Post Closure Care (PCC) Termination Plans: Principles and Needs

Modified Version – March 18, 2014

Kansas
Department of Health and Environment

Air & Waste Management Association Conference – February 19, 2013

Carl E. Burkhead
Bureau of Waste Management

Purpose of Presentation:

To assist Kansas Subtitle D landfill owners & operators in the preparation of a PCC termination plan using the Allen County Landfill (ACL) as a pilot landfill.

Before getting into the heart of the presentation, I want to state that:

"A successful PCC termination plan must be based on a *predetermined monitoring plan* designed to provide the data necessary for implementing the methodology used to determine a PCC termination date."

The remainder of the presentation will demonstrate the principles and the partial results of this premise for the ACL.

A *predetermined monitoring plan* should also consider the Conservation of Mass principle (besides trend analysis) where:

Input = Output + Accumulation

Tables 1 to 3 define the first two parts of the equation so that the last part can be estimated for the ACL (First, see Figures 1a to 1d).

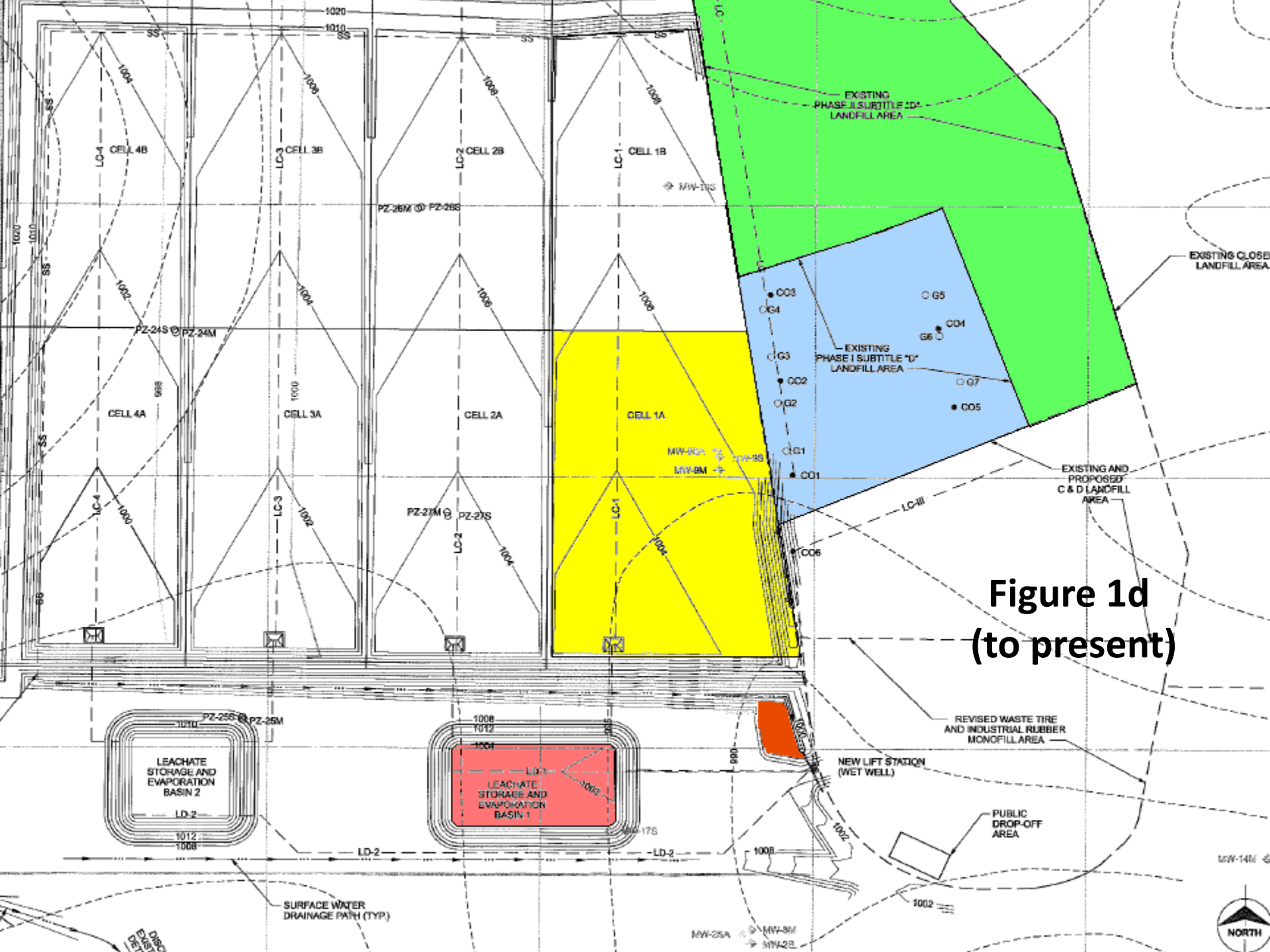


Figure 1d
(to present)

Table 1 – Ideal Input Leachate Values (ACL in green)

Values	Accounting Or Monitoring	Measurement Frequency	Data Summary
MSW et al Inputs	Tonnage	Daily	Monthly
Liquid Inputs	MSW Moisture	Estimated	Based on ppt. events
	RD&D Liquids (gallons)	As applied	Quarterly
	Leachate Recirculation (tonnage or volume)	As applied	Quarterly
	Other Liquids (e.g., Toe Drainage)	As applied	Quarterly
Climatic: Inputs	Precipitation (inches as rain or snow)	As occurs	Quarterly
Ambient	Temperature (^{o}F)	Daily (highs & lows)	Monthly
On-Site or Local Weather Station	Various Data Available	Depends on Station Daily & Monthly (Chanute)	Daily or Internet

Table 2 – Ideal Output Leachate Values (ACL in green)

Values	Phases	Frequency	Data Summary
Quantity	Individual	Monthly	Quarterly
	Combined	Monthly	Quarterly
Quality	Individual	Quarterly	Quarterly
	Combined	Quarterly & Annual	Quarterly
Temperature	Individual	Monthly	Quarterly
	Combined	Monthly	Quarterly
Storage: Tank(s)	Individual	Weekly	Annual
	Combined	Periodic?	?
Lagoon(s)	Individual	Weekly	Annual
	Combined	Periodic	?
On-site Treatment	Individual	Daily	Monthly
	Combined	As Treated	Monthly
Off-site Disposal*	Individual	Daily	Monthly
	Combined	As Hauled	Monthly

* May include POTW quantity and quality, regular or periodic, check data.

Table 3 – Ideal Output LFG Values

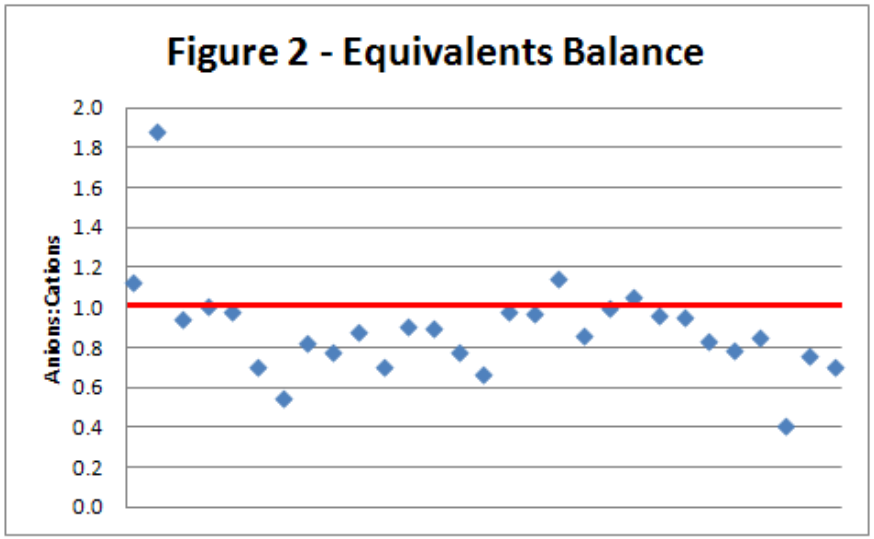
Values	Phases	Frequency	Data Summary
Quantity	Individual Combined	Monthly Quarterly	Quarterly Quarterly
Quality	Individual Combined	Monthly Quarterly	Quarterly Quarterly
Temperature	Individual Combined	Monthly Quarterly	Quarterly Quarterly
On-site Usage	Individual	Daily	Monthly
Flare	Combined	As used	Monthly
Off-site Usage*	Combined	As discharged	Monthly
Off-site CAA Migrations*	Individual Combined	Daily or Periodic Daily or Periodic	Quarterly Quarterly

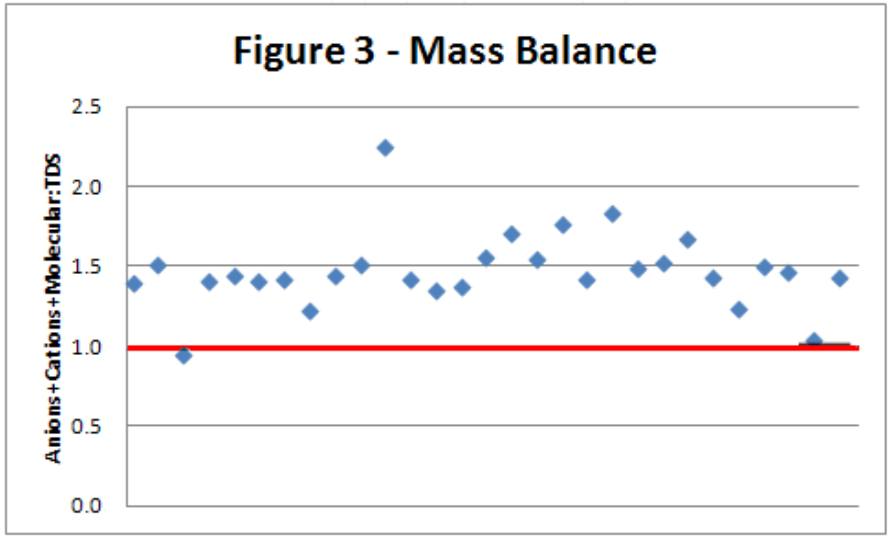
* May include users and/or government quantity and quality data.

Ways to use the collected data. To:

1. Check lab results' validity in terms of charge and mass.
2. Determine emission trends for key stability parameters (PCC Goal).
3. Establish useful correlations.
4. Use the Conservation of Mass principle to make:
   a. Water Balance
   b. Non-Water Balance:
      MSW vs. TDS + TSS + Gases
5. Meet discharge requirements (PCC Goal).

1. The ACL leachate quality data were used to check lab results validity:





2. To check for trends of key stability parameters:

Figure 4 - ACL Surrogate Organics (mg/L)

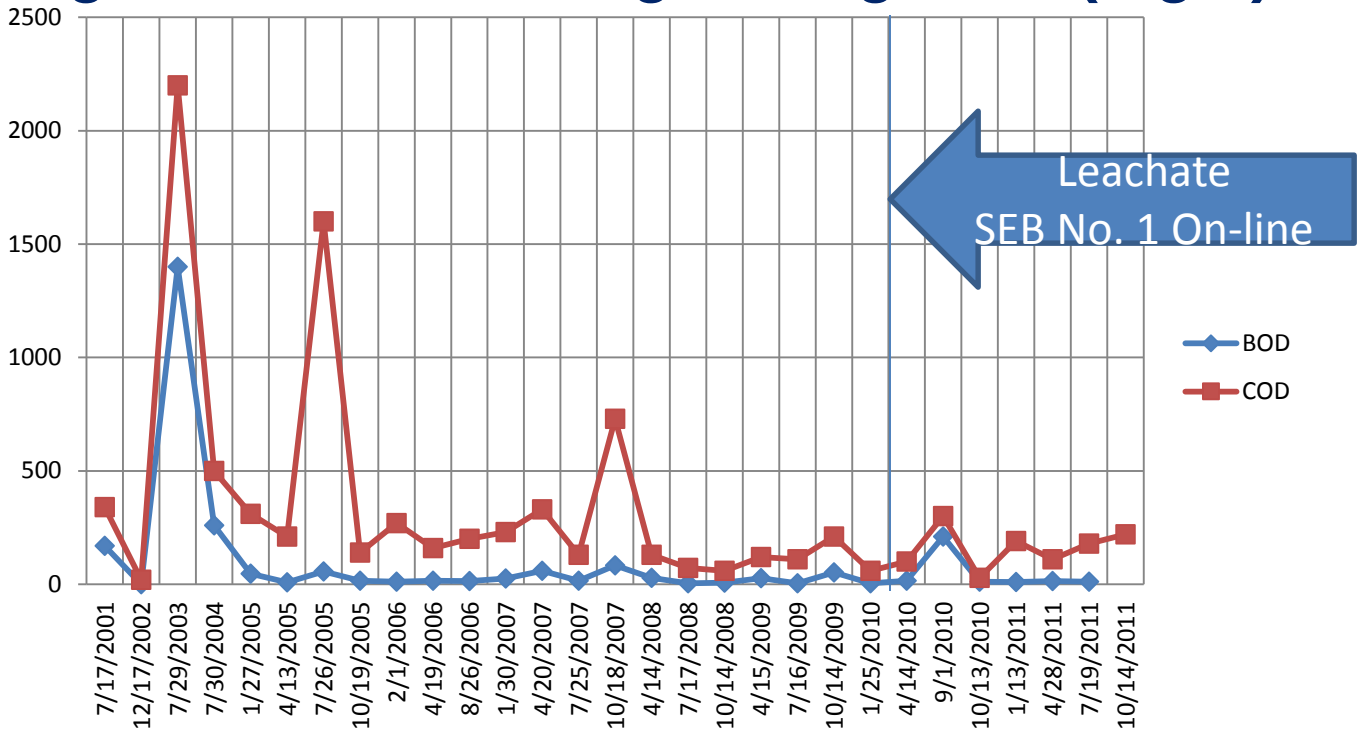


Figure 5 - TSS (mg/L)

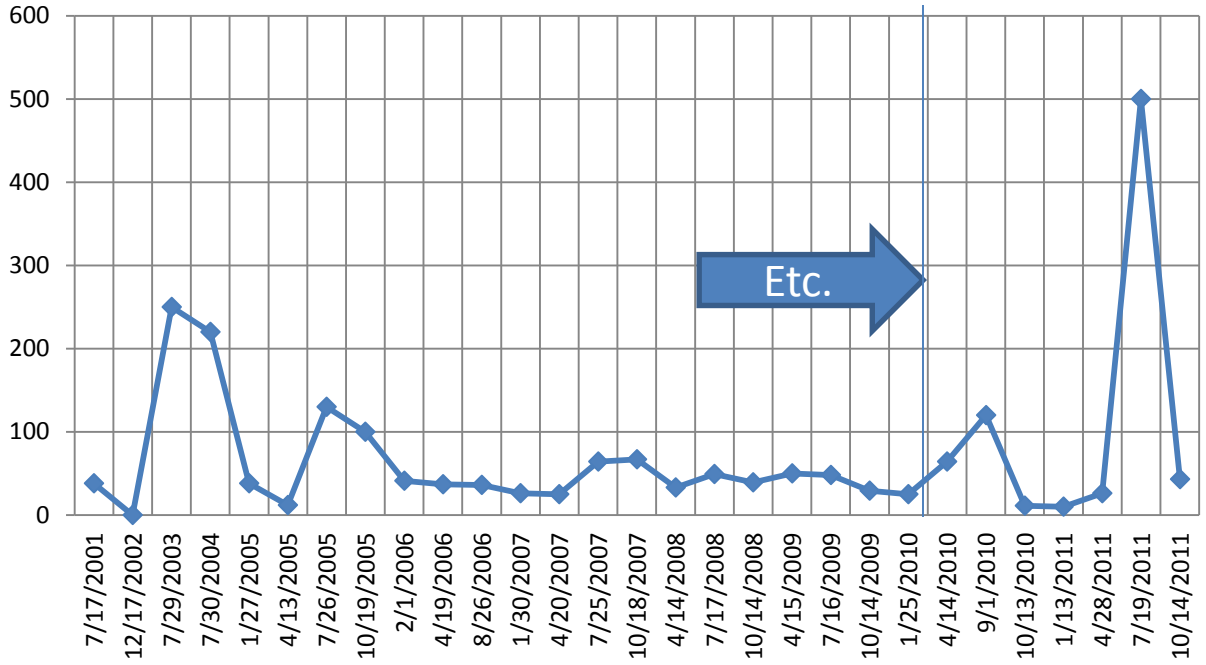


Figure 6 - Ammonia (mg/L)

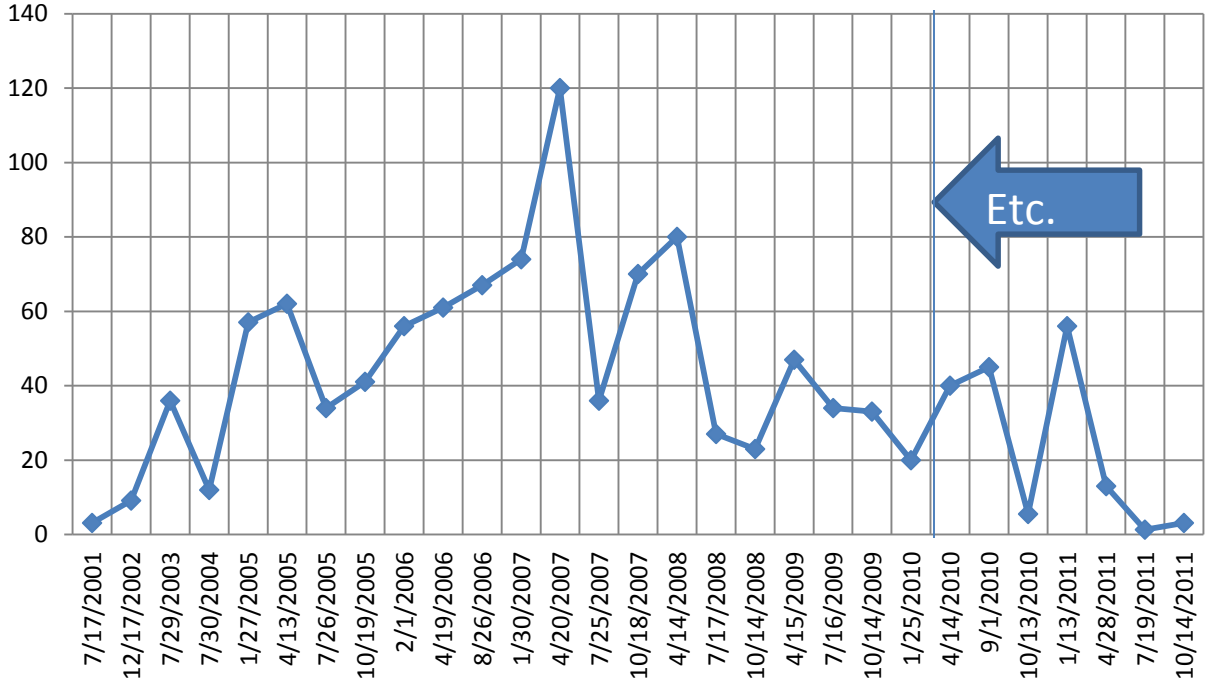


Figure 7 - pH

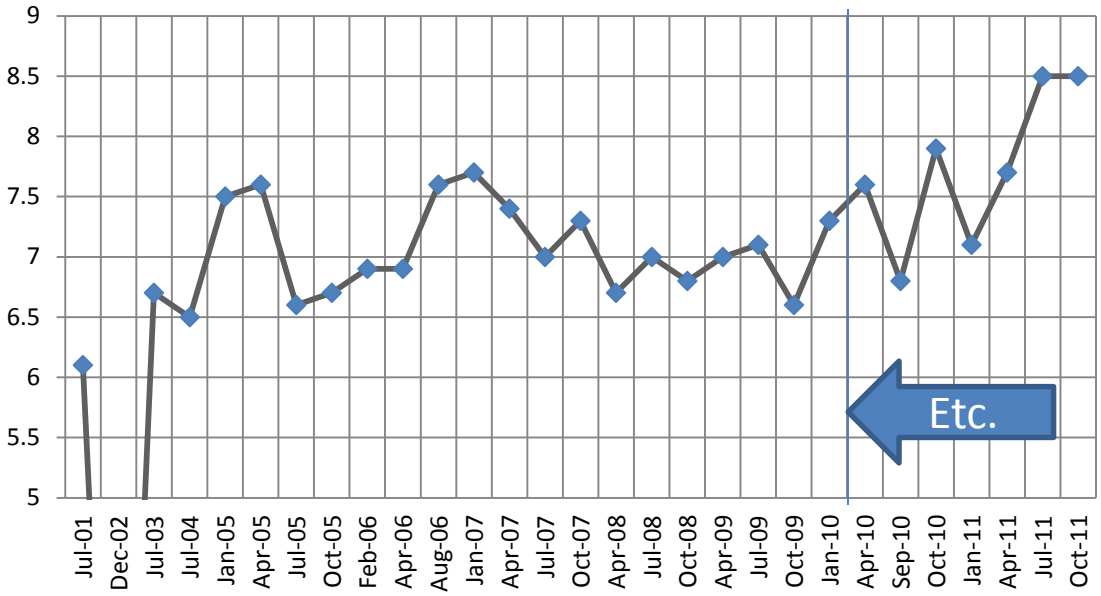
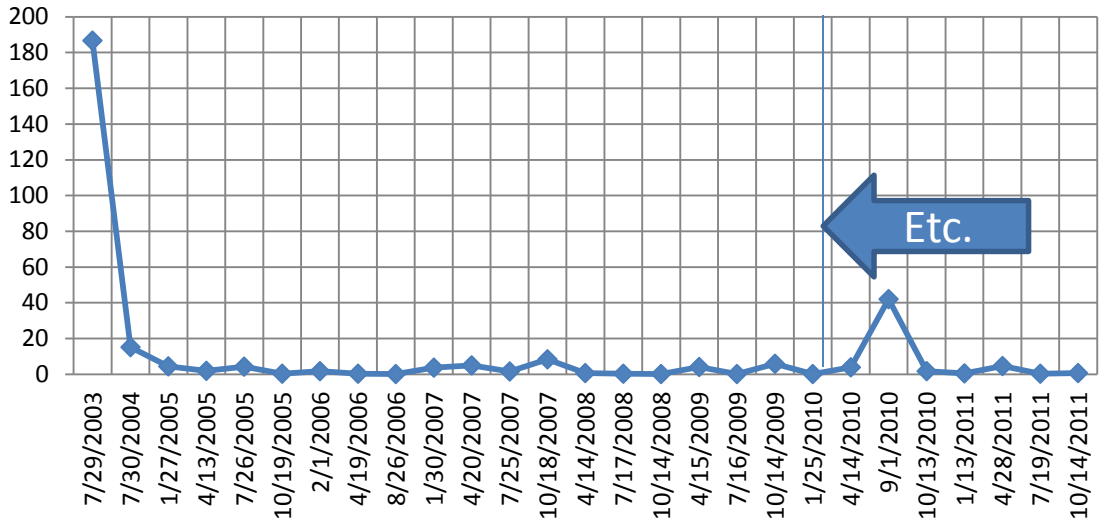
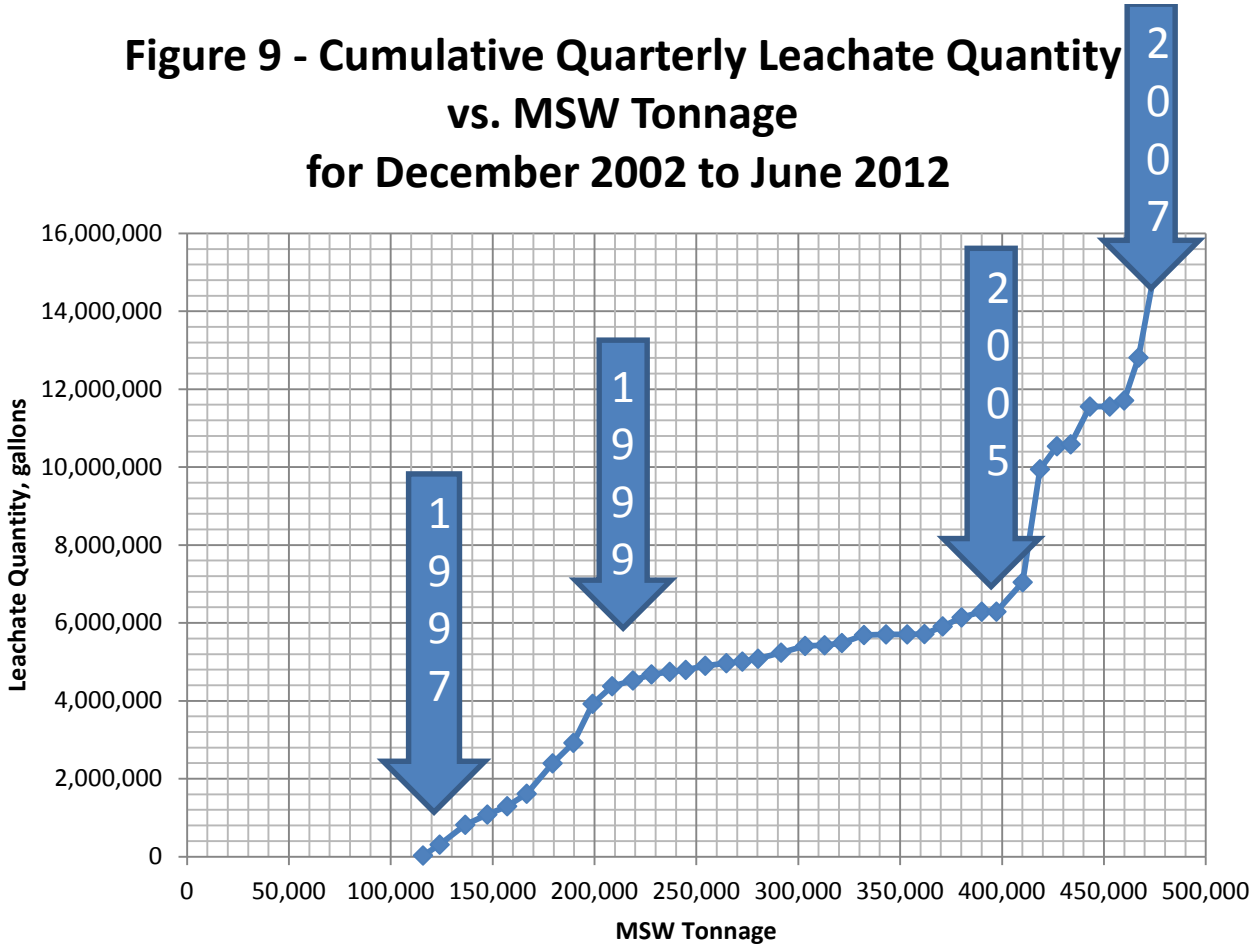

9
8.5
8
7.5
7
6.5
6
5.5
5
Jul-01
Dec-02
Jul-03
Jul-04
Jan-05
Apr-05
Jul-05
Oct-05
Feb-06
Apr-06
Aug-06
Jan-07
Apr-07
Jul-07
Oct-07
Apr-08
Jul-08
Oct-08
Apr-09
Jul-09
Oct-09
Jan-10
Apr-10
Sep-10
Oct-10
Jan-11
Apr-11
Jul-11
Oct-11
Etc.

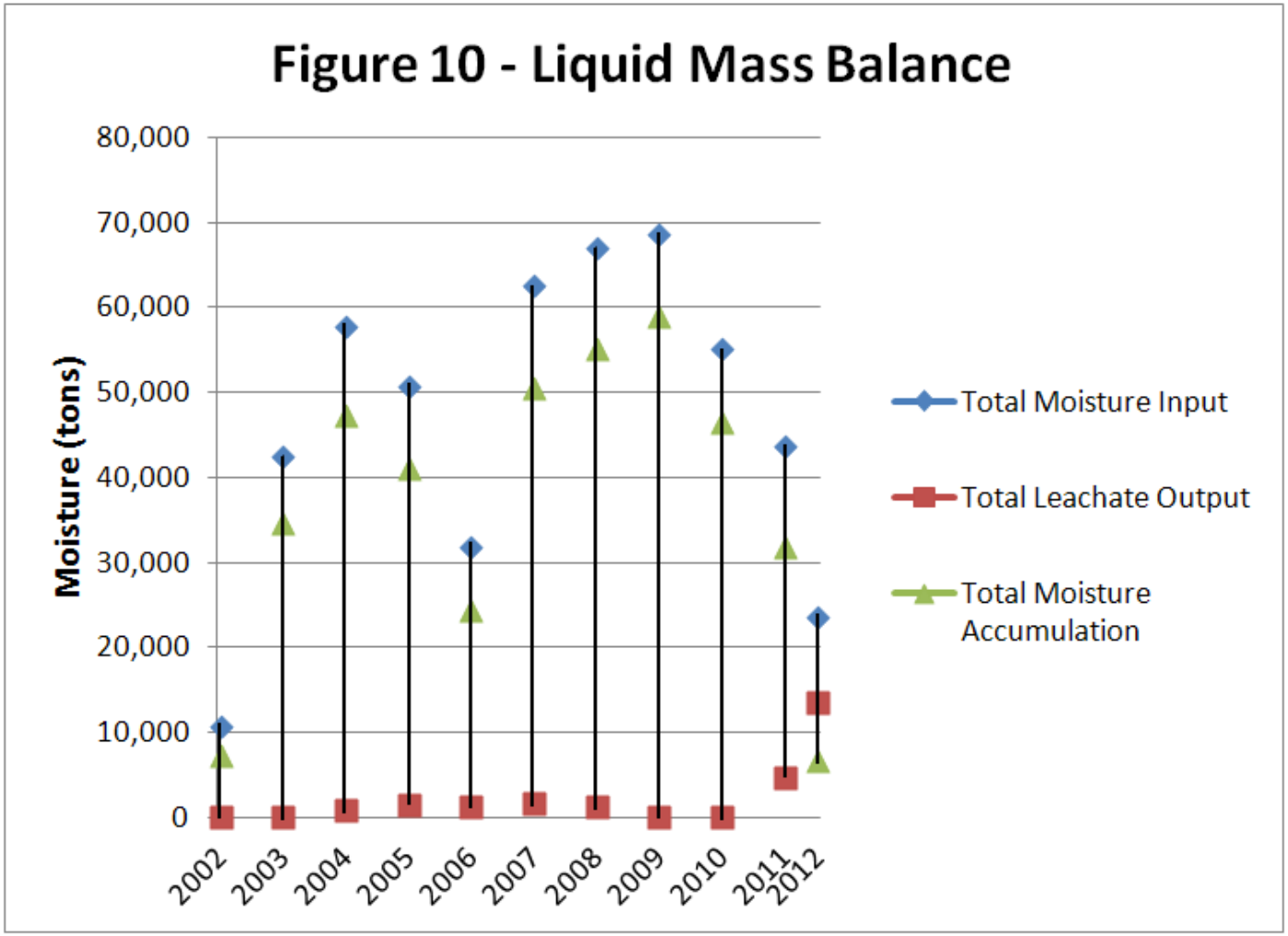
Figure 8 - BOD5 Mass Flow (lb/day)



3. To establish useful correlations:



4. To make a water balance:



5. To meet discharge requirements:

Table 4 - MSWLF Effluent Limitations vs. ACL Leachate Data

Regulated parameter	Maximum daily[1]	ACL Leachate [1, 3]	Maximum monthly avg.[1]	ACL avg. Leachate [1,3]
BOD_5	140	5 to 51	37	16.8
TSS	88	10 to 120	27	45.7
Ammonia (as N)	10	5.5 to 56	4.9	23.4
α-Terpineol	0.033	NA	0.016	NA
Benzoic acid	0.12	NA	0.071	NA
p -Cresol	0.025	NA	0.014	NA
Phenol	0.026	NA	0.015	NA
Zinc	0.20	NA	0.11	NA
pH	([2])	6.8 to 8.5	([2])	7.7

[1]Milligrams per liter (mg/L, ppm)
[2]Within the range 6 to 9.
[3]Based on last two years (2010 to 2011) of ACL data.

S

& Comments from audience.