Desalination Stakeholder Meeting Minutes – June 3, 2014

Introduction and Agenda – David Williams and Marlo Wanielista Berg, TCEQ

Capacity for RO Units, David Williams

- Larger RO Units are expected to have models for the proposed production flows while smaller systems may not.
- What options are feasible for determining the capacity on smaller units that lack modeling data? Are the manufacturer's specifications sufficient?
- Where is the line between small and large RO systems, 50-gallons per minute (gpm), 300-gpm, or some other factor?

Stakeholder Input

Tony Bennett, A. Bennett Consulting (ABC): Is there an application limit desired, such as non-community locations?

David Williams, TCEQ: Yes, we are thinking convenience stores, restaurants, and other limited use locations.

Marlo Wanielista Berg, TCEQ: These would be under the sink packages or small systems that may not have pressure tanks. Is there a problem with using manufacturer specifications for these smaller models?

Steve Walden, Texas Desalination Association (TDA): This is a grey area as there are a wide variety of package units. Some of these units have flows of 500-gpm. Perhaps this should be limited by flow rates.

Mike Morrison, Freese and Nichols: Is this at point of use or point of entry?

David Williams, TCEQ: We are thinking point of entry. Point of use will still require exceptions. Environments such as mobile home parks will present challenges on point of use.

Redundancy, David Williams

- We are suggesting systems treating >7.5-million gallons per day (MGD) for **primary contaminants** provide at least one redundant unit (skid, rack, or tank). This requires meeting the minimum required capacity with one unit offline.

- Is the 7.5-MGD an appropriate criterion? Are there other more salient criteria such as 110% of capacity?
- Should there be a requirement for extra units?
- Should the redundancy apply for primary contaminant treatments only?

Stakeholder Input

Allen Woelke, CDM Smith: Is this for primary or secondary treatment?

David Williams, TCEQ: This would be independent of the type of treatment because it is based on capacity requirements.

Allen Woelke, CDM Smith: Units can run more than their rated capacities for short periods of time. So would the Surface Water Monitoring Reports (SWMOR) still show that the standards are being met?

David Williams, TCEQ: There won't be a SWMOR. This regulation is strictly for the groundwater section of the rules.

Allen Woelke, CDM Smith: Would there be something similar?

David Williams, TCEQ: At some point in the future, possibly. That would not be in this portion of the rules, currently.

Eric Haydon, East Rio Hondo: How are you defining unit?

David Williams, TCEQ: Yes there are some unclear definitions, essentially we are discussing physically separate units that can be monitored, cleaned, and pulled off-line without disrupting train production.

Eric Haydon, East Rio Hondo: So a plant producing 7.5-MGD with two trains would be required to produce the same quantity with one train down for cleaning purposes?

David Williams, TCEQ: I am unsure how likely it would be for that scenario to occur.

Tony Bennett, ABC: To follow Eric's point, should you take a unit down for servicing you have not effectively diminished your production capacity so much as changed the blending ratio of the finished water.

David Williams, TCEQ: What if you were required to treat all of the flow because of a primary contaminant? Maybe this standard should be based on the need to treat the total production flow.

Tony Bennett, ABC: This is a very important distinction between the treatment of primary and secondary, as well as acute versus chronic contaminants. Such that even a short term of something slightly above the maximum contaminant level (MCL) doesn't constitute a violation over a running annual average. I think there is a different level of concern associated with a long-term exposure health effect or a short-term exposure health effect. Throwing them all together would require a matrix with individually prescribed responses for each contaminant.

David Williams, TCEQ: That is a good point, in the surface water rules we are discussing pathogen barriers and you can have potential problems when you take a part of your system off-line.

Marlo Wanielista Berg, TCEQ: So does anyone think that redundancy is needed for secondary contaminants? [0 hands] So we are answering one of those questions. Redundancy should be for primary contaminants only. Tony has just suggested that redundancy should be used only when treating acute primaries such as nitrate/nitrite. Does anyone have any comments about that idea? [1 good idea] Should there be a size that needs redundancy?

Allen Woelke, CDM Smith: Acute primary constituents must have redundancy regardless of size otherwise you wouldn't be meeting the drinking water standard; that goes back to the pathogen issue. The only issue is with the mom and pop service stations, do they have redundancy or not?

Marlo Wanielista Berg, TCEQ: With that we have talked about redundancy similarly to the way we discuss surface water treatment plants, which is one extra unit or filter. In this case is there another way to look at redundancy? For example make sure you have an increased capacity, looking at cleaning intervals versus diurnal flows, storage, or some other way we haven't brought up? If an extra unit is not as palatable what other solutions are there?

Eric Haydon, East Rio Hondo: The engineers are discussing design criteria for the removal of constituents and from the operational side I see this as a discussion of flow requirements. Most groundwater systems have some type of storage capacity and would be able to maintain the required flow rates and capacity for some calculated period of time while taking a unit down for service.

David Williams, TCEQ: Perhaps this is something that could be addressed in the Engineering Report. A section could discuss capacity and describe how under peak conditions a system will be able to maintain adequate production. Individual solutions could be approved during that stage of review.

Operational Conductivity Monitoring, David Williams

- It has been proposed that systems treating primary contaminants monitor conductivity continuously with 15-minute (min) recordings. Similarly, systems that are treating secondary contaminants would be required to monitor once each day and record the results. The 15-min and daily recordings would be maintained on-site for investigators.
- Is there a consensus that the monitoring plans above are warranted? If not, suggestions?
- Are there any scenarios in which secondary treatment might need more frequent monitoring?
- Based on prior input, we removed the stratification based on community and non-community systems. Are there any concerns about this?

Stakeholder Input

David Williams, TCEQ: I don't believe we had a strong consensus on these points in the last meeting.

Marlo Wanielista Berg, TCEQ: The consensus is that no one wants to be required to turn in monitoring data. It was suggested that it be kept on-site for process control.

David Williams, TCEQ: Is there any discussion as to whether on-line monitoring is applicable under any conditions? When would you always have it?

Eric Haydon, East Rio Hondo: I don't think anyone has a problem monitoring the conductivity. However, it is an arbitrary number as each system has different design requirements, depending on the type of membrane and type of feed water.

David Williams, TCEQ: If you have the monitoring then it allows better process control, for example a sudden increase in salt passage will alert the operators to a potential issue with the membranes.

Eric Haydon, East Rio Hondo: I agree but if you write this into regulation you will put a fixed value there and it won't apply to all systems.

David Williams, TCEQ: Right now we are looking for the submittal of an engineering report and later a follow-up submittal will establish the baseline performance. The design engineer would then establish a threshold for performance loss that will trigger operational response. We are thinking 15-min intervals and we are not requesting that this data be submitted to the TCEQ.

Tony Bennett, ABC: The 15-min standard originates from the surface water requirements. You can make correlations between that and other acute exposure contaminants, like nitrates, that need to be monitored at that level because one drink of water is a potential health effect for a certain population. However for chronic primary contaminants, a system that contains blended averages or time-weighted average wouldn't require tracking of a spike of say arsenic over 10-milligrams per liter (mg/L) for 15-min. While you may want to know this, it would not cause a violation or reporting issue as long as the average remains below the acceptable standards. On-line meters are not difficult to install.

David Williams, TCEQ: I think you are concerned with tracking of this information but the on-line tracking is meant for process control for the operation personnel, not for the TCEQ. Perhaps 15-min is too frequent for recording the data but I don't see how that becomes problematic.

Tony Bennett, ABC: Do you really want to include process control in the rules?

Steve Walden, TDA: Performance monitoring is good and we can move towards performance based regulations and conductivity is a tool by which systems can show they are in compliance. Perhaps you can state in the checklist that the engineering report must describe what the process controls will be including the intervals.

Tony Bennett, ABC: When you say the feed and the final water, is that the final production water, or at each skid or independent unit?

David Williams, TCEQ: In many cases we do approve these upon the permeate water. In some cases we have raw water. What about staging issues, what if you have a problem in the first stage but your final production water looks good? This leads us to our next discussion point.

Monitoring Locations, David Williams

- Pressure and conductivity monitoring on the feed water and permeate of each RO skid.
- Should we monitor in between all stages?
- Stable Feed Water: Can we allow permeate monitoring only in cases of consistent water quality?

Stakeholder Input

David Williams, TCEQ: Currently we have not specified monitoring in between stages, should we have monitoring between each stage or maybe between the second only? Any scenarios?

Marlo Wanielista Berg, TCEQ: Who here has a multi-stage RO? [4 Hands] Single? [0 hands] Who here monitors between each stage? [3 Hands]

Eric Haydon, East Rio Hondo WSC: I monitor between the 1st and 2nd stage for each individual vessel. It allows you to go back and isolate the problem.

David Williams, TCEQ: So mostly everyone agrees to monitor between stages. What about a situation where the feed rate is stable and the water quality does not significantly change? In this instance should we allow permeate water monitoring only? [no comments] Does anyone have only permeate monitoring? [no hands]

Pre-treatment, David Williams

- We have suggested general parameters of when pretreatment is necessary. This includes things like SDI > 5, turbidity > 1.0 NTU, and for any limiting parameter identified by the manufacturer. Would following the parameters set by the manufacturer be more appropriate?

Stakeholder Input

David Williams, TCEQ: We set some bars for when pretreatment is necessary. The standards are: SDI > 5, turbidity > 1.0 NTU, and parameters identified by the manufacturer. Maybe we shouldn't identify the bar in the rules. Maybe we should just define this in the engineers report. Are there cases we want to define the bar?

Tony Bennett, ABC: Typically the manufacturer recommends SDI > 3. What if they said 10?

David Williams, TCEQ: Unlikely, I don't think manufacturers would do that to themselves. That is why we researched standards. This provides a fallback as many spreadsheets vary from 1-5 < SDI.

Marlo Wanielista Berg, TCEQ: There were lots of nods when mentioning manufacturer's specifications.

Justin Sutherland, Carollo Engineers: Are you actually stating numbers in the rules? Or is it the engineer who looks at the manufacturer's design to decide if pretreatment is necessary?

David Williams, TCEQ: Hopefully everyone looks at the manufacturers design to decide if pretreatment is necessary. Having a couple of bars would be helpful.

Justin Sutherland, Carollo Engineers: What about warranty conflict? A checklist should define to check for turbidity and SDI and to compare to manufacturers limits.

Tony Bennett, ABC: A checklist would be helpful.

Post-treatment, David Williams

- The stakeholders suggested a defined set of parameters for non-corrosive water is difficult due to differences in water quality and the various indices for defining non-corrosive water.

Stakeholder Input

David Williams, TCEQ: The current regulations state "non-corrosive water", which is a very vague term, and we want to ensure appropriate post-treatment. Are there any circumstances which should have minimum numbers for corrosivity? Could systems report this in the engineering report?

Justin Sutherland, Carollo Engineers: For compliance, the lead and copper rule deals with corrosivity. What types do you see?

David Williams, TCEQ: Lead and copper go to the Public Drinking Water section. I'm not familiar with what they see.

Marlo Wanielista Berg, TCEQ: If systems have lead or copper issues, they are already doing some sort of treatment. There are lots of solutions for lead or copper issues.

Tony Bennett, ABC: A multi-phase lead or copper control study is performed to find the right treatment in regards to regulatory requirements. There is a broad range of corrosivities and stability to deal with, which could lead to stability issues.

David Williams, TCEQ: That is too broad to address with this rule due to unique issues with each facility. Is it a bad idea to have minimum evaluating data? Or should everything be handled through an engineering report?

Mike Morrison, Freese & Nichols: Is there any potential conflict between the lead and copper rule and these rules? Once you do a corrosivity study, as long as everything is compatible, there shouldn't be an issue.

Justin Sutherland, Carollo Engineers: Science is still coming up with new studies on this constantly, and providing new guidelines. Quantifying could be undercut by a new study. Could we refer to a guideline?

David Williams, TCEQ: American Water Works Association for RO has a set of 5-6 accepted criteria. When designing this, we (TCEQ staff) left out unfamiliar indices. The indices we are mentioning may not be one-size fits all.

Justin Sutherland, Carollo Engineers: We like the Langelier Saturation Index (LSI), I've seen one system have an LSI of -1, and have no corrosion issues. I've also seen another system have an LSI of +1, and have lots of corrosion problems. Refining the guidelines may be a better approach.

David Williams, TCEQ: We hope the engineers will look beyond pH and alkalinity as guidelines, and take it seriously. Not all will, but we want to add the guidelines to help avoid problems. Then those engineers which are less familiar with some of the corrosivity will have a minimum set of criteria which is appropriate for all systems. If the criteria are difficult to meet, then engineers will need to report why.

Justin Sutherland, Carollo Engineers: So you plan to state numbers?

David Williams, TCEQ: No, not necessarily, but several people have voiced concerns over not having numbers.

Justin Sutherland, Carollo Engineers: If an engineering report doesn't cover post-process, don't you get a red flag?

David Williams, TCEQ: Yes, but the Utilities and Technical Review (UTR) Team have to review a lot of reports quickly. Once they receive the reports, staff must go through submittals, and need a way to check the submittals quickly, analyze and review them.

Vera Poe: UTR gets approximately 150 plan submittals a month with varying plan quality including inexperienced individuals making these submittals. There are many folks which need to know what things to address on their submittals, so TCEQ needs to be as specific as possible regarding our expectations. We could specify for the engineering report the info we would need, and that the submittal needs to be clear.

Justin Sutherland, Carollo Engineers: Calcium, alkalinity and corrosion indices?

David Williams, TCEQ: At a minimum the submittal would address these parameters, as not one-size fits all.

Vera Poe, TCEQ: Within the engineering report, the submittal could specify that their corrosivity meets Subchapter F regulations.

Justin Sutherland, Carollo Engineers: Where ambiguity comes in, the rules aren't clear.

David Williams, TCEQ: We want to be helpful with the rules and not overly descriptive, but we want to make sure that corrosivity is looked at.

Justin Sutherland, Carollo Engineers: Maybe the engineering report needs to mention how it is going to address these parameters, or if appropriate.

Action Limits for Salt Passage and Trigger Limits, David Williams

- Action Limits for allowable increase in salt passage: Relative to baseline performance, TCEQ staff is trying to establish a defined action limit.
- Are there any other general parameters are tracked for raw and finished water?

Stakeholder Input

David Williams, TCEQ: Should the 10-20% increase in salt passage be a trigger for action based off of vendor information provided by Toray at the last stakeholder meeting? The 10-20% would be based on baseline performance and would cause a system to take the rack offline, isolate the rack, and clean it. Is 10-20% appropriate for these actions? Should this be stated in the engineering submittal?

Mike Morrison, Freese & Nichols: Systems have done pilot studies historically. So there would be no more pilot studies? Some type of limits such as Total Dissolved Solids, or transmembrane pressure would be a good indicator. Limits should also be defined by the manufacturer. We need to be careful where to set the bar to avoid irreversible fouling, this may also depend on the manufacturer.

David Williams, TCEQ: This might be an evolving parameter. At startup, there needs to be something like a baseline for the system to determine when to take action. The third stage of pilot studies gives the RO indication for cleaning; however this was typically for membranes and piloted RO never really needed to be cleaned within the pilot timeframe. This could be defined in an engineer report at startup. We would want you [engineering community] to define it for the water system.

Marlo Wanielista Berg, TCEQ: In the rule it states a system must set an action limit. Must we set a limit, or should we evaluate what the limits are, or let the engineer deal with that?

Justin Sutherland, Carollo Engineers: What will TCEQ do with the limits? Would reporting be necessary?

David Williams, TCEQ: The triggers should be defined, and will help indicate to the operators when to clean the membranes, and help look for trouble spots.

Justin Sutherland, Carollo Engineers: It sounds like it's a similar issue to corrosion control. We would put a plan into the engineering report.

Marlo Wanielista Berg, TCEQ: So it's much like the nitrification action plan. This is similar and everyone is comfortable with this? [A few nods]

David Williams, TCEQ: We're not suggesting putting a trigger in the rules, but that one should exist. Would this help systems to determine problems with their membranes? When you try to determine if there is an upset, how many readings determine this?

Angel Bustamante, El Paso Water Utilities: It's not the number of data points (to determine something significant), but trends are used. We look at the SCADA (Supervisory Data Control and Data Acquisition) and what is happening to determine when a cleaning is needed.

David Williams, TCEQ: So you look at the broader trends, not points.

Mike Morrison, Freese & Nichols: There is also interaction. You see conductivity and pressure increase together, so they are coupled. Then you look at the trend.

David Williams, TCEQ: Are there any other things that need to be tracked during the RO process?

Eric Haydon, East Rio Hondo: You pretty much have it up there on the slide: turbidity, alkalinity, conductivity, and pH.

All the above-stated including daily turbidity (raw and finished water), alkalinity (raw and finished water) and hardness, conductivity (raw and finished) and pH.

David Williams, TCEQ: Are there alarms on any of the triggers?

Eric Haydon, East Rio Hondo: Mostly off of conductivity and pressure. We use a 5-micron cartridge filter. Temperature is also important.

David Williams, TCEQ: What is the change in pressure for an action?

Eric Haydon, East Rio Hondo: The limits are mostly based on conductivity and then differential change in pressure. It is usually about 15-pounds per square inch differential (psid) for a 5 micrometer cartridge filter.

David Williams, TCEQ: Are there things that cause you to take an action?

Justin Sutherland, Carollo Engineers: Can add normalized permeate flow, salt passage, and temperatures are important.

David Williams, TCEQ: Do you use built-in alarms?

Eric Haydon, East Rio Hondo: The conductivity (greater than 300), and anti-scaling chemical feed have automatic shut-downs.

Robert Rodriguez, North Alamo WSC: At our plant which is less than 2 years old, our chemical room and Programmable Logic Controller communication error causes shutdowns. We've had the tech out several times to repair it. Our operators wanted to disconnect the alarm. The alarms are important because the lack of anti-scalant can ruin the membranes. There have been no Salt Density Index (SDI) shutdowns though. We perform conductivity, SDI's, in which the SDI's vary due to silt and sand from the well. The SDI's are worse at start-up whenever we start up the shutdown the plant. For online turbidity monitoring, the turbidity also increases for raw (water) whenever we shut-down the plant completely.

Angel Bustamante, El Paso Water Utilities: We have alarms on anti-scalant, conductivity, pressure differential.

Marlo Wanielista Berg, TCEQ: Should TCEQ require alarms?

David Williams, TCEQ: Should we not require alarms? Can you think of any reason? Are there certain systems where the water quality is consistent, and the system wouldn't need alarms?

Marlo Wanielista Berg, TCEQ: Should alarms be on or off for small systems?

Vera Poe, TCEQ: Should alarms be required for systems treating a particular MCL? Is anyone for or against this? What about an alarm for arsenic?

David Williams, TCEQ: Is there a need for greater process control?

Steve Walden, TDA: Within the 2-step process there is a good consensus. The first set of plans includes an engineering report, which describes how to get things done. The system then builds their plant, figures out how they need to operate and a checklist then submits their operating report which gives further details on production. This development establishes an appropriate level of alarms, and shows how to address the issues.

David Williams, TCEQ: So to spell out the things that UTR needs to look for, we could create a checklist and create an evolving document.

Chemical Cleaning, David Williams

- Should we have a basis for intervals for CIP on regulatory limits? Any thoughts?

Stakeholder Input

Eric Haydon, East Rio Hondo WSC: On our system, we've never cleaned due to a set-point only just because it happens annually.

Robert Rodriguez, North Alamo WSC: We would start cleaning annually. We have had one plant on since 2005 that is still running well with only a few cleans. We have another plant that will need cleaning annually, so it depends on the type of membranes and the raw water type.

David Williams, TCEQ: It looks like all plants will have a set schedule.

Robert Rodriguez, North Alamo WSC: Yes, I think annually is a good idea. At Doolittle [water treatment plant] we should have done an annual clean. The problem there might have been with the anti-scalant though. It might have been from a flow meter malfunction and under feeding the anti-scalant. You might not see what's happening even with all the monitoring in place.

Craig Stowell, TCEQ: What are the opinions on the cleaning chemicals? Are they proprietary or are there NSF options? [room answers most are proprietary]

Open Discussion

Stakeholder Input

David Williams, TCEQ: Let's have an open discussion now. Are there any other questions?

Allen Woelke, CDM Smith: In the engineering report is there anything that addresses the brine?

Marlo Wanielista Berg, TCEQ: Not in these rules, no. In 42(f) this section is titled "surface water" but we don't want to create confusion when referencing this section. Would it be better if we remove "surface" or put the whole regulation in that section?

Justin Sutherland, Carollo Engineers: Chemicals are chemicals. What are the implications for removing "surface?"

Marlo Wanielista Berg, TCEQ: For groundwater systems, bulk chlorine would need containment which is usually a good idea anyways.

Mike Morrison, Freese & Nichols: If you want to run a pilot study, there used to be documents telling you the guidelines. Are you going to develop new ones?

David Williams, TCEQ: That document had issues and was outdated, but most guidelines haven't changed.

Marlo Wanielista Berg, TCEQ: We certainly don't want to discourage piloting, but the items required in the engineering report are what you would need to produce to get approval.

Eric Haydon, East Rio Hondo WSC: Looking at my notes from last time, RO membranes are intolerant to chlorine so there is a requirement for measuring chlorine. Also, the last revision said there shall be no cross connection between the raw and permeate. What about if I'm blending?

Marlo Wanielista Berg, TCEQ: Good points. We need to rework that part.

Eric Haydon, East Rio Hondo WSC: It would be a good idea to do an analysis for alkalinity, pH for wells. This would things like standard chemical analysis for raw water.

Vera Poe, TCEQ: I'm concerned about annual samples for all systems.

David Williams, TCEQ: That sounds like a tracking issue.

Marlo Wanielista Berg, TCEQ: So I have another question for the group: Operators would need to hold a license based on plant type and size, as well as, 20 hours of additional training. Could it be any kind of class? Would they need an extra certificate? There could be a few options: Take a RO class, TCEQ makes a class, or operators need certification.

Eric Haydon, East Rio Hondo WSC: I feel if someone has a surface water C license it would cover RO training and incorporate RO stuff.

Marlo Wanielista Berg, TCEQ: So groundwater operators could take a part of that course? I see this being more of a module for RO.

Angel Bustamante, El Paso Water Utilities: If TCEQ would promote more classes that would be good. We need more resources to tap into.

David Williams, TCEQ: So does anyone think we need to have another meeting? [No responses]

Justin Sutherland, Carollo Engineers: From the last meeting: groundwater production and monthly daily demand were both being considered. Did we clarify which one would be the capacity requirement?

David Williams, TCEQ: We would need to take into account the waste stream.