North Carolina Department of Environment and Natural Resources
Division of Water Quality
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Director

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Secretary

May 13, 2013

MEMORANDUM

TO: Aquifer Protection Section Supervisors
Laboratories, Consultants, Permittees, and Interested Parties

FROM: S. Jay Zimmerman, P.G.
Section Chief

SUBJECT: Aquifer Protection Section Policy for Metals Determinations Required by Title 15A, North Carolina Administrative Code, Subchapter 2L

BACKGROUND

This policy supersedes the January 7, 2011 policy that addresses the preparation of groundwater samples for metals analyses. This policy is implemented to establish statewide consistency in the handling of groundwater samples collected to determine compliance with groundwater standards in Title 15A, North Carolina Administrative Code, Subchapter 2L (15A NCAC 2L). It also addresses treatment of groundwater quality samples for metal analyses and is applicable as follows:

> 15A NCAC 2L .0202(g), which addresses Class GA Standards for groundwater, states … "the standard refers to the total concentration in micrograms per liter of any constituent in a dissolved, colloidal or particulate form which is mobile in groundwater."

The purpose of collecting and analyzing groundwater samples is to obtain a representation of constituents that are mobile in groundwater. This can usually be achieved with few problems when clear samples are collected from wells that have been properly constructed and developed so that sediment in the water is minimal. However, for those samples that are not clear, it is difficult to differentiate between sediment that represents formational material versus mobile particulates or precipitates. Recently established EPA and USGS metals sampling protocols requiring turbidity level measurements have provided some additional guidance regarding this distinction. Well water samples that are highly turbid on a continuous basis may be a result of improper well construction. Therefore, it should be noted that the sampling procedures in this policy are not intended to be used in lieu of proper well construction standards found in 15A NCAC 02C .0100.

METHODOLOGY

Sample preparation for metals analysis by Standard Method 3030C for compliance with groundwater standards in 15A NCAC 2L will no longer be required. The basic preparation requirements of 3030C for determination of total metal concentrations in unfiltered samples are already incorporated and addressed in current methods from sources listed in 15A NCAC 2L .0112. Those sources include 40 CFR Part 136, which addresses approved methods under the Clean Water Act.

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In order to ensure that any required analysis reflects as little bias as possible due to the presence of sediment in samples being analyzed for metals that are mobile (i.e. dissolved and colloidal phases), the following sample collection protocols, based on EPA/USGS guidance, are required:

1. Redevelop wells, if necessary, to ensure turbidity levels are <10 NTU or until turbidity levels are stable. Turbidity is considered stable when three consecutive measurements vary no more than 10%.

   Turbidity measured in the field using a portable meter is not currently defined by certification rules as a field parameter. Field turbidity measurements are used to determine adequate purging and are not reported for permit compliance; therefore, certification is not required. Collectors must, however, follow equipment manufacturers' approved procedures for turbidity measurements when using portable meters in the field for purging during sample collection.

2. Use specific groundwater sample collection techniques such as low flow/low stress purging and sampling using an adjustable rate pump to minimize turbidity. Use the same pump for purging and sampling without removing it from the well. Purge wells before sampling to ensure turbidity levels are <10 NTU, or vary no more than 10%, and other field parameter measurements are stable. If the turbidity level is >10 NTU and has not stabilized within five well volumes, but is within +/- 5 NTU between measurements and decreasing, additional purging should be considered. It is at the discretion of the sample collector, however, whether or not to collect a sample or to continue purging to collect the best sample possible. Report the turbidity level with other field parameters for each sampling event.

3. Collect unfiltered samples acidified with 5 mL of concentrated nitric acid per liter of sample (more if necessary) to achieve a pH < 2 at the time of collection. Acid may be added to the samples in the field at the time of collection or may be added to the clean containers prior to transport to the field. Samples must be acidified at least 24 hours prior to analysis, and have a hold time of six months in accordance with preservation requirements specified in 40 CFR Part 136. The following exception is allowed:

   In accordance with 40 CFR Part 136.3, an aqueous sample may be collected and shipped without acid preservation. However, acid must be added at least 24 hours before analysis to dissolve any metals that adsorb to the container walls. If the sample must be analyzed within 24 hours of collection, add the acid immediately.

   Samples collected for mercury analysis and any other sampling requirements must be based on the requirements specified in 40 CFR Part 136 and the sample submission protocols of the Division of Water Quality (DWQ) certified laboratory analyzing the samples.

Samples must be prepared and analyzed by a laboratory certified by the DWQ using methods from sources listed in 15A NCAC 2L .0112. Water supply well samples with turbidity <1 NTU are excluded from preliminary laboratory preparation procedures as indicated in the sources listed in 15A NCAC 2L .0112.

For further information or questions, please contact staff at (919) 807-6464 in the Central Office.

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