WAC 173-350-500 Conference Call - 3/2/15
(notes by Tom Culhane)

Participants:
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Discussed three potential changes to WAC 173-350-500. In advance of the call Tom sent out short discussions of all three topics. Those short synopses are indicated in italics below, followed by notes on what was discussed during the conference call.

1. **Section 4(h)(i) -** Specify whether metals be analyzed for dissolved or total constituents.

*173-350 currently does not indicate whether metals analyses should be performed for dissolved or total concentrations. The required 173-350-500(4)(h)constituents are as follows, with those in **red** having an associated 173-200 secondary contaminant criteria, the one indicated in **blue** (nitrate) having an associated primary contaminant criteria, and those that are underlined being constituents used during geochemical analyses:*

(i) Field parameters:
(A) pH;
(B) Specific conductance;
(C) Temperature;
(D) Static water level;
Geochemical indicator parameters:
(A) Alkalinity (as Ca CO3);
(B) Bicarbonate (HCO3);
(C) Calcium (Ca);
(D) Chloride (Cl);
(E) Iron (Fe);
(F) Magnesium (Mg);
(G) Manganese (Mn);
(H) Nitrate(NO3);
(I) Sodium (Na);
(J) Sulfate (SO4);
(iii) Leachate indicators:
(A) Ammonia (NH3-N);
(B) Total organic carbon (TOC);
(C) Total dissolved solids (TDS).

This list lacks potassium (K), which is an end member used for geochemical analyses and which we have already decided to add to the list. One thing to note is that during the initial creation of 173-350, a decision was made to take a geochemical indicator and a waste-specific parameter selection approach to monitoring, rather than a detection and assessment monitoring approach like that in 173-351. This makes sense, since non-MSW waste tends to be very specific, and an approach mirroring something like Appendices I and III in 173-351 would not make sense.

Following Ecology's 2012 rewrite of 173-351, that rule now specifies <u>total</u> concentrations for Appendix I metals, since Washington State's Groundwater Quality Standards (173-200) include primary contaminant criterion presented as <u>total</u> concentrations. For the geochemical indicator parameters (Appendix II), 173-351 specifies <u>dissolved</u> concentrations for Fe and Mn, then does not specify dissolved or total metals for the rest. When metals analyses are conducted to facilitate cation-anion balancing or produce ion diagrams, dissolved metals analyses are preferred for constituents at least for Fe and Mn, since particulates could be present and skew results. And, since analyzing all geochemical indicator metals for dissolved concentrations can't hurt, when asked I recommend dissolved concentrations for all Appendix II geochemical indicator metals.

Fe and Mn pose an interesting set of issues. These two metals are typically found in groundwater at landfills because leachate and landfill gas change groundwater chemistry, not because the source is leachate directly. The changes in groundwater chemistry mobilize Fe and Mn from native soils and minerals. Fe and Mn are typically considered minor ions in groundwater; however, although they are not included in trilinear diagrams, concentrations can be high enough in groundwater at some landfills to impact ion balance calculations. Even though WAC 173-200 provides standards for <u>total</u> Fe and Mn, they are listed at the levels they are because dissolved concentrations cause aesthetic staining and taste problems, not because of toxicity. And it's the dissolved forms that cause aesthetic problems.

<u>Recommendation:</u> Bearing all this in mind, Ecology's recommendation is that 173-350-500 require dissolved concentrations for all metals. Dissolved metals concentrations are preferable when the goal is using results during geochemical analyses, such as with Ca, Mg and Na. Human health threats from Fe and Mn in groundwater (total or dissolved) are not a concern, but dissolved iron and manganese analyses provide valuable information when evaluating whether landfill gas or leachate are having an impact on groundwater chemistry.

<u>3/2/15 Discussion</u>

After Tom summarized the issue, there was quick agreement that metals should be analyzed for dissolved concentrations.

2. **Section 5(c) -** Potentially require operators to submit quarterly or semi-annual monitoring reports.

Discussion: Presently, Chapters 173-304, 173-306, and 173-350 WAC all only require annual landfill reports, and notification of the jurisdictional health department and Ecology if there has

been a statistically significant increase for any monitoring parameter. Chapter 173-351 WAC, on the other hand, requires both quarterly and annual reports.

If quarterly or semi-annual reports are required, at a minimum they logically would contain:

- *a summary of statistical results, trends and statistical calculations*
- *notification of any statistical increases and/or concentrations above Chapter 173-200 WAC criteria*

Additionally, the rule could require:

- *cation-anion balances and Trilinear diagrams*
- *static water-level readings, and potentiometric maps with the flow rate and direction*
- *all groundwater monitoring results for that sampling period*
- *leachate and/or surface water results and analyses, if sampled*

Pros - Operators are supposed to perform these sorts of analyses quarterly anyway, and they are required to notify jurisdictional health departments and Ecology within 30 days if there has been a statistically significant increase for any monitoring parameter. Requiring quarterly reports would provide jurisdictional health departments and Ecology a better opportunity to see whether these analyses are actually being performed, whether or not there are any problems occurring, and whether or not further action is needed.

Cons – Added effort and expense.

<u>3/2/15 Discussion</u>

After Tom summarized the issue based on the above, there was a good discussion of the pros and cons of requiring submission of quarterly or semi-annual monitoring reports. For most of the discussion it seemed like most folks envisioned the potential quarterly or semi-annual reports to simply be a reporting of water quality data and results of any statistical analyses.

Based on several responses it seemed like a number of operators currently are required to submit quarterly or semi-annual reports. Arguments in favor of making this a universal requirement included that since operators theoretically are performing these analyses anyway, placing those results in a report should not be that great of a burden. Along those same lines, another argument was that since some operators already are required to submit quarterly reports, it is equitable that all others be required to submit such reports as well.

Arguments against included that if the regulations require jurisdiction health departments and Ecology be notified in instances of a statistical increase anyway, how much added value is there to requiring quarterly reports? Another argument involved the fact that this would seemingly penalize the bulk of operators that already perform statistical analyses quarterly as required by rule, just to track those operators who may not be performing analyses in a timely manner.

One compromise suggestion was to require quarterly or semi-annual reports, but then to drop the requirement that operators notify the jurisdictional health department and Ecology within 30 days of receipt of the sampling data if a statistically significant increase over background is determined. Ecology stated that this notification was an important tool for tracking regulatory compliance and it would not be comfortable doing away with this.

Eventually the group decided it would be best to leave this requirement as it currently is – namely that the minimum requirement remain submission of annual reports.

3. **Section 5 (d) - Potentially require that data be submitted to Ecology's Environmental Information Management (EIM) database.**

Discussion: If we add this requirement, it likely would go under a new 173-351-500(5)(d) category and the wording could be something like:

> *All groundwater monitoring data must be submitted consistent with procedures specified by the department. Unless otherwise specified by the department, all groundwater monitoring data must be submitted in an electronic form capable of being transferred into the department's data management system.*

Submittal of data into EIM is already occurring for 173-351 landfills.

Pros – The data are being collected anyway, this would provide jurisdictional health departments and Ecology better access to it for making decisions, and the data would be available for outside entities to use.

Cons - Added effort and expense.

<u>3/2/15 Discussion</u>

After Tom summarized the issue based on the above, it was suggested that while submitting data to Ecology's data base makes sense, requiring data submission only annually (as opposed to quarterly) would ease the burden on operators while still achieving most of the same goals. And since operators are required to notify jurisdictional health department and Ecology within 30 days if there has been a statistically significant monitoring parameter increase, entering the data shortly after each quarter that is was collected would not do much more toward tracking regulatory compliance. Therefore, there was agreement to require that all data collected during the previous year be submitted to Ecology's Environmental Information Management (EIM) database by April 1st of each year.