Wastewater Operator Training Workshop Catalog
Operator Training and Assistance Program
Virginia Department of Environmental Quality

*Unless otherwise noted, all DEQ Operator Training Program workshops are recognized by the State Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals.

DEQ – 2 **Wastewater Sampling & Testing, pH & Residual Chlorine Workshop**
Training Credits: 1.0 Length: 2.0 days Fee: $100.00

This workshop uses a combination of lecture, demonstration and hands-on laboratory exercises. The program covers the approved potentiometric (meter and probe) method for pH and the approved DPD colorimetric and titrimetric procedures for the determination of total residual chlorine. During the hands-on activities participants will standardize pH meters, prepare standard solutions, prepare standard curves, use statistical calculations to verify standard curve data, calculate the line of best fit equation for the data and determine pH and total residual chlorine concentrations of samples supplied by the instructor. Recordkeeping and quality assurance/quality control requirements and other pertinent information for the selected test methods will also be covered during the lecture and demonstrations. Other total residual chlorine methods such as direct amperometric determinations may also be discussed or demonstrated based on student interest and available time.

DEQ – 3 **Wastewater Sampling & Testing, D.O. & BOD Workshop**
Training Credits: 1.0 Length: 2.0 days Fee: $100.00

This workshop consists of a combination of lecture, demonstration and hands on laboratory exercises. During the program participants will learn to: (a) collect valid, representative samples for dissolved oxygen (D.O.) and biochemical oxygen demand (BOD) testing; (b) perform the Modified Winkler and D.O. Meter and Probe Methods for determination of dissolved oxygen; (c) perform BOD sample pretreatment procedures for pH adjustment, and residual chlorine removal; (d) select an appropriate sample dilution range based on anticipated BOD levels; (e) perform seeded and unseeded BOD procedures; (f) select valid dilutions; (g) calculate accurate test results for seeded and unseeded BOD; (h) perform glucose-glutamic acid procedure; and (i) evaluate test data for toxicity indicators. The program will also cover sample preservation methods, maximum allowable holding times, recordkeeping requirements and quality assurance/quality control procedures for the subject test procedures. The carbonaceous BOD (CBOD) test procedure may also be discussed based on student interest and time availability.

DEQ - 4 **Wastewater Sampling & Testing, TKN and Ammonia Nitrogen Workshop**
Training Credits: 1.0 Length: 3.0 days Fee: $150.00

This two and a half day workshop consists of a combination of lecture, demonstration and hands on laboratory exercises. During the program the participant will learn to: (a) prepare standard solutions; (b) perform required slope checks on specific ion electrodes and meters used in the analysis; (c) perform the approved procedure for digestion of total kjeldahl nitrogen (TKN) samples using an approved semi-micro digestion procedure; (d) perform an approved semi-micro TKN distillation procedure; (e) determine the TKN concentration of the distilled sample by the approved specific ion electrode procedure; (f) perform the direct determination of TKN on a digested sample using EPA Method 351.4; (g) determine the ammonia nitrogen concentration of a sample using the specific ion electrode procedure; (h)

use statistical calculations to evaluate the validity of the standard curve and to generate the line of best fit equation for the curve; and (i) calculate TKN and ammonia concentrations using the appropriate line of best fit equations. Sample preservation methods, maximum holding times, quality control/quality assurance requirements, recordkeeping and other related topics will also be covered. Other ammonia nitrogen and total Kjeldahl nitrogen test methods (Nesslerization and titrimetric) may also be discussed based on student interest and available time.

DEQ - 5 Wastewater Sampling & Testing, Solids Workshop
Training Credits: 0.5 Length: 1.0 day Fee: $ 50.00

This workshop consists of a combination of lecture, demonstration and hands on laboratory exercises. The participant will learn to: (a) use an analytical balance to accurately weigh selected objects to 0.0001 grams; (b) perform required balance maintenance and accuracy checks; (c) prepare equipment (evaporating dishes, filters, etc) for use in solids determinations; (d) select appropriate sample volumes based on anticipated solids concentrations to ensure filtration times and weight changes meet test criteria; (e) determine the total suspended solids concentration of a sample supplied by the instructor. Sample collection, preservation methods, maximum holding times, quality control/quality assurance considerations, and recordkeeping requirements will also be discussed. Volatile solids, dissolved solids and solids/volatile solids in process residuals and biosolids may also discussed based on student interest and available time.

DEQ – 6 Wastewater Sampling & Testing, Chemical Oxygen Demand Workshop
Training Credits: 0.5 Length: 1.0 day Fee: $50.00

This workshop consists of a combination of lecture, demonstration and hands on laboratory exercises. The participant will learn to: (a) prepare standard solutions; (b) select appropriate test vials based on anticipated sample COD concentration; (c) safely pipet samples and blanks into vials; (d) perform the approved procedure for the direct determination of the sample COD concentration; (e) prepare a standard curve using prepared standards and blanks; (f) use statistical evaluation techniques to determine the validity of the curve and to define the line of best fit equation for the data; (g) use the calculated line of best fit equation to determine the concentration of samples. Sample preservation methods, maximum holding times, quality assurance/quality control requirements, recordkeeping and safety considerations will also be covered. Other methods for determination of the COD concentration may be discussed based on student interest and available time.

DEQ - 8 Wastewater Sampling & Testing, Ammonia Nitrogen Workshop
Training Credits: 0.5 Length: 1.0 day Fee: $50.00

This workshop consists of a combination of lecture, demonstration and hands on laboratory exercises. The participant will learn to: (a) prepare standard solutions; (b) perform required slope checks on specific ion electrode/meter used in the analysis; (c) determine the ammonia nitrogen concentration of a sample using the direct readout specific ion electrode and meter; (d) determine the ammonia nitrogen concentration of a sample using a spectrophotometer and laboratory generated standards; use statistical calculations to evaluate the validity of the standard data and to generate the line of best fit equation; and (i) calculate ammonia concentrations using the appropriate line of best fit equation. Sample preservation methods, maximum holding times, quality assurance/quality control requirements, recordkeeping and basic probe care and maintenance will also be covered. Other ammonia nitrogen test methods (Nesslerization and titrimetric) may be discussed based on student interest and available time.

DEQ – 11 **Wastewater Sampling & Testing: Phosphorus**
Training Credits: TBD Length: 2.0 days Fee: $100.00

This two day workshop consists of a combination of lecture, demonstration and hands on laboratory exercises. During the program the participant will learn to: (a) properly collect and preserve samples for total reactive (ortho-) phosphorus and total phosphorus analysis, (b) select the appropriate method based on the anticipated concentration of the sample, (c) determine the validity of a standard curve and the line of best fit, (d) describe and perform the acid persulfate digestion procedure, the ascorbic acid single reagent procedure, and the ascorbic acid (Hach PhosVer 3) procedure, (e) identify the essential components of a quality assurance/quality control program to assure accurate, reproducible results. Recordkeeping and safety considerations will also be covered. If you are responsible for conducting your facility's phosphorus sampling and testing, this program will be extremely beneficial.

DEQ - 12 **Wastewater Sampling & Testing For Small Treatment Plants**
Training Credits: 1.0 Length: 2.0 days Fee: $100.00

The program includes lecture, demonstration and hands-on laboratory exercises. The program will address topics of specific interest to small (<40,000 gpd) treatment facility owners and operators. Hands on activities will focus on requirements and procedures for on-site effluent and will include: (a) performing the dissolved oxygen (D.O.) test using a D.O. meter; (b) performing the total residual chlorine using a direct readout DPD colorimetric procedure; (c) performing the pH test using a pH meter and electrode(s). The program will also include discussions of determining composite sample volumes, sample collection and preservation methods for biochemical oxygen demand, total suspended solids, nutrient and bacteriological samples, recordkeeping, quality assurance/quality control requirements, completion of the discharge monitoring report, selection of a contract laboratory, and sources of assistance.

DEQ - 13 **Activated Sludge Process Control, Part I**
Training Credits: 2.0 Length: 3.0 days Fee: $150.00

This three day workshop provides the knowledge and skills required to monitor and adjust the operation of an activated sludge treatment plant. The program will focus on the basic concepts, process observations, basic process control testing, including settled sludge volume (settleability) testing, microscopic examination, dissolved oxygen and alkalinity, recordkeeping and data interpertation. The program's hands on activities will include observation of an activated sludge system, collection and analysis of process control samples, and data analysis. Managers, operators and operator trainees of activated sludge treatment systems will find this program very helpful.

DEQ - 14 **Activated Sludge Process Control, Part II**
Training Credits: 2.0 Length: 3.0 days Fee: $150.00

This three day workshop provides knowledge and skills required to evaluate and control the operation of an activated sludge treatment plant. The program will focus on the basic and advanced process control strategies, process control calculations, data interpertation and process troubleshooting. The program's hands on activities will include analysis of operational data, performing process control calculations; using calculated data to adjust operating levels and troubleshooting activated sludge treatment process performance problems. Managers, operators and operator trainees of activated sludge treatment systems will find this program very helpful.

DEQ - 15 **Extended Aeration Package Plant Operation Workshop**
Training Credits: 1.3 Length: 3.0 days Fee: $150.00

A three day program is designed to introduce various methods for evaluation and control of the extended aeration package plant treatment system. Program will include lecture, class exercises, hands on activities and visits to one or more typical extended aeration package treatment plants. Topics covered during the program include treatment system components, normal operation, basic process control observations, sampling and testing (such as dissolved oxygen, pH, 30 & 60 minute sludge settleability, mixed liquor suspended solids, microscopic evaluation-and others) as well as problem identification, calculations and process adjustment. Students will perform the subject tests and use the information collected to evaluate process condition. The program will include data interpretation and basic troubleshooting.

DEQ - 16 **VPDES Permit Recordkeeping and Reporting**
Training Credits: 0.35 Length: 0.5 days Fee: $ 50.00

This program is designed to review recordkeeping and reporting requirements associated with the Virginia Pollutant Discharge Elimination System (VPDES) permit. The program will include discussions of recordkeeping requirements and the various reporting requirements established in the VPDES permit. The program will also include hands on exercises in performing required calculations and completing the VPDES monthly discharge monitoring report (DMR). Managers and responsible charge operators with responsibility for complying with recordkeeping and reporting requirements of the treatment system's VPDES permit will find this program helpful.

DEQ - 17 **Nutrient General Permit Reporting**
Training Credits: 0.30 Length: 0.5 days Fee: $ 50.00

This program is designed to identify reporting requirements associated with the General Permit for Total Nitrogen and Total Phosphorus Discharges in the Chesapeake Bay Watershed. The program will review what reports must be submitted to comply with permit requirements and will focus on the methods and procedures required for completion of the Nutrient General Permit monthly discharge monitoring report (DMR) and Annual Report Form. The program will also include hands on exercises in performing required calculations and completing the DMR and Annual Report Form. Managers and responsible charge operators with responsibility for complying with recordkeeping and reporting requirements of the treatment system's Nutrient General permit will find this program helpful.

DEQ - 18 **Introduction to BNR (Biological Nutrient Removal)**
Training Credits: 1.2 Length: 2.0 days Fee: $100.00

This two day workshop provides an introduction to the principles involved in biological nutrient removal. The focus of the program will be the suspended growth (activated sludge) BNR processes. If you operate or manage a treatment system which includes biological nutrient removal or will be required to implement biological nutrient removal, this program will be helpful. The program will discuss the basic concepts associated with biological nutrient removal (nitrification, denitrification and biological phosphorus removal). It will identify performance factors, provide typical operating ranges for many of these factors and review various design and operational configurations currently being used for BNR. Based on availability, the program will include one or more site visits to facilities currently achieving full or partial BNR.

DEQ – 19 **Basic Lab Skills for Wastewater Operators**
Training Credits: 1.0 **Length: 2.0 days** **Fee: $100.00**

This two day workshop provides hands on instruction in the basic skills required to accurately perform wastewater related sampling and testing. If you are responsible for conducting your facility's sampling and testing, this program will be extremely beneficial. The program covers lab water sources, equipment selection, equipment and glassware cleaning and storage, and the collection and preservation of representative samples. The program also includes hands-on experience in using glassware and lab instruments to dilute samples and chemicals and to prepare standards. It will also present the basic quality assurance considerations required at any facility performing permit related testing. The QA discussion will include the use of blanks, replicates, split samples and performance standards, procedures for the systematic verification of instrument accuracy, initial demonstration of competency (IDC) requirements and other quality assurance related topics. The program includes lectures, demonstrations and hands on laboratory activities.

DEQ – 20 **Wastewater Math for Operators**
Training Credits: TBD **Length: 3.0 days** **Fee: $150.00**

This three day workshop provides hands on instruction in the basic skills required to accurately perform wastewater treatment related calculations. The program will review basic math concepts including area and volume, decimals and percents, calculating averages and completing necessary conversions. The program will also cover more complex calculations used for process control such as, but not limited to, velocity and flow, process loading and performance, sludge pumping and chemical addition. The course includes "real world" examples to assist the participant in understanding the formulas necessary to perform the calculations. If you are experiencing difficulty in performing many of the wastewater calculations required or would like a review, this program will be extremely beneficial.

ENV 40 **Basic Wastewater Licensure Review**
Training Credits: 2.3 **Length‡: variable** **Fee‡: variable**

A three - five day program designed to review the knowledge and skills usually associated with competent operation of a Class III or Class IV wastewater treatment facility. The program assumes the participant is qualified to sit for either the Virginia Class III or Class IV wastewater license. The program is offered in cooperation with vocational centers or community colleges throughout the state.

‡ Course length and cost are set by the host institution and will vary from site to site.

ENV 146 **Advanced Wastewater Licensure Review**
Training Credits: 2.3 **Length‡: variable** **Fee‡: variable**

A three - five day program designed to review the knowledge and skills usually associated with competent operation of a Class I or Class II wastewater treatment facility. The program assumes the participant is qualified to sit for either the Virginia Class I or Class II wastewater license. The program is offered in cooperation with vocational centers or community colleges throughout the state.

‡ Course length and cost are set by the host institution and will vary from site to site.