

US EPA ARCHIVE DOCUMENT

Sampling Plan for Local Limits Development

The sampling plan should address four issues which are discussed in more detail below, including: (1) the pollutants to be evaluated; (2) the points of sampling to determine removal rates and background loadings; (3) the number and type of sampling events; and (4) the analytical methods and the levels of detection to be used.

1. Pollutants to be Evaluated

EPA's local limits guidance lists fifteen pollutants that should always be included in the local limits evaluation. The "standard ten" parameters should be examined, which include **arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver and zinc. Molybdenum and selenium** should be examined due to their inclusion in EPA's sludge quality program and the availability of sludge quality-based criteria. The General Pretreatment Regulations include increasing the opportunity to recycle and reclaim municipal sludges (land application) as one of its goals, and therefore POTWs should develop their local limits to allow for land application even if this is not currently the chosen sludge disposal method. In addition, **BOD, TSS, and ammonia** should be evaluated. BOD and TSS are the pollutants that have been found to most frequently cause pass through and interference. POTWs should not allow industrial discharges that could result in influent levels exceeding the treatment plant design loadings for these pollutants. Ammonia has often been found to cause toxicity in POTW effluents, but can be eliminated from the list of pollutants if there are no industrial users discharging ammonia above background levels. The list of pollutants to be evaluated should include justification if the POTW is proposing not to include ammonia in the headworks analysis. Although the POTW may not end up adopting a limit for each of these 15 parameters, they should generally be included in the headworks analysis and examined to see if the need for a limit exists.

There may also be parameters which are not included above, but for which the POTW has an existing local limit, which appear in the POTW's permit¹, have shown up in significant quantities at the POTW (see below), are known to have caused problems in the past, are regulated through any applicable sludge disposal, air emission, or other requirement, are indicated as problem pollutants in a TMDL or other State 303(d) listing of impaired waterways for the POTW's receiving stream, or are discharged in significant quantities by any of the POTW's industrial users. Where the POTW accepts Marcellus Shale or other drilling wastes, the evaluation will need to include pollutants present in the waste in significant quantities such as total dissolved solids, specific ions such as chlorides and sulfates, specific radionuclides, metals such as barium and strontium, and other pollutants that could reasonably be expected to be present.

A review of past POTW influent and sludge priority pollutant scans should be used to help identify pollutants present in the POTW system in significant quantities. For this review,

¹ Excludes dissolved oxygen, fecal coliform, and residual chlorine. Where CBOD is limited, evaluation of CBOD in addition to BOD is not required.

data for the past three to five years should be used. For any priority pollutant (other than those already included in the list of pollutants of concern) that is detected in the influent, if the influent value is greater than the most stringent water quality standard for that pollutant times the instream dilution² then that pollutant should be considered a pollutant of concern for purposes of the local limits evaluation. For a pollutant that is detected in the sludge, if the sludge value is more than half of the sludge level listed in Appendix H (Additional Pollutants Eligible for a Removal Credit) of the General Pretreatment Regulations then that pollutant should also be considered a pollutant of concern. Any of these site-specific parameters should be included in the evaluation in addition to the 15 national pollutants of concern, and justification should be provided if they are not included.

This initial list of pollutants of concern is intended to identify any pollutants that could potentially be problematic. The POTW may choose to conduct the full headworks analysis for this entire list of pollutants or may choose to conduct a further screening evaluation to eliminate some of the pollutants. Note that the results of this additional screening evaluation must be submitted as part of the sampling plan if any of the pollutants are to be eliminated from the headworks analysis. There are three types of pollutants of concern for which this initial screening can be conducted:

- Pollutants that are added to the list through the influent priority pollutant scans based on a comparison of the influent level and the water quality standard – For these pollutants, the screening process gives no consideration to POTW removal of the pollutant. Therefore, if the POTW can show through effluent monitoring that the effluent levels of the pollutant are consistently well below water quality requirements, it may be possible to eliminate the pollutant from the full headworks analysis.
- Pollutants that are added to the list based on their presence at a user – For these pollutants, if the POTW can demonstrate that the pollutant is not detected in the POTW influent, effluent, or sludge in significant quantities and there are otherwise no problems resulting from the pollutant in the POTW or collection system, it may be possible to eliminate the pollutant from the full headworks analysis.
- 15 standard pollutants identified in the EPA local limits guidance as pollutants of concern – For any of these pollutants, if a previous headworks analysis showed that no local limit was necessary for that pollutant, no local limit currently exists for that pollutant, and the screening shows that the current influent, effluent, and sludge levels are consistent with the levels identified during the previous headworks analysis, it may be possible to eliminate that pollutant from the full headworks analysis.

The justification for eliminating any of these pollutants from the headworks analysis should be included in the sampling plan. For all other pollutants identified as pollutants of concern, the full headworks analysis should be completed.

² The instream dilution is defined as the receiving stream flow plus the POTW actual flow divided by the POTW actual flow.

2. Sampling Points

To an extent, the sampling points will depend on the design of the POTW and the type of treatment units that are present. However, the main sample points are: **raw influent, influent to secondary treatment, influent to tertiary treatment (if tertiary treatment is present), influent to digester (if anaerobic), final effluent, sludge to disposal, background/unregulated, and hauled waste (if received)**. The most important sample points are the influent, effluent, background/unregulated, and hauled waste because this data has the most impact on the final limits. It is important to ensure that enough data exists for these four sample points, and if necessary, sampling at the influent to the secondary and tertiary treatment units can be reduced or eliminated so that sufficient data can be collected at the other points.

The influent and effluent samples are used to calculate overall removal rates for the plant. The primary and secondary sample points are used to determine internal removal rates for use in the inhibition-based limits calculations. In general, sampling should be conducted at the influent to any treatment unit for which inhibition calculations will be done to develop a site specific removal rate. Removal rates are a critical piece of data and can have a significant impact on the final local limits.

The digester influent need only be sampled for non-conservative parameters for which an inhibition criteria is available (such as cyanide and ammonia) in order to account for alteration or loss of the non-conservative pollutant levels through the plant. For conservative pollutants, the overall removal rate can be used, and so no digester sampling is required. Sampling is necessary for anaerobic digestion units only, since there are no inhibition criteria for aerobic digesters in the EPA guidance.

The sludge sampling can be useful in generating a mass balance, so that the POTW may check that pollutant levels are being properly accounted for or assumed. It can also be used to generate overall removal rates which can then be checked against the influent/effluent-generated rates, or used when effluent detection levels prevent the calculation of adequate influent/effluent generated removals. Finally, sludge data can be used to help assess the appropriateness of the calculated limits and whether the POTW is currently meeting sludge disposal criteria.

The background, or unregulated, sample points should be located throughout the POTW's service area and include all typical wastestreams from sources to which the POTW does not intend to apply local limits. Therefore, commercial users (such as photo processors, dentists, dry cleaners, restaurants, etc.) would be included in the background as long as the POTW does not intend to regulate these users through the local limits. If the POTW's service area includes areas served by different water companies, it is recommended that separate sampling be conducted in each of the drinking water service areas since the pollutant levels may vary based on different water sources or chemical addition. The background data is used to calculate the unregulated loading which is then subtracted from the maximum allowable headworks loading (MAHL) to determine the total allowable industrial loading. Because the unregulated flow is generally a large percentage of the flow to the POTW, small changes in the background concentration can result in significant changes in the background loading, and therefore accurate background levels

are important when calculating the local limits.

Unless hauled waste is regulated through the local limits, it would be considered an unregulated waste. As with the background/domestic waste, the hauled waste loading is subtracted from the MAHL. Although the flow of hauled waste is often low when compared to the overall flow or the background/domestic flow, the concentration of pollutants in the hauled waste can be very high, resulting in significant loadings that must be accounted for in the local limits development. If the local limits are applied to the hauled waste, then the hauled waste loading is not subtracted from the MAHL, but the hauled waste flow is added to the industrial flow, and specific sampling data for the hauled waste is less important in the calculations.

3. Number and Type of Sampling Events

To obtain statistically valid results, at least 20-30 sampling events per parameter per sampling point are recommended. If cost is an issue, then sampling at the influent, effluent, domestic/unregulated, and hauled waste sample points should be stressed. Samples should be 24-hour flow proportioned composites if possible, except for those parameters which require grabs (e.g., cyanide, volatile organics, total phenols, oil & grease, sulfide, and pH). Where grab samples are necessary, a series of grabs samples over the course of a 24-hour period is recommended. Existing sampling data, such as results from NPDES permit-required influent/effluent monitoring, should be used in the evaluation, as long as it is technically valid and representative of current plant conditions. Note that quarterly sampling over the 5-year life of the NPDES permit would result in 20 samples for use in the local limits evaluation.

4. Analytical Methods/Detection Levels

Regardless of cost, the lowest detection levels available should be used in the sample analysis unless the POTW knows that an analytical method with a higher detection level will consistently yield results that are not non-detectable. Data that shows non-detectable levels with a high detection limit will result in a large amount of sampling data that is of limited or no use. Sampling and analysis must be done in accordance with 40 CFR 136.

Sampling Plan Checklist

	Y/N
List of Pollutants to be Evaluated	
→ Standard 15 pollutants? ³	
→ Existing local limit pollutants?	
→ Other pollutants listed in the NPDES permit?	
→ Toxic pollutants listed in other disposal requirements (sludge, air, etc.)	
→ Other pollutants identified in priority pollutant scans?	
→ Other pollutants identified in an applicable TMDL or 303(d) listing?	
→ If POTW accepts oil & gas waste, does plan address pollutants in this waste?	
→ If no to any of the above, is appropriate justification provided?	
Appropriate Sampling Points	
→ Influent (prior to any recycle stream)?	
→ Effluent?	
→ Sludge?	
→ Background (including unregulated commercial and industrial)?	
→ Digester influent (for non-conservative pollutants w/inhibition criteria)?	
→ Internal points (influent to treatment units with inhibition criteria)?	
→ Hauled waste?	
Number of Samples	
→ Use of existing data?	

³ Arsenic, cadmium, chromium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, silver, zinc, BOD, TSS, and ammonia

→ At least 20 sample events?	
Sample Type	
→ Grab for required pollutants? ⁴	
→ 24-hour composite for all others?	
Analytical Methods	
→ Use of EPA approved methods?	
→ Use of most sensitive methods?	

⁴ Cyanide, total phenols, volatile organics, oil & grease, sulfide, and pH