



SHALE GAS VOLUNTEER MONITORING PROGRAM

Monitoring Best Practices

Meter Care & Calibration

- Every day that you monitor, calibrate your meter.
- The protocol includes DUAL CALIBRATION.
 - Calibrate with 84 $\mu\text{S}/\text{cm}$ solution first so the meter can perform more accurately when reading low conductivity values.
 - The 1,413 $\mu\text{S}/\text{cm}$ solution calibrates the meter to a middle-range.
 - Check out the [new instructions online](#).
- Calibration fluid best practices:
 - Make sure it has not expired.
 - Invert fluid before calibration.
 - Screw cap on tightly after calibration so that the solution does not evaporate.
 - Dispose of solution after calibration.
 - Contact ALLARM if you need more solution.
- Allow the meter to stabilize in the solution before calibration (step 5 in the new instructions).
- In cold weather, turn your meter on before testing your sample and allow it to get used to the cold air. This should help to stabilize the reading faster.



Testing

- Monitor your stream (conductivity, TDS, stage and visual assessment) at least once a month, even if the stream is dry or frozen over. It is important to note these conditions.
- Take pictures of your stream, especially in different seasons! This can serve as baseline data in the event of a spill.
- Record data at ALLARMwater.org. All of ALLARM's shale gas resources can also be found here.

Measuring Stage

- Take the depth measurement at the same point every time you monitor your stream.
- Stage can also be found by measuring the distance between a bridge and the stream below.
- It is very important to measure from same point every time!
- Whatever method you choose to measure stage with, stick to it for consistency!

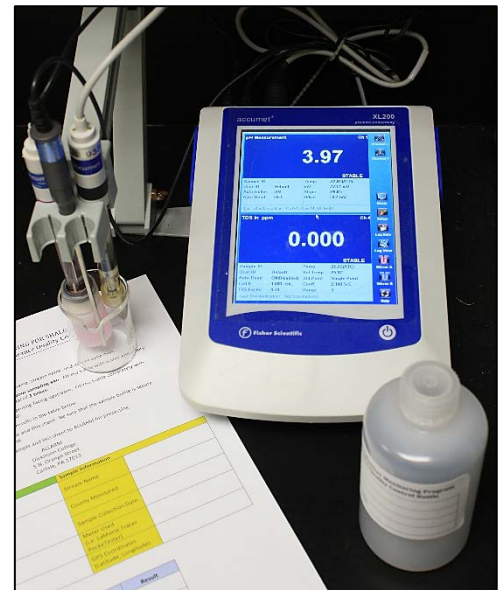


Quality Assurance/Quality Control (QA/QC)

- For each site that you monitor, a water sample should be sent to ALLARM for quality assurance/quality control (QA/QC) on 2 occasions:
 1. After initial training.
 2. Approximately six months later.
- When collecting the second water sample, it is important to consider sampling at a time when the stage is different from the first sample.
 - Example: after your initial training, if the flow of your stream is low, collect your second QA/QC sample at a time when the flow is high, approximately six months later.

Sending QA/QC Samples to ALLARM

- Collect a water sample and fill out the QA/QC form (found on the [database](#) or in the [Shale Gas Monitoring Manual](#)).
- Mail your water sample and completed QA/QC form to ALLARM in a box, not an envelope.
- If you are sending > 10 water samples, please contact ALLARM so the lab can prepare for a large number of samples.
- Please do not send samples in January, May, August, or December. ALLARM's student lab coordinators do not work during these months, so it takes longer to complete the process.
- Contact ALLARM if you need QA/QC bottles.
- If/when you change your monitoring site, please send a new baseline QA/QC sample.



What ALLARM Does with QA/QC Samples

- When ALLARM receives a QA/QC sample, we will send out a confirmation e-mail to the monitor.
- Conductivity and TDS are tested with the LaMotte PockeTester, then the Fisher Scientific Accumet.
- Samples are then acidified and sent to a nearby certified lab for barium and strontium analysis.
- Results are emailed to volunteers. The QA/QC process up to this point takes about 2 weeks. Then, when the Ba/Sr results are received, we will pass that information on to you as well.

Barium and Strontium Analysis

- Baseline barium and strontium levels are analyzed when QA/QC samples are sent to ALLARM (high stage and low stage when possible).
- Ba/Sr analysis helps to determine if a pollution event from flowback water has occurred when you find an elevated conductivity reading.
- If you believe a pollution event has occurred:
 - Collect a sample ASAP and send to a [local, certified lab](#).
 - [Decision trees](#) can help guide you with next steps and help determine if you have found a reportable event.

