CHAPTER 18

REGULATIONS GOVERNING LABORATORY CERTIFICATION AND STANDARDS OF PERFORMANCE

Authority

N.J.S.A. 13:1D–1 et seq., 58:10A–1 et seq., 58:12A–1 et seq., specifically 58:10A–4, 58:10A–9, 58:12A–4c(4) and 58:12A–9h.

Source and Effective Date

R.1991 d.385, effective July 3, 1991.
See: 23 N.J.R. 1109(a), 23 N.J.R. 2346(c).

Executive Order 66(1978) Expiration Date

Chapter 18, Regulations Governing Laboratory Certification And Standards Of Performance, expires on July 3, 1996.

Historical Note

Chapter 18, Regulations Governing Laboratory Certification And Standards Of Performance, was filed and became effective August 6, 1981 as R.1981 d.279. See: 13 N.J.R. 260(d), 13 N.J.R. 481(c). Chapter 18 was readopted as R.1986 d.351, effective August 6, 1986. See: 18 N.J.R. 1239(b), 18 N.J.R. 1239(b). Pursuant to Executive Order No. 66(1978), Chapter 18 was readopted as R.1991 d.385. See: Source and Effective Date.

See section annotations for specific rulemaking activity.

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SUBCHAPTER 1. GENERAL PROVISIONS

7:18–1.1 Scope and authority

This chapter, adopted pursuant to the Safe Drinking Water Act, N.J.S.A. 58:12A–1 et seq., the Water Pollution Control Act, N.J.S.A. 58:10A–1 et seq., and the Radon Act, N.J.S.A. 26:2D–70 et seq., constitutes the Department's regulations governing certification of laboratories performing analyses required to be performed by regulations or orders issued pursuant to those acts. This chapter establishes the procedures for obtaining and maintaining certifications, and the criteria and procedures laboratories shall follow in analyzing samples.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Added "and the Radon Act, N.J.S.A. 26:2D–70 et seq.," with stylistic changes.

7:18–1.2 Construction

These rules shall be liberally construed to permit the department to discharge its statutory function, and to effectuate the purposes of the laboratory certification program.

7:18–1.3 Purpose of the regulations

(a) This chapter is promulgated for the following purposes:

1. To establish the administrative procedures to be followed by certified laboratories and laboratories seeking certification.

2. To establish the categories and parameters in which laboratories may be certified.

3. To establish the standards, criteria and procedures as to laboratory equipment and supplies, practices, methodology, quality control, personnel, facilities, data reporting and data maintenance which a certified laboratory or laboratory seeking certification shall continually meet.

4. To establish the enforcement procedures the Department shall follow to ensure that all certified laboratories or laboratories seeking certification are in compliance with this chapter.

7:18–1.4 Certification Program Requirements

(a) Any laboratory wishing to analyze samples for compliance with regulations adopted or orders issued pursuant to the Safe Drinking Water Act, N.J.S.A. 58:12A–1 et seq., the Water Pollution Control Act, N.J.S.A. 58:10–1 et seq. or the Radon Act, N.J.S.A. 26:2D–70 et seq., shall follow the procedure set forth herein in order to obtain and maintain certification.

(b) Certified laboratories and laboratories seeking certification shall analyze all samples in accordance with the procedures and methods required by this chapter.

(c) A laboratory must be certified to analyze for radon or radon progeny pursuant to this subchapter before performing those activities.

1. A person shall be guilty of a crime of the third degree if they analyze for radon/radon progeny in air without being, at the time they perform the analyses, certified for those activities.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Added reference to the Radon Act with stylistic changes in (a).
Added (c).

7:18–1.5 Incorporation by reference

(a) The Department hereby adopts and incorporates into these regulations the "National Interim Primary Drinking Water Regulations", as amended, 40 CFR 141, and the "Guidelines Establishing Test Procedures for the Analysis of Pollutants", as amended, 40 CFR 136, and future supplements and amendments to those regulations, both of which have been duly promulgated as regulations by the Administrator of the United States Environmental Protection Agency.

(b) The above Federal regulations are available from either the U.S. Environmental Protection Agency Regional Library, 26 Federal Plaza, New York, New York 10007, or the New Jersey Department of Environmental Protection, Bureau of Collections and Licensing, CN 402, Trenton, New Jersey 08625, (609) 292–4071.

7:18–1.6 Program information

Unless otherwise specified, any questions concerning the requirements of this chapter should be directed to the Office of Quality Assurance, New Jersey Department of Environmental Protection, CN–027, Trenton, New Jersey 08625, (609) 292–3950.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Address changed.

7:18–1.7 Definitions

The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise.

"Accredited" means having the approval conferred upon school's institutions, or programs where appropriate by a nationally recognized accrediting agency or association as determined by either the U.S. Commissioner of Education, N.J. Commissioner of Education or Chancellor of Higher Education, or any combination of the three. "Analytical reagent (AR) grade, ACS reagent grade, and reagent grade" are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

"Authorized measurement protocols" means for radon measurements in air "Interim Indoor Radon and Radon Decay Product Measurement Protocols," EPA 520/1–86–04 or its latest revisions incorporated herein by reference; and, "Interim Protocols for Screening and Follow-up Radon and Radon Decay Product Measurements," EPA 520/1–86–014, incorporated herein by reference.

"Authorized proficiency program" means the United States Environmental Protection Agency Radon/Radon Progeny Measurement Proficiency Program at the Eastern Environmental Radiation Facility, Montgomery, Alabama 36109, or other program equally stringent and authorized by the Department in accordance with the latest edition of New Jersey Department of Environmental Protection document "New Jersey Radon Measurement Proficiency Program".

"Category" means a group of parameters for which certification is offered.

"Certified radon measurement business" means a commercial business enterprise certified pursuant to N.J.A.C. 7:28–27 to sell devices and/or test for radon/radon progeny.

"Certified radon laboratory" means a radiological laboratory which analyzes samples for the presence of radon and/or radon progeny in a facility separate from the location in which the sample was taken and which uses stationary measurement detection equipment and which is certified pursuant to this chapter.

"Certified radon measurement specialist" means a person certified pursuant to N.J.A.C. 7:28–27 to perform and/or evaluate radon and/or radon progeny measurements for a certified radon measurement business.

"Certified radon measurement technician" means a person certified pursuant to N.J.A.C. 7:28–27 to perform radon and radon progeny measurement activities.

"Certified thermometer" is a thermometer that has documentation from the manufacturer showing that it has been compared against a National Bureau of Standards thermometer for the temperature ranges employed by the laboratory and the correction factors from that comparison.

"Clean Water Act of 1977" means P.L. 95–217, 33 U.S.C. 1251 et seq., and amendments made thereto.

"Commissioner" means the Commissioner of the New Jersey Department of Environmental Protection or an authorized representative.

"Compliance analysis" means the analysis of a sample that is required to be analyzed by a Departmental regulation or order.

"Confluent growth" means a bacterial growth (coliform and noncoliform) covers the entire filtration area of the filter with no discrete colonies.

"Department" means the New Jersey Department of Environmental Protection. "40 CFR 136" means the "Guidelines Establishing Test Procedures for the Analysis of Pollutants", as amended, which were duly promulgated as regulations by the Administrator of the United States Environmental Protection Agency.

"Indicator parameter" means a parameter which is identified in a proficiency test and is used to evaluate the overall analytical performance of a laboratory on that specific method. The laboratory's performance on analyzing an indicator parameter is then used to determine the laboratory's certification status on all parameters covered by that analytical method.

"Laboratory pure water" means distilled or deionized water which is free of contaminants that may interfere with the analytical test in question.

"Laboratory seeking certification" means an uncertified laboratory which has submitted an acceptable application and the appropriate fee for the category in which it desires certification, and a laboratory holding a valid interim approval.

"Maximum contaminant level (MCL)" means the maximum permissible level of a contaminant allowed in drinking water under the National Interim Primary Drinking Water Regulations.

"Membrane filtration (MF) method" means a method for determining the coliform count in a water sample. In this method, a known volume of water is filtered through a membrane filter of optimum pore size for full bacterial retention. The filter is incubated in contact with culture medium to provide nutrients for bacterial growth. After incubation at a prescribed time and temperature, the cultures are examined for coliform colonies that are counted and recorded per 100 ml. of water sample.

"Microbiological Methods—EPA" means "Microbiological Methods for Monitoring the Environment, Water and Wastes", U.S. EPA, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268, EPA–600/8–78–017, December 1978. Available from ORD Publications, CERI, U.S. EPA, Cincinnati, Ohio 45268.

"Most probable number (MPN)" means a quantitative designation of microbial population which is determined by a statistical method. In this method, a multiple dilution tube technique is used with a standard culture medium. The tubes are incubated and observed for gas production. Results of these tubes are translated by mathematical probability tables into population numbers.

"40 CFR 141" means the National Interim Primary Drinking Water Regulations" as amended, which were duly promulgated as regulations by the administrator of the United States Environmental Protection Agency.

"New Jersey Pollutant Discharge Elimination System Regulations" or "NJPDES" means the regulations adopted by the Department at N.J.A.C. 7:14A–1.1 et seq. governing the New Jersey system for issuing, modifying, suspending, revoking and reissuing, terminating, monitoring, and enforcing discharge permits pursuant to the New Jersey Water Pollution Control Act.

"New Jersey Safe Drinking Water Act Regulations" means the current Safe Drinking Water Act Regulations promulgated at N.J.A.C. 7:10–1.1 et seq. by the Department pursuant to the New Jersey Safe Drinking Water Act.

"Personal and direct supervision" means that a qualified supervisor is available at all times when laboratory procedures are being performed.

"Primary standard" is a highly pure reagent used as a reference for standardizing other reagent solutions.

"Proficiency sample" is a sample containing a known amount of a specific or combination of parameters used to evaluate the analytical performance of a laboratory.

"Proficiency test" means a test, sample or program that is required by the Department and which a laboratory must pass in order to demonstrate its ability to analyze for a particular parameter.

"Proficiency test average value" means the average of all singularly determined values on a given radiological proficiency sample for one parameter.

"Radon" means the radioactive noble gas radon–222.

"Radon Act" means N.J.S.A. 26:2D–70 et seq.

"Radon progeny" means the short-lived radionuclides formed as a result of the decay of radon–222. The short-lived radon progeny consist of polonium–218, lead–214, bismuth–214 and polonium–214.

"Replicate sample" is a sample prepared by dividing a homogeneous sample into separate parts so that each part is also homogeneous and representative of the original sample.

"Safe Drinking Water Act" or "NJSDWA" means N.J.S.A. 58:12A–1 et seq.

"Standard curve" is a curve plotting concentrations of a known parameter standard minus a blank, versus the standard's absorbance or percent transmission.

"Standard methods, 14th Edition" means Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 14th Edition.

"State Primary Drinking Water Regulations" means those regulations promulgated at N.J.A.C. 7:10–5.1 et seq.

"State Secondary Drinking Water Regulations" means those regulations promulgated at N.J.A.C. 7:10–7.1 et seq.

"Subsequent to graduation" means laboratory training and experience acquired after receipt of the degree specified.

"Too numerous to count (TNTC)" means a bacterial count that is usually greater than 200 colonies per membrane. The count is designated in this way when a membrane filter culture has grown in such a way that the total number of bacterial colonies (coliform and non-coliform) are too numerous or not sufficiently distinct to obtain an accurate count, or both.

"USEPA" means United States Environmental Protection Agency.

"Water Pollution Control Act" or "NJWPCA" means N.J.S.A. 58:10A–1 et seq.

"Working level (WL)" means that concentration of short-lived radon decay products that will result in 130,000 million electron volts of potential alpha particle energy per liter of air. Working level is a measure of radon decay product concentration in air.

As amended, R.1984 d.283, eff. July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
"Certified thermometer" revised; "40 CFR 136" and "Indicator parameter" added.
Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Added definitions: "Authorized measurements protocols"; "Authorized proficiency program"; "Certified radon measurement business"; "Certified radon laboratory"; "Certified radon measurement specialist"; "Certified radon measurement technician"; "Proficiency test"; "Radon"; "Radon Act"; "Radon progeny"; "Working level (WL)".

7:18–1.8 Severability

If any section, subsection, provision, clause, or portion of this chapter is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of this chapter shall not be affected thereby.

7:18–1.9 Signatories

(a) All applicants shall, upon submission of initial or renewal applications, sign the following certification on the application forms:

1. "I certify under penalty of law that the information provided in this application is true, accurate and complete. I am aware that there are significant civil and criminal penalties for submitting false, inaccurate or incomplete information, including fines and/or imprisonment".

i. The certification set forth in (a)1 above shall be signed by the highest ranking individual at the facility with overall responsibility for that facility or the highest ranking individual with overall responsibility for more than one facility in New Jersey provided that appropriate procedures to ensure compliance are in place and subject to Department review and approval.

2. "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil and criminal penalties for submitting false, inaccurate or incomplete information, including the possibility of fine and/or imprisonment".

i. The certification required by (a)2 above shall be signed as follows:

(1) For a corporation, by a principal executive officer of at least the level of vice president;

(2) For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal or other public agency, by either the principal executive officer or ranking elected official.

(b) In cases where the highest ranking corporate, partnership, or governmental officer or official at the facility as required in (a)1i above is the same person as the official required to certify in (a)2i, only the certification in (a)1i need be made. In all other cases, the certifications of (a)1 and 2 shall be completed.

New Rule, R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).

SUBCHAPTER 2. PROGRAM PROCEDURES AND REQUIREMENTS

7:18–2.1 Requirement of certification

(a) All analyses performed for the purpose of determining compliance with microbiological, chemical, and radiological requirements of the State Primary and Secondary Drinking Water Regulations, N.J.A.C. 7:10–5.1 and 7:10–7.1, microbiological, chemical and bioassay requirements of the New Jersey Pollutant Discharge Elimination System Regulations, N.J.A.C. 7:14A–1, and radiological requirements of the Radon Act, N.J.S.A. 26:2D–70 et seq., or when required by order issued by the Department pursuant to the authority of the Safe Drinking Water Act, N.J.S.A. 58:12A–1 et seq., the Water Pollution Control Act, N.J.S.A. 58:10A–1 et seq., the Radon Act, N.J.S.A. 26:2D–70 et seq., or any other regulations adopted pursuant to those acts, shall be performed in laboratories certified for this purpose pursuant to this subchapter. Analyses performed in laboratories not so certified shall not be accepted by the Department as being in compliance with the requirements, regulations or orders of the Water Pollution Control Act or the Safe Drinking Water Act. Results of air and water analyses for radon/radon progeny performed in laboratories not so certified shall not be accepted for use by the Department, industry, or private citizens for compliance with the Department's rules.

(b) Laboratories in other states, where the certifying agency grants reciprocal certifications to laboratories located in New Jersey, certified under conditions no less stringent than those required by this chapter by the agency having primary enforcement responsibility under the Federal Safe Drinking Water Act, 42 U.S.C. 300 et seq., or the agency delegated administrative responsibility for the National Pollutant Discharge Elimination System under the Clean Water Act of 1977, 33 U.S.C. 1251 et seq., in such other state, shall be considered to be certified laboratories for purposes of this chapter once they have complied with the provisions of N.J.A.C. 7:18–2.4(a) through (d).

(c) Only laboratories certified pursuant to these regulations or maintained by the USEPA may be called State Certified Water or Radon Laboratories and no laboratory may adopt any name or make any oral or written statement intended or likely to mislead the public with respect to its certification status.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Added reference to N.J.S.A. 26:2D–70 et seq., N.J.S.A. 58:10A–1 et seq., and N.J.S.A. 26:2D–70 et seq. Added "Results of air and water analyses for radon/radon progeny performed in laboratories not so certified shall not be accepted for use by the Department industry, or private citizens for compliance with the Department's rules" in (a).
Added "or Radon" in (c).

7:18–2.2 Categories for certification

(a) A laboratory may apply for certification in any one or more of the following categories and shall be certified in those parameters within the category for which it demonstrates acceptable performance on proficiency tests, when available, and meets all other requirements of this chapter. The laboratory certificate shall specify the categories and the parameters within each category for which the laboratory is certified and shall be conspicuously displayed in the laboratory in a location visible to the public. The certification categories are as follows:

1. Microbiological Testing, which comprises tests for coliform bacteria conducted in accordance with the methods and procedures specified in 40 CFR 141 for compliance with the Safe Drinking Water Act and the State Primary Drinking Water Regulations, and 40 CFR 136 for compliance with the Water Pollution Control Act and the New Jersey Pollutant Discharge Elimination System Regulations.

2. Limited Chemistry, which comprises chemical tests or analyses required to determine compliance with the Safe Drinking Water Act and the State Primary and Secondary Drinking Water Regulations, and the Water Pollution Control Act and the New Jersey Pollution Discharge Elimination System Regulations, except those analyses for which the atomic absorption or gas chromatography methods are specifically required. Tests for the limited chemistry category shall be conducted in accordance with the methods and procedures specified in 40 CFR 141 for compliance with the Safe Drinking Water Act and the State Primary Drinking Water Regulations; N.J.A.C. 7:18–4.5 for compliance with the Safe Drinking Water Act and the State Secondary Drinking Water Regulations, and 40 CFR 136 for compliance with the Water Pollution Control Act and the New Jersey Pollutant Discharge Elimination System Regulations.

3. Atomic Absorption, which comprises tests or analyses required to determine compliance with the Safe Drinking Water Act and the State Primary and Secondary Drinking Water Regulations, and the Water Pollution Control Act and the New Jersey Pollutant Discharge Elimination System Regulations, for which the atomic absorption method is applicable or required. Tests for the atomic absorption category shall be conducted in accordance with the methods and procedures specified in 40 CFR 141 for compliance with the Safe Drinking Water Act and the State Primary Drinking Water Regulations; N.J.A.C. 7:18–4.5 for compliance with the Safe Drinking Water Act and the State Secondary Drinking Water Regulations; and 40 CFR 136 for compliance with the Water Pollution Control Act and the New Jersey Pollutant Discharge Elimination System Regulations.

4. Gas Chromatography, which comprises tests or analyses required to determine compliance with the Safe Drinking Water Act and the State Primary Drinking Water Regulations, and the Water Pollution Control Act and the New Jersey Pollutant Discharge Elimination System Regulations for which the gas chromatography method is applicable or required. Tests for the Gas Chromatography category shall be conducted in accordance with the methods and procedures specified in 40 CFR 141 and N.J.A.C. 7:18–4.5 for compliance with the Safe Drinking Water Act and the State Primary Drinking Water Regulations, and 40 CFR 136 for compliance with the Water Pollution Control Act and the New Jersey Pollutant Discharge Elimination System Regulations.

5. Radiological Testing, which comprises those tests or analyses for radioactivity required to determine compliance with the Safe Drinking Water Act, the State Primary Drinking Water Regulations, and the Radon Act. Tests for the Radiological category are as follows:

i. For drinking water, analyses shall be conducted in accordance with the methods and procedures specified in 40 CFR Part 141.

ii. For wastewater, analyses shall be conducted in accordance with the methods and procedures specified in 40 CFR Part 136.

iii. For radon and radon progeny in air, analyses shall be conducted in accordance with the methods and procedures specified in the Authorized Measurement Protocols most recent versions. Information on obtaining the protocol is available from the Office of Quality Assurance, New Jersey Department of Environmental Protection, CN 027, Trenton, N.J. 08625, (609) 292–3950.

iv. Radon/radon progeny sampling shall be conducted by a certified radon measurement business, certified pursuant to N.J.A.C. 7:28–27. The laboratory shall not analyze radon/radon progeny samples that are taken using measurement devices/techniques which are not specified in the authorized measurement protocols of N.J.A.C. 7:28–27.

v. For radon and radon progeny in water, sampling shall be conducted in accordance with the methods and procedures specified in the most recent update of the USEPA publication, "Radon in Water Sampling Program" EPA/EERF–Manual 78–1, incorporated herein by reference, and 40 CFR 141.

6. Bioassay Testing, which shall include any bioassay analyses required to determine compliance with the Water Pollution Control Act and the New Jersey Pollutant Discharge Elimination System Regulations. Bioassay analyses shall be conducted in accordance with the methods and procedures specified in Subchapter 6 of this regulation.

As amended, R.1984 d.283, eff. July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
(a)4: added N.J.A.C. reference.
Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Substituted "tests" for "samples" in (a).
Added "and the Radon Act" in (a)5.
Added (a)5i through v.

7:18–2.3 Application procedures for laboratories located in New Jersey including special provisions for the phase-in of the New Jersey Radon Laboratories Certification Program

(a) The owner of a laboratory in New Jersey who wishes it to be certified in any or all of the categories and parameters thereof, described in N.J.A.C. 7:18–2.2, or, if already certified, who wishes to add a category or a parameter within a category, shall apply for certification to the New Jersey Department of Environmental Protection, Division of Fiscal and Support Services, Bureau of Revenue, CN 402, Trenton, New Jersey 08625, (609) 777–1013 (hereinafter "Bureau"), on forms available therefrom. The applicant shall provide all information requested and shall submit the appropriate fee.

1. Laboratories seeking certification in the Radiological category shall:

i. For analysis of radiological parameters in water, have participated in the USEPA's radiological proficiency testing program during the immediately preceding 12 months; and shall submit copies of the USEPA's performance evaluation reports demonstrating that for each parameter in which the laboratory is seeking certification at least two blind proficiency evaluations and two cross checks have been within the control limits established for that parameter.

ii. For analysis of radon in water, have participated in the most recent USEPA Radon Intercomparison Study, if available, and shall submit copies of the USEPA's performance evaluation reports demonstrating that at least two blind proficiency evaluations and two cross checks have been within the control limits established.

iii. For analysis of radon/radon progeny in air, be a participant in an authorized proficiency program. The laboratory shall have passed two Department-authorized proficiency tests, at least one of which shall be either the most recent round of the USEPA Radon Measurement Program or a proficiency test administered within the immediate past 12 months from a Department-authorized proficiency program. The laboratory shall pass tests for each measurement device/technique, where certification is desired, prior to applying for certification.

iv. In addition, as part of the application procedure the Department's Office of Quality Assurance, or its designee, can send to the laboratory a set of proficiency test samples for each stationary detection method for which certification is requested in accordance with N.J.A.C. 7:18–2.10(b). The laboratory shall be responsible for acceptably analyzing the proficiency test samples as a condition for receiving certification.

2. Laboratories which intend to seek certification in the Radiological category, but which have not participated in the USEPA's radiological proficiency testing program may obtain information concerning that program from the Department's Office of Quality Assurance.

(b) If the applicant fails to submit all the information requested or fails to submit the appropriate fee, the Department shall reject the application without prejudice, and, if submitted, return the fee.

(c) If the applicant submits a complete application, the appropriate fee, proficiency data if required, and the information submitted meets the minimum requirements of this chapter for the category or categories for which certification is requested, the application shall be accepted. Acceptance of the application does not authorize the laboratory to perform analyses regulated by this chapter. The applicant shall be notified of the acceptance and shall participate in the following laboratory evaluation:

1. Microbiological and Bioassay Testing:

i. The Department shall contact the laboratory within three weeks after the application is accepted to arrange a mutually acceptable date for an on-site laboratory inspection;

ii. The laboratory shall be evaluated and inspected to determine if it is in compliance with the requirements of this chapter; and

iii. If the laboratory demonstrates to the Department that it is in compliance with the requirements of this chapter it shall be certified for the category and the parameters within the category for which it has requested certification.

2. Limited Chemistry, Atomic Absorption and Gas Chromatography:

i. The Department shall send to the laboratory a set of proficiency samples, if available, for the parameters for which certification is requested within two weeks after acceptance of the laboratory's application by the Department;

ii. The laboratory shall analyze the proficiency samples and return the proficiency data, within 45 days of its receipt of samples, to the Office of Quality Assurance, New Jersey Department of Environmental Protection, 401 East State Street, CN 027, Trenton, New Jersey 08625;

iii. The laboratory shall have satisfied the requirements for proficiency testing for a parameter when it acceptably analyzes both the high and low values for that parameter within a given set of proficiency samples;

iv. Acceptable analysis for a value in all water pollution parameters occurs when the reported value falls within the 99 percent confidence interval calculated by the USEPA from available performance evaluation data of USEPA and State laboratories;

v. Acceptable analysis for a value in all drinking water parameters excluding trihalomethane parameters occurs when the reported value falls within the 95 percent confidence interval calculated by the USEPA from available data of USEPA and State laboratories;

vi. Acceptable analysis for a trihalomethane parameter occurs when the reported value falls within the acceptance limits calculated by the USEPA as ± 20 percent of the true value;

vii. The laboratory shall have three separate opportunities to acceptably analyze one of three different sets of proficiency samples for each parameter;

viii. If the laboratory's analytical values of the proficiency samples are acceptable, the Department shall contact the laboratory to arrange a mutually acceptable date for an on-site laboratory inspection;

ix. If the laboratory demonstrates, during the on-site inspection, that it is in compliance with the requirements of this chapter, then it shall be certified in the category and the parameters within the category for which it has acceptably analyzed proficiency samples;

x. If performance evaluation samples are not available, then the evaluation of the laboratory will be based only on the on-site laboratory inspection.

3. Radiological Testing

i. The Department shall contact the laboratory within three weeks after the application is accepted and the required radiological/radon proficiency testing is completed to arrange a mutually acceptable date for an on-site laboratory inspection, and the inspection will be conducted by representatives of the Department; and

ii. If the laboratory demonstrates to the Department during the inspection that it is in compliance with the requirements of this chapter it shall be certified for the category and the parameters within the category for which it has requested certification;

iii. If the Department is unable to schedule an on-site inspection within 90 days after receiving an acceptable application from a laboratory, it may grant the laboratory an interim approval to analyze radiological samples until the laboratory is inspected provided the laboratory continues to participate in the USEPA's proficiency testing program, or in the case of radon/radon progeny in air an authorized proficiency program, and acceptably analyzes the program's samples. Other than the conditions given in (f) below, the Department will not grant interim approval for radon/radon progeny analysis;

iv. If the Department determines that proficiency tests are not available, then the evaluation of the laboratory will be based solely on the on-site laboratory inspection.

(d) Certifications may contain conditions requiring rectification of minor deficiencies identified by the Department by a date or dates specified therein, but only if such minor deficiencies do not affect the accuracy of the analytical results.

(e) An applicant for certification who either does not perform acceptably on the proficiency samples or does not meet the requirements of this chapter shall be notified that certification has been denied. Applicants receiving such a notification may not reapply for certification until the laboratory assures the Department in writing that all reasons for the denial of certification have been rectified.

(f) The following special provisions are applicable to the phase-in of the New Jersey Radon Laboratory certification program:

1. The owner of a laboratory who has been issued an interim approval in parameters within categories for the New Jersey Radon laboratory certification program shall follow the procedures and meet all the requirements of all previous subsections of this section except that:

i. A laboratory that has been granted an interim approval is authorized to perform radon/radon progeny analyses on air and water samples for use by the Department, industry, or private clients for compliance with the Department's rules while the laboratory is being evaluated for certification;

ii. The interim approval shall be valid until the laboratory is certified or until November 6, 1991, whichever is earlier;

iii. For a laboratory to receive interim status approval it must successfully perform on proficiency tests from an authorized proficiency program and follow all other application procedures as given in this chapter. Interim approval will be granted if the Department has approved a laboratory's application package and all other application procedures have been followed, but has not yet conducted an on-site audit;

iv. Laboratories notified that their interim approval has been revoked shall immediately cease performing analyses and shall comply with (e) above before reapplying for certification;

v. Laboratories which are interimly approved shall follow the normal renewal of certification procedures set forth in N.J.A.C. 7:18–2.5.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
In (c)2ii, 45 days was 38 days; in iv, "Acceptable analysis ... in all water pollution parameters" was "Acceptable analysis ... in all parameters excluding trihalomethane parameters"; new v added, former v-ix redesignated vi-x.
In (f)1, "The owner ... who has been issued an interim approval" was "The owner ... who requests certification", reference to application after July 1, 1981 deleted; in i, language changed to reflect interim approval status; in ii and iii, 1985 was 1982; iv and v deleted, vi made iv, new v added.
Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Changed "Pollutant Discharge Elimination System" to "Radon" in heading.
Changed Bureau of "Collection and Licensing" to Bureau of "Revenue"; changed telephone number in (a).
Deleted application procedures outlined in (a)1 and added new procedures in (a)1i through iv.
Changed "Bureau" to "Department's Office of Quality Assurance" in (a)2.
Changed address in (c)2ii.
Added "and the required radiological/radon proficiency testing is completed" in (c)3i.
Added "Other than the conditions given in (f) below, the Department will not grant interim approval for radon/radon progeny analysis" in (c)3iii.
Added (c)3iv.
Changed "New Jersey Pollutant Discharge Elimination System" to "New Jersey Radon" in (f) and (f)1.
Added "radon/radon progeny"; added "on air and water samples" for "use by the Department, industry, or private clients for compliance with the Department's rules while the laboratory is being evaluated for certification;"; deleted "the New Jersey Pollutant Discharge Elimination System program" in (f)1i.
Added "until November 6, 1991"; deleted "June 30, 1985" and "where the laboratory demonstrates to the Department that it is diligently seeking to meet the requirements for certification" in (f)1ii.
Deleted old text and added new text in (f)1iii.
Deleted "required to be performed in a certified laboratory for compliance with the Water Pollution Control Act and the New Jersey Pollutant Discharge Elimination System Regulations" in (f)1iv.

7:18–2.4 Procedure for laboratories not located in New Jersey

(a) The owner of a laboratory located in a State other than New Jersey which has been certified, under conditions no less stringent than those required by this chapter, by the agency having primary enforcement responsibility under the provisions of the Federal Safe Drinking Water Act or the Agency delegated administrative responsibility for the Federal Clean Water Act NPDES program in the State where it is located, who wishes to perform analyses in any or all of the categories described in N.J.A.C. 7:18–2.2 for public water systems or NJPDES permitted facilities located in New Jersey or as required by the Water Pollution Control Act or the Safe Drinking Water Act, shall:

1. Annually complete the application form provided by the New Jersey Department of Environmental Protection, Division of Financial Management, Planning and General Services, Bureau of Revenue, CN 402, Trenton, New Jersey 08625, (609) 777–1013;

2. Have the form certified to by the agency having primary enforcement responsibility or delegated administrative responsibility; and

3. Return the form with the proper fee and any necessary documentation to the Bureau.

(b) The Bureau shall review the application and if it finds it complete and the appropriate fee has been paid, shall assign or reassign the laboratory a number to be used in all correspondence with the Department.

(c) The receipt of the number authorizes the laboratory to perform analyses for public water systems or NJPDES permitted facilities or as required pursuant to the Water Pollution Control Act, the Safe Drinking Water Act, or the Radon Act in New Jersey for the balance of the fiscal year which expires on June 30.

(d) If the laboratory's certification is revoked by the agency having primary enforcement responsibility or delegated administrative responsibility, the New Jersey authorization is thereby automatically cancelled. The laboratory manager shall notify the Bureau and all clients in New Jersey that utilize the laboratory of the revocation within 48 hours of receipt of notice of revocation by the laboratory manager.

(e) The owner of a laboratory in a State other than New Jersey which is not certified by that State or the USEPA, or is certified under conditions less stringent than those required by this chapter, who wishes to perform analyses in any or all of the categories described in N.J.A.C. 7:18–2.2 for public water systems, NJPDES permitted facilities located in New Jersey, or for radon/radon progeny analyses, or as required by the Safe Drinking Water Act, the Water Pollution Control Act, or the Radon Act, shall apply for certification in accordance with the procedures set forth in N.J.A.C. 7:18–2.3. In addition, subsequent to conducting the on-site laboratory inspection, the laboratory shall submit to the Department as an additional fee the sum the Department determines to be sufficient to cover the travel, and room and board expenses of the certification inspectors to conduct the on-site inspection.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Changed "NJPDES" to "NPDES" in (a).
Changed "perform water analyses" to "perform analyses" in (a) and (c).
Changed address in (a)1.
Added "and any necessary documentation" in (a)3.
Added reference to radon/radon progeny analyses and the Radon Act; changed "prior" to "subsequent"; changed "Bureau" to "Department" in (e).

7:18–2.5 Renewal of certification

Applications for renewals of certification will be accepted by the Bureau during June of each year, shall be submitted on forms provided therefor, and shall be accompanied by the appropriate fee.

7:18–2.6 Fees

(a) Owners of laboratories applying for certification or renewal of certification, for each fiscal year commencing on July 1, shall submit the appropriate fee obtained from the annual fee schedule below along with the required application materials. Fees are nonrefundable. Laboratories owned or operated by the State of New Jersey or an Agency of the Federal Government are exempt from this fee requirement, but, except for the Environmental Protection Agency, shall make appropriate application for certification in accordance with the other provisions of these regulations.

Laboratory Certification Annual Fee Schedule:

	Fees
Microbiological Testing Chemistry	$400.00
Any one of the following categories:	
Limited chemistry, atomic absorption, Gas Chromatography	$400.00
Any two of the above-mentioned categories	$500.00
All three of the above-mentioned categories	$600.00
Radiological Testing	
Any one or two radiological parameters	$200.00
Any additional radiological parameter	$ 50.00 per each additional parameter
Any one radon or radon progeny stationary detection method	$1,500.00
Any additional radon or radon progeny stationary detection method	$150.00 each
Bioassay Testing	$400.00

(b) The annual fees shall not be prorated and shall apply in full to any portion of the fiscal year which remains prior to the annual renewal date, June 30.

(c) The section is applicable to laboratories with interim approval.

(d) Radon/radon progeny laboratory certification fees, for Fiscal Year 91 only, will be prorated from May 6, 1991 to the end of the fiscal year.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
Former (b), concerning laboratory fee exemption for NJPDES permit holders, deleted; (c)-(d) made (b)-(c).
Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Deleted "1981 and for subsequent fiscal years"; added two categories to fee schedule regarding radon or radon progeny methods in (a).
Changed "interimly approved" to "with interim approval" in (c).
Added (d).

7:18–2.7 Required laboratory personnel policies

(a) Every certified laboratory and laboratories seeking certification shall have sufficient properly qualified personnel commensurate with the workload and types of test or analyses required to be performed for the parameters for which the laboratory is certified, or is seeking certification, pursuant to this chapter.

1. One individual shall be designated as the person in responsible charge and, irrespective of any local title or designation, is herein referred to as the laboratory manager.

2. The laboratory shall have one or more supervisors who shall be qualified in accordance with the provisions of (d) below to perform the tests or analyses required to be performed within the category or categories for which the laboratory is certified, or seeks certifications. The laboratory manager may also serve as a laboratory supervisor, depending upon the size and functions of the laboratory, provided that the laboratory manager meets the qualifications for laboratory supervisor.

3. The laboratory shall have a sufficient number of laboratory technical personnel commensurate with the volume and diversity of the tests performed.

(b) Current employee records shall be maintained, which shall include a resume documenting each employee's training, experience, duties, and date or dates of relevant employment.

(c) Work assignments shall be consistent with qualifications.

(d) The laboratory supervisor shall possess the qualifications for the category which he or she supervises, and meet the following requirements:

1. If the laboratory performs tests in the category of Microbiological testing, the supervisor shall hold a bachelor's degree in biological science or chemistry from an accredited institution with at least three credits in bacteriology and, subsequent to graduation, shall have had at least one year of laboratory training or experience in bacteriology;

2. If a laboratory performs tests or analyses in the category of Limited Chemistry for chlorine residual, pH, temperature, turbidity, or settleable solids, the supervisor shall have had at least one year of laboratory training or experience in chemistry;

3. If the laboratory performs tests or analyses in the category of Limited Chemistry for parameters other than chlorine residual, pH, temperature turbidity, or settleable solids, the supervisor shall hold a bachelor's degree in chemistry or in a biological science from an accredited institution and, subsequent to graduation, shall have had at least one year of laboratory training or experience in chemistry;

4. If the laboratory performs tests or analyses in the category of Atomic Absorption the supervisor shall:

i. Hold a bachelor's degree from an accredited institution either in chemistry or in a biological science; and

ii. Have subsequent to graduation at least one year of laboratory training or experience in chemistry; and

iii. Have either six months' experience in the operation of atomic absorption equipment or have completed a formal training course in the operation of atomic absorption equipment; and

iv. Demonstrate competence in the operation of atomic absorption equipment and analytical procedures during an inspection by a representative of the Department.

5. If the laboratory performs tests or analyses in the category of Gas Chromatography, the supervisor shall:

i. Hold a bachelor's degree from an accredited institution either in chemistry or in a biological science; and

ii. Have subsequent to graduation at least one year of laboratory training or experience in chemistry; and

iii. Have either six months' experience in the operation of gas chromatography or have completed a formal training course in the operation of gas chromatography equipment; and

iv. Demonstrate competency in the operation of gas chromatography equipment and analytical procedures during an inspection by a representative of the Department.

6. If the laboratory performs tests or analyses in the category of Radiological Testing for compliance with the Safe Drinking Water Act and the State Primary Drinking Water Regulations, the supervisor shall:

i. Hold a bachelor's degree from an accredited institution in chemistry, radiochemistry, radioisotope technology, biology, physics, engineering, or any of the applied sciences; and

ii. Have subsequent to graduation at least five years' laboratory training or experience in any of the above, two years of which shall be in low-level radiation measurements and radiochemical procedures being considered for certification; and

iii. Demonstrate competency in the operation of radiological equipment and radiological procedures during an inspection by a representative of the Department.

7. If the laboratory performs tests in the category of Bioassay, the supervisor shall:

i. Hold a bachelor's degree from an accredited institution in a biological science or chemistry which shall include two courses in any of the following subjects:

(1) General Zoology;

(2) Biological Methods and Experimental Design;

(3) Ichthyology;

(4) Comparative Physiology;

(5) Environmental Science; and

ii. Have subsequent to graduation at least one year of laboratory training or experience in the bioassay procedure being considered for certification; or

(1) A master's degree from an accredited institution in a biological or environmental science may be substituted for the one year of laboratory training or experience requirement, as specified in 7ii above, provided the applicant can demonstrate competency in the operation of bioassay equipment and methodologies by having successfully completed at least six definitive bioassays prior to applying for supervisor. Competency in test organism handling, sample handling/preservation, test and data methodologies must be documented. The documentation shall be available during an inspection by a representative of the Department; and

iii. Demonstrate competency in the operation of bioassay equipment and methodologies during an inspection by a representative of the Department.

8. If the laboratory performs tests or analyses in the category of Radiological Testing for compliance with the Radon Act, the supervisor shall:

i. Hold a bachelor's degree from an accredited institution in chemistry, radiochemistry, radioisotope technology, biology, physics, engineering, or any of the physical or biological sciences;

ii. Have subsequent to graduation at least five years of laboratory training or experience in any of the sciences listed in (d)8i above, one year of which shall be in radiation and/or radioactivity measurements, and have successfully completed a governmental or privately sponsored course on radiation with emphasis on radon. In-house training is acceptable provided that a course outline is submitted with the application and approved by the Department; and

iii. Demonstrate competency in the operation of radon/radon progeny measurement equipment and procedures during an inspection by representatives of the Department.

(e) If a laboratory performs tests or analyses utilizing gas chromatography/mass spectrometry (GC/MS), the GC/MS operator shall:

1. Meet the requirements of N.J.A.C. 7:18–2.7(d)5;

2. Have completed a formal training course in GC/MS; and

3. Have six months experience in the operations of GC/MS equipment.

(f) Experience in a certified laboratory which was gained prior to acquiring a bachelor's degree may be substituted on an equivalency basis of 1.5 years of such experience for every one year of post-degree training and experience required.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
In (d)2, "temperature" included in tests; in (d)3, "for parameters other than ... settleable solids" added;
(d) 7ii(1) added.
New (e) added, former (e) made (f).
Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Deleted "or for laboratories applying for New Jersey Pollutant Discharge Elimination certification during the period in which the Department offers interim approvals, shall meet the requirements of (d)8 below" with stylistic changes in (d).
Added "for compliance with the Safe Drinking Water Act and the State Primary Drinking Water Regulations" in (d)6.
Deleted old text and substituted new text in (d)8.

7:18–2.8 Duties and responsibilities of laboratory personnel

(a) Laboratory managers shall have the following responsibilities:

1. The Manager shall serve the laboratory on either a full time basis or a regular part-time basis, and shall administer the operations of the laboratory including the reporting of tests and analyses. The manager shall be readily available for personal or telephone consultation, and, if the manager is to be absent, the manager shall arrange for a substitute. Where the manager is acting as laboratory supervisor the substitute shall meet the requirements of N.J.A.C. 7:18–2.7(d).

2. The manager shall be responsible for the employment of an adequate number of qualified personnel, commensurate with the workload of the laboratory and diversity of tests or analyses performed, and for the inservice training of such personnel.

3. The laboratory manager shall report the discovery of an analytical error to the Department and the person requesting an analysis within 72 hours of discovering the error if the error may affect the validity of a reported analytical result.

(b) Laboratory supervisors shall have the following responsibilities:

1. Each laboratory supervisor shall provide personal and direct supervision of technical personnel and the reporting of tests and analyses within the category or categories for which the supervisor is qualified.

2. Each laboratory supervisor shall perform tests or analyses within the category or categories for which he is qualified, when such tests or analyses require special scientific skills.

3. Each laboratory supervisor shall be held responsible by the Department for the proper performance of all laboratory procedures, tests and analyses, within the category or categories for which he is qualified.

7:18–2.9 Management of laboratories

(a) A certified laboratory may offer as a service those laboratory tests, analyses, or procedures that are within the category or categories for which it is certified provided it has a qualified supervisor in accordance with the provisions of N.J.A.C. 7:18–2.7(d) and for which adequate personnel, equipment and facilities are available.

(b) A laboratory that is certified shall accept only samples which are properly labeled, and for which there is assurance that the samples have been collected, preserved, processed, stored and transported in such a manner as to assure identity and the stability of the sample with respect to the requested tests or analyses; or if the stability of the sample has not been assured the laboratory shall refuse the sample.

(c) This section is applicable to laboratories holding interim approvals.

7:18–2.10 Proficiency testing

(a) Except when determined by the Department that an appropriate proficiency test is not readily available, all certified laboratories or laboratories seeking certification shall participate in a proficiency testing program covering all tests, analyses and analytical methods as made available within the category and categories in which the laboratory is certified or seeks certification; and shall comply with the requirements of N.J.A.C. 7:18–2.3 and 2.4.

1. In the Gas Chromatography category, a laboratory's performance on a specific analytical method may be determined by the ability of the laboratory to acceptably analyze three or four indicator parameters during a proficiency test.

(b) Appropriate samples or tests shall be distributed or made available by the Department's Office of Quality Assurance or its designee to such laboratories at such times and frequencies as designated by the Department's Office of Quality Assurance.

(c) Laboratories certified, or seeking certification, shall:

1. Receive, examine and analyze such samples;

2. Maintain records of such proficiency testing results; and

3. For all categories except radiological testing, submit the results of such testing, within 45 days from the date of receipt of the proficiency samples, to the Department for evaluation; or

4. For radiological proficiency testing, submit results in accordance with the directions of the USEPA.

(d) The laboratory shall be informed of the results of such evaluation and if the laboratory has not analyzed the proficiency samples acceptably, the Department may require the laboratory to analyze additional proficiency samples.

(e) The results shall be considered by the Department when making recommendations for improvement in laboratory procedures, and in evaluating whether the certification of the laboratory should be granted, denied, revoked, or suspended.

(f) Results of proficiency testing during the preceding twelve months shall be made available by the laboratory, upon request, to any person utilizing or requesting the services of the laboratory.

(g) Certified laboratories that desire to extend the range of tests or analyses offered shall submit a written request, comply with the requirements of N.J.A.C. 7:18–2.3, 2.4 or 2.10, and shall demonstrate satisfactory results in the required number of proficiency tests or samples as required by N.J.A.C. 7:18–2.3, 2.4 or 2.10 prior to the inclusion of this test or analysis in the list of tests or analyses for which proficiency has been established.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
(a) 1 added. In (g), "submit a written request" inserted, "N.J.A.C. 7:18–2.3 or 2.4" was " ... and 2.4".
Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Added reference to N.J.A.C. 7:18–2.3 and 2.4 in (a).
Added reference to Department's Office of Quality Assurance in (b).
Changed "at least one round of proficiency testing" to "the required number of proficiency tests or"; added reference to N.J.A.C. 7:18–2.3, 2.4, 2.10 in (g).

7:18–2.11 Laboratory inspections

(a) As a condition of obtaining and maintaining certification, a laboratory shall permit and facilitate inspections by personnel of the Department.

(b) The Department shall conduct at least one on-site inspection of a laboratory seeking certification in any parameter to determine whether or not the laboratory meets the Department's standards, as set forth in this chapter, for performing analyses for that parameter. The on-site inspection shall be performed prior to making a decision concerning the requesting certification.

(c) Regular inspections of laboratories certified in accordance with this chapter shall be conducted during normal State business hours at intervals of not more than two years. Such inspection shall be conducted by representatives of the Department upon presentation of credentials. Laboratories that have moved to a new location shall comply with N.J.A.C. 7:18–2.14 and shall be inspected within one month of receipt of notification by the Department of such changes of location.

(d) "Authorized representatives of the Department may make an announced or unannounced inspection, search or examination of a certified or interimly approved laboratory whenever the Department in its discretion considers such an inspection, search or examination necessary to determine the extent of the laboratory's compliance with the conditions of its certification and these regulations. Any refusal to allow entry to the Department's representatives shall constitute a violation of a condition of certification and grounds for revocation of certification."

(e) During inspections, consideration will be given to competence and attitude of staff; working conditions, including adequacy of space; lighting, equipment and supplies; efficient organization of the laboratory; testing or analytical methods used; quality control procedures; maintenance of all required records; and compliance with the requirements of this chapter.

(f) Following inspections, laboratories shall be furnished with inspection reports which shall list deficiencies found, and a listing of the parameters for which the laboratories have demonstrated proficiency during inspections. Such inspection reports and listings shall be deemed public records, and shall be made available to any person utilizing or requesting the services of the laboratory.

(g) Whenever deviations from the requirements of this chapter are found, the laboratory shall not be afforded more than 30 days from the date the inspection report is mailed to the laboratory in which to correct such deficiencies. If deficiencies affecting the accuracy of results are found, the certification shall be immediately suspended or revoked, in accordance with the provisions of N.J.A.C. 7:18–2.12.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Changed citation to N.J.A.C. 7:18–2.12 with other stylistic changes in (g).

7:18–2.12 Cancellation, suspension, and revocation of certification

(a) Any certified laboratory may cancel its certification in any category or parameter by notifying the Bureau in writing of the laboratory's decision to cancel its certification. The laboratory shall enclose its laboratory certificate and license with the letter of notification. This cancellation notification shall not entitle the laboratory to any refund of its certification fee.

(b) The Department may temporarily suspend a laboratory's certification in any or all categories or in any parameter when the laboratory fails to fully meet the standards of this chapter and the failure does not merit immediate decertification action. The Department shall notify the laboratory by letter of its suspension and the reason therefor. Suspension may be invoked for, but are not limited to, the following reasons:

1. Failure to submit in a timely manner a complete renewal application or the appropriate fee;

2. Failure to submit a timely or acceptable response to the laboratory evaluation report;

3. For all categories except Radiological Testing, failure to submit results of performance evaluation samples within 45 days of receipt of such proficiency samples;

4. For the Radiological category, failure to submit results of performance evaluation samples to the USEPA in a timely fashion;

5. For all categories except Radiological and Gas Chromatography Testing, failing to acceptably analyze both the high and low values for any one parameter during a proficiency test shall be grounds for suspension in the parameter;

6. For the Radiological category, the following shall be grounds for suspension:

i. For radiological analyses of parameters required to be monitored by the Safe Drinking Water Act and the State Primary Drinking Water Regulations, failing to acceptably analyze two of USEPA's blind performance evaluation samples or two cross check samples during the fiscal year shall be grounds for suspension for the parameter(s) failed. For radon analysis required to be monitored by the Safe Drinking Water Act, failing to participate in and pass every proficiency test, not to exceed four tests per year, shall be grounds for suspension.

ii. For radon/radon progeny analyses of air samples, failing to participate in and pass every required proficiency test made available during the fiscal year through an authorized proficiency program for each stationary detection device, not to exceed four tests per year and not less than one per year, shall be grounds for suspension in that method or device.

iii. A laboratory suspended in radon/radon progeny analyses has 120 days to pass a proficiency test from an authorized proficiency program. If a laboratory does not pass a proficiency test within 120 days, it will be decertified and required to reapply for certification in each stationary detection device for which it was decertified.

7. For the Gas Chromatography category, failing to acceptably analyze both the high and low values for any one parameter during a proficiency test shall be grounds

for suspension in all parameters covered by that gas chromatography method.

(c) A laboratory may be decertified by order of the Department for due cause, including, but not limited to:

1. Violation of a condition of the Certification;

2. Violation of a statute, regulation, or order of the Department;

3. Misrepresentations made to the Department;

4. Demonstrable nonconformance with the requirements of this chapter;

5. Substantial change in personnel, facilities or techniques without disclosure thereof to the Bureau;

6. Nonpayment of applicable fees;

7. For all categories except Radiological Testing, failure to analyze a set of proficiency testing samples within 45 days of the receipt of such proficiency samples;

8. For the Radiological category, failure to submit results of performance evaluation samples to the USEPA in a timely fashion;

9. For all categories except Radiological and Gas Chromatography Testing, failing to acceptably analyze both the high and low values for any one parameter during a proficiency test shall be grounds for decertification in the parameter;

10. For the Radiological Category, the following shall be grounds for decertification:

i. For radiological analyses of parameters required to be monitored by the Safe Drinking Water Act and the State Primary Drinking Water Regulations, failing to acceptably analyze two blind performance evaluation samples or two cross check samples for any one parameter during any consecutive 12 month period or for radon analysis of parameters required to be monitored by the Safe Drinking Water Act, failing to participate in and pass the next available authorized proficiency test after being suspended in any parameter shall be grounds for decertification in that parameter; or

ii. For radon/radon progeny analyses of parameters required to be monitored by the Radon Act, failing to participate in and pass an authorized proficiency test from an authorized proficiency program within 120 days of failing a required authorized proficiency test shall be grounds for decertification in a stationary detection method;

(1) If a laboratory is decertified it must reapply for certification in each stationary detection method for which it was decertified.

11. For the Gas Chromatography category, failing to acceptably analyze both the high and low values for any one parameter during a proficiency test shall be grounds for decertification in all parameters covered by that gas chromatography method; or

12. Performing and charging for additional tests or analyses that have not been requested by the customer, falsifying analyses, or engaging in other unethical or fraudulent practices.

(d) Interim approvals may be revoked for due cause by order of the Department, without right to a hearing thereon.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
In (b)5 and (c)9, "Gas Chromatography" added.
(b) 7 added; new (c)11 added, former 11 made 12.
Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Deleted old text and substituted new text regarding grounds for suspension in (b)6.
Changed "Certification may be revoked" to "A laboratory may be decertified" in (c).

7:18–2.13 Effect and duration of suspension and decertification orders

(a) The results of any tests or analyses performed after issuance of a suspension or decertification order for any category or parameter suspended or decertified shall not be submitted to or accepted by the Department for compliance with the requirements of the New Jersey Safe Drinking Water Act, the New Jersey Water Pollution Control Act, the Radon Act and regulations adopted pursuant to those acts.

(b) Radon/radon progeny analysis may not be performed by any laboratory for determining radon or radon progeny levels or for compliance with the requirements of the Radon Act or Safe Drinking Water Act or regulations adopted pursuant thereto after the issuance of a suspension or decertification order.

(c) Suspension shall not be withdrawn until all bases for the suspension have been eliminated or rectified.

(d) Revocations shall provide that reapplication for certification shall not be considered until all bases for revocation have been eliminated or rectified, and until a period of at least six months from the date of revocation has elapsed.

(e) Recipients of certification revocation orders shall have a right to a hearing thereon, if requested in writing within 20 days of receipt of the revocation order. The request for a hearing shall be sent to the Office of Legal Affairs, ATTENTION: Adjudicatory Hearing Requests, Department of Environmental Protection and Energy, CN 402, Trenton, New Jersey 08625–0402. Said hearing shall be held before an Administrative Law Judge and in accordance with the Administrative Procedure Act, N.J.S.A. 52:14B–1 et seq. The decision by the Commissioner, based on the hearing record and the recommendations of the Administrative Law Judge shall be the final administrative decision on the revocation.

(f) Use of any remedy provided by the Water Pollution Control Act, the Safe Drinking Water Act, the Radon Act or this chapter shall not preclude the use of any other remedy available to the Department.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Deleted "notification" and "revocation" in heading.
Changed "notification or revocation order" to "decertification order"; changed "revoked" to "suspended"; added "submitted to or"; added "the Radon Act" in (a).
Added (b).
Recodified existing (b)-(d) as (c)-(e).
Added (f).
Administrative change in (e).
See: 23 N.J.R. 3325(b).

7:18–2.14 Information to State

In the event there are any changes in the name, location, ownership, manager, post office address or telephone number of a laboratory to which the provisions of this chapter apply, written notice thereof shall be sent to the Bureau of Revenue New Jersey Department of Environmental Protection, CN 402, Trenton, New Jersey 08625. In the case of change in supervisor(s), the qualifications of the new supervisor showing compliance with the requirements of N.J.A.C. 7:18–2.7(d) shall be furnished.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Added "manager"; changed "Bureau of Collections and Licensing" to "Bureau of Revenue".

7:28–2.15 Criminal penalties

(a) In addition to any other penalties available to the Department pursuant to the Water Pollution Control Act, the Safe Drinking Water Act, the Radon Act and this chapter, any person who violates the Radon Act or any rule or regulation adopted pursuant to the Radon Act is guilty of a crime of the third degree.

(b) Use of any remedy under this section shall not preclude the use of any other remedy available to the Department.

New Rule, R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).

SUBCHAPTER 3. CRITERIA AND PROCEDURES FOR MICROBIOLOGICAL TESTING AND ANALYSIS

7:18–3.1 Scope

This chapter establishes the Department's requirements which a certified laboratory or a laboratory seeking certification shall continually meet and follow when performing microbiological analyses.

7:18–3.2 Laboratory facilities and safety

(a) Laboratory space and facilities shall be adequate to properly carry out the services performed in, or offered by, the laboratory.

(b) Laboratory work areas shall be arranged so as to minimize problems in transportation and communication.

(c) Workbench space within the laboratory shall be ample for the tests or analyses to be performed, and shall be well-lighted and convenient to a sink, and such water, gas, suction and electrical outlets as are necessary to properly carry out the specific tests or analyses performed in the laboratory.

(d) The temperature and humidity within the laboratory shall be maintained within the limits required for the proper performance of each test or analysis and for the proper operation of instruments which may be affected by temperature variations.

(e) Each laboratory shall have available to its facilities, equipment and instruments, including but not limited to water baths, incubators, sterilizers, and refrigerators, which shall be adequate to properly perform the tests and analyses for the parameters within this category for which the laboratory is certified or is seeking certification.

(f) Adequate fire precautions shall be taken, including but not limited to having readily available a fire extinguisher rated for the types of fires that reasonably may be foreseen given the types of tests and analyses performed by the laboratory.

(g) Appropriate occupational safety and health laws shall be posted and observed.

7:18–3.3 Laboratory equipment, supplies and materials

(a) Laboratories performing microbiological tests and analyses shall have on the premises and under the control of the laboratory supervisor the equipment and instruments listed in this section necessary for the preparation of the specific media and analysis of the samples for which the laboratory is seeking certification or is certified. Such instruments, when required, shall meet the following specifications:

1. The pH meters shall have an accuracy of and scale graduations within ± 0.1 unit.

2. Top-loader or pan balances shall meet the following requirements:

i. Balances shall be clean, not corroded, and shall be provided with appropriate weights of good quality; and

ii. Balances shall tare out and detect a weight of 100 mg when used for general media preparation.

3. Temperature-monitoring devices shall meet the following requirements:

i. Glass or metal thermometers shall be graduated in 0.5 degrees C increments for all analyses except fecal coliform analysis, in which case glass or metal thermometers shall be graduated in 0.2 degrees C increments;

ii. Continuous temperature recording devices shall be sensitive and accurate to within 1.0 degree C;

iii. The column of liquid in glass thermometers shall have no separation; and

iv. A certified thermometer shall be available for use by the laboratory.

4. Air or water-jacketed incubators, aluminum block incubators, incubator rooms, and water baths shall meet the following requirements:

i. Incubators, incubator rooms, and water baths shall be of sufficient size to accommodate periods of peak work load;

ii. Incubators and water baths must maintain internal temperatures of 35.0 ± 0.5 degree C for total coliform and fecal streplococci analysis, and 44.5 ± 0.2 degree C for fecal coliform analysis, in the area of use at maximum loading;

iii. When aluminum block incubators are used, culture dishes and tubes shall fit snugly within the block;

iv. The water bath or aluminum block shall be equipped with a calibrated thermometer graduated in increments of at least 0.2 degree C and the temperature recorded daily;

v. Whenever an air incubator is in use, a calibrated thermometer with its bulb immersed in liquid shall be placed on the top and bottom shelves in use within the incubator; and the temperature within the incubator shall be recorded daily; and

vi. A recording thermometer, sensitive and accurate to a temperature of 1 degree C may be used to monitor the general operation of the unit.

5. The autoclave shall meet the following requirements:

i. The autoclave shall be in good operating condition when observed during its operation cycle or when time-temperature charts are read, and, for most efficient operation, use of a double-walled autoclave constructed of stainless steel is suggested;

ii. The autoclave shall be equipped with an accurate thermometer, a separate pressure gauge, and a safety valve that is in good operating condition;

(1) The requirement for a separate pressure gauge shall be waived provided the laboratory has documentation from the manufacturer of the autoclave certifying that the equipment will operate safely without a separate pressure gauge.

iii. The autoclave shall reach the sterilization temperature of 121 degrees C and shall maintain that temperature throughout the sterilization cycle; and the autoclave shall complete the sterilization cycle in no more than 45 minutes; and

iv. During depressurization the autoclave shall not produce air bubbles in the fermentation media.

6. The hot air oven shall meet the following requirements:

i. The hot air oven shall be constructed in a manner which shall ensure a stable sterilization temperature;

ii. Use of the hot air oven is recommended for sterilization of glass pipets, bottles, flasks, culture dishes, and other laboratory glassware and utensils; and

iii. A calibrated thermometer in at least 10 degrees C increments with its bulb placed in sand shall be placed on one of the shelves in use within the hot air oven.

7. The refrigerator shall maintain an internal temperature of 1 degree to 4.4 degrees C (34 degrees to 40 degrees F).

8. Laboratories shall have available the following optical, counting, and lighting equipment:

i. At least one low power magnification device, preferably a binocular microscope with 10 to 15X magnification, for use in counting fecal coliform and fecal streptococci MF colonies;

ii. At least one low power magnification device, preferably a binocular microscope with 10 to 15X magnification, with a fluorescent light source for use in counting total coliform MF colonies; and

iii. A mechanical hand tally for use in counting bacteria colonies.

9. Inoculation equipment shall meet the following requirements:

i. The diameter of inoculation loops shall be at least 3mm and the loops shall be constructed of 24 to 26 gauge Nichrome, chromel, or platinum-iridium wire;

ii. Either single-service metal inoculation loops, pre-sterilized plastic inoculation loops, or reusable metal inoculation loops shall be used; and

iii. Disposable dry-heat-sterilized hardwood applicator sticks may be used.

10. Membrane filtration (MF) equipment shall meet the following requirements:

i. Units used in MF procedures shall be made of stainless steel, glass, or autoclavable plastic;

ii. MF equipment shall not leak and shall not be corroded; and

iii. Field equipment may be used for coliform detection; however, standard laboratory MF procedures must be followed when using field equipment.

11. Membrane filters and pads shall meet the following requirements:

i. Membrane filters shall be manufactured from cellulose ester materials, and shall be white, grid-marked, and have a 47mm diameter and 0.45 um pore size; however, another pore size may be used when the performance data provided by the manufacturer show the performance of that pore size to be equal to or better than the performance of the 0.45 um membrane filter; and

ii. Membrane filters and pads shall be either autoclavable or presterilized.

12. Laboratory glassware, plastic ware, and metal utensils shall meet the following requirements:

i. Glassware and metal utensils shall be resistant to the effects of corrosion, high temperatures, and vigorous cleaning operations;

ii. Flasks, beakers, dilution bottles, culture dishes, culture tubes, and other glassware shall be of borosilicate glass and free of chips, cracks, and excessive etching;

iii. Volumetric glassware should be Class A and need not be calibrated before use;

iv. Plastic items shall be of clear, inert, nontoxic materials and shall retain accurate calibration marks after repeated autoclaving; and

v. It is recommended that metal utensils made of stainless steel be used.

13. Sample bottles shall meet the following requirements:

i. Either wide-mouthed hard glass and stoppered sample bottles, or plastic sample bottles with screw caps, shall be used, and all sample bottles shall have a capacity of at least 120mL.;

ii. Glass-stoppered bottles shall be stored so that they are protected from contamination by dust and the caps shall be covered with either aluminum foil or kraft paper;

iii. Screw caps shall have leakproof nontoxic liners which are capable of withstanding repeated sterilizations, at temperatures of 121 degrees C sustained for 30 minutes per sterilization; and

iv. Sterile sample bottles shall contain 10 mg. of dechlorinating agent per 100 mL of sample.

v. Pre-sterilized plastic bags containing 10 mg. of sodium thiosulfate may be used for collecting drinking water samples for total coliform analyses.

14. Pipets shall meet the following requirements:

i. Sterile, glass or plastic pipets shall be used for measuring quantities of 10 mL or less;

ii. Glass pipets shall be made of borosilicate glass;

iii. Pipets shall deliver the required volume quickly and accurately within a 2.5 percent tolerance;

iv. Pipets shall not be excessively etched, mouthpiece or delivery tips shall not be chipped, and graduation marks shall be legible.

15. Pipet containers shall meet the following requirements:

i. Open packets of disposable sterile pipets shall be resealed after each use; and

ii. Pipet containers shall be made of aluminum or stainless steel.

16. Culture dishes shall meet the following requirements:

i. Sterile plastic culture dishes with tight or loose lids, or glass culture dishes with loose lids shall be used; and

ii. When culture dishes with loose lids are used, the relative humidity in the incubator shall not be less than 90 percent.

17. Culture dish containers shall meet the following requirements:

i. Culture dish containers shall be made of either aluminum or stainless steel, or the culture dishes may be wrapped in heavy aluminum foil or char-resistant paper; and

ii. Open packs of disposable sterile culture dishes shall be resealed after each use.

18. Culture tubes and closures shall meet the following requirements:

i. Culture tubes shall be made of borosilicate glass or other corrosion resistant glass and shall be of sufficient size to contain both the culture medium and sample portions to be tested, without being more than three-quarters full; furthermore, it is recommended that the fermentation vial be 10mm x 75mm and extend above the medium; and

ii. Caps should be made of snug-fitting stainless steel or plastic; however, loose-fitting aluminum caps or screw caps are also acceptable.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
In (a)1, "scale graduations" specified; in (a)3ii, 1.0 degree C was 0.5 degree C; in (a)4ii, "water baths" inserted; new (a)4iv added, former iv and v made v and vi; in v, "top and bottom shelves" was "one of the shelves"; in vi, accuracy was ± 0.5 degree C and ± 0.2 degree C for various incubators; in (a)5ii, "accurate thermometer" and "a separate pressure gauge" replaced "pressure and temperature gauges on the exhaust side" and (1) added; in (a)6iii, "in at least 10 degrees C increments" added; in (a)9i, "24 to 26" was "22 to 24"; (a)13v added.

7:18–3.4 Sample collection, handling, and preservation

(a) When the laboratory has been delegated responsibility for drinking water sample collection, handling, and preservation by the water purveyor, there shall be strict adherence to the required sampling procedures, complete identification of the sample, and prompt transfer of the sample to the laboratory as described in Standard Methods, 14th Edition, p. 904–907.

(b) The minimum sampling frequency for Drinking Water analysis shall be that specified in 40 CFR 141.21.

(c) The sample collector shall be trained by the laboratory in sampling procedures.

(d) When collecting drinking water samples, the water tap shall flow steadily for two to three minutes before the sample is collected. Any aerator, strainer, hose attachment, or water purification device shall be removed from the tap prior to sample collection.

(e) The sample volume shall be at least 100 mL. The sample bottle shall be filled only to the shoulder.

(f) Sample bottles shall have a capacity of at least 120 mL and shall be made of either sterile plastic or hard glass, and shall be wide mouthed with either a plastic screw cap or glass stopper. Sample bottles shall be capable of withstanding repeated sterilization. Ten milligrams of sodium thiosulfate per one hundred mL of sample shall be added to all sample bottles during preparation of the bottles.

(g) The sample report form shall be completed immediately after collection and shall state the sampling location, date and time of collection, chlorine residual, collector's name, and any remarks.

(h) The following chain of custody procedures shall be employed in collecting and handling samples and the information shall be reported on the sample report form or a chain of custody form.

1. Sterilized and decontaminated containers shall be used for sampling.

2. Tie-on or affixed labels with an identification number shall be used for labeling all samples.

3. After the sample has been collected, the appropriate information as to the identity of the sample shall be written on the label. If the label has been removed it shall be reaffixed before removing the label from any other container.

4. After collecting the sample, the label shall remain affixed to the sample container and shall not be removed until the required analyses have been completed and the surplus sample has been discarded.

5. Immediately upon delivery of the sample to the laboratory, the sample collector shall complete the appropriate chain-of-custody section of the sample report forms or chain-of-custody form.

6. The chain-of-custody information reported on the sample report form or chain of custody form shall list at a minimum the following information:

i. Sample number;

ii. Description of samples;

iii. Specific location of sample collection;

iv. Identity of person collecting the sample;

v. Date and time of sample collection;

vi. Date and time of custody transfer to laboratory (if the sample was collected by a person other than laboratory personnel);

vii. Identity of person accepting custody (if the sample was collected by a person other than a laboratory personnel);

viii. Date and time of initiation of analyses;

ix. Identity of person performing the analyses;

x. Name of laboratory performing the analyses.

7. Prior to accepting custody of the sample, the laboratory personnel who will accept the sample shall be reasonably assured that the sample has met the collection, handling and preservation requirements. If the sample fails to meet those requirements, the chain of custody section of the sample report form or the chain of custody form shall so indicate and the sample shall be rejected.

8. The laboratory personnel accepting responsibility for the sample as well as all other laboratory personnel performing analysis on that sample shall sign the form containing the chain of custody information.

9. When it is necessary to send samples by mail, bus, courier service, or private shipping, the chain of custody form shall be completed by the sampler prior to the shipping of the sample and shall accompany the sample during shipping. Upon receipt of the sample in the laboratory steps (h)6 through 8 above shall be followed.

(i) The holding time between sample collection and analysis of Drinking Water samples shall not exceed 30 hours. Samples that fail to meet this holding time shall be rejected and a new sample requested.

(j) Fecal coliform samples collected for NJPDES compliance analysis shall be analyzed within the holding time recommended in 40 CFR 136. Samples that fail to meet this holding time shall be rejected and a new sample requested.

(k) Drinking Water and NJPDES samples that cannot be analyzed within one hour following collection shall be stored in iced coolers during transit to the laboratory and refrigerated upon delivery until such analyses can be performed.

(*l*) A laboratory that has received either certification or interim approval shall accept only samples that are properly labeled and for which assurance is given that the samples have been collected, preserved, processed, stored and transported in a manner that will assure both the identity of the sample and that the sample is sufficiently stable to be used in the requested tests or analyses.

(m) Pre-sterilized plastic bags containing 10 mg of sodium thiosulfate may be used for collecting drinking water samples for total coliform.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
(m) added.

7:18–3.5 Methodology

(a) Laboratories shall use the test procedures required by 40 CFR 141 in the analysis of drinking water microbiological parameters.

(b) Test procedures required by 40 CFR 136 shall be utilized for the analysis of NJPDES parameters.

(c) All procedures other than those set forth in (a) and (b) above are considered alternative analytical techniques as described in 40 CFR 141.27 and 40 CFR 136.4. Laboratories shall make special application to the Commissioner for the use of alternative analytical methods and such application shall include a showing of acceptable comparability data.

(d) All laboratories which have previously been granted approval to use an alternate analytical method by the USEPA shall be allowed to continue using such method after it submits written proof of the approval to the Department.

(e) The membrane filter (MF) procedure used for Drinking Water Analysis should show good colony development over the entire surface. The golden green metallic sheen colonies shall be counted and recorded as the total coliform density per 100 mL of water sample. The following rules for reporting any problem with MF result shall be followed:

1. In the case of total coliform analysis, if there is confluent growth, with or without discrete sheen colonies, covering the entire filtration area of the membrane, the results shall be reported as "confluent growth per 100 mL, with (or without) total coliforms", and a new sample shall be requested.

2. In the case of fecal coliform and fecal streptococci analysis, if there is confluent growth, with or without typical discrete colonies, covering the entire filtration area of the membrane, the results shall be reported as "confluent growth per 100 mL, with (or without) fecal coliforms (or fecal streptococci)", and a new sample shall be requested.

3. When the total number of bacterial colonies on the membrane is greater than 200 total colonies, or is not sufficiently distinct, or both, the results shall be reported as "Too numerous to count (TNTC) per 100 mL, with (or without) total coliforms, (or fecal coliform, or fecal streptococci)" and a new sample shall be requested.

4. When both confluent growth and TNTC are present, a new sample shall be requested and, if the MF procedure is used, the sample volumes filtered shall be adjusted by increasing dilution of the sample; otherwise the most probable number (MPN) procedure shall be used.

5. If the laboratory has elected to use the MPN test on water supplies or discharges that have a history of confluent growth or TNTC with the MF procedure, all presumptive tubes from the MPN test that have heavy growth but no gas production should be submitted to the confirmed MPN test to check for the suppression of coliforms; the count shall be adjusted based upon confirmation and a new sample shall be requested. In addition, this procedure should be carried out on samples collected from water supplies or discharges known to have such a history, at a frequency of at least once every three months.

7:18–3.6 General laboratory practices

(a) Laboratory sterilization practices shall meet the following requirements:

1. The following times and temperatures shall be used for sterilization of materials by autoclaving:

Material	Temperature/Minimum Time
Membrane filter and pads	121°C/10 min.
Carbohydrate-containing media (lauryl tryptose, brilliant green lactose bile broth, etc.)	121°C/12–15 min.
Contaminated materials and discarded tests	121°C/30 min.
Membrane filter assemblies (wrapped), sample collection bottles (empty), individual glassware items	121°C/15 min.
Rinse water volumes of 500 ml to 1,000 ml	121°C/15 min.
Rinse water in excess of 1,000 ml	121°C/time adjusted for volume; check for sterility
Dilution water blanks	121°C/15 min.

2. Membrane filter assemblies made of metal shall be autoclaved after each sample filtration series, the end of which is marked by the lapse of 30 minutes or more between sample filtrations;

3. Membrane filter assemblies made of glass or plastic may be sterilized by two minutes of exposure in an ultraviolet sterilizer unit, provided its use does not affect the validity of the results and the ultraviolet lamps are tested with a light meter and a spread plate irradiation test is performed quarterly.

4. At least two minutes of ultraviolet light or boiling water may be used on a membrane filter assembly to prevent bacterial carry-over between filtrations; and

5. Dried glassware shall be sterilized in a hot air oven at 170 degrees C for a minimum of two hours.

(b) Laboratory pure water, including distilled, deionized, or other processed waters, shall meet the following requirements:

1. An analyst shall either test the quality of the laboratory pure water or have the laboratory pure water tested by another State certified laboratory; and

2. Only laboratory pure water meeting the requirements set forth in N.J.A.C. 7:18–3.7(a)1viii shall be used in performing bacteriological analyses.

(c) Rinse water and dilution water used by the laboratory shall meet the following requirements:

1. Stock buffer solution shall be prepared in accordance with Standard methods, 15th Edition on Microbiological Methods—EPA, using laboratory pure water adjusted to pH 7.2;

2. Stock buffer shall be either autoclaved or filter-sterilized, and must be labeled, dated, and stored at 1 degree to 4.4 degrees C;

3. The stored buffer solution shall be free of turbidity; and

4. Rinse and dilution water shall be prepared by adding 1.25 mL of stock buffer solution and 5 mL of magnesium chloride solution per liter of laboratory pure water, and the final pH shall be 7.2 ± 0.1.

(d) Media shall be prepared and stored in accordance with the following requirements:

1. Laboratories shall use commercial dehydrated media for routine bacteriological procedures;

2. All media shall be prepared according to the procedures for media preparation set out in Standard Methods, 14th Edition, or Microbiological Methods—EPA; however, lactose broth shall not be used;

3. Dehydrated media containers shall be kept tightly closed and stored in a cool, dry location, to prevent discoloration and caking; laboratories shall not use discolored or caked dehydrated media;

4. Dissolution of the media using laboratory pure water shall be completed before dispensing to culture tubes or bottles;

5. The membrane filter broth and agar media shall be heated in a boiling water bath until completely dissolved;

6. MF broths shall be stored and refrigerated no longer than 96 hours and MF agar media shall be stored, refrigerated and used within two weeks;

7. MPN media prepared in tubes with loose-fitting caps shall be used within one week, but if MPN media are refrigerated after sterilization, they shall be incubated overnight at 35 degrees C to confirm usability, and tubes showing growth or gas bubbles shall be discarded;

8. Media in screw cap containers may be held up to three months, provided that the media are stored in an enclosed area so that no light may enter and provided that evaporation does not exceed 0.5 mL per 10 mL total volume; in addition, commercially prepared liquid and agar media supplies may be used; and

9. Ampouled media shall be stored at 1 degree to 4.4 degrees C (34 degrees to 40 degrees F), and storage time shall be limited to the manufacturer's expiration date.

(e) When measuring sample volumes of more than 10 mL, graduated cylinders or graduated membrane filter funnels having an accuracy within 2.5 percent tolerance shall be used.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
In (a)1, minimum times reduced for certain materials; in (a)2, "assemblies made of metal shall be autoclaved" was "assemblies shall be sterilized"; new (a)3 added, former 3 and 4 made 4 and 5.
In (c)1, 15th Edition was 14th; in (c)4, "5 mL of magnesium chloride solution" added, final pH tolerance corrected to ± 0.1.

7:18–3.7 Quality control program

(a) Each laboratory shall develop and have on file and available for inspection a written description of the current laboratory quality control program. Such written description shall outline the procedures which the laboratory will use in meeting the quality control requirements set forth in this section and N.J.A.C. 7:18–3.4 and 7:18–3.6. Management, supervisors and analysts should participate in developing the quality control program. Each participant within the laboratory should have a copy of the quality control program and detailed guidelines for implementation of the participants responsibility. A record of analytical control tests and quality control checks on media, materials, and equipment shall be prepared by the laboratory and retained for at least five years.

1. Laboratories shall perform the following analytical quality control tests to ensure that general laboratory practices and methodology are in compliance with the requirements of this subchapter:

i. When analyzing Drinking Water samples, the laboratory shall verify at least five sheen or borderline sheen total coliform bacterial colonies from each membrane containing five or more such colonies. Bacteria counts shall be adjusted based on this verification. The verification procedure shall be conducted by transferring growth from the total coliform bacterial colonies into lauryl tryptose broth (hereinafter referred to as LTB) tubes and then transferring growth from gas-positive LTB cultures to brilliant green lactose bile (hereinafter referred to as BGLB) tubes. Colonies shall not be transferred exclusively to BGLB. However, colonies may be transferred to LTB and BGLB simultaneously. Negative LTB tubes shall be reincubated on the day following the verification procedure and shall be confirmed if gas is produced. It is recommended that laboratories verify all sheen colonies and borderline sheen colonies.

ii. A start and finish MF sterile control test of rinse water, media and supplies shall be conducted for each sample filtration series. If the MF sterile control tests indicate contamination of rinse water, media, or supplies, then all data which has been generated through tests involving the use of the contaminated rinse water, media, or supplies shall be rejected and the laboratory shall request immediate resampling of those waters involved in the laboratory error.

iii. The MPN test for Drinking Water samples shall be carried to completion on 10 percent of positive confirmed samples except that gram staining shall not be performed; but, if no positive tubes result from the tested Drinking Water samples, the complete MPN test, but not gram staining, shall be performed on a quarterly basis on at least one water source for which results have been positive;

iv. Laboratory pure water shall be analyzed annually by the test for bactericidal properties for distilled water as set forth in Standard Methods, 14th Edition, p. 888, or Microbiological Methods—EPA, p. 200. Only satisfactorily tested laboratory pure water is permissible in preparing media, reagents, rinse, and dilution water. If the tests do not meet the requirements for laboratory pure water set forth in subparagraph viii. below, then corrective action, including but not limited to purchasing a fresh supply of laboratory pure water or purification of the existing supply and source of laboratory pure water, shall be taken immediately and the water shall be retested;

v. Laboratory pure water shall be analyzed monthly for conductance, pH, chlorine residual, and standard plate count. If the test results for any of the substances exceed the standards set forth in subparagraph viii. below, then corrective action, including but not limited to purchasing a fresh supply of laboratory pure water, or purification of the existing supply and source of laboratory pure water, shall be taken and the water shall be retested;

vi. The laboratory shall ensure that laboratory pure water does not come in contact with heavy metals. Laboratory pure water shall be analyzed annually for trace metals, with particular emphasis upon analysis to detect Pb, Cd, Cr, Cu, Ni, and Zn. If the test results show that the laboratory pure water does not meet the requirements set forth in subparagraph viii of this section, then corrective action, including but not limited to purchasing a fresh supply of laboratory pure water or purification of the existing supply and source of laboratory pure water, shall be taken and the water shall be retested;

vii. Standard plate count procedure shall be performed on laboratory pure water as described in Standard Methods, 14th Edition, or Microbiological Methods—EPA. Plates shall be incubated at 35.0 ± 0.5 degrees C for 48 hours.

viii. Requirements for laboratory pure water:

pH	5.5 – 7.5
Conductivity	Greater than 0.5 megohm-cm as resistivity or less than 2.0 micromhos/cm as conductance at 25 degrees C
Trace metals:	
Pb, Cd, Cr, Cu, Ni and Zn	Not greater than 0.05 mg/L
Total metals not limited to those above	Equal to or less than 1.0 mg/L
Test for bactericidal properties of distilled water (Standard Methods, 14th Edition p. 888, or Microbiological Methods EPA, p. 200)	0.8 – 3.0
Free chlorine residual	0.0
Standard plate count	Less than 1,000 colonies/mL

ix. Each laboratory should analyze one quality control sample per year, when available from the Department, for the parameter or parameters for which the laboratory has received certification or interim approval;

x. Each laboratory shall satisfactorily analyze one unknown performance sample per year, when available, for the parameter or parameters within the category or categories for which the laboratory has received certification or interim approval;

xi. Duplicate analyses should be run on known positive samples at least once per month, and the duplicates should then be run as a split sample by more than one analyst, with each split constituting a 50 mL sample;

xii. Any laboratory associated with a public water facility shall examine a minimum of one polluted water

source per month in addition to analyzing the required number of distribution samples;

xiii. In the case of laboratories having more than one analyst, each analyst should count the total coliform sheen colonies on a membrane from a polluted water source at least once per month, colonies on the membrane should be verified, and the analysts' counts should be compared to the verified count;

xiv. There shall be available at all times, in the immediate bench area of laboratory personnel engaged in examining samples and performing related procedures within a category, current laboratory manuals or other complete written descriptions and instructions related to:

(1) The analytical methods to be used by those personnel, properly designated and dated to reflect the most recent supervisory reviews;

(2) Pertinent current literature references; and

(3) Such written descriptions and instructions may be supplemented by, but not replaced by, textbooks relating to the particular analytical methods and procedures employed by such personnel;

xv. Only the laboratory manager or supervisor shall make changes in laboratory procedures and those changes shall only be effective when put in writing; and

xvi. Laboratories shall maintain an acceptable quality control program covering each method or procedure for testing and analyses performed by the laboratory in order to verify and assess accuracy, measure precision, and detect errors in the results of such tests and analyses.

2. The following procedures shall be followed in performing quality control checks of laboratory media, equipment, and supplies:

i. Each pH Meter shall be cleaned immediately after each use period and calibrated prior to usage using two pH buffer standards and records of each calibration shall be maintained; buffer aliquots shall not be used more than once; commercial buffer solutions shall be dated at the time of initial use and buffer standards should bracket the value to be measured;

ii. Top loader or pan balances shall be checked monthly against class "S" weights, and a record shall be made of each calibration check;

iii. The accuracy of all thermometers used to monitor temperatures shall be verified by comparing the readings of such thermometers with readings of a certified thermometer. A record shall be made containing the identification number of each thermometer, the temperature displayed on the certified thermometer and the thermometer being verified, correction factors when applicable, dates on which the quality control checks were performed, and the name of the analyst performing such checks. Glass thermometers shall be verified yearly and metal thermometers shall be verified quarterly.

iv. The temperature of air or water-jacketed incubators, water baths, and incubator rooms shall be either recorded continuously or recorded twice daily from in-place thermometers immersed in liquid and placed on the top and bottom shelves in use;

v. Date, time, and temperature shall be either recorded continuously or recorded individually during each sterilization cycle of the autoclave;

vi. Each hot air oven shall be equipped with a thermometer, the bulb of which shall be placed in sand, or with a temperature recording device, and records shall be maintained showing the date, time and temperature of each sterilization cycle;

vii. Laboratories shall use only membrane filters that have been recommended by the manufacturer for use in the analysis of water;

viii. The temperature of each refrigerator shall be either recorded continuously or recorded daily from an in-place thermometer immersed in liquid and placed on at least one of the shelves in use;

ix. Washing processes shall be adequate to provide clean glassware with no stains or spotting, and at the time of initial use of a detergent or washing product and whenever the brand or type of washing product is changed, the rinsing process shall demonstrate that the detergent or washing product provides glassware free of toxic material by the inhibitory residue test as set forth in Standard Methods, 14th Edition, p.885, or Microbiological Methods—EPA, p.199;

(1) Test each batch of clean glassware for acid or alkaline residues by adding bromthymol blue indicator to representative items;

x. At least one sample bottle from each batch of sterilized sample bottles shall be checked by adding approximately 25 mL of sterile LTB to the bottle or bottles and then incubating the preparation at 35 degrees ± 0.5 degrees C for 24 hours, at the end of which time the bottle or bottles shall be checked for growth;

xi. Service contracts or internal protocols approved by the Office of Quality Assurance shall be maintained on balances, autoclave, water still, and any other equipment requiring periodic servicing, and records of actual servicing shall be entered in a log book;

xii. Records of preparation of each batch of sterilized media shall be made available for inspection and shall show the lot number of the hatch, date of preparation, sterilization time and temperature, final pH of each batch, and the preparing technician's name;

xiii. Both positive and negative cultures should be used, and should be tested to determine recovery and performance compared to a previous acceptable lot of medium;

xiv. Media should be ordered on the basis of estimated needs for the next 12 month period. Bottles shall be dated upon receipt by the laboratory and upon initial opening. Except for large volume uses, media should be purchased in 1/4-lb bottles. Bottles of media should be used within six months after opening; however, in no case should opened media be used after one year. Opened bottles should be stored in a desiccator to extend storage time beyond six months. Shelf life of unopened bottles is two years;

xv. Testing should be carried out on membranes to determine recovery and performance as compared to a previously acceptable lot of membranes;

xvi. The lot number of packages of membrane filters and date of receipt by the laboratory shall be recorded;

xvii. Heat sensitive tapes, spore strips, or spore ampoules should be used during sterilization, and it is recommended that a maximum registering thermometer be used;

xviii. All reagents and solutions shall be labeled to indicate identity and, when applicable, strength or concentration, recommended storage requirements, preparation or expiration date, and other information pertinent to identification;

xix. Materials of substandard reactivity and deteriorated materials shall not be used; and

xx. All outdated material shall be discarded immediately.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
In (a)1viii, requirements revised; (a)1xvi(1) and (2) deleted; in (a)2ii, annual calibration deleted; in (a)2iv, "twice daily" was "daily", "top and bottom shelves" was "at least one of the shelves", (a)2ix(1) added; in (a)2xv, testing of media deleted; in (a)2xviii, "strength" was "titer strength".

7:18–3.8 Records and data reporting

(a) Each laboratory shall maintain records and report data in accordance with the requirements set forth in this section.

(b) Records of microbiological analysis shall be kept by the laboratory for not less than five years. This requirement is equally applicable to all raw data, quality control data, chain of custody forms and laboratory reports.

(c) The following information shall be kept by the laboratory as part of the records of all bacteriological analyses, although such information need not be included in the report to the person requesting the laboratory analysis unless otherwise required:

1. Laboratory number or other form of identification of the sample;

2. Date, time, and specific location of sampling, as well as the name of the person who collected the sample or the laboratory which submitted the sample;

3. For drinking water samples, identification of the sample source as a routine distribution system sample, check sample, raw or process water sample, or other applicable designation;

4. The date and time of receipt of the sample by the laboratory; whether the sample, when received, was preserved or unpreserved;

5. The date and time of analysis of the sample;

6. The person or persons who performed analysis of the sample;

7. The type of analysis performed and the specific analytical method or methods employed;

8. The results of the analysis; and

9. The name and address of the laboratory to which the sample was forwarded, if the analysis was not performed at the laboratory which received the sample.

(d) If the chain of custody information is reported on the chain of custody form, a copy of the chain of custody form shall be attached to the sample report form.

(e) Results of each analysis shall be calculated and entered on the sample report form which is to be forwarded to the person requesting the analysis of the sample. A careful check shall be made to assure that each result entered on the sample report form is the same as the result entered on the bench sheet and once the check is completed the analyst shall initial the bench sheet.

(f) The original or true duplicate of the results of the tests or analyses shall be sent promptly to the person who requested such tests or analyses, and shall be signed by the laboratory manager or a designee whose designation is in writing and has been submitted to the Department. In the case of tests or analyses performed pursuant to the Safe Drinking Water Act Regulations for Public Noncommunity Water Systems, the results of such tests or analyses shall be reported to the owner of the water system on computer input forms which will be provided by the department.

(g) Whenever a certified or interimly approved laboratory refer samples to another laboratory for analyses, the person requesting the analyses or tests shall receive the original laboratory report or a true duplicate of that report on the form of the laboratory that performs the tests or analyses. In the case of tests or analyses performed under the Safe Drinking Water Act Regulations for Public Noncommunity Water Systems, when use of a specific laboratory report form is required, the laboratory performing the tests shall report the results on such required forms.

(h) All results shall be reported immediately to the person requesting the analyses.

(i) For Drinking Water samples, positive results shall be reported as preliminary without waiting for MF verification or MPN completion. After MF verification or MPN completion, the adjusted counts shall be reported to the person requesting the analyses.

(j) If results are entered into a computer storage system, a printout of the data should be verified with the raw data.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
(a)1vi added.

SUBCHAPTER 4. CRITERIA AND PROCEDURES FOR CHEMICAL TESTING AND ANALYSIS

Executive Order 66(1986) Expiration Date

Pursuant to the requirements and criteria of Executive Order 66(1978), this subchapter expires on August 6, 1986.

7:18–4.1 Scope

This chapter establishes the Department's requirements which a certified laboratory or a laboratory seeking certification shall continually meet and follow performing chemical analyses.

7:18–4.2 Laboratory facilities and safety

(a) Laboratory space and facilities shall be adequate to properly carry out the services performed in, or offered by, the laboratory.

(b) Laboratory work areas shall be arranged so as to minimize problems in transportation and communication.

(c) Workbench space within the laboratory shall be ample for the tests or analyses to be performed, and shall be well-lighted and convenient to a sink, and such water, gas, suction and electrical outlets as are necessary to properly carry out the specific tests or analyses performed in or offered by, the laboratory.

(d) The laboratory shall be adequately ventilated to exhaust the gases produced by the tests or analysis performed by and the types of materials handled by the laboratory.

(e) The temperature and humidity within the laboratory shall be maintained within limits required for the proper performance of each test or analysis and for the proper operation of instruments which may be affected by temperature variations.

(f) Volatile or corrosive chemicals and flammable solvents shall be stored in accordance with the Federal Occupational Safety and Health Act and attendant Regulations.

(g) Adequate fire precautions shall be taken, including but not limited to having readily available a fire extinguisher rated for the types of fires that may reasonably be foreseen given the types of testing and analyses performed by and the types of materials handled by the laboratory.

(h) Appropriate occupational safety and health laws shall be posted and observed.

7:18–4.3 Specifications for laboratory equipment and instrumentation

(a) Laboratories which have received certification or are seeking certification to perform any of the required chemical analyses, shall have on the premises and under the control of the laboratory manager, all of the equipment and instruments necessary to analyze each parameter in which the laboratory is certified, or is seeking certification and such equipment and instruments shall meet the following specifications:

1. Analytical balance which shall meet and be operated in accordance with the following specifications:

i. Each analytical balance shall have a sensitivity of 0.1 mg;

ii. The analytical balance should be mounted on a heavy, shock-proof table. The balance level should be checked frequently and shall be adjusted as necessary;

iii. The analytical balance should be located in an area that is not near laboratory traffic and is protected from sudden drafts and humidity changes;

iv. The balance temperature shall be equilibrated with room temperature;

v. Special precautions should be taken to avoid spillage of corrosive chemicals on the pan or inside the balance case, and the interior of the balance housing should be kept scrupulously clean.

vi. Two class "S" weights shall be available for checking the analytical balance.

2. The photometers shall meet and be operated in accordance with the following specifications:

i. Spectrophotometers:

(1) The maximum spectral bandwidth shall be no more than 200 nm;

(2) Wavelength accuracy shall be within 0 ± 2.5 nm;

(3) The spectrophotometer should be capable of using several sizes and shapes of absorption cells to provide a sample path from 1 to 5 cm.

(4) All cells shall be kept clean and free of scratches, fingerprints, smudges, and evaporated film residues; and

(5) An exterior, high-capacity, constant voltage transformer is recommended for general laboratory analyses;

ii. Filterphotometers;

(1) Isolation of relatively broad bands (10 to 75 nm) of this radiant energy is achieved by use of filters at or near the maximum absorption of the colorimetric methods; and

(2) Filterphotometers should be capable of using several sizes and shapes of absorption cells to provide a sample path from 1 to 5 cm.

3. The magnetic stirrer shall have variable speeds and a Teflon R coated stirring bar.

4. The pH meter shall meet and be operated in accordance with the following specifications:

i. The accuracy of the pH meter shall be within ± 0.05 units;

ii. The scale readability of the pH meter shall be ± 0.1 units;

iii. Both glass and calomel electrodes shall be rinsed well with laboratory pure water after each reading, and shall be either rinsed or dipped several times into the next sample to be tested before the final reading is taken;

iv. Weakly buffered samples should be stirred during measurement;

v. Glass electrodes should be either immersed in distilled water or stored according to the manufacturer's recommendations during periods of inactivity.

5. Specific ion meter shall be readable and accurate to ± 5 mv.

6. The atomic absorption spectrophotometer shall meet and be operated in accordance with the following requirements and minimum specifications;

i. The atomic absorption spectrophotometer shall be a single channel, single or double beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, a wavelength range of 190 to 800 nm, and provisions for interfacing with either a strip chart recorder or a digital printout unit;

ii. The lamps of the spectrophotometer should be dated when first used;

iii. The pressure inside the acetylene tank should always be greater than 75 psi;

iv. Proper ventilation shall be maintained above the burner head;

v. A moisture trap should be incorporated into the flow system between the air source and the atomic absorption spectrophotometer itself;

7. Laboratories performing atomic absorption analysis shall have a strip chart recorder for use with the atomic absorption spectrophotometer. The strip chart recorder shall have a chart width of 10 inches (25 cm), a full scale response time of 0.5 second or less, 10 or 100 mv input to match the instrument, and variable chart speeds of 5 to 50 cm/min, or an equivalent chart speed. A digital printout unit may be substituted for the recorder.

8. Laboratories performing gas chromatographic analysis may use either a commercial or custom-designed gas chromatograph (with appropriate detectors), but in either case the gas chromatograph shall have a column oven capable of isothermal temperature control to within ± 0.2 degrees C. The system should be equipped with accurate needle-valve gas flow controls and should accept 1/4 in. glass columns with the option of direct on-column injection.

9. Laboratories performing gas chromatographic analysis shall have a strip chart recorder for use with the gas chromatograph. The strip chart recorder shall have at a minimum a chart width of 10 in. (25 cm), a full scale response time of one second or less, a 1 mv (–0.05 to 1.05) signal to match the instrument, and variable chart speeds of 5 to 50 cm/minute or an equivalent chart speed. A digital/integrator plotter may be substituted for the recorder.

10. The conductivity meter, suitable for checking laboratory pure water quality, shall be readable in ohms.cm or mhos/cm, have a range of 2 to 2,500,000 ohms.cm or equivalent mhos/cm (1 percent), and have a sensitivity of 0.33 percent or better. The conductivity meter should be equipped with platinum electrodes.

11. Gravity or mechanical convection drying ovens shall have a selectable temperature control ranging from room temperature to 180 degrees C or higher. A long stem thermometer which has been calibrated against a certified thermometer shall be inserted through a center ceiling port, and the bulb of the thermometer shall be inserted into a cylinder filled with sand.

12. Desiccators with the appropriate indicator desiccant shall be either glass or plastic as appropriate to the particular task being performed.

13. Hot plates shall have selectable temperature controls.

14. For storage of aqueous reagents and samples, a standard household refrigerator may be used. However, for storage of organics and flammable materials, an explosion-proof refrigerator should be used. The refrigerator shall maintain an internal temperature of 1 degree to 4.4 degrees C (34 degrees to 40 degrees F).

15. Laboratory glassware should be made of borosilicate glass that is resistant to damage by heat, chemicals, and repeated use. When applicable, Class A volumetric glassware shall be used and need not be calibrated before

use. The following criteria and procedures apply to laboratory glassware:

i. Unless otherwise specified, borosilicate bottles shall be used for the storage of reagents and standards solutions;

ii. Polyethylene bottles may be used instead of borosilicate bottles for the storage of reagents and standard solutions;

iii. Serological or Mohr-type pipets are not volumetric pipets and shall not be used in tests or analyses requiring quantitative sample transfer and measurement;

16. The stirred water bath for nitrate analysis shall have a temperature range from ambient temperature to 100 degrees C, the bath shall have a gable lid and it shall be stirred by a stirring device.

17. Temperature monitoring devices shall meet the following requirements:

i. Glass or metal thermometers shall be graduated in 0.5 degrees C increments;

ii. Continuous temperature-monitoring, devices shall be sensitive to 0.5 degrees C;

iii. The liquid column of glass thermometers shall have no separation; and

iv. Laboratories shall have available at least one certified thermometer.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
(a)1vi added;

7:18–4.4 Sample collection, handling and preservation

(a) Sample collection, handling and preservation techniques set out in the following Table I shall be followed for primary drinking water parameters.

(b) Sample collection, handling, and preservation techniques recommended in 40 CFR 136 shall be followed for NJPDES and secondary drinking water parameters and, unless stated otherwise, samples requiring preservation shall be preserved at the time of collection.

(c) Sample collection, handling, and preservation techniques required by the analytical methods listed in Table III shall be followed for the organic parameters analyzed by these methods.

(d) Additional information on sampling for pesticide and herbicide analysis may be found in the following publications:

1. "The Manual of Analytical Methods for the Analysis of Pesticide Residues in Human and Environmental Samples", USEPA, Health Effects Research Laboratory, Research Triangle Park, N.C. 27711, 1979 (Hereinafter referred to as PEST);

2. "Handbook for Analytical Quality Control in Water and Wastewater Laboratories", USEPA, EMSL, Cincinnati, Ohio 45268, EPA 600/4–79–019, 1979 (hereinafter referred to as EPAQC); and

3. Standard Methods, 14th Edition.

(e) The sample report form shall be completed immediately after collection and shall state the sampling location, date and time of collection, collector's name, and any remarks.

(f) The following chain of custody procedures shall be employed in collecting and handling samples.

1. Decontaminated containers shall be used for sampling.

TABLE I—SAMPLE COLLECTION, HANDLING, AND PRESERVATION [1]

Primary Drinking Water Parameters	Preservative[2]	Container[3]	Maximum Holding Time[4]
Arsenic	Conc HNO_3 to pH2	P or G	6 months
Barium	Conc HNO_3 to pH2	P or G	6 months
Cadmium	Conc HNO_3 to pH2	P or G	6 months
Chromium	Conc HNO_3 to pH2	P or G	6 months
Lead	Conc HNO_3 to pH2	P or G	6 months
Mercury	Conc HNO_3 to pH2	G P	38 days 14 days
Nitrate	Conc H_2SO_4 to pH2	P or G	14 days
Selenium	Conc HNO_3 to pH2	P or G	6 months
Silver	Conc HNO_3 to pH2	P or G	6 months
Fluoride	None	P or G	6 months
Chlorinated hydrocarbons	Refrigerate at 4°C as soon as possible after collection	G with foil or Teflon-lined cap	14 days[5]
Chlorophenoxys	Refrigerate at 4°C as soon as possible after collection	G with foil or Teflon-lined cap	7 days[5]
Trihalomethanes	Refrigerate at 4°C as soon as possible after collection	Narrow mouth screw cap bottles with TFE fluorocarbon face silicone septa cap liners	14 days
Turbidity	None required	P or G	1 hour
Free Chlorine Residual	None required	P or G	1 hour

[1] If a laboratory has no control over these factors, the laboratory supervisor shall reject any samples not meeting these criteria and so notify the authority requesting the analyses.
[2] Samples requiring preservation shall be preserved at time of collection. A laboratory that has interim approval or certification shall accept only samples which are properly labeled, and for which there is reasonable assurance that they have been collected, preserved, processed, stored and transported in such a manner as to identity and stability of the sample with respect to the requested tests or analyses; or if the stability of the sample has not been assured, the laboratory report shall clearly state that the result may be invalid due to an unsatisfactory sample. If HNO_3 cannot be used because of shipping restrictions, sample may be initially preserved by icing and immediately shipping it to the laboratory. Upon receipt in the laboratory, the sample must be acidified with conc. HNO_3 to pH2. At time of analysis, sample container should be thoroughly rinsed with 1:1 HNO_3; washings should be added to sample.

[3] P equals Plastic, hard or soft; G equals Glass, hard or soft.
[4] In all cases, samples should be analyzed as soon after collection as possible.
[5] Well-stoppered and refrigerated extracts can be held up to 30 days.

2. Tie-on or affixed labels with an identification number shall be used for labeling all samples and the information shall be reported on the sample report form or a chain of custody form.

3. After the sample has been collected, the appropriate information as to identity of the sample shall be written on the label and the label shall be reaffixed, if necessary, before removing the label from any other container.

4. After collecting the sample, the label shall remain affixed to the sample container and shall not be removed until the required analyses have been completed and the surplus sample has been discarded.

5. Immediately upon delivery of the sample to the laboratory, the sample collector shall complete the appropriate chain of custody section of the sample report form of a custody form.

6. The chain-of-custody information reported on the sample form or the chain of custody form shall list at a minimum the following information:

i. Sample number;

ii. Description of samples;

iii. Specific location of sample collection;

iv. Identity of person collecting the sample;

v. Date and time of sample collection;

vi. Date and time of custody transfer to laboratory (if the sample was collected by a person other than laboratory personnel);

vii. Identity of person accepting custody (if the sample was collected by a person other than laboratory personnel);

viii. Date and time of initiation of analysis;

ix. Identity of person(s) performing analysis; and

x. Name of laboratory performing the analysis;

7. Prior to accepting custody of the sample, the laboratory personnel who will accept the sample shall be reasonably assured that the sample has met the preservation requirements. If the sample fails to meet those requirements, the chain of custody section of the sample report form or the chain of custody form shall so indicate and the sample shall be refused.

8. The laboratory personnel accepting responsibility for the sample as well as all other laboratory personnel performing analysis on that sample shall sign the form containing the chain of custody information.

9. When it is necessary to send samples by mail, bus, courier service, or private shipping, the chain of custody form shall be completed by the sampler prior to the shipping of the sample and shall accompany the sample during shipping. Upon receipt of the sample in the laboratory, steps (e) 6 through 8 above shall be followed.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a) 16 N.J.R. 1759(a).
New (c) added, former (c)-(e) made (d)-(f).

7:18–4.5 Methodology

(a) Analytical methods for drinking water parameters

1. Laboratories shall use the test procedures specified in 40 CFR 141 in the analysis of primary drinking water parameters.

2. Test procedures set out in the following Table II shall be utilized for the analysis of secondary drinking water parameters.

3. Test procedures set out in the following Table III shall be utilized for the analysis of the parameter identified in the Interim Safe Drinking Water Act Testing Schedule for Hazardous Contaminants by Public Community Water Systems, N.J.A.C. 7:10–14.

TABLE II—METHODOLOGY FOR SECONDARY DRINKING WATER PARAMETERS

Parameter	Method Description	S.M. 14th Ed.(1)	Method EPA (1979)(2)	ASTM(3)
Chloride	Potentiometric	306		
	Mercuric Nitrate	304	325.3	
	Silver Nitrate	303		
Color	Platinum–Cobalt	64–66	110.2	
Copper	Direct Aspiration (A.A.)	144–147	220.1–1	
	Graphite Furnace		220.2–1	
	Neocuproine	196		
ABS/LAS	Methylene Blue (Foaming Agents)	600	425.1	
Iron	Direct Aspiration (A.A.)	144–147	236,1–1	
	Graphite Furnace		236.2–1	
	Phenanthroline	208		
Manganese	Direct Aspiration (A.A.)	144–147	231.1–1	
	Persulfate	225		
	Graphite Furnace		243.2–1	
	Periodate	227		
Odor	Consistent Series Method	75–82	140.1–1	
pH	Glass Electrode Method	460–465	150.1–1	D12937 A or B
Sulfate	Turbidimetric Method	496–498	375.4	
	Gravimetric	493	375.3	
Total Dis. Solids	Dried at 180 degrees C	92	375.3	
Zinc	Direct Aspiration (A.A.)	144–147	289.1	
	Graphite Furnace		289.2	
	Dithizone	263–265		
Hardness	EDTA Test	202	130.2	D1126–6
	Automated Colorimetric		130.1	
Sodium	Direct Aspiration (A.A.)		273.1	D1428.6
	Flame Photometric	250		
	Graphite Furnace		273.2	

TABLE III—INTERIM METHODOLOGY FOR DRINKING WATER PARAMETERS

Parameter	Method Description	Method EPA (4)	EPA (5)
Trichloroethylene	Gas Chromatography	601	
	Gas Chrom./Mass. Spec.	624	
Tetrachloroethylene	Gas Chromatography	601	
	Gas Chrom./Mass. Spec.	624	
Carbon Tetrachloride	Gas Chromatography	601	
	Gas Chrom./Mass. Spec.	624	
1,1,1,-Trichloroethane	Gas Chromatography	601	
	Gas Chrom./Mass. Spec.	624	

Parameter	Method Description	Method EPA (4)	EPA (5)
1.2–Dichloroethane	Gas Chromatography	601	
	Gas Chrom./Mass. Spec.	624	
Vinyl Chloride	Gas Chromatography	601	
	Gas Chrom./Mass. Spec.	624	
Methylene Chloride	Gas Chromatography	601	
	Gas Chrom./Mass. Spec.	624	
1,1,–Dichloroethylene	Gas Chromatography	601	
	Gas Chrom./Mass. Spec.	624	
tran–1,2–Dichloroethylene	Gas Chromatography	601	
	Gas Chrom./Mass. Spec.	624	
Benzene	Gas Chromatography	601	
	Gas Chrom./Mass. Spec.	624	
Chlorobenzene	Gas Chromatography	601	
	Gas Chromatography	602	
	Gas Chrom./Mass. Spec.	624	
Dichlorobenzene	Gas Chromatography	601	
	Gas Chromatography	602	
	Gas Chrom./Mass. Spec.	625	
Polychlorinated Biphenyls	Gas Chromatography	608	
	Gas Chrom./Mass. Spec.	625	
Chlordane	Gas Chromatography	608	
	Gas Chrom./Mass. Spec.	625	
Trichlorobenzene(s)	Gas Chromatography	612	
	Gas Chrom./Mass. Spec.	625	
Xylenes	Gas Chromatography	602	503.1
	Gas Chrom./Mass. Spec.	625	

REFERENCES

(1) "Standard Methods for the Examination of Water and Wastewater," American Public Health Association, 14th Edition.
(2) "Methods for Chemical Analysis of Water and Wastes", Environmental Protection Agency, Office of Technology Transfer, Washington, D.C. 20460, 1979.
(3) "Annual Book of ASTM Standards", American Society for Testing Materials, Part 31.
(4) "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", United States EPA–600/4–82–057, July 1982.
(5) "The Analysis of Aromatic Chemical Indicators of Industrial Contamination in Water by the Purge and Trap Method", USEPA–600/4–81–057.

(b) Test procedures identified in 40 CFR 136 shall be utilized for the analysis of National Pollutant Discharge Elimination System compliance monitoring parameters.

(c) All procedures other than those set forth in subsections (a) and (b) are considered alternative analytical methods as described in 40 CFR 141.27 and 40 CFR 136. Laboratories shall make special application to the Commissioner for the use of alternative analytical methods and such application shall include a showing of acceptable comparability data.

(d) All laboratories which have previously been granted approval to use an alternate analytical method by the USEPA shall be allowed to continue using such method after it submits written proof of the approval to the Department.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
(a)3, Table III, and References (4) and (5) added.

7:18–4.6 General laboratory practices

(a) Laboratories utilizing visual comparison devices shall calibrate the standards incorporated into such devices at least once every four months. The laboratory shall make and maintain records of the date and method of each such calibration. Directions for preparing temporary and permanent type visual standards are specified in the applicable sections of Standard Methods, 14th Edition. By comparing standards of known concentrations to the sealed, permanent visual standard and plotting the comparison on graph paper, a correction factor shall be derived, documented, and applied to all future results.

(b) Distilled and deionized water shall have at a minimum, resistivity values between 0.5 to 2.0 megohms-cm (2.0 to 0.5 micromhos/cm.) at 25 degrees C. Preferably, distilled and deionized water should have resistivity values greater than 1.0 megohms-cm (less than 1.0 micromhos/cm) at 25 degrees C. When purchasing distilled or deionized water, laboratories should request a list of quality specifications for the water purchased. Containers of distilled or deionized water should be capped when not in use and should be capped immediately after each use.

(c) Analytical reagent grade (AR) chemicals should be used for most analyses. Detailed information on reagent grades is set forth in Standard Methods, 14th edition, section 102, pages 5–8. Individual analytical procedures in Standard Methods 14th Edition, and the EPA's "Methods for Chemical Analysis of Water and Wastes", Environmental Protection Agency, Office of Technology Transfer, Washington D.C. 20460, 1979, specify requirements for the reagents to be used. In addition, laboratory chemicals and reagents shall meet the following requirements:

1. Stock and working standard solution shall be checked regularly for signs of decomposition, including but not limited to discoloration, formation of precipitates, and concentration change due to evaporation;

2. All solutions shall be properly labeled with identification of the compound, concentration, solvent, date, and analyst who prepared the solution;

3. All standards used for atomic absorption analyses shall be of high purity;

4. All chemicals, solutions, and standards, shall be dated upon receipt by the laboratory; and

5. Compressed gases used for atomic absorption analyses may be of commercial grade; and

6. Special purity solvents and reagents may be required for specific organic analysis.

(d) All glassware should be washed in a warm detergent solution and thoroughly rinsed first in tap water and then in distilled water. This cleaning procedure is sufficient for most analytical needs, but the individual methods should be referred to for more elaborate precautions to be taken against contamination of glassware. It has been found advantageous to maintain a separate set of glassware, suitably prepared, for the nitrate, mercury, phosphate, lead, pesticide and herbicide methods due to the potential for contamination from the laboratory environment. All glassware used in pesticide and herbicide analysis should be cleaned and stored as outlined in section 3A of "The Manual of Analytical Methods for the Analysis of Pesticide Residues in Human and Environmental Samples", USEPA, Health Effects Research Laboratory, Research Triangle Park, N.C. 27711, 1979.

7:18–4.7 Quality control program

(a) All quality control data and records required by this section shall be retained by the laboratory and shall be made available for inspection by the Office of Quality Assurance. Such retained data shall include but shall not be limited to, the results of and the raw data generated by Proficiency Sample analyses.

(b) Each laboratory shall develop a detailed written description of the laboratory's current quality control program, and such written description shall include, but need not be limited to, the following:

1. Procedures which the laboratory will use in meeting the quality control requirements of N.J.A.C. 7:18–4.7 pertaining to laboratory equipment and instrumentation, and the frequency with which such procedures will be performed.

2. Procedures which the laboratory will use in meeting the quality control requirements of N.J.A.C. 7:18–4.6 pertaining to general laboratory practices and the frequency with which such procedures will be performed.

3. Procedures which the laboratory will use in meeting the quality control requirements of subsection (e) below, and the frequency with which such procedures will be performed.

(c) Each laboratory shall develop a written laboratory procedures manual which shall set forth, in detail, the methods which the laboratory will use in chemical analyses for all parameters for which the laboratory has received certification or for which the laboratory is seeking certification, and such methods shall comply with the criteria and procedures set forth in N.J.A.C. 7:18–4.5.

(d) Each laboratory shall record and retain all raw data and calculations derived from analyses and quality control procedures in a manner that shall provide easy verification of the data and calculations during onsite inspections.

(e) Laboratories shall perform the following internal quality control checks:

1. Each analytical balance shall be checked and adjusted annually by a service person employed by the laboratory or by a balance consultant. The accuracy of each analytical balance shall be checked once a month using at least two class "S" weights one in the gram range and one in the milligram range. The weights used, weight detected to nearest 0.1 mg, dates on which checks were performed, analyst, and other pertinent information shall be recorded in a log book.

2. The wavelength setting of the spectrophotometer shall be checked yearly by comparing the wavelength setting to the absorption maxima of colored standards or filters such as didymium glass. The wavelength observed, dates on which checks were performed, analyst and other pertinent information shall be recorded in a log book.

3. Each pH meter shall be cleaned immediately after each use period and calibrated prior to usage with two pH buffer standards bracketing the value to be measured and the calibration recorded. A daily check shall be made of the pH meter after calibration by setting the meter to pH 7.00 with a buffer standard and then without further adjustment, reading pH buffer standards of pH 4.00 and 10.00 and recording the actual readings.

4. Conductivity meters equipped with conductivity cells having platinum electrodes shall be checked over the range of interest using at least five concentrations of a standard potassium chloride solution. Conductivity cells not having platinum electrodes shall be checked against a conductivity meter equipped with platinum electrodes. This check shall be performed annually and the raw data, cell constant, and results shall be recorded in a log book.

5. A daily record of the temperature of the drying oven shall be maintained for each day on which the drying oven is in use.

6. The temperature of each refrigerator and each incubator shall be either recorded continuously or recorded daily from in place thermometers immersed in liquid and placed on one of the shelves being used.

7. The accuracy of all thermometers used to monitor temperatures shall be verified by comparing the readings of such thermometers with the readings of a certified thermometer. A record shall be made containing the identification number of each thermometer, the temperatures displayed on the certified thermometer and the thermometer being verified, correction factors when applicable, dates on which quality control checks were performed, and the name of the analyst performing such checks. Glass thermometers shall be verified yearly and metal thermometers shall be verified quarterly.

8. Standard curves used in analysis of parameters in the Limited Chemistry category shall be prepared as follows:

i. Standard curves consisting at a minimum of one reagent blank and five standards shall be prepared with each analysis. The absorbance or transmittance reading for each prepared standard shall be based upon the average of three replicate readings of each standard; or

ii. A standard curve consisting at a minimum of a reagent blank and five standards shall be prepared and shall be used with each subsequent analysis provided the standard curve is verified by using at least one reagent blank and one standard at or near the maximum contaminant level (MCL) in the case of analyses under the Safe Drinking Water Program, or in the case of analyses under the NJPDES program at the concentration levels normally encountered in such analyses. The absorbance or transmittance reading for each prepared standard shall be based upon the average of three replicate readings of each standard. A new standard curve should be prepared on a daily basis or

whenever a new reagent is prepared, and shall be prepared on at least a quarterly basis. Such verifications shall be considered satisfactory if, and only if, the results are within ± 10 percent of the original curve. All data used in drawing the curve, shall be so indicated on the curve, and a record shall be made of the verification containing the dates on which such verifications were performed, the results of the verification, and the name of the analyst who performed the check.

9. Standard curves used in the analysis of parameters in the Atomic Absorption category shall be prepared as stated in (e) 8 above, except that a minimum of one reagent blank and four standards are required.

10. Laboratories which analyze 20 or more samples per day shall verify the working standard curve by running an additional standard at or near the MCL, in the case of analyses under the Safe Drinking Water Program, or, for analyses under the NJPDES program at the concentration level normally encountered in such analyses. The frequency of such analyses shall be one verification analysis after the analysis of each set of 20 samples. Such checks shall be satisfactory only if the results are within ± 10 percent of the original documented reagent curve.

11. In all cases where possible, replicate sample analyses shall be conducted or parameters in the Limited Chemistry and Atomic Absorption categories to verify the precision of the method and such verification shall be performed at one of the two following frequencies:

i. Laboratories which analyze twenty or more samples per month of any one parameter shall verify the precision of such analyses on at least 5 percent of the samples analyzed and shall document the result, the dates on which such verification analyses were performed, the method of verification, and the name of the analyst performing such verifications; or

ii. Laboratories which analyze an average of less than twenty samples per month of any one parameter shall verify the precision of the analysis once a month, and shall make a record of such verification in accordance with subparagraph i above.

12. In all cases where possible, spiked sample analyses shall be conducted to verify the accuracy of the method at the same frequency as set forth in paragraph 11 of this subsection for the applicable parameters in the Limited Chemistry and Atomic Absorption categories. Documentation shall be made in accordance with the requirements of that paragraph.

13. In all cases where possible, standard deviations shall be calculated and documented for all applicable measurements being conducted in the Limited Chemistry and Atomic Absorption categories and such calculations and documentation shall be done in accordance with the following criteria and procedures:

i. Standard deviations shall be calculated for control samples which have been prepared at the maximum contaminant level for the parameter of interest in the case of drinking water parameters, or at the concentration level normally encountered in the analysis for all other parameters;

ii. Once the standard curve has been prepared or verified, the control sample shall be analyzed;

iii. After 20 such determinations have been obtained, using one control sample per run, the standard deviation shall be calculated;

iv. Standard deviations shall be obtained for all parameters;

v. The theoretical value, mean value, and the range of acceptable values derived from two standard deviations, shall be recorded; and

vi. Standard deviations shall be documented in either tabular form or, preferably on control charts.

14. Spiked reference materials (SPRM's) shall be analyzed for all organic methodologies requiring the use of a gas chromatograph at the following frequency:

i. For laboratories ten or less samples per day, one SPRM shall be analyzed during that time of analysis and documented; or

ii. For laboratories analyzing more than ten samples per day, each 10th sample shall be a SPRM.

15. Information pertaining to SPRM may be found in section 3 of "The Manual of Analytical Methods for the Analysis of Pesticide Residues in Human and Environmental Samples", USEPA, Health Effects Laboratory, Research Triangle Park, N.C. 27711, 1979.

16. A record shall be maintained for each gas chromatograph and shall contain the following information:

i. Date of installation and serial number of each detector installed;

ii. Background current (BGC) profiles obtained at the time of installation of each detector and subsequent profiles (column identity notations should be made); and

iii. Date of change of pyrometer batteries, if used.

17. A record shall be maintained on each gas chromatographic column used and shall contain the following information:

i. Column identification number;

ii. Date of packing or purchase;

iii. Liquid phase identity and lot number of precoated column packing;

iv. Conditioning temperature, flow rate and number of hours;

v. Length and shape of column;

vi. Background current on newly installed column and subsequent background current profiles during the life of the column;

vii. Date of each silylation of column; and

viii. When applicable, compound conversion data; with dates monitored, and percentage of compound breakdown.

18. A record shall be maintained on the preparation of pesticide and herbicide standards and shall include, but not be limited to, the following information:

i. The identification number of the concentrated stock standard solution, date of preparation, chemist who prepared the solution, all chemical compounds in the solution, lot number, purity, gross weight, tare weight, net weight, adjusted net weight (corrected for purity of primary standard), dilution volume and concentrations in ng/ul;

ii. The identification number of the intermediate concentration standard solution, date of preparation, chemist who prepared the solution, all chemical compounds in the solution, identification number of the concentrated stock, strength of concentrated stock in ng/ul, aliquot of concentrated stock, dilution volume, and final concentration in ng/ul; and

iii. The identification number of the working standard solution, date of preparation, chemist who prepared the solution, all chemical compounds in the solution, identification number of the intermediate concentration standards, concentration of intermediate standards, aliquot volumes, dilution volumes, and final concentrations in pg/ul.

iv. Additional information on preparation of standards may be found in "The Manual of Analytical Methods for the Analysis of Pesticide Residues in Human and Environmental Samples", USEPA, Health Effects Research Laboratory, Research Triangle Park, N.C. 27711, 1979, pp. 59–67.

19. All quality control procedures cited in the gas chromatography methodologies shall be performed and documented.

20. All reagents and solutions shall be labeled to indicate identity and, when applicable, titer, strength, or concentration, recommended storage requirements, preparation or expiration date, and any other pertinent information. Materials of substandard reactivity and deteriorated materials shall not be used. All outdated material shall be discarded immediately.

21. There shall be available at all times, in the immediate bench area of personnel engaged in the examination of samples and related procedures within the chemical category, the most current laboratory manuals or other complete written descriptions and instructions relating to:

i. The analytical methods to be used by such personnel, properly designated and dated to reflect the most recent supervisory reviews;

ii. Pertinent current literature in the field for use as reference materials including the appropriate Federal regulations; and

iii. Textbooks may be used to supplement such written descriptions, but may not be used in lieu thereof.

22. Only the laboratory manager or supervisor shall make changes in laboratory procedures and those changes shall only be effective when put in writing.

23. Dissolved oxygen meters shall be checked weekly using the Winkler Method and the results recorded.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
In (e)1, gram and milligram ranges stipulated; in (e)3, bracketing of value and daily check required; in (e) 8i and ii, "average of three replicate readings" for absorbance and transmittance stipulated, and in ii, recording of curve data clarified; (e)23 added.

7:18–4.8 Records and data reporting

(a) Records of chemical analysis, including but not limited to all raw data, calculations, quality control data, and laboratory reports, shall be kept by the laboratory for at least five years.

(b) The following information shall be retained by the laboratory as part of the records of chemical analysis and the records of chain custody:

1. The laboratory number or other form of identification of the sample;

2. The date, time, specific site of sampling, and the name of the person who collected the sample or the laboratory which submitted the sample;

3. In the case of drinking water samples, designation of whether the sample is routine distribution system sample, check sample, raw or process water sample, or other applicable designation;

4. The date and time when the laboratory received the sample, whether the sample was received preserved or unpreserved;

5. The date and time of analysis of the sample;

6. The person or persons who performed the analysis;

7. The type of analysis performed and the analytical method employed;

8. The results of the analysis and the raw data generated by the analysis; and

9. The name and address of the laboratory to which the sample was forwarded, if the analysis was not performed at the laboratory which first received the sample.

(c) If the chain of custody information is reported on a chain of custody form, a copy of the chain of custody form shall be attached to the sample report form.

(d) The results of each analysis shall be calculated and entered on the sample report form which is to be forwarded to the person requesting the analysis of the sample. A careful check shall be made to assure that each result entered on the sample report form is the same as the result entered on the bench sheet and once the check is completed the analyst shall initial the bench sheet.

(e) The original or true duplicate of the results of the test or analysis shall be sent promptly to the person who requested such tests or analyses, and shall be signed by the laboratory manager or a designee whose designation is in writing and has been submitted to the Department. In the case of tests or analyses performed pursuant to the Safe Drinking Water Act Regulations for Public Noncommunity Water Systems, the results of such tests or analyses shall be reported to the owner of the system on computer input forms which will be provided by the Department.

(f) Whenever a laboratory refers samples to another laboratory, the person ordering the examination shall receive the original laboratory report or a true duplicate of that report on the form of the laboratory that actually performed the test or analysis. In the case of tests or analyses performed under the Safe Drinking Water Act Regulations for Public Noncommunity Water Systems, when use of a specific laboratory report form is required by the Department, the laboratory performing the tests shall report the results on such required forms.

SUBCHAPTER 5. CRITERIA AND PROCEDURES FOR RADIOLOGICAL TESTING AND ANALYSIS

7:18–5.1 Scope

This chapter establishes the Department's requirements which a certified laboratory or a laboratory seeking certification shall continually meet and follow when performing radiological analyses.

7:18–5.2 Laboratory facilities

(a) Laboratory facilities shall meet the following minimum requirements, other than those specific instances where certain equipment is not necessary to perform the analyses for which certification is being granted:

1. The counting instruments required for measurement of those activities or specific radionuclides described in 40 CFR 141 methods, or the Safe Drinking Water Act, shall be located in a room other than the one in which samples and standards are prepared or in which other types of chemical analyses are being performed. The temperature of the room shall not exceed 27 degrees centigrade. Temperature variation under normal operating conditions shall not exceed three degrees centigrade.

2. All instruments shall be properly grounded, and a regulated power supply, either external or internal shall be available for use with each instrument.

3. In areas in which radioactive standards are being prepared, care shall be taken to minimize contamination of surfaces and personnel. Either bench surfaces of an impervious material covered with absorbent paper, or trays constructed of stainless steel, plastic, or fiberglass and lined with absorbent paper may be used.

4. Laboratory space and facilities shall be adequate to properly carry out the services performed in, or offered by the laboratory. There should be at least 100 to 150 square feet of floor space per analyst. This space should contain no less than 15 linear ft. of bench space and the following equipment:

i. A sink with hot and cold running water (not necessary for radon/radon progeny analyses of air samples);

ii. Electrical outlets with a carrying capacity at 120 V a.c. and such outlets shall be grounded;

iii. A source of distilled or deionized water (not necessary for radon/radon progeny analyses of air samples);

iv. A supply of natural gas or liquefied petroleum, or a propane cylinder with proper attachments in the case of laboratories performing limited amounts of analytical work (not necessary for radon/radon progeny analyses of air and water samples);

v. A vacuum line, pump, or aspirator (not necessary for radon/radon progeny analyses of air and water samples);

vi. An exhaust hood (not necessary for radon/radon progeny analyses of air and water samples).

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Added "other than those specific instances where certain equipment is not necessary to perform the analyses for which certification is being granted" in (a).
Added "methods, or the Safe Drinking Water Act" with stylistic changes in (a)1.
Added "(not necessary for radon/radon progeny analyses of air samples)" in (a)4i through vi.

7:18–5.3 Specifications for laboratory equipment and instruments

(a) Laboratories performing radiological tests and analyses shall have on the premises and under the control of the laboratory manager the equipment and instruments listed in this section necessary for the preparation and analysis of the specific standards and samples for which the laboratory is seeking certification or is certified. Such instruments, when required, shall meet the following specifications;

1. The following are specifications for general instrumentation and equipment:

i. The analytical balance shall have a precision of ± 0.5 mg, and minimum scale readability of 0.1 mg;

ii. The pH meter shall have an accuracy of ± 0.1 units;

iii. The specific ion meter shall have an expanded scale millivolt capability, and shall be readable to 0.1 mv and accurate to ± 0.5 mv;

iv. The conductivity meter shall be readable in ohms or mhos, shall have a range of 2 to 2.5 million ohms-cm or micromhos/cm ± 1 percent, and shall have a sensitivity of 0.33 percent or better;

v. A gravity convection drying oven which shall be capable of maintaining stable temperatures;

vi. Either glass or plastic dessicators may be used as appropriate for the particular task being performed;

vii. Either a large or small hot plate may be used; however, hot plates shall have temperature controls;

viii. Laboratory glassware shall be constructed of borosilicate glass, and all volumetric glassware shall be marked Class A, denoting that it meets Federal specifications, thereby eliminating the need for calibration prior to use;

ix. The muffle furnace shall be automatically controlled and shall have a chamber capacity of at least 2,200 cc (10 × 9.5 × 23) and a maximum operating temperature of 1,000°C continuous and 1,100°C intermittent;

x. A general purpose table-top centrifuge which shall have a maximum speed of at least 3,000 rpm and a loading option of 4 × 50 mL;

xi. The fluorometer shall be capable of detecting 0.0005 ug of uranium; and

xii. For radon/radon progeny analyses, where required by the authorized measurement protocols, a microscope or automated counting system capable of detecting and counting alpha tracks shall be used. For analyses made with a radon progeny integrating sampling unit (RPISU), a thermoluminescent dosimeter (TLD) reader is required. The method used for detecting and counting radon/radon progeny shall give accurate quantitative results (that is, precision, accuracy, and reproducibility), and the laboratory shall demonstrate this capability.

(b) The types of radiation counting systems needed to comply with measurements described in 40 CFR 141 methods, or the Safe Drinking Water Act are set forth below. Laboratories shall have on the premises and under the control of the laboratory manager those instruments needed to analyze for those activities or specific radionuclides for which the laboratory is seeking certification or for which the laboratory is certified. Such instruments shall meet the specifications listed below:

1. A liquid scintillation system is required if the laboratory is to be certified for measurement of tritium in drinking water samples. The system shall be such that the sensitivity shall meet or exceed the requirements of 40 CFR 141.25.

2. A gas-flow proportional counting system shall be used for the measurement of gross alpha and gross beta activities, radium–226, radium–228, strontium–89, strontium–90, cesium–134, and iodine–131 as described in the reference cited in 40 CFR 141.25(a). The detector shall be either a "windowless" internal proportional counter or a "thin window" type. A minimum shielding equivalent to 5 cm of lead shall surround the detector. A cosmic (guard) detector should be operated in anticoincidence with the main detector. The gas-flow proportional counting system shall be such that the sensitivity of the radiological analysis of the water sample will meet or exceed the requirements of 40 CFR 141.25.

3. For measurement of gross activities and radium–226, a scintillation system designed for alpha counting may be substituted for the gas-flow proportional counter described in (b)2 above. When a scintillation system is used for counting, a Mylar disc coated with a phosphor (silver-activated zinc sulfide) shall be placed either directly on the sample or on the face of a photomultiplier tube, and the disc and sample or tube shall then be enclosed within a light-tight container along with the appropriate electronics, including but not limited to a high voltage supply, amplifier, timer, and scaler.

4. For the specific measurement of radium–226 by the radon emanation method, a scintillation system designed to accept scintillation flasks ("Lucas cells") shall be used. This type of scintillation system consists of a light-tight enclosure capable of accepting the scintillation flasks, a detector (phototube), and the appropriate electronics which includes but is not limited to a high voltage supply, amplifier, timers, and scalers. The flasks (cells) required for this measurement shall be either purchased from commercial suppliers or shall be constructed by laboratory personnel in accordance with the specifications set forth in Lucas, H.F., "Improved Low–Level Alpha Scintillation Counter for Radon". (Rev. Sci. Instrum., 28:680, 1967).

5. Gamma spectrometer systems shall have either a sodium iodide (NaI(T1)) crystal detector or a solid state lithium drifted germanium (Ge(Li)) detector connected to a multichannel analyzer if the gamma spectrometer system is to be used for analyses of manmade photon emitters, and the detector shall meet the criteria and specifications set forth in either subparagraph i or subparagraph ii below:

i. If a sodium iodide detector is used, such detector shall meet the following criteria and specifications:

(1) A 10cm × 10cm NaI cylinder crystal should be used, but, at a minimum, a 7.5cm × 7.5cm crystal shall be used;

(2) The detector shall be shielded with at least 10cm of iron or the equivalent thereof;

(3) The distance from the center of the detector to other art of the shield should be at least 30cm.

ii. A system with a lithium drifted germanium (Ge(Li)) detector may be used for measurement of manmade photon emitters provided the following requirements are met:

(1) The efficiency of the detector shall be such that the sensitivity of the gamma spectrometry system meets the minimum detectable activity requirements cited in 40 CFR 141.25;

(2) The detector shall be shielded with at least 10cm of iron or the equivalent thereof; and

iii. The multichannel analyzer, in addition to appropriate electronics, shall have a memory of at least 200 channels for NaI and 2,000 channels for Ge(Li) and shall have at least one readout device;

6. For radon/radon progeny analyses of air samples, the instruments shall be capable of meeting a one picocurie per liter (pCi/L) minimum detectable activity with a 95 percent confidence, and for water samples, the instrument shall be capable of meeting 100 pCi/L minimum detectable activity with a 95 percent confidence.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Added (a)1vii.
Added "methods, or the Safe Drinking Water Act" with stylistic changes in (b).
Added (b)6.

7:18–5.4 Preservation of samples, methodology, and major instrumentation

(a) Table IV below gives the minimum requirements for sample handling including preservation, methodology, and major instrumentation.

Table IV

Minimum Requirements for Sample Handling, Preservation, Methodology[1] and Major Instrumentation

Parameter	Preservative[2]	Container[3]	Instrumentation[4]
Gross alpha	Conc. HC1 or HNO_3 to pH<2[5]	P or G	A or B
Gross beta	Conc. HCl or HNO_3 to pH<2[5]	P or G	A
Strontium–89	Conc. HCl or HNO_3 to pH<2	P or G	A
Strontium–90	Conc. HC1 or HNO_3 to pH<2	P or G	A
Radium–226	Conc. HCl or HNO_3 to pH<2	P or G	A, B or D
Radium–228	Conc. HCl or HNO_3 to pH<2	P or G	A
Cesium–134	Conc. HCL to pH2	P or G	A or C
Iodine–131	None	P or G	A
Tritium	None	G	E
Uranium	Conc. HCl or HNO_3 to pH<2	P or G	F
Photo emitters[7]	Conc. HCl or HNO_3 to pH<2	P or G	C
Radon/radon progeny in air	None[6]		[6]
Radon in water	None	G	E,[6]

[1]With the exception of measurement of radon/radon progeny in air, all other methods are from 40 CFR part 141.
[2]It is recommended that the preservative be added to the sample at the time of collection unless suspended solids activity is to be measured. However, if the sample must be shipped to a laboratory or storage area, acidification of the sample (in its original container) may be delayed for a period not to exceed 5 days. A minimum of 16 hours must elapse between acidification and analysis.
[3]P = Plastic, hard or soft; G = Glass, hard or soft.
[4]A = Low background proportional system; B = Alpha scintillation system; C = Gamma spectrometer (NaI(Tl) or Ge(Li); D = Scintillation cell (radon) system; E = Liquid scintillation system; F = Fluorometer.
[5]If HCl is used to acidify samples which are to be analyzed for gross alpha or gross beta activities, the acid salts must be converted to nitrate salts before transfer of the samples to planchets.
[6]Methods and instrumentation requirements as specified in N.J.A.C. 7:18–2.2(a)5i, ii, iii, iv, v and N.J.A.C. 7:18–5.5(a)1 and 2.
[7]Chromium–51, Cobalt–60, Ruthenium–106, Zinc–65.

As amended, R.1984 d.283, effective July 2, 1984.
See: 16 N.J.R. 966(a), 16 N.J.R. 1759(a).
Table III redesignated Table IV.
Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Stylistic revision of "minimum requirements" in heading of Table IV.
Added "Radon/radon progeny in air" and "Radon in water" as categories in Table IV.
Added new footnote 1 in Table IV.
Deleted "(Section C.2a)" and "(Section C.1.1)" in footnote 4 of Table IV.
Added footnotes 6 and 7 in Table IV.

7:18–5.5 Methodology

(a) Laboratories performing radiological analyses shall use the following analytical procedures:

1. For drinking water analyses, the laboratory shall use the analytical procedures specified in 40 CFR 141.

2. For analyses of radon/radon progeny performed in the laboratory, the laboratory shall follow the protocols specified in N.J.A.C. 7:18–2.2(a)5i, iii, iv and v for all measurement devices/techniques.

(b) All procedures other than those set forth in (a) above are considered alternative analytical methods as described in 40 CFR 141.27. Laboratories shall make special application to the Department's Office of Quality Assurance for the use of alternative analytical methods and such application shall include a showing of acceptable comparability data.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Substituted old text with new text in (a).
Added (a)1, 2.
Changed "Commissioner" to "Department's Office of Quality Assurance" with stylistic changes in (b).

7:18–5.6 General laboratory practices

(a) Laboratory practices shall meet the following requirements:

1. All glassware shall be washed in a warm detergent solution and shall be thoroughly rinsed in tap water. A distilled or deionized water rinse shall follow the tap water rinse. When necessary for proper performance of specific analytical methods, more detailed procedures for ensuring cleanliness of glassware shall be employed.

2. All water used in preparation of reagents, standards, and samples shall have resistance values that are between 0.5 to 2.0 megohms-cm (2.0 to 0.5 micromhos/cm) at 25°C. If such high quality water is not available in the laboratory, it shall be purchased from commercial suppliers; the laboratory shall request a list of quality specifications for water purchased from the supplier and the laboratory shall periodically check the actual quality of the purchased water against these specifications.

3. Analytical reagent grade (AR) chemicals shall be used for all analyses, unless otherwise required for an individual analytical procedure.

4. All radon/radon progeny measurement devices/techniques shall be calibrated at least once per year. Permanent records shall be maintained of preventive maintenance, periodic inspection, testing, and calibration for the proper operation of radiation instruments and analytical balances; validation of methods; chain of custody records and procedures; evaluation of reagents and volumetric equipment; surveillance of results; and remedial actions taken in response to detected defects. For radon/radon progeny analysis, all information specified by the authorized measurement protocols and methods described in N.J.A.C. 7:18–2.2(a)5i, ii and iii; and N.J.A.C. 7:18–5.5(a)1 and 2 shall be recorded and maintained. All records shall be kept on file by the laboratory for a period of at least five years.

5. Standards and samples shall be prepared in an area of the laboratory specifically designated for and exclusively used for the preparation of radioactive standards and samples. Adequate precautions shall be taken in this area to ensure against radioactive contamination. Provisions shall be made for safe storage and disposal of radioactive wastes and for monitoring of the work area for radioactivity.

6. All reagents and solutions shall be labeled with pertinent information. Materials of substandard reactivity and deteriorated materials shall not be used.

7:18–5.7 Quality control program

(a) Laboratories shall develop and implement quality control procedures meeting the following minimum requirements:

1. Each laboratory shall develop and have on file and available for inspection a written description of the current laboratory quality control program. Such quality control program shall cover all types of tests and analyses performed by the laboratory and shall provide for verification and assessment of the accuracy, measurement of precision, and detection of error. Management, supervisors, and analysts should participate in the quality control program. Each participant within the laboratory should have a copy of the quality control program and detailed guidelines for implementation of the participant's responsibility.

2. Quality control data and records shall be available for inspection.

3. There shall be available at all times, current laboratory manuals or other complete written descriptions and instructions relating to:

i. The analytical methods to be used by those personnel, properly designated and dated to reflect the most recent supervisory reviews;

ii. Operating manuals and calibration protocols for counting instruments shall be available to analysts and technicians;

iii. Such manuals, written descriptions, protocols, and instructions may be supplemented by, but not replaced by, textbooks relating to the particular analytical methods and procedures employed by such personnel.

4. Permanent records shall be maintained of preventive maintenance, periodic inspection, testing, and calibration for the proper operation of radiation instruments and analytical balances; validation of methods; evaluation of reagents and volumetric equipment; surveillance of results; and remedial actions taken in response to detected defects. Such records shall be kept on file by the laboratory for a period of at least five years.

5. The following minimum daily quality control measures shall be performed by the laboratory:

i. To verify internal laboratory precision duplicate analyses equal to ten percent of sample analyses shall be performed. The differences between duplicate measurements shall be less than twice the standard deviation of the specific analysis as described in "Environmental Radioactivity Laboratory Intercomparison Studies Program" (EPA–600/4–77–001). If the differences exceed two standard deviations, the prior measurements shall be considered to be suspect, all calculations and procedures for that day shall be examined, and all samples shall be reanalyzed when necessary.

ii. Laboratories performing 20 or more specific analyses each day, shall measure at least one calibration standard and at least one background sample along with each group of 20 samples.

iii. Laboratories performing less than 20 specific analyses in any one day, shall measure one calibration standard and one background sample along with the samples measured on that day.

iv. Quality control performance charts, performance records, and raw data used in the verification procedure set forth in this paragraph shall be maintained for a period of at least five years.

6. Balances shall be checked periodically using Class "S" weights, and laboratories shall have current service contracts in effect for balances.

7. Laboratories shall have an electronics technician in their employ or shall have current factory servicing contracts for repair of laboratory instruments.

8. Only the laboratory manager or supervisor shall make changes in laboratory procedures and those changes shall only be effective when put in writing.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).

7:18–5.8 Records and data reporting

(a) The laboratory shall maintain records which are adequate and appropriate for the services offered.

(b) Work records of quantitative tests shall be maintained for at least five years and shall indicate final results together with all corresponding instrument readings and calculations. Where instrumentation produces tracings or printouts, such tracings or printouts may serve as the work record.

(c) A record shall be maintained for at least five years of the daily receipt of samples. Each such record shall be numbered or otherwise appropriately identified and shall contain the following information:

1. The laboratory number or other identification of the sample.

2. Identification of the sample source, water system, discharger, population served, and Public Water Supply Identification number or permit number.

3. The name of the person or laboratory which submitted the sample.

4. The data, time and specific location of sample collection. For radon/radon progeny samples taken by a certified radon measurement specialist or certified radon measurement technician, the record shall also include a chain-of-custody form that will state which sampling device/technique was used and whether the authorized protocols were followed.

5. The date and time of receipt of the sample by the laboratory.

6. The type of test or analysis performed, method of testing or analysis, and date of analysis.

7. The results of the test or analysis, including raw data, and the name of the analyst or analysts.

8. The name and address of the laboratory to which the sample was forwarded, if the testing or analysis was not performed by the laboratory which initially received the sample.

(d) The original or a true duplicate of the results of the tests or analyses shall be sent promptly to the person who requested such tests or analyses. The results shall be reported on the laboratory's forms and signed by the laboratory manager or his or her designee whose designation has been submitted to, and approved by, the Department's Office of Quality Assurance.

(e) Whenever a certified laboratory refers samples to another certified laboratory for analysis, the person who ultimately receives the results shall receive the laboratory report or a true duplicate of that report on the report form of the laboratory that performs the tests or analyses. In the case of tests or analyses performed under the Safe Drinking Water Act Regulations for Public Noncommunity Water Systems, where use of a specific laboratory report form is required, the laboratory performing the tests or analyses shall report the results on such required form.

(f) Laboratories shall follow the chain-of-custody procedures set forth in N.J.A.C. 7:18–4.4(f)6, 4.8(b), 4.8(c), 5.8(c)4 and 5.8(g)1.

(g) Records of radiological analyses shall be kept by the laboratory for not less than five years. This includes, but is not limited to, all raw data, calculations, quality control data, and reports. In addition, actual laboratory reports shall be kept for not less than five years. However, all data, with the exception of compliance check samples as detailed in 40 CFR 141.33(b), may be transferred to tabular summaries provided that the following information is included:

1. The date, specific place, and time of sampling. For radon/radon progeny samples taken by a certified radon measurement specialist or certified radon measurement technician, the record shall also include a chain-of-custody form that will state which sampling device/technique was used and whether the authorized protocols were followed.

2. The name of the person who collected the sample.

3. Identification of sample as a routine distribution sample, check sample, raw or process water sample, or other special purpose sample.

4. The date of receipt of the sample by the laboratory and the date of analysis.

5. The name of the laboratory and the person or persons who performed the analysis.

6. The analytical technique or method used.

7. The results of the test or analysis, including the raw data generated during the test or analysis.

Amended by R.1991 d.246, effective May 6, 1991.
See: 23 N.J.R. 29(b), 23 N.J.R. 1423(a).
Added text to describe method to be used for radon/radon progeny sampling in (c)4.
Added "The results shall be reported on the laboratory's forms"; added "and approved by"; added "Department's Office of Quality Assurance" in (d).
Stylistic changes in (e).
Changed citations to N.J.A.C. 7:18–4.4(f)6, 4.8(b), 5.8(c)4 and 5.8(g)1 in (f).
Added text to describe method to be used for radon/radon progeny sampling in (g)1.

SUBCHAPTER 6. CRITERIA AND PROCEDURES FOR BIOASSAY TESTING AND ANALYSIS

7:18–6.1 Scope

This subchapter establishes the Department's requirements which a certified laboratory or a laboratory seeking certification shall continually meet and follow when performing bioassay analysis.

7:18–6.2 Definitions

For the purpose of this subchapter, the following definitions in addition to those found in N.J.A.C. 7:18–1.7 are applicable.

"Acclimation" means an organism's physiological adjustment to environmental changes including, but not limited to, changes in temperature and salinity.

"Act" means the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A–1 et seq.

"Acute toxicity" means causing death or severe damage to an organism by poisoning during a brief exposure period, normally 96 hours or less.

"Bioassay" means a determination of the concentration or dose of a given material necessary to affect a test organism under stated conditions.

"Biomonitoring" means all testing methods which utilize a biological system or any of its parts for assessing the presence or effects of one or more pollutants and/or environmental factors, either alone or in combination. For purposes of this subchapter, biomonitoring refers to acute toxicity bioassays.

"Composite sample" means a sample composed of several discrete samples collected at equal time intervals, or collected proportionally to the flow rate of the discharge, over the compositing period.

"Control" means an exposure chamber which receives only dilution water samples and is used in conjunction with an effluent bioassay.

"Definitive test" means a full-scale bioassay consisting of a minimum of five different concentrations of effluent in a logarithmic series with each concentration and control being tested against a minimum of 20 organisms of a species designated by the Department.

"Dilution water" means the unpolluted water of desired quality to be used for preparing the different test concentrations of the effluent and the controls. Dilution water is usually collected from a point as close as possible, but not within, the mixing zone influenced by the effluent.

"Discharge" means the releasing, spilling, leaking, pumping, pouring, emitting, emptying, or dumping of a pollutant into the waters of the State or onto land or into wells from which the pollutant might flow or drain into said waters, and shall include the release of any pollutant into a municipal treatment works.

"Effluent" means an out flow from a point source.

"Flow-through bioassay" or "Continuous flow-through bioassay" means a bioassay test technique which permits test solutions to flow into and out of the test chambers on a once through basis for the duration of the test.

"Grab sample" means an individual sample collected over a time period of less than 15 minutes.

"Incipient lethal level" or "incipient LC 50" means the concentration at which acute toxicity ceases, this is, the concentration at which 50 percent of the test organism's population can live for an indefinite time.

"LC 50" means the concentration of a toxicant which is lethal to 50 percent of the organisms of a particular species under a given set of conditions in a specified length of time (i.e., 24, 48, or 96 hours).

"Mixing zone" means a localized area of surface waters, as may be designated by the department, into which wastewater effluents may be discharged for the purpose of mixing, dispersing, or dissipating such effluents without creating nuisances or hazardous conditions in compliance with the Surface Water Quality Standards, N.J.A.C. 7:9–4.1 et seq.

"Methods for Measuring Acute Toxicity—EPA" means "Methods for Measuring Acute Toxicity of Effluents to Aquatic Organisms," U.S.E.P.A., Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268, EPA–600/4–78–012.

"Modified static daily-renewal bioassay" means a test in which the aquatic organisms are exposed to a test solution which is changed once every 24 hours for the duration of the test period. Fresh samples of the effluent are obtained daily, fresh concentrations of test solution are prepared, and the test organisms are transferred daily to the new test solution.

"Permit" means a NJDEP permit issued pursuant to Section 6 of the Act.

"Point source" means any discernible, confined, and discrete conveyance from a mobile or stationary source, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, from which pollutants are or may be discharged.

"Pollutant" means any dredged soil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munition, chemical wastes, biological materials, radioactive materials, thermal waste, wrecked or discarded equipment, and construction waste or runoff or other residue discharged to the land, ground waters or surface waters of the state.

"Range-finding bioassay", "screening bioassay", or "exploratory bioassay" means a short-term (i.e., 8–24 hours) flow-through or, more often, static bioassay used for determining the approximate concentrations, above and below the LC50, to be used in the definitive test when the toxicity of a waste is unknown. In this test, groups of five test organisms are exposed to three to five widely-spaced effluent dilutions, usually in a logarithmic ratio, such as 0.01, 0.1, 1.0, 10 and 100 percent.

"Salinity" means the total amount of dissolved salts in sea water in parts per thousand (0/00 or ppt) by weight when all the carbonate has been converted to oxide, the bromide and iodine have been replaced with chloride, and all organic matter has been completely oxidized.

"Sampling point" means a particular site whose location may be specified in a permit, or otherwise, and from which effluent samples are to be collected for testing and evaluation.

"Total length" means the straight line measurement from the tip of the snout of a fish to the extreme tip of the fish's caudal fin.

"U.S.E.P.A.–1972" means U.S. EPA, 1972. "Recommended bioassay procedure for flathead minnows, Pimephales promelas, Rafinesque" chronic tests. National Water Quality Lab., Duluth, Minnesota.

"U.S. EPA–1978" means "Bioassay Procedures for the Ocean Disposal Permit Program", U.S. EPA, EPA–600/9, March 1978.

"Volume percent" is (100 x volume of effluent) divided by (volume of effluent plus volume of dilution water).

"Waters of the State" means the ocean and its estuaries, all springs, streams and bodies of surface or ground water, whether natural or artificial, within the boundaries of this state or subject to the jurisdiction.

"Year class" means fish which originate from the same annual brood or spawning.

7:18–6.3 Laboratory facilities and safety

(a) Laboratory space and facilities shall be adequate to properly carry out the services performed in, or offered by the laboratory.

(b) Workbench space within the laboratory shall be ample for the tests or analyses to be performed, and shall be well-lighted and convenient to a sink, and such water, gas, suction, and electrical outlets as are necessary to properly carry out the specific tests or analyses performed in, or offered by, the laboratory.

(c) The temperature and humidity within the laboratory shall be maintained within the limits required for the proper performance of each test or analysis and for the proper operation of instruments which may be affected by temperature variations.

(d) Adequate fire precautions shall be taken, including but not limited to, having readily available a fire extinguisher rated for the types of fires that reasonably may be foreseen given the types of tests and analyses performed by the laboratory.

(e) Appropriate occupational safety and health laws shall be posted and observed.

7:18–6.4 Laboratory equipment, supplies and materials

(a) Laboratories performing bioassay tests and analyses shall have under the control of the laboratory manager the equipment and instruments listed in this section necessary for the analysis of samples for which the laboratory is seeking certification or is certified. Such instruments, when required, shall meet the following specifications:

1. Air supply for aeration of tanks shall either be from compressors equipped with seals designed to prevent contamination of air lines from oil, or from compressed air or oxygen tanks.

2. Bioassay testing systems may consist of temperature control units, pipes, valves and fittings, diluter, pumps, mixing equipment, tanks, and exposure chambers and shall meet the following requirements:

i. All components of the bioassay testing system shall be constructed of lead-free glass, No. 316 stainless steel, silicone sealant and tubing, unplasticized polyethylene or polypropylene, Teflon R, Tygon R, nylon, fiberglass or any other materials proven to be nontoxic in the test organisms;

ii. Tubing, connectors and screens made of materials known to absorb significant amounts of trace organic compounds shall be used once and discarded; and

iii. All components that are reused shall withstand cleaning, without significant degradation, by the procedures cited in N.J.A.C. 7:18–6.7(e).

3. For flow through bioassays, a dilutor system is required for the accurate measuring, mixing, and delivery of sample and dilution water to the exposure chambers. A variety of methods may be used; however, the proportional dilutor is the preferred system for routine effluent toxicity tests. Detailed descriptions of dilutor systems may be found in Standard Methods—14th Edition and Methods for Measuring Acute Toxicity—EPA. All dilutor systems shall meet the following requirements:

i. Dilutor system shall provide an adequate supply of dilution water to maintain a 24 hour continuous operation. This supply shall be provided by the usage of a large dilution water reservoir or by direct continuous pumping from the source of the water.

ii. The dilutor system shall be capable of metering the flow of dilution water and sample into a mixing chamber for the determination of concentrations. Metering of dilution water and sample may be accomplished by using a constant head box or metering pumps.

iii. Mixing chambers shall be used to ensure complete mixing of dilution water and sample prior to dispensing of solutions into the exposure chambers.

iv. Separate delivery tubes shall be used for transmission of the dilution water and sample from the flow splitters, mixing chambers, to each of the duplicate exposure chambers.

v. The flow rate through the exposure chambers shall be sufficient to maintain adequate dissolved oxygen in the exposure chambers, according to N.J.A.C. 7:18–6.6(m)10ii, but no less than five water volume changes every 24 hours.

vi. The flow rate through the exposure chambers shall not vary by more than ± 10 percent between all exposure chambers or ± 5 percent within any given exposure chamber throughout the duration of the test.

vii. The dilutor system shall maintain the test concentration in each exposure chamber within ± 5 percent of the starting concentration for the duration of the test.

viii. The dilutor system shall have heating and cooling equipment designed to maintain a constant temperature in the exposure chambers to within 12C of the specified test temperature.

ix. If the supply of dilution water to the mixing chamber is interrupted, the dilutor system shall be designed to automatically curtail the delivery of the sample to the mixing chambers.

x. The exposure chambers shall have an overflow system designed to prevent the test organisms from entering the outlets.

xi. The dilutor system shall be capable of maintaining a minimum of five separate effluent dilutions and a control containing dilution water at any necessary flow rate, required by N.J.A.C. 7:18–6.4(a)3v. with duplicate exposure chambers.

xii. The dilutor system shall be capable of, but not limited to, providing concentrations at 10^{-1} and 10^{-2} of the logarithmic series of concentration, 5.6, 10.0, 18.0, 32.0, 56.0, and 100 percent effluent by volume.

4. Holding, acclimating, and culturing chambers shall meet the following requirements:

i. Chambers shall be constructed of non-toxic materials and shall meet the requirements set forth in N.J.A.C. 7:18–6.4(a)2.

ii. Chambers shall either be constructed so as to include devices for temperature control or be located in a temperature controlled room. Chambers shall also be equipped with aeration devices.

iii. Chambers shall be constructed for ease of cleaning and the prevention of waste material build-up. It is recommended that either square or rectangular chambers with a standpipe drain at one end of the tank or round chambers with a standpipe drain in the center of the tank be used. The standpipe drain should be installed so that upon removal of the standpipe, the drain opening is flush with the bottom of the chamber. The chamber bottoms should slope gently towards the drain.

iv. The interior surface of the chambers shall be smooth to facilitate cleaning, reduce risk of injury to test organisms, and prevent accumulation of material in cracks or corners.

v. Chambers shall be shielded from outside disturbances. Materials used for shielding shall meet the requirements set forth in N.J.A.C. 7:18–6.4(a)2i.

5. Laboratories shall have available top-loader or pan balances which shall meet the following requirements:

i. Balances shall be clean, not corroded, and shall be provided with appropriate weights of good quality; and

ii. Balances shall tare out and detect a weight of at least 100mg accurately.

6. Temperature monitoring devices shall meet the following requirements:

i. Glass or metal thermometers shall be graduated in 0.5 degrees C increments;

ii. Continuous temperature recording devices shall be sensitive and accurate within ± 0.5 degrees C;

iii. The column of liquid in glass thermometers shall have no separation; and

iv. A certified thermometer shall be available for use by the laboratory.

7. Air or water-jacketed incubators, incubator rooms, and water baths shall meet the following requirements:

i. Incubators, incubator rooms, and water baths shall be of sufficient size to accommodate periods of peak work load;

ii. Incubators must maintain internal temperatures at the desired level to within ± 0.5 degrees C;

iii. Whenever an air incubator is in use, a calibrated thermometer with its bulb immersed in liquid shall be placed on one of the shelves in use within the incubator; and

iv. The temperature within an incubator shall be recorded daily, or a recording thermometer, sensitive to temperature of ± 0.5 degrees C shall be used and the recording tape shall be checked daily.

8. The autoclave shall meet the following requirements:

i. It shall be in good operating condition when observed during its operational cycle or when time-temperature charts are read, and, for most efficient operation, use of a double-walled autoclave constructed of stainless steel is suggested;

ii. It shall have pressure and temperature gauges on the exhaust side, and shall have a safety-valve that is in good operating condition;

iii. It shall reach the sterilization temperature of 121 degrees C and pressure of 1.1 lb/cm^2 (15 psi) and shall maintain that temperature and pressure throughout the sterilization cycle. The sterilization cycle shall be for 15 minutes or 15 minutes per liter of sample, whichever is longer;

iv. After the sample has cooled, it shall be allowed to equilibrate either in an air or carbon dioxide atmosphere so that the lost carbon dioxide is replaced.

9. The refrigerator shall be of sufficient size to accept the required sample volumes, and shall maintain an internal temperature of 1 degree to 4.4. degrees C.

10. Laboratories shall have at least one low power magnification device, preferably a binocular microscope with up to 10x magnification, for working with invertebrates.

11. Laboratory glassware, plastic-ware, and metal utensils not previously specified, shall meet the following requirements:

i. Glassware and metal utensils shall be resistant to the effects of corrosion, high temperatures, and vigorous cleaning operations;

ii. Volumetric containers should be Class A and need not be calibrated before use;

iii. Plastic items shall be of inert, nontoxic materials;

iv. Metal utensils shall be made of stainless steel.

12. Dilution water sample containers shall meet the following requirements:

i. Either wide-mouthed lead-free glass or unplasticized plastic containers that are equipped with stoppers, screw caps, or an equivalent closure.

(1) After each use, containers shall be cleaned in accordance with the procedures set forth in N.J.A.C. 7:18–6.7(e).

13. Effluent sample containers shall meet the following requirements:

i. Either wide-mouthed lead-free glass, or disposable unplasticized plastic containers that are equipped with stoppers, screw caps or equivalent closure shall be used.

(1) After each use, only reusable containers shall be cleaned in accordance with procedures set forth in N.J.A.C. 7:18–6.7(e).

(2) Disposable containers shall be discarded after use and shall not be cleaned and reused.

ii. Glass-stoppered containers shall be stored to prevent contamination.

iii. Screw caps shall have leakproof non-toxic liners.

7:18–6.5 Sample collection, handling and preservation

(a) Dilution water samples shall be collected, handled and preserved as follows:

1. Dilution water shall be deemed acceptable for use in a bioassay provided healthy test organisms survive in it through the acclimation period without showing any signs of stress, including but not limited to, abnormal behavior or discoloration.

2. Dilution water samples shall be representative of the receiving water system which the effluent is discharged into. Samples shall be collected in the following manner:

i. In non-tidal waters, dilution water samples shall be collected from a location as close as possible to, but upstream of, the effluent mixing zone;

ii. In tidal waters, dilution water samples shall be collected from a location as close as possible to, but upstream of, the effluent mixing zone. Samples shall also be collected during the outgoing tide up to and during low slack tide;

iii. The sampling location shall be such that the salinity of the sample shall be within the salinity range for the receiving water immediately outside of the effluent mixing zone;

iv. When samples are collected from streams or rivers, it is recommended that an integrated sample be collected. This is a sample that is collected from bottom to top of the water column so that the sample collected is proportional to flow. If only a grab sample can be taken then it should be collected at mid-depth in midstream;

v. When samples are collected from reservoirs or lakes, the effects of seasonal stratification, runoff, and previous rainfall upon the chemical/physical characteristics of the water should be considered.

3. If the receiving water is influenced immediately upstream of the effluent outfall by other point sources of pollution so as to disqualify its use as dilution water, then the dilution water sample(s) shall be obtained from a location just above the other point sources.

4. If acceptable dilution water cannot be obtained from the receiving water at any location because of upstream pollution, then some other unpolluted water, meeting the following requirements, shall be used:

i. Another surface water or groundwater having a natural quality similar to that of the receiving water prior to its pollution may be used; or

ii. Reconstituted or artificial freshwater or saltwater having a natural quality similar to that of the receiving water prior to its pollution may be used;

iii. A substitute dilution water shall have a total hardness, total alkalinity, and specific conductance within 25 percent and a pH within 0.2 units of the receiving water prior to its pollution.

5. Modification of the salinity of a dilution water sample in order to comply with N.J.A.C. 7:18–6.6(k)11 or the preparation of reconstituted fresh or saltwater shall follow the procedures given in Standard Methods, 14th Edition, pp. 696–697 and Methods for Measuring Acute Toxicity—EPA, pp. 14–16.

6. Except for aeration under the procedures stated in N.J.A.C. 7:18–6.6(p) and the procedures described in N.J.A.C. 7:18–6.5(a)5, the only other permissible treatment of the dilution water shall be filtration through screening made of a non-toxic material as specified in N.J.A.C. 7:18–6.4(a)2. This screening shall have a mesh of 2mm or larger for freshwater or a 20 micron filter shall be used for saltwater.

7. Sample collection and transport containers shall meet the requirements listed in N.J.A.C. 7:18–6.4(a)12. Prior to sample collection, containers shall be pre-rinsed with the dilution water and then filled so that there is little or no air in the container neck or cap.

8. Dilution water sample storage shall be in covered containers constructed of non-toxic materials as specified in N.J.A.C. 7:18–6.4(a)2.

9. Samples shall not be stored for more than 96 hours and should be collected as close as possible to the time of testing.

(b) Effluent samples shall be collected, handled and preserved as follows:

1. Unless otherwise specified by the Department, the effluent sampling location shall be the same as the specified in the NJPDES permit. An alternate sampling location may be specified when the following conditions prevail:

i. When there is better access to the effluent at a point located between the final treatment and the discharge outfall; or

ii. When the processed waste is chlorinated prior to discharge and the purpose of the test is to determine the toxicity levels of the unchlorinated effluent. In this case, the sampling point shall be located prior to the effluent's contact with the chlorine.

2. Samples shall be representative of the discharge, taking into account the plant operating conditions and the retention time of the effluent in the wastewater treatment plant.

3. For flow-through bioassays the following sampling procedures shall be adhered to in order to insure a representative effluent sample:

i. If the facility discharges continuously, the effluent shall be pumped directly and continuously from the discharge line to the dilutor system for the duration of the test; or

ii. If the facility discharges continuously but the effluent cannot be pumped directly and continuously to the dilutor system, then the following procedure shall be employed:

(1) When the minimum retention time of the wastewater in the treatment plant is less than 96 hours as determined from flow metering devices or

dye studies, a six hour composite sample consisting of equal volumes taken once every 30 minutes shall be collected and transported to the dilutor every six hours for the duration of the test.

(2) When the minimum retention time of the wastewater in the treatment plant is between 96 hours (four days) and 14 days, as determined from flow-metering devices or dye studies, then a 24 hour composite sample consisting of equal volumes taken once every hour shall be collected and transported to the dilutor daily for the duration of the test.

(3) When the minimum retention time of the wastewater in the treatment plant is greater than 14 days as determined from flow-metering devices or dye studies, a single grab sample shall be collected and transported to the dilutor daily for the duration of the test.

iii. If the facility discharges intermittently, a composite sample consisting of equal volumes collected once every 30 minutes shall be taken for the duration of the plant's operating schedule, or a single grab sample shall be taken in the case of a short-term batch discharge.

4. In order to insure the collection of a representative effluent sample for a static or modified static bioassay, the following sampling procedures shall be followed:

i. When the minimum retention time of the wastewater in the treatment plant is less than 96 hours as determined from flow-metering devices or dye studies, four consecutive six hour composite samples, each consisting of an equal volume taken once every 30 minutes, shall be collected and used in setting up four separate static or modified static bioassay tests. This procedure is repeated for the duration of the test.

ii. When the minimum retention time of the wastewater in the treatment plant is between 96 hours (four days) and 14 days as determined from flow-metering devices or dye studies, a single grab sample shall be collected and used to set-up a single test. This procedure is repeated for the duration of the test.

iii. When the minimum retention time of the wastewater in the treatment plant is greater than 24 days, as determined from flow-metering devices or dye studies, a single grab sample shall be collected and used to set-up a single test. This procedure is repeated for the duration of the test.

5. Alteration of samples shall be limited to filtration through Teflon R or No. 316 austenitic stainless steel screening having a mesh of 2 mm or larger and/or introduction of dry, disease free, artificial sea salts for the purposes of adjusting the effluent salinity according to the procedures specified in N.J.A.C. 7:18–6.6(j)2. Screening constructed of unplasticized polyethylene or polypropylene may be substituted provided the screens are discarded upon the completion of a bioassay.

6. Composite or grab sample collection and handling containers shall meet the requirements listed in N.J.A.C. 7:18–6.4(a)13. Prior to sample collection, containers shall be pre-rinsed with the effluent and then filled so that there is no air space in either the neck or cap.

7. Effluent samples shall be stored in covered, unsealed containers constructed of non-toxic materials as specified in N.J.A.C. 7:18–6.4(a)2.

8. Unless the purpose of the bioassay is to ascertain the persistence of the toxicity of an effluent, testing shall begin within 24 hours of the collection of an effluent.

9. If samples are collected for offsite testing, the samples should be stored so that they are maintained at the test temperature specified in N.J.A.C. 7:18–6.6(i)4 by holding it either in a constant-temperature bath or a controlled-temperature room. Samples that are to be tested two or more hours after collection should be kept chilled at between 0 degrees—4 degrees C.

(c) The following chain of custody procedures shall be employed in collecting and handling composite or grab samples:

1. Only clean or new containers, as specified in N.J.A.C. 7:18–6.4(a)12 and 13 previously rinsed with laboratory pure water or the material being sampled, shall be used for taking composite or grab samples.

2. Tie-on affixed labels with an identification number shall be used for labeling all samples.

3. After a sample has been collected, the appropriate information as to identity of the sample shall be written on the label and the label affixed. The label shall remain affixed until the test has begun and the surplus sample has been discarded.

4. Immediately upon delivery of a sample to the laboratory, the sample collector shall complete the appropriate section of the sample report form or chain of custody form.

5. The chain of custody form shall list at a minimum the following information:

i. Sample number;

ii. Description of samples;

iii. Specific location of sample collection;

iv. Identity of person collecting the sample;

v. Date and time of sample collection;

vi. Date and time of custody transfer to laboratory (if the sample was collected by a person other than laboratory personnel);

vii. Identity of person accepting custody (if the sample was collected by a person other than laboratory personnel);

viii. Date and time of initiation of analyses;

ix. Identity of person performing analysis; and

x. Name of laboratory performing the analyses.

6. Prior to accepting custody of a sample, the laboratory personnel accepting the sample shall be reasonably assured that the sample has met the collection and handling requirements. If the sample fails to meet those requirements, the chain of custody section of the sample report form or chain of custody form shall so indicate and the sample shall be refused.

7. The laboratory personnel accepting responsibility for the sample, as well as all other laboratory personnel performing the analysis on that sample, shall sign the form containing the chain of custody information.

7:18–6.6 Methodology

(a) The following aquatic organisms shall be used for bioassay testing;

1. Either the fathead minnow, Pimephales promelas, or the bluegill, Lepomus macrochirus shall be used as the bioassay test organisms when the effluent's receiving water has a salinity of less than or equal to 1 ppt.

2. For estuarine or marine receiving waters, those with a salinity greater than 1 ppt., any of the following organisms shall be used as the bioassay test organism.

i. Atlantic silverside, Menidia menidia;

ii. Sheepshead minnow, Cyprinodon variegatus;

iii. Grass shrimp, Palaemonetes pugio.

iv. Opossum shrimp, mysidopsis bahia.

(b) Bioassay test organisms should either be cultured in the laboratory or obtained from commercial or Federal governmental hatcheries. Collecting bioassay test organisms from the field is not recommended but may be necessary for some of the estuarine/marine species designated.

(c) Culturing of fathead minnows in the laboratory shall be in accordance with the methods contained in U.S. EPA–1972.

(d) Culturing of the mysid shrimp in the laboratory shall be in accordance with the methods contained in U.S. EPA–1978. Culturing of bluegills in the laboratory shall be in accordance with the methods contained in U.S.E.P.A., Acquisition with Culture of Research Fish: Rainbow Trout, Fathead Minnow, Channel Catfish, and Bluegills, May 1975.

(e) Culturing of the atlantic silverside and the sheepshead minnow in the laboratory shall be in accordance with the methods contained in Standard Methods, 14th Edition, section 801A 2–5, pp. 847–853.

(f) Culturing of the grass shrimp in the laboratory shall be in accordance with the methods contained in U.S. EPA–1978.

(g) Culturing of the opossum shrimp in the laboratory shall be in accordance with the methods contained in U.S. EPA–1978.

(h) Fathead minnows, bluegills, atlantic silversides or sheepshead minnows to be used as test organisms shall meet the following requirements:

1. All fish shall be actively feeding young of the year which have not been previously in any bioassay or other test procedure;

2. All fish used in a bioassay shall be from the same source;

3. The total length of the longest fish of a group shall not be more than 1 1/2 times that of the shortest fish of the same group to be used for any test; and

4. The net weight of each fish should be within 0.1 to 1.5 grams.

(i) Grass shrimp to be used as test organisms shall meet the following requirements:

1. Immature (larval) states should be used whenever possible, but post larvae are permissible. All shrimp shall not have been used previously in any bioassay or other test procedure;

2. All shrimp used in a bioassay shall be from the same source.

3. Organisms should be as uniform in size as possible. The maximum size shall be 10–20 mm rostrum to telson length.

(j) Mysid shrimp to be used as test organisms shall meet the following requirements.

1. Only newly hatched juvenile opossum shrimp up to five days old shall be used; and

2. All adult opossum shrimp from which the juveniles are obtained shall be from the same source.

(k) The holding and handling of the organisms shall be as follows:

1. While being transported to the laboratory, organisms shall not be overcrowded, the dissolved oxygen shall be maintained at or above 60 percent of saturation, and the temperature shall not change by more than 3 degrees C in any 12 hour period;

2. When first brought into the laboratory, the organisms shall be quarantined for at least 10 days in order to observe them for parasites and diseases. If more than 10 percent of the quarantined organisms die after the second day or are heavily diseased or parasitized, and the prob-

lem cannot be controlled, that lot shall be destroyed, the holding tanks and equipment cleaned and sterilized, and another batch of organisms obtained;

3. After the quarantine period is over the healthy organisms have been transferred to the stock holding tanks, the organisms shall be gradually acclimated to the laboratory holding conditions. The organisms shall not be subjected to water temperature changes of more than 3 degrees C or salinity changes of more than three ppt., in any 12 hour period, nor to a total change of more than 6 degrees C or six ppt. salinity during the entire transportation, quarantine, and acclimation period;

4. Organisms that touch dry surfaces, are dropped, or are injured during handling shall be discarded;

5. Organisms shall be handled as little as possible. When handling is required, the following equipment shall be used:

i. Large organisms shall be handled with dipnets of the appropriate size and mesh; and

ii. Small organisms, such as juvenile invertebrates and fish fry, shall be handled by pipeting with smooth glass tubes of approximately 9mmI.D.

6. The preferred type of holding tank is one of flow through design which allows for a flow rate of at least two tank volumes per day. If flow-through tanks are not feasible, then holding tanks with a closed-recirculating water system, where the water is filtered through charcoal, shall be used;

i. The original or true duplicate of the results of the bioassay shall be sent promptly to the person who requested such test and shall be signed by the laboratory manager or a designee whose designation is in writing and has been submitted to the Department.

7. Only laboratory grade water as specified in N.J.A.C. 7:18–6.7(a) shall be used to hold organisms in the laboratory; unless the organisms are to be acclimated to the dilution water for subsequent use in a bioassay immediately after the quarantine period. Under those circumstances dilution water, as specified in N.J.A.C. 7:18–6.5(a), shall be used.

8. Dissolved oxygen levels in holding tanks shall be kept above 60 percent of saturation at all times. If necessary, the use of aeration is acceptable;

9. Photoperiods and light intensities favorable to the organisms as specified in Standard Methods, 14th Edition, pp. 719–721 should be used;

10. The environment the organisms are maintained in should follow the natural seasonal variations. Temperature should be as follows:

i. Depending upon the season, fathead minnows should be held at temperatures between 10 degrees–25 degrees C;

ii. Depending upon the season, opossum shrimp should be held at temperatures between 18 degrees–28 degrees C;

iii. Depending upon the season, grass shrimp should be held at temperatures between 18 degrees–25 degrees C;

iv. Depending upon the season, sheepshead minnows should be held at temperatures between 10 degrees–30 degrees C; and

v. Depending upon the season, atlantic silversides should be held at temperatures between 10 degrees–25 degrees C.

11. Depending upon the procedure selected from N.J.A.C. 7:18–6.6(n) estuarine/marine test organisms shall either be held at a salinity within their optimal range or to a series of salinities, ranging from 5–35 ppt. and including at least 10, 20, and 30 ppt.

i. Optimal salinity for atlantic silversides is between 24 and 30 ppt.;

ii. Optimal salinity for sheepshead minnows is between 15 and 20 ppt.

iii. Optimal salinity for grass shrimp is between 10 and 20 ppt.; and

iv. Optimal salinity for opossum shrimp is between 10 and 27 ppt.

12. Organisms shall not be fed for at least 24 hours prior to a test, except for mysid shrimp which shall be fed ad libitum up to and during a test.

(*l*) Test organisms shall be taken from groups whose mortality while held was less than 10 percent for the seven day period prior to the bioassay.

(m) The test organisms shall be acclimated to the test water and the test temperature in accordance with the following requirements:

1. Fathead minnows and bluegills shall be acclimated by gradually changing from 100 percent holding water to 100 percent dilution at least over a 24 hour period. Temperature changes shall not exceed the criteria given in N.J.A.C. 7:18–6.6(k)3.

2. Atlantic silversides, sheepshead minnows, grass and opossum shrimp shall be acclimated by gradually changing from 100 percent holding water to 100 percent dilution water over at least a 24 hour period. Temperature and salinity changes shall not exceed the criteria given in N.J.A.C. 7:18–6.6(k)3.

3. All test organisms shall be exposed to 100 percent dilution water at the required test temperature for a minimum of 24 hours before they are used in the bioassay.

4. If more than five percent of the test organisms die during the 48 hour acclimation period, immediately preceding the test, the organisms shall not be used and the following procedures shall be used:

i. The entire group of test organisms shall be discarded and a new group obtained;

ii. The new group of organisms shall be transported, held, and acclimated in accordance with the procedures contained in N.J.A.C. 7:18–6.6(a) through (m); and

iii. If more than five percent of the second group of test organisms die within 48 hours, an alternate source of dilution water shall be used.

(n) Effluents from estuarine or marine outfalls often consist of adulterated freshwater. Therefore, when the effluent is mixed with a saline dilution water the salinity of the mixture will be inversely proportional to the percent volume of effluent. Obviously a 100 percent concentration of a freshwater (≤1 ppt. salinity) effluent cannot be used with estuarine/marine test organisms. One of the two following procedures shall be used to deal with this situation:

1. Hold and acclimate the test organisms to a series of salinities, ranging from 5–35 ppt., staying within the natural salinity tolerances of the organism. The salinities chosen will be dependent upon the salinity of the effluent, the salinity of the dilution water and the test concentrations of effluent used; or

2. Using dry artificial sea salts, adjust the salinity of the effluent to that of the dilution water so that the test concentrations will all be at one salinity. Acclimate test organisms to the dilution water at that salinity.

(*o*) The standardized test temperature for all organisms specified shall be 22 C ± 2 C, unless seasonal bioassays are performed. If seasonal bioassays are performed, the test temperatures used shall be the highest average monthly temperature for the receiving water during each season.

(p) The dissolved oxygen levels in the exposure chambers shall be maintained at or above 40 percent of saturation for the fathead minnow, bluegill, sheepshead minnow, atlantic silverside, grass shrimp, and opossum shrimp by the following methods:

1. In static and modified static bioassay tests, a depression of dissolved oxygen below 45 percent of saturation shall necessitate aerating of all exposure chambers.

2. In flow-through bioassay tests, if the dissolved oxygen becomes depressed below 50 percent of saturation, first increase the flow rate to the maximum, if necessary. If the increased flow does not present a continued decrease in dissolved oxygen then, aerate the dilution water prior to the addition of the effluent. If those two measures fail to maintain adequate dissolved oxygen, then also aerate all the exposure chambers. In the case of the 100 percent effluent concentration, aeration shall be the second measure taken after increasing flow.

(q) Short-term range-finding or screening bioassays shall be used to determine the approximate range of effluent concentrations that should be used in a subsequent short-term definitive test. The range-finding methodology shall meet the following requirements:

1. Test duration shall be 24 hours;

2. Test type shall be either static or flow-through with the following specifications:

i. Exposure chamber loading for fish and grass shrimp shall not exceed 2.5 grams per liter in flow-through tests and 0.4 grams per liter for static tests at temperatures above 20 degrees C. Exposure chamber loading for fish and grass shrimp shall not exceed five grams per liter in flow-through tests and 0.8 grams per liter for static tests at temperatures of 20 degrees C or less;

ii. Exposure chamber loading for the bay mysid shall not exceed 10 mysids per liter for static tests and 12 mysids per liter for flow-through tests;

3. Test organisms shall be exposed to:

i. At least five widely spaced effluent concentrations based either on a logarithmic ratio, such as 0.01, 0.1, 1.0, 10 and 100 percent; or

ii. Progressive bisections of intervals on the logarithmic scale as described in Standard Methods, 14th Edition, pp. 715–716; and

iii. A control.

4. Effluent concentrations shall be expressed as percent effluent by volume;

5. Five test organisms shall be exposed to each effluent concentration and the control;

6. Water temperature in the exposure chambers shall be maintained for the duration of the test, to within ± 2 degrees C of the specified test temperature;

7. If the lowest concentration used kills all the test organisms, another test shall be setup using a series of concentrations which starts at the lowest concentration previously tested;

8. All effluent solutions for a concentration series shall be prepared from the sample of effluent; and

9. Any undissolved material in the effluent sample shall be dispersed uniformly by gentle agitation prior to withdrawal and aliquots of both effluent and dilution water shall be mixed well in the exposure chambers. Test organisms shall be added within 30 minutes to begin test.

(r) Short-term definitive bioassay tests shall be used to determine the acute toxicity of an effluent. The test methodology shall meet the following requirements.

1. Test duration shall be at least 96 hours, but if required by the Department the test shall be continued until the toxicity curve shows that the threshold toxicity called the Incipient LC 50, has been reached.

2. Test type shall be either modified static (daily renewal) or flow-through with the same specifications on test organism loading as listed in (q)2 above.

3. Test organisms shall be exposed to at least five effluent concentrations, the range of which will have been determined previously by a range-finding bioassay based on progressive bisections of intervals on the logarithmic scale as described in Standard Methods, 14th Edition, pp. 715–716, and a control. Concentrations shall be expressed as percent effluent by volume;

4. The test shall be conducted in replicate with at least twenty organisms exposed to each effluent concentration and the control. Replicates shall be true replicates with no direct water connections between them;

5. Exposure chambers shall be randomly assigned to either an effluent concentration or the control, and the test organisms shall be randomly assigned to the exposure chambers.

6. Water temperature maintenance shall be as specified in (q)6 above.

7. Test organisms shall be acclimated to the dilution water in accordance with the procedures listed in (m) above prior to their use in a test;

8. All effluent solutions for a concentration series shall be prepared from the same sample of effluent;

9. The following required methods apply only to conducting modified static tests:

i. The test organisms shall be exposed to fresh solution of the same concentration of effluent every 24 hours either by transferring the test organisms from one test chamber to another or by replacing the effluent solutions in the exposure chambers;

ii. The modified static test procedure used for opossum shrimp should follow the method described in U.S.E.P.A.–1978, pp. 61–63;

iii. The procedure described in (q)9 above shall be followed for setting-up and beginning a modified static test;

10. The following required methods apply only to conducting flow-through tests:

i. The diluter system of the flow-through apparatus shall be in operation for at least 24 hours prior to the addition of the organisms and the beginning of the test. During this time, the water temperature, flow rate through the exposure chamber, and the effluent concentrations in the exposure chambers shall be adjusted to the test requirements;

ii. After adjustments but prior to beginning the tests, there shall be at least one tank volume exchange. Flow rate through the exposure chambers shall be sufficient to maintain a minimum dissolved oxygen concentration of 40 percent of saturation and provide no less than five tank water volume changes every 24 hours.

(s) Observations of test organisms in the exposure chambers shall be made at least once every 24 hours for the duration of the test. It is suggested that observations be made of each exposure chamber at 1.5, 3, 6, 12, and 24 hours after the beginning of the test and twice a day thereafter.

(t) In short-term acute toxicity bioassays, death is the adverse effect which shall be quantified. The criterion for death shall be no movement which will include respiratory movement in fish, no movement of antenna, mouth parts or other organs in invertebrates, and reaction to gentle prodding.

(u) Effects such as erratic swimming, loss of reflex, hyperventilation, curved spine, hemorrhaging, discoloration, changes in behavior, excessive mucus production, molting and cannibalism shall be reported.

(v) During short term tests, deaths in the controls should be virtually absent. Mortality of the control test organisms greater than 10 percent shall invalidate the test.

(w) Dissolved oxygen, pH, specific conductivity, total alkalinity, total hardness, and when applicable, salinity shall be measured in the exposure chambers and recorded initially and at least once every day thereafter for the duration of the test.

(x) The lengths and weights of the test organisms shall be determined by sacrificing and measuring a representative sample of the stock organisms before the test and by measuring all of the test organisms after the completion of the test. This may be accomplished by preserving both the surviving and dead fish. An acceptable alternative shall be to measure a representative sample of the test organisms, consisting of both surviving and dead fish, instead of measuring all of the test organisms.

(y) The calculation and reporting of the results of any bioassay shall meet the following requirements:

1. The results of all bioassays are to be expressed in terms of their median lethal concentration, or LC 50 for a specified time period.

2. Range-finding bioassays shall be analyzed by using the graphical interpolation method for estimating the LC 50 presented in Standard Methods, 14th Edition, pp. 731–733, Methods for Measuring Acute Toxicity–EPA, pp. 37–38.

3. Definitive bioassays shall be analyzed by any of the following methods and with the following requirements:

i. The LC 50 values for the 24, 48, 72 and 96 exposure times, depending upon the duration of exposure, shall be estimated by Litchfield–Wilcoxon method as described in Methods for Measuring Acute Toxicity–EPA, pp. 29–36, or by probit analysis or Finney's method of formal probit analysis as described in Standard Methods, 14th Edition, pp. 733–735.

ii. The 95 percent confidence or fiducial limits for the 96 hour or Incipient LC 50's shall be calculated. The simplified nomographic methods of Litchfield and Wilcoxon, Methods for Measuring Acute Toxicity–EPA, are acceptable.

iii. In order to estimate an LC 50 for a definitive test by any of the aforementioned methods, partial mortalities must have occurred in at least two of the test concentrations. If these conditions are not met, the LC 50 shall be estimated by the graphical interpolation method referenced in (y)2 above.

iv. If the highest effluent concentration does not kill more than 65 percent of the test organisms exposed to it, the percentage of organisms killed by various concentrations of the effluent shall be reported.

v. A toxicity curve shall be plotted using the LC 50's for each of the observation times according to the methodology presented in Standard Methods, 14th Edition, section 801 F. 26. The presence or absence of an Incipient LC 50, as estimated from the toxicity curve, shall be reported along with its value.

4. If the responses from two or more exposure chambers deviate from the expected trend in such a manner that a lower effluent concentration shows a more toxic response than a higher effluent concentration, then the test should be considered invalid, no estimation of the LC 50 made, and the test should be repeated.

5. LC 50 values shall not be estimated for any bioassay if a test is invalid under the definition given in (v) above.

(z) The analysis of all parameters, excluding salinity, as required by this subchapter shall be conducted in accordance with the requirements set forth in 40 CFR 136 and subchapter 4.

(aa) The determination of salinity as required in this subchapter shall be computed from chlorinity, electrical conductivity, refractive index, or some other property whose relationship is well established.

(ab) All procedures other than those set forth in this section are considered alternative analytical methods. Laboratories shall make special application to the Commissioner for the use of alternative analytical methods and such application shall include a showing of comparability data.

Administrative Correction to (k)11iv: changed "20" to "10".
See: 22 N.J.R. 3365(b).
Amended by R.1991 d.378, effective August 5, 1991.
See: 23 N.J.R. 1089(a), 23 N.J.R. 2366(a).
In (v), deleted "For all fish . . . invalidate the test."; added "Mortality of the control test organisms greater than 10 percent shall invalidate the test."

7:18–6.7 General laboratory practices

(a) Laboratory grade water shall meet the following requirements:

1. Natural or artificial sources of water may be used, but natural sources are preferred.

2. Natural sources shall be free of pollution, low in turbidity, high in dissolved oxygen, low in B.O.D., and the pH shall be favorable to the maintenance of the organisms.

3. Fresh water shall meet the following requirements:

i. Fresh water shall be constant in quality and shall not contain more than the designated amounts of the following:

(1) 20 mg/l of suspended solids;

(2) 10 mg/l of total organic carbon or chemical oxygen demand;

(3) 20 ug/l of un-ionized ammonia;

(4) 50 ug/l of residual chlorine;

(5) 50 ng/l of total organiphosphorus pesticides;

(6) 50 ng/l of total organochloride pesticides plus PCBs; and

(7) Water shall be considered of constant quality if the monthly ranges of total alkalinity, total hardness, specific conductivity, TOC or COD, and salinity are less than 10 percent of the respective averages.

ii. Municipal water supplies are not recommended since they often contain unacceptable concentrations of heavy metals and fluoride. If municipal water must be used as a source, it shall be determined that the concentrations of these materials are less than 1 ug/l each. Residual chlorine can be removed by passing the water through activated carbon filters.

4. Saltwater shall meet the following requirements:

i. Natural saltwater shall be from a source free of pollution, having a pH and salinity favorable to the organism. (N.J.A.C. 7:18–6.6(k)11);

ii. If adjustments to the salinity of natural saltwater are necessary, they shall be made either by adding laboratory pure water to reduce salinity or a strong natural brine (Standard Methods, 14th Edition, pp. 697) or dry artificial sea salts to raise the salinity. Prior to use, the saltwater shall be filtered through a 20 micron filter; and

iii. Artificial saltwater may be substituted for natural saltwater if an acceptable supply of the latter is unavailable. It shall be prepared according to the methods listed in Standard Methods, 14th Edition, pp. 696–697 Methods for Measuring Acute Toxicity–EPA, or obtained from a commercial source.

(b) The food and feeding of the test organisms shall be as follows:

1. Fish shall be fed at least once a day a combination of natural foods, either live or frozen, and any of several prepared dried foods.

2. Grass and opossum shrimp shall be fed ad libitum live freshly hatched brine shrimp naplii or commercial fish foods, or both.

(c) Treatment of diseased or parasitized organisms shall be in accordance with the procedures given in Standard Methods, 14th Edition, pp. 703–704, and Methods for Measuring Acute Toxicity–EPA.

(d) Organisms treated for disease or parasites shall not be used in bioassays for at least 10 days after treatment.

(e) Cleaning all chambers and equipment shall be in accordance with the following procedure:

1. As soon after breaking down a test as is practicable, rinse with acetone to remove organic compounds and then rinse twice with laboratory grade freshwater; and

2. Secondly, soak and wash with a warm synthetic detergent/laboratory grade freshwater solution, and then rinse with 50 degrees C or warmer laboratory grade water; and

3. Finally, rinse with a fresh 5 percent hydrochloric or nitric acid solution, for the removal of metals and bases, and then rinse again with 50 degrees C or warmer laboratory grade freshwater.

(f) When measuring sample volumes of more than 10 ml, graduate cylinders, having an accuracy within 2.5 percent tolerance, shall be used.

(g) A laboratory that has received either certification or interim approval shall accept only samples that are properly labeled and for which reasonable assurance is given that the samples have been collected, preserved, processed, stored and transported in a manner that will assure both the identity of the sample and that the sample is sufficiently stable to be used in the requested tests or analyses. If the identity or stability of the sample has not assured, both the chain of custody form and the laboratory report shall clearly state that the result may be invalid due to the possible misidentification or instability of the sample.

7:18–6.8 Quality control program

(a) An acceptable degree of precision for definitive bioassays shall be that the 95 percent confidence or fiducial intervals be within less than ± 30 percent of the 96 hour or incipient LC 50 value.

(b) Each laboratory shall develop and have on file and available for inspection a written description of the current laboratory quality control program. The written description shall outline the procedures which the laboratory will use in meeting the quality control requirements set forth in N.J.A.C. 7:18–4.6 and 7:18–4.7. A record of analytical control tests and quality control checks on equipment and materials shall be prepared by the laboratory and retained for at least five years.

1. Laboratories shall perform the following analytical quality control tests to ensure that general laboratory practices and methodology are in compliance with the requirements of this subchapter:

i. Laboratory pure water shall be analyzed for and meet the following requirements:

pH	5.5 – 7.5
Conductivity	Greater than 0.2 megohn-cm as resistivity or less than 5.0 micromhos cm as conductance at 25 degrees C
Trace metals:	
A single metal	Not greater than 0.05 mg/l
total metals	Equal to or less than 1.0 mg/l
Test for bactericidal properties of distilled water (Standard Methods, 14th Edition, pg. 888, or Microbiological Methods—EPA, pp 200)	0.8 – 3.0
Free chlorine residual	0.0

ii. Laboratory pure water checks for pH, conductivity, and free chlorine residual shall be performed monthly and documented.

iii. Laboratory pure water checks for trace metals, bactericidal properties, and standard plate count shall be performed annually and documented.

iv. Laboratory grade water shall be analyzed monthly for pH, D.O., chlorine residual, and specific conductance;

v. Laboratory grade fresh water shall be analyzed at least twice annually for the materials specified in N.J.A.C. 7:18–6.7(a)3;

vi. There shall be available at all times, in the immediate bench area of laboratory personnel engaged in examining samples and performing related procedures within a category, current laboratory manuals or other complete written descriptions and instructions relating to:

(1) The analytical methods to be used by those personnel, properly designated and dated to reflect the most recent supervisory reviews;

(2) Pertinent current literature references; and

(3) Such written descriptions and instructions may be supplemented by, but not replaced by, textbooks relating to the particular analytical methods and procedures employed by such personnel;

vii. Only the laboratory manager or supervisor shall make changes in laboratory procedure and those changes shall only be effective when put in writing.

viii. The following procedures shall be followed in performing quality control checks of laboratory media, equipment, and supplies:

(1) Each pH meter shall be cleaned immediately after each use period and calibrated prior to usage using two pH buffer standards and records of each calibration shall be maintained; buffer aliquots shall not be used more than once; and commercial buffer solutions shall be dated at the time of initial use it is recommended that the buffer standards bracket the value to be measured;

(2) Top loader or pan balances shall be calibrated annually, calibration shall be checked monthly against class "s" weights, and a record shall be made of each calibration check;

(3) The accuracy of all thermometers used to monitor temperature shall be verified by comparing the readings of such thermometers with the readings of a certified thermometer. A record shall be made containing the identification number of each thermometer, the temperature displayed on the certified thermometer and the thermometer being verified, correction factors when applicable, dates on which quality control checks were performed, and the name of the analyst performing such checks. Glass thermometers shall be verified yearly and metal thermometers shall be verified quarterly.

(4) The temperature of air or water-jacketed incubators, aluminum block incubators, water baths, and incubator rooms shall be either recorded continuously or recorded daily from in-place thermometers immersed in liquid and placed on at least one of the shelves in use.

(5) Date, time and temperature shall be either recorded continuously, or recorded individually during each sterilization cycle of the autoclave;

(6) Each hot air oven shall be equipped with a thermometer, the bulb of which shall be placed in sand, or with a temperature recording device, and records shall be maintained showing the date, time and temperature of each sterilization cycle;

(7) The temperature of each refrigerator shall be either recorded continuously or recorded daily from an in-place thermometer immersed in liquid and placed on at least one of the shelves in use;

(8) All reagents and solutions shall be labeled to indicate identity and, when applicable, titer, strength or concentration, recommended storage requirements, preparation or expiration date, and other information pertinent to identification;

(9) Materials of substandard reactivity and deteriorated materials shall not be used; and

(10) All outdated material shall be discarded immediately.

(c) The temperature in, flow rate through the exposure chambers and the maintenance of effluent concentrations, shall be checked initially, daily during the duration of the test, and upon completion of the test, adjusted as necessary, and documentation of these adjustments and measurements shall be made.

7:18–6.9 Records and data reporting

(a) Each laboratory shall maintain records and report data in accordance with the requirements set out in this section.

(b) Records of bioassay analysis shall be kept by the laboratory for not less than five years. This requirement is equally applicable to all raw data, quality control data, chain of custody forms and laboratory reports.

(c) The following information shall be kept by the laboratory as part of the daily log of feeding, behavioral observations, and mortality of organisms during holding acclimation:

1. Water temperature of holding tanks;

2. Air temperature in culturing/holding room;

3. Mortalities of organisms per holding tank;

4. Analysis of laboratory grade water as specified in N.J.A.C. 7:18–6.6(b);

5. Food and feeding schedule; and

6. General observations of behavior and condition.

(d) A sample report form shall be completed immediately after collection of either dilution water or effluent composite or grab samples and shall state the sampling location, date and time of collection, chlorine residual, collectors name, and any remarks.

(e) The bioassay experimental results shall be reported in accordance with the specifications given in Methods for Measuring Acute Toxicity–EPA, pp. 24–25 and;

1. The incipient LC 50 shall be reported if applicable.
2. A figure showing the toxicity curve shall be included.