# Results of TWG Analysis of March Stage 2 Scenarios, SBREFA, and Development of April Stage 2 Scenarios

Meeting Summary - April 2000

M/DBP Stage 2 Federal Advisory Committee (FACA2)
**Results of TWG Analysis of March Stage 2 Scenarios, SBREFA, and Development of April Stage 2 Scenarios**

**Meeting #10**

**April 18-19, 2000**
**Washington, DC**

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**ATTACHMENTS**

## I Introduction

On April 18-19, 2000, EPA held the tenth meeting of the Stage 2 Disinfection Byproducts and Long-Term 2 Enhanced Surface Water Treatment Rules (MDBP) Federal Advisory Committee (FACA). Facilitator Abby Arnold, RESOLVE, began the meeting by reviewing the proposed agenda and objectives of the meeting. At the March FACA meeting the FACA developed a list of regulatory scenarios for addressing microbial occurrence and DBPs. The TWG presented its analysis of these regulatory scenarios at this meeting. The TWG worked very hard and long hours to complete the analyses requested by the FACA in the two weeks between the March and April meetings. They were not, however, able to complete all the analyses requested. The FACA negotiated additional regulatory scenarios for TWG analysis for the June meeting and developed a list of questions for the TWG to address (see section VI of this summary). EPA also presented an overview of the Small Business Regulatory Enforcement Fairness Act (SBREFA) process. See Attachment I.a for a list of meeting participants and Attachment I.b for the draft meeting agenda.

EPA provided FACA members with the following updates:

- At the March FACA meeting EPA agreed to work offline with several FACA parties on an agreement on how the FACA would handle the discussion of unfiltered systems - given the use of FACA and TWG presentation materials in a lawsuit in Massachusetts. EPA and the relevant parties on the FACA have reached an agreement that will allow the FACA to continue to include unfiltered systems in the negotiation. All parties have agreed that presentations to the FACA and TWG will not used outside of the Stage 2 M/DBP FACA negotiation table.
- EPA proposed the Ground Water Rule on April 18. This rule is related to the deliberations of this Committee because it deals with microbes in groundwater source drinking water systems.
- The Federal Court of Appeals has vacated EPA's proposed Maximum Contaminant Level Goal (MCLG) for chloroform of zero. The court has asked for briefings in its consideration of remedies.

Ephraim King, EPA, presented a list of issues that EPA would like the FACA to address in the Stage 2 rule recommendations. These questions are in addition to the issues on DBP levels and microbial disinfection that are already being discussed by the FACA:

1. What action, if any, should be taken on uncovered finished water reservoirs?

- Current rules require that all new finished water reservoirs be covered. Should action be taken to cover the several hundred (of all sizes) reservoirs that remain uncovered?

2. Should EPA take action to require cross connection control measures?

3. Should EPA move to increase its authority to require corrective action from individual systems with significant deficiencies?

- The 1997 FACA Agreement identified systems with deficiencies that are causing or have the potential to cause contamination. Under the Agreement, states with primacy to administer drinking water programs have the authority to require corrective actions. In one state, EPA does not have primacy to administer drinking water programs. EPA, therefore, does not have authority to take action to correct the deficiency unless there is an imminent threat of contamination.
- It is unclear whether a change in EPA's authority to enforce corrective actions in states without primacy would effect EPA and state authority in states with primacy.
- In addition, a FACA member added that the FACA should consider DBP monitoring in groundwater system aquifers, do systems need to continue monitoring when results are consistently negative?

**II TWG Presentation: Analysis and Discussion of Stage 2 Scenarios**

Mike McGuire, MEC, presented the TWG's analysis of regulatory scenarios requested at the March FACA meeting [Attachment II.a is the TWG presentation slides and II.b are the summary tables from the TWG analyses]. The TWG has had to work quickly to analyze the requested scenarios and has not had time to review this presentation with the full TWG as it has in the past. McGuire presented TWG analyses on behalf of the TWG and will depend on other TWG members make comments as appropriate.

At the March meeting the FACA asked the TWG to analyze a series of Stage 2 regulatory scenarios [see Attachment II.a slide 4 for the Matrix]. The Matrix includes increasingly stringent DBP and Microbial inactivation requirements and analyzes DBP "exposure" (occurrence data is used as a surrogate because exposure cannot be measured directly though ICR data), technology shifts, and costs.

In setting up to conduct the requested SWAT runs the TWG found that the SWAT is not designed to predict analysis of the Locational Running Annual Average (LRAA) [See Attachment II.c for detailed explanation and Selection of SWAT Runs to Estimate FACA Negotiation Options]. The TWG identified the Annual Average of the Maximum (AAM) as the best estimate of LRAA. To identify a surrogate for LRAA the TWG compared SWAT outcomes for TTHM/HAA5 for annual averages of distribution system (DS) average and DS maximum with actual ICR data for the four LRAA values. The TWG also added the Running Annual Average (RAA) to the revised Stage 2 Scenario Matrix (below). In addition, the TWG made the following changes in the revised Matrix:

- Small system SW estimates switched to AAM column.
- Substantial increase in number of SWAT runs and Sorts for microbial condition of 20% of plants achieving 2.0 log Crypto inactivation.
- UV On/Off analyzed.
- Low and High Bromate MCLs analyzed.

The TWG was only able to develop large, medium and small surface water costs, not groundwater costs, in the two weeks between the March 30 FACA and the current meeting. The TWG will develop groundwater and National costs for these scenarios for the June 1-2 FACA meeting.

***REVISED* STAGE 2 SCENARIOS MATRIX**

| | **Microbial:** | | **DBPs:** | | |
|---|---|---|---|---|---|
| | 120/90<br>Single Highest | 80/60<br>Running Annual Ave | **80/60**<br>**Annual Ave of the Maximum** | **80/60**<br>**Single Highest** | 40/30<br>Single Highest |
| | | | | | |
| 0 log *Crypto* removal (UV off) | X | X | **X** | **X** | X |
| 0.5 log *Crypto* removal | XX<br>(UV on/off)<br>(Bromate=10) | XX<br>(UV on/off)<br>(Bromate=10) | **XX**<br>**(UV on/off)**<br>**(Bromate=10)** | **XXXX**<br>**(UV on/off)**<br>**(Bromate=5/10)** | XX<br>(UV on/off)<br>(Bromate=10) |
| Sort Only 20%<br>2.0 log | XX<br>(UV on/off) | XX<br>(UV on/off) | **XX**<br>**(UV on/off)** | **XXXX**<br>**(UV on/off)**<br>**(Bromate=5/10)** | XX<br>(UV on/off) |

| | | | | | |
|---|---|---|---|---|---|
| *Crypto* removal | (Bromate=10) | (Bromate=10) | **(Bromate=10)** | | (Bromate=10) |
| 2.0 log *Crypto* removal | XX<br>(UV on/off)<br>(Bromate=10) | XX<br>(UV on/off)<br>(Bromate=10) | **XX**<br>**(UV on/off)**<br>**(Bromate=10)** | **XXXX**<br>**(UV on/off)**<br>**(Bromate=5/10)** | XX<br>(UV on/off)<br>(Bromate=10) |
| | | | **+Small SW Systems; National Costs Not**<br>**Available** | **+Small SW Systems; National Costs Not**<br>**Available** | |

X = SWAT run for a total of 41 runs

McGuire presented additional questions and issues that the FACA needs to consider as part of their consideration of these analyses and the TWG workplan:

1. Prediction of SWAT vs. ICR data:

- In comparing SWAT predictions to ICR data the TWG has found that above the 50th percentile, the SWAT model tends to slightly over-predict the ICR Observed values for TTHM and HAA5, by as much as 20-30 mg/l for TTHMs. This pushes systems further down the decision-tree in choosing technologies, overestimating costs. However, the TWG believes that this overestimation is offset by increased benefits (reduction in TTHMs and HAAs) resulting in a good overall estimate of National costs.
- Many factors effect predictions (e.g., distribution system modeling). These prediction problems and problems with ICR data account for some of the discrepancy between SWAT predictions and ICR data.
- The two cumulative probability distributions for SWAT Initial Plant and ICR Observed are indistinguishable below the 50th percentile for both TTHM and HAA5.
- The TWG accepted this variation as the best that could be done for the SWAT model for TTHM and HAA5.

3. Comparison of sampling scenarios using ICR data

- The difference between the LRAA and RAA is very small and insignificant in comparison to differences between the other averaging strategies. Therefore the TWG considers AAM a good estimate of LRAA.

2. Distribution monitoring options and issues

- The technique specified for sampling within the distribution system will have a large impact on the compliance, especially for chloramines.

2. Distribution systems with chloramines (break back to free chlorine for one month)

- Structure of monitoring and/or compliance will have a large impact on technology choices. For example, many utilities that use chloramines convert to free chlorine for one month out of the year to control nitrification. For quarterly monitoring, this should not be a problem. For Single Highest MCL options and monthly monitoring, this would reduce the advantage of chloramines.

4. Bromate in hypochlorite

- TWG needs guidance how to handle bromate contamination of hypochlorite. For ozone plants that use hypochlorite, there could be much more strict treatment required. The TWG proposes reducing bromate targets from 8 to 7 ug/L and from 4 to 3 ug/L.

McGuire and Michelle Frey, MEC, reviewed the Summary Results tables of Matrix SWAT runs [Attachment II.b]. While the handout is complete, it is hard to notice trends due to the blizzard of numbers. The TWG made the following observations:

- In general, there are increasing shifts to more complex technologies with more stringent DBP and Microbial scenarios.
- More stringent DBP scenarios result in lower concentrations of DBPs in distribution systems.
- 0.5 and 2.0 log *Crypto* inactivation requirement for every plant results in dramatic shift in technology selection and cost of disinfection.
- 20% of plants at 2.0 log inactivation requirement results in more modest shifts in technology.
- Dramatic shifts in technology translate into significant Household cost increases.

Incorporating UV in the mix of technologies has been a challenge for the TWG. In SWAT, UV acts like a black box, changing microbial inactivation without effecting DBPs. In the SWAT model UV is assumed to inactivate *Giardia* - this has not been proven. The SWAT modeling runs with UV "*on*" assume 100% feasibility, SWAT runs with UV "*off*" assume 0% feasibility. In practice, UV technology has not been determined to be 100% feasible or completely unfeasible. Many question remain about UV commercial feasibility on a national and costs associated with installing UV nationally.

- The SWAT model with UV *on* assumes up to 2.0 logs of inactivation is achieved by all systems. Technology selection in these cases is controlled by the DBP option only.
- If ultimately UV is not feasible, the model requires the instillation of advanced disinfectants at higher technology costs (e.g., ozone and GAC). Further, bromate limitations drive plants to GAC and membrane technologies.
- A FACA member noted that the TWG has not yet developed data on UV applied to small systems. Ozone or UV may reduce the need for addition of chlorine dioxide.
- The effect of UV on DBPs is unknown. Chlorine is used in drinking water plants for reasons other than killing pathogens (e.g., as an oxidant). A FACA member noted that a central question is to what extent UV, if feasible, will reduce technology shifts?
- A FACA member noted that the increased use of advanced technologies increases the confidence in predictions of finished water quality because the effectiveness of advance technologies is better understood.

In response to this discussion Dan Schmelling, EPA, distributed copies of slides from Jim Malley's September 1999 presentation to the FACA regarding UV *Giardia* and viral inactivation. A summary of these slides is included below:

**Giardia Inactivation**

- Theory suggests the DNA is vulnerable to UV.
- There are two independent data sets:
- Work in press by Finch and Belosevic (*G. muris*)
- Work performed by Sobsey and Linden (*G. lamblia*)
- Data sets are consistent up to 2-log inactivation of *Giardia. G. Lamblia* work shows greater inactivation.
- Additional work is planned by other groups over the next two years to verify this 2-3 log effectiveness.

**Viral Inactivation**

- Theory suggests that viral nucleic acid is attached by UV. Protein coating can provide some UV protection. DS-RNA or DS-DNA will be harder to attack.
- UV doses of 40 achieve 4-log inactivation for poliovirus, hepatitis-A, rotavirus, coxsackie virus, and MS-2.
- Recent work suggests adenovirus may be more resistant.
- Dosages of 80 may be needed for 3-log inactivation
- Dosages of 120 may be needed for 4-log inactivation
- Independent Confirmation Warranted
- Should adenovirus be the basis for viral inactivation?

McGuire presented data from the SWAT runs on two specific technologies: GAC10 (including GAC10 and GAC10 + oxidants) and membrane filtration (including nanofiltration for removal of DBPs and precursors). These data (slides 25-26) show the number of plants driven to these technologies. With UV on, inactivation estimates are the same for all runs (2-log inactivation), therefore estimates for inactivation scenarios are given for UV *off* only.

- For GAC10, the number of plants at higher stringency scenarios drops as more plants are driven to membranes.
- Plants may shift to higher technologies for reasons other than requirements.
- A FACA member requested that the TWG develop data on DBP speculation due to technology shifts.

McGuire presented an overview of the cost comparisons included in the Summary Table Examples. No groundwater costs are available yet. Monitoring and implementation costs are not included in estimates. Utility-Primacy Agency transactional costs not included.

*Total annual cost* is annualized capital cost plus the annual operation and maintenance costs. For this estimate capital costs are annualized at a 3% discount rate (determined by EPA policy).

*Capital costs* are defined as total capital investment minus total capital cost for installing technology. (McGuire noted that cents/1000 gallons/year equal dollars/household/year.) Capital costs are not annualized and do not include operation and managment.

*Household cost* estimates presented go beyond ICR data and include medium systems data. It is impossible to derive full distribution or percentile statistics (given limitations of SWAT for plant-by-plant analysis.) Household costs are total costs divided by the number of households. The TWG is now reporting average cost to median U.S. household. Cost to median household can be computed without estimates for small systems

In addition to the Matrix, the FACA requested the following analyses, which the TWG presented:

- Monster SWAT Run: The 1986 SDWA Amendment included GAC as a -+best available technology. FACA members requested that the TWG analyze this option, as presented in the SDWA; prepare a cumulative probability distribution of TTHM and HAA5; Set MCLs for the DBP levels at the 90th percentiles; perform Smart SWAT runs based on these MCLs
- Screening SWAT Runs: Sort 160 screening SWAT runs by significant technology shifts (UV is a significant tech shift), national costs of SWAT utilities, and DBP exposure. The TWG found no clear "knee in the curve".
- For Stage 1 Baseline SWAT run (80/60 Running Annual Average), sort monthly DBP predictions for all 273 plants by increasing levels of TTHM and HAA5 and determine how many plants are

over 120/90 as single highest value the following number of times (1, 2, 3, etc.). Only three plants were found with over 120/90 SH value.

- Next, for Stage 1 Baseline SWAT run (80/60 Running Annual Average), sort monthly DBP predictions for all 273 plants by increasing levels of TTHM and HAA5 and determine which plants exceed 120/90 as single highest value; then go to the SWAT run for 120/90, and identify what those plants had to do to comply with 120/90. Present technology shifts meeting 120/90 single highest value under these conditions (this may be an example of a composite regulatory option combining RAA and SH).

FACA members requested for the next FACA meeting that the TWG provide cost measurements for individual systems that have to make shifts, not just National average. This request included estimating small system costs, and costs based on the rate that systems are charged for borrowing money (estimated at 5%) for the next meeting.

**III TWG Presentation to FACA Committee Stage 2 Compliance Technology Predictions for Small SW Systems**

On behalf of the TWG non-ICR subgroup Frank Letkiewicz, Cadmus, presented technology shift predictions for small surface water systems (serving under 10,000 people) [Attachment III]. There are approximately 4000 community (small) surface water systems serving approximately 10 million people nationwide. These systems are further divided by the non-ICR subgroup into three categories for cost and feasibility analysis:

a) 1,000 to 10,000 served (~2,200 systems)

b) 100 to 1,000 served (1,300 systems)

c) < 100 served (~ 600 systems)

The TWG develops its predictions for small surface water systems based on SWAT data for large and medium systems. The TWG modified the SWAT ending technology predictions to obtain predictions for 1,000 to 10,000 population served category. Predictions for the systems serving 1,000 to 10,000 people are modified to obtain predictions for systems serving 100 to 1,000 people. Predictions for systems serving 100 to 1,000 people are modified to obtain predictions for systems serving less than 100 people.

Key considerations in modifying technology predictions to the small system categories include:

- Source water quality appears to be somewhat better for small surface water systems (TOC, Br). Therefore, there is believed to be a slightly lower shift to advanced technologies to meet DBP goals.
- Ozone and chlorine dioxide are less feasible for the 100-1,000 category, and will not be used in the <100 category. Therefore technologies shift toward more advanced treatments due to the operational difficulties of ozone and chlorine dioxide.
- GAC20 is judged to be preferred over GAC10 for smallest systems.

With no additional *Crypto* inactivation requirements, slightly less overall use of advanced technologies is predicted for small systems. With additional *Crypto* inactivation the overall total of advanced technologies predicted is similar to that for large systems. However, the advanced technologies that are predicted in either case are further down the decision tree which means systems, especially the very smallest systems, will have to install more expensive technologies to comply.

In its analysis the TWG is considering the use of chlorine verses chloramine and the feasibility of GAC for the smallest systems. A FACA member noted that chloramine technology is tricky for very small systems,

especially those that have limited water hours (i.e. do not run 24 hours a day). This is due to operator availability and capability as much as cost. Small systems may be forced to use the simplest technology, not the least expensive. GAC20 may be used over GAC10 because it is a simpler technology.

Letkiewicz presented a list of the scenarios analyzed by the TWG for ending technology (see Attachment III for results):

- Stage 1: 80/60 Running Annual Average (RAA), 0 Log *Crypto* removal requirement with UV *off*.
- Stage 2: 80/60 AAM and Single Maximum (SM) for 0, 1.5, and 2 Log *Crypto* removal, UV *on* and *off* (some runs included high and low bromate).

In summary Letkiewicz made the following points:

- Stage 2 technology predictions can be derived from SWAT results for large systems.
- In general, technical feasibility limitations drive small systems toward more advanced technologies. This is offset slightly in 0 log inactivation options (where DBP control is the driver) by better source water quality.
- The TWG will continue to consider whether small systems will use chloramine and GAC.
- The TWG will prepare predictions for additional Stage 2 options if needed.

**IV Elaboration of the Microbial Framework**

Stig Regli, EPA, represented the TWG in presenting a working draft of the Microbial Framework and how it might be applied to filtered systems in the LT2ESWTR [Attachment IV.] Regli stated that the objective of the Framework is to identify plants needing microbial control beyond minimum requirements of existing rules (Stage 1/IESWTR, LT1ESWTR, Filter Backwash Rule, Operator Certification, and Source Water Assessment). The Framework does not address distribution systems issues, which the TWG will addressed separately.

The Framework consists of the following four elements:

1. Treatment Characterization

2. Characterization of source water

    - Determine whether Crypto monitoring is necessary
    - Monitoring criteria for estimating mean Crypto concentrations in source water

5. Criteria for classifying potential exposure

    - using mean Crypto concentration and treatment characterization for plant

7. Criteria for mitigating potential exposure

    - based on watershed and/or treatment control measures

*Treatment Characterization* will characterize existing treatment, compare to toolbox of other treatment methods and treatment effectiveness, and determine if a systems treatment method is adequate and whether further action is necessary.

*Characterization of source water*. This involves determining whether *Crypto* monitoring is necessary and monitoring criteria for estimating mean *Crypto* concentrations in source water. The framework considers

use of one or more of following: fecal coliform, E. coli , total coliform, turbidity, as indicator(s) of challenged watershed, and/or watershed characteristics (a watershed index). If indicator(s) (possibly a mean value) is below a critical level, the system would be considered below a *Crypto* occurrence level of concern. TWG has not yet determined best strategies to determine if the water is a concern.

Regli presented the Vulnerability Index as one method of identifying those systems (of the 7000 surface water systems) with the *Crypto* occurrence that would be correctly identified using different indicators. The Vulnerability Index contains data using Supplemental Surveys (*Crypto* Method 1623) and ICR (*Crypto* Method 1622) data. Regli pointed out that Method 1623 is more accurate, however, both tests are expensive and not highly reliable. The cost and effectiveness of different indicators is highly variable. Regli pointed out that the higher the stringency, the lower the level of miscalculation. However, higher stringency also means fewer plants avoid increased monitoring. Different fields (e.g., engineering or medicine) treat the risk of misclassification differently. In medicine false negatives are much more important to avoid and relatively high false positive rates are tolerated. The FACA will want to discuss what to screen for and what methodology is acceptable as part of the framework discussion.

The TWG is discussing a few options for classifying potential exposure:

- 24 monthly samples (2 years), at least 10L/sample, 40% mean recovery, 50% CV, approximately $500./sample.
- Concerns identified by the TWG with this approach are: high costs (utilities and states), method is not approved, interpretation of results, high burden on small systems, does not measure infective *Crypto*, not necessarily capturing peak events.
- Benefits identified by the TWG: it is the most direct approach for determining relative levels of *Crypto* in the source water.

The TWG is also discussing various options for mitigating potential exposure based on watershed and/or treatment control measures:

- Plants that must monitor would monitor monthly for Crypto in source water at intake of each plant
    - Method 1623 (or equivalent) by approved labs
- At the end of 2 years, systems would calculate
    - option 1: mean value
    - option 2: highest running annual mean
- Systems would use mean concentration of each plant to classify potential exposure
- Method 1623 appears adequate for estimating mean *Crypto* concentrations in source water.

Regli presented a breakout of system *Crypto* vulnerability, as measured by the ICR and Supplemental Surveys, in terms of three "bins" or vulnerability levels.

| Concentration | ICR | Supplemental. Surveys |
|---|---|---|
| >1 oocyst detected | 37% | 81% |
| >10 oocysts | 24% | 37% |
| >100 oocysts | 15% | 8% |

The Framework provides options that address the following:

1. Across the board regulatory action because we cannot with high certainty identify those systems with the highest risk.

2. Across the board monitoring followed by corrective actions in those systems that have occurrence. This method has risk of misclassification of systems.

3. Screening and corrective action for those systems identified as high risk.

EPA commented that the FACA must decide if it is concerned with these levels of exposure and if the subset of systems with *Crypto* occurrence require further corrective action.

The Maximum Contaminant Level Goal for *Crypto* is zero, and EPA is bound to manage to achieve this level. The question for the FACA group is what is "technologically feasible."

Regli reviewed a potential classification approach for systems splitting plants into four categories depending on highest running annual mean concentration of *Crypto.* For the three catagories that would required corrective action systems would go to the toolbox to pick technologies:

- Less than or equal to 0.01/L are low risk and would require no action because of inactivation of existing treatment under present regulations;
- 0.01 - 0.1/L may require no action, or may be required to go to the Toolbox;
- 0.1 - 1.0/L; and
- Greater than 1.0/L.

The Treatment Toolbox consists of a list of treatment measures/options with their inactivation effectiveness and cost. The TWG is still working on how to assign disinfection credit to different measures/options.

The workplan for the TWG in May for presentations in June will include:

- Fleshing out the framework further;
- Developing national distribution estimates, including the implications for individual systems and costs; and
- Developing the microbial index.

The Microbial Subgroup is scheduled to meet May 11-12 and May 17-18, 2000.

FACA members made the following additional points:

- 20% false negative rate for *Crypto* monitoring is very high and will result in high monitoring costs. The cost of testing is also very high, it is unknown if increased demand will bring the cost of testing down.
- The TWG should look into event driven monitoring (e.g., rain) to focus monitoring on peak events.
- It is unclear if peak events are the high-risk events. *Crypto* may not be viable, higher live counts may occur under other conditions.
- Measuring a test's sensitivity and specificity requires an accurate account of the actual number of true positives. In the case of *Crypto* this is unknown. The TWG believes that the *Crypto* test is useful in that it can measure if treatment is protective or not.
- The TWG pointed out that some numbers presented are not consistent because different recovery adjustments have been applied. The TWG will try and present data in a consistent format so translation between charts makes sense.
- Present *Crypto* methods are not accurate enough to measure *Crypto* in finished water, so any present categorization will be of source water and not finished water.
- The FACA agreed that the TWG should continue its development of the Framework and Toolbox and report back to the FACA in June.

**V Small Business Regulatory Enforcement Fairness Act (SBREFA)**

Tom Kelly, EPA, presented an overview of the SBREFA process for the Stage 2 rules and coordination with the Stage 2 FACA. Kelly explained that SBREFA is a complimentary and supplemental process to analyze the impacts of rules to identify significant impacts and burdens on small entities (including business, community groups and non-profit organizations), perform outreach to small entities regarding the rule, and propose options to avoid or minimize impacts. Under SBREFA EPA and Occupational Safety and Health Administration are required to conduct a Small Business Advocacy Review Panel made up of Federal agency representatives only. Ephraim King, EPA/OGWDW, will serve on this panel and will provide a link with the FACA. The panel will review the Stage 2 rules prior to proposal. The Small Business Administration also convenes a group of small entity representatives to provide feedback on the rule. FACA member Rodney Tart, National Rural Water Association representative, is serving on this group for the Stage 2 drinking water rules. The SBREFA review will use the same information as that generated for the FACA. The Panel has 60 days from its first meeting (April 26) to review the regulations and submit its findings to the EPA Administrator. Though this report will not be released until the proposed rules are published, the Panel will work transparently with the FACA in consideration of data and analysis.

In summary:

- The SBREFA Panel is advisory and does not set policy, recommendations are submitted to the EPA Administrator.
- The SBREFA Panel is consensus oriented, however, if consensus is not reached the report will include dissenting opinions.
- Both SBREFA and FACA include EPA staff providing direct link between the deliberations and considerations and consistency between the two bodies.
- This FACA has made clear that small entities are an ongoing concern and are being included in its deliberations. SBREFA is another channel to ensure that small entities are considered.

Following Kelly's presentation FACA members made the following points:

- EPA is structuring its participation on both the FACA and the SBREFA Panel to ensure up front and transparent dialogue and avoid surprises.
- EPA will work with SBREFA and with Office of Management and Budget (OMB) in analyzing the impacts of proposed Stage 2 rules. However, EPA will make its own decisions regarding proposed rules. EPA agrees to abide by whatever recommendations are agreed to by the FACA.
- Jim Laity, OMB, noted that OMB does not participate or constrain the FACA or SBREFA Panel in its deliberations. OMB review occurs after the proposed rule is drafted, before publication, to ensure that it is consistent with criteria specified under an Executive Order. EPA is under no obligation to concur with the outcome of the OMB review.

**VI TWG Direction for June 1-2 FACA Meeting**

FACA members met in caucus and cross-caucus meetings to begin discussion of regulatory scenarios. In Plenary discussion following caucus meetings, the FACA agreed to the following analysis and questions for TWG to answer for the June 1-2 FACA meeting:

**TWG Analyses Identified by FACA April 19, 2000 and Revised April 26, 2000**

**Stage 2 MDBP Scenarios Matrix**

| **DBPs:** | 80/60<br>RAA | 80/60<br>RAA | 80/60<br>AAM | 80/60<br>AAM | 80/60<br>LRAA | 80/60<br>LRAA | 80/60<br>SH | 80/60<br>SH |
|---|---|---|---|---|---|---|---|---|

| | Bromate = 10 | Bromate = 5 | Bromate = 10 | Bromate = 5 | & 80/60 SH Action Level (5% SF) Bromate = 5 | & 100/75 SH Bromate = 5 | Bromate = 10 | Bromate = 5 |
|---|---|---|---|---|---|---|---|---|
| **Microbial:** | | | | | | | | |
| 0 log *Crypto* | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** |
| 0.5 log *Crypto* removal | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** |
| Sort only 20% 1.0 log *Crypto* | | | | | | **xx** | | |
| 1.0 log *Crypto* | | | | | | **xx** | | |
| Sort only 20% 2.0 log *Crypto* | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** |
| 2.0 log *Crypto* | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** | **xx** | **xxxx** |

- Each option in matrix should be run with "UV on" and "UV off" (i.e., 2 analyses for each box **xx**).
- Total national costs (large, medium & small and surface water & ground water plants)developed for all options with shading. Large and medium SW systems analyzed for each option. GW system analysis for all "0 log Crypto" options.
- Option of "80/60 SH & bromate =5 & 2.0 log Crypto" will be run w/ and w/o 1 ppb bromate reduction to account for bromate in hypochlorite (drk gray shading)
- Output from each run:
    - Technology forecast: change in fraction each technology (& CLM);
    - DBP occurrence: average and 90$^{th}$% endpoints for THM4, HAA5, bromate, chlorite
    - Costs (as change from Stage 1 baseline): capital costs, annual costs, household costs for all system sizes

        - Range of costs (i.e., tails).
        - Costs to households affected
        - Costs of UV (10%, 20%, 50% systems using UV for 2 log *Crypto* inactivation). Qualitative discussion on effect of market constraints.
        - Delayed implementation costs (after 3 yrs 20% implementation; 5 yrs 40%; 10 yrs 80%).

- The outputs for the following runs will include chloroform, trichloroacetic acid, and dibromochloromethane occurrence (bold border):
    - 80/60 AAM & bromate =5 & 0 log Crypto; 80/60 SH & bromate =5 & 0 log Crypto; 80/60 SH & bromate =10 & 0 log Crypto
- Safety factor sensitivity analysis.

- System versus plant (?)

**Additional Requests:**

- Suggestions for tools to respond to DBP action level exceedences (e.g., distribution system flushing, in system reservoir storage).
- What operational strategies can systems use to eliminate DBP peaks?
- Qualitative description of the difference between RAA, LRAA, AAM, and SH compliance scenarios. What best reflects spatial and temporal variability?
- Characterization of DBP risks and risk reductions.
- Characterization of microbial risks.
- What are the assumptions about monitoring, infectivity, treatment effectiveness?
- Microbial Framework (toolbox) for source waters: monitoring feasibility & control enhancement measures
- Methods to identify vulnerable systems? What other criteria or combinations of criteria can be considered?
    - What watershed characteristics can be used?
    - Where are the *Crypto* problems occurring?
- How can misclassification be minimized and what are the consequences of misclassification?
- What credits can be identified for monitoring outs? What is the rationale for each suggestion?
- What is the prevalence of *Crypto* occurrence? (As a basis for understanding misclassification consequences.)
- What are the characteristics of the watersheds where false +/- were found using ecoli metric?
- UV characterization
- What is the availability of UV? UV implementation issues?
- Inactivation of *Giardia*, *Crypto*, and viruses?
- GAC and chloramine applicability to small systems (information/data from suppliers)?
- Distribution System Water Quality Framework.
- Cross connection program options?
- Uncovered FW reservoirs

**VII Public Comment**

There was no public comment.

**VIII FACA Next Steps**

- The TWG will continue its analysis of the regulatory scenarios and questions from the April FACA meeting, and those it was not able to complete from the March FACA meeting.
- Ephraim King agreed to revise the One-Text document outline. The goal is to develop the One-Text document over the final two FACA meetings (June 1-2, 29-30) and between meetings into the FACA's agreement document. King will submit the revised One-Text to Abby Arnold who will circulate and discuss it with FACA members prior to the June 1-2 meeting.
- FACA members will be encouraged to submit to Abby Arnold their preferred Stage 2 options for consideration by the FACA in mid to late May. These options will be compiled by Arnold for distribution and discussion at the June 1-2 FACA meeting.
- The FACA agreed to hold a conference call on June 26 to discuss the instructions to the TWG.

**Adjourn**