Nutrient Workgroup Meeting – April 27, 2009
Summary of Afternoon Session on Implementation Procedures

Overview of changes made to the nutrient section in response to comments received after the January workgroup meeting.

K. Holligan –
- Section substantially reorganized for more logical flow of ideas and edited for clarity.
- Some subsection titles revised to be more descriptive of content.
- Text added to allow consideration of domestic renewals and industrials on a case-by-case basis.
- Text added to allow more flexibility in determining TP limits (other than just permitted flow).
- Text added to allow consideration of more complex nutrient models if they are submitted to the TCEQ.
- Additional screening factors (sensitivity to growth of aquatic vegetation based on observations and based on shading and sunlight in narrow backwaters and small coves) added to the section on local effects in reservoirs.
- Quantitative screening based on water clarity in streams and rivers deleted.

Discussion of whether/why smaller WWTPs have more trouble than larger WWTPs meeting TP limits.

K. Holligan - TCEQ has about 50 domestic permits with TP limits ranging from 0.1 to 2 mg/L. Staff are reviewing the self-reported TP data to see if there is a trend in fraction of violations versus permitted flow. Plants discharging near their permitted flow appear to have more trouble meeting TP limits. Analysis is continuing.

L. Tischler - from a technical standpoint, permitted flow should not be an issue regarding compliance with a TP limit but that operational issues could be.

R. Palachek - smaller WWTPs generally have less sophisticated operators who are at the plant less frequently.

G. Clingenpeel – smaller facilities bear a disproportionate cost to hire a higher level operator.

R. Bhattarai - because TP is precipitated out, filtration reduces TP and that compliance with a TP limit will depend to the extent the plant filters the effluent. Filtration is essential for TP limits less than 1 mg/L.

Discussion of why evaluation/impact distances differ among the three nutrient screening procedures and also differ from DO impact distances.

K. Holligan - DO models are run at a hot summer temperature of 30.5C, while nutrient screening is performed at an annual average temperature of 19.5C. Since rates are temperature dependent,

we need to evaluate greater distances for TP than for DO. As far as why there are differences among the three nutrient screening procedures – the distances in the draft IP are based on BPJ; J. Davenport included the distances that staff use in practice. We are considering using a default model at 19.5C to determine appropriate evaluation distances. Factors to discuss include: appropriate decay rate for TP and appropriate TP endpoint (a specific concentration or fraction of the initial TP in the effluent?) The current rate in the draft IP is 0.08/day based on a conservative analysis of five central Texas streams that had WLEs that could be used to "calibrate" the decay rate.

P. Jensen – are you looking for a more sophisticated decay rate?

K. Holligan – that's part of it.

L. Tischler – the 0.08/day decay rate is based on a 90% confidence level in central Texas streams. TCEQ should consider looking at rates for other streams around the state for which we have data and calibration models. Maybe TCEQ could come up with some regional rates.

K. Holligan – while working on a project in the panhandle, I used the calibration model and TP data for the Prairie Dog Fork Red River and came up with a decay rater of 0.17/day.

R. Palachek and L. Tischler - include language that allows the use of other appropriate decay rates. That language had already been included in the draft IP.

M. Hess – on page 19, the "<" notations in the table of evaluation distances are ambiguous. Do they mean "out to" the given distance or much less than the given distance. Please clarify.

Discussion of nutrient screening for main pool effects in reservoirs with numeric criteria.

K. Holligan – the change in TP in an entire reservoir due to a discharge is now compared to the ambient TP concentration instead of to the difference between the TP screening level and the ambient TP.

M. Ernst – how do the results of the two methods compare?

K. Holligan – we never tested the previous calculation, so we don't know.

J. Davenport – if the screening level is roughly twice the ambient, then not much of a difference. Advantage is TCEQ can screen a reservoir without criteria.

R. Palachek – what is the period of record used to calculate the ambient TP concentrations?

K. Holligan – it is the same data set used to calculate the TP screening values and it is from the same time period as the chlorophyll *a* data.

J. Davenport – the goal is to use a long-term data set.

R. Palachek – how often does TCEQ recalculate the ambient TP values?

J. Davenport – not sure – we need feedback on whether those values should be recalculated.

B. Cook – how are cumulative impacts being addressed?

K. Holligan – let us walk before we run. All of the nutrient screening procedures are new. We are not planning to address cumulative impacts in this IP revision. Perhaps in a future IP revision.

P. Jensen – any story behind the 5% and 10% cuts? Using a >10% change as an indicator for a TP limit seems to align with antidegradation.

J. Davenport – the nutrient screening procedures are in part an antidegradation review, and 10% seems like an appropriate level of concern.

M. Ernst – why is the nutrient screening tied to antidegradation rather than a waste load allocation?

J. Davenport – the appropriate % change could be argued, but we don't think it would be appropriate to use all of the assimilative capacity for a single discharge. A full waste load allocation would have to consider point and nonpoint sources.

L. Tischler – since this review is for new or increased discharge it's good to have them in line with one another.

P. Jensen – if 5% or less, will this be considered no degradation?

L. Tischler – TP is not a criterion.

J. Davenport – no specific mention of antidegradation in the nutrient section.

P. Jensen – perhaps TCEQ should consider mentioning antidegradation in the nutrient section.

L. Tischler – requested that an example screening be provided in the section on rivers and streams.

Discussion of revised regression equation (provided by TIAER) relating chlorophyll *a* to TP.

J. Davenport – purpose of regression equation is to provide a method that can be used to estimate a change in chlorophyll *a* over an entire reservoir based on the estimated change in TP. This is a very rough equation that is not being used for permit decisions at this time.

R. Palachek – what is the r-squared of the regression?

M. Ernst – what is the equation based on?

L. Hauck – in dealing with the question of whether chlorophyll *a* is responding to TP, we looked at trophic indices and values used to create the criteria. About six reservoirs appeared to be outliers and were not used. The remaining 90 reservoirs were used to develop the regression. The mean TP and chlorophyll *a* values were used.

L. Kalisek – how would the regression equation be used in permitting? Use the 5% and 10% boundaries again?

J. Davenport – no plans to use the regression equation during permit reviews. EPA is interested in the % change in chlorophyll *a*. It is a potential tool.

L. Kalisek – add language to clarify how equation is used. This will be important for future permit hearings.

R. Palichek – how much better (%) is this regression equation than the previous one?

J. Davenport – the r-squared is significantly higher.

L. Hauck – some, but not an order of magnitude.

P. Jensen – what is the intent of the equation?

J. Davenport – the equation would translate an estimated change in TP to a potential change in chlorophyll *a*.

Discussion of chlorophyll *a* to TP ratio – revised calculation.

K. Holligan – TRA provided an alternate calculation of chlorophyll *a* to TP and suggested boundaries for low, moderate, and high concern. Could be used as a measure of sensitivity (one of many screening factors) for local effects in reservoirs.

G. Clingenpeel – likes having the ratio. The boundaries are a policy decision. Do they make sense or would it be better to divide reservoirs into roughly three equal groups (boundaries of <1.2, 1.2-2, >2 would accomplish this)?

P. Radloff – the regression equation we just discussed related ln(Chl *a*) to ln(TP), but this ratio related ln(Chl *a*) to TP. This doesn't make sense.

P. Jensen – will TCEQ recalculate these ratios when the criteria are recalculated to include more recent data?

K. Holligan – yes.

Discussion of nutrient screening for estuary discharges.

K. Holligan – TCEQ has only two draft permits and no issued permits with TN limits to address estuary discharges. The estuary section has been generalized; specific permit limits for TP and TN have been removed; section refers to the seagrasses section of the IP. TCEQ is trying to set up a conference call or meeting for those who have commented on seagrass issues. So far no luck coordinating everyone's schedules. If you are interested in a seagrass conference call or meeting and have not already been contacted, send me an email indicating your interest in participating.

USGS – is TCEQ looking primarily at TN instead of TP?

K. Holligan – yes.

T. Martin – concerned about degradation of seagrasses in general. Has TCEQ considered the effects of TN on brown tides (Matagorda Bay).

M. Hess – the way the section is worded now, TCEQ would not consider the effect of brown tides on seagrasses. Consider adding language to consider brown tides in seagrass areas.

P. Jensen – look beyond areas with seagrasses.

Break

Discussion on establishing TP limits in permits based on screening procedures.

K. Holligan – staff performed beta testing of screening procedure for discharges into reservoirs with numeric nutrient criteria. Tests used effluent flows of 0.1, 0.25, 0.50, 1.0, 2.5, and 5.0 MGD at distances of 0, 3, 6, 9, 12, and 15 miles from each reservoir. All reservoirs that have proposed nutrient criteria and sufficient information were tested. (We lack retention times for some reservoirs.) Test results indicated that 38% of the cases would not need a TP limit (estimated change in TP over entire reservoir < 5%); 51% would need a TP limit (estimated TP change > 10%); and 11% would get extra scrutiny (estimated TP change 5-10%). Of the 474 domestic permits in the watersheds of these segments, 331 are discharge permits, and about 92 (28% of discharge permits) would need a TP limit, based on the distribution of permits among the reservoirs and the fraction of model runs for each reservoir that would result in a TP limit. Some of the more sensitive reservoirs had few or no existing permits in their watersheds. Out of the universe of 2600 domestic wastewater permits in the state, this represents only 3.6% of the total (including no-discharge facilities).

L. Tischler – is TCEQ looking at just new permits and amendments to increase flow?

K. Holligan – yes, although we have not ruled out looking at renewals. The question is: if a facility applies for an increase in flow – for example, from 1.5 MGD to 3.5 MGD – do we evaluate a flow of 3.5 MGD or 2.0 MGD? We need to specify.

T. Bennett – have you compared your beta test results with the chlorophyll *a* to TP ratio tables?

K. Holligan – no, but that's a great idea.

M. Ernst – which reservoirs were able to handle a 5 MGD discharge? For example, what about Benbrook Lake?

K. Holligan - just over half the model runs for Benbrook Lake indicated that TP limits would be needed.

M. Ernst – considering its size, that doesn't seem right for Benbrook. It should be able to hold more TP than that.

L. Tischler – some of the retention times look unlikely – Twin Buttes, E. V. Spence, Mackenzie. Consider using a historical pool elevation rather than the normal conservation pool for some of these reservoirs.

P. Radloff – clarify WWTP screening for reservoirs and rivers. If a discharge is into a river or stream and then into a reservoir with numeric criteria, would screening done for the whole reservoir and for local effects in the cove/backwater of the reservoir and for the river or stream?

R. Palachek – was any testing done using the local effects screening procedures (either reservoirs or streams)?

K. Holligan – not yet.

R. Palachek – then the number of permits that may need TP limits could increase?

K. Holligan – possibly.

R. Palachek – the fiscal note for the rule should include this impact.

K. Holligan – additional guidelines have been included for assessing the results of local effects screening for both reservoirs and streams. We have tried to make the assessment a little more quantitative, but we are not married to this particular method. We have not yet tested the method. We would like your input.

G. Clingenpeel - TCEQ will be putting itself in a box if the numeric method is published in the guidance document. The weight of evidence approach is preferable to the numeric approach. TCEQ will be losing flexibility for staff BPJ.

L. Tischler – BPJ requires more documentation.

P. Jensen – numeric method assumes all screening factors have equal weight, but most scenarios are more complex than that.

K. Holligan – we do include the possibility that the screening factors do not all have equal weight.

M. Ernst – why not use QUAL-TX to model TP? Keep all the qualitative screening factors and add the QUAL-TX model to evaluate impacts downstream.

K. Holligan – for the local effects in reservoirs, we do include a screening factor for local dispersion and mixing that can use a QUAL-TX model. The stream section does not include any mention of using QUAL-TX.

L. Tischler – so we don't want numbers but we want to use a QUAL-TX model?

P. Radloff – how would you work with limits in modeling? We don't want one permit to use up all the assimilative capacity.

K. Holligan – the antidegradation review would ensure that one discharge did not use up all the assimilative capacity.

P. Radloff – it would still be tempting to use QUAL-TX to come up with a limit.

M. Hess – include discussion about the relative weights of the screening factors. Don't retreat back to just the language in the first paragraph about weight of evidence.

Discussion of Standards and IP timeline

L. Hamilton – trying to get revised draft of Standards to management for review by May 15. Hoping for adoption some time in spring 2010.

The workgroup would like to see the draft Standards and IP when they are proposed (submitted as Agenda backup) so they will have more than 45 days to review.