandGEM parameters for use in particular situations.

The Division considers the following a considerable amount of PCS:

- PCS acceptance at the landfill is greater than or equal to 15.0% of the total solid waste acceptance at the landfill on mass basis in any calendar year.
 - A landfill may exceed the 15.0% calendar year limit above and not be considered to have accepted considerable PCS if the landfill can prove that PCS acceptance has not exceeded 8.0% of the total solid waste acceptance at the landfill on a mass basis in any rolling five-year average. This will allow landfills that have historically accepted very little PCS to avoid triggering the “considerable PCS” status based on only one high year.
- This method for determining if considerable PCS has been accepted, and the calculation procedures of this memo, shall apply to the calendar years 2012 and beyond.

TABLE 1 – Co-disposal Values

Pollutant	Co-disposal Concentration
NMOC (as hexane)	2420 ppmv
Benzene	11.0 or 11.1 ppmv ¹
Toluene	165 or 170 ppmv ¹
VOC (% of NMOC)	85% by weight (2060 ppmv as hexane)

¹ There were slight differences in the default concentrations between AP-42 2.4 and LandGEM. The Division will accept either default value.

TABLE 2 – Additional LandGEM Parameters

Parameter	Small Quantities of PCS		Considerable Quantities of PCS	
	Emission Calculation & Permit Limits	NSPS Calculation	Emission Calculation & Permit Limits	NSPS Calculation
Methane Generation Rate Constant "k"	0.02	0.02	0.02	0.02
Methane Generation Potential "Lo"	100	170	100	170
NMOC (as hexane)	956 ppmv ¹ , Tier 2 Result, or other Division approved value	4000 ppmv or Tier 2 Result	2420 ppmv or Tier 2 Result	4000 ppmv or Tier 2 Result
Benzene	Default	N/A	11.0 or 11.1 ppmv ²	N/A
Toluene	Default	N/A	165 or 170 ppmv ²	N/A
VOC (% of NMOC)	39%	N/A	85% by weight (2060 ppmv as hexane)	N/A

¹ This value is based upon a survey of Colorado landfills conducted by the Waste Industry Air Coalition and Solid Waste Tech magazine.

² There were slight differences in the default concentrations between AP-42 2.4 and LandGEM. The Division will accept either default value.

For the purpose of this guidance document only, Petroleum Contaminated Soils shall include the following:

- Soil which has become contaminated with one or more of the following liquid products made from petroleum: all forms of fuel known as gasoline, diesel fuel, jet fuel, kerosene, grades 2 through 6 fuel oils, crude oil, bunker C oil, residual oils, condensate, natural gas liquids; and petroleum based lubricating, hydraulic, and mineral oils. This contamination often occurs due to storage tank leaks or spills.
- Petroleum impacted soils from the exploration, production, processing, transportation, storage, and distribution of oil and natural gas. This shall include, but is not limited to, petroleum impacted soils as a result of spills, drilling mud and cuttings, sand and liquids recovered during hydraulic fracturing of a well, tank bottom sediments, reclaimed waste pits from drilling new wells and stimulating existing wells, workover fluids, pigging wastes from gathering flow lines, and natural gas gathering, processing, and storage wastes.
- Soils with Total Petroleum Hydrocarbon (TPH) concentrations greater than 500 mg/kg. Valid and representative testing must occur should a facility want to exclude contaminated/impacted soils from being considered PCS based on this threshold. Records of the testing must be maintained for each soil load received to utilize this threshold. Records will be subject to Division review. TPH includes both Gasoline Range Organics (GRO) plus Diesel Range Organics

(DRO). GRO is often referred to as Total Volatile Petroleum Hydrocarbons (TVH), which includes C₆ through C₁₀. DRO is often referred to as Total Extractable Petroleum Hydrocarbons (TEH), which includes C₁₀ through C₂₈.

Site-specific Testing:

If a landfill meets the qualifications above (i.e. landfill has accepted considerable PCS), the co-disposal concentrations must be used in emission calculations for the remaining life of the landfill, including the post-closure period. The landfill has the option to conduct site specific testing in lieu of using the co-disposal values. The concentrations established via testing shall be valid for a period of five years. The landfill may conduct site-specific testing every five years to establish the appropriate pollutant concentrations. Should three consecutive tests (over 15 years) be fairly consistent, the landfill may submit documentation to the APCD to request continued use of appropriate pollutant concentrations without the need to re-test every five years. The Division will review and respond to these requests on a case-by-case basis. It may not be appropriate to use the co-disposal default value(s) should any site-specific testing reveal pollutant concentrations at a landfill that are higher than the default value(s). Please contact the Division to discuss your options in such cases. Closed (capped) landfills may use the most recent results from a pre-closure Tier II test since testing a capped landfill may be unworkable.

Proper procedures must be followed when conducting emission compliance tests in Colorado. These procedures are documented in the Division's *Compliance Test Manual*. Some of the requirements include:

- A source test protocol shall be received by the Air Pollution Control Division at least thirty calendar days prior to the proposed test date.
- The test methods and procedures must be approved IN ADVANCE.
- The owner or operator of an affected facility shall provide the Division 30 days prior notice of the performance test to afford the Division the opportunity to have an observer present.
- Performance test(s) shall be conducted and the data reduced in accordance with the applicable reference test methods
- Additionally, testing that potentially will disturb the integrity of the facility's final cover must be approved by the Department's Permitting Unit of the Solid Waste and Material Management Program.

Reasonably Available Control Technology (RACT) Requirements:

AQCC Regulation No. 7, Section V.A. requires that "No person shall dispose of volatile organic compounds by evaporation or spillage unless RACT is utilized". This RACT requirement applies state-wide. PCS can't be used as daily cover and must be buried the same day as it is accepted at a landfill to meet the RACT requirements of Regulation No. 7, Section V.A. The Division considers this emission control approach to be presumptive RACT. Landfill permits issued by the Division will include a requirement to bury PCS the same day as it is accepted.

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A landfill can meet the RACT requirement through methods other than same-day burial. However, this would involve the submittal of a formal RACT determination and review by the Division on a case-by-case basis.

Air Pollutant Emission Notice (APEN):

Separate APENs will not be required to account for emissions from PCS at landfills. The PCS emissions are estimated using LandGEM and should be included on the landfill APEN with the other landfill emissions along with a copy of the LandGEM report. Division engineers will contact any landfill that submitted a separate PCS APEN to resolve any action needed to conform to this guidance document.

Recordkeeping:

Landfills must maintain and make available upon request records of PCS acceptance to determine if they accept a considerable amount of PCS. Permits will now include a condition to require recordkeeping of total PCS acceptance on a mass basis. Monthly records will be required based on daily tracking information. These records shall be maintained on site and made available to the Division upon request.

Landfills that are unable to directly measure the mass of incoming PCS should use another Division-approved method to estimate the mass (e.g. volume-to-mass conversion factor).

Permitting:

These emission estimation procedures are effective upon publication of this document. A landfill may need to apply for a permit modification should the potential-to-emit VOC emissions exceed the existing permit limit due to the required use of the co-disposal default values, or use of site specific values. A permit modification is not necessary solely to accept a considerable amount of PCS.

Compliance:

The Division will work with landfills that may become out of compliance with certain permit requirements with the use of the co-disposal, or site-specific, concentrations due to PCS acceptance. The Division will review these situations on a case-by-case basis.

Note: Use of the co-disposal default parameters will increase the VOC, NMOC, benzene and toluene emissions calculated with LandGEM. Total landfill gas, methane, and CO₂ emissions will not change based on the use of the co-disposal default parameters.