**Notes on Waste Decay Rate Vintaging (LFA, LFB, LFC)**

**Conversation with Steve Peterson, 7/20/2018 & 7/25/2018**

**Overview**

The purpose of this part of the model is to calculate regional (CA or ROTUS) methane production and collection from landfills (methane prodn tonne per year, Methane prodn volume, per facility CH4 collection) based on an initial stock of waste in landfills (INIT LF Stocks) and flow of additional waste into landfills over time (LF decomposable influx).

**3-Stock Chain LF A-C**

The purpose of the 3-stock chain LF A, LF B, and LF C is to model the production of methane from decomposable waste over a 20-year decay period. This is modeled as a 3rd-order delay to delay the production of methane relative to timing of waste influx and smooth the flow over time, avoiding unrealistic pulses of production. StepPulseTransients.STMX, committed with this document, shows the effect of 1st-order vs. higher-order delay. This model is based on a residence time concept instead of a decomposition rate concept, but a residence time of y years is equivalent to an annual decomposition rate of 1/y. (0.05 decomposition rate used in WESyS = 20 year residence time.) This is simpler than a conveyor with full vintaging and different decomposition rates for each vintage. The net effect is that it takes 20 years for stuff to move through if system is in steady state.

Ultimate fraction that turns to methane is 0.47 of the decomposeable fraction turns to methane.

100% of the waste that goes in goes to landfill gas, 47% of which is methane.

Annika & Danny want to calibrate this

**Initialization**

Stocks LF A, LF B, and LF C are each initialized with 1/3 of the decomposable stock of waste (INIT LF Stocks). The idea is to approximate different vintages of waste, with relatively new waste in A, middle-aged waste in B, and old waste in C.

**Flows**

LF A to B, LF B to C, and LF decomp each multiply the decomposition rate by a factor of 3 (.three) to compensate for applying the rate in 3 steps. The net result gives you the annual decomposition rate (LF decomposition rate) per year.

**Trouble-shooting:**

If this process appears to be giving wrong answers, ideas for trouble-shooting or recalibrating include:

-Number of facilities

-Amount of decomposable waste that is initially in landfill by vintage (INIT LF Stocks and LF A – C)

-Decomposable waste influx (LF decomposable influx, INIT frac decomposables decomposed)

-volatile fraction may be too high

Options

1. Could re-allocate the stocks
2. Change share that’s considered decomposable
3. Change volatile fraction (probably not)