## Challenging an Average

### Testing Challenges

**1. There's not enough data –** keep testing! If there are only a few numbers, an average can be misleading. The average might change a lot with the next number.

**2. They didn't test in the hot spots.** There may be places where the levels are much higher. Without them, the average won't be accurate.

**3. They didn't test when the levels were highest.** There may be times of year when the numbers are much higher (e.g. groundwater tests in dry seasons). Without them, the average is misleading.

**4. The detection limit is too high.** There might be contamination at levels of concern, but you won't know if the equipment wasn't sensitive enough to detect those levels.

**5. They tested until they had a low number that would bring down the average.** A company may just keep measuring until getting a result below the level of concern, and stop. If the rest of the data is higher, the low reading may not be typical.

### Calculation Challenges

**6. They didn't include the high number.** If one number is very different from all others, it may be considered an "outlier" – an unusual measuring mistake. If they removed an outlier from the average. they need to explain why.

**7. There's too much variation.** If the numbers are all over the place, an average may not be a good way to describe them.

**8. Average is low, but recent numbers are high.** The average might be low, but recent numbers might show an upward trend.

**9. They used the detection limit like it was zero.** If contamination is below the detection limit, that doesn't mean it's zero. A measurement below the detection limit should be included in an average as if they found contamination equal to the detection limit.

**10. An average isn't what we want here.** Sometimes the average just isn't the best summary of the data, and it's better to know the median, or the maximum, or some other number.

**Or...this average looks OK.** Sometimes the average is accurate and there's no problem with the numbers at all. Hopefully, this happens most of the time!