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AGC Call for Input! What Are the Obstacles To Sampling Construction Site Runoff?

Be aware that the U.S. Environmental Protection Agency (EPA) remains committed to developing a first-time, nationwide numeric turbidity limitation for active construction sites. EPA has asked the public for feedback on issues related to collecting stormwater samples in the field and analyzing monitoring data. EPA also is looking for more information on the performance of stormwater treatment technologies, in general.

PLEASE RESPOND to any (or all) of the questions below to help AGC craft a well-informed and comprehensive response to EPA by the **March 5 deadline**! Don't let the federal government set an unattainable discharge limit or mandate costly and complicated monitoring procedures.

More Details

The construction site runoff dataset that EPA used to develop its December 2009 numeric turbidity limit of 280 nephelometric turbidity units (NTU) – *dictating how much dirt is allowed in stormwater that runs across a construction site* – is based on numerous factual errors. EPA has suspended indefinitely the 280 NTU limit, responding to legal challenges brought by the U.S. Small Business Administration and industry.[1] Currently the agency is working to propose a "corrected" turbidity limit.

EPA published a notice on Jan. 3, 2012,[2] acknowledging that there are many issues associated with monitoring turbidity in stormwater runoff from construction sites — primarily pointing out the limitations associated with sample collection procedures, turbidity measuring equipment, and sample handling and analysis methods. EPA is asking the public to comment on these issues.

EPA also is asking the public to provide it with additional data and input on the performance, cost, effectiveness and feasibility of different treatment technologies ("passive and semi-passive approaches") in controlling turbidity levels (a measure of water clarity) in construction stormwater discharges. EPA said it will use the data and information submitted by the public to set a new, "corrected" numeric turbidity limit for construction site runoff.

EPA will accept comments until March 5, 2012. AGC plans to respond in advance of the deadline.

Following are specific questions on which AGC would like contractor-members' input. You do not need to answer every question! Members' responses will help shape the Association's comment letter to the EPA.

Please respond as soon as possible via e-mail to Leah Pilconis at pilconisl@agc.org.

[1] Effective Jan. 4, 2011, states are no longer required to incorporate the turbidity limit or associated monitoring and reporting requirements published at 40 CFR §450.22(a) and §450.22(b) into their construction general permits. A lawsuit challenging the limit and other associated stormwater management issues remains pending in the U.S. Court of Appeals for the 7th Circuit.

2 *See* 77 *Fed. Reg.* 112.

I. Questions for Industry on Sampling and Data Collection

Stormwater Collection Procedures

Stormwater samples will be used (1) by EPA to set a numeric limit on the amount of dirt allowed in construction site runoff and (2) by the construction site operator to demonstrate compliance with EPA's numeric "turbidity" limit.

Generally, EPA believes that samples used to characterize performance should be collected regularly over the course of the event in order to capture variability in flows and associated pollutant parameters.

At this point, EPA is favoring the use of the "grab sample" method – which is an individual "catch" sample collected at one specific site at one point in time. Grab samples may be collected using manual or automatic sampling equipment.

AGC believes it is very important that EPA identify an appropriate sample collection procedure to ensure that EPA uses "representative data" in setting a construction stormwater limit. It is equally important that EPA establishes a consistent procedure for the regulated community to follow in demonstrating compliance with any limit that EPA may decide to publish.

EPA requests comment on the most appropriate procedure(s) for collecting samples of stormwater on construction sites, as well as the potential costs and challenges associated with sample collection.

1. What are the limitations/concerns with using automatic grab sampling equipment?

   AGC Draft Response: There is no way to know in advance how much precipitation and stormwater flow will occur. Due to the variability in precipitation events and stormwater flow, it is difficult – if not impossible – to select an appropriate "sample collection interval" that ensures sufficient samples are collected over the course of the hydrograph to adequately characterize the discharge. If the sample collection interval is set too low, then the sampler may fill up before the end of the event and a portion of the hydrograph may not be sampled. If the interval is set too high, then too few samples may be collected to adequately characterize the event.

2. What are the limitations/concerns with taking manual grab samples?

   AGC Draft Response: Collecting a grab sample requires that someone be physically present on the site. This is frequently difficult, especially given the variable nature of storm events. Also, in many instances the jobsite is not located in close proximity to the field offices of the sampling personnel.

3. Should EPA consider another method (e.g., composite sample) for collecting samples of construction site runoff (i.e., a method that is preferable to the "grab sample" method)? Why?

   AGC Draft Response: Site logistics — the specifics of a particular site (such as the location of the site, the number of discharge points, proximity of discharge points, accessibility of discharge points, etc.) — are important considerations in determining the type of sample to be collected.

Turbidity Measuring Equipment

At this point, EPA is assuming that industry would use a hand-held turbidimeter to measure the turbidity levels of any samples collected in the field.

4. What are the limitations that EPA should consider related to turbidimeters?

AGC Draft Response: Turbidimeters only operate within specific ranges. The high-end of the range is typically around 1,000 NTU or more. Samples with high amounts of turbidity may need to be diluted in order for the turbidity of the sample to be within the operating range of the instrument. This is a potential source of error, especially if done in the field.

Different types of turbidimeters may provide different measurements of turbidity for the same sample. This is due to differences in light sources and differences in the orientation of the light source with respect to the detector.

5. Should EPA consider other types of equipment for measuring turbidity levels in stormwater runoff?

   AGC Draft Response: Another method for measuring turbidity is to use an in-situ meter coupled to a data-logger. As with the hand-held turbidimeter, there is a limited range for readings. What is more, turbidity above the measurement range of the instrument cannot be determined, since a physical sample is not collected. In addition, the source of error is particularly high during periods of peak flows where turbidity may be very high.

   In-situ meters are also susceptible to equipment malfunctions and failure, such as from battery failure or a piece of debris obscuring the detector.

6. What unit should EPA use to measure turbidity?

   AGC Draft Response: While turbidity measured in NTUs is the standard contained in EPA's methods, turbidity can also be measured in other units, such as formazin turbidity units (FTUs).

Sample Handling & Analysis Methods

EPA publishes laboratory analytical methods that are used by industries and municipalities to analyze stormwater and other samples that are required by regulations under the authority of the Clean Water Act. All these methods are published as regulations in the *Code of Federal Regulations* (CFR) at Title 40 Part 136. For turbidity, the current CFR Part 136 approved methods are based on nephelometric equipment: EPA Method 180.1 Rev 2.0 (USEPA 1993).

Much of the stormwater sampling data included in EPA's current dataset that it plans to use to set its "corrected" numeric turbidity limit was collected in a manner that is not entirely consistent with EPA Method 180.1. EPA has acknowledged many deviations from approved methods, but EPA DOES NOT believe that such deviations would produce appreciable changes in measured turbidity.

EPA solicits comment on the appropriate protocol for collecting samples of construction site runoff for the purpose of setting a turbidity limit construction site stormwater discharges and for showing compliance with that limit.

Temperature and Time Issues

EPA method 180.1 states that turbidity samples should be immediately refrigerated or iced to 4 degrees Celsius and analyzed within 48 hours.

7. Much of the stormwater runoff data that EPA is currently evaluating (as a basis for its "corrected" numeric turbidity limit) were collected using automated samplers; the samples were analyzed several days or weeks after collection and they were not refrigerated or iced. EPA notes the deviation from approved methods for temperature and time parameters, but EPA does not believe that this deviation would produce appreciable changes in measured turbidity in any case. Do you agree?

8. Sample refrigeration and analytical timeframe guidelines are intended to minimize changes in turbidity that would result due to microbial decomposition of solids in the sample. EPA expects little organic material to be present in samples of stormwater runoff from construction sites because, according to EPA, the solids are primarily composed of inert soil particles. Do you agree that biological activity would not appreciably change the turbidity of the samples?

9. In some cases, polyacrylamides may be presents in stormwater samples collected from construction jobsites. If residual or unbound polyacrylamide is present in the sample, EPA notes that some additional flocculation could occur in the sample bottles during the time period between collection and analysis or during transport from the field to the laboratory. EPA requests comment on the appropriateness of using data from samples not analyzed within 48 hours.

Mixing and Settling Time

EPA method 180.1 for measuring turbidity provides the following instructions: ''Mix the sample to thoroughly disperse the solids. Wait until air bubbles disappear then pour the sample into the turbidimeter tube. Read the turbidity directly from the instrument scale or from the appropriate calibration curve." The method further explains that ''the presence of floating debris and coarse sediments which settle out rapidly will give low readings. Finely divided air bubbles can cause high readings.'' However, the EPA approved sampling method does not describe an appropriate period of time between mixing of the sample bottle and collection of the subsample for analysis.

10. Much of the stormwater runoff data that EPA is currently evaluating (as a basis for its "corrected" numeric turbidity limit) were allowed to settle for approximately 30 seconds after mixing before a subsample was collected and analyzed for turbidity. EPA understands that this 30-second settling period after mixing was to allow large flocculated particles to settle (because analyzing turbidity of a sample that contains large agglomerates may prevent the turbidity meter from producing a stable reading or may underestimate turbidity of the sample. Do you think allowing mixed sample bottles to sit for 30 seconds (or some other time period after mixing) before collecting the subsample for analysis is an appropriate means of addressing possible interferences due to the presence of large particles?

11. Allowing the sample to settle prior to collecting the subsample for analysis may result in fewer particles generally being present in the subsample and thus an artificially low turbidity reading. To what extent do varying settling times affect the observed turbidity values (both for purposes of evaluating the performance of technologies and for compliance purposes)?

II. Questions for Industry on Passive and Semi-Passive Treatment

EPA is asking for public input on how the agency currently is characterizing ''passive'' and ''semi-passive'' treatment systems in the context of construction site stormwater management.

Passive Treatment Systems

According to EPA, passive treatment systems (PTS) are "practices that do not rely on computerized systems with pumps, filters and real-time controls but do incorporate a treatment chemical to aid in sediment and turbidity removal."

12. Do you agree with the following description of PTS, as provided by EPA?

> In passive treatment, polymer can be placed in channels that convey water on the construction site, or they may be used prior to basins or other practices (such as a

> baffle-grid, in ground sand filter or a geotextile filter bag) that allow for settling and/or filtration of the flocculated material. Treatment chemicals, either in solid or liquid forms, can be applied at various locations on the site. Common PTS include fiber check dams with PAM and sediment basins dosed with PAM. Recent improvements to PTS incorporate the use of two polymers, which can be placed in a manifold or in a channel. The use of baffles and floating outlets or ''skimmers'' on basins are frequently incorporated as part of PTS, and directing treated water to vegetated areas or ''biofilters'' can also provide additional sediment and turbidity removal prior to discharge. Passive treatment could include pumps where they are necessary to move water around the construction site, and pumping may be integral to properly dosing the water with treatment chemicals in some cases.

13. What are the advantages and disadvantages of passive treatment systems?

AGC Draft Response: The performance of PTS varies based on the type of system, the method used to dose chemicals, as well as other factors. The performance of simple PTS appears to be sensitive to the type and frequency of maintenance and system configuration, as well as the intensity and duration of storm events. An advantage of simple PTS, such as fiber check dams w/PAM, is that they are very inexpensive and can be easily incorporated into sites at multiple locations and do not require large ponds for storage prior to treatment. A disadvantage is that achieving a consistent level of performance is difficult due to variations in storm flows and sediment loads and little control over dosage rates. A simple passive treatment system does not perform well during larger and/or more intense storm events.

14. What critical storm intensity and/or duration over which that storm occurs would render simple passive treatment systems ineffective? [This information will help EPA determine the appropriate criteria for an exemption from a turbidity limitation.]

Semi-Passive Treatment Systems

According to EPA, "when pumps are utilized to pump the water through a manifold or other apparatus to dose the chemical, this type of treatment has been characterized by the industry as semi-passive treatment."

15. Do you agree with the following description of semi-passive treatment as provided by EPA?

> The term semi-passive treatment has been used to describe practices that utilize pumped water to dose the chemical, or applications where the water is first held in a basin or other impoundment and withdrawn under more controlled conditions for subsequent treatment. Semi-passive approaches, which first hold the water in a basin, tank or impoundment and then release water either by gravity or with a pump to provide dosing, appear to be capable of providing lower, and perhaps more consistent, turbidity levels due to dampening of the storm flows by the basins.

16. What are the advantages and disadvantages of semi-passive treatment systems?

AGC Draft Response: An advantage of semi-passive approaches is that since the water is withdrawn by pumping (although semi-passive dosing can be accomplished using gravity flow in certain cases), flow rates and dosing rates can be more easily controlled, allowing for more consistent and likely better performance. A disadvantage may be that the stormwater must first be stored in ponds, tanks or other impoundments in order to provide a controlled release. These storage requirements add significant costs and additional operational considerations to address, particularly during extended periods of precipitation.

17. Are you aware of any data or information on the toxicity associated with the use of chemicals in controlling sediment discharge in construction stormwater?

AGC Draft Response: Cationic treatment chemicals are very problematic. *See* Ultrastructural and Clinicopathological Studies on the Toxicity of Cationic Acrylamide-based Flocculant to Rainbow Trout, M. ALBASSAM, J. MOORE, AND A. SHARMA (1987).

III. Questions for Industry on How to Evaluate Performance Data

EPA sets numeric discharge limits based on the degree of control that can be achieved by using various levels of pollutant control technology, considering cost and other relevant factors. EPA requests comment on the factors it should consider in evaluating treatment performance data.

18. Other than the descriptive information listed below, are there other items that you think EPA must consider when evaluating performance data for purposes of establishing an effluent limitation?

- Site information—including project size, project type (residential, commercial, road/highway, etc.), location, phase of construction (e.g., before, during or after grading, site stabilization, etc), etc.;
- Sample date(s) and time(s) of collection and date(s) and time(s) of analysis;
- Sample type (grab sample, flow or time-weighted composite, etc.);
- Type of field instrument used to measure turbidity levels;
- Description of the treatment system (passive, semi-passive, advanced), including method of treatment chemical dosing used;
- Estimates of the amount/intensity of precipitation preceding and/or during sampling events;
- Drainage characteristics (predominant soil types/textures, drainage area, estimate of the quantity or percent of the drainage area that is disturbed);
- The ambient air temperature when the data is being collected;
- Date of last calibration if a field instrument was used;
- Descriptions of any quality assurance/quality control procedures implemented for the data collection activity; and
- Costs—including installation costs (both material and labor), operation and maintenance burden (in terms of labor hours and/or costs), quantity, cost and frequency of treatment chemical use, and other costs (residuals management, consumables, energy use, etc.).

AGC Draft Response: Additional information that EPA should consider when evaluating performance data includes a description of discharge point where sample was taken and a list of the specific types of best management practices (i.e., erosion and sediment controls) that the sample flowed through prior to treatment and the condition of those BMPs.

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