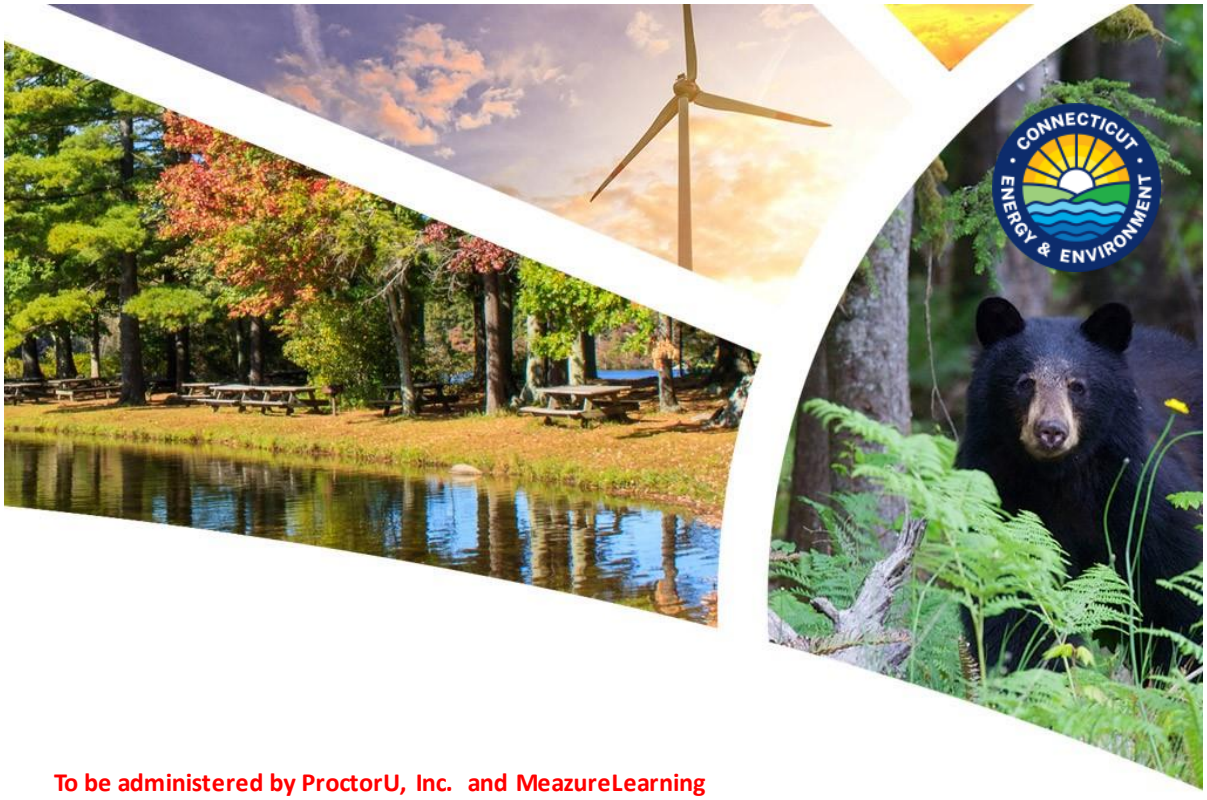
The Connecticut State Board of Examiners

Candidate Guide for the Licensed Environmental Professional Examination



To be administered by ProctorU, Inc. and MeazureLearning

Connecticut Department of Energy & Environmental Protection

About the Connecticut State Board of Examiners of Environmental Professionals
The Board of Examiners of Environmental Professionals ("the Board") was formed in February of 1996 pursuant to Section 22a-133v of the Connecticut General Statutes. The Commissioner of the Department of Energy and Environmental Protection designates the Chairman of the Board. The other ten members are appointed by the governor and must consist of six environmental professionals, two active members of an environmental organization, one member representing business, and one employee of a lending institution. The members of the Board administer the provisions of licensure and issuance, reissuance, suspension, or revocation of licenses of environmental professionals and are supported by staff from the Department of Energy and Environmental Protection.

The Connecticut Department of Energy and Environmental Protection, acting on behalf of the Board of Examiners of Environmental Professionals, contracted with a vendor to develop, score, and administer the Licensed Environmental Professional (LEP) examination.

Purpose of the Candidate Guide
The purpose of this Candidate Guide is to provide you with background information on examination development and to provide you with sample test questions similar to those on the LEP examination. Though this Candidate Guide does not guarantee your success in passing the examination, it does provide pertinent information that should enhance your performance on the examination.

Examination Development
The development of a valid examination for LEPs began with a job analysis—a clear and concise definition of the knowledge, skills, and abilities needed for competent job performance. Using interviews, group discussions, surveys, and accepted analytical procedures, the vendor worked with experts in the field to delineate critical job components. This job analysis was used as the basis for the questions in the examination.

Examination Content
The 1997 LEP Job Analysis Study identified five performance domains for practice in the field. Within each performance domain are several identified tasks which provide the basis for questions in the examination. Following is a brief outline of those domains and the tasks which fall under each domain.

Domain 1: Site Characterization and Interpretation
Number of Questions on Exam: 71

Researching and Inspecting Environmental Settings
Evaluating the Likelihood of Site Contamination
Developing Models of Migration Pathways to Design a Phase II Investigation
Selecting Appropriate Investigative Techniques to Determine Contaminants
Collecting and Analyzing Data Regarding the Presence of Contaminants
Designing Phase III Investigations to Define the Nature and Extent of Contamination
Conducting Phase III Investigations by Collecting and Analyzing Data
Comparing Results of Phase III Investigations to RSRs to Determine Compliance

Domain 2: Remedy Selection and Implementation
Number of Questions on Exam: 34

Identifying Remedial Action Goals and Selecting Remedial Strategies
Screening Potential Remedial Strategies
Evaluating the Feasibility of Promising Remedial Strategies
Filling Data Needs to Allow Selection of the Final Remedy
Selecting the Final Remedy
Collaborating with Other Professionals to Achieve the Remedy
Monitoring the Remedy's Implementation

Domain 3: Performance Evaluation
Number of Questions on Exam: 13

Monitoring Performance of the Remedy to Determine if it is Functioning as Intended
Monitoring Environmental Media to Determine if Remedy is Progressing Toward Goals
Modifying the Remedy as Necessary to Enhance Performance

Domain 4: Verification
Number of Questions on Exam: 11

Determining if Investigations have been Performed in Accordance with Prevailing Standards
Determining if Sites have been Remediated in Accordance with RSRs
Verifying that Investigations have been Performed and no Further Action is Needed

Domain 5: Professional Responsibility
Number of Questions on Exam: 21

Pursuing Professional Development to Maintain Continuing Competence
Adhering to Rules of Professional Conduct for LEPs
Performing Only Necessary Activities to Avoid Excessive or Duplicative Activities

Sample Examination Questions
The questions on the LEP examination were developed from the tasks identified in the 1997 Job Analysis Study. Multiple sources were utilized in the development of questions for the test. Each question is linked to one of the job analysis task statements as well as the knowledge and skills identified for each task statement. A brief summary of the tasks are listed in this candidate guide under Examination Content. For a complete list of tasks and related knowledge and skills please send your request to Elizabeth.mcauliffe@ct.gov to receive the 1997 LEP Job Analysis Study.

Questions on the test are designed to assess your recall of factual information, your ability to apply information to solve problems, and your ability to analyze problems. Some questions require calculations. Others require you to read drawings, tables of information, etc., to derive the correct response. You will be provided with a calculator, a ruler, a copy of the Remediation Standard Regulations ("RSRs"), a copy of Table 3 of the Connecticut Water Quality Standards, and a table of chemical properties.

Following are sample questions which are similar to those you will find in the LEP exam. These questions, however, are not necessarily representative of the breadth, variety, and degree of difficulty of questions on the examination.

1. Which compound typically travels fastest in ground water?

   A. Ethylbenzene
   B. Xylene
   C. MTBE
   D. Benzene

2. Remedial progress monitoring of an SVE system typically includes all of the following **EXCEPT**:

   A. Soil contaminant concentrations.
   B. Dissolved ground water contaminant concentrations.
   C. System vacuum readings.
   D. Exhaust vapor concentrations.

3. All of the following are examples of *in situ* control measures that prevent the further spread of contaminants in ground water through physical or hydrodynamic barriers **EXCEPT**:

   A. Installation of a slurry wall.
   B. Implementation of a dewatering system to lower water below the zone of contamination.
   C. Installation of pumping/injection wells to capture the ground water plume.
   D. Injection of nutrients and oxygen.

4. A soil vapor extraction system is installed to remediate a 20 lb. release of PCE. Approximately 10 lb. of PCE were removed during the first year. From system start-up, when will all 20 lb. be removed using only a soil vapor extraction system?

   A. Within 2-3 years
   B. Within 4-5 years
   C. Within 10-12 years
   D. Never

5. One of the main reasons for conducting a treatability study to evaluate a remedial alternative is to obtain data to:

   A. Estimate the duration of remediation.
   B. Define the secondary contaminant.
   C. Determine the need for remediation.
   D. Estimate the volume of media requiring treatment.

6. A release-specific dilution factor may be calculated for all of the following substances in a GB area **EXCEPT**:

   A. Inorganics or PCB.
   B. Total petroleum hydrocarbons.
   C. Semivolatiles, PCB, and pesticides.
   D. 1,2-dichlorobenzene, ethylbenzene, toluene, and xylenes.

7. An ETPH release in a residential GA area was remediated by excavation which extended to the seasonal low water table. Following the excavation, representative samples of the sidewall were taken and the results were as follows:

Sample #	Result
1	22 mg/kg
2	ND<2 mg/kg
3	50 mg/kg
4	125 mg/kg
5	100 mg/kg
6	82 mg/kg
7	550 mg/kg
8	10 mg/kg

The **MOST** appropriate conclusion to reach from these data regarding compliance with the GAPMC is that compliance is:

A. Not met because the sample size is less than 10.
B. Not met because one sample exceeds the criterion.
C. Met because the mean value of all results at the 95% upper confidence level is less than the criterion.
D. Met because only one sample exceeds the criterion by less than twice the maximum level.

8. You have completed a soil remediation activity in a GA area and are now monitoring ground water as required in the RSRs. You have generated four quarters of ground water data; in one quarter concentrations were above background data while in three quarters concentrations were in compliance with background data and your client insists that you can now stop monitoring. As an LEP, your **BEST** response is:

A. "Yes, the site now complies with the RSRs."
B. "No, you need to collect at least two more rounds of sample data."
C. "No, you must continue to monitor ground water until you have four quarters below background data over a two-year period."
D. "No, you must generate four more quarters of data equivalent to background conditions."

9. A ground water plume has been characterized. The principal contaminant of concern is hexavalent chromium. A pump test has been designed to evaluate ground water recovery and treatment as a remedial option. Which parameter is **MOST** critical in determining the number and spacing of recovery wells?

A. Well yield
B. Specific capacity
C. Zone of influence
D. Coefficient of transmissivity

10. What hydrogeologic condition is **MOST** suitable for implementation of air sparging?

A. Lodgement till
B. Glacial outwash
C. Fractured bedrock
D. Varved lacustrine deposits

11. There has been a release at a gasoline station in a GB area where groundwater was observed at 5 feet below grade. Given the soil data provided below, which of the following statements are true?

Data Set:

Boring	(depth)	ETPH mg/kg	Benzene mg/kg
B-1	0-2'	700	0.1
B-2	6-8'	2800	0.1
B-3	6-8'	2600	200.0
B-4	2-4'	2500	0.2
B-5	2-4'	2600	400.0

A. Exceedance(s) of the direct exposure criteria in boring B-1
B. Exceedance(s) of the pollutant mobility criteria in boring B-2
C. Exceedance(s) of the direct exposure criteria in boring B-3
D. Exceedance(s) of the pollutant mobility criteria in boring B-4
E. Exceedance(s) of the direct exposure and pollutant mobility criteria in B-5

A) A, B, and E
B) C, D, and E
C) A, C, and E
D) A and B

12. Four separate drainage basins have identical physical characteristics but are underlain by different geologic materials. Which geologic materials would result in a basin with the highest Q99 stream flow?

A. Till
B. Massive crystalline bedrock
C. Varved glaciolacustrine deposits
D. Stratified drift

13. An aquifer has storativity of 0.20, transmissivity of 5,000 gpd/ft, and thickness of 38 feet. What is the hydraulic conductivity of the aquifer if the pumping rate is 23 gallons per minute and the recovery well is pumped for five days?

A. 1.3×10^2 gpd/ft^2
B. 2.6×10^1 gpd/ft^2
C. 6.6×10^2 gpd/ft^2
D. 1.5×10^4 gpd/ft^2

14. Ground water contaminated with VOCs is to be treated by tray aeration discharged to a sanitary sewer. Which of the following **MUST** be considered in finalizing the design of the treatment process?

A. Residents with private wells in the area
B. Residents downwind of the site
C. A construction crew working on site
D. People fishing in the stream to which ground water naturally discharges

15. You have completed 4 quarters of groundwater monitoring as required in the RSRs in a GB area where no potable wells are present, and the results were similar to the fourth sampling event as follows.

Data Set:

Sample	(screened interval)	PCE µg/L	TCE µg/L	Vinyl Chl.
MW-1S	7-12'	ND	1.5	ND
MW-1M	15-20'	18	52	6.3
MW-1D	25-30'	7.7	6	0.5
MW-2	10-15'	ND	ND	ND
MW-3	10-15'	ND	3.0	ND

Based on the data, which of the following actions would be BEST to achieve compliance for groundwater:

A. Additional monitoring of MW-1S, MW-1M, MW-1D and MW-3
B. Record an Environmental Use Restriction prohibiting residential activities
C. No further action required; the plume is in compliance with the RSRs
D. Install a sub-slab depressurization system beneath the building

Answers to Sample Examination Questions

1.	C	Dom. 1	6.	A	Dom. 1	11.	C	Dom. 1
2.	A	Dom. 3	7.	B	Dom. 4	12.	D	Dom. 2
3.	D	Dom. 2	8.	C	Dom. 1	13.	A	Dom. 1
4.	D	Dom. 2	9.	C	Dom. 2	14.	B	Dom. 2
5.	A	Dom. 2	10.	B	Dom. 2	15.	C	Dom 1

Examination Registration
Applications are available on the Connecticut Department of Energy and Environmental Protection's website. The State Board of Examiners of Environmental Professionals review the applications and determine eligibility for entrance to the examination. The Board notifies applicants as soon as possible of their status. Please note that the examination is administered in accordance with regulations adopted pursuant to Section 22a-133v of the Connecticut General Statutes.

Examination Rules
Candidates must present their admission ticket and a photo identification card to be admitted to the examination. Candidates should arrive at the test site at least thirty minutes prior to the beginning of the examination. Late candidates may not be admitted.

The examination will be administered on computer at a proctored location. The examination contains multiple-choice questions and will be given in two parts, each of equal length. The overall examination contains 150 questions (each part contains 75 questions). Candidates must indicate their answers on the computer generated exam.

The Remediation Standard Regulations, the Environmental Use Restriction Regulations, Water Quality Standards, and a table of chemical properties will be provided as attachments tabbed in the electronic exam. A calculator is built into the tool bar. Scrap paper or a dry erase board will be provided by the proctor. No books, papers, or other reference materials may be taken into the examination room. An area will be provided for storage of such materials. Visitors are not allowed in the examination room (including children).

No examination materials, documents, or memoranda of any type may be taken from the room by any candidate.

The examination will be given only on the date and time noted on the admission ticket. If an emergency arises, and you are unable to take the examination as scheduled, you may call the examination site telephone number listed on your Admission Ticket. No refunds will be given.

No questions concerning the content of the examination may be asked during the examination period. Candidates should listen carefully to the directions given by the proctor.

Examination Date
The LEP Examination will be administered annually, typically in May. The examination will be offered at several proctored locations in Connecticut, as well as throughout the region and the country. Be sure to registered with the vendor for the location of your choice.

Scoring
The vendor will score all examinations and mail score reports to each examination candidate. This process takes approximately one month.

The passing point is determined by a criterion-referenced approach called the Angoff Modified Technique. Criterion-referenced examinations are quota-free with regard to passing percentages. The passing point is fixed to ensure that all candidates achieve the same score in order to be granted licensure.

Examination References

The following references may be helpful to you as you prepare for the LEP examination. Please note that this is not a comprehensive list of all materials used to validate the examination.

Connecticut Department of Energy and Environmental Protection. (2021). *Remediation Standard Regulation.* Hartford, CT: Regulations of Connecticut States Agencies, Section 22a-133k-1 to 22a-133k-3 and 22a-133q-1.

Connecticut Department of Energy and Environmental Protection. (2011). *Site Characterization Guidance Document*. Hartford, CT: State of Connecticut Department of Environmental Protection.

Connecticut Department of Energy and Environmental Protection. (2013). *Water Quality Standards*. Hartford, CT: State of Connecticut Department of Energy and Environmental Protection.

Connecticut Department of Energy and Environmental Protection. (2016). *State Board of Examiners of Environmental Professionals:* Hartford, CT: Regulations of Connecticut States Agencies 22a-133v-1—22a-133v-8.

Domenico, P.A. and Schwartz, F.W. *Physical and chemical hydrogeology.* New York, NY: John Wiley and Sons.

Driscoll, F.G. *Groundwater and wells.* St. Paul, MN: Johnson Filtration Systems, Inc.

Environmental Protection Agency. *Data quality objectives for remedial response activities. Example Scenario: RI/FS activities at a site with contaminated soils and ground water.* United States Environmental Protection Agency 540-G-87-004.

Fetter, C.W. *Applied hydrogeology.* Columbus, OH: Charles E. Merrill Publishing Co.

Freeze, R.A. and Cherry, J.A. *Groundwater*. Englewood Cliffs, NH: Prentice-Hall, Inc.

Helsel, D.R. and Hirsch, R.M. *Statistical methods in water resources.* New York, NY: Elsevier.

LaGrega, M.D., Buckingham, P.L., and Evans, J.C. *Hazardous waste management*. New York, NY: McGraw-Hill, Inc.

Nielsen, D.M. *Practical handbook of ground-water monitoring.* Chelsea, MI: Lewis Publishers, Inc.

Nyer, E.K. *Groundwater treatment technology. (2nd. Ed.).* New York, NY: Van Nostrand Reinhold Company.

Pankow, J.F. and Cherry, J.A. *Dense chlorinated solvents and other DNAPLs in groundwater.* Portland, OR: Waterloo Press.