

EPA ICR Implementation

EPA ICR Fact Sheet Series

#3 - Treatment Studies

This fact sheet summarizes the treatment studies requirements for the Information Collection Requirements (ICR) Rule as promulgated in May 1996. Treatment study applicability monitoring must begin no later than August 1996 and the treatment studies must begin no later than April 1998.

Plants Required to Conduct Applicability Monitoring

Public Water Systems Affected

Plants in Categories A, B, C, D and G (defined in Tables 1 and 2 of §141.141(b)) must conduct treatment study applicability monitoring.

These categories include the following treatment plants:

- All treatment plants which serve 100,000 persons or more (Categories A & B).
- The largest treatment plant operated by a PWS which serves 100,000 persons or more if no plant operated by the PWS serves 100,000 persons or more (Categories C & D).
- The largest ground water plant operated by a PWS with a ground water population served of 50,000 to 99,999 persons (Category G).

Start of Treatment Study Applicability Monitoring

Monitoring Required

In August 1996, plants in Categories A, B, C, D and G must begin treatment study applicability monitoring to determine: (1) if the treatment plant precursor levels are low enough to avoid the treatment study requirement, and in some cases (2) if two or more plants qualify for a common source designation. The applicability monitoring requirements are:

TOC monitoring

- 12 consecutive monthly total organic carbon (TOC) samples are required for all A, B, C, D and G Category treatment plants.

UFCTOX monitoring

- 12 consecutive monthly total organic halide (TOX) samples evaluated under uniform formation conditions (UFCTOX) may be necessary to demonstrate that two or more plants are using a common source.

Monitoring locations

- Surface water plants monitor influent water while plants using only ground water monitor finished water.

Distribution System DBP option

- In addition to TOC monitoring, surface or ground water plants using only chlorine as the primary and residual disinfectant may conduct quarterly monitoring of trihalomethanes (THM4) and haloacetic acids

(HAA5) at four points in the distribution system to determine if the plant qualifies to avoid the treatment study requirement.

Treatment Study Avoidance

Results from the 12 months of applicability monitoring can be used to avoid the treatment study requirement if:

Avoidance based on TOC

- The influent TOC concentration does not exceed 4.0 mg/L for treatment plants using surface waters or ground waters under the direct influence of surface water.
- The finished water TOC concentration does not exceed 2.0 mg/L for treatment plants using only ground waters.

Avoidance based on Distribution System DBPs

- The treatment plant is using only free chlorine as the primary and residual disinfectant AND the mean of four quarterly average THM4 samples is less than 40 µg/L AND the mean of four quarterly average HAA5 samples is less than 30 µg/L.

Treatment Study Options

Treatment plants that do not qualify to avoid the treatment study requirement have the following options:

5 Study Options

Individual Study

- Plants can conduct individual treatment studies: plants serving ≥500,000 persons must conduct a pilot-scale study, and plants serving < 500,000 persons must conduct either a bench- or pilot-scale study.

Common Source Study Joint Study

- Multiple plants using a common source and operated by a single PWS are only required to conduct a single treatment study.

Buy Out

- Multiple plants using a common source and operated by different PWSs may apply to conduct a joint treatment study.

Grandfathered Study

- Plants may apply to buy out of the treatment study requirement by contributing to a cooperative research fund if another common source plant is conducting a treatment study.
- Plants may apply to grandfather data from a previous treatment study to meet the treatment study requirement.

Applying for Treatment Study Options and Important Deadlines

Data Deadline

- Part 1 of the "ICR Manual for Bench- and Pilot-Scale Treatment Studies" describes the application process for treatment studies.
- All treatment study applicability data must be submitted no later than October 1997.

Application Deadline

- An application to grandfather data from a previous study must be submitted no later than February 1997.
- Applications for all other treatment study options must be submitted no later than November 1997.

Study Deadlines

- Treatment studies must begin no later than April 1998.
- The final study report must be submitted no later than July 1999.

Bench, RBSMT studies must evaluate 2 membranes at 4 recoveries during each quarter of 1 year

Bench, SEBST studies must evaluate 2 membranes during each quarter of 1 year

Bench, long-term SEBST studies must evaluate 1 membrane for at least 6600 hours

Pilot-scale membrane studies must evaluate 1 membrane for at least 6600 hours

Evaluate membrane productivity & product water quality including SDS-DBPs

Bench-Scale Membrane Study Requirements

Three (3) options are provided for bench-scale membrane studies:

1. Rapid Bench-Scale Membrane Test (RBSMT)
 - Evaluate 2 membranes with molecular weight cutoffs (MWCO) less than 1000 Daltons.
 - Evaluate four recoveries (30%, 50%, 70% and 90%) for each membrane, with all other operating parameters held constant.
 - Evaluate each membrane at each recovery during each quarter of one year.
2. Single Element Bench-Scale Test (SEBST)
 - Evaluate 2 membranes with MWCOs less than 1000 Daltons.
 - Evaluate a minimum element size of 2.5 inches in diameter by 40 inches in length (2.5" × 40").
 - Operate the system at a recovery of 75±5%.
 - Operate each membrane continuously for four weeks during each quarter of one year.
3. Long-Term Single Element Bench-Scale Test
 - Evaluate 1 membrane with a MWCO less than 1000 Daltons.
 - Evaluate a minimum element size of 2.5" × 40".
 - Operate the system at a recovery of 75±5%.
 - Operate the system for at least 6600 hours over the course of one year.

Pilot-Scale Membrane Study Requirements

- Evaluate 1 membrane with a MWCO less than 1000 Daltons.
- Evaluate a minimum element size of 2.5" × 40".
- Operate the system at a recovery of at least 75%.
- Operate the system for at least 6600 hours over the course of one year.
- The system must consist of at least 2 stages with at least 2 pressure vessels in the first stage and at least 1 pressure vessel in the second stage (i.e., a 2-1 array).
- Each pressure vessel must contain at least three elements.

Monitoring Membrane Systems

- The productivity of membrane systems must be assessed in terms of water flux, required net driving pressure and cleaning frequency.
- The feed and permeate streams must be analyzed for pH, temperature, turbidity, total dissolved solids, alkalinity, total hardness, calcium hardness, TOC, UV₂₅₄ and bromide.
- Simulated distribution system tests must be conducted on the feed and permeate streams to evaluate the chlorine demand and the formation of TOX, THM4 and HAA6.

***Bench-scale GAC tests
using the RSSCT***

***Evaluate EBCTs of 10
and 20 minutes***

12 effluent samples

Pilot-scale columns

***Evaluate EBCTs of 10
and 20 minutes***

15 effluent samples

***Evaluate influent and
effluent SDS-DBPs as
well as other water
quality parameters***

***Data collection
software***

Summary report

For more information

Bench-Scale GAC Study Requirements

- Use the rapid small-scale column test (RSSCT) for the bench-scale evaluation of GAC.
- Evaluate two empty bed contact times (EBCT): 10 and 20 minutes.
- Evaluate each EBCT each quarter of one year.
- Operate each column until 70% breakthrough of TOC or the attainment of steady-state precursor removal.
- Sample the effluent from each column at least twelve times over the course of a quarterly run for simulated distribution system DBPs and other water quality parameters.

Pilot-Scale GAC Study Requirements

- Use continuous-flow columns with a minimum diameter of 2 inches for pilot-scale GAC studies.
- Evaluate two empty bed contact times (EBCT): 10 and 20 minutes.
- Operate each column until 70% breakthrough of TOC or the attainment of steady-state precursor removal.
- If breakthrough occurs for the 20-minute EBCT prior to 4000 hours runtime, then a second run shall be conducted at both EBCTs.
- Sample the effluent from each column at least fifteen times over the course of a run for simulated distribution system DBPs and other water quality parameters.

Monitoring GAC Systems

- The influent to the RSSCT or pilot-scale GAC column must be analyzed for pH, temperature, turbidity, alkalinity, total hardness, calcium hardness, ammonia, TOC, UV₂₅₄ and bromide.
- The effluent from the RSSCT or pilot-scale GAC column must be analyzed for pH, temperature, TOC and UV₂₅₄.
- Simulated distribution system tests must be conducted on the influent and effluent streams from the GAC column to evaluate the chlorine demand and the formation of TOX, THM4 and HAA6.

Treatment Study Final Reports

- A diskette containing data collection software will be sent to PWSs conducting treatment studies.
- The treatment study data must be entered in this data collection software and the diskette returned to EPA.
- A summary report must be submitted along with the data diskette.
- Both process performance and cost information must be submitted.

Contact the Safe Drinking Water Hotline, 1-800-426-4791.