

Calculations of Mercury in Maine Thermostats and Annual Waste Stream Amounts

In January 1999 the Land and Water Resources Council submitted the report "Labeling and Collection of Mercury-Added Products Report to the Joint Standing Committee on Natural Resources, 119th Maine Legislature 1/1/99 " It provided calculations on the standing stock and waste stream amounts of mercury in Maine. In that report calculations were based on the following assumptions:

- a thermostat has 30 year life span;
- There are on average 1.5 thermostats per home;
- There are 1.25 per business establishment and;
- 83% of all thermostats contain mercury;
- Most Maine thermostats contain 3 grams of mercury.

According to the Thermostat Stakeholder Group convened by the DEP in 2003, thermostats are often changed when new furnaces are installed, or other household remodeling is done. Most furnaces don't last 30 years, and homes are typically remodeled more often than once every 30 years, but for the sake of new calculations, a 30 year life span will be used. All other assumptions given in the original report will remain the same, although they are thought to be very conservative. (For example, in the stakeholder group those who work with in the Maine HVAC industry observed that the percentage of mercury thermostats in Maine may be closer to 90%. This 90% concurs with other studies done for US EPA study. It was also observed that the number of thermostats per building unit was very conservative.)

Using these conservative numbers the calculations are as follows.

Using the 2000 US census, there are 651,901 households and 83,023 business establishments¹ in Maine. Some of the households are mobile homes (63,902) or boats, RVs, vans etc. (1,811) which would not have a mercury thermostat. This brings the residential number to 586,188. Using the assumptions above: $(586,188 \times 1.5) + (83,023 \times 1.25) = 983,061$ thermostats.

If 83% of this number have mercury, that means $983,061 \times 83\% = 815,941$ thermostats with mercury. We know that the most common thermostat has approximately 3 grams² of mercury. (TRC data for Maine, gathered from 2001 through 2005, shows an average of 3.9 grams of mercury per thermostat collected³. This is consistent with TRC's national data as well.) Using 3 grams in the calculation is conservative. So $815,941 \times 3\text{gms} = 2,447,822$ gms. Divide this by 454 gms/lb. = 5392 lbs of mercury as standing stock in Maine homes and businesses.

Assuming the life of a thermostat is 30 years, each year 1/30th of the thermostats are replaced. $5392 \text{ lbs.} / 30\text{yrs.} = 180 \text{ lbs.}$ of mercury per year in discarded thermostats. It really doesn't matter if the thermostats are thrown out or held onto, the point is that they are being replaced and could find their way into the waste stream at any time.

Standing Stock: 5392 lbs.

Waste Stream: 180 lbs./year

¹ Based on 2005/06 number of commercial/industrial customer meters read by Maine's three electrical utilities.

² Some have 2 ampules, therefore 6 grams of mercury, and none that we know of have less.

³ TRC's recent data for Maine actually reports higher average amounts recovered from Maine thermostats: 2003 average 4.23 grams per thermostat; 2004 average 4.1 grams per thermostat; 2005 average 5.32 grams per thermostat.