

# Operator Facts

TECHNICAL FACTS FOR WASTEWATER TREATMENT PLANT OPERATIONS

New York State Department of Environmental Conservation

## Wastewater Operator Certification Testing Change — January 2008

Certification testing will change from a pencil and paper test to a computer-administered test on January 1, 2008. The change will provide operators several benefits –

- the option to take the test up to 4 times per year
- elimination of the exam filing deadline
- the ability to schedule the test at a time convenient to you (Monday through Saturday, at 9:00 AM or 1:30 PM)
- a better testing environment
- and getting your test results immediately.

The cost for the certification test will increase to \$85 per test.

The current certification application procedure and written certification exams will remain in place through 2007. The 2007 test dates are February 28 and August 29. The filing deadlines are January 17, 2007 and July 18, 2007, respectively.

Starting January 1, 2008 operators will take their certification test on a computer at one of eight proctored locations throughout New York State (or other locations nationwide). Applied Measurement Professionals (AMP) will be providing the computer and testing sites. For more information on AMP, go to



[www.abccert.org/pdf/abcampinfo.pdf](http://www.abccert.org/pdf/abcampinfo.pdf)

The test is still an Association of Boards of Certification (ABC) certification exam. The format is the same as the current written test with 100 multiple-choice questions. The passing grade is still 70%. To try the new test format, go to: [www.lxr.com/products~webtests.htm](http://www.lxr.com/products~webtests.htm) and select the *ABCwebtestdemo* option.

By changing to a computerized testing format, the certification process will change slightly:

- you have the option to take a certification test every 90 days
- No more exam filing deadlines or waiting 6 weeks or more to take the test.
- You do not send payment with your application.

When you have obtained the necessary operating experience and training, mail your complete operator application to your DEC Regional Office or County Health Department (where appropriate).

**You cannot schedule to take the test until DEC approves your application.**

After you receive your approval letter from DEC, send payment directly to AMP. Payment can be done online with a credit card or by mail with a money order or company check.

The cost will be \$85 per test, payable to AMP. To schedule your test, call AMP at (888) 519-9901 or go to their website at [www.goamp.com](http://www.goamp.com). The tests can be scheduled Monday through Saturday, at 9:00 AM or 1:30 PM. The New York state test center locations are listed on Page 5, for other locations go to [www.abccert.org/pdf/abcampinfo.pdf](http://www.abccert.org/pdf/abcampinfo.pdf):

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## Future ABC Exam Dates (Final Written Exams)

Applications for ABC exams must be postmarked by the filing deadline. This includes new applications and those retaking the exam. The cost is \$35.00. Applicants who miss the deadline will be scheduled for the next exam.

<u>Exam Date</u>	<u>Filing Deadline</u>
February 28, 2007	January 17, 2007
August 29, 2007	July 18, 2007

## Operator Facts

The purpose of this technical bulletin is to inform wastewater operators about various operational practices, problem-solving approaches, technical developments and certification and training issues.

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You are invited to submit technical articles or other information of interest to operators for publication in *OperatorFacts*.

Be sure to notify us of a change of address if you wish to continue to receive *Operator Facts* and training notices. Please include your certificate number.

The mention of any product or listing of any company's seminar is not an endorsement by this department.

Send all correspondence to:  
*Operator Facts*, NYSDEC, 625  
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Visit our website at:  
[www.dec.state.ny.us/website/  
dow/bwcp/foas\\_main.html](http://www.dec.state.ny.us/website/dow/bwcp/foas_main.html)



Summer/Fall 2006

# Know Your Capacity and Loading - Part 750

**A**ttention all POTWs! DEC will be looking for the annual certification statement required in Part 750 for flow management and loading with the February 2007 DMR. The certification statement, which has to be signed by the municipality's chief fiscal officer, says that the POTW complies with 6 NYCRR Part 750-2.9(c). To be in compliance, the plant must meet the design, planning, and flow management criteria, or submit an engineering report within 120 days (July 26, 2007).

Calculating the flow criteria is straightforward. For flow, the average annual flow must be below 95% of the permitted flow. Simply average the 12 monthly average flows reported on your DMR. Plants with annual average flow limits or rolling 12 month average limits will report the average annual flow calculated for the calendar year. If your average annual flow is at or above 95% of the permitted flow, you'll need to submit an engineering report.

Determining compliance with the loading criteria may be a little tricky because design loading is not on your preprinted DMR. These numbers are in your plant's engineering design documents, O&M plans, or perhaps in later engineering reports. To calculate loadings for TSS and BOD, multiply the average monthly concentration on the DMR, by the average monthly flow and 8.34. For design and planning, the influent TSS and BOD must be below the design loading criteria for 8 out of the last 12 months. If this

criterion is exceeded, an engineering plan must be submitted to the Regional Water Manager. If you can't find your plant's "BOD and TSS design loading criteria," contact your engineer.

In addition, if a plant that is exceeding the loading criteria also has BOD, UOD, or TSS effluent violations for four months during any two consecutive quarters, a sewer connection moratorium must be imposed. A quarter means a period of three consecutive months beginning in January as follows: January, February, March; April, May, June; July, August, September; October, November, December.

Effective May 11, 2003, 6NYCRR Part 750, a.k.a. "Part 750", replaced the SPDES permit General Conditions. Part 750-2.9(c) POTW Design, Planning, and Flow Management requires POTW SPDES permittees to submit an annual certification statement with their February DMR.

NYSDEC is preparing a worksheet and certification statement, which will be mailed out at the time of the February DMR mailing. Remember, every POTW must submit a certification, even if your plant is in compliance.

Direct your questions to Shayne Mitchell at (518) 402-8125 or you may email Shayne at: [samitche@gw.dec.state.ny.us](mailto:samitche@gw.dec.state.ny.us)

Don't forget — Part 750 is on the web at: [www.dec.state.ny.us/  
website/regs/ch10.htm](http://www.dec.state.ny.us/website/regs/ch10.htm)

# Preparing Data for DMR Reporting

Whether the data we collect is to be used to evaluate process performance, determine design requirements, or report on the Discharge Monitoring Report (DMR), it may require simplification before its use. The objective of data simplification is to reduce the raw data to more manageable forms while making sure the information is not changed or masked.

All measuring devices have some uncertainty in a measurement. Each analytical measurement has accuracy limitations because of the chemical nature of the procedure, instrumentation and/or methodology. The objective is to report as many digits as were accurately measured while avoiding reporting digits not known. When this is accomplished, meaningful information is not lost, and the data does not suggest greater accuracy than is warranted. The significant figures for any measurement include all digits known with certainty plus the last digit. This last digit is an approximation.

Reporting sample results and calculations on the DMR requires using the number of significant figures of the raw data and that specified by the SPDES permit limit or action level. If the permit does not clarify the number of significant digits, sample measurements must be reported in two significant digits, except in the cases of effluent TSS or BOD where single digit effluents are achieved. In these cases, single digits can be reported.

The DMR Manual outlines the rules for significant figures (page 7) and uses the term significant figures and significant digits interchangeably.

## Rules for Significant Figures:

1. All non-zero digits (1-9) are to be counted as significant.
2. All zeros between non-zero digits are always significant. Both 4308 and 40.05 contain four significant digits.
3. For numbers that do not contain decimal points, the trailing zeros may or may not be significant. The number 470,000 may have two to six significant digits. The number of digits that are significant depends on the accuracy of the measurement.
4. For numbers that do contain decimal points, the trailing zeros are significant. Both .360 and 4.00 have three significant digits.
5. If a number is less than 1, zeros that follow the decimal point and are before a non-zero digit are not significant. Both 0.00253 and .0670 contain three significant digits.

When reporting results on your DMR, rounding the data to the same number of significant figures specified by the permit limit or action level or raw data may be necessary. All calculations (i.e., averaging and multiplying) are completed before any rounding is done.

## Rules for Rounding:

1. If the digit being dropped is 1, 2, 3, or 4, leave the preceding number as it is.

For example, 20.3 rounded to the nearest whole number, is 20.

2. If the digit being dropped is 5, 6, 7, 8, 9, increase the preceding digit by one. For example 26.5 and 26.9, rounded to the nearest whole number, is 27 in both cases.

Beyond using the number of significant figures specified by the SPDES permit, sample measurements must be reported with the same degree of precision achieved in the analysis or measurement. This means that numbers resulting from calculations cannot be more precise than the raw data used in the calculations.

## Rules for Precision:

1. For addition or subtraction, the answer can contain no more decimal places than the least precise measurement. Example:  $13.681 - 0.5 = 13.181$  should be rounded off to the tenths place, with a correct result of 13.2.
2. For multiplication or division, the least number of significant digits in any of the measurements determines the number of significant digits in the answer. Example:  $2.5 \times 3.42 = 8.55$  should be rounded off to two significant digits, with a correct result of 8.6.
3. Numbers such as conversion factors or number of days,

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# Renewal and Certification Training & Upcoming Meetings

## Looking for Some Training?

### O&M of Wastewater Collection Systems

Date: September 12-14, 2006  
Location: Southtowns AWWTP Training Room, Woodlawn, NY  
Cost: \$160  
Contact: NEIWPCC (978) 323-7929

### O&M of Wastewater Collection Systems

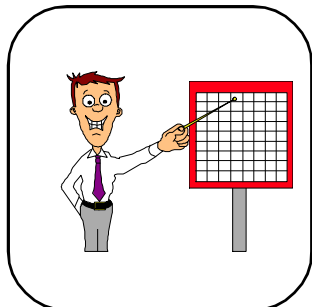
Date: September 19-21, 2006  
Location: Townley Hall, Town of Wallkill, NY  
Cost: \$160  
Contact: NEIWPCC (978) 323-7929

### Sampling and Laboratory Procedures for WWTP Operators

Date: October 5, 2006  
Location: Yorktown Heights Fire Department, Yorktown Heights, NY  
Cost: \$90  
Contact: NEIWPCC (978) 323-7929

### Phosphorus Precipitation and Clarifier Optimization

Date: October 24, 2006  
Location: Chenango Town Hall, Chenango, NY  
Cost: TBD  
Contact: Robert Wither, NYSDEC at (518) 402-8097



**NYWEA, Inc.**  
525 Plum Street, Suite 102  
Syracuse, NY 13204  
(315) 422-7811  
e-mail: [mail@nywea.org](mailto:mail@nywea.org)  
[www.nywea.org](http://www.nywea.org)

### National Events

WEFTEC  
October 21-25, 2006  
Dallas, Texas

### State Events

Voluntary Collection System Operator  
Certification Exam  
September 27, 2006  
Several Locations Throughout  
New York State  
For more information call:  
Maggie Hoose (315) 422-7811

2006 New York City Watershed  
Science & Technical Conference  
September 20-21, 2006  
Fishkill Holiday Inn & Conference Ctr.  
Fishkill, NY

2006 Energy Speciality Conference  
November 8-9, 2006  
Otesaga Hotel, Cooperstown  
Ways to save energy and money

### Capital District Chapter

Chapter Picnic & Operator Training  
Session  
Topic: Sludge Dewatering Equipment  
September 15, 2006  
Saratoga State Park

### Genesee Chapter

Meeting & Steakroast  
September 15, 2006  
Brae Burn Recreation  
Dansville, NY

## Certification Courses

### Basic Operations

September 11-22, 2006  
SUNY at Morrisville  
(315) 684-6082

September 11-22, 2006  
Great Lakes Laboratory - Buffalo  
(716) 878-5422

September - December 2006  
NYCDEP  
(212) 860-9316

### Basic Laboratory

October 2-6, 2006  
SUNY at Morrisville  
(315) 684-6082

### Activated Sludge

October 9-12, 2006  
Great Lakes Laboratory - Buffalo  
(716) 878-5422

October 30-November 2, 2006  
SUNY at Morrisville  
(315) 684-6082

### Supervision & Technical Operations

October 23-27, 2006  
Great Lakes Laboratory - Buffalo  
(716) 878-5422

November-December 2006  
NYCDEP  
(212) 860-9316

### Management Course

October 16-19, 2006  
SUNY at Morrisville  
(315) 684-6082

November 1-3, 2006  
Great Lakes Laboratory - Buffalo  
(716) 878-5422

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## Testing Change

New York State Testing Centers  
 Long Island (Hicksville)  
 Manhattan  
 Queens  
 White Plains  
 Clifton Park  
 Utica (Whitesboro)  
 Rochester  
 Buffalo (Williamsville)

Bring one current government issued photo identification with signature and one signature identification with you to the test site. Also, bring a non-programable calculator. You will take a proctored test at a computer work-station. The ABC formula sheet, pencil and scratch paper will be provided. No other writing instruments or personal belongings are allowed.

You still have three hours to complete the test. After completion, the test is instantly graded. You will have a copy of your written results when you leave the test center. The minimum passing grade is still 70%.



After passing your test, DEC will process your certificate. Processing your certificate will take 8 to 10 weeks, however, your certificate will be effective the day you pass the test. To retake a certification test, you simply follow the instructions on the score report.

In the next issue of Operator Facts, we will cover frequently asked questions concerning this change.

For further information on computerized testing, go to the ABC web site at: [www.abccert.org/web\\_test.html](http://www.abccert.org/web_test.html) or call NYSDEC at (518)402-8177.

## DMR Reporting (continued from Page 3)

are counted numbers and are not considered when determining the number of significant digits or decimal places in the calculation.

- If both addition/subtraction and multiplication/division are used in a calculation, follow the rules for multiplication/division.

### Example 1:

Report the annual total mass loading for phosphorus using the monthly mass loadings: 250.2 lb, 101.0 lb, 135.0 lb, 180.0 lb, 159.0 lb, 225.9 lb, 258.0 lb, 237.0 lb, 202.5 lb, 210.0 lb, 246.3 lb, 236.4 lb. The permit limit is 3125 lbs/yr.

$$\text{Annual Mass Loading} = 250.2 + 101.0 + 135.0 + 180.0 + 159.0 + 225.9 + 258.0 + 237.0 + 202.5 + 210.0 + 246.3 + 236.4 = 2441.3 \text{ lbs/yr.}$$

The permit limit specifies four (4) significant figures and the data has four (4) significant figures. Precision Rule #1 applies. Therefore, the number 3 (in the tenths place) in the result, is rounding down. Leave preceding number as is; enter 2441 in the Sample Measurement Box on the DMR.

### Example 2:

Calculate the 7-day average for ammonia using the four (4) sample results collected during the week: 0.56 mg/l, 0.93 mg/l, 2.53 mg/l, 6.92 mg/l. The Permit Limit is 4.5 mg/l.

$$\text{Average} = \frac{0.56 + 0.93 + 2.53 + 6.92}{4} = 2.735 \text{ mg/l}$$

The '0' before the sample results 0.56 and 0.93 are not significant figures (Significant Figures Rule #5). Two (2) significant figures are specified by the permit limit and raw data. Following Precision rules 2, 3, and 4, the numbers 2 and 7 in the result are the two significant digits. The number 3 (in the hundredths place) in the result, is rounding down. Leave the preceding number as is; enter 2.7 in the Sample Measurement Box.

More information on data reporting can be found in the DMR Manual. The Manual is available from the NYSDEC website at: [www.dec.state.ny.us/website/dow/bwcp/dmrmanual.html](http://www.dec.state.ny.us/website/dow/bwcp/dmrmanual.html)



## Wet Weather On-Line Training

This online wet weather operations course provides the skills and knowledge necessary to develop wet weather operating plans for a wastewater treatment facility. Available over the Internet, from the New England Interstate Water Pollution Control Commission (NEIWPCC) the course is self-paced and can be completed at home or at work. The cost is \$75. Upon successful completion of the course, 10 training contact hours will be awarded.

Additional information is available at: [www.neiwpcc.org/wetweathertraining](http://www.neiwpcc.org/wetweathertraining) or [www.dec.state.ny.us/website/dow/bwcp/foas\\_main.html](http://www.dec.state.ny.us/website/dow/bwcp/foas_main.html)

# DMR REPORTING FOR FECAL COLIFORM AND TOTAL COLIFORM

**A** SPDES permit often requires the reporting of the maximum 7-Day and 30-Day Geometric Means for Fecal or Total Coliform. Calculating the geometric mean does require the use of a calculator with exponential, logarithm and antilogarithm capabilities or a computer software program such as Microsoft Excel. Definition of the monitoring periods used to calculate the 7-Day and 30-Day Geometric Means are found on page 9 of the DMR Manual. The 7-Day Geometric Mean (7 DA GEO) is calculated for each seven (7) day monitoring period. Highest of these calculations is reported on the DMR as the Maximum Quality or Concentration. Calculation of the 30-Day Geometric Mean is made using all Fecal or Total Coliform samples collected during the 30 day monitoring period. This calculation (30 DA GEO) is reported on the DMR as the Average Quality or Concentration.

Geometric means are calculated by multiplying the values (C) in the monitoring period (7-day or 30-day) together and taking the Nth root of the product. Mathematically this looks like:

$$\text{Geometric Mean} = \sqrt[N]{C_1 \times C_2 \times \dots \times C_N} \text{ or } \text{Log}^{-1} \left\{ \frac{[\text{Log}(C_1) + \text{Log}(C_2) + \dots + \text{Log}(C_N)]}{N} \right\}$$

where; N = Number of samples during the 7-day or 30-day monitoring period

$C_1, C_2, \dots, C_N$  = Concentration of sample values during the 7-day or 30-day monitoring period

Example. During a 30-Day monitoring period, the following Fecal Coliform sample results were obtained:

Week 1 = 3.0/100 ml, Week 2 = 36/100 ml, Week 3 = 24/100 ml, Week 4 = 14/100 ml  
 where; N = 4,  $C_1$  = 3.0/100 ml,  $C_2$  = 36/100 ml,  $C_3$  = 24/100 ml,  $C_4$  = 14/100 ml

The maximum (7 DA GEO) for this sample set is 36/100 ml. Since only one sample was collected and analyzed during each 7 Day monitoring period, the maximum is the highest of these four sample results.

The 30-Day Geometric Mean (30 DA GEO) is calculated as follows:

$$\begin{aligned} 30 \text{ DA GEO} &= \sqrt[4]{(3.0) \times (36) \times (24) \times (14)} = 13.8/100 \text{ ml} \\ \text{or} \\ 30 \text{ DA GEO} &= \text{Log}^{-1} \left\{ \frac{[\text{Log}(3.0) + \text{Log}(36) + \text{Log}(24) + \text{Log}(14)]}{4} \right\} = 13.8/100 \text{ ml} \end{aligned}$$

The 30-Day Geometric Mean is reported as 14/100 ml (rounding rules) in the Fecal Coliform Average Quality or Concentration Box of the DMR.

The preceding example used quantitative sample results. The following sections and examples will outline steps for including less than (<) and Too Numerous to Count (TNTC) values into the geometric mean calculation.

**Less Than:** To calculate a Sample Measurement in which one or more of the reported observed/analytical values are preceded by the “less than” (<) symbol, use the reported value in the calculation. At the end of the calculation add the less than symbol (<) to the left of the calculated value. The Sample Measurement is then reported as less than the calculated value.

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Example. Calculate the 7-day and 30-day Geometric Means from the following weekly Fecal Coliform results. Observed/analytical values:

Week 1 = <1.0/100 ml, Week 2 = 3.0/100 ml, Week 3 = 11/100 ml, Week 4 = 5.0/100 ml  
where; N = 4,  $C_1 = <1.0/100$  ml,  $C_2 = 3.0/100$  ml,  $C_3 = 11/100$  ml,  $C_4 = 5.0/100$  ml

7-day Geometric Mean = the highest of the four samples = 11/100 ml

30-day Geometric Mean =  $\sqrt[4]{1.0 \times 3.0 \times 11 \times 5.0} = 3.6/100$  ml

Enter 11 in the Maximum Quality or Concentration Box and <3.6 in the Average Quality or Concentration Box.

**Too Numerous To Count (TNTC):**

For one observed/analytical value per monitoring period: Report the observed/analytical value by entering the letter **T** in the Sample Measurement Box and attach an explanation to the DMR.

**For more than one observed/analytical value per monitoring period:**

Use all numeric values in the calculation. At the end of the calculation, add the greater than symbol ('>') to the left of the calculated value and attach an explanation to the DMR.

When determining the highest of the 7-day/30-day Averages to report, any value with a greater than symbol ('>') will be considered the highest and must be reported.

Example. Calculate the 7-day and 30-day Geometric Means from the following weekly Fecal Coliform results. Observed/analytical values:

Week 1 = 36/100 ml, Week 2 = 45/100 ml, Week 3 = TNTC, Week 4 = 75/100 ml  
where; N = 4,  $C_1 = 36/100$  ml,  $C_2 = 45/100$  ml,  $C_3 = T$ ,  $C_4 = 75/100$  ml

7-day Geometric Mean = T

30-day Geometric Mean =  $\sqrt[3]{36 \times 45 \times 75} = 49.5/100$  ml

Enter T in the Fecal Coliform Maximum Quality or Concentration Box and >50 (rounding rules) in the Fecal Coliform Average Quality or Concentration Box. Include an explanation with the DMR for the Week 3 result.

More information on rounding rules and completing the Discharge Monitoring Report (DMR) for your State Pollutant Discharge Elimination System (SPDES) permit can be found in your SPDES permit, the DMR Manual or by contacting your NYSDEC Regional Office. Copies of the DMR Manual can be obtained from NYSDEC's website at: [www.dec.state.ny.us/website/dow/bwcp/dmrmanual.html](http://www.dec.state.ny.us/website/dow/bwcp/dmrmanual.html).



Visit Our Website at:  
[www.dec.state.ny.us/website/dow/bwcp/foas\\_main.html](http://www.dec.state.ny.us/website/dow/bwcp/foas_main.html)

# NYSERDA Technical Assistance Program Opportunity Notice

Applications accepted June 1, 2006 - November 20, 2006



## Program Summary:

The New York State Energy Research and Development Authority (NYSERDA), as administrator of the New York Energy Smart program, is seeking applications from facilities interested in energy efficiency technical evaluations, peak load reduction studies, energy procurement analysis and proposals that study the feasibility of implementing combined heat & power (CHP) and renewable generation.

For most projects NYSERDA will cost-share up to \$50,000 on selected studies, performed by an independent Service Provider as described herein. For electrical cus-

tomers of Consolidated Edison Company of New York, Inc. NYSERDA will cost-share up to \$100,000 on selected studies.

Eligible participants include: New York State (NYS) industrial and commercial facilities, state and local governments, not-for-profit and private institutions, public and private K-12 schools, colleges and universities, multifamily buildings five (5) units or larger, and health care facilities. NYSERDA is particularly interested in working with New York State electric distribution system customers of Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New

York, Inc., New York State Electric & Gas Corporation, National Grid, Orange and Rockland Utilities, Inc. and Rochester Gas and Electric Corporation, and commercial firm gas customers of Con Edison.

Applications will be accepted through November 30, 2006.

More information on this program can be found on NYSERDA's website at: [www.nyserda.org/](http://www.nyserda.org/).

After entering the web site check on "Funding Opportunities" and scroll down the page to "PON 1045."

Visit FOAS' Website:  
[http://www.dec.state.ny.us/website/dow/bwcp/foas\\_main.html](http://www.dec.state.ny.us/website/dow/bwcp/foas_main.html)

New York State DEC  
Facility Operations Assistance Section  
625 Broadway - 4th Floor  
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