MASTER CONTENT OUTLINE
FOR
LICENSED SITE PROFESSIONAL EXAMINATION

1. SITE ASSESSMENT (31%, 50 Items)

A. GATHER AND INTERPRET APPROPRIATE HISTORICAL AND VISUAL SITE INFORMATION

1. Ability to identify sources of information
   a. Insurance maps and site plans
   b. Deeds
   c. Photographs
   d. Historical business/site records
   e. MassDEP files and databases
   f. Regulatory (town and state) permits
   g. USGS/GIS/geologic maps
   h. Infrastructure records
   i. Existing site reports
   j. Zoning, master plans, and aquifer protection maps
2. Ability to conduct interviews
3. Ability to interpret historical site information
4. Ability to interpret observations at site

B. DETERMINE AFFECTED MEDIA

1. Knowledge of geology
   a. Soil types
   b. Depth of bedrock
   c. Types of bedrock
   d. Integrity of bedrock
2. Knowledge of hydrogeology
   a. Types of aquifers
   b. Presence of aquitards
   c. Depth of groundwater
   d. Direction of groundwater flow
   e. Rates of groundwater flow
   f. Groundwater discharge points
   g. Groundwater recharge points
   h. Presence of preferred pathways
   i. Groundwater withdrawal points
3. Knowledge of surface hydrology
   a. Precipitation characteristics
   b. Topographical characteristics
   c. Runoff and erosion
   d. Sediment transport and deposition
   e. Flow rate and dilution
   f. Infiltration rate
4. Knowledge of chemistry and biochemistry

a. Physical properties of oil and hazardous materials
    (1) Density
    (2) Specific Gravity
    (3) Solubility
    (4) Viscosity
    (5) Volatility
    (6) Henry's Law
b. Chemical properties of oil and hazardous materials
    (1) Reactivity
    (2) Flammability
    (3) Corrosivity
    (4) Partition coefficients
    (5) Degradation
    (6) Speciation
    (7) Oxidation reduction

5. Knowledge of underground storage tanks
    a. Common construction materials
    b. Corrosion processes
    c. Leak detection methods
    d. Age/integrity relationships
    e. Operation and maintenance
    f. Common failure or release modes
6. Knowledge of common industrial practices
    a. Gas stations and petroleum storage industry
    b. Dry cleaners
    c. Electroplaters
    d. Machining
    e. Solvent cleaning
7. Knowledge of disposal practices
    a. Dumps
    b. Landfills
    c. Cesspools
    e. Septic fields
    f. Injection wells
    g. Floor drains
    h. Sewers and storm drains
    i. Stack emissions
    j. Road spray
    k. Waste tanks
    l. Non-point sources
8. Knowledge of fate and transport processes
    a. Air
    b. Surface water
    c. Groundwater
    d. Soil
    e. Sediment

f. Bioconcentration
g. Soil gas
h. Non-aqueous phase liquids

9. Knowledge of biota
   a. Stressed vegetation
   b. Food-chain transfers

C. DETERMINE SAMPLING AND SITE EXPLORATION PLAN

1. Ability to develop and utilize conceptual site models
   a. Source identification
   b. Nature, degree and extent
   c. Risk characterization
   d. Remedial design
   e. Data quality objectives
2. Ability to develop appropriate spatial and temporal monitoring plans
   a. Number of sampling locations
   b. Sampling frequency
   c. Sampling analytes
3. Knowledge of drilling techniques
   a. Hollow stemmed auger
   b. Drive and wash
   c. Air rotary
   d. Rotosonic
   e. Mud rotary
   f. Microwells
   g. Direct push technology
4. Knowledge of well construction
   a. Construction materials
   b. Screened interval
   c. Well diameter
   d. Well packing and sealing
   e. Well development
   f. Well abandonment
   g. Well security
   h. Depth
5. Knowledge of sampling techniques and procedures
   a. Bailers
   b. Pumps
   c. Split spoon samplers
   d. Hand augers
   e. In-situ techniques
   f. Cores
   g. Soil gas probes
   h. Air/soil gas canisters/containers
   i. Sorption tubes
   j. Biota
   k. Composite sampling vs. discrete sampling vs. incremental sampling

l. Random vs. judgmental sampling
m. Decontamination procedures
n. Sample disposal
o. Low-flow sampling
p. Diffusion sampling techniques
q. Water level measurements
r. NAPL measurements
s. Incremental Sampling Methodology (ISM)
t. Pressure differential determination

6. Knowledge of sample handling procedures
   a. Sample containers
   b. Sample preservation
   c. Sample storage
   d. Chain of custody procedures
   e. Holding time
   f. Sample quantity required
   g. Transportation
   h. Filtering
7. Ability to recognize signs of contamination

D. DETERMINE ANALYTES AND METHODS

1. Knowledge of chemical composition of common OHM mixtures
   a. Petroleum products
   b. Waste oil
   c. Manufactured gas plant waste
   d. Plating waste
   e. Landfill leachate
   f. Coal tar
   g. Radioactive materials
2. Knowledge of testing methods
   a. Gas chromatography
   b. Gas chromatography/mass spectroscopy
   c. Infrared spectroscopy
   d. Petroleum analytical methods including VPH/EPH and residual saturation
   e. Applicability of different testing methods
   f. Limitations of different testing methods
3. Knowledge of screening techniques
   a. Headspace
   b. Immunoassay
   c. Colorimetric
   d. pH/conductivity/temperature
   e. X-ray fluorescence
   f. Ultraviolet Fluorescence (UVF)
   g. Laser-Induced Fluorescence (LIF)
4. Knowledge of QA/QC practices
   a. Precision
   b. Accuracy

c. Lab/trip blanks
d. Matrix spikes
e. Reporting limits

5. Knowledge of data usability principles, procedures, and requirements
   a. data quality objectives
   b. Presumptive Certainty
   c. appropriate use/limitations of testing methods and method modifications
   d. utility and implications of QA/QC requirements and performance standards

E. EVALUATE/INTERPRET DATA

1. Ability to evaluate data representativeness
2. Ability to integrate data in a meaningful manner
3. Ability to determine adequacy of assessment
4. Ability to determine nature and extent of contamination
5. Ability to determine nature and extent of migration pathways
6. Ability to determine need for further assessment
7. Ability to determine background and local conditions
8. Ability to identify Substantial Release Migration
9. Ability to identify Critical Exposure Pathways

F. PERFORM RISK ASSESSMENT

1. Ability to identify/screen transport pathways, exposure points
   a. Air
   b. Water
   c. Soils
   d. Sediments
2. Ability to identify/screen exposure pathways
   a. Ingestion
   b. Inhalation
   c. Dermal
3. Ability to identify/screen receptors
   a. Human
      (1) Children
      (2) Adults
      (3) Groups of sensitive receptors (e.g., pregnant, elderly)
   b. Aquatic biota
   c. Terrestrial biota
4. Determination of exposure point concentrations
   a. Evaluation of hot spots
   b. Evaluation of non-detects
   c. Arithmetic averages
5. Knowledge of toxicology
   a. Substances of concern
      (1) Carcinogens
      (2) Non-carcinogens
      (3) Mutagens

(4) Teratogens
b. Effects
(1) Acute
(2) Subchronic
(3) Chronic

6. Knowledge of ecological risk assessment techniques
   a. Determination of complete and incomplete pathways
   b. Stage I screening
   c. Stage II comprehensive
7. Ability to identify current and foreseeable site uses
   a. Zoning
   b. Wetlands
   c. Land use
   d. Plans
   e. Ownership
8. Ability to communicate risk to the public effectively
9. Knowledge of human risk assessment methods and models
   a. Deterministic models
   b. Probabilistic models
   c. MassDEP short form risk assessment
10. Ability to determine need for and extent of risk reduction
    a. Pathway elimination
    b. Receptor relocation
    c. Contaminant reduction
    d. Estimation of cleanup targets
11. Ability to identify Imminent and Substantial Hazards
12. Ability to evaluate risks to public welfare

2. REMEDIATION (16%, 25 ITEMS)

A. IDENTIFY OBJECTIVES

1. Ability to interpret site and risk characterization

B. IDENTIFY AND EVALUATE ALTERNATIVES WHICH MEET OBJECTIVES

1. Knowledge of remediation techniques
   a. Excavation and removal
   b. Thermal desorption
   c. Chemical fixation
   d. Asphalt emulsion fixation
   e. Incineration
   f. Biological degradation
   g. Soil vapor extraction
   h. Sparging
   i. Air stripping
   j. Carbon adsorption
   k. Capping/containment and Engineering Barriers
   l. Chemical oxidation

m. Reactive walls
n. Groundwater extraction/hydraulic containment
o. Multi-phase extraction
p. Monitored natural attenuation
q. Remedial additives

2. Knowledge of remedial design considerations
   a. Technical limitations
   b. Regulatory limitations
   c. Economic/financial limitations
   d. Risk from remedial operations
3. Knowledge of permit requirements
4. Ability to perform cost effectiveness analysis
   a. Capital costs
   b. Operation and maintenance costs
   c. Benefits analysis

C. SELECT PREFERRED ALTERNATIVE

1. Ability to select appropriate alternative
2. Ability to justify selection

D. CONSTRUCT PREFERRED ALTERNATIVE

1. Knowledge of health and safety standards
2. Knowledge of basic construction techniques/constraints

E. OPERATE AND MAINTAIN PREFERRED ALTERNATIVE

1. Ability to specify appropriate monitoring parameters and frequencies
   a. Discharge effluent(s)
   b. Site media
   c. Mechanical systems

F. MONITOR AND DOCUMENT EFFICACY

1. Ability to evaluate effectiveness of remediation
   a. Ability to interpret monitoring data
   b. Comparison of actual performance to design performance
2. Knowledge of documentation requirements

G. TERMINATE REMEDIATION

1. Ability to interpret site data to document compliance with remediation objectives and cleanup requirements

3. NOTIFICATION REQUIREMENTS AND PROCEDURES (7%, 11 ITEMS)

A. DETERMINE REPORTING REQUIREMENTS FOR RELEASE

1. Ability to use and interpret MOHML
2. Knowledge of the reporting exemptions of the MCP
3. Knowledge of Adequately Regulated provisions
4. Ability to verify data
5. Knowledge of regulated media (e.g., groundwater vs. surface water)

B. DETERMINE WHETHER REPORTING THRESHOLD IS MET

1. Knowledge or reporting thresholds
   a. Quantities
   b. Concentration

c. Site conditions
2. Knowledge of notification timing
3. Knowledge of site characteristics (RCGW-1, etc.)
   a. Current use
   b. Proximity to groundwater and surface water resource areas
   c. Proximity to sensitive receptors

C. INFORM CLIENT OF APPROPRIATE NOTIFICATION PROCEDURES

1. Knowledge of whether client has duty to report
   a. Determine whether client is potentially responsible party (e.g., owner or operator)
   b. Determine whether client is otherwise required to report (e.g., fiduciaries, utilities)
2. Knowledge of notification requirements, procedures and forms
   a. Type of notification (e.g., verbal, written)
   b. Which regional office to notify
   c. Off-hours notification procedures
   d. Which form(s) to use and eDEP filing procedures
   e. eDEP alternative filing procedure
   f. Timing for submittal of completed forms

D. DETERMINE LSP's NOTIFICATION REQUIREMENTS

1. Knowledge of imminent hazard requirements of LSP regulations
   a. Timing of notification to DEP
2. Knowledge of notification requirements for termination of LSP
   a. Definition of LSP of Record
   b. Timing of notification

4. RESPONSE ACTION REQUIREMENTS (15%, 24 ITEMS)

A. DETERMINE NEED FOR RISK REDUCTION MEASURES

1. Knowledge of LRA provisions
2. Knowledge of URAM provisions
3. Knowledge of RAM provisions
4. Knowledge of IRA provisions
5. Knowledge of Critical Exposure Pathway provisions

B. PERFORM APPROPRIATE RISK REDUCTION MEASURES

1. Knowledge of response action requirements and limits
   a. Quantities of remediation waste
   b. Objectives and restrictions of specific risk reduction measures
   c. Financial assurance
2. Knowledge of plans, status reports, completion reports and forms
   a. Requirement for
   b. Timing
   c. Type of approvals
   d. Submittal requirements

C. UNDERTAKE PRELIMINARY RESPONSE ACTIONS

1. Knowledge of required investigations and reports
   a. Determine whether a Phase I report is necessary
   b. Content of Phase I report
2. Knowledge of time frame
3. Knowledge of resulting options
   a. Permanent Solution
   b. Requirement for Tier Classification
4. Knowledge of Downgradient Property Status
   a. Generation and evaluation of empirical lines of evidence
      (1) hydrogeological
      (2) contaminant releases and media concentrations
      (3) analytical test data/forensics
   b. Discussion and articulation of weight-of-evidence opinion

D. TIER CLASSIFY

1. Knowledge of Tier Classification Process
   a. Massachusetts Geographic Information Systems (GIS) maps
   b. Tier I criteria
   c. Public and Written Notice requirements
   d. Eligible Persons and Tenants

E. FOLLOW APPROPRIATE TIER REGULATIONS

1. Knowledge of Tier ID requirements
2. Knowledge of Tier reclassification requirements and process
3. Knowledge of Tier extension process

F. CONFORM TO COMPREHENSIVE RESPONSE ACTION REQUIREMENTS

1. Knowledge of required investigation and reports
   a. Phase II: Comprehensive Site Assessment
      (1) Determine whether a Phase II report is necessary
      (2) Content of Phase II report
      (3) Knowledge of time frame
      (4) Knowledge of resulting options
         (a) Permanent Solution
         (b) Requirement for Phase III
   b. Phase III: Comprehensive Feasibility Study
      (1) Determine whether a Phase III report is necessary
      (2) Content of Phase III report
      (3) Knowledge of time frame
      (4) Knowledge of resulting options
         (a) Permanent or Temporary Solution
         (b) Requirement for Phase IV
   c. Phase IV: Comprehensive Remedial Actions
      (1) Determine whether a Phase IV report is necessary
      (2) Content of Phase IV report
      (3) Knowledge of time frame

(4) Knowledge of resulting options
(a) Permanent or Temporary Solution
(b) Requirement for Phase V

d. Phase V: Operation and Monitoring
(1) Content of Phase V report
(2) Knowledge of time frame
(3) Knowledge of resulting options
(a) Permanent or Temporary Solution
(b) Phase V Operation and Maintenance
(c) Re-evaluate need for additional response actions
(d) Remedy Operation Status applicability and requirements

2. Knowledge of conditions that require reclassification

5. RESPONSE ACTION STANDARDS (15%, 24 ITEMS)

A. USE APPROPRIATE METHOD TO DETERMINE AND/OR ACHIEVE NO SIGNIFICANT RISK"

1. Knowledge of applications and limitations of Methods 1, 2 and 3
2. Ability to apply Method 1 standards
   a. Knowledge of soil classification categories
   b. Knowledge of groundwater classification categories
3. Ability to develop and then apply Method 2 standards
   a. Knowledge of fate and transport processes and mathematical model
   b. Knowledge of Method 2 ceiling concentrations
4. Ability to conduct or interpret Method 3 risk characterization
   a. Knowledge of DEP guidance documents
   b. Knowledge of MCP risk management standards
5. Knowledge of Method 3 Ceiling Limits and their applicability
6. Knowledge of performance standards to achieve Temporary or Permanent Solution

B. COMPLY WITH RESPONSE ACTION PERFORMANCE STANDARD (RAPS)

1. Ability to demonstrate appropriate standard of care

C. DETERMINE WHETHER PERMANENT OR TEMPORARY SOLUTION IS ACHIEVED

1. Knowledge of performance standards to achieve temporary or permanent solution Source Elimination or Control
   a. Migration Control
   b. NAPL
   c. Background Levels of OHM
   d. Active Exposure Pathway Mitigation Measures
2. Knowledge of Categories of Permanent Solution
3. Knowledge of Activity and Use Limitations (AULs)
   a. When AULs are required
   b. When AULs are allowed

c. Type, content and formats of AULs
d. How to modify or remove AULs
e. Filing and notification requirements

4. Knowledge of temporary solution requirements
   a. Periodic evaluation of site conditions, technologies and exposures
   b. Feasibility of achieving permanent solution
5. Knowledge of requirements to determine feasibility of restoration to or approaching background
6. Knowledge of regulatory provisions for remedial actions conducted after a Permanent or Temporary Solution has been achieved

D. COMPLY WITH REMEDIATION WASTE, REMEDIAL WASTE WATER, AND REMEDIAL AIR EMISSIONS MANAGEMENT STANDARDS

1. Knowledge of applicability
2. Knowledge of classification criteria
3. Knowledge of storage/disposal deadlines
4. Knowledge of tracking/BOL criteria
5. Knowledge of disposal/recycling alternatives, requirements and limitations
   a. On-site
   b. Off-site
   c. Testing criteria
   d. Record keeping and reporting

E. COMPLY WITH HEALTH AND SAFETY REQUIREMENTS

1. Knowledge of worker health and safety issues and standards
   a. Familiarity with federal laws and regulations
   b. Familiarity with state laws and regulations
   c. Personal protective equipment
2. Knowledge of public health and safety issues and standards
   a. Potential receptors
   b. Pathways
   c. Mitigation techniques
3. Knowledge of monitoring techniques

6. SUBMITTAL REQUIREMENTS (5%, 8 ITEMS)

A. UTILIZE APPLICABLE DEP FORMS

1. Knowledge of when forms are required
2. Knowledge of which forms are required
3. Knowledge of electronic submittal procedures
4. Ability to complete forms properly

B. COMPLY WITH REPORTING AND SUBMITTAL FORMATS

1. Knowledge of content and format of required report submittals

C. COMPLY WITH REPORTING AND SUBMITTAL SCHEDULES

1. Knowledge of reporting requirements and schedules

D FEES

1. Knowledge of when fees are required

2. Knowledge of fees

7. PUBLIC INVOLVEMENT REQUIREMENTS (3%, 5 ITEMS)

A. NOTIFY APPROPRIATE PARTIES PER REGULATIONS

1. Ability to advise client of public involvement requirements
   a. Identify appropriate parties
   b. Knowledge of format and timing of required notification

B. COMPLY WITH PUBLIC INVOLVEMENT PLAN (PIP) PROVISIONS IF APPLICABLE

1. Ability to advise client of PIP requirements
   a. Knowledge of when PIP applies
   b. Knowledge of PIP process

8. STATUTES AND REGULATIONS (3%, 5 ITEMS)

A. COMPLY WITH MGL c. 21E and 21A, sections 19 through 19J

1. Knowledge of administrative sanctions
2. Knowledge of civil sanctions
3. Knowledge of criminal sanctions

B. COMPLY WITH APPROPRIATE FEDERAL REGULATIONS

1. Ability to advise client as to applicability of federal regulations that pertain to response actions
   a. NPDES
   b. RCRA
   c. TSCA
   d. CERCLA

C. COMPLY WITH APPROPRIATE STATE REGULATIONS

1. Ability to advise client as to applicability of state regulations that pertain to response actions
   a. Wetlands
   b. Groundwater discharge permits
   c. Underground injection control
   d. Underground storage tanks
   e. Sewer extension/discharge permits
   f. Air quality

9. LSP STANDARDS OF PROFESSIONAL CONDUCT (5%, 8 ITEMS)

A. ADDRESS CONFLICTS OF INTEREST

1. Ability to identify potential conflicts of interest
2. Knowledge of how to resolve conflicts of interest

B. ADDRESS ISSUES OF PROFESSIONAL RESPONSIBILITY

1. Knowledge of situations requiring client notification
2. Knowledge of limited confidentiality rules
3. Knowledge of ethical standards for business or professional practices

C. ADDRESS ISSUES OF PROFESSIONAL COMPETENCE

1. Knowledge of criteria for rendering Opinions

D. COMPLY WITH LSP BOARD'S RULES OF PROFESSIONAL CONDUCT

1. Knowledge of LSP Board's Rules of Professional Conduct
2. Knowledge of LSP Board's advisory rulings
3. Knowledge of Definitions (309 CMR 2.02)