

# EPA Public Drinking Water Stage 2 Rule Package Second Stakeholder Meeting October 24, 2006

8:00 – 8:30     **Arrival and Sign in**

8:30 – 9:00     **Overview of Package, Topics, and Today's Meeting Flow**

Introduction of Rule Project Manager: Marlo Wanilesta Berg

Marlo Wanilesta Berg addressed:

- Housekeeping issues
- Stakeholder Meeting Ground Rules
- Meeting Goals
- Role and Responsibilities
- TCEQ Mission
- Today's Schedule

Marlo Wanilesta Berg addressed:

- Long Term 2 Enhanced Surface Water Treatment Rule (LT2 or LT2ESWTR)
- Purpose of LT2ESWTR
- What is *Cryptosporidium* and what are its health effects?
- Overview and Process of LT2ESWTR
- Schedules
  
- Today, we are focusing on the list of tool box options:
  - watershed control program
  - presedimentation basin w/ coagulation
  - treatment performance
    - Combined Filter Effluent (CFE) performance
    - Individual Filter Effluent (IFE) performance
  - Additional filtration
    - Membranes
    - Bag and cartridge filtration
    - Slow sand filters
    - Second stage filter
  - Ultraviolet light
  - Chlorine dioxide
  - Ozone

9:00 – 11:30    **Breakout Discussion Sections on the LT2 Toolbox Items, to address:**

- Ultraviolet Light Disinfection (Sam Turner; moderator, Bill Melville scribe, and Alicia Diehl)
- Membranes (Skip Ferris, moderator; Allison Marshall, scribe)
- Source Water Protection (Greg Rogers, moderator; Dave Terry, scribe)
- Turbidity Optimization (Jack Schulze, moderator; Cindy Haynie, scribe)
- Other Toolbox Items (Marlo Wanilesta Berg, moderator; Debra Cerda, scribe)

11:30 – 1:00    **Lunch on Your Own**

1:00 – 2:30      **Discussion on How to Monitor New Sources & Plants and Other Monitoring Topics**

TCEQ Question: The EPA rule is silent on new systems and plants. Special primacy requirements says the states must decide so we need to explore the options. All existing plants are required explicitly by rule to monitor for *Crypto* and *E. coli*. So the question is what about new plants? Where and when do you perform the sampling? Do you get a boat and do the compliance samples before the facility is designed, or do you wait until after the facility is built and take samples from the intake?

*Stakeholder Question:* How many new surface water sources are developed? *TCEQ answer:* Three to four a year.

*Stakeholder Question:* Are they on existing reservoirs? *TCEQ answer:* Yes.

*Stakeholder Statement:* Then, since data has been collected for other intakes on that reservoir, don't you already have data? *TCEQ answer:* No; the data must be intake specific.

*Stakeholder Question:* Preliminary would it be ok to take the sample from the lake if you think there is a lot of *Crypto* but otherwise you should get the sample after the plant goes on-line? *TCEQ Restated Question:* Monitor before the plant is built or after? *Stakeholder Follow-up:* For 2 years of sampling, would it be possible to sample at "imaginary" sample point representing intake, consistent with design/build time-frame.

*Stakeholder Statement:* Dry/wet years are Texas water quality drivers so monitoring may not catch the 'right' levels? *TCEQ answer:* Sure, things change. In a couple of years we'll have data for most reservoirs.

*Stakeholder Statement:* Pumping at intake impacts water quality as contrasted against grab samples from a boat.

*TCEQ comment:* Rule says per raw water intake. *Stakeholder Comment:* So I have a new intake approximately 300 feet from old one. I have to do more sampling? There are other sources on the lake, can't we use that? *TCEQ Response:* That's what the rule says. Maybe there is flexibility. Let's ask the EPA.

*Stakeholder Question:* Even if your intakes are side by side, must you do samples? *EPA Response:* Yes you must sample at all intakes unless you are drawing from the same level and the same "run-off" area.

*Stakeholder Question:* There are other sources on the lake. Can't we average or something? Perhaps combine analysis with three separate intakes? *EPA Response:* Sample at each intake. *Stakeholder Response:* I don't like that answer. *EPA Follow-up:* It's the rule. Monitor at each source.

*TCEQ Question to Stakeholders:* What do you think about the 300 feet separation difference? We ought to have a good understanding of what's in the lake. There can be problems with different elevations in the lake. *EPA Response:* If you've got a different structure it's a different set of samples. For each source of water, it doesn't distinguish between the intakes. You've got to monitor each intake.

*Stakeholder Question:* Our source water changes depending on upstream conditions. We will have a new source of raw water entering our existing intake. Will blending normal water with this new water from Lake George induce secondary sampling and secondary data now? *TCEQ answer:* No. The city draws water from the last 23 samples last month. You can't draw water from the City. It's your 24<sup>th</sup> sample. Your operating procedures say when and where you draw the water is representative of where you draw your water during normal operating conditions, which is representative of your climate and the conditions of your reservoir. For seasonal sources, if you use a water source during a specific season then that's where your water comes from. You monitor your seasonal source for 24 months, but not in a row; like 3 months each year for four years..

*Stakeholder Question to EPA:* What does 'sources' mean? We have withdrawal from lake not normally used, do we need to take another set of samples? *EPA Response:* No, if your operating procedures identify that as a valid source you use under certain conditions, like a drought, then that is allowed. This would be considered a seasonal source and part of normal operations. It's like withdrawing from different depths. You monitor from whatever the level is operating.

*EPA Clarification:* It's like an intake structure from different depths. Select your sampling dates for 24 months where you take it from whatever depth you're getting your water source when it's time to take your sample. That's your operating conditions. A system that begins using a new source (rule talks about pipes and intake structures) of surface water must begin monitoring and must monitor the new source on a schedule approved by the state. If you just looked at the letter of the rule, every intake must be sampled.

*TCEQ Statement:* Intakes on the same lake may have very different water. If you look at an aerial photo, you can see that the shallower areas in low flow areas look green with algae, while the good running parts look clear. For some systems you'll see an intake in the green algae stagnant line and at another intake nearby there may be significant water quality differences.

*TCEQ Clarification:* With Option 1 (the boat in the lake before the plant is built), you would do your compliance sampling when your intake is brought on-line, which is before you design the facility.

*Stakeholder Question:* Is there any data that says you can row out there, drop down 18", siphon water, and get an accurate reading? Why does EPA think this boat option is viable? You are talking about sampling for 24 months before you do anything (build it and go on line).

*Stakeholder Question:* How do I interpret the results? Aren't you going to alter it after the plant is up and running? And what about plants that come on-line after the second round? *EPA Response:* What I recommend is profiling the intake areas as best you can but don't use those as your 24 months samples. It would be nice to know the quality of the water before you build the plant. If you do see *Crypto* you might have to rethink your plant design. For a new facility built between sampling rounds 1 and 2, it comes down to when you are between the two monitoring rounds. What are you going to do after the second round of sampling? New systems must begin the second round no later than 6 years after the date of your initial bin classification. *TCEQ Statement:* So that makes it less critical whether first round is in boat or actual intake. Once the intake is built, can you still use the boat if you started that way? And if your data comes in different does that trigger the second round early? *Stakeholder Comment:* Surface water is variable anyway. Water quality will change regardless of sampling method. Bin classifications are so narrow that one sample event can put you over.

*Stakeholder Vote:*

- Option 1—the boat in the lake before the plant is built (3 votes)
- Option 2—Set the intake after it's built (2 votes)
- Option 3—Ability to do either option 1 or 2 (10 votes)

Most stakeholders preferred option 3 and there is opportunity for 2<sup>nd</sup> round.

*EPA Statement:* There's got to be a second round for the new ones 6 yrs after bin classification on the new system. There is a fourth option: wait until the treatment plant is on-line, take your sample that month and see what you get. You could take some grabs for design if you want but not start compliance sampling till after construction.

*Question to Stakeholders:* Why should TCEQ allow preliminary data collection instead of post-build data collection? If 'boat' sampling is not well-correlated to actual intake sampling, it is of questionable use for planning. *EPA Response:* Try your best before building but wait until on-line for 24 months of sampling.

*Stakeholder Question:* Is the second round of sampling on a specific date? *EPA Response:* Six years after for existing. TCEQ determines for plants built between first and second rounds.

*TCEQ Question to Stakeholders:* How should we interpret results when the intake results – taken when the intake has suction on the pumps – are different from the boat results? With flow to move the water; if the numbers differ, you trigger round 2. What about when it rains and something else flows in? Your water quality has changed. It needs to be the same point for 24 consecutive months - the highest running annual average (RAA) from 24 months. *Stakeholder Comment:* First round establishes Bin classification and goes into second round.

*EPA Statement:* The first round, your sampling point should be the same point for all 24 months. The 2<sup>nd</sup> round, your sampling point can be a different location than the first round (but must be same place for the whole 24 months). We're trying to get a good profile on the water. You might have a spike or two. We're trying to minimize your bad events. By pulling the 24 samples you are excluding long droughts. *TCEQ Comment:* The idea of averaging is to exclude unusual weather.

*EPA Statement:* There is another option: we recommend you wait until your plant is on-line before beginning your 24 months of samples. *Stakeholder Comment:* I think you ought to be able to go into final build with good, regulatory, 24 months samples.

*Stakeholder Question:* When is a new plant considered 'on-line'? *TCEQ Response:* When it's delivering water to the people; we only care when the people get to drink it. The water systems think the options are good. They would prefer knowing what the water quality is before they build the plant. *Stakeholder Comment:* Boat method provides relative baseline for design; otherwise, you are shooting in the dark. *TCEQ Statement:* The problem occurs in swapping from the boat to the intake method; however, if you don't have correlation between boat and intake, you are also shooting in the dark anyway.

*Stakeholder Comment:* Option 5: None of above, site specific EPA-set level. *EPA Response:* A system that begins using a new source of surface water must begin monitoring on a schedule approved by the State.

*Stakeholder Comment:* Variation in water body won't be drastically different between intakes that are close together. *EPA Response:* Depends upon the depth.

*TCEQ Statement:* If you do use the boat method, you may be at 90% design before you finish the sampling. *Stakeholder Comment:* Also you would need CT study.

*TCEQ Statement:* If EPA doesn't approve the crosswalk (switch from boat to intake) you've got to rebuild. TCEQ staff have not seen a lot of data on the boat method.

*Stakeholder Comment:* It's either design to Bin 1, then do 24 months, or require up-front design assistance with boat sampling. Either you say you can design to Bin 1 specifications and assume you are going to be there and you start the source monitoring and TCEQ then says 'No'; you are bumped up into Bin 2 or 3. Or, you could require water quality samples up front and the TCEQ could say that your design meets your water quality.

*Stakeholder Comment:* TCEQ should put it in design rules.

*Stakeholder Comment:* Another option is the compressed monitoring schedule. *EPA Response:* You can't do that; your sampling location must be approved before backwash recycle is applicable. Once you select your location you can't change it during the 24 months. Recommend some public water systems drive sampling for design. Suggest you do a few samples to profile the water to see if your design is appropriate and then you can start your 24 months sampling.

*TCEQ Statement:* We probably will not be able to call a EPA-defined “source” a lake. We will use the term “intake”.

*EPA Action Item:* EPA Stakeholder can pose the question to the EPA’s lawyers and get back to TCEQ with their reply.

*Questions for Stakeholder Consideration:*

- When should a new system or plant sample for *Crypto* (or *e. coli*) for bin determination?
- What about using other sources of data?
- What about a compressed round of sampling?
- What is in the best interest of public health?
- Can do preliminary sampling...would you prefer to do preliminary and then do compliance sampling thereafter?

## Sampling in General

*Question to Stakeholders:* We are considering adopting the sampling requirements (*Crypto* and *E.coli*) by reference because sampling will only occur 2 times. Is this a good or bad idea? Why? We can change the wording so it would be clearer for Texans. We can’t change the requirements but we can make it consistent with Texas language since we all need to be on the same page and speak the same language.

*EPA Statement:* TCEQ may not want to reference the rule since systems would have to use the DCTS database submission system. DCTS was written considering that EPA had to do direct implementation. Once the State takes over, there is not requirement that they use the DCTS system since the EPA is no longer the primary agency. At that time the TCEQ is making the bin classifications and not us. We are approving your primacy package and once we approve it, it’s yours.

*Stakeholder Statement:* April started using the DCTS, was done in October. Impossible, had to reregister twice. CDX↔EPA referred me back to each other.

*EPA Statement:* Positive thing is EPA RG-database person will review the data. Organized a meeting with management and are putting in emergency fixes. We will call you to verify your data. *Stakeholder Comment:* Everyone was polite and patient and helpful.

*Stakeholder Comment:* I emailed my data; I did not use DCTS. *EPA Response:* Yes, we provided better training to contractors and timings improved. *TCEQ Follow-up:* That is one reason not to adopt by reference as rule requires DCTS.

*Stakeholder Vote:*

- Option 1—Written into the rule Texas-ized (6)
- Option 2—Adopt by reference; Guidance needed (0)

*Consensus Stakeholder Comment.* Adopt by reference and then Texas-ize it to make it consistent with Texas language and put it in a guidance manual and not the rule.

*Stakeholder Question:* We are using out-of-state lab. \$350 plus shipping (filter is appx. \$100 per). Twenty-six approved labs, 20 accepting samples. Lab reports to EPA.

*TCEQ Question:* Can’t grandfather in the second round? *EPA Response:* Grandfathering must start no later than 6 years after. The intent of the rule is to have some period of time between your rounds. It can’t occur sooner than bin classification. *Stakeholder Question:* We are still sampling monthly. In 6 years can we use that data? *TCEQ Question:* Should we allow that? At start up we had lab capacity issues. Are these ok now? *Stakeholder Statement:* You should be able to can turn in data after bin classification.

*Question to Stakeholders:* For the second round of monitoring, should we allow grandfathering? You can turn in data any time after you do your bin determination; the intent is to see if there has been some change. Grandfathered data has some pluses but in the next round everyone will be on the same schedule.

*Stakeholder Question:* How long does it take the TCEQ to do bin classification? *TCEQ Response:* About 3 months.

*Stakeholder Question:* I've got the money now and my folks know how to do it. Can we look at putting in a statement that you can do the sampling "no sooner than" a specified time? *TCEQ Response:* Yes, what we need to consider is 'what is the time period to look at to determine whether the watershed has changed?' With a lot of new home construction occurring, over 4-6 years you can have a significant change in the watershed. *EPA Follow-up:* Recommend reasonable (4+) year gap to find changes. *Stakeholder Statement:* It seems ok to have "no sooner than" as well as "no later than" but this may sound more stringent.

*Stakeholder Vote:* What gap is needed before you can do the 2<sup>nd</sup> round?

- Do right after your bin classification (1)
- After a 2 year break (2)
- After 4 year break (5)

*Stakeholder Statement:* I would like to introduce a rule directed at water producers. Stakeholders for the last 16 years have focused on *Crypto*. My stakeholders are concerned with secondary disinfectants. If I were to go to TCEQ or DSHS and ask 'how many persons died of *Crypto* for various years' and they were to say 6-7; that same number of people have died from Legionella. I think this room would be in such turmoil. Legionella comes into the hospital through drinking water. There is nothing being done about this and I can't understand it. If the State reports deaths, there should be notice. Why is there no ability to do anything about this? *TCEQ Response:* The State can't be more stringent than the federal rules. *Second Stakeholder's Comment:* Several years ago a task force put together guidelines for control of legionnaires in hospitals and long-term health care. Currently there are discussions occurring on the national level and this is an issue that must first be addressed on a national level. *Previous Stakeholder's Response:* I am aware of the task force recommendations and totally support those recommendations. I studied those recommendations and sent them to TCEQ to read. If you were to ask 50 hospitals, none would be aware of these recommendations. I bring it up because TCEQ decides what treatment is. *TCEQ Response:* Existing standards set design. *First Stakeholder's Comment:* Would you agree that no one has died from *Crypto*? *TCEQ Response:* We are aware of the incident in Milwaukee a few years ago when approximately 40 to 100 individuals died. *First Stakeholder's Commented:* I want this group of stakeholders (hospitals) recognized as vitally impacted by secondary disinfections. *Second Stakeholder's Statement:* The TCEQ gets specific rules from the EPA and we're here to help the TCEQ implement those specific rules.

2:30 – 2:40      **Break**

2:40 – 4:15      **Presentation from the Individual Breakout Discussion Sessions**

## **Ultraviolet Light**

1. *TCEQ Question:* Is anyone interested in this toolbox option? *Consensus Stakeholder Response:* Yes.
2. *TCEQ Question:* Should this credit be for LT2 Bin 2–4 systems only? *Stakeholder Comment:* No. You should be able to get credit if you are not an LT2 Bin 2-4 system. You should be able to get *Crypto* credit, or get credit for other microbial inactivation even though the main reason you use it is for DBP control. In our system of greater than 100,000 people, we want this option in addition,

even though we will be in Bin 1 we want to be able to get credit for UV. This way we can lessen chlorine levels and thereby control DBPs better. Ozone is more expensive. *Consensus Stakeholder Response:* Yes. Bin 1 systems should get credit for inactivation with UV.

3. *TCEQ Question:* Should this credit be available for ground water systems? Note— the Ground Water Rule will require 4 log viral inactivation of fecally contaminated wells. *Consensus Stakeholder Response:* Yes. If any system wants the credit they should have that option. The technology works in any water that should be recognized by rule.
4. *TCEQ Question:* Should this credit be applied to *Giardia* also? *The surface water treatment rules require 3 log removal/inactivation of Giardia; 4 log removal/inactivation of viruses; and, 2 log removal of Crypto. Consensus Stakeholder Response:* Yes. UV can inactivate *Giardia*, so credit should be given.
5. *TCEQ Question:* Should this credit be applied to viruses also? *Consensus Stakeholder Response:* Yes. UV can inactivate viruses, so credit should be available.
6. *TCEQ Question:* Should the UV systems be all-or-nothing or use a sliding scale for inactivation credit? *Stakeholder Question:* Would it be applied in combination with chemicals? *TCEQ Response:* No just UV part. *Stakeholder Comment:* Don't make systems locked into specific inactivation techniques. It should be sum of all removals plus inactivations. *TCEQ Remark:* Use algorithm or distinct boxes (all or nothing)? Should one method be disallowed? *Stakeholder Responses:* No. Let facility choose algorithm or distinct boxes. All or nothing for credit is not an option. *Consensus Stakeholder Response:* Stakeholders feel that the additional guidance from EPA is needed to resolve the question of whether 'all-or-nothing' should be allowed. *Stakeholder Question:* Based on which parameters? *TCEQ Clarification:* We are using three terms
  1. Extrapolation — Connect the dots (using known range of inactivation and computational fluid dynamics in mathematical equation or algorithm). Algorithm=extrapolation: T, %T, Lamp age, Flow Rate, and Sensor Reading →Number. Number=range. 0...∞
  2. Incremental — Stair step (on/off), but with range of possible inactivation levels
  3. All-or-Nothing — One increment=All; Adequate; On. The other increment=Nothing; NG; Off. This is like the old "minimum residuals" that were set by case-by-case CT studies. Benefit is that it does not require ongoing transmissivity measurement, which reduces cost. But, it uses more energy, which increases cost. It is easier to run. The assumption of worst case percent transmissivity (T%), flow, temperature etc. are used. Safety factors would be determined during validation, very complex. Result is 40 mJ/cm<sup>2</sup> or 0. Number = 1 log or 0.
7. *TCEQ Question:* Should UV validation and reporting be the same for all systems that receive credit? Currently there is a part of the rule that says that only 95% of the water needs to be disinfected. This is different than our current rules in two respects. Currently, compliance for the chemical disinfectants is on a time, not volume basis; and that basis is four hours of off-spec water. What do you think about this? *Stakeholders Comments:* On the 95% disinfected question - that is a bad idea. TCEQ should be consistent with current rules. Why does EPA allow this only for UV and not other disinfectants? UV disinfection should be the same as chemical disinfection. We should not let disinfection fail for longer than four hours in Texas just because EPA said that. TCEQ rules should require consistency of log credit like all other disinfectants. What is this rule based upon? *TCEQ Response:* Regulatory negotiation at EPA federal level. *Stakeholders Comments:* UV should follow log credit for *Giardia*/viruses just like for chlorine, chloramines, chlorine dioxide. You can keep the requirement that you have to attain 95%, but also require that you can never fall below a minimum level. Provide same level of protection as current Texas inactivation rule. It should not matter which disinfectant you use, as long as you get your CT. Get the same level of protection from UV that you do from chemicals under current rule. *TCEQ Comment:* UV has no known adverse health effects.

8. *TCEQ Question:* Under what conditions should we accept validation testing:
- on-site versus off-site?
  - Germany or other approved locations?
  - manufacturers versus 3<sup>rd</sup> party?

*Stakeholder Comments and Questions:* Oversight by ANSI/NSF type agency should set standards of validation testing. Same agency has authority to say whether a third part can test to the set standards. Consistency of regulations is important. There must be a sufficient audit trail for validation. Does ANSI allow self-validation for other equipment? Is on-site validation testing allowed? National standards should answer this (ANSI/NSF). Any validation should be consistent with national ANSI-type program. *Consensus Stakeholder Response:* If ANSI approves the technology and procedures involved then that is acceptable to TCEQ

9. *TCEQ Question:* What should be collected on the MOR? Basic elements for inactivation ratio. *Stakeholder Comments:* Do pages 4 and 5 of MOR provide enough information to satisfy regulations?

*TCEQ Clarification:* There are some parameters that EPA requires to be collected for credit, others that might be appropriate.

Water temperature at UV unit:

Sensor unit

Raw water

Chemical residual

Transmissivity / Absorbance

Lamp status (age)

Light sensor performance

MOR algorithm (same 5 basic elements plus sensor calibrations) is used to determine overall inactivation based on the measured parameters:

→ site-specific parameters/SCADA data

*TCEQ Comment:* MOR will have to be developed to take into account calculation and parameters.

10. *TCEQ Question:* Do we need more test parameters? *Consensus Stakeholder Response:* No. Leave up to the EPA if additional test parameter is required since UV is relatively new to Texas. If EPA approves the validation procedure TCEQ should accept it. Need to see EPA Guidance
11. *TCEQ Question:* How should we require dose to be measured? *Stakeholders Comments:* Sensor-related: calibration and validation. Need EPA-approved methodology: similar to turbidity; technology, application of technology; accuracy of technology. *Consensus Stakeholder Response:* Leave up to the EPA if additional test parameter is required since UV is relatively new to Texas. If EPA approves the procedure TCEQ should accept.
12. *TCEQ Question:* How should we regulate rain water systems that use UV (possibly no filtration)? *Stakeholders Comment:* Must filter! Meet viral inactivation requirement. Assumes filters remove *Crypto/Giardia*. Treated like surface water? Like GWUDI/GUI (groundwater under the direct influence of surface water). *Consensus Stakeholder Response:* A rainwater system for a public water system should be treated in the same way as a public water system.

*General Stakeholder Remarks:*

- UV should be treated consistently for credit as other disinfectants.
- For non-credit, treat like other non-credit items like potassium permanganate, etc.

## Membranes

**Bag and cartridge filters**—Up to 2-log credit with demonstration of at least 1-log greater removal in a challenge test when used singly. Up to 2.5-log credit with demonstration of at least 0.5-log greater removal in a challenge test when used in series.

**Membrane filtration**—Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing.

1. *TCEQ Question:* Is anyone interested in this toolbox option? *Consensus Stakeholder Response:* Yes

2. *TCEQ Question:* Should this credit be for LT2 Bin 2–4 systems only? *Consensus Stakeholder Response:* No. Bin 1 should be included as well, but they wanted some incentive; extend TOPS Recognition Program to those in Bin 1 that install membrane filtration as an incentive for extra treatment.

3. *TCEQ Question:* Should this credit be applied to *Giardia* also? *Consensus Stakeholder Response:* Yes if you can get the 4 log removal from *Crypto*, you should be the credit for *Giardia* also.

4. *TCEQ Question:* Should this credit be applied to viruses also? TCEQ currently gives 2 log virus removal credit if membrane filtration follows coagulation, flocculation and clarification. *Consensus Stakeholder Response:* No; no reason for doing this. If yes, what safety factor (such as with cartridge or bag filters) do you recommend (since no DIT can be performed for viruses)? Question is moot as previous answer is no.

5. *TCEQ Question:* The systems currently operating are not following the LT2 DIT and challenge study requirements. Should the same DIT and Challenge Study requirement be applied to LT2 Bin 1 systems that will have to be applied to Bin 2-4 systems? *Consensus Stakeholder Response:* Yes.

*TCEQ Question:* How do you recommend we handle challenge studies for existing systems?

*Consensus Stakeholder Response:* It is not that difficult to get the challenge studies in the field. Existing systems should be grandfathered unless they want additional credit.

6. *TCEQ Question:* Since many systems backwash at 15 minute intervals do you believe the 15 minute turbidity monitoring is practical? *Stakeholder Response:* Needs to be more frequent than 15 minutes.

*TCEQ Question:* If it is not, what should it be? *Consensus Stakeholder Response:* Samples could occur every 5 minutes. The objective is to allow you to discard a random high reading if it is not confirmed.

7. *TCEQ Question:* For LT2, the standard for Turbidity is 0.15 NTU before action is needed. A DIT must be done every day under LT2. Should this level be for all systems or just those under LT2 Bin 2-4? *Consensus Stakeholder Response:* All systems should meet this requirement.

8. *TCEQ Question:* Challenge Study (LT2 systems)

A. Who should conduct them? *Consensus Stakeholder Response:* A third party would be the best.

- B. Should we accept challenge LRV's from other States? *Consensus Stakeholder Response:* Yes but TCEQ needs to be looking at or approving/monitoring the protocols to establish these LRVs. *Stakeholder Statement:* Suggest TCEQ require the challenge mechanism to be registered w/ ANSI or NSF.
- C. Any problem with accepting ETV results? *Consensus Stakeholder Response:* No.
- D. *TCEQ Question:* Should we require pre-approval of Challenge Study protocol? *Consensus Stakeholder Response:* It needs to be something equivalent to the ETV protocol, or have TCEQ approval of protocol as in 8 B above
- E. Should we require pre-approval of QCRV? TCEQ should review/approve protocol as in 8 B above.

## Source Water Protection

Table 1. Source Protection and Management Toolbox Options

Watershed Control Program	0.5-log credit for State-approved program comprising required elements, annual program status reports to State, and regular watershed survey. Unfiltered PWSs are not eligible for credit.
Alternative Source/Intake Management	No prescribed credit. PWSs may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies.

Table 2. Bin Classification:

With a <i>Cryptosporidium</i> Bin Concentration of:	The Bin Classification is:
Less than 0.075 oocysts/L	Bin 1
0.075 oocysts/L but less than 1.0 oocysts	Bin 2
1.0 oocysts/L but less than 3.0 oocysts	Bin 3
3.0 oocysts/L or higher	Bin 4

### Overview

Watershed control plan has 4 elements:

- 1) "Area of Influence"
- 2) Identification of crypt sources
- 3) Analysis of control measures, and
- 4) Goals and specific actions.

Maintain Credit:

- 5) Annual Status Report:
  - a) How plan is implemented
  - b) Are goals being met
  - c) Plan to address shortcomings, and
  - d) Changes in watershed
- 2) Notify State of changes, and
- 3) Perform Watershed Sanitary Survey.

1. *TCEQ Question:* Is anyone interested in this toolbox option?

*Stakeholders Discussion:* No reported fatalities in 10 years due to *Crypto*; deaths due to legionnaires (29,000 since 1984). Groundwater public water systems switching to surface water,

concerns over chloramines. Purchase water concern. Would ½ log credit transfer to public water system? How onerous is the option? CRP, watershed protection plan and wastewater treatment plant improvements should apply. Septic system CI requirements should apply. New systems must comply. Chlorine in effluent should be sufficient. CRP monitoring could measure SWP efforts. Credit would be beneficial from Pont Comfort and CC. Not enough money. May not be able to afford. Which option is most effective?

*Consensus Stakeholder Response:* Yes, interest exists.

2. *TCEQ Question:* Does anyone believe they already have a plan in place that may meet the requirements? *Stakeholder Response:* No.

3. *TCEQ Question:* Should this option be for LT2 Bin 2-4 systems only?

*Stakeholder Comment:* Incentives to participate in structural best management practices, this seems to be an incentive even if you're a Bin 1 water system. This would give an incentive to water systems to have a source water protection. Should offer for all bins so the response is more mixed.

*EPA Response:* It is a meaningless credit since they are already getting their 3 log credit. Consider extending SWP to Bin 1. If you say *Crypto* protection lowers your source water *Giardia* levels as well and source water impacts all manner of fecal contamination you must think of this in parallel. Source water should not be allowed as a substitute.

*Stakeholder Concern:* How much control local water systems have over the watershed.

4. *TCEQ Question:* Should GUI Sources be handled differently?

*Consensus Stakeholder Response:* Will be difficult to determine the source. If we can't determine the source, this may have some applications.

5. *TCEQ Question:* Do PWSs have the resources to effectively implement and report on this type of plan?

*Stakeholder Question:* Does ½ log credit apply to all the systems pulling off Lake Tawakoni?  
*Answer:* Probably not if wholesaler and they have no sources, then their purchase systems would have the ½ log credit (purchasing treated water).

*Stakeholder Comment:* This is a lot of work for a ½ log credit; will be difficult to implement without local water system management support.

#### About the Plan

1. *TCEQ Question:* How should a PWS determine the "area of influence" in the watershed, which is defined as the area outside of which the likelihood of *Cryptosporidium* contamination affecting the treatment plant intake is not significant?

*Stakeholder Comment:* Look at point sources. Look at confined animal feeding operations (CAFOs) and industry. TCEQ should base the area on the prevalence of *Crypto* source. The area of influence could not be a set standard for each watershed; should be site specific.

2. *TCEQ Question:* How should PWSs complete and report the identification of both potential and actual sources of *Cryptosporidium* contamination, including the qualitative assessment of the relative impact of these contamination sources on water quality at the treatment plant intake? Discussed TCEQ databases and source water assessments that can be used to track down the sources. Do we have the available money to successfully do this?

*Stakeholder Comment*: The State should focus on the source water assessments. What about a plan to take care of all of the containment sources? If this is not possible, the focus should be on the *Crypto* sources. TCEQ DBs and SWSAs. Use aerial imagery and geographic information systems (GIS). Do an initial inventory. Should the PWS inventory? Refine the source water assessment (SWA). All encompassing plan; but what do you get for it?

3. *TCEQ Question*: How should the analysis of control measures that could mitigate the sources of *Cryptosporidium* contamination be conducted? Should a source monitoring plan be in place to provide this analysis? Action items, recommendation to implement.

*Stakeholder Comment*: Field Office inspections on wastewater treatment plants. Source water sampling and by whom (EPA or funding to sample). Current sampling is expensive. Only large public water systems can implement. Sample for E.coli first and then proceed to *Crypto* if needed.

*Consensus Stakeholder Response*: Making some recommendations for implementation. TCEQ FOD (regional inspectors) could provide more regular source water protection assessments. Current sampling requirements are already burdensome. This plan is focused on large systems and not small systems.

4. *TCEQ Question*: What are some goals and specific actions a PWS could undertake to reduce source water *Cryptosporidium* levels?

1. Significant removal of fecal contaminant sources.
2. Removal of septic systems, but lift stations and sewage lines are still present.
3. Roles of watershed partners and other programs.
4. Adding additional treatment at waste water facilities.

*Stakeholder Discussion*: Spray irrigation septic may be worse, study needed. Septic removal to sewage: money for collection systems, increase bills for wastewater treatment plant, public resistance. Could use CRD. Additional treatment at wastewater treatment plant (ultraviolet light and filtration). New wastewater treatment plant must notify public water system.

5. *TCEQ Question*: There are many Source Water Protection activities that will not have an immediate affect on limiting the likelihood of fecal contamination. Should these also be part of the plan? (e.g. education/outreach, pet waste management strategies, storm water management).

*Consensus Stakeholder Response*: Should be optional due to the monetary cost.

6. *TCEQ Question*: How should changes to the plan be reported? *Consensus*

*Stakeholder Response*: Do this in a letter format versus the cumbersome annual report. Keep it as simple as possible.

7. *TCEQ Question*: If TCEQ does not respond, the rule states that the plan is automatically approved. What is a reasonable amount of time for TCEQ to respond?

*Consensus Stakeholder Response*: TCEQ must approve them. The Stakeholders recommend 30 days, but say that the TCEQ needs to establish their timeframe. The Stakeholders also recommend automatic approval if no TCEQ response after 30 days.

8. *TCEQ Question*: What specific criteria should be used to approve the plan?

*Consensus Stakeholder Response*: Template needed. Guidelines to be developed by the State. Professional Engineer is not required to do the plan. Will TCEQ PE review the plan? Set realistic goals (can goals be met?). Maps should be part of the plan and include locations of *Crypto* sources

and boundary of area of influence. Can use GIS (County maps, USGS). Specific action items. How to rank containment sources, including: large volume versus small wastewater treatment plant, prioritizing *Crypto* sources and eliminate low priority *Crypto* sources. What containments would be the highest priority? Young cattle (wild) have high levels of *Crypto*.

#### The Annual Report/Site Visit

1. *TCEQ Question:* What should be reported? How can the 0.5 log credit best be justified?

*Consensus Stakeholder Response:* Should justify why the credit should be maintained (state implemented actions, schedules, and milestones) and should include monitoring results.

2. *TCEQ Question:* How should it be formatted?

*Consensus Stakeholder Response:* Short letter; updated map; develop process for minor versus major change.

3. *TCEQ Question:* How should the on-site visits be conducted? What format? How often?

*Consensus Stakeholder Response:* Roll into the Annual Report with check list of potential sources of contamination visited.

4. *TCEQ Question:* What watershed changes would warrant changes to the plan? Addition/subtraction of *Crypto* sources? New septic systems added, including subdivisions on septic systems?

*Consensus Stakeholder Response:* Discuss any subdivisions. Work with county offices on identifying new development projects

5. *TCEQ Question:* States have the authority to require that a watershed sanitary survey be conducted at an earlier date if the State determines that significant changes may have occurred in the watershed since the previous survey. What time frame is reasonable? The triggers can be citizen inquiry or sample results. Special sampling indicates increased *Crypto* should ½ log credit be removed?

*Consensus Stakeholder Response:* Stakeholders says 90 days from receipt.

#### New questions/Topics

*TCEQ Question:* Any watershed protection plans should dovetail into the *Crypto* plans for onsite septic systems. Clean rivers monitoring efforts are clearly a means of determining whether the SWA plan to see if the SWP efforts are taking effect. Not enough money available. The most cost effective option. Septic systems— aerobic—need more research on spray and *Crypto*. Septic system removal would be costly. Who pays? Increased bills for wastewater treatment plant. Some public resistance.

Clean rivers program has an active monitoring program. Get them more involved in public drinking water issues. Additional communication about wastewater treatment plants.

EPA— Is this representative of the source water going into the treatment plant? Which watershed are we controlling if we are doing the monitoring where we are getting the diversion water? Where it originally came from is not relevant.

What if you have blended sources? *Consensus Stakeholder Response:* Depends on the definition of watershed and the 'area of influence'.

## Turbidity Optimization

### Toolbox Options – Excerpt from 40 CFR §141.175(b)

Treatment Performance Toolbox Options	
(6) Combined filter performance .....	0.5-log credit for combined filter effluent turbidity less than or equal to 0.15 NTU in at least 95 percent of measurements each month. Specific criteria are in § 141.718(a).
(7) Individual filter performance .....	0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter and is never greater than 0.3 NTU in two consecutive measurements in any filter. Specific criteria are in § 141.718(b).
(8) Demonstration of performance .....	Credit awarded to unit process or treatment train based on a demonstration to the State with a State- approved protocol. Specific criteria are in § 141.718(c).

1. Do you think very many plants will be interested in these toolbox options?  
*Background Information:* Based on Texas Optimization (TOP) Program results, 5-10 plants are currently able to consistently achieve IFE <0.15 and CFE <0.15.  
*Stakeholder Question:* CFE=0.5 + IFE 0.5 = 1.0 Credit? *TCEQ response:* Yes  
*Stakeholder Remark:* Because of optimization history, least economic impact. Increased priority after U.V.  
*Stakeholder Question:* Where does chlorine dioxide (ClO<sub>2</sub>) fit in? *TCEQ Response:* Bin classifications; increased *Crypto*, increased treatment required. Top 2 Bins will require combination membrane, ClO<sub>2</sub>, U.V., etc.—. However, ClO<sub>2</sub> credit requires high doses. High doses can result in chlorite MCL violation. Good for preoxidation but *Crypto* credit will probably be limited to plants using an iron salt coagulant.  
*Stakeholder Remark:* Small plants in East Texas will be interested.  
*Consensus Stakeholder Response:* Yes. As many as twenty-five percent of surface water treatment plants may be interested, especially those running IFE 0.15 or less under TOPS.
  
2. Should TCEQ allow CFE credit when sampling does not occur at 4-hour intervals?  
*Background Information:* LT2 does not explicitly require 4 hr monitoring at systems serving <500 but the preamble implies that 4-hour monitoring is the basis for additional credit. Rule allows systems <500 to CFE once per day.  
*Stakeholder Remarks:* credit (and monitoring requirement) should be based on duration of operation. Have to monitor NTU to know if compliance is met. One sample per day is not representative. 0.5-log CFE or 0.5-log IFE, not separated, everything based on IFE.  
*TCEQ Question:* Should more than one CFE per day be required?  
*Stakeholder Response:* Shouldn't be required to do additional CFE monitoring to get IFE credit. Small systems should be able to: IFE and make it, then get CFE credit; IFE and don't make it, monitor CFE more than once per day (representative sample).  
*Stakeholder Question:* If IFE is met, CFE isn't automatically met, afterflock (not pathogens). If IFE is met, why not full log (IFE+CFE)?  
*TCEQ Response:* We'll get to that in question 4.  
*Consensus Stakeholder Response:* while the State may allow exception, if you want to claim credit, you should have the data to support your claim.
  
3. Should TCEQ apply a CFE requirement similar to the "no consecutive IFE reading above 0.3 NTU" requirement to the CFE credit? If so:
  - a) What should the turbidity limit be? (e.g., 0.3 NTU, 1.0 NTU, or some other level)
  - b) Should it be based on:
    1. a single CFE reading,
    2. consecutive CFE readings, or
    3. some percentage of CFE readings?*Consensus Stakeholder Response:*
  - During the breakout session, the answer was: No, not at this point we'll see if anyone goes over 0.3. Not necessary at this time.

- However, during the recap, some stakeholders recommended a “no single reading over 1.0 NTU” criteria because this is a treatment technique violation and it seemed inappropriate to give additional removal credit to a plant that had to issue a public notice for not meeting minimum requirements.

4. How should TCEQ apply the “optimization” credits at plants with IFE meters? The breakout group discussed the following alternatives.
- a) 0.5-log CFE credit regardless of IFE levels
  - b) 0.5-log CFE credit only when IFE is below some trigger level (e.g., 1.0 NTU, 2.0 NTU, or some other number)
  - c) a full 1.0-log IFE credit regardless of CFE
  - d) an additional 0.5-log IFE only when CFE credit is claimed
  - e) an additional 0.5-log IFE even when CFE credit cannot be claimed
  - f) How should TCEQ deal with the “unusual and short-term” circumstances issue?

*Background Information:* Plants with more filters can have more difficulty meeting IFE requirement since it applies to each filter individually but an easier time meeting CFE requirement due to dilution. Also, 95% of IFE can be < 0.15 but CFE > 0.15 due to afterfloc or silt, especially if CFE is measured after the clearwell.

*Question to Stakeholders . . . items a) and b):* How bad can IFE be and still claim CFE? If you get no IFE credit due to filter malfunction, what conditions would need to exist to not get CFE credit?

*Stakeholder Question:* What are the current IFE triggers for special studies?

*TCEQ Response:* each event with consecutive IFE readings > 1.0 NTU requires evaluation, 3 events with IFE > 1.0 requires filter assessment, 2 consecutive months with IFE events > 2.0 require third-party Comprehensive Performance Evaluation.

*TCEQ Question:* If you are in Bin 2+, it is because *Crypto* risk is higher; shouldn't TCEQ be more restrictive in these cases?

*Consensus Stakeholder Response:* Recommend option a). If TCEQ chooses to propose option b) the IFE trigger level should not be set <2.0 NTU. <2.0 NTU would be too tight. Include obvious reasons option.

*Question to Stakeholders . . . items c) – e):* Treat IFE & CFE together or treat them separately?

*Stakeholder Remarks:* Leave an open a door . . . if I don't get CFE due to silt accumulation in the well, why can't I get IFE? There are non-biological reasons for why you can't 95% CFE < 0.15 NTU while maintaining 95% IFE < 0.15 NTU. We recommend that you either get 1 log IFE credit and if you don't get IFE credit, you can take advantage of the ½ log CFE credit.

*Consensus Stakeholder Response:*

- Recommended a) and c). IFE credit and CFE credit are together. If IFE meets criteria, then 1.0-log IFE credit but no additional CFE credit. CFE credit applies only if the plant does not meet IFE criteria.
- If choosing b) and c), the IFE trigger level should not be set <2.0 NTU. <2.0 NTU would be too tight. Include obvious reasons option.

*Question to Stakeholders . . . item f):* How should we deal with the “unusual and short-term” circumstances issue? Ex. A hurricane. Should we define those conditions and/or define temporary?

*Stakeholder Response:* Too many to list in the rule but some examples of unusual conditions that occur occasionally include:

Air in lines;	SCADA errors;	power surges?
Blown filter drain	Fouled bleed valves	back wash valve failure
temporary upsets	Mechanical failure (ex., single clarifier not working);	

*Question to Stakeholders . . . item f):* What is ‘short-term’? IFE and CFE credit based on monthly performance so are we talking about ≤ 4 hour period like for daily disinfection violations? 4 days? 7 days? How long is long?

*Stakeholder Response:* Depends on the system's size and nature of problem. Large systems ≤ 1 day; Small System — Could be different; 1 week.

*Consensus Stakeholder Response:* TCEQ needs to include the "unusual and short term" provision in their rules and then describe examples in guidance documents. TCEQ needs to base 'unusual and short term' on event experiences, however data set of examples does not exist yet.

5. How should TCEQ apply the credit at small, 2-filter plants with no IFE meters? The breakout group discussed the following alternatives.
- a) 0.5-log IFE credit based on all of the 15-minute CFE readings
  - b) 0.5-log CFE credit based on a 4-hour subset of data
  - c) 1.0-log IFE credit based on all of the 15-minute CFE readings

*Stakeholder Remarks:* 95% of the 15 minute readings <0.15 is better than 95% of the 4 hour readings. For example:

16 CFE readings / 4 hrs	95%		1 4 hr readings
32 CFE readings / 8 hrs	95%	Or	2 4 hr readings
96 CFE readings / 20 hrs	95%		6 4 hr readings
	<b>Preferred method (a)</b>		Alternative method (b)

*TCEQ Remarks:* More data points does not necessarily improve the results. 95% is 95%. More frequent sampling means you will pick up more data points that lie above 0.15 but, at the same time, this increased number is offset by the increased number of good data points. More data is better only because one outlier 4 hour reading is equivalent to 16 consecutive 15-minute readings even though the period may have only lasted 45-60 minutes (3 or 4 15-minute readings). One of the big advantages is that TCEQ may be able to give additional credit if there are no consecutive 15-minute readings above 0.3 NTU, that is, treat 2-filter CFE just as the rule says we should treat consecutive IFE readings.

*Consensus Stakeholder Response:* Those plants are required to monitor every 15 minutes so:

- apply the 1.0-log credit if 95% of those readings are under 0.15 and no consecutive CFE > 0.3
- give the 0.5-log credit if 95% of those readings are under 0.15 but there are consecutive readings > 0.3;

6. Should we extend this additional removal credit to Giardia since it is several times larger than *Crypto*?  
*Consensus Stakeholder Response:* Yes

7. Should we allow additional viral removal credit even though viruses are many times smaller than *Crypto*?

*Stakeholders Remarks:* No more viral reduction for this than conventional treatment. Varies by Technology. Should rely on disinfection since it's the most conservative approach. Data is not available to support this.

*Consensus Stakeholder Response:* No, but only because we lack the data to show that reducing the turbidity levels reduces the viral threat.

If so: *Not applicable.*

- a) How much additional viral removal can be expected based on CFE < 0.15 NTU?
- b) How much additional viral removal can be expected based on IFE < 0.15 NTU?

8. Should we extend additional removal credit for lowering turbidity levels to plants in Bin 1 or limit it to plants in Bins 2 –4?

*Stakeholders Remarks:* No additional treatment required at Bin 1 plants because the risk of source water contamination is lower. Multiple barrier protection can lower disinfection requirements. Get removal credit for Giardia but maybe not virus. Additional public health protection? Decrease in NTU (increased removal) + decrease in disinfection equals the same total level of protection (inactivation+removal).

*Consensus Stakeholder Response:* Good idea as treatment consists of a multi-barrier approach. The stakeholders wanted to apply the “take it out or kill it” when we do the benchmark together. So when TCEQ reviews the disinfection protocol when the plant lower the disinfection levels, allow the log credit for Bin 1 systems; however stakeholders didn’t reach consensus on the bins 2-4. Higher risk, stakeholders were not sure TCEQ should extend the removal credit in situation where there might be a source water risk. When the overall risk goes up why shouldn’t the overall treatment go up?

9. Should we consider additional removal credits when evaluating “significant changes to the disinfection process”, i.e., should we evaluate total removal/inactivation or just inactivation when evaluating benchmarks?

*Background:* TCEQ already does this to some extent to allow system’s additional flexibility for lowering DBPs. The approach is a core element of the current regulatory strategy for membrane plants (since membrane gets credit for a 3.0-log Giardia removal).

*TCEQ Question:* Should goal of benchmarking be to decrease DBPs or just quantify disinfection?

*Stakeholder Response:* Reducing DBPs is one objective but we have to keep in mind that the primary objective is to reduce waterborne disease. DBP control is secondary.

Also see answer above on #8.

Yes, allow additional Giardia credit on Bin 1 if goal is lowering DBP risk. On Bin 1, benchmark should be based on total inactivation/removal. Increased risk, additional credit, but can’t reduce disinfection. Low risk, additional credit, but can we reduce disinfection? *Crypto* removal requirements based on increased *Crypto*, but increase *Crypto* may mean increased Giardia and increased virus.

*TCEQ Question:* If disinfectant credit is lowered, less protection for Giardia and viruses. What is correlation with *Crypto*/Giardia/virus?

*Stakeholder Response/Remarks:* Maybe TCEQ should do it in Bin 1 but not Bin 2-4? Balance CT credit with removal requirements? Total inactivation in finished water.

*Consensus Stakeholder Response:* Essentially the same as the one for question 8.

10. Would plants prefer one SWMOR spreadsheet that contains all the extra worksheets needed for these toolbox options or to have a separate spreadsheet (such as the TOPMOR)?

*Background:* There are lots of macros in the SWMOR. More compliance calculations mean more macros which means slower spreadsheet. On the other hand, separate spreadsheets means that data has to be manually transferred from supplemental spreadsheets to the SWMOR for compliance calculations and this increases error rates.

*Consensus Stakeholder Response:* Don’t slow everybody down for a few plants. Don’t mess with the SWMOR. Keep these two reports separate and unless it can be merged without making the SWMOR run slower.

11. Do you think we should allow Demonstration of Removal?

*Stakeholder Discussion:* Stakeholders discusses one of the wastewater demonstration projects for overland flow to remove heavy metals. It was a three-year project. Theoretical reduction rates figured.

*TCEQ Question:* How do you measure *Crypto* removal? Influent versus effluent? High volume of water required.

*Stakeholder comments:* Demonstration should be like pilot proposals; submit to TCEQ for approval; case by case analysis. Increase NTU after rainfall. Plants should be able to treat.

Unusual event? Look at 95%...ex. Taylor. Can handle 8-9 hours high NTU. Trident, 100 NTU, if enough backwashes, lose quantity.

*Consensus Stakeholder Response:* Yes, TCEQ should include this in the rule. However, the Stakeholders do not know what the criteria should be at this time or how it can be implemented.

If so: *These issues were not addressed.*

a) What are some of the implementation options/approaches?

b) Should this concept be applied to plants in Bin 1 or limited to plants in Bins 2 –4

## Other Toolbox Items

Who is interested in using?

- Presedimentation with Sufficient Coagulant Addition—*Stakeholders Questions*: Does dissolved air flotation fall under this? Some continuous pre/post; once daily minimum when plant is in operation. *TCEQ Answers*: DAF not under the rule, but we may be able to consider it as a pre-sedimentation option. Rule does allow an option to demo performance. *Consensus Stakeholder Response*: Yes I am interested. You should require plants to sample daily to show ½ log removal of your NTU.
- 2 Stage Lime Softening—No one was interested in this option. One City abandoned this; too difficult. Austin uses lime softening but doesn't have a second stage.
- Bank Filtration — One stakeholder mentioned they would like to consider this option for future projects; will use lake data to determine design but not sure if applicable. *TCEQ Reminder*: If system is in Bin 1, it won't need the extra credit. *Question to Stakeholders*: Should we give viral or Giardia credit, in addition to *Crypto*? Answer: Giardia makes sense; larger organism. *Stakeholder Question*: Can you demo viral? Answer: Not practical, size of organism, risks. *Stakeholder Statement*: A lot of systems are not aware of this, the rule and new requirements, including Valley systems still dealing with DBP1. *Consensus Stakeholder Response*: Would only apply for new systems at the 2<sup>nd</sup> round of sampling. No sampling until they were made to at the 6 year mark. Stakeholders were only mildly interested in this option.
- Chlorine Dioxide — *TCEQ Question*: would systems want to use this technology? Is there a problem with allowing ClO<sub>2</sub> to be installed after coagulation? *Stakeholder Comment*: High TOCs in raw, high TTHM leads to ClO<sub>2</sub>, consider UV but rules not in place. Has worked well. Initially applied to raw H<sub>2</sub>O before. Now it is split. First does as coagulate aid second after filtrations. This plan seems to work. No re-flocculation in Clear Wells. Some pH issues due to chloramines. Yes; it is working for them, but chlorites can be an issue. *Caveat*: Don't add ferrous chloride too soon. Keep an eye on the PHs; injection points.
- Ozone — Great but can't use it if Bromide is present. *Consensus Stakeholder Response*: Already part of the rule. No changes.
- Bag and Cartridge Filtration — *Stakeholder Response*: No one was interested in this option. Generally smaller surface water treatment plants, industrial sites, parks. *Question*: Should we go back and have all who are using have their manufacturers do a challenge study? For additional credit, yes; but for existing credit, no. *Question*: Should we require upstream and downstream turbidity monitoring? Yes for extra credit. Not require daily testing of *Crypto* based on challenge study to ensure performance meets challenge test (integrity). *Question*: Concerning modifications to the modules, challenge testing by manufacturers? Who will check modifications? *Stakeholder Comment*: Trust the manufactures, one outbreak and it affects their product. Issue in membranes, you can do the daily monitoring of parameters, if after a year from certification, State would challenge them to prove either: challenge study holds, efficiency same or better increase or redo. Any significant change. *Concern*: Manufactures are not always so trustworthy; small systems don't have the available money, are in disrepair, and no staff. 0.3 NTU need to know levels *Consensus Stakeholder Response*: particles greater than 1 micron create huge turbidity spikes. During plan review if it has been challenge studied over a year ago, we need to get from the manufacture that this is the same technology.
- Second Stage Filtration (box of rocks and another box of rocks) — See Section 141.715(b)(12). *TCEQ Question*: Where should NTU monitor occur? Have to test anyway, why not just once? *TCEQ Question*: Does first stage have to meet LT1? Put in 2<sup>nd</sup> set? Place before 2<sup>nd</sup> set of filters? Coagulation first. After Effluent. *EPA Response*: Rule says whatever comes off filter, after treatment train. More stringent before, but rules support after. Multi-barrier. Might be able to get grab sample instead of on-line monitoring. If you want extra credit for *Crypto*, you can apply more stringent monitoring. *TCEQ Question*: Design criteria? Depth of filtrate, etc.? Which? Same or new? Will use

same or similar design/criteria. *Consensus Stakeholder Response:* Yes. Monitor after the 2<sup>nd</sup> set of for the turbidity samples. Same design criteria as for normal filters.

- Slow Sand Filtration—No one was interested in this option; more interested in granular, membrane, etc.

Final: Giardia Credit? Virus Credit? Overall see #3. *No for filtration, only disinfection.* Had time to prove viral inactivations.

- 1) *.5 Crypto, why not .5 for Giardia? For viruses, still need disinfectant.*
- 2) *.5 Crypto, why not .5 for Giardia? For viruses, still need disinfectant.*
- 3) *Yes for viruses, same for granular media and cautious, look at media depth. Too much variability, for a good comfort level.*
- 4) *Based on challenge study, ok for Giardia.*
- 5) *Small amt for viruses*
- 6) *Small amt for viruses*
- 7) *Is good.*
- 8) *Is good.*

4:15      **Wrap up and adjourn**

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**ANSI/NSF Standard** means a specific standard that was developed jointly by the American National Standards Institute (ANSI) and the National Sanitation Foundation (NSF).

**Identified “PARKING LOT” Concerns**

- Valley Systems
- Small Systems
- Outreach
- Involvement
- Money
- Oversight