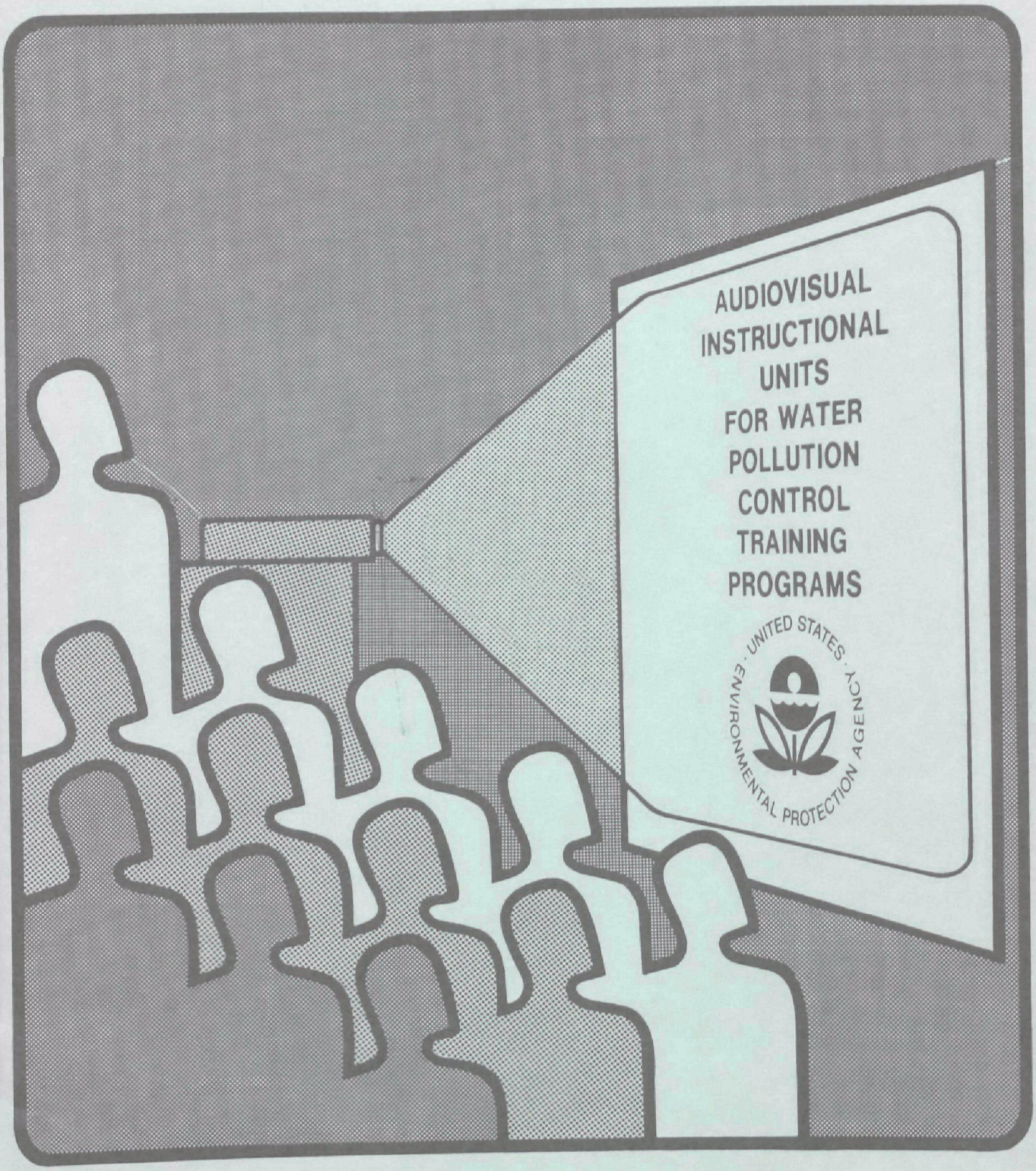

U.S. ENVIRONMENTAL PROTECTION AGENCY
WATER PROGRAM OPERATIONS
MUNICIPAL PERMITS AND OPERATIONS DIVISION

AUDIOVISUAL INSTRUCTIONAL UNITS

TRAINING SUPPORT

U. S. ENVIRONMENTAL PROTECTION AGENCY
Water Program Operations
Municipal Permits and Operations Division
National Training Center
Cincinnati, Ohio 45268

1974

FOREWORD

The audiovisual instructional units listed on the following pages are currently used in support of training efforts by this agency. These training aids should not be regarded as self-contained units designed to replace an instructor. They were developed or acquired as training tools to be used in an integrated presentation of topics pertinent to water quality. Accordingly, the user is urged to read carefully the recommendations given in this brochure relative to effective utilization of the instructional units.

These materials are available for short-term loan to other organizations and agencies. Priority is given to those who train personnel engaged in programs related to the detection, causes, prevention and control of environmental pollution.

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AUDIOVISUAL INSTRUCTIONAL UNITS

INSTRUCTIONAL UNITS:

These consist of slides and a narration tape with cues which automatically change slides in a projector. All units include a script of the narration. Some have associated instructional materials such as a quiz, a booklet, etc.

TOPICS:

See the catalog listings of available instructional units.

RELATED EQUIPMENT AND MATERIALS:

Upon request for a loan, the loaning office will mail:

1 set of slides in proper order in a Carousel tray
1 cassette tape of a narration with cues to automatically change slides for the series
1 tape playback unit with a connection for a projector
1 instruction sheet regarding setting up the equipment
1 copy of the script for the series
1 copy of any associated instructional materials
1 sheet for record information to return to the loaning office.

The User Must Provide:
-A projector equivalent to a Kodak Carousel slide projector
-A screen

UTILIZATION OF INSTRUCTIONAL UNITS

DISCUSSION LEADER

PREPARATION:

-See the catalog description of the intended audience for the unit.

-Preview the instructional unit.

-Review the unit topic.

References are listed in the catalog. The script and any associated information are sent with the unit. Questions about content should be directed to:

U.S. Environmental Protection Agency
Water Program Operations
Municipal Permits and Operations Division
National Training Center
Cincinnati, OH 45268

-Give viewers sufficient notice of any preparatory assignments.

UTILIZATION:

-Tell the viewers about the content of the program and important points to notice while viewing. Tell them to concentrate on seeing and hearing rather than on taking notes during the presentation.

-Run the program. The tape playback can be stopped during the program, if desired.

-Conduct a discussion of the content. Particular slides can be projected if desired.

-Run the program again. Now the viewers can best comprehend the content.

FORMAT OF CATALOG ITEMS

The *TITLE* and *CATALOG NUMBER* of the unit.

An *ABSTRACT* of the unit content with date of production or of updating review.

FOR describes the intended audience.

REFERENCE – sources used to produce or to update unit content.

STANDARD REFERENCES cited are:

ASTM STANDARDS – American Society for Testing and Materials, Part 23, Philadelphia, PA, ASTM, 1970.

EPA METHODS MANUAL – Methods for Chemical Analysis of Water and Wastes, Analytical Quality Control Laboratory, Office of Water Programs, EPA, Cincinnati, OH, July 1971.

STANDARD METHODS – Standard Methods for the Examination of Water and Wastewater, NY, APHA-AWWA-WPCF, 13th ed., 1971.

For OTHER REFERENCES:

Principle Author, the Title of the Journal or Book and the Date of Publication are listed.

NOTES: These include viewing time, the number of slides and any associated instructional materials sent with the particular unit.

UPGRADING BIOLOGICAL TREATMENT **XT-25**

ABSTRACT: Discusses ways to get maximum use of present existing secondary treatment processes by improved operational control or design. Case histories of how the pollutional strength of an activated sludge plant effluent was reduced to one-quarter of its former strength at one location; and how trickling filter pretreatment with activated sludge polishing accomplished 99% reduction for a combination of domestic sewage and strong meat packing wastes at another. (1969)

FOR: Experienced and supervisory wastewater works operators and managerial personnel. Of interest to design engineering personnel.

REFERENCE: West, Proceedings: 8th Annual Environmental and Water Resources Eng. Conf., Vanderbilt U. (1969); Mallory, Water Works and Sewerage (1941 and 1943); Hughes and Reynolds, JWPCF (1969); and Leary, et.al., JWPCF (1968).

NOTES: 28 minute tape and 65 slides, also script.

ATOMIC ABSORPTION **XT-26**

ABSTRACT: The basic theory of Atomic Absorption Spectroscopy; the design fundamentals of the instrumentation involved; kinds of interferences that can be encountered and methods for eliminating those effects; methods for increasing sensitivity and the application of atomic absorption instrumentation for the analysis of trace metals in water. (1969)

FOR: Chemists, biologists and engineers having a professional background and responsibility for performing, using or interpreting chemical analyses for water quality.

REFERENCE: Walsh, Spectrochem-Acta (1955); Willard, et.al., Instrumental Methods of Analysis (Book-1965).

NOTES: 20 minute tape and 52 slides; also script and booklet: "Atomic Absorption Spectroscopy" (an introductory theoretical discussion), 8 pp.

CHEMICAL OXYGEN DEMAND (COD) XT-27

ABSTRACT: An introduction to the Chemical Oxygen Demand (COD) procedure. Order of topics is: basis of test, how it differs from the Biochemical Oxygen Demand (BOD) Test, potassium dichromate as an oxidizing agent, use of blank and reflux condensers, role of ferrous ammonium sulfate and ferroin, etc., sample preservation, applications of test results and COD/BOD ratios. (1971)

FOR: Chemists, biologists and engineers having a professional background and responsibility in performing, using, or interpreting chemical analyses for water quality.

REFERENCE: Standard Methods (1971); Moore, et.al., Analytical Chemistry, (1951); Van Hall, et.al., Analytical Chemistry (1963); Sawyer and McCarty, Chemistry for Sanitary Engineers (Book-1967).

NOTES: 17 minute tape and 60 slides, also script, quiz and key.

DETERMINATION OF PHENOLICS XT-28

ABSTRACT: An introduction to the determination of phenolics. Defines and gives sources and uses of phenolics, biological treatment, effects on fish and water quality, the 4–aminoantipyrine reaction, sample preservation, procedure, interferences and remedies. (1971)

FOR: Chemists, biologists, and engineers having a professional background and responsibility for performing, using or interpreting chemical analyses for water quality.

REFERENCE: Standard Methods (1971); ASTM Standards (1970); McFarren, et.al., Water Phenols No. 1 (1967); Burttschell, et.al., JAWWA (1959); and Dennis, Proceedings: Ohio Sewage and Industrial Wastes Treatment Conference (1951).

NOTES: 17 minute tape and 64 slides, also script, quiz, and key.

DISSOLVED OXYGEN DETERMINATION **XT-29**

ABSTRACT: Sampling techniques; basic chemistry of the Winkler dissolved oxygen determination and the Alsterberg azide modification; methods for the addition of reagents; sample preservation and the basic calculations used in the determination. Photos of relevant laboratory equipment are included. (1971)

FOR: Beginning laboratory personnel (chemistry).

REFERENCE: Standard Methods (1971); E P A Methods Manual (1971); Sawyer, Chemistry for Sanitary Engineers (Book-1960).

NOTES: 15 minute tape and 72 slides, also script, quiz and key.

ULTIMATE DISPOSAL TO THE ENVIRONMENT **XT-30**

ABSTRACT: Possible disposal sites for liquid and solid wastes and presented along with pollutional and economic factors relevant to each. Sludge disposal and the use of sludge for reclaiming mine spoil and other low grade soils are considered in detail with on-site examples of the methods considered. Using a periodic chart, a summary of disposal site choices and of re-use possibilities for common elements and their compounds is included with special emphasis on successful reclamation of water. (1971)

FOR: Anyone seeking an introduction to the topic, especially agricultural uses of sludge.

REFERENCE: Dean, Environmental Science and Technology (52 references listed-1968); Dean, EPA-OWP Training Manual Outline (1971).

NOTES: 42 minute tape and 37 slides; also script, reprint Dean: "Ultimate Disposal of Waste Water: A Philosophical View," 4 pp. and reprint Evans: "The Soil as a Resource Renovator," 4 pp.

MARGIN FOR SAFETY **XT-31**

ABSTRACT: Providing safe conditions for performance of routine duties in Wastewater works. Includes detailed discussions of the importance of good housekeeping, preventing slips or falls, personal protective equipment, and dealing with fire extinguishers, machinery with moving parts and vehicular traffic in work areas. Also emphasizes safety attitudes. (1970)

FOR: All wastewater works personnel.

REFERENCE: The Water Pollution Control Federation Safety Committee in consultation with the Bureau of Safety (Middle West Service Company) developed the script and the original series of slides.

NOTES: 18 minute tape and 45 slides, also script.

THE SAFE WAY **XT-32**

ABSTRACT: Performing routine duties in wastewater works in a safe way. Duties considered involve manholes, electrical equipment, sampling, contaminated water, air tools, steep stairways, vehicular traffic, excavations, bar screens, wire ropes, flammable materials and chemicals. (1970)

FOR: All wastewater works personnel.

REFERENCE: The Water Pollution Control Federation Safety Committee in consultation with the Bureau of Safety (Middle West Service Company) developed the script and the original series of slides.

NOTES: 14 minute tape and 39 slides, also script.

The slides and script for units XT-31 and XT-32 are COPYRIGHT MATERIAL and MAY NOT BE REPRODUCED. See page 24 for purchase information.

ANAEROBIC DIGESTION AND ANALYTICAL CONTROL **XT-34**

ABSTRACT: Discussion of the anaerobic decomposition processes utilized to treat organic materials in wastes, the environmental conditions required for the involved bacteria, and a description of the related process control analyses: volatile acids (stepwise procedure given), alkalinity, total organic nitrogen content, total organic load, pH and gas production. (1972)

FOR: Experienced wastewater treatment plant operators who wish to upgrade plant performance and to increase their own knowledge and skills.

REFERENCE: Eckenfelder and O'Connor, Biological Waste Treatment (Book-1961); Sawyer and McCarty, Chemistry for Sanitary Engineers (Book-1967).

NOTES: 13 minute tape and 62 slides, also script.

LET'S INVENTORY YOUR CHLORINE HANDLING PRACTICES **XT-35**

ABSTRACT: Discussion on handling elemental chlorine. Principle divisions of information are: physical and chemical characteristics of chlorine, safety requirements for six segments of typical chlorine feed systems, chlorine emergency procedures, in-plant operating procedures for safe handling of chlorine (15 items), and sources of additional information. (1970)

FOR: All personnel in water supply and wastewater treatment plants.

REFERENCE: The Ohio Department of Health, Division of Engineering developed the script, the original series of slides and a taped narration. References cited in the narration are: The Chlorine Institute, Inc., Chlorine Manual (1969); Health Education Service, Recommended Standards for Sewage Works (1968); AWWA Manual M3, Ohio Industrial Commission (claims records) and Manufacturers' literature.

NOTES: 32 minute tape and 80 slides, also script.

RESIDUAL CHLORINE AND CHLORINE DEMAND **XT-37**

ABSTRACT: Basic principles of chlorination practices in treatment plants, reactions of chlorine with water and wastewater, sanitary significance of chlorine residuals and analytical procedures for the determination of chlorine and chlorine residuals in treatment plant effluents. (Rev. 3/74)

FOR: Beginning wastewater treatment plant operators.

REFERENCE: Sawyer and McCarty, Chemistry for Sanitary Engineers (Book-1967).

NOTES: 12 minute tape and 56 slides, also script.

SAFETY PROGRAM GUIDE **XT-38**

ABSTRACT: A guide for establishing an effective safety program including the role of management, organization required, record-keeping, accident investigation and evaluation procedures, causes of accidents, protective equipment required, establishing safety rules and procedures, elements of employee training programs and suggestions for motivating employees. (1969)

FOR: Wastewater works supervisory personnel and management.

REFERENCE: The Water Pollution Control Federation Safety Committee in consultation with the Bureau of Safety (Middle West Service Company) developed the script and the original series of slides.

NOTES: 20 minute tape and 39 slides, also script.

WHY A SAFETY PROGRAM IN EVERY WATER POLLUTION CONTROL WORKS **XT-39**

ABSTRACT: Demonstrates the need to establish an effective safety program by discussing safety as efficient operations, knowledge of job requirements, good relations with public, effective cost control, good employee relations and good management. Gives sources for further information. (1969)

FOR: Wastewater works supervisory personnel and management.

REFERENCE: The Water Pollution Control Federation Safety Committee in consultation with the Bureau of Safety (Middle West Service Company) developed the script and the original series of slides.

NOTES: 12 minute tape and 27 slides, also script.

The slides and script for units XT-38 and XT-39 are COPYRIGHT MATERIAL and MAY NOT BE REPRODUCED. See page 24 for purchase information.

OPERATIONAL CONTROL TESTS FOR THE ACTIVATED SLUDGE PROCESS—Part I **XT-40**

ABSTRACT: Part One of a three-part lesson series on operational control tests for the activated sludge process. Entitled "Observations," this first part is concerned with the accurate reading of meters and with the visual observations to be made both at the aerator (foam characteristics, sludge color and odor) and at the final clarifiers (clarity, evidences of bulking and of septic solids). Provisional interpretations to be made of these visual observations are presented, and also a detailed discussion of the effective use of a sludge blanket finder. (1971)

FOR: Experienced wastewater works operators who wish to upgrade plant performance and to increase their own knowledge and skills.

REFERENCE: West, Proceedings: 8th Annual Environmental and Water Resources Eng. Conf., Vanderbilt U. (1969); Mallory, Water Works and Sewerage (1941 and 1943); Hughes and Reynolds, JWPCF (1969) and Leary, et.al., JWPCF (1968).

NOTES: 16 minute tape and 50 slides, also script.

OPERATIONAL CONTROL TESTS FOR THE ACTIVATED SLUDGE PROCESS—Part II **XT-41**

ABSTRACT: Part Two of a three-part lesson series on operational control tests for the activated sludge process. This part is a detailed discussion of the preferred techniques involved in conducting settlometer tests to determine settling characteristics and in centrifuging samples to determine the concentration of the mixed liquor and return sludge. Handling the related samples is included along with provisional interpretations and applications of the tests presented. (1971)

FOR: Experienced wastewater works operators who wish to upgrade plant performance and to increase their own knowledge and skills.

REFERENCE: West, *Proceedings: 8th Annual Environmental and Water Resources Eng. Conf.*, Vanderbilt U. (1969); Mallory, *Water Works and Sewerage* (1941 and 1943); Hughes and Reynolds, JWPCF (1969); and Leary, et.al., JWPCF (1968).

NOTES: 17 minute tape and 47 slides, also script.

OPERATIONAL CONTROL TESTS FOR THE ACTIVATED SLUDGE PROCESS—Part III **XT-42**

ABSTRACT: Part Three of a three-part lesson series on operational control tests for the activated sludge process. This concluding part presents development of settling and concentration curves from settlometer and centrifuge test results, techniques for conducting turbidity tests as well as the significance of turbidity results, a summary of all the tests presented in the three-part series, the control adjustments which are made on the basis of these test results, and progressive trend charts of process characteristics. (1971)

FOR: Experienced wastewater works operators who wish to upgrade plant performance and to increase their own knowledge and skills.

REFERENCE: West, Proceedings: 8th Annual Environmental and Water Resources Eng. Conf., Vanderbilt U. (1969); Mallory, Water Works and Sewerage (1941 and 1943); Hughes and Reynolds, JWPCF (1969); and Leary, et.al., JWPCF (1968).

NOTES: 22 minute tape and 67 slides, also script.

DISSOLVED OXYGEN ANALYSIS— ACTIVATED SLUDGE CONTROL TESTING **XT-43**

ABSTRACT: Rapid and valid techniques are described for control of the activated sludge treatment process using electronic measurement of DO and DO changes. Sample data are discussed for interpretation of sludge condition in response to stabilization, feed, load ratio or conditions. Information obtainable within 20 minutes provides suggested corrective action in time to upgrade effluent quality. (1971)

FOR: Advanced wastewater treatment plant operators or plant control supervisors.

REFERENCE: Bloodgood, Sewage Works Journal (1938); Kessler, Water Works and Sewerage (1936); Sawyer, Sewage Works Journal (1939); Hughes and Reynolds, JWPCF (1969), and Manufacturers' literature.

NOTES: 34 minute tape and 73 slides, also script, supplement Ludzack: "Dissolved Oxygen Testing Procedure," 4 pp., and lesson plan.

THE DETERMINATION OF PHOSPHORUS **XT-44**

ABSTRACT: Presents the reasons for determining phosphorus, an explanation of phosphorus terminology, and the Office of Water Programs analytical procedures. Discussion of procedure includes basic chemistry involved, sensitivity range, sample collection and preservation, filtration and digestion, pH, reagent preparation, color development and spectrophotometric determination, care of glassware and possible interferences. (1971)

FOR: Beginning laboratory personnel (chemistry).

REFERENCE: E P A Methods Manual (1971); Sawyer, Chemistry for Sanitary Engineers (Book-1960).

NOTES: 15 minute tape and 65 slides, also script, quiz, and key.

TAPE-SLIDE PRESENTATIONS— HOW TO MAKE THEM **XT-45**

ABSTRACT: How to compile a tape-slide audiovisual presentation—also the equipment required to produce one. Topics include statistics on the effectiveness of combining visual materials and sound, basic equipment required, five steps to produce a program, incorporating sound effects, etc., guidelines for planning slides, and equipment available for specific uses of the finished program. (1970)

FOR: Anyone interested in producing tape-slide presentations.

REFERENCE: The Elco Optisonics Division of the Elco Corporation developed and produced this series of slides and the accompanying narration tape with cues.

NOTES: 10 minute tape and 80 slides.

The slides and script for this unit are COPYRIGHT MATERIAL and MAY NOT BE REPRODUCED. See page 24 for purchase information.

GRAPHICAL ANALYSIS VIA NORMAL PROBABILITY PAPER **XT-47**

ABSTRACT: Viewers are introduced to graphical analysis of data for normal distribution, using normal probability paper only. They are shown how to plot data on normal paper and ascertain if it is normal, how to estimate the mean and the standard deviation for normal data, and how to identify why some nonlinear graphs are not normal. (1971)

FOR: Anyone required to test a set of data for normal distribution, or who is interested in graphical analysis techniques per se. Three prerequisites for the viewer are introductory knowledge about the normal curve, ability to plot data on a coordinate system, and ability to draw a line of best fit through this plotted data.

REFERENCE: Natrella, Experimental Statistics (NBS Handbook 91. 1963); Santner, An Introduction to Normal Probability Paper (EPA Training Manual, 1971); Harter, Expected Values of Normal Order Statistics (ARL Technical Report, 1960).

NOTES: 18 minute tape and 38 slides; also script, instructions and problem solution for Discussion Leader, 2 pp., and a problem sheet with associated materials for viewers, 5 pp. Include the *number of expected viewers* on the loan request form.

DETERMINATION OF CHEMICAL OXYGEN DEMAND **XT-48**

ABSTRACT: A basic presentation of the laboratory technique involved in test procedures for all levels of COD. Sequence of topics is: method summary, sample handling and preservation, interferences, apparatus, preparation of reagents, step-wise procedure, example of calculations, and treatment of mercury-containing test wastes. (1971)

FOR: Beginning laboratory personnel and wastewater treatment plant operators.

REFERENCE: Standard Methods (1971); EPA Methods Manual (1971); Dean, et.al., Environmental Science and Technology (1971); Burns, et.al., JWPCF (1965).

NOTES: 22 minute tape and 80 slides; also script and reprint Dean, et.al.: "Disposal of Mercury Wastes from Water Laboratories," 2 pp.

BASIC STATISTICS – PART I **XT-49**

ABSTRACT: Part One of a two-part series. Topics: analytical results as samples of a number population; some requirements for valid data; construction of frequency tables, histograms and polygons; normal distribution curves; use of normal probability paper; definition and determination of the mode, median, and mean as measures of central tendency. (1972)

FOR: Laboratory personnel (chemistry) and others who need basic information about (1) graphical techniques for summarizing data and (2) the determination of central tendency statistics.

REFERENCE: Natrella, Experimental Statistics (1963); Snedecor, Statistical Methods (1946); Fisher, Statistical Methods for Research Workers (1958); Freund and Williams, Modern Business Statistics (1958).

NOTES: 20 minute tape and 46 slides; also script, instructions and problem solutions for Discussion Leader, 2 pp., and an outline, 5 pp., worksheet, I p., and problem sheet, I p., for Viewers. Include the number of *expected viewers* on the loan request form.

BASIC STATISTICS – PART II **XT-50**

ABSTRACT: Part Two of a two-part series. Topics: definitions and step-by-step instructions for Viewer to calculate dispersion statistics (the range, deviation of data and of the mean, variance, and standard deviation of data and of the mean); contrasts among them and criteria for choosing which to calculate; application of mean and standard deviation as estimates of normal distribution parameters; and a summary of Parts I and II. (1972)

FOR: Laboratory personnel (chemistry) and others who need basic information about the calculation of dispersion statistics.

REFERENCE: Natrella, Experimental Statistics (1963); Dixon and Massey, Introduction to Statistical Analysis (1951); Snedecor, Statistical Methods (1946); Fisher, Statistical Methods for Research Workers (1958); Freund and Williams, Modern Business Statistics (1958).

NOTES: 30-minute tape and 59 slides; also script, instructions and problem solutions for Discussion Leader, 2 pp., and an outline, 5 pp., work sheet, I p., and problem sheet, I p., for Viewers. Include the number of *expected viewers* on the loan request form.

USE OF THE SPECTRONIC 20 SPECTROPHOTOMETER **XT-51**

ABSTRACT: The stepwise use of the spectrophotometer including warm-up procedures, adjustments prior to use, making measurements and changing the photo tube. (1972)

FOR: Beginning laboratory personnel and wastewater treatment plant operators.

REFERENCE: Bausch and Lomb Instrument Manual.

NOTES: 10 minute tape and 35 slides, also script.

THE DETERMINATION OF BIOCHEMICAL OXYGEN DEMAND **XT-54**

ABSTRACT: An introduction to the BOD Test. Topics include reasons for making the determination, the preparation of dilution water, seeding techniques, sample pretreatment and dilution, and calculations. (1972)

FOR: Beginning laboratory personnel and wastewater treatment plant operators.

REFERENCE: Standard Methods (1971); EPA Methods Manual (1971).

NOTES: 13 minute tape and 71 slides, also script.

DETERMINATION OF GREASE AND OIL **XT-56**

ABSTRACT: The laboratory procedure to determine grease and oil. Topics are: terminology, problems caused by grease and oil in wastewater treatment, sampling and preservation, apparatus, the stepwise procedure and calculations. (Rev. 3/74)

FOR: Beginning laboratory personnel and wastewater treatment plant operators.

REFERENCE: EPA Methods Manual (1971); Standard Methods (1971).

NOTES: 15 minute tape and 54 slides, also script.

DETERMINATION OF SUSPENDED SOLIDS **XT-57**

ABSTRACT: The laboratory procedure to determine suspended solids. Topics are: importance of suspended solids to water quality, sampling, apparatus, the step-wise procedure and calculations. (1973)

FOR: Beginning laboratory personnel and wastewater treatment plant operators.

REFERENCE: EPA Methods Manual (1971); Standard Methods (1971).

NOTES: 10 minute tape and 40 slides, also script.

DETERMINATION OF TOTAL ORGANIC CARBON **XT-59**

ABSTRACT: Use of a Carbonaceous Analyzer to determine organic materials in water. Topics: BOD, COD, TOC tests defined and contrasted, steps of TOC determination, functions of instrument components, injection syringe characteristics, sampling and preservation, stepwise procedure to prepare and use a calibration graph to determine carbon in samples, sample pretreatment, discussion of two types of analyzers and calculations using data from each. (1973)

FOR: Beginning laboratory personnel and wastewater treatment plant operators.

REFERENCE: EPA Methods Manual (1971); Standard Methods (1971); Williams, Paper: 21st Instrument Society of America Conf., N.Y., (1966).

NOTES: 13 minute tape and 62 slides, also script.

PROCESS CONTROL DEMANDS (PART A) **XT-60**

ABSTRACT: Introduction to a series on operational control of an activated sludge process. A plant schematic is used to present the effects of return sludge flow adjustments on sludge concentrations, sludge detention times, process equilibrium, sludge characteristics, and final effluent quality. (1972)

FOR: Experienced wastewater works operators who wish to upgrade plant performance and to increase their own knowledge and skills.

REFERENCE: This is an advance presentation of elements of a book being developed by Mr. Alfred W. West, P.E., Chief, Waste Treatment Branch, National Field Investigations Center—Cincinnati, Ohio (45268), Office of Enforcement and General Counsel, EPA.

NOTES: 10 minute tape and 36 slides, also script.

PROCESS CONTROL DEMANDS (PART B) **XT-61**

ABSTRACT: One of a series, this unit presents the derivation of mixing formulae that will be used in subsequent sections to develop the return sludge flow demand formula used in operational control of an activated sludge process. A schematic is used to illustrate components of the formulae and to develop a final mass balance ratio of return sludge concentration to mixed liquor concentration in terms of clarifier sludge percentage. Simple mixing formulae are then derived for each of the three factors along with example calculations. (1972)

FOR: Experienced wastewater works operators who wish to upgrade plant performance and to increase their own knowledge and skills.

REFERENCE: This is an advance presentation of elements of a book being developed by Mr. Alfred W. West, P.E., Chief, Waste Treatment Branch, National Field Investigations Center—Cincinnati, Ohio (45268), Office of Enforcement and General Counsel, EPA.

NOTES: 15 minute tape and 40 slides, also script.

ALKALINITY **XT-66**

ABSTRACT: A general consideration of alkalinity in water supplies including sources and effects, summary of laboratory determinations, classification systems for hydroxide, carbonate and bicarbonate, and applications of alkalinity data. (1973)

FOR: Professional chemists and sanitary engineers.
REFERENCE: Sawyer and McCarty, Chemistry for Sanitary Engineers (Book-1967); Standard Methods (1971); EPA Methods Manual (1971).

NOTES: 11 minute tape and 66 slides, also script.

DETERMINATION OF AMMONIA NITROGEN **XT-67**

ABSTRACT: Determination of ammonia concentrations of 1–25 mg/liter. Topics are summary of method, the required laboratory apparatus and reagents, the stepwise procedure, and an example of calculating ammonia nitrogen from test results. (1973)

FOR: Beginning laboratory personnel and wastewater treatment plant operators.
REFERENCE: EPA Methods Manual (1971).

NOTES: 8 minute tape and 45 slides, also script.

DETERMINATION OF ALKALINITY **XT-68**

ABSTRACT: The laboratory procedure to determine alkalinity electrometrically to an end point of pH 4.5. Topics are: alkalinity fundamentals and titration curves, sampling, apparatus, the stepwise procedure, calculation formula, and applications of alkalinity data. (1973)

FOR: Beginning laboratory personnel and wastewater treatment plant operators.
REFERENCE: EPA Methods Manual (1971); ASTM Standards (1970); Standard Methods (1971); Sawyer and McCarty, Chemistry for Sanitary Engineers (Book-1967).

NOTES: 15 minute tape and 74 slides, also script.

pH METER - LABORATORY OPERATION XT-69

ABSTRACT: Introduction to the theoretical concepts of pH measurement. Designed to be shown as supplemental information for laboratory session on pH measurements in Environmental Monitoring Procedures course for wastewater treatment plant operators. Sequence shows set-up, calibration and operational procedures for portable type pH meter. (1974)

FOR: Wastewater treatment plant operators learning to perform this operation.

REFERENCE: Standard Methods (1971)

NOTES: 11 minute tape and 50 slides, also script.

DETERMINATION OF DISSOLVED OXYGEN— POLAROGRAPHIC PROBE METHOD XT-83

ABSTRACT: Basic procedure for set-up, calibration and use of YSI oxygen meter for the determination of dissolved oxygen in a sample of wastewater treatment plant effluent. Designed to be shown as supplemental information for laboratory session on dissolved oxygen measurements in Environmental Monitoring Procedures Course. (1974)

FOR: Wastewater treatment plant operators learning to perform this procedure.

REFERENCE: Standard Methods (1971); Yellow Springs Instrument Co. Instruction Manual (Model 54).

NOTES: 6 minute tape and 30 slides (estimated*), also script.

Available by November 1, 1974.

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(Contact Mrs. Eileen Hopewell, address on page 25, for information about copies of the taped narrations for this series on Safety.)

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Municipal Permits and Operations Div.
National Training Center
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