

# **SUPERVISOR QUALIFICATIONS CONCEPTS AND OPTIONS**

**November 4, 2003**

**BACKGROUND:** The Environmental Laboratory Accreditation Act (27 Pa C.S. §§ 4101 – 4113) provides the Department of Environmental Protection with the power and duty to establish an accreditation program for environmental laboratories. The Act further indicates that regulations shall be adopted as necessary to implement the Program to include the establishment of requirements for education, training and experience of laboratory supervisors.

- “Laboratory supervisor.” A technical supervisor of an environmental laboratory who supervises laboratory procedures and reporting of analytical data. (Section 4102. Definitions.)
- Laboratory supervisor. – Testing, analysis and reporting of data by an accredited laboratory shall be under the direct supervision of a laboratory supervisor. The laboratory supervisor shall certify that each test or analysis is accurate and valid and that the test or analysis was performed in accordance with all conditions of accreditation. The department may disqualify a laboratory supervisor who is responsible for submission of inaccurate test or analysis results. (Section 4106. Requirements of certificate of accreditation.)

The proposed draft regulations will set forth the qualifications of laboratory supervisors.

**OPTIONS AVAILABLE:** The following options could be used for the qualifications of the laboratory supervisor:

1. The existing Drinking Water Program has established qualifications for a laboratory supervisor. The unique qualifications for a laboratory supervisor are detailed for each category, microbiology, chemistry, and radiochemistry. Identical qualifications could be used for the expanded State laboratory accreditation program. The qualifications are:
  - a. Microbiology: The supervisor of the microbiology laboratory shall have a bachelor’s degree in microbiology, biology, or equivalent. Supervisors who have a degree in a subject other than microbiology must have had at least one college-level microbiology laboratory course in which environmental microbiology was covered. In addition, the supervisor should have a minimum of two weeks training at a Federal agency, State agency, or academic institution in microbiological analysis of drinking water or, 80 hours of on-the-job training in water microbiology at a certified laboratory, or other training acceptable to the State or EPA. If a supervisor is not available, a consultant having the same qualifications may be substituted, as long as the laboratory can document that the consultant is acceptable to the State and is present on-site frequently enough to satisfactorily perform a supervisor’s duties.

The laboratory supervisor has the responsibility to insure that all laboratory personnel have demonstrated their ability to satisfactorily perform the analyses to which they are assigned and that all data reported by the laboratory meet the required quality assurance and regulatory criteria. (Critical Elements for Certification of Drinking Water Laboratories for Microbiology, 150-2302-002/October 1, 1997, Section 1.1)

- b. Chemistry: Laboratory Supervisor: Minimum requirements are listed below. If the supervisor is also an laboratory analyst, the requirements of paragraph 1.2 must be met.
    - i. Bachelor's degree in science that includes the number of credit hours in chemistry courses required for a major in chemistry.
    - ii. Minimum of one year of experience in the chemical analysis of drinking water.
    - iii. Working knowledge of quality assurance principles.
    - iv. Responsibility to insure that all laboratory personnel have demonstrated their ability to satisfactorily perform the analyses to which they are assigned.
    - v. Responsibility to insure that data reported by their laboratory meet the required quality assurance and regulatory criteria. (Critical Elements for Certification of Drinking Water Laboratories for Chemistry, 150-2302-001/October 1, 1997, Section 1.1)
  
  - c. Radiochemistry: The laboratory supervisor shall have at least a bachelor's degree with a major in chemistry or equivalent and at least one year of experience in the analysis of drinking water for radiochemicals. The laboratory supervisor shall have at least a working knowledge of quality assurance principles. The laboratory supervisor has immediate responsibility to insure that all laboratory personnel have demonstrated their ability to satisfactorily perform the analyses to which they are assigned and that all data reported by the laboratory meet the required quality assurance criteria. (Critical Elements for Certification of Drinking Water Laboratories for Radiochemistry, 150-2302-003/October 1, 1997, Section 1.1)
2. The National Environmental Laboratory Accreditation Conference has established qualifications for a laboratory supervisor. Identical qualifications could be used for the expanded State laboratory accreditation program. Different qualifications are listed for the different types of laboratories. Note that the NELAC standards use the term "technical director" as the equivalent of "laboratory supervisor." The relevant qualifications are as follows:
- a. The technical director(s) means a full-time member of the staff of an environmental laboratory who exercises actual day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results. The title of such person may include but is not limited to laboratory director, technical director, laboratory supervisor or laboratory manager. A laboratory may appoint one or more technical

directors for the appropriate fields of accreditation for which they are seeking accreditation. His/her name must appear in the national database. This person's duties shall include, but not be limited to, monitoring standards of performance in quality control and quality assurance; monitoring the validity of the analyses performed and data generated in the laboratory to assure reliable data. An individual shall not be the technical director(s) of more than one accredited environmental laboratory without authorization from the primary Accrediting Authority. Circumstances to be considered in the decision to grant such authorization shall include, but not be limited to, the extent to which operating hours of the laboratories to be directed overlap, adequacy of supervision in each laboratory, and the availability of environmental laboratory services in the area served. The technical director(s) who is absent for a period of time exceeding 15 consecutive calendar days shall designate another full-time staff member meeting the qualifications of the technical director(s) to temporarily perform this function. If this absence exceeds 65 consecutive calendar days, the primary accrediting authority shall be notified in writing.

- b. Qualifications of the technical director(s).
  - i. Any technical director of an accredited environmental laboratory engaged in chemical analysis shall be a person with a bachelors degree in the chemical, environmental, biological sciences, physical sciences or engineering, with at least 24 college semester credit hours in chemistry and at least two years of experience in the environmental analysis of representative inorganic and organic analytes for which the laboratory seeks or maintains accreditation. A masters or doctoral degree in one of the above disciplines may be substituted for one year of experience.
  - ii. Any technical director of an accredited environmental laboratory limited to inorganic chemical analysis, other than metals analysis, shall be a person with at least an earned associate's degree in the chemical, physical or environmental sciences, or two years of equivalent and successful college education, with a minimum of 16 college semester credit hours in chemistry. In addition, such a person shall have at least two years of experience performing such analysis.
  - iii. Any technical director of an accredited environmental laboratory engaged in microbiological or biological analysis shall be a person with a bachelors degree in microbiology, biology, chemistry, environmental sciences, physical sciences or engineering with a minimum of 16 college semester credit hours in general microbiology and biology and at least two years of experience in the environmental analysis of representative analytes for which the laboratory seeks or maintains accreditation. A masters or doctoral degree in one of the above disciplines may be substituted for one year of experience.

- iv. A person with an associate's degree in an appropriate field of the sciences or applied sciences, with a minimum of four college semester credit hours in general microbiology may be the technical director(s) of a laboratory engaged in microbiological analysis limited to fecal coliform, total coliform and standard plate count. Two years of equivalent and successful college education, including the microbiology requirement, may be substituted for the associate's degree. In addition, each person shall have one year of experience in environmental analysis.
- v. Any technical director of an accredited environmental laboratory engaged in radiological analysis shall be a person with a bachelor's degree in chemistry, physics or engineering with 24 college semester credit hours of chemistry with two or more years of experience in the radiological analysis of environmental samples. A masters or doctoral degree in one of the above disciplines may be substituted for one year experience.
- vi. The technical director(s) of an accredited environmental laboratory engaged in microscopic examination of asbestos and/or airborne fibers shall meet the following requirements:
  - 1. For procedures requiring the use of a transmission electron microscope, a bachelor's degree, successful completion of courses in the use of the instrument, and one year of experience, under supervision, in the use of the instrument. Such experience shall include the identification of minerals.
  - 2. For procedures requiring the use of a polarized light microscope, an associate's degree or two years of college study, successful completion of formal coursework in polarized light microscopy, and one year of experience, under supervision, in the use of the instrument. Such experience shall include the identification of minerals.
  - 3. For procedures requiring the use of a phase contrast microscope, as in the determination of airborne fibers, an associate's degree or two years of college study, documentation of successful completion of formal coursework in phase contrast microscopy, and one year of experience, under supervision, in the use of the instrument.
- vii. Any technical director of an accredited environmental laboratory engaged in the examination of radon in air shall have at least an associate's degree or two years of college and one year of experience in radiation measurements, including at least one year of experience in the measurement of radon and/or radon progeny.
- viii. Notwithstanding any other provision of this section, a full-time employee of a drinking water or sewage treatment facility who holds a valid treatment plant operator's certificate appropriate to the nature and size of such facility shall be deemed to meet the educational and experience requirements serving as the director of the accredited laboratory devoted exclusively to the examination of environmental samples taken within such facility system. Such

accreditation for a water treatment facility and/or a sewage treatment facility shall be limited to the scope of that facility's regulatory permit, and when the facility's laboratory is analyzing water treatment/sewage treatment samples collected within the state where the laboratory is situated, the scope of accreditation shall be determined by the accrediting authority.

- ix. A full-time employee of an industrial waste treatment facility with a minimum of one year of experience under supervision in environmental analysis shall be deemed to meet the requirements for serving as the director of an accredited laboratory devoted exclusively to the examination of environmental samples taken within such facility for the scope of that facility's regulatory permit. Such accreditation for a industrial waste treatment facility shall be limited to laboratories analyzing industrial waste treatment samples collected within the state where the laboratory is situated, and the scope of accreditation shall be determined by the state accrediting authority. (2001 NELAC Standards Section 4.1.1.1 Definitions, Technical Director(s) and Section 4.1.1.2 Personnel Qualification Clarifications and Exceptions).
3. The preliminary draft regulations (May 2003) modified the requirements for technical director or laboratory supervisor found in the NELAC standards. The qualifications of the laboratory supervisor listed in the Section 252.302 of the May 2003 preliminary draft regulations are as follows:
- i. A laboratory supervisor of an environmental laboratory engaged in chemical analysis shall have the following qualifications:
    - 1. A bachelor's degree in chemistry, physics, environmental science, biology, microbiology, physical sciences, or engineering.
    - 2. At least 24-college semester credit hours in chemistry.
    - 3. At least two years of experience in the testing or analysis of environmental samples in representative inorganic and organic fields of accreditation for which the environmental laboratory seeks to obtain or to maintain accreditation. A master's or doctoral degree in chemistry, physics, environmental science, biology, microbiology, physical sciences, or engineering may be substituted for 1 year of experience.
  - ii. A laboratory supervisor of an environmental laboratory limited to the basic non-potable water category or the basic drinking water category, shall have the following qualifications:
    - 1. At least 16-college semester credit hours in chemistry, physics, environmental science, biochemistry, biology, microbiology, physical sciences, or engineering.
    - 2. At least 2 years of experience in the testing or analysis of environmental samples in representative fields of

accreditation for which the environmental laboratory seeks to obtain or to maintain accreditation.

- iii. A laboratory supervisor of an environmental laboratory limited to inorganic chemical analysis, other than metals analysis, shall have the following qualifications:
  1. At least an earned associate's degree in chemistry, physics, environmental science, biology, microbiology, physical sciences, or engineering, or 2 years of equivalent and successful college education.
  2. At least 16-college semester credit hours in chemistry.
  3. At least 2 years of experience in the testing or analysis of environmental samples in representative fields of accreditation for which the environmental laboratory seeks to obtain or to maintain accreditation.
  
- iv. A laboratory supervisor of an environmental laboratory engaged in microbiological or biological analysis shall have the following qualifications:
  1. A bachelor's degree in chemistry, physics, environmental science, biology, microbiology, physical sciences, or engineering.
  2. At least 16-college semester credit hours in general microbiology and biology.
  3. At least 2 years of experience in the testing or analysis of environmental samples in representative microbiological or biological fields of accreditation for which the environmental laboratory seeks to obtain or to maintain accreditation. A master's or doctoral degree in chemistry, physics, environmental science, biology, microbiology, physical sciences, or engineering may be substituted for 1 year of experience.
  
- v. A laboratory supervisor of an environmental laboratory engaged in microbiological analysis limited to fecal coliform, total coliform and heterotrophic plate count shall have the following qualifications:
  1. An associate's degree in chemistry, physics, environmental science, biology, microbiology, physical sciences, or engineering.
  2. A minimum of four-college semester credit hours in general microbiology.
  3. Two years of equivalent and successful college education, including a minimum of four-college semester credit hours in general microbiology, may be substituted for the associate's degree.
  4. At least 2 years of experience in the testing or analysis of environmental samples in representative fields of

accreditation for which the environmental laboratory seeks to obtain or to maintain accreditation.

- vi. A laboratory supervisor of an environmental laboratory engaged in radiological analysis shall have the following qualifications:
  - 1. A bachelor's degree in chemistry, physics, environmental science, biology, microbiology, physical sciences, or engineering.
  - 2. At least 24-college semester credit hours in chemistry.
  - 3. At least 2 years of experience in the testing or analysis of environmental samples in representative radiological fields of accreditation for which the environmental laboratory seeks to obtain or to maintain accreditation. A master's or doctoral degree in chemistry, physics, environmental science, biology, microbiology, physical sciences, or engineering may be substituted for 1 year of experience.
  
- vii. A laboratory supervisor of an environmental laboratory engaged in microscopic examination of asbestos or airborne fibers shall have the following qualifications:
  - 1. For procedures requiring the use of a transmission electron microscope, a bachelor's degree, successful completion of courses in the use of the instrument, and one year of experience, under supervision, in the use of the instrument. Such experience shall include the identification of minerals.
  - 2. For procedures requiring the use of a polarized light microscope, an associate's degree or 2 years of college study, successful completion of formal coursework in polarized light microscopy, and 1 year of experience, under supervision, in the use of the instrument. Such experience shall include the identification of minerals.
  - 3. For procedures requiring the use of a phase contrast microscope an associate's degree or 1 year of college study, documentation of successful completion of formal coursework in phase contrast microscopy, and 1 year of experience, under supervision, in the use of the instrument.
  
- viii. Notwithstanding any other provision of this section, an employee of a drinking water, wastewater, or industrial waste system meeting the following requirements shall be deemed qualified as a laboratory supervisor of an environmental laboratory:
  - 1. The employee meets the employer's definition of full-time employment.
  - 2. The employee has at least 2 years of experience in the testing or analysis of environmental samples in representative fields of accreditation for which the environmental laboratory seeks to obtain or to maintain accreditation.

3. The employee holds a valid treatment plant operator's certificate under the Water and Wastewater Systems Operators' Certification Act (63 P.S. §§ 1001 –1015.1) for laboratory supervisor in the appropriate water or wastewater sub-classification.
      4. Approval as a laboratory supervisor under this section shall be limited to the fields of accreditation required by the scope of that facility's regulatory permit.
4. For all options, a grandparent provision may be included.
  - a. The current Drinking Water Laboratory Accreditation allowed for recognition of existing supervisors but required all new supervisors to meet the listed requirements. The specific language used:

Personnel acting in the capacity of laboratory supervisor, in a Pennsylvania DEP certified laboratory, on the effective date of this document are hereby waived of the requirements cited under Laboratory Supervisor in this document if they do not meet the requirements. Any changes in personnel occurring after the effective date of this document must meet the requirements outlined.
  - b. Section 4.1.1 of the 2001 NELAC standards provides that persons who do not meet the education credential requirements but possess the requisite experience of the NELAC standards shall qualify as technical director(s) subject to the following conditions.
    - i. The person must be a technical director of the laboratory on the date the laboratory applies for NELAP accreditation and/or becomes subject to NELAP accreditation, and must have been a technical director in that laboratory continuously for the previous 12 months or more.
    - ii. The person will be approved as a technical director for only those fields of accreditation for which he/she has been technical director in that laboratory for the previous 12 months or more.
    - iii. A person who is admitted as a technical director under these conditions, and leaves the laboratory, will be admitted as technical director for the same fields of accreditation in another NELAP laboratory.
    - iv. A person may initially be admitted as a technical director under the provisions of this section during the first twelve months that the primary accrediting authority offers the NELAP fields of accreditation for which the person seeks to be technical director or during the first twelve months that the program is required by the state in which the laboratory is located.
  - c. Section 252.303 of the May 2003 preliminary draft provides that a person who does not meet the education credential requirements for a laboratory supervisor but possesses the requisite years of experience shall qualify as laboratory supervisor subject to the following conditions:



- i. The person shall be a laboratory supervisor of the environmental laboratory on the date the environmental laboratory becomes subject to accreditation.
- ii. The person shall have been a laboratory supervisor of the environmental laboratory for at least 12 months for the fields of accreditation for which the environmental laboratory is applying.
- iii. A person will be approved as a laboratory supervisor only for those fields of accreditation for which the person has been laboratory supervisor of the environmental laboratory for at least 12 months.

**EVALUATION AND DISCUSSION:** Regardless of the option or modified option that is chosen, the Department would strongly support the concept of accepting an existing laboratory supervisor. The Laboratory Accreditation Advisory Committee indicated during a previous meeting that it supported restricting the acceptance of an existing supervisor to the initial environmental laboratory. Based upon this information, no changes are proposed for Section 252.303.

OPTION #1: These criteria have been in use since at least 1997 for drinking water laboratories. The smallest drinking water laboratories have occasionally had difficulty meeting this requirement. Some small laboratories use a consultant as the laboratory supervisor. For the drinking water program, the US EPA is expected to continue using similar language when the Manual for the Certification of Laboratories Analyzing Drinking Water (EPA 815-B-97-001) is revised in the near future. The US EPA defines a bachelor's degree as a college degree with an equivalent 30 semester hours in a specific discipline.

OPTION #2: The qualifications of the laboratory supervisor listed in the NELAC standards need to be understood within the context of the entire NELAC standards. To be accredited to the NELAC standards, an environmental laboratory must meet all of the NELAC standards, not just the qualifications for a laboratory supervisor. The NELAC standards require the environmental laboratory to establish a rigorous quality system that is compliant with international standards. Additionally, the NELAC standards require that the environmental laboratory perform proficiency test samples every 6 months (for each matrix, method/technology, and analyte/analyte group combination) and maintain a history of 2 successful proficiency test studies out of the 3 most recent proficiency test studies attempted. A successful on-site evaluation is required every 2 years. An environmental laboratory may select this option by choosing to seek accreditation according to the NELAC standards under the voluntary program.

OPTION #3: This option recognizes that the type of testing and analysis performed by the laboratory should set the level of qualifications for the laboratory supervisor. All laboratory supervisors would be required to have experience in environmental testing that is relevant to the area being supervised.

**DEPARTMENT PROPOSAL:** The Department proposes that Option #3 be modified. The modifications would recognize that the Environmental Laboratory Accreditation regulations must be consistent with the regulations being developed under the Water and Wastewater Systems Operators' Certification Act (63 P.S. §§ 1001 –1015.1). The

Department would propose changes to Sections 252.301(h) and (i) and complementary wording in the Operator Certification Regulations.

#### **CHAPTER 303 CHANGES:**

*Drinking Water Laboratory Supervisor (Water Subclassification 15)* - An individual having the experience, knowledge, skills and abilities necessary to supervise laboratory procedures and reporting of analytical data for an environmental laboratory operated by a public water system in accordance with industry, state and federal standards.

*Wastewater Laboratory Supervisor (Subclassification 5)* - An individual having the experience, knowledge, skills and abilities necessary to supervise laboratory procedures and reporting of analytical data for an environmental laboratory operated by a wastewater or industrial waste system in accordance with industry, state and federal standards.

#### **§ 303.305. Laboratory supervisor certification.**

(a) There shall be a laboratory supervisor subclassification (15) for individuals responsible for the supervision of testing or analysis of environmental samples and reporting of analytical data for water supply systems in an environmental laboratory operated by a public water system.

(b) There shall be a laboratory supervisor subclassification (5) for individuals responsible for supervision of the testing or analysis of environmental samples and reporting of analytical data for wastewater systems in an environmental laboratory operated by a wastewater or industrial waste system.

(c) No certified operator, including those holding Master certifications, shall be qualified by the Department for a laboratory supervisor certification without meeting the requirements set forth in this section.

(d) Laboratory supervisor certification is not required to qualify for a Master certification in water or wastewater.

(e) Applicants for laboratory supervisor's certification for drinking water or wastewater must have two (2) years of experience in the testing and analysis of environmental samples for water or wastewater systems.

#### **CHAPTER 252 CHANGES:**

Because an individual would need to have 2-years of experience to obtain the laboratory supervisor classification, the Department would propose deleting the experience requirement from the Section 252.302(h). In addition, the Department would propose adding language to allow for a transition period to allow individuals to obtain the certification as a laboratory supervisor. Sections 252.302(h) and (i) would then read as follows:

## **§ 252.302. Qualifications of the Laboratory Supervisor.**

- (h) Notwithstanding any other provision of this section, an employee of a drinking water, wastewater, or industrial waste system meeting the following requirements shall be deemed qualified as a laboratory supervisor of an environmental laboratory:
- (1) The employee meets the employer's definition of full-time employment.
  - (2) The employee holds a valid treatment plant operator's certificate under the Water and Wastewater Systems Operators' Certification Act (63 P.S. §§ 1001 –1015.1) for laboratory supervisor in the appropriate water or wastewater sub-classification.
  - (3) Two years of experience performing testing or analysis of environmental samples using the methods and procedures currently in use by the environmental laboratory may be substituted for a certificate as a laboratory supervisor issued under the Water and Wastewater Systems Operators' Certification Act (63 P.S. §§ 1001 –1015.1) for 12 months after such laboratory supervisor certificates become available from the Department.
- (i) Approval as a laboratory supervisor under (h) shall be limited to the fields of accreditation required by the scope of that facility's regulatory permit.