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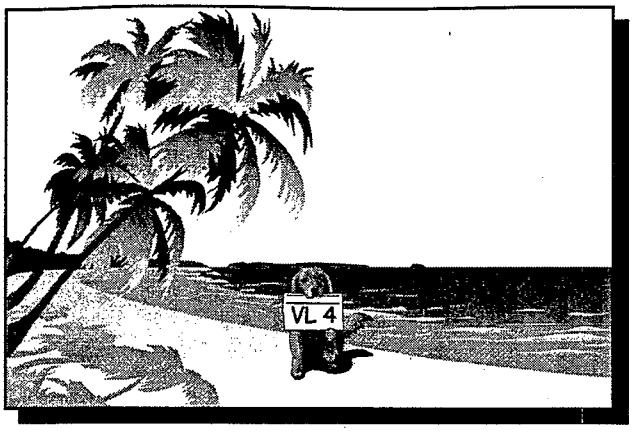

"Ah, at last, the perfect spot to review my VL & VU reports!"

ICR Update
Jim Walasek, Editor
Technical Support Center
May 1998

Here Comes Summer!

ICR Update Issue Number 11 - This information sheet, the **ICR Update**, is the eleventh one to be issued by the Technical Support Center (TSC) of the Office of Ground Water and Drinking Water (OGWDW). Future issues will be distributed as needed to maintain information flow related to the ICR.

Editor's Note: April 30th marked the end of the A-Team's involement in the ICR. A message will remain on their 800 number until May 31st directing people with questions about the ICR to the Safe Drinking Water Hotline at 800-426-4791. The hotline will be able to help you or direct you to people who can.

A Tip of the Old Hat - The **A-Team** was instrumental in getting the ICR off the ground. Composed of a group of **drinking water experts**, they helped with the development of the sampling schematics, Initial Sampling Plans, and provided technical assistance to utilities as they got involved with the sampling phase of the ICR. However, effective April 30th the A-Team ceased operation. The Technical Support Center staff thanks the entire A-Team staff for a job well done. The A-Team was made up of the following individuals: Michael J. McGuire, Louis A. Briganti, David A. Cornwell, Kevin Dixon, Ellen P. Flanagan, Judy Musgrove, Eva Nieminski, Douglas Owen, Jeffrey Rosen, Charlotte D. Smith, Barbara Spade, and Anne M. Sandvig. Thanks again, we couldn't have done it without your help!

Chemistry PE Study Results - Laboratories that are approved to perform disinfection byproduct (DBP) and/or surrogate (TOC, UV, Br, and TOX) analyses for the ICR must successfully participate in six quarterly PE studies. **PE Study 7**, the fourth of the six "required" PE studies, was sent to 203 participating laboratories the week of March 30th. Analytical results are due at EPA on or before May 5th.

Data Upload Begins! - All laboratory quality control (QC) diskettes for the July and August 1997 sampling periods were uploaded to the ICR Federal database (ICR FED). Laboratory QC validation was successfully run and QC failure (**VL**) reports were printed and mailed to laboratories. They have been instructed to review the printed reports, correct any data entry errors, but to **not** resubmit data until water utility data is uploaded, QC failure (**VA**) reports are printed, distributed and reviewed. Utilities will then receive a set of "**VU**" reports after laboratories have an opportunity to resubmit data disks to EPA. Thank you.

VU CAUTION! - Quality assurance procedures were developed for the ICR monthly sample data which include **validation** of the data that are submitted to EPA on the monthly diskettes from laboratories and utilities. (**NOTE:** Validation is the term that EPA uses to describe the application of computer algorithms to the data reported to EPA to ensure data meets the QC criteria that are detailed in the ICR manuals - **see ICR Update 7**, Reports, Reports, Reports.)

When you start to receive reports from EPA, you will notice that "cautionary" language is included above the header of some of the VU reports indicating the data in the report has not undergone **final validation** by EPA. Remember, the ICR data is only considered validated once EPA has processed the resubmitted data from the laboratories and utilities. The validated data will reside on the EPA computer and the public will have access to the ICR validated data as soon as possible. Be assurred that any data approved by ICR FED during final lab/utility validation will not be changed without your prior notification. Of course, EPA encourages each water system to inform its customers of its ICR results , especially data that may be considered "controversial."

EPA added the cautionary language to the VU reports so anyone reviewing the reports will be made aware that the data can "change" as a result of laboratories or utilities correcting data up until final validation by EPA. If requested, EPA must provide copies of the VU reports when the reports are available, and prior to EPA processing resubmitted data from utilities and laboratories. We understand that some stakeholders are very interested in reviewing whatever ICR data are available, even if the data have not been through the validation process. Furthermore, in the current climate of open communication with the stakeholders, EPA is obligated to provide the requested data. Therefore, it is very important that utilities provide their ICR results to their customers as soon as possible so customers are not "surprised" by preliminary ICR results from other stakeholders. However, as agreed upon with the stakeholders, EPA **will not** release **summaries** of data before final validation because EPA is committed to following the QA procedures laid out in the ICR regulation.

The general cautionary language for the VU reports is stated below:

CAUTION: This data has not been validated by EPA and, therefore, could change upon final validation. It has not undergone the rigorous quality assurance review and validation procedures established for the ICR. This data should not be used for site specific compliance or public health assessments. The validated data will be used for rule development and research purposes only.

Additional cautionary language for the VU reports containing **disinfection byproduct** results is:

Please note that TTHM, HAA, and bromate proposed regulatory standards are calculated quarterly based on a running average of 4 quarterly sampling events. Therefore, even future compliance assessments cannot be determined based upon this report alone.

The additional language for VU reports containing **microbial** results is:

The current ICR method for detecting *Giardia* and *Cryptosporidium* has significant technical limitations. The primary limitation is the method's low and variable recovery. In addition, the ICR method cannot determine whether these organisms are alive or dead or could cause illness.

What do our protozoa and virus data mean? - Utility and EPA Regional personnel have contacted us with questions about how to interpret the data they will be receiving from the ICR for protozoa and virus. Questions primarily center on method recovery and precision and how they impact data interpretation and what can be inferred about health risk to utility customers.

The ICR was designed to support national regulatory impact analysis. The data were not intended to provide informational value regarding occurrence or treatment effectiveness at individual sites. EPA recognizes that determinations may represent overestimates at some sites and underestimates at others. However, EPA believes that with regard to overall national estimates these will average out. Great care must be taken when trying to interpret individual results.

PROTOZOA

- *Cryptosporidium parvum* and *Giardia lamblia* are protozoan pathogens (disease-causing organisms) found in most surface waters.
- If infectious protozoans are ingested, they may cause diarrhea and abdominal cramps.
- Although *Giardia* cysts and *Cryptosporidium* oocysts are usually removed by filtration, some cysts may pass through the filtration process. Disinfection will often effectively kill *Giardia* cysts depending on the type, dosage and contact time of the disinfectant, and the water temperature. *Cryptosporidium,* however, is very resistant to disinfection and even a well-operated plant cannot ensure that drinking water will be completely free of this

parasite.

- The ICR protozoan method measures the approximate concentrations of *Giardia* and *Cryptosporidium* cysts and oocysts. However, the method cannot determine if the organisms are alive and possibly harmful or dead and harmless. Therefore, caution must be used when interpreting results.

- Due to limitations of the method, if cysts and oocysts are not detected, one cannot conclude that they were not present and therefore, negative ICR protozoan data do not provide assurance that the source water is clean.

- Positive results can indicate that cysts and oocysts may be present in the water. However, they do not indicate the particular species of *Giardia* or *Cryptosporidium*, nor do they indicate whether they are alive or harmful.

- Limitations of the method are such that comparisons between individual samples are unreliable. Thus, comparisons between sampling dates or between raw and finished water samples are highly uncertain. Because microorganisms are not evenly distributed in water, representation of water quality for a given site is only possible with large numbers of samples.

EPA, in partnership with the Centers for Disease Control and Prevention, has prepared **optional public notice language** for systems that detect *Cryptosporidium* in their finished water and wish to notify the public. This information is posted on the OGWDW homepage at **http://www.epa.gov/OGWDW/icr_not.html.**

For more information, please refer to "*Cryptosporidium* and Water: A Public Health Handbook" and "*Cryptosporidium*: Answers to Questions Commonly Asked by Drinking Water Professionals," which are available from the American Water Works Association for $35-$40.

VIRUS

- Viruses which infect humans may be present in waters as a result of fecal contamination and may cause a variety of symptoms including diarrhea, vomiting and nausea. In rare cases, exposure may lead to more serious diseases. Most viruses should be easily killed by chlorine and other disinfectants.

- The ICR virus method does not detect all viruses, and not all detected viruses are pathogenic to humans. Although a positive result may indicate that fecal contamination is likely, it does not necessarily signify that pathogens are present. As with the protozoa, a negative result does not necessarily mean that viruses are absent. Therefore, caution must be used in interpreting results.

- The results are expressed as MPN (most probable number)/100 L which is a statistical estimate of the concentration. MPN assays, inherently have a high degree of variability.

In summary, ICR monitoring will result in a large body of microbial data which will be considered on a national basis to develop future regulations. ICR protozoa and virus monitoring was not designed to determine individual treatment plant efficiencies or product water safety.

In responding to inquiries from their customers, utilities which are members of the Partnership for Safe Water may wish to point out that they are taking steps toward continuous performance improvement and improved protection of their customers from waterborne diseases through their Partership activities.

I hope this information helps you to appropriately interpret your ICR protozoa and virus results. If you have additional questions, please call the Safe Drinking Water Hotline at 800-426-4791 or refer to the fact sheets on the Internet at **http://www.epa.gov/OGWDW/icr_hotl.html** and the joint EPA/CDC "Guidance for People with Severely Weakened Immune Systems" at **http://www.epa.gov/OGWDW/crypto.html**.

And They're Off! - The **deadline** to start the ICR treatment studies was **April 14th**, and all utilities required to conduct these studies have submitted study plans which have been approved by EPA. Thanks for your timely submissions! In general, the study plans showed a good understanding of the treatment study requirements. Now the real fun starts as the studies get underway! As you get started with these studies, remember to consult the two documents that outline the treatment study protocols and reporting requirements: The ICR Manual for Bench- and Pilot-Scale Treatment Studies (EPA 814-B-96-003, April 1996) and the ICR Treatment Studies Data Collection Spreadsheets User's Guide (EPA 815-B-97-002, April 1997) Also, technical assistance is available through the **Safe Drinking Water Hotline**, 800-426-4791.

Treatment Studies/SDS Testing - In past issues of the ICR Update, we have discussed the importance of the simulated distribution system (SDS) test during the ICR treatment studies; however, there still seems to be some confusion regarding the use of free chlorine vs. chloramines. The solution to this issue is very straightforward: only **free chlorine** is to be used during SDS tests conducted during treatment studies, regardless of the disinfectant that is used in full-scale treatment! A free chlorine residual must be present at the end of the SDS incubation period, and there should not be a combined residual present. If ammonia is present in the water, breakpoint chlorination must be practiced to completely satisfy the ammonia demand and achieve a free chlorine residual. Plants that use chloramines in the full-scale plant should target a free chlorine residual of 0.5 to 1.0 mg/L at the end of the SDS incubation period.

The objective of the treatment studies is to evaluate the ability of GAC and membranes to control DBP formation by removing the precursors, and the SDS test is used to assess the concentration of precursors in the influent and effluent from the advanced treatment process. Specifically, the influent and effluent samples will be chlorinated under SDS conditions and trihalomethanes (THMs), haloacetic acids (HAAs) and total organic halides (TOX) will be

measured at the end of the incubation period. Since, these DBPs to not form at appreciable levels when natural organic matter is reacted with chloramines, it is necessary to use free chlorine in the SDS test to accurately assess the precursor concentrations for THMs, HAAs and TOX. Furthermore, the use of free chlorine in the SDS test will result in a "worst case" assessment of DBP formation relative to the use of chloramines. Finally, comparison of DBP formation and precursor removal will be more straightforward since all utilities conducting treatment studies are using free chlorine in the SDS test.

Additional information regarding SDS testing conducted during treatment studies can be found in Section 4.6, Part 1 of the ICR Manual for Bench- and Pilot-Scale Treatment Studies (EPA 814-B-96-003, April 1996) and in the ICR Treatment Study Fact Sheet: The Simulated Distribution System Test (EPA 815-F-97-002, November 1997). This fact sheet can be found on the Internet at **http://www.epa.gov/OGWDW/icr_sds.html**.

ICR Data Analysis - Data extraction joint requirements planning (JRP) meetings were held at the EPA Systems Development Center (SDC) in Arlington, Virginia on February 20, 1998 and on April 14-16, 1998. Participants at these JRPs were from the EPA, the drinking water industry and SDC staff. The objective of these meetings was to define all data extractions needed to facilitate ICR data analysis to support the M/DBP rule development process. The data will be extracted in an organized manner to facilitate data analysis using Microsoft Access software. The participants agreed on the data elements that needed to be extracted and on the organization of the data elements in auxiliary databases. SDC staff are finalizing the requirements documents prior to the design phase of the auxiliary databases which will be held June 15-18, 1998. We will periodically report on the ICR data analysis process in future issues of the **ICR Update.**

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