



NPDES Compliance Inspection Training Program Instructor's Guide



**NPDES COMPLIANCE INSPECTION
TRAINING PROGRAM
INSTRUCTOR'S GUIDE
FINAL**

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DISCLAIMER

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FOREWORD

FOREWORD

To prepare novice inspectors to conduct complete and accurate inspections under the National Pollutant Discharge Elimination System (NPDES) program, the Office of Enforcement and Compliance Assurance of the U.S. Environmental Protection Agency (EPA) has developed the NPDES Compliance Inspection Training Program, which is designed for independent study. The student works under the guidance of an experienced inspector or "instructor" to complete the *NPDES Compliance Inspection Training Program Student's Guide* (hereafter referred to as the "Guide") and to perform a period of intensive field work. The program reviews the Clean Water Act (CWA) and focuses on the basic policies, procedures, and techniques involved in NPDES inspections. The program's primary references are EPA's 1994 *NPDES Compliance Inspection Manual* (hereafter referred to as the "Manual") and the following EPA 1990 *NPDES Compliance Monitoring Inspector Training Modules*:

- *Overview* – Presents a review of the NPDES program and briefly summarizes the different types of inspections
- *Legal Issues* – Discusses the legal issues which must be addressed during an inspection and provides legal information to assist inspectors
- *Biomonitoring* – Outlines the principles of biomonitoring and the role of biological testing in the NPDES inspection program
- *Sampling Procedures* – Details procedures to be used when conducting sampling
- *Laboratory Analysis* – Outlines procedures and information necessary to perform an effective evaluation of a permittee's laboratory.

The period of intensive field work accomplished under the guidance of the instructor is intended to provide the student with practical "hands-on" experience and to reinforce the information presented in the Guide. The student's performance is evaluated regularly by the instructor, who makes recommendations for additional work (if necessary).

This document is the instructor's guide in the NPDES Compliance Inspection Training Program; it provides directed study and questions on the Manual, the five training modules, the CWA, and relevant regulations. This guide contains the answers to the 14 self-study units which are contained in the student's guide. The student's guide leads the student through the reference materials, tests his/her understanding of the topics, and prepares him/her for independent field inspections.

HOW THE PROGRAM WORKS

Each unit consists of a series of activities that explore, review, and reinforce:

- Standard inspection procedures
- Techniques for defensible evidence collection
- The overall NPDES enforcement program.

Each unit contains at least one exercise that includes a reading assignment and a study checklist. The study checklist includes questions that the student should be able to answer after completing the reading assignment. The student should first read through the study checklist and respond to as many questions as possible. This will help focus the material presented in the reading assignment, as well as identify areas that will need detailed study. The student should then complete the recommended reading assignment. After reading all the assigned material, the student should return to the study checklist and respond to each question. The student should work through the checklist, correcting any errors made the first time. If questions persist, they should be discussed with the instructor. The student must not proceed to the next exercise until each item on the checklist is completed correctly. The study checklists within each unit include the appropriate references where the answers to the questions can be found. The Instructor's Guide includes the answers to all the study checklist questions. Each unit also contains an exam which should be completed after the student has finished each exercise in that unit. A final exam is also included in Appendix A to be completed by the student after completion of all the units. The Instructor's Guide contains references and answers to each unit exam and final exam questions. Appendix B contains applicable literature references.

Most units contain several exercises which require the student to use basic information to solve problems that inspectors often face in the field. Responses to many of these exercises are not simply right or wrong, but are open to interpretation and discussion. It is important that the student and instructor review and discuss the student's responses.

THE ROLE OF THE INSTRUCTOR

The instructor's primary responsibilities in this self-study training program are to assist the student as a:

- Program Coordinator - The instructor should work out a schedule with the student for completion of each unit. Field work related to the program should be scheduled in advance. Personnel with expertise in particular areas covered by the Student's Guide should be consulted to supplement the content of this program.

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- Resource - Questions and problems with the program material are bound to arise and will need clarification. Many of the study units require the student to interpret concepts and develop practical responses to problems that an inspector often faces. The instructor should discuss these exercises with the student and provide as much practical help as possible.
- Monitor of the student's progress - The instructor's role includes monitoring the student's progress and making sure that study units and field work are completed on schedule. The instructor should also monitor the student's level of performance to ensure a thorough understanding of the material covered.

Although the NPDES Compliance Inspection Training Program is designed for independent study, the instructor should take time to assist the student. By following the guidelines below, the instructor can minimize the amount of time required, yet still provide adequate assistance to the student.

- The instructor should read through the instructor's guide.
- The instructor should establish (with the student) a reasonable schedule for completing the program. The Schedule/Checklist Form on the following page can be used to plan the schedule. Other duties that the student will be involved in should be taken into account. Field work and other supplementary activities should also be scheduled by the instructor with the student's concurrence.
- If it is practical, the instructor should set up specific times for the student to ask questions or for periods of evaluation.
- The study units conclude with exams that evaluate the student's understanding of the material. The instructor should review the completed exams to determine the student's performance level and recommend additional work (if necessary).
- The instructor should use the Schedule/Checklist to monitor the student's progress throughout the program and should determine when the student has satisfactorily completed the assigned material and track this progress by signing each section as it is completed.

This Instructor's Guide contains questions and answer keys for all unit study checklists, exams, as well as the final exam. The instructor has several options for using the exam answer keys. They can be used to correct student exams; they can be given to the student to check his/her own exam responses; or they can be reviewed and discussed by the instructor and the student together. In any event, the student should always correct all unit exams before proceeding to another unit.

SCHEDULE/CHECKLIST

		STUDENT <hr style="border-top: 1px dashed black;"/> INSTRUCTOR	
STUDY UNIT	ESTIMATED TIME TO COMPLETE	SCHEDULED COMPLETION DATE	SATISFACTORY COMPLETION
1. Introduction	9 hours		
2. Inspection Procedures	6 hours 15 minutes		
3. Documentation/Record Keeping and Reporting	1 hour 30 minutes		
4. Facility Site Review	5 hours		
5. Sampling	5 hours 45 minutes		
6. Flow Measurement	3 hours 30 minutes		
7. Laboratory Procedures and Quality Assurance	3 hours 15 minutes		
8. Toxicity	5 hours 30 minutes		
9. Pretreatment	3 hours 15 minutes		
10. Sewage Sludge	2 hours 45 minutes		
11. Storm Water	3 hours 15 minutes		
12. Combined Sewer Overflows	1 hour 30 minutes		
13. Pollution Prevention	2 hours		
14. Multi-Media Concerns	2 hours 30 minutes		
Final Exam	2 hour 30 minutes		
TOTAL	57 hours 30 minutes		

UNIT ONE
INTRODUCTION

The primary responsibility of an inspector is to inspect facilities for compliance with permit requirements. To carry out this responsibility, inspectors must be knowledgeable of the CWA, the many procedural requirements and responsibilities, and multimedia concerns involved in conducting a successful inspection. Unit One is designed to familiarize the student with these program aspects.

Unit One corresponds to Chapter 1 of the Manual, select sections of the CWA, the NPDES regulations, and EPA's 1990 *NPDES Compliance Monitoring Inspector Training Overview* module. The exercises included in this unit cover:

- Legal authority for NPDES inspections
- NPDES permitting regulations
- Responsibilities of the NPDES inspector.

EXERCISE 1-1**LEGAL AUTHORITY FOR
NPDES INSPECTIONS****3 HOURS AND 30 MINUTES**

To carry out their duties effectively, inspectors must be thoroughly familiar with the legal bases for their actions. A clear understanding of the objectives, purpose, scope, and requirements of the CWA is imperative.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapters 1A and 1B of the Manual and Chapters 1 and 2 of the *NPDES Compliance Monitoring Inspector Training Overview* module.
3. Obtain a copy of the current CWA from your instructor. Read Sections 301, 303, 304, 308, 309, 402, 504, and 507.
4. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. State (in your own words) the objective of the CWA. (Overview module, Chapter 1A, page 1-1)

The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.

2. Section 301(b)(1)(B) of the CWA requires Publicly Owned Treatment Works (POTWs) in existence on July 1, 1977, or approved pursuant to Section 203 of the CWA prior to June 30, 1974, to meet effluent limits based on "secondary treatment" as defined by the Administrator pursuant to Section 304(d) of the CWA.
3. List 5 things that must be taken into consideration when establishing new or revised water-quality standards [under Section 303(c)(2)(A) of the CWA].

a. Public water supplies

b. Propagation of fish and wildlife

c. Recreational purposes

d. Agricultural, industrial, and other purposes

e. Navigation

4. Section 304 of the CWA establishes a time table for EPA and States to develop and publish information on water quality.

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

5. Indicate which part of Section 308 of the CWA addresses confidential information.

Section 308(b).

6. List two types of penalties available to EPA under Section 309 of the CWA.

a. Civil

b. Criminal.

7. Under Section 402 of the CWA, a permit may never be renewed, reissued, or modified to contain effluent limitations which are less stringent than the effluent limits in the previous permit.

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Section 402(o)(2) of the CWA allows for the reissuance of a permit with less stringent effluent limits in certain specific cases such as substantial alterations to the permitted facility or the availability of new information.

8. Describe the circumstances under which EPA may take action to immediately stop someone from discharging pollutants. (CWA Section 504)

Where the pollution source, or combination of sources, presents an imminent and substantial danger to the health or the welfare of persons, or where such danger is to the livelihood of such persons.

9. Section 507 of the CWA sets forth protection for employees who testify or institute proceedings under the CWA.

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

10. Summarize the process by which EPA, under the CWA, regulates the discharge of pollutants into the Nation's waterways. (Manual, Chapter 1B, page 1-7)

The CWA gives EPA the authority to establish the NPDES permit program, define pollution control technologies, establish effluent limitations, obtain information through reporting and compliance inspections, and take enforcement actions when violations of the CWA occur.

11. List nine types of NPDES compliance inspections presented in the Manual and the Overview module. (Manual, Chapter 1A, pages 1-1 through 1-3; Overview module, Chapter 2, pages 2-1 through 2-4)

- a. *Reconnaissance Inspection (RI)*
- b. *Compliance Evaluation Inspection (CEI)*
- c. *Pretreatment Compliance Inspection (PCI)*
- d. *Performance Audit Inspection (PAI)*
- e. *Compliance Sampling Inspection (CSI)*
- f. *Toxics Sampling Inspection (XSI)*
- g. *Compliance Biomonitoring Inspection (CBI)*
- h. *Diagnostic Inspection (DI)*
- i. *Legal Support Inspection (LSI)*

EXERCISE 1-2**NPDES PERMITTING REGULATIONS****3 HOURS**

The NPDES permitting regulations detail the regulatory requirements under which a permittee must operate a facility to remain in compliance. This exercise will review those requirements that affect the inspector's understanding of his/her responsibilities and ability to perform successful inspections.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Obtain a copy of the regulations [*Code of Federal Regulations* (CFR) Title 40. Part 122 "EPA Administered Permit Programs: The National Pollutant Discharge Elimination System"] from your instructor and read them.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. State (in your own words) the purpose and scope of the NPDES permitting regulations. [40 CFR 122.1]

The NPDES permitting regulations require permits for point-source discharges of pollutants into waters of the United States. The regulations cover EPA permitting requirements, State program approval and administrative requirements, and EPA procedures for processing permit applications and appeals.

2. List six things that must be included in a facility's monitoring records for each sample or measurement taken. [40 CFR 122.41(j)(3)]

a. Date, exact place, and time of sampling

b. The people who performed the sampling

c. The dates analyses were performed

d. The people who performed the analyses

e. The analytical techniques or methods used

f. The results of such analyses

3. List two conditions under which a "bypass" will not result in an enforcement action. [40 CFR 122.41(m)(2)&(4)]

a. A bypass will not result in an enforcement action if it is for essential maintenance and doesn't cause effluent limits to be exceeded.

b. A bypass will not result in an enforcement action if the bypass was unavoidable to prevent loss of life, personal injury, or severe property damage, there were no feasible alternatives, and the permittee submitted required notices.

-
4. List four conditions that a permittee must demonstrate to establish an "upset" as an affirmative defense. [40 CFR 22.41(n)(3)]

- a. Evidence that the cause of the upset was identified*
- b. The facility was being properly operated at the time*
- c. The permittee notified EPA within 24 hours*
- d. The permittee complied with remedial measures set forth in 40 CFR 122.41(d)*

5. Describe what production-based limits for existing facilities (except POTWs) should be based on. [40 CFR 122.45(b)]

Limits should be based on a reasonable measure of actual production at the facility, not on the designed production capacity.

6. Describe the manner in which permit effluent limitations for continuous-discharge POTWs should be stated. [40 CFR 122.45(d)]

Permit limitations should be stated as average weekly and average monthly discharge limitations.

7. List four factors that should be considered when limiting the discharges from noncontinuous-discharge facilities. [40 CFR 122.45(e)]

- a. Frequency of discharge*
- b. Total mass*
- c. Maximum rate of pollutants during the discharge*
- d. Prohibition or limitation of specified pollutants by mass, concentration, or other appropriate measure*

8. Identify the maximum length of time for which a permit may be granted. [40 CFR 122.46]

NPDES permits can be effective for a fixed term not to exceed 5 years. However, a permit can be issued for a shorter period of time.

9. Indicate by when compliance schedules must require compliance. [40 CFR 122.47(a)]

Compliance schedules require compliance as soon as possible, but not later than the applicable statutory deadline under the CWA.

10. List three types of information specified in permits for the recording and reporting of monitoring results. [40 CFR 122.48]

- a. Requirements concerning the proper use, maintenance, and installation of monitoring equipment or methods*
- b. Required monitoring (including type, intervals, and frequency to yield representative data)*
- c. Applicable reporting requirements based on the impact of the regulated activity and as specified in 40 CFR 122.44*

EXERCISE 1-3**RESPONSIBILITIES OF THE NPDES INSPECTOR****2 HOURS**

Inspections are the enforcement mechanisms for detecting and verifying violations of NPDES permits. Inspectors must know and abide by the legal authority concerning inspections and the accepted procedures for conducting them. This exercise focuses on the purpose, scope, and elements of various inspections, and the basic responsibilities of an inspector.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 1C and Appendix A of the Manual and Chapters 3 through 5 of the *NPDES Compliance Inspector Training Overview* module.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. State the purposes of an inspection. (Manual, Chapter 1C, page 1-9)

The purposes of an inspection are to gather information that can be used to determine the reliability of the permittee's self-monitoring data and evaluate compliance with NPDES permit conditions, applicable regulations, other requirements, and to develop enforcement cases if violations are found.

2. List two legal requirements under which an inspector must conduct all NPDES inspections. (Manual, Chapter 1C, page 1-9)

a. Present proper credentials

b. Properly handle confidential business information

3. Summarize the inspector's responsibilities related to personal safety during an inspection. (Manual, Chapter 1C, pages 1-10 through 1-11; Overview module, Chapter 4, page 4-3)

The inspection of wastewater and other environmental pollution control facilities always poses a certain health and safety risk. To avoid unnecessary risks, the inspector should be familiar with all safety guidance and practices. Prior to an inspection, an NPDES inspector must be familiar with all safety obligations including Regional or State policy and requirements. The safety equipment and procedures required for a facility will be based on either standard safety procedures or the response to the 308 (inspection notification) letter. Safety requirements must be met, not only for safety reasons, but to ensure that the inspector is not denied entry to the facility (or to parts of it). The inspector must maintain safety equipment and use it in accordance with available guidance and labeling instructions. Inspectors must not enter the confined spaces unless properly trained, equipped, and permitted (if applicable).

4. Summarize the responsibilities of an inspector relating to ethical conduct and professionalism during an inspection. (Manual, Chapter 1C, pages 1-11 through 1-12; Overview module, Chapter 3, page 3-1)

Inspectors are expected to perform their duties with the highest degree of professionalism. Procedures and requirements ensuring ethical actions have been established during many years of Government inspection

experience. The procedures and standards of conduct listed below have evolved for the protection of the individual and EPA, as well as industry.

- *All inspections are to be conducted within the framework of the United States Constitution and with due regard for individual rights regardless of race, sex, creed, or National origin.*
 - *A continuing effort should be made to improve professional knowledge and technical skill in the inspection field.*
 - *The inspector is a representative of EPA and is often the initial or only contact between EPA and the permittee. In dealing with facility representatives and employees, inspectors must be professional, tactful, courteous, and diplomatic.*
 - *Inspectors should dress appropriately, including wearing protective clothing or equipment, for the activity in which they are engaged.*
 - *Inspectors should not accept favors or benefits under circumstances that might be construed as influencing the performance of governmental duties.*
5. Information from a permitted facility that has been classified as confidential may be withheld from an EPA or State NPDES inspector. (Overview module, Chapter 3, page 3-2)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

The claim of confidentiality relates only to public availability of such information and may not be withheld from EPA or State inspectors.

6. It is permissible for the NPDES inspector, after completing an inspection of a facility, to discuss both the findings of the inspection and all violations identified with representatives of the permittee. (Overview module, Chapter 4, page 4-5)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Permit violations should be noted on the NPDES Compliance Inspection Report and should not be discussed with the permittee during the closing conference.

7. Which of the following is not an objective of the CSI? (Circle correct answer.) (Overview module, Chapter 5, pages 5-9 through 5-10)

b. To evaluate the permittee's laboratory techniques.

8. Which of the following is not a component of a CEI? (Circle correct answer.) (Overview module, Chapter 5, page 5-1)

c. Biomonitoring procedures review.

9. A CSI is (more/less) resource-intensive than a CEI. (Circle correct answer.) (Overview module, Chapter 5, page 5-10)

10. It is the NPDES inspector's obligation during a PAI to be knowledgeable about common permittee self-monitoring deficiencies. (Overview module, Chapter 5, page 5-12)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

11. Which of the following is/are objectives of the records and reports review conducted as part of the CEI? (Circle correct answer.) (Overview module, Chapter 5, page 5-2)

d. All of the above.

UNIT 1	EXAM	30 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time limit listed above.3. Verify the answers with your instructor.4. Correct any errors and clarify problems or questions before proceeding to Unit 2.		

Exam Questions and Answers

1. Explain the process by which EPA, under the CWA, regulates the discharge of pollutants into the Nation's waterways. (Manual, Chapter 1B, page 1-7)

EPA regulates pollutant discharges by establishing the NPDES permit program, defining pollution control technologies, establishing effluent limits, obtaining information through reporting and compliance inspections, and taking enforcement actions.

2. Explain the purpose of the NPDES permitting regulations. (40 CFR 122)

The purpose of the regulations is to detail the regulatory requirements under which a permittee must operate a facility to remain in compliance.

3. According to 40 CFR 122.44 of the NPDES regulations, permits must include numerous conditions. List three examples of these conditions. (40 CFR 122.44)

The student's answer should include any three of the choices listed below:

- a. *Technology-based effluent limitations*
- b. *Water quality-based standards*
- c. *Toxic pollutant limitations*
- d. *Notification levels*
- e. *24-hour reporting requirements*
- f. *Monitoring requirements*
- g. *Pretreatment program requirements for POTWs*
- h. *Other conditions listed in 40 CFR 122.44*

4. List two basic purposes of NPDES inspections. (Manual, Chapter 1C, page 1-9)

The student's answer should include any two of the choices listed below:

- a. To determine the reliability of self-monitoring data*
- b. To evaluate compliance with permit conditions, applicable regulations, and other requirements*
- c. To gather information for enforcement case support and permit development*

5. Information from a permitted facility that has been classified as confidential may never be withheld from an inspector. (Overview module, Chapter 3, page 3-2)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

6. Describe what a CSI focuses on. (Manual, Chapter 1A, page 1-1; Overview module, Chapter 2, page 2-3)

The CSI includes all functions of a CEI (i.e., it verifies a permittee's compliance with NPDES permit self-monitoring requirements, effluent limits, and compliance schedule conditions) and also involves sampling the effluent (to assess compliance with the facility's permit requirements, to verify the accuracy of the permittee's self-monitoring program, including records and reports, and to provide evidence for enforcement proceedings).

7. A DI usually results in the issuance of a Administrative Order to conduct a detailed analysis to correct the identified problem(s). (Overview module, Chapter 2, page 2-3)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

8. List the six activities commonly involved in NPDES inspections (Manual, Chapter 1C, pages 1-9 through 1-10.)

- a. Pre-inspection preparation*
- b. Entry*
- c. Opening conference*
- d. Facility inspection*
- e. Closing conference*
- f. Inspection report*

UNIT TWO

INSPECTION PROCEDURES

Section 308 of the CWA and NPDES regulations provide the general authority and limitations for inspections. The terms and conditions of the NPDES permit, however, more precisely define the authority to inspect a permitted facility. The scope of an NPDES inspection can be complex and will vary from facility to facility. However, inspection procedures and guidelines have been established for those elements common to all inspections. Unit Two of this Guide corresponds to Chapter 2 of the Manual, EPA's 1990 *NPDES Compliance Monitoring Inspector Training Overview* module, and EPA's 1990 *NPDES Compliance Monitoring Inspector Training Legal Issues* module. Chapter 2 is divided into the following six exercises:

- Planning and preparing for an inspection
- Entering the facility
- Conducting the opening conference
- Ensuring appropriate documentation
- Conducting the closing conference
- Preparing the inspection report.

EXERCISE 2-1	PLANNING AND PREPARING FOR AN INSPECTION	2 HOURS
<p>Proper planning and preparation are necessary to ensure that an inspection is conducted smoothly, efficiently, and professionally. This exercise is designed to focus on the procedures involved in the preinspection process.</p> <ol style="list-style-type: none">1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.2. Read Chapter 2A and Appendix B of the Manual; review Chapter 4 and Appendices E through F of the <i>NPDES Compliance Monitoring Inspector Training Overview</i> module; and read Chapters 1 through 5 and Appendix B of the <i>NPDES Compliance Monitoring Inspector Training Legal Issues</i> module.3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. Explain how facilities are selected for inspections. (Overview module, Appendix E; Legal Issues module, Chapter 4, pages 4-1 through 4-2).

The two processes for selecting a facility for inspection are the Neutral Inspection Plan and inspections based on evidence of an existing violation. The former is an attempt at choosing facilities based on objective, administrative/resource criteria, such as the amount of time since the last inspection or geographical proximity to another facility high on the inspection priority list. Facilities showing evidence of violation from Discharge Monitoring Reports (DMRs), citizen complaints, or other sources are ranked separately from the routine inspections.

2. List five sources of legal authority. (Legal Issues module, Chapter 1, page 1-3)

- a. *United States Constitution*
- b. *Legislative acts passed by Congress*
- c. *Common law principles and legal precedents established by court decisions*
- d. *Regulations adopted by Government agencies*
- e. *Court decisions interpreting the first four sources of legal authority*

3. EPA inspectors may visit a facility which has not been issued an NPDES permit. (Legal Issues module, Chapter 3, page 3-1)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, please make changes to correct it.)

4. List five sources of evidence regarding specific violations. (Legal Issues module, Chapter 4, page 4-2)

- a. *DMRs*
- b. *Citizen complaints*
- c. *Observations during emergency situations*
- d. *Follow-up to previous inspections*
- e. *Specific inspections for enforcement case support*

5. Routine inspections should not be targeted at facilities in litigation with EPA. (Legal Issues module, Chapter 4, pages 4-1 through 4-2)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

6. Describe how facilities may be notified of an impending inspection. (Manual, Chapter 2A, page 2-6; Overview module, Chapter 4, page 4-4; Legal Issues module, Chapter 4, page 4-2)

Inspectors can send a 308 letter or phone the facility but should not contact the facility if an unannounced inspection is scheduled.

-
7. List three goals of reviewing facility background information prior to an inspection. (Manual, Chapter 2A, page 2-1)

The student's answer should include three of the choices listed below:

- a. Familiarize inspectors with facility operations*
- b. Conduct a timely inspection*
- c. Minimize inconvenience to the facility by not requesting data already provided*
- d. Conduct a thorough and efficient inspection*
- e. Clarify technical and legal issues before entry*
- f. Develop a factual and sound inspection report*

8. List three sources of facility background information. (Manual, Chapter 2A, pages 2-4 through 2-5)

The student's answer should include three of the choices listed below:

- a. Previous inspections*
- b. Laws and regulations*
- c. Permits and permit applications*
- d. Regional and State files and personnel*
- e. Technical reports, documents, and references*
- f. Other statutory requirements*

9. Explain how an inspector may determine what equipment and supplies might be needed during an inspection. (Manual, Chapter 2A, pages 2-6 through 2-8; Overview module, Appendix F)

The facility's response to the 308 letter, if sent, may include a description of any safety equipment and procedures specific to that facility. Otherwise, the inspector could phone the facility to obtain information on required safety equipment. Sampling equipment needed will depend on the facility being inspected and the types of sampling to be performed. Table 2-1 of the Manual and Appendix F of the Overview module list equipment that may be needed.

10. List components or facets of an inspection that should be addressed during development of an inspection plan. (Manual, Chapter 2A, pages 2-5 through 2-6)

- a. Inspection objectives*
- b. Tasks to be conducted*
- c. Procedures to be used*
- d. Personnel and equipment needed*

*e. Inspection schedule and time requirements**f. Coordination with laboratories or other regulatory agencies*

11. Claims of confidentiality must be asserted at the time of the inspection or they will be considered waived by the permittee. (Legal Issues module, Chapter 4, page 4-3)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

A business may assert a claim of confidentiality at any time, according to 40 CFR 2.203(c).

12. The procedures for handling claims of confidentiality are set out in **40 CFR Part 2**. (Legal Issues module, Chapter 4, page 4-4)
13. Inspectors should sign confidentiality or secrecy agreements if entry will be otherwise denied by the facility. (Legal Issues module, Chapter 4, page 4-5)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Inspectors should never sign confidentiality or secrecy agreements.

14. Unauthorized disclosure of confidential information is a criminal offense. (Legal Issues module, Chapter 4, page 4-6)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

15. The types of sampling which the inspector may undertake at the facility is determined by the terms and conditions of the permit. (Legal Issues module, Chapter 5, page 5-2)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

For enforcement purposes.

EXERCISE 2-2**ENTERING THE FACILITY****45 MINUTES**

Specific procedures for entering a facility have been established and must be followed by inspectors at all times. It is imperative that inspectors understand these procedures and their legal ramifications. Inspectors should be aware that enforcement proceedings against a facility may be hindered if inspectors fail to follow required procedures. This exercise focuses on entering a facility to conduct an inspection.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 2B and Appendix C of the Manual and Chapters 6 and 7 of the *NPDES Compliance Monitoring Inspector Training Legal Issues* module.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. Describe the legal authority for an inspector's entry into a facility. (Manual, Chapter 2B, page 2-9)

Legal authority for entry is in Section 308(a)(4)(B) of the CWA, which states that an authorized representative of the Administrator has the right to enter any facility in which an effluent source is located or in which any records are maintained. The inspector must first show his/her credentials, and then s/he has the right to inspect the facility, sample the wastewater, and have access to (and copy) any records.

2. State when and why an inspector's credentials need to be presented to facility officials. (Manual, Chapter 2B, page 2-9; Legal Issues module, Chapter 6, page 6-1)

Credentials need to be presented to facility officials as soon as the officials have been identified and introduced, whether requested or not. They indicate that the holder is a lawful representative of the regulatory agency and is authorized to perform NPDES inspections.

3. Explain how an inspector might overcome initial reluctance on the part of a facility official to give consent to an inspector. (Manual, Chapter 2B, page 2-10; Legal Issues module, Chapter 6, page 6-3)

If consent is denied, the inspector can try diplomacy, ask why consent is being denied, attempt to overcome misunderstandings, and provide Section 308 of the CWA to industry representatives.

4. Generally, inspections must occur during a facility's business hours. (Legal Issues module, Chapter 6, page 6-1)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

5. If the facility refuses entry to an inspector, it becomes subject to civil penalties for violating its permit. (Legal Issues module, Chapter 6, page 6-3)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

The Supreme Court ruled that no sanction may be imposed upon an owner who declines to consent to inspection.

6. Summarize the procedures to be followed if entry to a facility is denied. (Manual, Chapter 2B, page 2-11; Legal Issues module, Chapter 6, page 6-3)

The inspector should: ensure that credentials are presented properly to the facility owner or agent in charge; ask why entry is not granted; withdraw from the premises if access is still denied and contact his/her supervisor; and carefully note all observations and details of denial.

7. List two things an inspector should NEVER do if entry is denied. (Manual, Chapter 2B, pages 2-11 through 2-12; Legal Issues module, Chapter 6, page 6-3)

a. *Never discuss potential penalties or threaten the industry officials*

b. *Never behave in an unprofessional or impolite manner*

8. Once consent is given, it cannot be withdrawn, and an inspector does not have to halt an inspection. (Manual, Chapter 2B, page 2-12; Legal Issues module, Chapter 6, page 6-3)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

The permittee may withdraw consent at any time during the inspection.

9. Describe the actions that an inspector should take if consent to conduct a facility inspection is withdrawn during such an inspection. (Manual, Chapter 2B, page 2-12)

If consent is withdrawn during an inspection, the inspector should leave the premises, following the procedures for denial of entry. Because all evidence collected before denial is useful, the inspector should not leave it behind. Also, the inspector should not leave equipment or personal possessions behind.

10. Explain the purpose of a warrant. (Manual, Chapter 2B, page 2-12; Legal Issues module, Chapter 7, page 7-1)

A search warrant is sometimes necessary to gain access to a facility if consent is denied; this constitutes judicial authorization for entry to inspect specific portions and functions of a facility.

11. List the three grounds for obtaining a search warrant are. (Legal Issues module, Chapter 7, page 7-1)

a. *Criminal probable cause*

b. *Civil probable cause*

c. *Administrative probable cause.*

12. To obtain a search warrant, an affidavit, indicating the grounds for issuance of the warrant, will also have to be signed. (Legal Issues module, Chapter 7, page 7-3)
13. A criminal conviction requires the permitting authority to demonstrate evidence which is beyond a reasonable doubt. (Legal Issues module, Chapter 7, page 7-6)

EXERCISE 2-3**CONDUCTING THE OPENING CONFERENCE****15 MINUTES**

The intent of an opening conference is to provide facility officials with a clear understanding of the authority, purpose, and scope of the inspection to be conducted. The opening conference also provides the inspector with the opportunity to carry out administrative duties. This exercise focuses on the components of an inspection's opening conference.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 2C of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List three considerations that should be discussed during an opening conference to prevent misunderstandings and assist facility personnel during an inspection. (Manual, Chapter 2C, pages 2-13 through 2-15)

The student's answer should include three of the choices listed below:

- a. *Inspection objectives*
- b. *Meeting and inspection schedules*
- c. *List of records required*
- e. *Accompaniment during the inspection*
- f. *Permit verification*
- g. *Safety requirements*
- h. *New requirements*
- i. *Split samples*

EXERCISE 2-4	DOCUMENTATION	2 HOURS
<p>One basic responsibility of an inspector is documentation of the actual conditions existing at the time of the inspection. Documentation is the basis on which EPA builds a case to prosecute violations of the CWA. It is imperative that all documentation be developed in accordance with established procedures to ensure its accuracy and objectivity. This exercise focuses on the components of documenting an inspection.</p> <ol style="list-style-type: none"> 1. Read through the study checklist. Test your background knowledge by responding to as many items as possible. 2. Read Chapter 2D of the Manual and Chapters 8 through 12 of the <i>NPDES Compliance Monitoring Inspector Training Legal Issues</i> module. 3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise. 		

Study Checklist At the end of this exercise, you should be able to:

1. Explain the purpose of the field notebook and list the types of information to be entered in it. (Manual, Chapter 2D, pages 2-17 through 2-18)

The field notebook is the documentary support of discrepancies uncovered during an inspection. It serves to "freeze" the existing conditions for later review by compliance personnel. It should be objective, accurate, complete, written in permanent ink, and bound. The notebook may become an important part of the evidence entered in court actions against the facility, and it also becomes part of EPA's files. It should include a detailed record of the inspection, samples collected, observations, documents and photographs, unusual conditions and problems, and general information including personnel names, titles, and any statements they provide.

2. Summarize the procedures for documenting a suspected violation by means of the items listed below. (Manual, Chapter 2D, pages 2-18 through 2-22; Legal Issues module, Chapter 8, pages 8-1 through 8-2)

- a. Statement from witnesses

An inspector can obtain a formal statement from a person who has firsthand knowledge of facts pertinent to a potential violation. The statement should be signed and dated by the person providing it, and can be admissible as evidence. The inspectors should determine the need for a statement, ascertain the facts, use active voice as s/he recites the statement, positively identify the person, and have them read, verify, and sign it.

- b. Photographs

An inspector should obtain permission for taking photographs, avoid confrontations about photographing inspections, use a single-lens reflex camera, and carefully document photographs in a log in the field notebook (noting time, date, location, view, weather conditions, and description). Once developed, photos should be numbered and the photographer should sign them.

c. Video tapes

An inspector should obtain permission to videotape, add narrative of the inspection, and take written notes as back-up in case of mechanical problems.

d. Drawings and maps

An inspector's schematic diagrams of site location, etc., should be simple and should include scale, title, date, and signature.

e. Printed matter

All printed matter collected during the inspection should be identified with the date and the inspector's initials and origin.

f. Mechanical recordings

Electronic records can be used as evidence. Hard copy documents produced from computer output should be obtained and treated like other documentation.

3. Describe standard procedures for copying and identifying records. (Manual, Chapter 2D, pages 2-22 through 2-24)

Copies can be made onsite using portable photocopiers or the facility's copier. The inspector can pay for the copies if requested. All copies should be initialed and dated for identification purposes. Close-up photos can replace photocopies, if necessary. To ensure admissibility as court evidence, copies must be initialed, dated, tagged with the facility name, and logged into the field notebook. Documents showing suspected violations should be assigned an identifying number and marked with the number. The number should be entered into the notebook. The notebook should contain the reason for copying the material, the source of the record, and the manner of collection.

4. Use of documentation as evidence in court is one reason why standard procedures are important when documenting inspection findings. Assume you are called to the witness stand to testify regarding an inspection conducted the previous year and are asked to identify a particular record. Describe how you would prove when, why, and by whom the record was examined. (Manual, Chapter 2D, pages 2-22 through 2-24)

A particular record can be identified by the inspector later because the inspector initialed, dated, and logged the document in the field notebook at the time of the inspection. The log should include the reason for copying the material, the source of the document, and how it was collected.

5. Describe how information can be claimed as confidential by the permittee. (Manual, Chapter 2D, page 2-24)

A permittee can claim information as confidential under Section 308(b)(2) of the CWA. The permittee must request the EPA Administrator to consider the information confidential and demonstrate how disclosure would divulge trade secrets. This cannot prevent the inspector from reviewing the information; it only protects the permittee from public disclosure.

6. Explain what security measures should be taken to safeguard inspection data or information that a permittee satisfactorily claims as confidential. (Manual, Chapter 2D, page 2-25)

Security measures for confidential information should include marking the information as confidential and keeping the information locked in a filing cabinet or safe immediately after the inspection is completed. A

chain-of-custody record must be maintained. While traveling, the information should be kept in the physical possession of the inspector (out of view of others) in a locked briefcase or in a locked motel room or car trunk. In the office, the information should be accessible only to authorized personnel, and an access log should be maintained.

7. Explain the policies regarding the discussion of deficiencies and violations identified during an inspection with facility officials. (Manual, Chapter 2D, page 2-24)

It is permissible to discuss self-monitoring procedure deficiencies and the required corrective action. Information which indicates criminal or civil violations should not be discussed. If an enforcement action may be required, no information should be disclosed before consulting with the attorney in the Regional office.

8. Log books can be used to refresh the inspector's memory in the event s/he is called on to be a witness in an enforcement action. (Legal Issues module, Chapter 10, page 10-3)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

9. If the inspector believes s/he has made an error in testifying, the error should be announced or corrected as soon as possible. (Legal Issues module, Chapter 10, page 10-3)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

EXERCISE 2-5	CONDUCTING THE CLOSING CONFERENCE	15 MINUTES
<p>A final meeting with facility officials will enable the inspector to "wrap up" the inspection and will allow questions to be answered and information gaps to be closed. This exercise focuses on the components of an inspection's closing conference.</p> <ol style="list-style-type: none">1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.2. Read Chapter 2E and Appendix D of the Manual.3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. List two topics an inspector should generally refrain from discussing with facility officials. (Manual, Chapter 2E, page 2-27)
 - a. *Don't discuss compliance status or enforcement consequences*
 - b. *Don't recommend particular consultants*
2. Explain the purpose of a Deficiency Notice. (Manual, Chapter 2E, pages 2-27 through 2-28)

A Deficiency Notice is used to promptly communicate problems with a permittee's self-monitoring program. It provides a swift and simple method for improving the quality of data from self-monitoring activities.
3. List five areas of a permittee's self-monitoring program that an inspector may address in a Deficiency Notice if problems are identified during an inspection. (Manual, Chapter 2E, page 2-28)

The student's answer should include five of the choices listed below:

- a. *Monitoring location*
- b. *Flow measurement*
- c. *Sample collection/holding time*
- d. *Sample preservation*
- e. *Test procedures*
- f. *Recordkeeping*
- g. *Other self-monitoring deficiencies*

EXERCISE 2-6**PREPARING THE INSPECTION REPORT****30 MINUTES**

Information gathered during an inspection must be organized and arranged in a manner that will allow case proceedings personnel to develop a sound evidence package. The inspection report, if properly prepared, will serve as the basis for this evidence. This exercise focuses on how to prepare an inspection report.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 2F and Appendix E of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. State the objective of an inspection report. (Manual, Chapter 2F, page 2-29)

The inspection report serves to organize all inspection information and evidence into a comprehensive, useful document.

2. List the four basic elements of an inspection report. (Manual, Chapter 2F, page 2-30)

a. NPDES Compliance Inspection Report Form

b. Supplementary narrative information

c. Copies of completed checklists

d. Documentary support

3. Describe the purpose of a narrative report and the steps that should be followed to prepare a narrative report. (Manual, Chapter 2F, pages 2-30 through 2-31)

A narrative report provides a concise, factual summary of observations and inspection activities and is supported by specific references to accompanying support documentation. To prepare a narrative report, the inspector should review the information gathered during the inspection, organize the material logically, and reference support documentation. The report should be written logically, simply, and concisely. Paragraphs should be brief and to the point. The active voice should be used, and repetition should be avoided.

4. Explain the inspector's responsibility relative to the Permit Compliance System (PCS). (Manual, Chapter 2F, page 2-31)

The inspector should ensure that all data listed in Section A of the NPDES Compliance Inspection Report Form 3560-3 are entered into PCS so the inspection is credited to the program. Data should be entered within 30 days of the inspection.

UNIT 2	EXAM	30 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time limit listed above.3. Verify the answers with your instructor.4. Correct any errors and clarify problems or questions before proceeding to Unit 3.		

Exam Questions and Answers

1. Official credentials must always be presented whether or not identification is requested by facility officials. (Manual, Chapter 2B, page 2-9)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

2. Authority to inspect under the CWA is granted by Section 304. (Manual, Chapter 2B, page 2-9; Overview module, Chapter 1, page 1-1)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Section 308(a) provides the authority to inspect.

3. An inspector must secure the expressed consent of the agent in charge of the facility before entering. (Manual, Chapter 2B, page 2-10)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Expressed consent is not necessary; absence of expressed denial constitutes consent.

4. If entry to a facility is denied for any reason, or if consent to inspect is withdrawn during an inspection, the inspector should follow the denial of entry procedures which state that the inspector: (Manual, Chapter 2B, page 2-11)

a. Should talk with officials to see if obstacles (such as misunderstandings) can be overcome

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

b. May suggest that facility officials contact their attorneys to clarify the situation

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

- c. Should explain to facility officials the penalties under the CWA regarding refusal to allow entry
- TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)
- Penalties should not be discussed.*
- d. Should write down all observations regarding the incident, including any reasonable suspicions about the reasons for denial of entry
- TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)
5. Once an inspector is granted access to the facility, s/he, without additional consent from facility officials, has the authority to: (Manual, Chapter 2B, page 2-9)
- a. Observe the source of discharges
- TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)
- b. Sample the effluent
- TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)
- c. Read and copy facility records
- TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)
- d. Inspect the monitoring equipment and observe self-monitoring procedures
- TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)
6. List five types of information about the facility the inspector should obtain prior to an inspection. (Manual, Chapter 2A; Overview module, Chapter 4, pages 4-2 through 4-3)
- a. *General facility information*
- b. *Requirements, regulations, and limitations*
- c. *Pollution control and treatment systems*
- d. *Facility compliance and enforcement history*
- e. *Pretreatment information*
7. Describe the legal requirement an inspector must meet immediately on arrival at the facility. (Manual, Chapter 2B, page 2-9)

The inspector must present official credentials.

8. What information should be recorded in the inspector's field notebook? (Circle correct answer.) (Manual, Chapter 2D, page 2-17)

f. All of the above.

9. Of the following two items, which one best illustrates the type of information that should be included in a statement used to document an alleged violation? (Circle correct answer.) (Manual, Chapter 2D, pages 2-18 through 2-19)

a. "It's common knowledge that they're dumping toxic chemicals illegally. You can see the trucks going by every day."

b. "My boss told me to take a load of drums and keep them out in the back. Some of the drums were marked 'hazardous'."

Explain why.

Statement b is objective, factual, and relates to a specific incident so it should be used.

10. Describe how photographs taken during an inspection should be identified. (Manual, Chapter 2D, page 2-19)

As photos are taken, they should be logged into the inspector's field notebook with detailed information on subject, date, location, time, and other descriptive details. When the film is developed, photos should be numbered and the photographer should sign them. The other information may also be transferred to the back of the photograph.

11. Specific procedures have been developed to ensure that all inspection data received as confidential are protected while in the custody of the inspector. Which of the following activities are not in accordance with these procedures for handling confidential inspection data? (Circle the correct answer.) (Manual, Chapter 2D, page 2-25)

d. Carrying inspection data while inspecting another facility.

12. The inspection report is a comprehensive collection of information designed to support enforcement personnel in preparing for legal action. The information in the report must, above all, be complete and accurate. List three other requirements of an inspection report. (Manual, Chapter 2F, page 2-29)

The student's answer should include three of the choices listed below:

a. Relevant

b. Factual

c. Comprehensive

d. Coordinated

e. Objective

f. Nonspeculative

g. Logical

- h. Concise*
- i. Clear*
- j. Neat*
- k. Legible*

UNIT THREE

DOCUMENTATION/RECORD KEEPING AND REPORTING

The NPDES permit program requires permittees to maintain records and report periodically on the quantity and character of the waste in their wastestreams. Section 308 of the CWA authorizes inspection of required records and reports. The NPDES inspector must be familiar with the purpose of, and procedures for, inspecting records. Unit Three is based on Chapter 3 of the Manual. The unit is comprised of two exercises:

- Inspection authority and evaluation procedures for facility record reviews
- Summary/review (optional).

EXERCISE 3-1	INSPECTION AUTHORITY AND EVALUATION PROCEDURES FOR FACILITY RECORD REVIEWS	1 HOUR
<p>A review of a facility's records determines whether record-keeping and reporting requirements stipulated in the permit are being met. This review is an important part of an NPDES inspection. Careful examination of the data often indicate violations of record-keeping and reporting requirements as well as of other permit violations. This exercise focuses on inspection authorities and evaluation procedures for facility record reviews.</p> <ol style="list-style-type: none">1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.2. Read Chapter 3 of the Manual and watch the video <i>Conducting a Records Inspection</i>.3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. State the primary objective of a records inspection. (Manual, Chapter 3A, page 3-1, Video)

The primary objective of a records inspection is to determine compliance with records maintenance and reporting requirements in the NPDES permit. Another objective is to determine if records are complete and data is properly reported.

2. A permittee's required recordkeeping requirements are contained in its NPDES permit. (Manual, Chapter 3A, page 3-1, Video)
3. As part of the pre-inspection preparation, the inspector should review the facility's Discharge Monitoring Reports to determine the facility's compliance history and to detect irregularities in sampling results. (Video)

4. List three items contained in a facility's permit that should be verified during the opening conference or walk-through inspection. (Manual, Chapter 3B, page 3-3)

The student's answer should include any three of the choices listed below:

- a. All discharges are in accordance with the general provisions of the permit (e.g., no noxious odors, no invisible solids in the discharge, and no fish or vegetation kills near the outfalls)*
 - b. Correct name and address of facility*
 - c. Correct name and location of receiving waters*
 - d. Number and location of discharge points*
 - e. Principal products and production rates (where appropriate)*
5. List at least five types of data or records that should be reviewed during the inspection to ensure retention for the minimum required period of time. (Manual, Chapter 3B, pages 3-3 through 3-4, Video)

The student's answer should include any five of the choices listed below:

- a. Sampling and analysis data*
 - b. Monitoring records*
 - c. Laboratory records*
 - d. Facility operating records*
 - e. Treatment plant records*
 - f. Management records*
 - g. Pretreatment records*
 - h. Spill Prevention Control and Countermeasure (SPCC) plan*
 - i. Best Management Practices (BMP) information*
6. List four items the inspector should verify when reviewing sampling and analytical data to ensure that the facility followed proper procedures. (Video)

The student's answer should include four of the choices listed below:

- a. Sampling and analysis is conducted in accordance with permit requirements and 40 CFR Part 136*
- b. All monitoring results are reported*
- c. Proper sample types are collected*
- d. Samples are properly preserved*

- e. Samples are collected at the appropriate location*
 - f. Chain-of-custody forms are maintained*
 - g. Samples are analyzed within allowable holding times*
 - h. Sampling and laboratory equipment is properly calibrated and maintained*
7. To identify any discrepancies or errors in reporting sampling and analytical data, the inspector should compare results on the DMRs to the facility's raw data or bench sheets. (Video)
8. Explain when a compliance schedule status review should be conducted, and provide at least three reasons why it should be conducted. (Manual, Chapter 3B, pages 3-5 through 3-6)

A compliance schedule status review should be conducted if the discharger is on a compliance schedule to determine: whether the permittee is conforming to the compliance schedule, and if not, whether final requirements will be achieved on time; the accuracy of the reports relating to compliance schedules; the length of delay associated with a construction violation; whether any schedule violations are beyond the control of the discharger; and whether requests for permit modifications are valid.

9. Summarize (for each of the following components) the elements that should be reviewed by an inspector during evaluation of a permittee's ability to meet its compliance schedule deadline. (Manual, Chapter 3B, pages 3-6 through 3-7)

- a. Construction progress

Review documents to determine whether contracts for labor and material have been fulfilled and whether the permittee or the permittee's engineering consultant is monitoring progress.

- b. Construction contract and equipment orders

Review documents to determine if the permittee has obtained approval to start construction. Note the start and completion dates or schedule delivery dates in service or equipment contracts.

- c. Authorization and financing

Determine if the permittee has the authority and funds to complete the required structures.

- d. Attainment of operational status.

If construction is complete but facility is not yet operational, determine whether the appropriate procedures are being used to ensure working status at the earliest possible date. Verify initiation of self-monitoring procedures and establishment of adequate record-keeping procedures and adequate work schedules/assignments.

10. Summarize the procedures for conducting a review of POTW pretreatment program requirements. (Manual, Chapter 3B, pages 3-7 through 3-8)

In a review of the POTW pretreatment program, the inspector must determine the POTW's compliance with its approved pretreatment program and regulations and collect information on contributing industries, discharge permits, inspection and sampling activities, and enforcement.

11. Describe when an in-depth investigation of permittee records should be conducted. (Manual, Chapter 3B, page 3-8)

An in-depth inspection of records is necessary to substantiate a suspected violation, to verify self-monitoring data for use as evidence in an enforcement action, or to confirm sampling analyses or reporting discrepancies discovered during a limited inspection.

12. List at least five procedures that should be followed while conducting an in-depth investigation. (Manual, Chapter 3B, pages 3-8 through 3-9)

The student's answer should include five of the choices listed below:

- a. Determine investigation objective*
- b. Determine information needed*
- c. Determine data source*
- d. Review inspection authority*
- e. Inspect direct and indirect data sources*
- f. Take statements from qualified facility personnel*
- g. Prepare documentation*
- h. Follow confidentiality procedures*

EXERCISE 3-2**SUMMARY/REVIEW (OPTIONAL)****15 MINUTES**

This is an optional exercise which summarizes and reviews Chapter 3 of the Manual on record keeping and reporting.

1. Read the statements below describing a situation an inspector may face during an inspection. In the space provided, respond to each statement, explaining how you would proceed to evaluate and document the situation. Refer to Chapter 3 of the Manual as necessary.
2. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to respond to these situations:

1. During an inspection of a permittee's records, it is discovered that records of laboratory equipment calibration, required by the permit, have not been kept for the past 6 months. Respond to this situation. (Manual, Chapter 3B)

The inspector should document the inadequacy, try to get a statement from the laboratory manager or other responsible official, and evaluate whether an in-depth investigation is necessary.

2. During a review of POTW pretreatment requirements, the POTW is unable to produce a list of contributory Industrial Users (IUs). Respond to this situation. (Manual, Chapter 3B)

The inspector should document the problem, review related sources (i.e., industrial files) to evaluate the extent of the problem, try to get a statement from the responsible official, and evaluate whether an in-depth investigation is needed.

UNIT 3	EXAM	15 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time limit listed above.3. Verify the answers with your instructor.4. Correct any errors and clarify questions or problems before proceeding to Unit 4.		

Exam Questions and Answers

1. List at least five types of records generally verified during a facility inspection. (Manual, Chapter 3B, page 3-3 through 3-5)

The student's answer should include five of the choices listed below:

- a. *Sampling and analysis data*
 - b. *Monitoring records*
 - c. *Laboratory records*
 - d. *Facility operating records*
 - e. *Treatment plant records*
 - f. *BMP programs*
 - g. *Management records*
 - h. *Pretreatment records*
 - i. *SPCC plans*
2. Authority to require that certain records be kept by permittees comes from the CWA in Sections 308 and 402. (Manual, Chapter 3A, page 3-1)
 3. Routine record-keeping and reporting evaluations are conducted at all permittee facilities. Provide an example of when an in-depth investigation of records would be warranted. (Manual, Chapter 3B, page 3-8)

The student's answer should include one of the choices listed below:

- a. *To substantiate a suspected violation*
- b. *To verify self-monitoring data that may be used as corroborative evidence in an enforcement action*
- c. *To confirm apparent sampling, analysis, or reporting warrant*

4. List three actions of a permittee's compliance schedule covered by compliance schedule status reviews. (Manual, Chapter 3B, pages 3-6 through 3-7)

The student's answer should include three of the choices listed below:

- a. Construction progress*
- b. Construction contract and equipment orders*
- c. Authorization and financing*
- d. Attainment of operational status*
- e. POTW pretreatment program implementation*

UNIT FOUR

FACILITY SITE REVIEW

The objective of a facility site review is to examine the permittee's physical and operational plant functions for compliance with permit conditions and effluent limitations. To carry out this responsibility, inspectors must have a thorough understanding of each treatment process in the facility and how each process fits into the overall treatment scheme. The success of a facility site review will depend on the inspector's ability to identify problem areas that will affect the performance of the treatment facility. Unit Four corresponds to Chapter 4 of the Manual and several other EPA documents. Topics covered in the three exercises contained in this unit include:

- Physical inspection of the facility
- Operation and Maintenance (O&M) evaluation
- Summary of treatment units and operations that should be inspected (optional).

EXERCISE 4-1	PHYSICAL INSPECTION OF THE FACILITY	1 HOUR
<p>To carry out their duties effectively, inspectors must be thoroughly familiar with the physical aspects of a treatment facility. This exercise is designed to review the primary indications of noncompliance at a treatment facility.</p> <ol style="list-style-type: none">1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.2. Read Chapters 4A and 4B of the Manual. For additional information, review EPA's 1978 <i>Field Manual for Performance Evaluation and Trouble-Shooting at Municipal Wastewater Treatment Facilities</i>, MO No. 16, EPA 430/9-78-001.3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. List four objectives of the facility site review. (Manual, Chapter 4A, page 4-1)
 - a. *Assess the conditions of the facility's current treatment processes and operations*
 - b. *Evaluate the permittee's O&M activities*
 - c. *Check the completeness and accuracy of the permittee's performance/compliance records*
 - d. *Determine if the treatment units are achieving the required treatment efficiencies*

2. List four areas that should be covered in the walk-through. (Manual, Chapter 4B, page 4-3)

The student's answer should include four of the choices listed below:

- a. Influent characteristics*
- b. Process control*
- c. Unit operations*
- d. Equipment condition*
- e. Maintenance and operation staff*
- f. Safety controls and equipment*
- g. Effluent characteristics*
- h. Other conditions particular to the plant*

3. List five problem indicators associated with chemical treatment units. (Manual, Chapter 4B, page 4-13)

The student's answer should include five of the choices listed below:

- a. Evidence of heavy corrosion*
- b. No portion-measuring device at the feed unit*
- c. pH measurement not evident at the pH adjustment tank*
- d. Chemicals left open to the atmosphere*
- e. Chemicals outdated*
- f. Chemical containers stored improperly or hazardously*
- g. Chemical tank cars stored, moved, or handled improperly*
- h. Dry chemicals spilled on the floor*
- i. Improper disposal of empty containers*
- j. Large containers handled improperly*
- k. Container transfer equipment not maintained*
- l. Inappropriately sized berms or dikes at liquid chemical feed units or storage and transfer areas*
- m. Use of inappropriate coagulant*
- n. Glass carboys stored or handled improperly*

- o. Inadequate supply of chemicals*
 - p. Chemical dust covering feed unit, storage, or transfer areas*
4. List five problem indicators associated with primary clarifiers and five problem indicators associated with secondary clarifiers. (Manual, Chapter 4B, pages 4-6 and 4-7)

The student's answer should include five of the choices listed below:

Primary clarifiers

- a. Excessive gas bubbles or grease on surface*
- b. Black or odorous wastewater*
- c. Poor suspended solids removal in the primary clarifier*
- d. Excessive build-up of solids in the center well of circular clarifier*
- e. Discharge weirs unlevel*
- f. Fouling of overflow weirs*
- g. Evidence of short circuiting*
- h. Scum rake ineffective*
- i. Scum overflow or lack of adequate scum disposal (i.e., scum pit full)*
- j. Excessive floating sludge*
- k. Excessive sludge on bottom*
- l. Noisy sludge scraper drive*
- m. Broken sludge scraper*

The student's answer should include five of the choices listed below:

Secondary clarifiers

- a. Excessive gas bubbles on surface*
- b. Fouling of overflow weirs*
- c. Overflow weirs unlevel*
- d. Evidence of short circuiting*
- e. Excessive build-up of solids in the center well of the circular clarifier*
- f. Deflocculation in clarifier*

- g. Pin floc in overflow*
- h. Scum rake ineffective*
- i. Sludge floating to the surface*
- j. Billowing sludge*
- k. Sludge blanket too high*
- l. Sludge withdrawal ports on secondary clarifier clogged*

5. List four problem indicators associated with trickling filters. (Manual, Chapter 4B, page 4-6)

The student's answer should include four of the choices listed below:

- a. Trickling filter ponding (indicating clogged media)*
- b. Leak at the center column of the trickling filter's distribution arms*
- c. Uneven distribution of flow on trickling-filter surface*
- d. Uneven or discolored growth*
- e. Excessive sloughing of growth*
- f. Odor*
- g. Clogging of trickling filter's distribution arms*
- h. Restricted rotation of distribution arms*
- i. Filter flies, worms, or snails*
- j. Ice build-up on trickling-filter media or distribution arms*

6. List five problem indicators associated with a filtration unit (i.e., an advanced physical treatment system). (Manual, Chapter 4B, page 4-8)

The student's answer should include five of the choices listed below:

- a. Filter surface clogging*
- b. Short filter run*
- c. Gravel displacement of filter media*
- d. Formation of mud balls in filter media*
- e. Air binding of filter media*

- f. Loss of filter media during backwashing*
 - g. Recycled filter-backwash water in excess of 5 percent*
7. List four problem indicators for chlorination units and four problem indicators for dechlorination units. (Manual, Chapter 4B, page 4-9)

The student's answer should include four of the choices listed below:

Chlorination units

- a. Sludge build-up in contact chamber*
- b. Gas bubbles*
- c. Inadequate retention time*
- d. Floating scum and/or solids*
- e. Evidence of short circuiting*
- f. Inadequate ventilation of chlorine feeding room and storage area*
- g. High temperature in chlorination rooms*
- h. Improper operation of automatic feed or feedback control*
- i. Excessive foaming downstream*
- j. Evidence of toxicity downstream (i.e., dead fish)*
- k. Improper chlorine feeding, storage, and reserve supply*

The student's answer should include four of the choices listed below:

Dechlorination units

- a. Improper storage of sulfur dioxide cylinders*
- b. Inadequate ventilation of sulfur dioxide feeding room*
- c. Problems with operation of automatic sulfur dioxide feed or feedback control*
- d. Depressed Dissolved Oxygen (DO) after dechlorination*
- e. Improper storage and mixture of sodium metabisulfite containers*
- f. Reduced efficiency of activated carbon dechlorination units from organic and inorganic compound interference*

8. List three problem indicators for polishing ponds or tanks. (Manual, Chapter 4B, page 4-12)
- a. Objectionable odor, excessive foam, floating solids, or oil sheens in polishing ponds or tanks*
 - b. Solids or scum accumulation in the tank or at the side of the pond*
 - c. Evidence of bypasses because of low capacity*
9. List three general problem indicators that may be found during an inspection of sludge-handling facilities and four problem indicators that may be identified during inspection of sludge-disposal processes. (Manual, Chapter 4B, pages 4-9 through 4-12)

The student's answer should include three of the choices listed below:

Sludge Handling

- a. Inadequate sludge removal from clarifiers or thickeners*
- b. Poor dewatering characteristics of thermal-treated sludge*
- c. Thickened sludge too thin*
- d. Fouling of overflow weirs on gravity thickeners*
- e. Air-flotation skimmer blade binding on beaching plate*
- f. Substantial down time of heat treatment unit*
- g. Sludge disposal inadequate to keep treatment system in balance*
- h. Sludge decant or return flows high in solids*

The student's answer should include four of the choices listed below:

Sludge Disposal

- a. Sludge constituents not analyzed before disposal*
- b. Sludge not transported in an appropriate/approved vehicle*
- c. Surface runoff of sludge at land-application site*
- d. Liquid sludge (i.e., less than 10 percent solids) applied to landfill site*
- e. Inadequate coverage of sludge in subsurface plow-injection system*
- f. Malodors at land-application site*
- g. Slow drying of soil-sludge mixture in subsurface injection system*
- h. Sludge ponding at land-application site*

- i. Flies breeding and/or odors at landfill*
 - j. Inadequate burial of sludge at landfill site*
 - k. Erosion at sludge sites*
 - l. Waste sludges disposed of onsite in nonpermitted sites*
 - m. Waste sludges in landfills, surface impoundments, or land-application units not according to Federal, State, or local regulations*
 - n. Inadequate runoff control at landfill or land-application site*
10. Discuss potential production changes at an industrial facility which should be evaluated or verified and documented by an inspector. (Manual, Chapter 4B, pages 4-13 through 4-14)

Changes to production processes, raw materials, amount of finished product, water use, water reuse or recycling, waste treatment processes, and other related changes should be evaluated or verified and documented by the inspector.

EXERCISE 4-2**O&M EVALUATION****30 MINUTES**

Operating factors that may affect plant performance range from the knowledge and skill of the operator to physical deficiencies in the equipment. This exercise will review the plant O&M functions that an inspector should cover.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 4C of the Manual. For additional information, review EPA's 1973 *Maintenance Management Systems for Municipal Wastewater Facilities*, EPA 430/9-74-004.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List the five areas that must be evaluated by an inspector during a review of operation functions. (Manual, Chapter 4C, page 4-15)
 - a. *Policies and procedures*
 - b. *Organization*
 - c. *Staffing*
 - d. *Planning*
 - e. *Management controls*

2. Discuss the information that should be available to the inspector while evaluating the operating policy and procedures of a facility. (Manual, Chapter 4C, page 4-15)

The operations manual or other written operating procedures prepared for the facility should be available to the inspector for evaluation.

3. Identify the facility staff members that should be interviewed by the inspector to identify staffing problems. (Manual, Chapter 4C, page 4-15)

The inspector should interview the individual in charge of overall operation, the chief operator, specific unit process operators, and laboratory staff.

4. Describe Occupational Safety and Health Administration (OSHA) Right-to-Know laws. (Manual, Chapter 4C, page 4-16)

OSHA Right-to-Know Laws require a written hazard communication program, labeling of chemicals, and the availability of material safety data sheets to employees on request.

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5. Discuss the factors an inspector should consider when evaluating management controls. (Manual, Chapter 4C, page 4-16)

The inspector should consider factors affecting monitoring practices (e.g., sampling program, performance testing, analytical capabilities, and record-keeping practices) and factors for effective process control (process-control data, process knowledge of the operators, basis for control practices, implementation of control practices, past performance, operator emphasis on controls, and record keeping).

6. Explain how corrective- and preventive-maintenance programs relate to efficient plant functions and why this is important to an inspector. (Manual, Chapter 4C, pages 4-16 through 4-17)

Preventive maintenance reduces facility operating costs by eliminating breakdowns and the need for corrective maintenance, improves reliability by minimizing the amount of time equipment is out-of-service, and increases the useful life of the equipment. Corrective maintenance returns malfunctioning equipment to operation. These are important to the inspector because both preventive and corrective maintenance can avoid possible compliance violations.

7. List three topics of primary concern to an inspector during a maintenance evaluation. (Manual, Chapter 4C, page 4-17)

a. Staffing and training

b. Planning and scheduling

c. Management control (i.e., records systems and inventory control)

8. Describe the elements of a maintenance cost-control system. (Manual, Chapter 4C, page 4-17)

A maintenance cost-control system consists of budgets for preventive maintenance, corrective maintenance, and projected and actual major repair costs. Annual costs must be compared to the budget to control maintenance expenditures.

9. Describe the elements of the management-control system for plant maintenance that an inspector should evaluate. (Manual, Chapter 4C, pages 4-23 through 4-24)

The elements of the management-control system for plant maintenance that an inspector should evaluate include: the maintenance-record system; current base-record system; work-order system for scheduling maintenance; detailed and usable work orders; procedures for completing emergency work and checking records and emergency-equipment failures; procedures for transferring work-order information to the maintenance-record system; catalog or index system for inventory; detailed withdrawal tickets; summary of maintenance-system information for management reports; record of contract maintenance and specialized assistance; and safeguards and penalties to ensure maintenance work is being completed.

**EXERCISE 4-3 SUMMARY OF TREATMENT UNITS AND OPERATIONS
THAT SHOULD BE INSPECTED (OPTIONAL)****3 HOURS**

This summary exercise focuses on the types of treatment units and operations found at wastewater treatment facilities.

1. Obtain an example inspection plan and a description of a wastewater treatment facility from your instructor.
2. Develop a written plan for the inspection of this facility. It should detail the objectives and information to be collected during the inspection. The plan should list treatment units and O&M functions that should be inspected. For each unit or function you identify, describe how you plan to evaluate compliance (Manual, Chapter 4).
3. Discuss the plan with your instructor. If an observation inspection can be arranged, use the inspection to clarify questions or problems you have regarding the facility site review.
4. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Note to Instructor: An example inspection plan (e.g., from a previous inspection) should be provided to the student to serve as a guide. The example plan should clearly indicate areas of the plant to be inspected and how compliance at each of these areas is to be evaluated (e.g., conditions to look for, questions to be asked, etc.). A description of a wastewater treatment facility should also be provided so that the student can develop an inspection plan. If possible, the student should develop a plan for an upcoming inspection and accompany the instructor on the inspection. Alternatively, it may be possible to conduct an observation inspection.

UNIT 4	EXAM	30 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time limit listed above.3. Verify the answers with your instructor.4. Correct any errors and clarify questions or problems before proceeding to Unit 5.		

Exam Questions and Answers

1. For each of the areas listed below, list a minimum of three indicators of treatment process problems. (Manual, Chapter 4B, pages 4-4 through 4-5)

The student's answer should include three of the choices listed below:

a. Flow indicators

- *Surcharging of influent lines, overflow weirs, and other structures*
- *Flow through bypass channels*
- *Overflows at alternative discharge points, channels, or other areas*
- *Excessive septage dumping by septic tank pumpers*
- *Flow from unknown source or origin*
- *Open-ended pipes that appear to originate in a process or storage area and that periodically flow to ground or surface water*

The student's answer should include three of the choices listed below:

b. Unusual waste indicators

- *Disposal of collected screening, slurries, sludges, waste piles, or byproducts of treatment so that none enter navigable waters*
- *Improper recycling of filtrates and supernatants from sludge beds*
- *Improper storage of chemicals and hazardous substances with particular attention to proper diking*
- *Spills or mishandling of chemicals*

2. Discuss the impact of production changes and describe the areas related to production changes the inspector should investigate relating to production changes. (Manual, Chapter 4B, pages 4-13 through 4-14)

Any production changes by the facility may change the type or load of the discharged pollutants. To verify the compliance status of the facility, the inspector should determine whether any changes have been made in the production processes, raw material, amount of finished product, water use, water reuse or recycling, or waste treatment processes. In addition, the inspector must verify that the regulatory agency has been notified of the changes.

3. List three important areas to be addressed during an operation evaluation. For each area, list three questions that should be asked by the inspector. (Manual, Chapter 4C, pages 4-15 to 4-16)

The student's answer should include three of the choices listed below:

- a. Policies and procedures*
- b. Organization*
- c. Staffing*
- d. Planning*
- e. Management controls*

Refer to Table 4-1 in Chapter 4 of the Manual for the questions related to these topics.

4. List three important areas to be addressed during a maintenance evaluation. For each area, list three questions that should be asked by the inspector. (Manual, Chapter 4C, pages 4-16 to 4-18)

- a. Staffing and training*
- b. Planning and scheduling*
- c. Management controls*

Refer to Table 4-1 in Chapter 4 of the Manual for the questions related to these topics.

UNIT FIVE

SAMPLING

NPDES permittees are required to sample their wastewater as part of the NPDES Compliance Monitoring Program. The inspector's role is to both evaluate the permittee's self-monitoring compliance program and verify those program data on overall permit compliance by sampling the wastewater. To fulfill this two-fold responsibility, the inspector must know:

- Permittee sampling requirements
- Sampling procedures and techniques.

These topics correspond to Chapter 5 of the Manual, EPA's 1990 NPDES Compliance Monitoring Inspector Training Sampling module, and several other EPA documents. They are addressed in the two exercises included in this unit.

EXERCISE 5-1**EVALUATION OF PERMITTEE SAMPLING
PROGRAM AND COMPLIANCE SAMPLING****30 MINUTES**

When evaluating a permittee's sampling program, the NPDES inspector must be cognizant of the effluent limitations and monitoring requirements of the permit. The objectives and requirements for inspecting sampling programs are covered in this exercise.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 5A of the Manual and Chapter 1 of the *NPDES Compliance Monitoring Inspector Training Sampling* module.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List the five objectives of sampling conducted by inspectors. (Manual, Chapter 5A, page 5-1; Sampling module, Chapter 1, page 1-3)
 - a. *Verify compliance with daily effluent limitations and permit conditions*
 - b. *Verify accuracy of reports and program self-monitoring*
 - c. *Support enforcement action*

- d. Support permit development reissuance and/or revision*
 - e. Determine the quantity and quality of the effluent*
2. List six areas to assess in evaluating sampling procedures. (Manual, Chapter 5A, page 5-2; Sampling module, Chapter 1, pages 1-3 through 1-4)

The student's answer should include six of the choices listed below:

- a. Sample collection techniques*
 - b. Sample identification*
 - c. Sample preservation and holding time*
 - d. Transfer of custody and shipment of samples*
 - e. Quality Control (QC)*
 - f. Data handling and reporting*
 - g. Sampling location(s)*
 - h. Flow measurement*
3. The inspector does not have to evaluate sampling procedures of a POTW for SIUs that discharge to the POTW. (Manual, Chapter 5A, page 5-2)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

The inspection should evaluate POTW sampling procedures for SIUs that discharge to the POTW.

EXERCISE 5-2**SAMPLING PROCEDURES AND TECHNIQUES 4 HOURS 30 MINUTES**

By collecting samples, the inspector can verify firsthand a permittee's compliance with effluent limitations and other permit parameters, further evaluate the permittee's self-monitoring program, and support enforcement actions or permit reissuance or revision. This exercise reviews general sampling methods and associated procedures.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 5B and Appendix F of the Manual and Chapters 2, 3, 4, 6, and 7 of the *NPDES Compliance Monitoring Inspector Training Sampling* module. Watch the video *Sampling Wastewater at a Wastewater Treatment Plant*. For additional information, refer to these two EPA handbooks: EPA's 1979 *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020 and EPA's 1982 *Handbook for Sampling and Sample Preservation of Water and Wastewater*, EPA-600/4-82-029.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. Summarize the main features of a representative site for collecting samples. (Manual, Chapter 5B, pages 5-3 through 5-4; Sampling module, Chapter 2, pages 2-5 through 2-6, Video)
 - a. Influent samples

Influent samples should be taken at points of high turbulent flow (above plant return lines), and sampling equipment should not interfere with flow measuring devices.
 - b. Effluent samples

Effluent sampling should be conducted at the site specified in the permit or (if no site is specified) at the most representative site downstream from all wastestreams before they enter the receiving waters.
2. Prior to going onsite to conduct sampling, the inspector should develop a *sampling plan* that identifies sampling procedures to be followed. (Video)

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3. List and describe the two primary types of samples that can be collected. (Manual, Chapter 5B, page 5-5; Sampling module, Chapter 2, pages 2-8 through 2-10)

- a. *Grab samples are individual samples collected over a period of time not to exceed 15 minutes and are representative of conditions at the time the sample is collected. They can be taken manually or automatically. Grab samples are appropriate when effluent is not discharged on a continuous basis to provide information on instantaneous concentrations of pollutants or to monitor parameters not amenable to compositing.*
- b. *Composite samples are collected over time, either by continuous sampling or by mixing discrete samples and represent the average characteristics of the wastestream during the compositing period. They are appropriate when determining the average pollutant concentration during the time period, for calculating mass/unit time loadings, and for highly variable wastes.*

4. Describe the parameters for which grab samples should be taken. (Manual, Chapter 5B, page 5-5; Sampling module, Chapter 2, page 2-8)

Grab samples should be collected for pH, temperature, DO, chlorine, purgeable organics, Oil and Grease (O&G), bacteria, and other parameters specified by the NPDES permit, which may include phenols, sulfites, and hexavalent chromium. Volatile organics, sulfides, phenols, and phosphorus samples can be composited but require special handling procedures.

5. List the four methods for compositing samples. (Manual, Chapter 5B, pages 5-5 through 5-6; Sampling module, Chapter 2, pages 2-9 through 2-10)

- a. *Time composite*
- b. *Flow-proportional composite*
- c. *Sequential composite*
- d. *Continuous composite*

6. Required sample containers, preservation methods, and maximum allowable holding times are contained in **40 CFR Part 136** (Manual, Chapter 5B, pages 5-6 through 5-8; Video)

7. Indicate how to determine the appropriate sample volume that should be collected. (Manual, Chapter 5B, page 5-6; Sampling module, Chapter 2, page 2-14; Video)

The volume must be sufficient for all of the analyses required plus an amount for split samples, Quality Assurance (QA/QC), and repeat analyses.

8. Discuss the types of sample containers appropriate for collecting samples to be analyzed for specific constituents or classes of pollutants. (Manual, Chapter 5B, page 5-6; Sampling module, Chapter 2, pages 2-6 through 2-7; Video)

Required sample containers are described in 40 CFR Part 136. Containers must be made of chemically resistant material that does not affect the pollutant concentration to be measured and must have contamination-resistant closure. Containers for chemical analyses should be glass or plastic. Glass containers must be used for O&G, pesticides, volatile organics, PCBs, and phenols.

9. Describe how a bacteriological sample should be collected. Explain why. (Sampling module, Chapter 2, pages 2-20 through 2-21; Video)

Bacteriological samples must be taken directly in sterile sample containers. To avoid contamination, the sampler should hold the container's lower part with the container's opening against the current and should avoid contaminating the lid to the container.

10. Indicate the type of container O&G samples should be taken in. (Manual, Chapter 5B, page 5-6; Sampling module, Chapter 2, page 2-22; Video)

O&G samples should be taken in a glass container with a teflon insert in the lid.

11. Describe the type of sample container used for volatile organics and indicate how a sample is collected. (Sampling module, Chapter 2, page 2-22)

Volatile organics sampling requires a 40-milliliter glass sample bottle sealed with a teflon-coated septum seal. There must be no air bubbles in the container after the screw cap and septum are applied.

12. List two types of blank samples that a sampler may need to take in the field. (Manual, Chapter 5B, page 5-9; Sampling module, Chapter 6, pages 6-3 through 6-4; Video)

The student's answer should include two of the following choices:

a. Trip blanks

b. Field blanks

c. Equipment blanks

13. Describe what an equipment blank is and what it is used for. (Video)

Equipment blanks are prepared by running reagent water through the sampling equipment and pouring it into a sampling container. This sample is then analyzed at the laboratory. Equipment blanks detect sample contamination by the sampling equipment.

14. List five examples of the kinds of information that should be recorded to identify a sample. (Manual, Chapter 5B, page 5-7; Sampling module, Chapter 2, page 2-16)

The student's answer should include five of the choices listed below:

a. Name of sample collector

b. Sample identification number

c. Date and time of sample collection

d. Location of sample collection

e. Preservatives used

f. Facility name and location

- g. Unusual conditions*
- h. Sample type*
- i. Parameters to be analyzed*

15. Identify the proper container, preservative, and maximum holding time for testing wastewater alkalinity. (Manual, Chapter 5B, Table 5-3; Sampling module, Appendix E)

A polyethylene or glass container can be used. Preservation should be accomplished by cooling the sample to 4°C. Maximum holding time is 14 days prior to analysis.

16. List three standard procedures used to preserve samples. (Manual, Chapter 5B, pages 5-7 through 5-8; Sampling module, Chapter 2, page 2-15; Video):

- a. Cooling/Refrigeration*
- b. pH adjustment*
- c. Chemical fixation*

17. Describe the purpose and importance of chain-of-custody procedures and records when transferring and handling samples. (Manual, Chapter 5B, page 5-8; Video)

Chain-of-custody procedures are necessary to ensure the validity of the permit compliance sampling data in court. They are used to create an accurate written record of the possession and handling of the sample from collection to analysis.

UNIT 5

EXAM

45 MINUTES

Instructions

1. Complete this exam without referring to text or notes.
2. Do not exceed the time limit listed above.
3. Verify the answers with your instructor.
4. Correct any errors and clarify problems or questions before proceeding to Unit 6.

Exam Questions and Answers

1. The inspector (should/should not) be able to determine whether or not the sampling site specified in the permit is adequate for the collection of a representative sample. (Circle the correct answer.) (Manual, Chapter 5B, pages 5-3 through 5-4)
2. Identify the citation to the CFR which specifies required sample containers, preservation techniques, and maximum allowable holding times to be used in wastewater analysis. (Manual, Chapter 5B, page 5-6; 40 CFR 136)

40 CFR Part 136.

3. List three preferred influent sampling points for raw wastewater. (Manual, Chapter 5B, page 5-3; Sampling module, Chapter 2, page 2-6)

The student's answer should include three of the choices listed below:

- a. Upstream siphon following the comminutor*
- b. Upstream collection lines, tank, or distribution box following pumping from the main plant wet well*
- c. Aerated grit chamber*
- d. Flume throat*
- e. Pump wet well*
- f. Waste flowing from the last process in a manufacturing operation*

-
4. List two situations when collection of a grab sample is appropriate, and two situations when collection of a composite sample is appropriate. (Manual, Chapter 5B, pages 5-4 through 5-5; Sampling module, Chapter 2, pages 2-8 through 2-10)

The student's answer should include two of the choices listed below:

Grab

- a. When stipulated by the permit*
- b. Providing information about instantaneous concentrations of pollutants at specific times*
- c. Allowing collection of a variable sample volume*
- d. Corroborating composite samples if the waste is not highly variable*
- e. Monitoring pollutant parameters not amenable to compositing*
- f. Sampling an effluent discharge that is not on a continuous basis*

The student's answer should include two of the choices listed below:

Composite

- a. When stipulated in the permit*
 - b. To determine the average pollutant concentration during the compositing period*
 - c. To calculate mass/unit time loadings*
 - d. When wastewater characteristics are highly variable*
5. Identify the type of sample to be collected for determining pH. (Manual, Chapter 5B, page 5-5; Sampling module, Chapter 2, page 2-8)

Determination of pH should be conducted by collecting a grab sample or by continuous monitoring.

6. List at least six items that must be recorded on the label and/or data sheet to accurately identify a sample. (Manual, Chapter 5B, page 5-7; Sampling module, Chapter 2, page 2-16)

The student's answer should include six of the choices listed below:

- a. Facility name/location*
- b. Sample site location*
- c. Sample number*
- d. Sample collector's name*
- e. Date and time of collection*

-
- f. Indication of grab or composite sample with time and volume information*
- g. Parameter to be analyzed*
- h. Preservative used*
- i. Unusual conditions*
7. Summarize the sample types listed below and explain the objectives of each in terms of their usefulness. (Manual, Chapter 5B, page 5-9)
- a. Duplicate samples
- *Samples taken from the same source at the same time*
 - *They provide a check on sampling equipment and precision of techniques.*
- b. Split samples
- *Samples that are divided into two containers for analysis by separate laboratories*
 - *They help identify discrepancies in the analytical techniques and procedures.*
- c. Spiked samples
- *Samples that have a known quantity of some substance added*
 - *They provide a proficiency check for accuracy of analytical procedures.*
- d. Sample preservative blanks
- *Samples of distilled water with a known quantity of preservatives*
 - *They provide a check on contamination or effectiveness of preservatives.*
8. Explain the significance of a chain-of-custody record in the event that a facility is in violation of its permit requirements. (Manual, Chapter 5B, page 5-8; Sampling module, Chapter 2, page 2-20)
- As admissible evidence, the record provides a written history that can be used to trace the possession and handling of the sample from the time of collection to analysis and introduction as evidence.*
9. Indicate who must fill out the chain-of-custody record. (Manual, Chapter 5B, page 5-8; Sampling module, Chapter 2, page 2-19)
- Every custodian and transferee of the sample, including the person who collected the sample and the individuals who receive the sample for analysis.*
10. Describe the parameters for which grab samples are appropriate. (Manual, Chapter 5B, page 5-5; Sampling module, Chapter 2, page 2-8)
- Grab samples should be collected for pH, temperature, O&G, chlorine, DO, purgeable organics, bacteria, and any other parameters specified in the permit.*
-

UNIT SIX

FLOW MEASUREMENT

NPDES permits require facilities to accurately measure, record, and report the quantity of wastewater discharged. Flow measurement by a permittee provides information on the operation, performance, and cost of wastewater treatment and data for long-term plant production capacity in conjunction with treatment capacity. Evaluations of a permittee's compliance with flow-measurement requirements involve inspection of a facility's flow-measurement devices, data handling and reporting procedures, and QC measures, as well as independent flow measurement by inspectors. Topics addressed in this unit and corresponding to Chapter 6 and Appendix G of the Manual and EPA's 1990 *NPDES Compliance Monitoring Inspector Training Sampling* module include:

- Evaluation of a permittee's flow-measurement equipment and procedures
- Flow-measurement methods
- Flow-measurement compliance inspection procedures.

EXERCISE 6-1**EVALUATION OF A PERMITTEE'S
FLOW-MEASUREMENT EQUIPMENT AND PROCEDURES****1 HOUR**

To accurately evaluate a permittee's flow-measurement program, the inspector must be familiar with flow-measurement devices, data-recording concerns, and QC needs. This exercise provides an introduction to each of these concerns.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 6A of the Manual and Chapter 5 of the *NPDES Compliance Monitoring Inspector Training Sampling* module.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. Differentiate between closed-channel flow and open-channel flow. (Manual, Chapter 6A, page 6-1; Sampling module, Chapter 5, pages 5-1 and 5-7)

Closed-channel flow occurs under pressure in a liquid-full conduit (pipe). Open-channel flow occurs in conduits that are not liquid-full.

2. Differentiate between primary and secondary flow-measurement devices and give an example of each. (Manual, Chapter 6A, pages 6-1 through 6-2; Sampling module, Chapter 5, pages 5-1 through 5-7)

Primary flow measurement devices such as flumes and weirs are standard hydraulic structures installed in the channel. Secondary devices are used with primary devices to automate the flow-measurement process. They measure the liquid depth in the primary device and convert the depth to a corresponding flow. Examples include floats, ultrasonic transducers, and bubblemeters.

3. List five conditions that inspectors should evaluate while inspecting flow measurement devices installed by a permittee for self-monitoring purposes. (Manual, Chapter 6A, pages 6-2 through 6-3)

The student's answer should include five of the choices listed below:

- a. Verify that devices have been installed according to manufacturer's instructions.*
- b. Inspect the primary device for evidence of corrosion, scale formation, or solids accumulation.*
- c. Verify that weirs are level, plumb, and perpendicular to the flow direction.*
- d. Verify that flumes are level, the throat walls are plumb, and the throat width is appropriate.*
- e. Observe the flow patterns near the primary device for excessive turbulence or velocity. The flow lines should be straight.*
- f. Inspect historical records for evidence of continuous flow measurements.*
- g. Ensure the entire wastestream discharge is being measured.*
- h. Verify that an appropriate site is being used.*
- i. Verify that closed channel flow measuring devices are placed where the pipe is always full.*
- j. Verify that appropriate tables, curves, and formulas are being used.*
- k. Review and evaluate calibration and maintenance programs.*
- l. Verify that flow measurement devices are adequate for normal and maximum flow.*

4. Describe the information that should be maintained by a permittee to illustrate thorough record-keeping practices for flow. (Manual, Chapter 6A, page 6-3)

The following information should be maintained by a permittee to illustrate thorough record keeping practices for flow: date, flow, and time of reading; operator's name; maintenance and inspection dates; flow meter calibration dates; and irregularity or uniformity of flow.

5. List four issues integral to QC that should be evaluated by an inspector. (Manual, Chapter 6A, page 6-4)

The student's answer should include four of the choices listed below:

- a. Proper O&M of equipment*
- b. Accurate records*

- c. Sufficient inventory of spare parts*
- d. Precise flow data*
- e. Valid flow measurement techniques*
- f. Adequate frequency of calibration checks*

EXERCISE 6-2	FLOW-MEASUREMENT METHODS	1 HOUR
This exercise introduces the student to the basics of flow measurement (including hydraulic calculations and the components and use of various flow-measurement devices).		
<ol style="list-style-type: none"> 1. Read through the study checklist. Test your background knowledge by responding to as many items as possible. 2. Read Appendix G of the Manual. 3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise. 		

Study Checklist At the end of this exercise, you should be able to:

1. Describe the components of a typical continuous flow-measurement system. (Manual, Appendix G, page G-1)

The components are a flow device, a flow sensor, transmitting equipment, a recorder, and a totalizer.

2. Discuss the difference between continuous and instantaneous flow measurement. (Manual, Appendix G, pages G-1 through G-2)

Continuous flow measurement requires the equipment listed in Question 1 above. Instantaneous flow can be obtained simply by measuring the water depth (head) in the primary device.

3. List four variations of the sharp-crested weir. (Manual, Appendix G, Figure G-2; Sampling module, Chapter 5, page 5-4)

a. *Suppressed rectangular weir*

b. *Contracted rectangular weir*

c. *Trapezoidal (Cipolletti) sharp-crested weir*

d. *V-notch (triangular) sharp-crested weir*

4. Summarize the operating principles on which the primary devices listed below are based. (Manual, Appendix G, pages G-2 through G-5; Sampling module, Chapter 5, pages 5-2 through 5-9)

- a. Weirs

The rate of flow over a weir is directly related to the height of the water above the crest at a point upstream of the weir where the water surface is level.

- b. Parshall flume

The rate of flow through a Parshall flume is directly proportional to the height of the water at a certain point upstream of the constriction.

- c. Palmer-Bowlus flume

The upstream depth of water above the raised step in the throat of the Palmer-Bowlus flume is related to the discharge rate.

- d. Venturi meter

The water velocity in a Venturi meter is increased in the constricted portion of the inlet section which results in a decrease in the static pressure. The pressure difference between the inlet pipe and the throat is proportional to the square of the flow.

- e. Electromagnetic flow meter

The electromagnetic flow meter operates according to Faraday's Law of Induction: the voltage induced by a conductor moving at right angles through a magnetic field is proportional to the velocity of the conductor through the field. With the flow meter, the conductor is the liquid stream and the field is produced by a set of electromagnetic coils.

- f. Propeller meter

The propeller meter operates on the principle that liquid hitting the propeller will cause the propeller to rotate at a speed proportional to the flow rate.

5. Define the purpose of secondary flow measurement devices. Define the two classes of secondary devices and provide examples of each. (Manual, Appendix G, page G-5; Sampling module, Chapter 5, page 5-7)

Secondary flow measurement devices are the devices in the flow measurement system that translate the interaction of primary devices in contact with the fluid into the desired records or readout. There are two broad classes: nonrecording types with direct readout (e.g., a staff gauge) or indirect readout (e.g., a float) and recording types with either digital or graphic recorders (e.g., a float-in-well or bubbler).

6. Describe the advantages and disadvantages of using pressure-bulb measuring devices. (Manual, Appendix G, Table G-9)

The advantage to pressure bulb devices is that the source can be linked directly to the sampler since no compressed air is used. The disadvantages are that they are expensive and the openings can clog.

7. Explain why flow measurement using pump data is not normally used for NPDES permit compliance evaluation. (Manual, Appendix G, page G-6)

Pump data are normally not used for NPDES compliance evaluation of flow measurement because they are not accurate enough. At best, they provide only an estimate of the flow.

EXERCISE 6-3**FLOW-MEASUREMENT COMPLIANCE
INSPECTION PROCEDURES****1 HOUR**

A review of a permittee's flow-measurement devices and techniques and of the data collected should indicate whether or not the permittee is accurately monitoring and reporting the type and amount of wastewater generated and discharged. This exercise introduces procedures for inspecting various flow-measurement devices, measuring flow using common, permanent, and portable systems, and evaluating flow data.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 6B of the Manual and watch the video *Inspecting a Parshall Flume*.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist: At the end of this exercise, you should be able to:

1. List the four steps that an inspector should follow to evaluate flow measurement systems. (Manual, Chapter 6B, page 6-6; Video)
 - a. *Physical inspection of the primary device*
 - b. *Physical inspection of the secondary device and ancillary equipment*
 - c. *Flow measurement verification using the primary/secondary device combination*
 - d. *Certification of the system using a calibrated, portable instrument (if appropriate)*
2. List two examples of when the use of a portable flow meter would be appropriate. (Manual, Chapter 6B, page 6-5)
 - a. *When the permittee's flow measurement system is not accurate within ± 10 percent*
 - b. *When an inaccurate flow sensor or recorder cannot be corrected in time for use during the inspection*
3. List four items that an inspector should consider during evaluation of a permittee's flow-measurement system. (Manual, Chapter 6B, page 6-5)
 - a. *Whether the system measures the entire discharge flow*
 - b. *The system's accuracy and good working order*
 - c. *The need for new system equipment*
 - d. *The existence or absence of a routine calibration and maintenance program for flow-measurement equipment*
4. List four common sources of errors in the use of primary flow measuring devices (sharp crested weirs and Parshall flumes) and four sources of errors in the use of secondary devices. (Manual, Chapter 6B, page 6-6 and pages 6-9 through 6-10; Video)

Primary Devices

- a. Faulty fabrication
- b. Improper installation
- c. Sizing errors
- d. Poor maintenance

Secondary Devices

- a. Improper location
- b. Inadequate maintenance
- c. Incorrect zero setting
- d. Operator error

5. Describe how to inspect sharp-crested weirs. (Manual, Chapter 6B, page 6-7)

Inspect the upstream approach to the weir to verify that the weir is perpendicular to the flow direction and that the approach is a straight section of conduit of adequate length. The flow should not be turbulent, and the approach should not contain accumulated debris. Inspect the weir itself to verify that the weir is in good condition, the proper size, and installed correctly.

6. Describe the proper location of a Parshall flume. (Manual, Chapter 6B, page 6-8; Video)

The flume must be located as required by the facility's NPDES permit. The flume should be located in an area free of turbulence and accumulated matter.

7. Describe how to inspect a Parshall flume. (Manual, Chapter 6B, page 6-8; Video)

The flume should be inspected to ensure it is symmetrical, made of appropriate materials, and in good condition. Ensure that the side-walls are level by checking with a carpenter's level. Also ensure that the floor in the convergence section is level. Measure the dimensions of the flume and ensure they are in accordance with design criteria and are of proper size.

8. Describe how to inspect the discharge (downstream channel) of a Parshall flume. (Manual, Chapter 6B, page 6-8; Video)

The flume discharge should be inspected to ensure that downstream water levels are low enough to maintain free discharge conditions (i.e., the head of water in the discharge is not restricting flow through the flume). Also check to see if there are any obstructions, constrictions, or channel turns that could cause the flow to back-up and verify if submergence occurs at or near maximum flows.

9. Describe the procedures used to measure flow in a Parshall flume under free-flow conditions. (Manual, Chapter 6B, page 6-10)

The upstream head or level should be measured using a staff gauge, yardstick, or carpenter's rule. If a staff gauge is used, first use a yardstick or carpenter's rule to verify that it is set to zero. Then take the head measurement in feet and determine the appropriate flow rate from an equation (as in Table G-5 of the Manual), standard curve (as in Figure G-5 of the Manual), or tables published in flow-measurement references. Ensure that the head measurement is taken back from the throat at a distance of two-thirds of the length of the convergence section.

10. Describe how to verify that a flow totalizer is correctly calibrated. (Manual, Chapter 6B, page 6-12; Video)

During a period of steady flow, read the totalizer, and at the same moment, start a stop watch. After 10 to 30 minutes, the totalizer should be read again, and the stop watch stopped. Subtract the two totalizer readings to obtain the total flow. Divide this by the time elapsed in minutes to obtain the flow rate in gallons per minute. Compare this number to the flow measured at the primary device. If it is within 10 percent, the totalizer is calibrated.

UNIT 6	EXAM	30 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time limit noted above.3. Verify the answers with your instructor.4. Correct any errors and clarify problems or questions before proceeding to Unit 7.		

Exam Questions and Answers

1. The permittee may be required to retain flow-measurement records for a minimum of 2 years. (Manual, Chapter 6A, page 6-3)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Permittees are required to retain flow-measurement records for a minimum of 3 years.

2. The inspector should determine whether primary and secondary flow devices are adequate for measuring normal flow as well as for measuring maximum expected flow. (Manual, Chapter 6A, page 6-3)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

3. A flow-measurement system must be able to measure within ± 10 percent to be considered accurate. (Manual, Chapter 6A, page 6-4)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

4. The permittee may choose an appropriate flow-measurement site regardless of permit specifications. (Manual, Chapter 6A, page 6-3)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Only if the permit does not specify a site may the facility select its own.

5. Describe the circumstances under which the inspector would use a portable flow sensor and recorder rather than those installed in the facility being inspected. (Manual, Chapter 6B, page 6-5)

A portable flow sensor and recorder would be used if a flow-measurement system is inaccurate (not within ± 10 percent) and cannot be repaired in a timely manner.

6. List three factors the inspector should consider when evaluating a Parshall flume. (Manual, Chapter 6B, page 6-8)

a. The flume approach

b. The flume

c. The flume discharge

7. The Venturi meter measures differences in pressure between the inlet section and the throat of the meter. (Manual, Appendix G, page G-4)

8. Discuss the advantages and disadvantages of using electromagnetic flow meters. (Manual, Appendix G, page G-5)

The advantages are high accuracy, wide flow-measurement range, negligible pressure loss, no moving parts, and rapid response. The disadvantages are they are expensive, and errors can result from grease build-up or pitting by abrasive wastewaters.

9. Explain how secondary devices are used within a flow-measurement system. (Manual, Appendix G, page G-5)

They translate the interaction of primary devices in contact with fluid into the desired records or readout.

10. List the two broad classes of secondary devices. (Manual, Appendix G, page G-5)

They are the nonrecording type with direct readouts or with indirect readouts from fixed points and the recording type with digital or graphic recorders.

UNIT SEVEN

LABORATORY PROCEDURES AND QUALITY ASSURANCE

The analytical laboratory has the primary responsibility for providing the data necessary to determine a permittee's compliance with NPDES standards and requirements. These data must be accurate and reliable in their description of the characteristics and concentrations of constituents appearing in the test samples. The laboratory QA program ensures accurate data result from the activities of the analytical laboratory. Topics covered in the exercises in this unit (which correspond to Chapter 7 of the Manual and EPA's 1990 *NPDES Compliance Monitoring Inspector Training Laboratory Analysis* module) include:

- Objectives and requirements
- Sample handling procedures
- Laboratory analyses techniques evaluation
- QA and QC.

EXERCISE 7-1	OBJECTIVES AND REQUIREMENTS	15 MINUTES
Reviews of sampling, analytical, and laboratory QA techniques are components of many NPDES inspections. This exercise is intended to provide an introduction to laboratory QA requirements and procedures.		
1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.		
2. Read Chapter 7A of the Manual and Chapter 1 of the <i>NPDES Compliance Monitoring Inspector Training Laboratory Analysis</i> module.		
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. List two primary functions of the laboratory QA program. (Manual, Chapter 7A, page 7-1)
 - a. *To monitor and document the accuracy and precision of the reported results*
 - b. *To meet reliability requirements*
2. Define QA. (Manual, Chapter 7A, page 7-1)

QA is a total program including administrative and technical procedures and policies regarding personnel, resources, and facilities for ensuring the reliability of data.

3. Describe activities for which QA measures are required. (Manual, Chapter 7A, page 7-1)

- a. Project/study definition*
- b. Sample collection and tracking*
- c. Laboratory analysis*
- d. Data validation*
- e. Analysis, reduction, and reporting*
- f. Documentation*
- g. Data storage system*

4. Describe items that should be included in a laboratory's QA/QC manual. (Manual, Chapter 7A, page 7-1)

- a. The individuals involved in the QA/QC program and their responsibilities*
- b. Documentation of the laboratory's standard operating procedures for meeting user's requirements for specificity, completeness, precision, accuracy, representativeness, and comparability*

5. Define QC. Indicate how QC is different from QA. (Manual, Chapter 7A, page 7-1)

QC is the routine application of procedures to control the accuracy and precision of the measurement process. QC is a function of QA. Examples of QC procedures include calibration of equipment and the use of appropriate analytical procedures.

6. Explain the purpose of the laboratory evaluation. (Laboratory Analysis module, Chapter 1, pages 1-2 through 1-3)

The purpose of the laboratory evaluation is to determine whether the laboratory is performing analyses and reporting analytical results in a manner consistent with NPDES permit requirements and applicable regulations.

EXERCISE 7-2**SAMPLE HANDLING PROCEDURES****15 MINUTES**

Sample handling procedures are an important component of any monitoring program. To accurately assess the adequacy of a laboratory's sample receipt and handling procedures, an inspector must be familiar with such requirements. This exercise addresses sample handling procedures.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 7B of the Manual and Chapter 2 (Sections 2.1 through 2.4) of the *NPDES Compliance Monitoring Inspector Training Laboratory Analysis* module.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. Explain why sample handling and control procedures are important to a permittee. (Manual, Chapter 7B, page 7-3; Laboratory Analysis module, Chapter 2, page 2-9)

Sample handling and control procedures are important to ensure the sample is valid and representative of the wastestream and also to ensure resulting data can be used as evidence in enforcement actions.

2. List five procedures that should be used by laboratory personnel and verified by an inspector. (Manual, Chapter 7B, page 7-3)

The student's answer should include five of the choices listed below:

- a. *The laboratory has a sample custodian*
 - b. *The laboratory area is secure and restricted to authorized personnel only*
 - c. *The laboratory has a sample security area that is dry, clean, and isolated, has sufficient refrigerated spaces, and can be locked*
 - d. *Samples are handled by a minimum number of people*
 - e. *All incoming samples are received by the custodian, who signs the chain-of-custody form and retains it as a permanent record*
 - f. *The custodian ensures that the samples are properly stored*
 - g. *Only the custodian distributes samples to personnel who do the analyses*
 - h. *Care and custody records for sample handling are accurate and up-to-date*
 - i. *Transfer of samples is always documented*
3. Describe the primary sources of information about a permittee and its compliance with the permit requirements. (Laboratory Analysis module, Chapter 2, page 2-3)

The primary sources of information include the permit file, the inspection file, DMRs and DMR QA results, and the PCS.

EXERCISE 7-3**LABORATORY ANALYSES TECHNIQUES
EVALUATION****45 MINUTES**

The use of uniform and standardized testing methodologies is critical in comparing or sharing data among laboratories. In addition, maintenance of the laboratory's facilities and equipment is also important to laboratory QA. This exercise addresses laboratory analyses techniques evaluation.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 7C of the Manual and Chapter 2 (Section 2.5) of the *NPDES Compliance Monitoring Inspector Training Laboratory Analysis* module.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. Identify the part and section of the CFR in which the approved analytical test procedures are prescribed. (Manual, Chapter 7C, page 7-5; Laboratory Analysis module, Chapter 2, page 2-13)

40 CFR Part 136.

2. List at least two publications in which approved 40 CFR Part 136 procedures are published. (Manual, Chapter 7C, page 7-5; Laboratory Analysis module, Chapter 2, page 2-13)

The student's answer should include two of the choices listed below:

- a. *Methods for Chemical Analysis of Water and Wastes (1979)*
 - b. *Standard Methods for the Examination of Water and Wastewater*
 - c. *ASTM Annual Book of Standards, Part 31, Water (1975)*
 - d. *Microbiological Methods for Maintaining the Environment*
3. Explain why it is important that a laboratory use approved, standardized analytical methods. (Manual, Chapter 7C, page 7-5)

Standardized methods are necessary when comparing or using data from more than one laboratory.

4. Identify the key to quality analytical performance. (Laboratory Analysis module, Chapter 2, page 2-14)

The key to quality analytical performance is the skilled analyst who has had appropriate and continued training.

-
5. List four items that should be verified by an inspector while evaluating a laboratory's analytical procedures. (Manual, Chapter 7C, pages 7-5 through 7-6)

The student's answer should include four of the choices listed below:

- a. *Analytical methods specified in 40 CFR Part 136 are followed and deviations allowed by 40 CFR Part 136 are properly performed*
 - b. *The QC system conforms to the system specified in the permit, or detailed in Standard Methods*
 - c. *The QC record is maintained on reagent preparation, instrument calibration and maintenance, and supply purchasing*
 - c. *QC checks are made on materials, supplies, equipment, instrument calibration and maintenance, facilities, analyses, and standard solutions*
 - e. *Procedures from 40 CFR Part 136 are followed*
 - f. *Any EPA-approved deviation is documented*
6. List four items or services which affect the reliability of data that should be available in all laboratories. (Manual, Chapter 7C, page 7-6)

The student's answer should include four of the choices listed below:

- a. *Adequate supply of laboratory pure water*
 - b. *Sufficient bench, instrumentation, storage, and record-keeping space*
 - c. *Appropriate humidity and temperature control*
 - d. *Satisfactory lighting and ventilation*
 - e. *Availability of dry, uncontaminated, compressed air (when required)*
 - f. *Efficient fume hood systems*
 - g. *All necessary equipment*
 - h. *Sufficient electrical power for routine laboratory use and (if needed) sufficient voltage regulation for delicate electronic instruments*
 - i. *Appropriate safety and emergency equipment*
 - j. *Vibration-free area for accurate weighing.*
7. List four procedures or conditions that should be verified by an inspector while evaluating a laboratory's storage and preparation of reagents and standards. (Manual, Chapter 7C, pages 7-7 through 7-8)
- The student's answer should include four of the choices listed below:*
- a. *Required reagent purity for specified analytical method is used*
-

- b. Standard reagents and solvents are stored according to manufacturer's directions*
 - c. Working standards are checked frequently*
 - d. Concentrations of stock solutions are verified before being used to prepare new working standards*
 - e. Laboratory supplies with limited shelf-life are properly handled (see answer to Question 8)*
 - f. Reagents are prepared and standardized against reliable primary standards*
 - g. Standards and reagents are properly labeled*
 - h. Standards and reagents are stored in appropriate containers and under required conditions*
 - i. Purchased solutions contain the chemicals specified by the method being used and are checked for accuracy*
 - j. Clean containers with tight-fitting stoppers are used*
 - k. Reagents are discarded when deteriorated*
 - l. Stock solutions and standards are prepared using volumetric glassware*
8. Describe the procedures that should be observed when dealing with laboratory supplies that have a limited shelf life. (Manual, Chapter 8C, page 8-7)

Laboratory supplies with a limited shelf-life should be dated on receipt, and the shelf-life restrictions (discard date and storage requirements) should be strictly observed.

EXERCISE 7-4**QA AND QC****1 HOUR 45 MINUTES**

Laboratory control procedures are established to ensure high-quality analyses. The precision (reproduceability among replicate observations) and accuracy (degree of difference between observed and actual values) of a laboratory's findings are important factors in ensuring the quality of analytical results. This exercise summarizes QA and QC procedures.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 7D of the Manual and Chapter 2 (Sections 2.6 through 2.7) of the *NPDES Compliance Inspector Training Laboratory Analysis* module.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List the four primary procedures used by laboratories to ensure high-quality analyses. (Manual, Chapter 7D, page 7-9)
 - a. *Control samples*
 - b. *Control charts*
 - c. *Reference manuals*
 - d. *Instrument calibration*
2. Define the terms "precision" and "accuracy." (Manual, Chapter 7D, page 7-9; Laboratory Analysis module, Chapter 2, page 2-22)

Precision is the reproduceability or degree of agreement among replicate measurements of the same quantity. Accuracy is the degree of difference between the observed and the actual value.

3. Explain how, when, and/or why each of the following items or processes is used to establish the precision or accuracy of laboratory analytical procedures. (Manual, Chapter 7D, pages 7-9 through 7-10; Laboratory Analysis module, Chapter 2, pages 2-24 through 2-29)
 - a. Control samples

Control samples are all samples used to monitor the performance of the analytical system.
 - b. Duplicate samples/analyses

Duplicate samples/analyses are identical portions of the same raw sample which are used to assess the precision of the analytical method by observing how close the results are for the two duplicate samples.

- c. Precision control charts

Precision control charts are developed by analyzing a minimum of 15 to 20 duplicate samples under controlled conditions for an extended period of laboratory time (e.g., 10 to 20 days).

- d. Spiked samples

Spiked samples are samples to which known amounts of a particular constituent have been added. They are used to assess the accuracy of the analytical method by determining how close the measured value is to the actual amount of constituent added.

- e. Accuracy control charts

Accuracy control charts are developed by analyzing a minimum of 15 to 20 samples (spiked samples or reference samples) under controlled conditions.

4. Explain how accuracy warning and control limits are established and when corrective actions should be taken with respect to these limits. (Manual, Chapter 7D, pages 7-9 through 7-10; Laboratory Analysis module, Chapter 2, pages 2-26 through 2-30)

In accuracy control charts, limits are established based on the standard deviations calculated from the analyses of the minimum 15 to 20 samples analyzed. Accuracy limits are established based on standard deviations whose upper and lower control limits are established at three times the standard deviation above and below the central line. Upper and lower warning limits are established at twice the standard deviation above and below the central line. These charts are used on a daily basis to ensure the reliability of the data. When data falls outside the upper or lower warning and control limits, the problem must be identified and corrective action taken and documented.

5. List five procedures that should be used by analytical laboratories to record, process, and report data. (Manual, Chapter 7D, pages 7-10 through 7-11)

The student's answer should include five of the choices listed below:

- a. Correct formulas are used to calculate the final results*
- b. Round-off rules are uniformly applied*
- c. Significant figures are determined for each analysis*
- d. Provisions are available for cross-checking calculations*
- e. Control chart approaches and statistical calculations are determined for QC and reporting*
- f. Report forms are complete, permanent records and facilitate data processing*
- g. The program for data handling has data in the form/units required*
- h. Laboratory records are readily available to the regulatory agency for a minimum of 3 years*
- i. Laboratory notebooks or preprinted data forms are used to provide permanent documentation (see answer to Question 6)*

-
- j. Computer data are backed up with duplicate copies*
 - k. All contract laboratories implement proper data handling and reporting procedures*
6. List five types of data that should be kept in a laboratory analyst's notebook. (Manual, Chapter 7D, page 7-11)
- a. Procedures performed*
 - b. Details of the analysis (i.e., original value recorded, correction factor applied, blanks used, and reported data values)*
 - c. Date of analysis*
 - d. Analyst who performed the tests*
 - e. Any abnormalities occurring during the test procedures*
7. Describe the skills required of professional laboratory personnel and laboratory assistants. (Manual, Chapter 7D, page 7-11)
- Adequate training; ability to follow procedures; skill in using equipment and analytical methods; precision and accuracy in performing analytical tasks; clear understanding of tasks and responsibilities.*
8. Explain the Discharge Monitoring Report Quality Assurance (DMR QA) Program. (Manual, Chapter 7D, page 7-12)
- NPDES permittees are sent performance evaluation samples (containing constituents normally found in industrial and municipal wastewater) to analyze using the analytical methods normally used for their reporting of NPDES self-monitoring data. Responding permittees receive a report showing the evaluation of their data.*
9. List three benefits or positive aspects of the DMR QA Program. (Manual, Chapter 7D, page 7-12)
- The student's answer should include three of the choices listed below:*
- a. Excellent means for focusing on (and improving) the quality of laboratory results used in developing DMR data*
 - b. Helps permittees identify and correct both analytical and data handling problems in their laboratories*
 - c. Makes permittees receptive to the program and recognize its value*
 - d. Regions and States can use the results of the program to target inspections and direct other follow-up activities*
 - e. One of the least resource-intensive methods for maintaining direct and regular contact with permittees*
-

10. Explain the interdependency of the NPDES inspection program and the DMR QA Program. (Manual, Chapter 7D, page 7-13)

The DMR QA evaluations can be used to target inspections and identify potential problems in laboratory analysis or data handling and reporting. Inspections, particularly the PAI, can be used to follow up the DMR QA. The DMR QA results should be cross-checked with permit parameters prior to the onsite visit, and the parameters that failed should be stressed.

UNIT 7	EXAM	15 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time limit listed above.3. Verify the answers with your instructor.4. Correct any errors and clarify questions or problems before proceeding to Unit 8.		

Exam Questions and Answers

1. Define QA. (Manual, Chapter 7A, page 7-1)

QA is a total program (including administrative procedures and policies regarding personnel, resources, and facilities) for ensuring the reliability of data.

2. Define QC. (Manual, Chapter 7A, page 7-1)

QC is the routine application of procedures to control the accuracy and precision of the measurement process. QC is a function of QA. Examples of QC procedures include proper calibration of instruments and the use of appropriate analytical procedures.

3. List the two reference books many standardized test procedures as promulgated under 40 CFR Part 136 are published in. (Manual, Chapter 7C, page 7-5)

a. Methods for Chemical Analysis of Water and Wastes (USEPA 1979)

b. Standard Methods for the Examination of Water and Wastewater (APHA, AWWA, WEF).

4. List four services that all laboratories should have on hand to ensure production of reliable data. (Manual, Chapter 7C, page 7-6)

The student's answer should include four of the choices listed below:

a. Adequate supply of laboratory pure water

b. Adequate supply of dry, uncontaminated, compressed air

c. Efficient fume hood systems

d. Sufficient electrical power

e. Adequate lighting and ventilation

f. Adequate bench, instrumentation, storage, and record-keeping space

g. Appropriate humidity and temperature control

h. Appropriate safety and emergency equipment

i. Vibration-free area for accurate weighing

j. All necessary equipment

5. Written schedules for required or recommended replacement, cleaning, checking, and/or adjustment of laboratory instruments and equipment are not a concern to the inspector. (Manual, Chapter 7C, page 7-7)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

The inspector should verify written schedules for replacement, cleaning, checking, and/or adjustment.

6. Working standards should be checked frequently to determine changes in concentration or composition. (Manual, Chapter 7C, page 7-8)
7. 10 percent of samples should be duplicated. (Manual, Chapter 7D, page 7-9)
8. The upper and lower accuracy control limits are established at three times the standard deviation above and below the central line. (Manual, Chapter 8D, page 8-10)
9. Explain when the laboratory should take corrective actions for precision control limits. (Manual, Chapter 7D, page 7-10)

Corrective actions should be taken when data fall outside the warning and control limits.

10. A laboratory does not need to have provisions for cross-checking calculations. (Manual, Chapter 7D, page 7-10)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Laboratories should have provisions for cross-checking calculations.

11. All incoming samples should be received by a custodian, who then signs the chain-of-custody record sheet accompanying the samples and retains the sheet as a permanent record. (Manual, Chapter 7B, page 7-3)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

UNIT EIGHT

TOXICITY

The inspector's responsibility during a biomonitoring inspection is to attempt to determine whether or not the permittee's toxicity testing program meets the requirements of the permit. The inspector must be familiar with the permittee's toxicity testing requirements as well as with toxicity sampling and monitoring procedures and any modifications to those procedures.

CBI (as opposed to biomonitoring inspections) involve evaluation of a permittee's effluent through the inspecting agency's (i.e., EPA or the State) conduct of toxicity testing. The regulatory agency or inspector may evaluate a permittee's effluent by conducting either onsite or offsite toxicity tests. To ensure successful conduct of a CBI, the inspector must be knowledgeable of sample collection and handling procedures, use of test organisms, facility/equipment needs, and toxicity testing procedures. Topics addressed in this unit (which correspond to Chapter 8 of the Manual and EPA's 1990 *NPDES Compliance Monitoring Inspector Training Biomonitoring* module) include:

- Objectives
- Requirements of WET testing
- Analysis of results.

EXERCISE 8-1	OBJECTIVES	30 MINUTES
<p>NPDES permits impose toxicity testing requirements as a means of assessing the quality or toxicity of a facility's effluent. To effectively evaluate a permittee's self-monitoring program, the inspector must be familiar with toxicity testing requirements and procedures. This exercise provides the inspector with an introduction to such information.</p> <ol style="list-style-type: none">1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.2. Read Chapter 8A of the Manual and Chapter 1 of the <i>NPDES Compliance Monitoring Inspector Training Biomonitoring</i> module.3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. List at least four objectives of a biomonitoring inspection. (Manual, Chapter 8A, page 8-1)

The student's answer should include four of the choices listed below:

- a. *Assess compliance with NPDES permit limits and requirements*
 - b. *Determine compliance with State water quality standards*
 - c. *Evaluate quality of self-monitoring data*
 - d. *Address adequacy of self-monitoring procedures*
 - e. *Document existence or lack of toxic conditions*
 - f. *Identify the need to perform a Toxicity Identification Evaluation (TIE) or Toxicity Reduction Evaluation (TRE)*
 - g. *Develop permit limits*
2. Toxicity is a characteristic of a substance (or group of substances) that causes adverse effects in organisms. (Manual, Chapter 8A, Chapter 8A, page 8-1; Biomonitoring module, Chapter 1, page 1-3)
 3. Explain how toxicity of a substance is measured. (Manual, Chapter 8A, page 8-1)

Toxicity of a substance is measured by observing the responses of organisms to increasing concentrations of that substance.
 4. List five types of NPDES inspections which involve performing or evaluating whole effluent toxicity testing (Manual, Chapter 8A, page 8-1; Biomonitoring module, Chapter 1, pages 1-3 through 1-4)
 - a. *CEI*
 - b. *CSI*
 - c. *PAI*
 - d. *XSI*
 - e. *CBI*

EXERCISE 8-2**REQUIREMENTS OF
WET TESTING****3 HOURS
30 MINUTES**

Inspectors must be familiar with the technical procedures to be followed when conducting effluent biomonitoring or toxicity testing inspections. Procedures and standards exist for effluent and dilution water, test organisms, and record keeping and reporting. These issues are covered in this exercise.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 8B and Appendix H of the Manual and Chapters 2 through 7 of the *NPDES Compliance Monitoring Inspector Training Biomonitoring* module. Watch the video *Conducting a Performance Audit Inspection at a Facility Performing Toxicity Testing*.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. Discuss the difference between acute and chronic toxicity test methods. (Manual, Chapter 8B, page 8-3; Biomonitoring module, Chapter 2, page 2-3)

Acute toxicity tests measure short-term effects with impacts usually resulting in death or extreme physiological disorder to organisms immediately or shortly following exposure. Chronic toxicity tests involve a stimulus that lingers or continues for a relatively long period. A chronic effect may result in death, stunted growth, or reduced reproductive rates.

2. List five protocols or requirements for WET testing that are typically included in a facility's NPDES permit. (Manual, Chapter 5B, pages 8-3 through 8-7; Video)

The student's answer should include five of the following choices:

- a. Sampling location
 - b. Sample type
 - c. Test organism
 - d. Effluent dilutions
 - e. Dilution water source
 - f. Test type
 - g. Test duration
 - h. Toxic effect
3. If an effluent sample is not to be used immediately, describe how it should be preserved. (Manual, Chapter 8B, page 8-4; Biomonitoring module, Chapter 4, page 4-3)

It should be refrigerated or placed on ice to cool the sample to 4°C.

4. Effluent samples must be used within 36 hours of sampling. (Manual, Chapter 8B, page 8-4; Biomonitoring module, Chapter 3, page 3-3; Video)
5. If the DO in an effluent sample is not near saturation, the sample should be aerated. (Video)
6. Discuss dilution water sources and how to determine which source should be used. (Manual, Chapter 8B, page 8-5; Biomonitoring module, Chapter 5, pages 5-1 through 5-2)

The choice of dilution water is generally specified in the NPDES permit and depends on the purpose of the toxicity test. Synthetic dilution water should be used to determine the inherent toxicity of an effluent. To determine an effluent's toxicity relative to the receiving water, the dilution water should be taken from the receiving water.

7. Receiving water that is used as dilution water should be refrigerated if not used in a test within 24 hours. (Manual, Chapter 8B, page 8-6; Biomonitoring module, Chapter 5, page 5-2)
8. Describe problems that can be caused by not removing excess food. (Manual, Chapter 8B, page 8-7; Biomonitoring module, Chapter 6, page 6-6)

Failure to remove excess food can lead to bacterial decomposition which can foul the water and lower DO levels.

9. If a laboratory cultures test organisms onsite, it may house the brood stock in the testing area. (Video)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

The brood stock should be housed separately from the testing area to help prevent potential impact or contamination of the brood stock.

10. Adding dilution water to the water that organisms were raised in prior to a test is called acclimation. (Biomonitoring module, Chapter 6, page 6-6)
11. The zero percent dilution (that is 0% effluent and 100% dilution water), is the control. (Video)
12. Plastic containers and tubing that are used in a toxicity test can be washed and used again. (Manual, Chapter 8B, page 8-6; Biomonitoring module, Chapter 7, page 7-2)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Plastic containers and tubing used in toxicity tests should be discarded after use.

13. No materials containing copper, brass, galvanized metal, rubber, and lead should come into contact with any solution to be used in toxicity testing. (Manual, Chapter 8B, page 8-6; Biomonitoring module, Chapter 7, page 7-2)
14. What should be done with test results obtained when temperatures were outside ranges specified by the test protocol? (Biomonitoring module, Chapter 7, page 7-3)

The test results should be carefully evaluated for acceptability.

-
15. DO should be above 40 percent saturation for tests run at more than 20°C or above 60 percent saturation for tests run at below 20°C. (Manual, Chapter 8B, page 8-7; Biomonitoring module, Chapter 7, page 7-4)
 16. List the five areas or procedures that are generally covered during a PAI at a facility conducting toxicity testing. (Video)
 - a. *Laboratory facility*
 - b. *Test species culturing*
 - c. *Sample collection documentation*
 - d. *Test procedures and conditions*
 - e. *Calculation of results*
 17. List four test conditions that should be evaluated during an inspection of a laboratory conducting toxicity testing. (Video)

The student's answer should include four of the choices listed below:

- a. *Feeding of test organisms*
 - b. *Loading of test organisms*
 - c. *Temperature maintained*
 - d. *Light intensity*
 - e. *Light period*
 - f. *DO and pH in test chambers*
18. In a test with a reference toxicant, what should be done with organisms whose responses are outside the limits specified for that toxicant? (Biomonitoring module, Chapter 6, page 6-5)

The results test should not be used in toxicity testing.

EXERCISE 8-3**ANALYSIS OF RESULTS****30 MINUTES**

Inspectors should be able to analyze and interpret WET test results, including acceptable mortality in controls and abnormalities in test data. Inspectors should also be familiar with the definitions in which test results are expressed so that test results can be compared to permit limits. This exercise familiarizes the inspector with this information.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 8C of the Manual, review Chapter 2 and read Chapter 8 of the *NPDES Compliance Monitoring Inspector Training Biomonitoring* module.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. Mortality in controls not exceed **10** percent for acute tests and **20** percent for chronic tests. (Manual, Chapter 8C, page 8-11; Biomonitoring module, Chapter 8, page 8-1)
2. List three results that would be questionable for acute testing. (Manual, Chapter 8C, page 8-12)
 - a. *Higher mortalities in lower concentrations than in higher concentrations of effluent*
 - b. *100 percent mortality in all effluent dilutions*
 - c. *Greater percent mortality in the control than in the lower dilutions of effluent*
3. The **LC₅₀** is the calculated percentage of effluent at which 50 percent of the test organisms die during the test period. (Manual, Chapter 8C, page 8-12; Biomonitoring module, Chapter 2, page 2-7)
4. The highest tested concentration at which test organisms' responses are not statistically different from the control organisms' responses is called the **No Observable Effect Concentration (NOEC)**. (Manual, Chapter 8C, page 8-13; Biomonitoring module, Chapter 2, page 2-8)
5. The ChV, which stands for **the chronic value**, is calculated by **taking the geometric mean of the NOEC and the least observable effect concentration**. (Biomonitoring module, Chapter 2, page 2-8)

UNIT 8	EXAM	1 HOUR
Instructions 1. Complete this exam without referring to any text or notes. 2. Do not exceed the time limit listed above. 3. Verify the answers with your instructor. 4. Correct any errors and clarify questions or problems before proceeding to Unit 9.		

Exam Questions and Answers

1. List four objectives of a biomonitoring inspection. (Manual, Chapter 8A, page 8-1)

The student's answer should include four of the choices listed below:

- a. Assess compliance with NPDES permit limits and requirements*
- b. Determine compliance with state water quality standards*
- c. Evaluate quality of self-monitoring data*
- d. Assess adequacy of self-monitoring procedures*
- e. Document existence or lack of toxic conditions*
- f. Identify need to perform a TIE or a TRE*
- g. Develop permit limits*

2. Describe how effluent samples used for WET testing purposes should be stored. (Manual, Chapter 8B, page 8-4; Biomonitoring module, Chapter 4, page 4-3)

Effluent samples should be stored at 4°C for less than 36 hours.

3. List four procedures the inspector should evaluate when reviewing a laboratory's test organism handling and maintenance procedures. (Manual, Chapter 7B, page 7-12 and 13)

The student's answer should include four of the choices listed below:

That the organisms are:

- a. Correct organisms for the test*
- b. Fed properly*
- c. Handled as little as possible*

d. Quarantined upon receipt from the outside source

e. Maintained under appropriate DO conditions

That the laboratories:

a. Maintain daily logs of feeding, mortality, and observations

b. Keep records of the source and holding conditions of organisms

4. Explain where receiving water should be obtained for use as dilution water. (Manual, Chapter 8B, page 8-4; Biomonitoring module, Chapter 5, page 5-1)

Receiving water should be collected from a point as close as possible to the outfall, but upstream from (or outside of) the zone influenced by the effluent. The location should be free of other sources of contamination (e.g., other outfalls).

5. Explain when it is necessary to conduct an abbreviated, preliminary range-finding or screening test. (Biomonitoring module, Chapter 2, page 2-1)

A preliminary range-finding or screening test is necessary to determine what concentrations to use in the definitive tests when the approximate toxicity of the effluent is not known.

6. Explain the basis of a definitive toxicity test. (Manual, Chapter 8B, page 8-3; Biomonitoring module, Chapter 2, page 2-1)

In a definitive test several groups of organisms are exposed for a predetermined length of time to solutions containing various proportions of effluent and dilution water. The response of each organism in each test concentration is observed and recorded, and the number of responses is analyzed in relation to the concentrations of effluent to which the organisms were exposed.

7. List the three types of toxicity tests based on how the test organisms are exposed to test solutions. (Manual, Chapter 8B, page 8-4; Biomonitoring module, Chapter 2, page 2-4)

a. Flow-through

b. Static renewal

c. Static

8. Explain how temperature control is manually achieved during toxicity testing. (Manual, Chapter 8B, page 8-6)

Temperature control is achieved using circulating water baths, heat exchangers, or environmental chambers.

UNIT NINE
PRETREATMENT

EPA has developed two types of onsite reviews to evaluate POTW and IU compliance with pretreatment program requirements. These include pretreatment program audits and PCIs. Pretreatment audits evaluate all aspects of a POTW's pretreatment program, and therefore, are more comprehensive than PCIs [which principally evaluate compliance monitoring (sampling and inspection) and enforcement activities]. Unit 9 corresponds to Chapter 9 of the Manual and EPA's 1990 *NPDES Compliance Inspector Training Overview* module. More information on pretreatment program requirements may be obtained from the guidance manuals listed in Chapter 9 of the Manual. Topics covered in this unit include:

- Review of the General Pretreatment Regulations
- PCIs and audits.

EXERCISE 9-1	REVIEW OF THE GENERAL PRETREATMENT REGULATIONS	2 HOURS
<p>Understanding the basic concepts of the General Pretreatment Regulations and the requirements and responsibilities of EPA, States, POTWs, and industries is essential to the inspector's evaluation of pretreatment program implementation and enforcement. These issues are covered in this exercise.</p> <ol style="list-style-type: none">1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.2. Read Chapter 9A of the Manual, 40 CFR Part 403 (the General Pretreatment Regulations), and Chapter 6 of the <i>NPDES Compliance Inspector Training Overview</i> module.3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. List the three specific objectives of the General Pretreatment Regulations. (Manual, Chapter 9A, page 9-1; 40 CFR Part 403; Overview module, Chapter 6, page 6-1)
 - a. *Prevent the introduction of pollutants that would cause interference with the POTW or limit the use and disposal of its sludge*
 - b. *Prevent the introduction of pollutants that would pass through the treatment works or be otherwise incompatible*
 - c. *Improve the opportunities to recycle or reclaim municipal and industrial wastewaters and sludges*

2. List the specific areas in which the Control Authority has responsibility to implement the pretreatment program. (Manual, Chapter 9A, pages 9-3 through 9-4).

The Control Authority has pretreatment program responsibilities in the areas of legal authority, pretreatment standards, industrial user compliance and enforcement, public participation, data management, and resources.

3. Discuss the public-participation requirements that a Control Authority must meet to adequately implement its pretreatment program. [Manual, Chapter 9A, page 9-5; 40 CFR 403.5(c)(3) and 40 CFR 403.8(f)(2)(vii)]

The Control Authority must publish a list of IUs that were in significant noncompliance within the past 12 months as defined in 40 CFR 403.8(f)(2)(vii), must notify the public of any changes in the local limits after program approval, and must submit pretreatment program modifications to the Approval Authority.

4. List three types of discharge standards or requirements with which industrial dischargers must comply. (Manual, Chapter 9A, page 9-6; 40 CFR Part 403)
 - a. *Prohibited discharge standards*
 - b. *Appropriate pretreatment standards (categorical standards, State requirements, or local limits)*
 - c. *Reporting requirements*

5. List five types of reports required of IUs by 40 CFR 403.12. (Manual, Chapter 9A, page 9-10; 40 CFR 403.12)

The student's answer should include five of the choices listed below:

- a. *Baseline Monitoring Report (BMR)*
- b. *Compliance schedule progress report*
- c. *90-day compliance report*
- d. *Periodic compliance report*
- e. *Notices of potential problems (including slug loadings)*

- f. Notice of changed discharge*
- g. Notice of violation and resampling*
- h. Notice of discharge of hazardous waste*

6. Describe briefly when the Combined Wastestream Formula (CWF) is needed and the purpose of its use. [Manual, Chapter 9A, page 9-6; 40 CFR 403.6(e)]

The CWF is needed when the industry combines the flows from more than one regulated process or combines a regulated flow with other flows. This formula adjusts the categorical pretreatment standard to account for the combined flow.

7. Explain the basis of categorical pretreatment standards and their point of application. (Manual, Chapter 9A, page 9-6; 40 CFR 403.6)

Categorical pretreatment standards are developed by EPA and are based on the characteristic wastes produced by the manufacturing processes at each type of industry, available wastewater control technologies, and economic considerations. The standards apply at the point of discharge from the pretreatment unit for the regulated process, or at the point of discharge of the process wastewater.

8. Explain who (EPA, the State, or the Control Authority) is responsible for establishing and periodically re-evaluating local limits to prevent interference, pass through, and/or sludge contamination. [Manual, Chapter 9A, page 9-4; 40 CFR 403.5(c)]

The Control Authority is responsible for these tasks.

EXERCISE 9-2**PCIs AND AUDITS****30 MINUTES**

PCIs and audits evaluate POTW and IU efforts to meet Federal, State, and local POTW program requirements. NPDES inspectors are asked to conduct PCIs in conjunction with visits to POTWs for other NPDES inspections. This exercise and the corresponding text provide inspectors with an introduction to, and an overview of, PCIs and audits.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 9B of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. Discuss the differences between a PCI and an audit. (Manual, Chapter 9B, page 9-19; Overview module, Chapter 6, pages 6-2 and 6-9)

PCIs evaluate the Control Authority's compliance monitoring and enforcement activities. The audit is a more comprehensive, resource-intensive review of all facets of the POTW's pretreatment program. In addition to the items covered in a PCI, an audit covers legal authority, application of pretreatment standards, data management, and program resources.

2. Describe previsit preparation responsibilities. (Manual, Chapter 9B, page 9-16)

To prepare for an audit or a PCI, the inspector should:

- a. *Coordinate the visit with the EPA Regional or State Pretreatment Coordinator*
- b. *Review background information (such as approved program annual report, NPDES permit compliance status, etc.)*
- c. *Notify Control Authority officials (if appropriate).*

3. Describe onsite responsibilities. (Manual, Chapter 9B, page 9-16)

- a. *Entry*
- b. *Conduct opening conference*
- c. *Review pretreatment program files*
- d. *Inspect industries (optional)*
- e. *Interview Control Authority officials*
- f. *Tour the POTW (optional)*
- g. *Conduct the closing conference*

UNIT 9	EXAM	45 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time limit above.3. Verify all the answers with your instructor.4. Correct any errors and clarify questions or problems before proceeding to Unit 10.		

Exam Questions and Answers

1. Identify the part and section of the CFR which sets forth State and POTW regulations and requirements of the National Pretreatment Program. (Manual, Chapter 9A, page 9-1)

40 CFR Part 403.

2. List the three objectives of the General Pretreatment Regulations. (Manual, Chapter 9A, page 9-1)
 - a. *To prevent the introduction of pollutants that would cause interference with the POTW or limit the use and disposal of its sludge*
 - b. *To prevent the introduction of pollutants that would pass through the treatment works or be otherwise incompatible*
 - c. *To improve the opportunities to recycle and reclaim municipal and industrial wastewaters and sludge*
3. Define the terms "interference" and "pass through." (Manual, Chapter 9A, page 9-2; 40 CFR Part 403.3)
 - a. *Interference is a discharge that, alone or in conjunction with discharges from other sources, inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use, or disposal, and therefore causes a violation of any requirement of the POTW's NPDES permit or prevents sewage sludge use or disposal in compliance with statutory provisions or regulations.*
 - b. *Pass through is a discharge that exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a NPDES permit violation.*

4. List five of the specific prohibitions in 40 CFR 403.5(b). (Manual, Chapter 9A, page 9-8; 40 CFR Part 403.5)

The student's answer should include five of the choices listed below:

- a. *Pollutants which create a fire or explosive hazard (including with closed-cup flashpoint of less than 140°F or 60°C)*
- b. *Pollutants which will cause corrosive structural damage or have a pH lower than 5.0*
- c. *Solid or viscous pollutants in amounts which cause obstructions resulting in interference*

- d. Pollutants, including oxygen-demanding pollutants, released at a flow rate and/or pollutant concentration which will cause interference*
 - e. Heat in amounts which will inhibit biological activity at the POTW or increase the temperatures above 104°F at the treatment plant*
 - f. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts which cause interference or pass through*
 - g. Pollutants which result in the presence of toxic gas, vapors, or fumes within the POTW in a quantity which causes acute worker health and safety problems*
 - h. Any trucked or hauled pollutants, except at designated discharge points*
5. A POTW with an approved pretreatment program is located in a State that has not been approved by EPA to implement a State pretreatment program. List the Control Authority and the Approval Authority. (Manual, Chapter 9A, page 9-2)
- a. POTW*
 - b. EPA*
6. Metal finishing is a Federally regulated category with specific discharge standards for IUs. (Manual, Chapter 9A, page 9-13; 40 CFR Part 403.6)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

7. A POTW has developed local limits that are less stringent than Federal categorical standards promulgated for the electrical and electronic components industry. An industry, which is subject to those Federal standards, discharges process wastewaters directly to the sewer without combining with other wastestreams. The POTW may apply the less stringent local limits to the IU's discharge. (Manual, Chapter 9A, page 9-6)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Control Authorities must apply the most stringent standards or limits and may not waive categorical pretreatment standards.

8. The PCI is a comprehensive review of all facets of a POTW's pretreatment program. (Manual, Chapter 9B, page 9-15; Overview module, Chapter 6, pages 6-2 and 6-9)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

The audit is a more comprehensive review of a POTW's pretreatment program than the PCI.

UNIT TEN

SEWAGE SLUDGE

EPA has promulgated technical standards for the use or disposal of sewage sludge. Consequently, sludge use and disposal requirements are being included in NPDES permits when they are reissued. Evaluation of sludge management activities and compliance with sewage sludge regulations is intended to be incorporated into the existing inspection structure. Therefore, inspectors need to be familiar with the sewage sludge regulations and how to evaluate a facility's compliance with those regulations. Unit 10 corresponds to Chapter 10 of the Manual. Topics covered in this unit include:

- Review of the sewage sludge regulations
- Sludge inspection procedures.

EXERCISE 10-1	REVIEW OF THE SEWAGE SLUDGE REGULATIONS	45 MINUTES
Understanding the sewage sludge regulations and their applicability to generators and preparers of sewage sludge is necessary so that inspectors can adequately determine compliance. This exercise provides an overview of the sewage sludge regulations.		
1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.		
2. Read Chapter 10A of the Manual.		
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. List the three sewage sludge use and disposal practices for which technical standards have been promulgated under 40 CFR Part 503. (Manual, Chapter 10A, page 10-1)
 - a. *Land application*
 - b. *Surface disposal*
 - c. *Incineration*

-
2. List the five types of requirements under 40 CFR Part 503. (Manual, Chapter 10A, page 10-2)
- a. Pollutant limits*
 - b. Pathogen and vector attraction reduction requirements*
 - c. Management practices*
 - d. Monitoring requirements*
 - e. Record-keeping and reporting requirements*
3. Most sewage sludge records for land application and surface disposal are required to be maintained for a minimum of five years. (Manual, Chapter 10A, pages 10-4 and 10-5)
4. Pathogen reduction treatment processes used to achieve Class A sludge are referred to as Processes to Further Reduce Pathogens (PFRP), and treatment processes used to achieve Class B sludge are referred to as Processes to Significantly Reduce Pathogens (PSRP). (Manual, Chapter 10A, page 10-4)
5. List the three classes of facilities that are required to report at least once per year under 40 CFR Part 503. (Manual, Chapter 10A, page 10-5)
- a. Class 1 sludge management facilities*
 - b. POTWs with a design capacity greater than or equal to 1 MGD*
 - c. POTWs serving a population of 10,000 or more*
6. Surface disposal sites that are equipped with a liner and leachate collection system are not required to meet any pollutant concentration limits. (Manual, Chapter 10A, page 10-5)
- TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)
7. List the 40 CFR Part 503 three types of monitoring requirements for sewage sludge incinerators. (Manual, Chapter 10A, page 10-6)
- a. Sewage sludge pollutant concentrations (metals)*
 - b. Incinerator stack exit gases (total hydrocarbon or CO, oxygen concentrations, and moisture content)*
 - c. Incinerator combustion temperatures and air pollution control equipment operating parameters*

EXERCISE 10-2**SLUDGE INSPECTION PROCEDURES****1 HOUR
30 MINUTES**

Inspectors should incorporate evaluation of sewage sludge use and disposal practices into existing inspections as much as possible. This exercise provides inspectors with an introduction to how to evaluate whether a facility is in compliance with the sewage sludge regulations, including sample collection and analysis.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 10B and Appendices I and J of the Manual and watch the video *Sampling Sewage Sludge*.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List the six steps an inspector should do while preparing for an inspection. (Manual, Chapter 10B, pages 10-10 through 10-11)
 - a. *Review the facility's NPDES permit*
 - b. *Review sludge self-monitoring data*
 - c. *Become familiar with sludge disposal practice used*
 - d. *Review Federal regulations*
 - e. *Review relevant guidance*
 - f. *Verify that permittee's records facilitate compliance evaluation*
2. List five items that should be included in a sewage sludge sampling plan. (Video)

The student's answer should include five of the following choices.

- a. *Sample parameters*
- b. *Types of sludge treatment units to identify sampling location*
- c. *Sample collection techniques*
- d. *Sample amount required*
- e. *Appropriate sampling equipment*
- f. *QC procedures*
- g. *Safety equipment*

-
3. In general terms, describe where sewage sludge samples should be collected. (Manual, Chapter 10B, pages 10-12 and 10-17, Video)

Sewage sludge samples should be collected from the treatment process immediately prior to disposal or end use.

4. In general terms, describe how composite samples are collected for metals analysis. (Video)

Collect a series of grab samples or aliquots periodically over the discharge period and place in a clean bucket. The bucket must be kept on ice. After all samples are collected, the sludge in the bucket is mixed and used to fill the sample containers.

5. Describe how sewage sludge samples should be preserved in the field. (Manual, Chapter 10B, pages 10-12 and 10-17, Video)

Sewage sludge samples should not be chemically preserved in the field but should be chilled to 4°C.

6. Describe where in the Code of Federal Regulations approved analytical methods for sewage sludge analyses are listed. (Manual, Chapter 10B, page 10-13)

Approved analytical methods for sewage sludge analyses are listed in 40 CFR 503.8.

7. List the three elements related to sewage sludge laboratory analysis that are evaluated during a PAI. (Manual, Chapter 10B, pages 10-17 through 10-18)

a. Permittee sample handling procedures in the laboratory

b. Laboratory analysis techniques

c. QA/QC procedures

8. Part 503 pollutant standards are expressed on a *dry weight* basis. (Manual, Chapter 10B, page 10-18)

9. Describe the sewage sludge parameter that must be known to convert pollutant concentrations from a wet to a dry weight basis. (Manual, Chapter 10B, page 10-19)

The percent total solids of the sludge must be known to be able to convert pollutant concentrations from a wet to a dry weight basis.

10. Describe the appropriate location and method for sampling composted sludge. (Manual, Chapter 10B, page 10-23; Video)

Full core samples of composted sludge should be collected from randomly selected sites in the compost pile. No less than four core samples should be collected and mixed together. Alternatively, sludge should be sampled from the front-end loader or other conveyance device as the sludge is being loaded into trucks to be hauled away.

11. List the appropriate records that may be kept to demonstrate compliance with Class A, Alternative A1, pathogen reduction. (Manual Chapter 10B, page 10-24)
 - a. Analytical results for the density of Salmonella sp. bacteria or fecal coliform*
 - b. Sludge temperature*
 - c. Time temperature is maintained*
12. List the appropriate records that may be kept to demonstrate compliance with vector attraction reduction Option 1. (Manual, Chapter 10B, page 10-27)
 - a. Volatile solids concentration of raw and final sludge streams*
 - b. Calculations showing 38 percent reduction in volatile solids*

UNIT 10	EXAM	30 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time listed above.3. Verify the answers with your instructor.4. Correct any errors and clarify questions or problems before proceeding to Unit 11.		

Exam Questions and Answers

1. List the three sewage sludge use and disposal practices for which technical standards have been promulgated under 40 CFR Part 503. (Manual, Chapter 10A, page 10-1)
 - a. *Land application*
 - b. *Surface disposal*
 - c. *Incineration*
2. All sewage sludge that is land applied must meet ceiling concentration pollutant limits. (Manual, Chapter 10A, page 10-3)
3. Part 503 regulations contain management practices for siting and operation of sludge use and disposal activities. (Manual, Chapter 10A, page 10-2)
4. Vector attraction reduction requirements are intended to reduce the characteristics of sewage sludge that attract disease vectors. (Manual, Chapter 10A, page 10-4)
5. Required minimum self-monitoring frequencies for land application or surface disposal of sewage sludge are based on the volume of sewage sludge land applied or disposed of. (Manual, Chapter 10A, pages 10-4 through 10-5)
6. In general, sewage sludge records must be maintained for a minimum of three years. (Manual, Chapter 10A, pages 10-4 and 10-5)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Sewage sludge records must be maintained for a minimum of five years.

7. Samples for pathogen analyses should be collected directly into sterile sampling containers. (Video)
8. Describe how sewage sludge samples should be preserved in the field. (Manual, Chapter 10B, pages 10-12 and 10-17)

Sewage sludge samples should not be chemically preserved in the field but should be chilled to 4°C.

9. Sample containers for liquid sewage sludge should be completely filled for all pollutant analyses. (Video)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Except for samples collected for volatile organics analysis, a head space should be left in the sample containers to allow for expansion in the event of gas production.

10. Approved analytical methods for sewage sludge analyses are contained in 40 CFR Part 136. (Manual, Chapter 10B, page 10-13)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Approved analytical methods for sewage sludge analyses are listed in 40 CFR 503.8.

UNIT ELEVEN

STORM WATER

Under the storm water regulations, certain point source storm water dischargers must apply for a storm water discharge permit. As a result, NPDES inspectors may be inspecting facilities which have NPDES permits that include storm water requirements and conditions. To be able to assess a facility's compliance with the storm water regulations and applicable permit requirements, inspectors need to be familiar with the regulations. Unit 11 corresponds to Chapter 11 of the Manual. Topics covered in this unit include:

- Storm water regulations
- Storm water permits
- Sampling and inspection considerations.

EXERCISE 11-1**STORM WATER REGULATIONS****45 MINUTES**

Understanding the storm water regulations and their applicability to facilities being inspected is necessary so that inspectors can adequately determine compliance. This exercise provides an introduction to the storm water regulations and permit application procedures.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 11A of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List the three general types of dischargers that are regulated under the storm water regulations. (Manual, Chapter 11A, page 11-7)
 - a. *Sites with industrial activities (11 categories)*
 - b. *Medium separate storm sewers*
 - c. *Large separate storm sewers*

2. List the three types of permit applications for storm water discharges associated with industrial activities. (Manual, Chapter 11A, page 11-5)

a. Individual permit applications

b. Group permit applications

c. General permit applications

3. Describe what a light industrial facility that determines that there is no exposure to storm water should do. (Manual, Chapter 11A, page 11-3)

A light industrial facility that determines that there is no exposure to storm water should document the evaluation that led to that determination and retain the documentation onsite.

4. Industrial storm water discharges include immediate access roads and rail lines that are used by a facility's carriers of raw materials, products, waste materials, or by-products. (Manual, Chapter 11A, page 11-3).

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

5. Industrial facilities that want to be covered under a general permit must file a Notice of Intent (NOI). (Manual, Chapter 11A, page 11-6)

6. Under Section 402(p)(4) of the CWA, permits must require compliance no later than 3 years after the permit issuance date. (Manual, Chapter 11A, page 11-8)

EXERCISE 11-2**STORM WATER PERMITS****45 MINUTES**

To be able to determine a facility's compliance with applicable storm water regulations, inspectors need to be familiar with conditions normally included in storm water discharge permits. These issues are covered in this exercise.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 11B of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List five requirements included in EPA's baseline general permits. (Manual, Chapter 11B, page 11-15)

The student's answer should include five of the choices listed below:

- a. *Applicability*
 - b. *Storm water Pollution Prevention Plans*
 - c. *Effluent limits*
 - d. *Monitoring and reporting requirements*
 - e. *Standard permit conditions*
 - f. *Special conditions*
 - g. *Reopener language*
 - h. *Notice of Termination (NOT) provisions*
2. Pollution Prevention Plans for industrial activities must contain a description of **potential pollutant sources** and a description of **measures and controls** to prevent or minimize pollution of storm water. (Manual, Chapter 11B, page 11-15)
 3. List three types of pollutant measures or controls that may be included in a Pollution Prevention Plan for industrial activities. (Manual, Chapter 11B, page 11-16)

The student's answer should include three of the choices listed below:

- a. *Good housekeeping of industrial areas exposed to storm water*
- b. *Preventative maintenance of storm water controls and other facility equipment*
- c. *Spill prevention and response procedures*
- d. *Outfall testing for cross connections*
- e. *Employee pollution prevention training*

4. The EPA baseline general permit includes additional requirements for facilities that have discharges associated with industrial activity and are subject to **Section 313 of Emergency Planning and Community Right-to-Know (EPCRA) for chemicals classified as Section 313 water priority chemicals**. (Manual, Chapter 11B, page 11-17)
5. List the three types of controls that must be included in Pollution Prevention Plans for construction activity. (Manual, Chapter 11B, page 11-19)
 - a. *Erosion and sediment controls*
 - b. *Storm water management controls*
 - c. *Other controls*
6. List the four types of pollutant sources that must be addressed in storm water management programs for municipal separate storm sewer systems. (Manual, Chapter 11B, page 11-21)
 - a. *Runoff from residential and commercial areas*
 - b. *Storm water runoff from industrial areas*
 - c. *Runoff from construction sites*
 - d. *Non-storm water discharges*

EXERCISE 11-3**SAMPLING AND INSPECTION
CONSIDERATIONS****1 HOUR
15 MINUTES**

Inspectors should be familiar with sources of storm water pollutants and procedures for collecting samples to characterize these pollutants. In addition, inspectors should be familiar with storm water flow measurement considerations and inspecting for illicit connections. These issues are covered in this exercise.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 11C of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List the six activities associated with industrial activities that have been identified as major potential sources of storm water pollutants. (Manual, Chapter 11C, page 11-27)
 - a. *Loading and unloading of bulk materials*
 - b. *Outdoor storage of raw materials or products*
 - c. *Outdoor process activities*
 - d. *Dust or particle generating processes*
 - e. *Illicit connections*
 - f. *Waste disposal practices*

2. List three conditions that make storm water sampling difficult and may require adjustment to sampling plans. (Manual, Chapter 11C, page 11-29)

The student's answer should include three of the choices listed below:

- a. *No rainfall*
 - b. *Hazardous weather conditions*
 - c. *Non-representative storm event*
 - d. *Duration between storm events*
 - e. *Form of precipitation*
 - f. *Accessibility of sampling locations*
3. The storm water regulations specify that the storm event to be sampled must be at least **72 hours** after the previously measurable storm event (greater than 0.1 inches). (Manual, Chapter 11C, page 11-29)
 4. EPA's general storm water permit requires that monitoring records be maintained for a minimum of **6 years**. (Manual, Chapter 11C, page 11-30)

5. List four items the inspector should assess to verify that outfalls receive storm water discharges from substantially identical outfalls. (Manual, Chapter 11C, page 11-30)
 - a. *Industrial activities and processes*
 - b. *Significant materials that may be exposed to storm water*
 - c. *Storm water management and material management practices*
 - d. *Flows*
6. List the four most common methods of measuring storm water flow. (Manual, Chapter 11C, page 11-31)
 - a. *Runoff coefficient method*
 - b. *Float method*
 - c. *Slope and depth method*
 - d. *Bucket and stopwatch method*
7. List and describe the two types of illicit connections to storm sewer systems. (Manual, Chapter 11C, page 11-31)
 - a. *Pronounced connections are direct hookups to the sewer system*
 - b. *Subtle connections are indirect, intermittent, and usually without piping*
8. List the two steps an inspector can follow to evaluate facilities for illicit connections. (Manual, Chapter 11C, page 11-32)
 - a. *Screen the facility for indications of possible illicit connections*
 - b. *Investigate for identification of actual illicit connections if indications exist*
9. List four conditions that may indicate that an illicit connection exists. (Manual, Chapter 11C, page 11-33)
 - a. *Dry weather flows*
 - b. *Odors, residues, color, floatables, or other noticeable properties in the outfall*
 - c. *Affected vegetation in the area of the outfall*
 - d. *Structural damage*

UNIT 11	EXAM	30 MINUTES
<p>Instructions</p> <ol style="list-style-type: none"> 1. Complete this exam without referring to any text or notes. 2. Do not exceed the time listed above. 3. Verify the answers with your instructor. 4. Correct any errors and clarify questions or problems before proceeding to Unit 12. 		

1. List the three general types of dischargers that are regulated under the storm water regulations. (Manual, Chapter 11A, page 11-7)

a. Sites with industrial activities (11 categories)

b. Medium separate storm sewers

c. Large separate storm sewers

2. List three types of pollutant measures or controls that may be included in a Pollution Prevention Plan for industrial activities. (Manual, Chapter 11B, page 11-16)

The student's answer should include three of the choices listed below:

a. Good housekeeping of industrial areas exposed to storm water

b. Preventative maintenance of storm water controls and other facility equipment

c. Spill presentation and response procedures

d. Outfall testing for cross connections

e. Employee pollution prevention training

3. List the four types of pollutant sources that must addressed in storm water management programs for municipal separate storm sewer systems. (Manual, Chapter 11B, page 11-21)

a. Runoff from residential and commercial areas

b. Storm water runoff from industrial areas

c. Runoff from construction sites

d. Non-storm water discharges

4. List six activities associated with industrial activities that have been identified as major potential sources of storm water pollutants. (Manual, Chapter 11C, page 11-27)

a. Loading and unloading of dry bulk materials or liquids

b. Outdoor storage of raw materials or products

c. Outdoor process activities

d. Dust or particle generating processes

e. Illicit connections

f. Waste disposal practices

5. The storm water regulations allow permittees to sample and report monitoring data on only one of two or more substantially identical outfalls. (Manual, Chapter 11C, page 11-30)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

6. The runoff coefficient method of estimating storm water flow is very accurate. (Manual, Chapter 11C, page 11-31)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

The runoff coefficient method of flow measurement is the least accurate method for estimating flows.

7. Conductivity and pH are two tests that can be key indicators of non-storm water discharges. (Manual, Chapter 11C, page 11-33)

UNIT TWELVE

COMBINED SEWER OVERFLOWS

Many municipalities have combined sanitary and storm sewer systems that result in Combined Sewer Overflows (CSOs) during wet weather events. Since these CSOs are considered point sources of pollution, they are subject to the NPDES permit program. NPDES inspectors may have to determine a facility's compliance with EPA's 1994 CSO control policy and CSO conditions contained in NPDES permits. Unit 12 corresponds to Chapter 12 of the Manual. Topics covered include:

- The CSO control policy
- CSO inspection procedures.

EXERCISE 12-1	THE CSO CONTROL POLICY	30 MINUTES
<p>Inspectors should be familiar with EPA's CSO control policy so that a facility's compliance with that policy can be determined. This exercise provides an overview of the EPA's CSO control policy.</p> <ol style="list-style-type: none">1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.2. Read Chapter 12A of the Manual.3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. CSOs are not subject to secondary treatment requirements. (Manual, Chapter 12A, page 12-1)
TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)
2. List the four steps that the CSO control policy encourages permittees to take. (Manual, Chapter 12A, pages 12-1 through 12-2)
 - a. *Implement nine minimum CSO control measures*
 - b. *Develop a Long-Term CSO Control Plan (LTCP)*
 - c. *Implement the LTCP*
 - d. *Implement a post-construction compliance monitoring program*

3. List the nine minimum CSO controls. (Manual, Chapter 12A, page 12-3)
 - a. Proper operation and maintenance of the sewer system and CSOs*
 - b. Maximum use of the collection system for storage*
 - c. Review and modification of pretreatment requirements*
 - d. Maximization of flow to the POTW*
 - e. Prohibition of dry weather CSOs*
 - f. Control of solid and floatable materials in CSOs*
 - g. Establishment of pollution prevention programs*
 - h. Public notification*
 - i. Monitoring to characterize CSO impacts and effectiveness of CSO controls*
4. List the nine elements of LTCs. (Manual, Chapter 12A, page 12-3)
 - a. Characterization, monitoring, and modeling of the combined sewer system*
 - b. Public participation*
 - c. Consideration of sensitive areas*
 - d. Evaluation of alternatives*
 - e. Cost/performance considerations*
 - f. Operational plan*
 - g. Maximizing treatment*
 - h. Implementation schedule*
 - i. Post-construction compliance monitoring program*

EXERCISE 12-2**CSO INSPECTION PROCEDURES****45 MINUTES**

Inspectors should evaluate a facility's compliance with its NPDES CSO permit conditions and the CSO policy. This exercise covers basic CSO inspection procedures.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 12B of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List the two documents in which requirements for CSO control can be found. (Manual, Chapter 12B, page 12-5)
 - a. *The NPDES permit*
 - b. *Enforcement orders*
2. After permit issuance, permittees are usually given 2 years to submit a report documenting implementation of the nine minimum controls. (Manual, Chapter 12B, page 12-5)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

3. List five areas for which the compliance inspector should obtain information to determine compliance. (Manual, Chapter 12B, page 12-5)

The student's answer should include five of the choices listed below:

- a. *Elimination of dry weather CSOs*
 - b. *Implementation of the nine minimum controls*
 - c. *Schedule for development of LTCP*
 - d. *Schedule for implementation of CSO controls*
 - e. *Water quality-based effluent limits*
 - f. *Monitoring program*
 - g. *Elimination or relocation of overflows from sensitive areas*
4. List the four steps inspectors may take when determining compliance with CSO controls. (Manual, Chapter 12B, pages 12-5 through 12-8)
 - a. *Preparation*
 - b. *Onsite records review*
 - c. *Interviews*

d. Facility site inspection

5. List four types of CSO records a facility may maintain. (Manual, Chapter 12B, page 12-7)
- a. Log books, reports, or internal memos describing maintenance and operations activities*
 - b. CSO outfall flow records*
 - c. CSO, collection system, or receiving stream monitoring data*
 - d. Records pertaining to installation of CSO controls*
6. A schedule submitted by a permittee in its LTCP is an enforceable schedule. (Manual, Chapter 12B, page 12-7)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

A schedule submitted by the permittee in its LTCP is not an enforceable schedule. Only schedules in a permit or enforcement order are enforceable.

7. List five examples of records or documents a permittee may maintain to demonstrate proper operation and maintenance of the combined sewer system. (Manual, Chapter 12B, page 12-9)
- a. Log of sewer system cleaning, flushing, or debris removal*
 - b. Log of repair or maintenance of regulators*
 - c. Log of lift station malfunctions and repairs made*
 - d. Log of preventative maintenance of interceptor lift stations and pumps*
 - e. Log of inspections of lift stations, sewer lines, and regulators*
8. Describe what the inspector should do if any dry weather CSO discharges are observed. (Manual, Chapter 12B, page 12-8)

The inspector should make a photographic record, conduct in-depth interviews, and obtain statements if dry weather CSO discharges are observed.

UNIT 12	EXAM	15 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time listed above.3. Verify the answers with your instructor.4. Correct any errors and clarify questions or problems before proceeding to Unit 13.		

1. List the four steps that the CSO control policy encourages permittees to take. (Manual, Chapter 12A, page 12-1)
 - a. *Implement nine minimum CSO control measures*
 - b. *Develop a Long-Term CSO Control Plan (LTCP)*
 - c. *Implement the LTCP*
 - d. *Implement a post-construction compliance monitoring program*
2. List the nine minimum CSO controls. (Manual, Chapter 12A, page 12-3)
 - a. *Operation and maintenance of the combined sewer system and CSOs*
 - b. *Maximum use of the collection system for storage*
 - c. *Review and modification of pretreatment requirements*
 - d. *Maximization of flow to the POTW*
 - e. *Prohibition of dry weather CSOs*
 - f. *Control of solid and floatable materials in CSOs*
 - g. *Establishment of pollution prevention programs*
 - h. *Public notification*
 - i. *Monitoring to characterize CSO impacts and effectiveness of CSO controls*
3. List the two documents in which requirements for CSO control can be found. (Manual, Chapter 12B, page 12-5)
 - a. *The NPDES permit*
 - b. *Enforcement orders*

4. Inspections of CSO outfalls are routinely conducted as part of NPDES inspections. (Manual, Chapter 12B, page 12-8)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Inspections of CSO outfalls are not routinely conducted as part of NPDES inspections. However, inspection of the CSO structures, treatment systems, or areas of the collection system may be necessary to determine compliance with CSO requirements.

UNIT THIRTEEN

POLLUTION PREVENTION

The goal of pollution prevention is to achieve the reduction of pollution by the elimination or reduction of waste. Although inspectors may be limited in incorporating pollution prevention assessments into NPDES inspections, inspectors can identify pollution prevention options that would improve compliance. Therefore, inspectors should be familiar with the basics in identifying pollution prevention opportunities. Topics covered in the exercises in this unit (which corresponds to Chapter 13 of the Manual) include:

- Overview of pollution prevention
- Pollution prevention for industrial facilities
- Pollution prevention for municipal wastewater treatment plants.

EXERCISE 13-1	OVERVIEW OF POLLUTION PREVENTION	30 MINUTES
<p>To be able to identify pollution prevention opportunities, inspectors should be familiar with the goals and benefits of pollution prevention and the waste management hierarchy. These issues are covered in this exercise.</p> <ol style="list-style-type: none">1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.2. Read Chapter 13A of the Manual.3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. Pollution prevention is intended to minimize or eliminate pollutants released without shifting pollutants from one media to another. (Manual, Chapter 13A, page 13-1)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

2. List four ways by which a facility can implement pollution prevention. (Manual, Chapter 13A, page 13-1)
 - a. *Equipment or technology modifications*
 - b. *Process or procedure modifications*
 - c. *Raw materials substitution*
 - d. *Improvements in housekeeping, maintenance, training, and/or inventory control*

3. List the four levels of the waste management hierarchy. (Manual, Chapter 13A, pages 13-2 through 13-3)

- a. *Source reduction*
- b. *Recycling*
- c. *Waste treatment*
- d. *Waste disposal*

4. Describe source reduction. (Manual, Chapter 13A, page 13-2)

Source reduction is the use of materials, processes, or practices that reduce or eliminate the quantity and toxicity of wastes at the point of generation. Source reduction opportunities include raw material substitution, improved operating practices, and process and equipment modifications.

5. Evaporating spent electroplating baths is an example of pollution prevention. (Manual, Chapter 13A, page 13-3)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Evaporation is an example of waste treatment and not of pollution prevention.

6. List three direct benefits of pollution prevention. (Manual, Chapter 13A, pages 13-4 and 13-6)

The student's answer should include three of the choices listed below:

- a. *Improved environmental compliance*
- b. *Cost savings*
- c. *Improved worker health and safety*
- d. *Reduced amounts of pollution released to the environment*
- e. *Public recognition*

EXERCISE 13-2**POLLUTION PREVENTION FOR
INDUSTRIAL FACILITIES****45 MINUTES**

During inspections of industrial facilities, inspectors can identify pollution prevention opportunities through evaluation of facility layout, equipment and processes, and waste generation, handling, and disposal. This exercise covers the basics of identifying pollution prevention opportunities at industrial facilities.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 13B of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List the four phases of pollution prevention opportunity assessments. (Manual, Chapter 13B, page 13-7)
 - a. *Planning and organization*
 - b. *Assessment*
 - c. *Feasibility analysis*
 - d. *Implementation*
2. To better enable the inspector to identify pollution prevention opportunities, detailed information should be collected to develop a flow diagram or material balance for each process step. (Manual, Chapter 13B, page 13-7)
3. List the six areas or activities the inspector should focus on during the facility site visit. (Manual, Chapter 13B, page 13-10)
 - a. *Loading and unloading operations*
 - b. *In-plant transfers*
 - c. *Process operations*
 - d. *Housekeeping practices*
 - e. *Maintenance activities*
 - f. *Waste management operations*
4. List the four types of wastestreams that should be evaluated during a facility site visit. (Manual, Chapter 13B, page 13-10)
 - a. *Wastewater*
 - b. *Air emissions*
 - c. *Hazardous wastes*

d. Nonhazardous solid wastes

5. List two examples of how a facility could achieve the goal of pollution prevention through the use of fewer resources. (Manual, Chapter 13B, page 13-11)

The student's answer should include two of the choices listed below:

- a. Installing flow restrictors on rinse waters*
 - b. Installing high efficiency boilers and furnaces*
 - c. Using heat exchangers to heat process water*
6. List the five pieces of information the inspector should gather information on for each identified wastestream. (Manual, Chapter 13B, page 13-10)
- a. Whether the wastes are hazardous or nonhazardous*
 - b. Other physical and chemical characteristics of wastes and emissions*
 - c. Actual points of generation*
 - d. Quantities*
 - e. Handling, treatment, and storage procedures*

EXERCISE 13-3**POLLUTION PREVENTION FOR
MUNICIPAL WASTEWATER TREATMENT PLANTS****30 MINUTES**

The Municipal Water Pollution Prevention (MWPP) program promotes the application of pollution prevention concepts to POTWs. During inspections of POTWs, inspectors can assess the POTW's current pollution prevention practices and identify pollution prevention opportunities. These issues are covered in this exercise.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 13C of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. List four benefits for implementing pollution prevention at POTWs. (Manual, Chapter 13C, page 13-15)
 - a. *Reduced need for capital investment*
 - b. *Improved worker health and safety*
 - c. *Improved sludge quality*
 - d. *Reduced operation and maintenance costs*
2. List three benefits of reducing sewer system infiltration/inflow. (Manual, Chapter 13C, page 13-16)
 - a. *Reduced plant expansion needs*
 - b. *Improved performance efficiency*
 - c. *Reduced amounts of grit*
3. Implementing pollution prevention through the pretreatment program is one of the best ways to control pollutants at their source. (Manual, Chapter 13C, page 13-16)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

4. List five areas on which POTWs could focus pollution prevention practices. (Manual, Chapter 13C, page 13-15)

The student's answer should include five of the choices listed below:

- a. *Operation and maintenance*
- b. *Reduced wastewater flows and pollutant loadings*
- c. *Energy and water conservation*

- d. Planning and financing future needs and economic growth*
- e. Toxicity reductions*
- f. Recycling*
- g. Proper waste treatment*
- h. Beneficial use of sludge*

UNIT 13	EXAM	15 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time listed above.3. Verify the answers with your instructor.4. Correct any errors and clarify questions or problems before proceeding to Unit 14.		

1. List four ways by which a facility can implement pollution prevention. (Manual, Chapter 13A, page 13-1)
 - a. *Equipment or technology modifications*
 - b. *Process or procedure modifications*
 - c. *Raw material substitution*
 - d. *Improvements in housekeeping, maintenance, training, and/or inventory control*
2. List the four levels of the waste management hierarchy. (Manual, Chapter 13A, pages 13-2 through 13-3)
 - a. *Source reduction*
 - b. *Recycling*
 - c. *Waste treatment*
 - d. *Waste disposal*
3. Inspectors generally will be able to conduct full pollution prevention opportunity assessments as part of NPDES compliance inspections. (Manual, Chapter 13B, page 13-7)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Inspectors generally will not conduct full pollution prevention opportunity assessments as part of NPDES compliance inspections but can use the inspection to identify pollution prevention options.
4. List the six areas or activities the inspector should focus on during the facility site visit. (Manual, Chapter 13B, page 13-10)
 - a. *Loading and unloading operations*
 - b. *In-plant transfers*
 - c. *Process operations*
 - d. *Housekeeping practices*
 - e. *Maintenance activities*
 - f. *Waste management operations*

5. List four benefits for implementing pollution prevention at POTWs. (Manual, Chapter 13C, page 13-5)
 - a. *Reduced need for capital investment*
 - b. *Improved worker health and safety*
 - c. *Improved sludge quality*
 - d. *Reduced operation and maintenance costs*
6. The pretreatment program is one of the best ways to control pollutants discharged to a POTW at their source. (Manual, Chapter 13C, page 13-16)

UNIT FOURTEEN

MULTI-MEDIA CONCERNS

NPDES inspectors may find it necessary to evaluate a facility's compliance with applicable environmental regulations in media other than wastewater. Therefore, inspectors may need to be familiar with other environmental programs such as RCRA, CERCLA, and air. Topics covered in this unit (which corresponds to Chapter 14 of the Manual) include:

- Introduction and overview
- Multi-media concerns and the screening program
- Multi-media inspections.

EXERCISE 14-1	INTRODUCTION AND OVERVIEW	15 MINUTES
<p>Inspectors may be called upon to perform multi-media inspections of varying depth and complexity. This exercise provides an introduction to the various levels of multi-media inspections that may be conducted.</p> <ol style="list-style-type: none">1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.2. Read Chapters 14A and 14B of the Manual.3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.		

Study Checklist At the end of this exercise, you should be able to:

1. Describe the difference between Category A and Category B inspections. (Manual, Chapter 14B, page 14-3)

Both Category A and B inspections determine a facility's compliance in one specific program area. However, Category B inspections also screen for obvious noncompliance in other program areas.

2. Category A inspections are the most complex multi-media inspections. (Manual, Chapter 14B, page 14-3)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Category D inspections are the most complex multi-media inspections; Category A inspections determine compliance in only one program area.

3. List the five advantages to conducting multi-media inspections as opposed to program-specific inspections. (Manual, Chapter 14B, page 14-4)
- a. More comprehensive compliance assessment*
 - b. Improved enforcement support*
 - c. Higher probability to prevent problems*
 - d. More effective response to non-program specific complaints, issues, or needs*
 - e. Less resource intensive*

EXERCISE 14-2**MULTI-MEDIA CONCERNS AND
THE SCREENING PROCESS****1 HOUR
30 MINUTES**

Inspectors that participate in multi-media inspections should have a basic understanding of other environmental program areas. This exercise provides a brief overview other program areas.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 14C and Appendices S and T of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. RCRA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. (Manual, Chapter 14C, page 14-5)
2. The control of hazardous waste discharged directly to surface waters is deferred to the CWA under the direct discharge exclusion. (Manual, Chapter 14C, page 14-5)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

3. List the four fates of hazardous wastes that are discharged to wastewater treatment plants. (Manual, Chapter 14C, page 14-5)
 - a. *Pass through to surface waters*
 - b. *Removed in sludge*
 - c. *Degradation*
 - d. *Volatilization/exfiltration*
4. POTWs that receive hazardous wastes by truck, rail, or dedicated pipeline are subject to RCRA permit by rule requirements. (Manual, Chapter 14C, page 14-5)
5. RCRA and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulate the cleanup of hazardous waste sites. (Manual, Chapter 14C, page 14-6)
6. Municipal sewage sludge that is co-incinerated with other wastes is regulated by the Clean Air Act (CAA). (Manual, Chapter 14C, page 14-6)

EXERCISE 14-3**MULTI-MEDIA INSPECTIONS****30 MINUTES**

Multi-media inspections are generally performed by an inspection team. This exercise provides an overview of team responsibilities and required skills.

1. Read through the study checklist. Test your background knowledge by responding to as many items as possible.
2. Read Chapter 14D of the Manual.
3. Respond to each item on the study checklist. Correct any errors and expand any incomplete responses made in Step 1. Discuss any questions or problems with your instructor. Do not proceed until you have mastered the material in this exercise.

Study Checklist At the end of this exercise, you should be able to:

1. Describe the two steps in the basic strategy for performing multi-media inspections. (Manual, Chapter 14D, page 14-9)
 - a. *Prioritize the processes and waste management activities*
 - b. *Move from the beginning to the end of a process, emphasizing regulated waste stream generation and disposition*
2. Each multi-media inspection team member should have expertise in each program area being evaluated. (Manual, Chapter 14D, page 14-10)

TRUE ☐ FALSE ☒ (Check one. If the statement is false, make necessary changes to correct it.)

Each team member does not have to have expertise in all program areas but should have expertise in one specific program area and should be trained in general inspection procedures.

3. The team leader has overall responsibility for conducting a multi-media inspection. (Manual, Chapter 14D, page 14-10)
4. List five skills or qualifications that each multi-media team member should possess. (Manual, Chapter 14D, page 14-10)

The student's answer should include five of the choices listed below:

- a. *Knowledge of basic inspection policies and procedures*
- b. *Understanding of sampling equipment and procedures*
- c. *Knowledge of manufacturing processes, pollution control, waste management, flow measurement, and waste monitoring*
- d. *Investigatory skills*
- e. *Ability to write clear reports*
- f. *Compliance inspection experience*
- g. *Good communication skills*
- h. *Understanding of procedures to obtain administrative warrants*

UNIT 14	EXAM	15 MINUTES
Instructions		
<ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time listed above.3. Verify the answers with your instructor.4. Correct any errors and clarify questions or problems before proceeding to the final exam.		

1. Inspections that focus on one specific program area but also screen for possible noncompliance in other program areas are Category ____ investigations.
2. Category C investigations are conducted by a team of investigators and focus on two or more targeted program areas.

TRUE ☐ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

3. RCRA regulates the _____ of hazardous waste.
4. List the four fates of hazardous wastes that are discharged to wastewater treatment plants.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
5. The _____ has overall responsibility for conducting a multi-media inspection.

UNIT 14	EXAM	15 MINUTES
Instructions <ol style="list-style-type: none">1. Complete this exam without referring to any text or notes.2. Do not exceed the time listed above.3. Verify the answers with your instructor.4. Correct any errors and clarify questions or problems before proceeding to the final exam.		

1. Inspections that focus on one specific program area but also screen for possible noncompliance in other program areas are Category B investigations. (Manual, Chapter 14B, page 14-3)
2. Category C investigations are conducted by a team of investigators and focus on two or more targeted program areas. (Manual, Chapter 14B, page 14-3)

TRUE ☒ FALSE ☐ (Check one. If the statement is false, make necessary changes to correct it.)

3. RCRA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. (Manual, Chapter 14C, page 14-5)
4. List the four fates of hazardous wastes that are discharged to wastewater treatment plants. (Manual, Chapter 14C, page 14-5)
 - a. *Pass through to surface waters*
 - b. *Removed in sludge*
 - c. *Degradation*
 - d. *Volatilization/exfiltration*
5. The team leader has overall responsibility for conducting a multi-media inspection. (Manual, Chapter 14D, page 14-10)

