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**Calculation of the Geometric Mean Using Beach Water Data**  
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The following information is provided to assist operators of public and semi-public beaches and Boards of Health in interpretation of the water testing standards in 105 CMR 445.000: *Minimum Standards for Bathing Beaches (State Sanitary Code, Chapter VII)*. Additional information is available on our website at [www.mass.gov/dph/beaches](http://www.mass.gov/dph/beaches) or by contacting the Environmental Toxicology Program at (617) 624-5757 or [dph-beach@state.ma.us](mailto:dph-beach@state.ma.us).

Under 105 CMR 445.031, beach water quality must meet both the single sample and the geometric mean<sup>1</sup> (geomean) standards. Single sample results are intended to represent current conditions while the geomean is intended to reflect typical water quality found during the preceding time period (typically a month). This document is meant to clarify the calculation and application of the geomean.

#### Calculation Inputs

- The calculation of the geomean must include the most recent five (5) results collected in the same year. This includes samples impacted by rainfall.
- The calculation may not include more than two samples collected on the same day, and any same-day samples must be collected at least four hours apart. This requirement will ensure that samples represent a reasonable timespan that is representative of variations in water quality due to changes in tides, weather, swimmers, etc., while ensuring that beach operators have some flexibility.

#### Calculation Approach

- We recommend that Boards of Health and beach operators utilize statistical software or free online tools when calculating the geomean.
- An online calculator is currently available on the website here: <http://www.graftacs.com/geomean.php>

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<sup>1</sup>The geometric mean is the  $n^{\text{th}}$  root of the product of a set of numbers. For example, to calculate this type of average you would multiply the numbers together and then take a square root (for two numbers), cube root (for three numbers), etc.