

CEM EXAM TOPICS (Revised 08/2009)

The following list provides prospective CEMs with a guideline for the scope of the multiple choice 4-hour CEM exam. We have provided references where applicable and appropriate, however, we assume that for most topics, prospective CEMs have access and are familiar with any relevant NDEP and US EPA guidance that addresses that topic.

- I. UST/AST
 - a. State Petroleum Fund
 - i. NAC 590.700 – 790
 - ii. Cost guidelines : http://ndep.nv.gov/bca/pet_fund_cost_guideline.htm
 - iii. Resolutions: <http://ndep.nv.gov/bca/fundhome.htm>
 - b. State and Federal UST/AST regulations
 - i. 40 CFR 280
 - ii. NAC 459.9921 - 445.9995
- II. Remediation
 - a. Documents
 - i. EPA document titled [*How to Evaluate Alternative Cleanup Technologies for Underground Storage Tanks*](#), US EPA 510-R-04-002, May 2004
 - b. NAC 459.9973 (a-k)
 - c. NAC 445A.226-227 (action levels)
 - d. NAC 459.973-9743 (Voluntary Cleanup Program)
- III. Nevada Geology and hydrogeology (see reference websites at bottom of document)
- IV. RCRA
 - a. 40 CFR
 - i. 261
 - ii. 262
 - iii. 264 (Subpart B-F, I, J)
 - iv. 265 (Subpart B-F, I, J),
- V. Emergency Response
 - a. Use of Emergency Response Guidebook
 - b. NV spill response notification requirements NAC 445A.345-347
 - c. [NDEP Guidelines for Discovery Events](#)
- VI. General understanding of the following federal laws: TSCA, FIFRA, NEPA, CWA, CERCLA, SDWA, CAA
 - a. Overall purpose
 - b. Types of media and/or chemicals each covers.
- VII. Health and Safety, PPE
 - a. Procedures
 - b. Levels
 - c. Types of equipment
 - d. Decontamination
- VIII. Wells
 - a. Types
 - b. Construction
 - c. Characteristics
 - d. NV regulations
 - i. NAC 445A.844-849

- ii. NAC 445A.856-858
 - iii. NAC 445A.891-896
- IX. Superfund Regulations
 - a. 40 CFR 302, 312, 355, 370
 - b. Purpose
- X. Certification Programs
 - a. Standards of Practice
 - b. NAC 459.970-9729
- XI. Risk Assessment and Toxicology
 - a. Purpose of risk assessments
 - b. When and how risk assessments are used
 - c. Be familiar with [ASTM Standard Guide for Risk Based Corrective Action Applied at Petroleum Release Sites, E 1739-95](#)
 - d. Familiarity with common toxicological terms (e.g. LD₅₀, dose response curve)
- XII. Sampling and Analysis
 - a. Field Equipment
 - b. Analytical methods
 - c. Field procedures
- XIII. Common types of projects in NV (Be able to describe how they would be completed, pertinent regulations, field issues, technical/scientific reason on why they are problems.)
 - a. petroleum cleanups
 - b. tank removals
 - c. sampling
 - d. mining issues
 - e. remediation
- XIV. Characteristics of common pollutants at NV site cleanups (what types of characteristics)
 - a. Fate and transport in the subsurface
 - b. Effective remediation techniques
 - c. Toxicity
- XV. AAI's/Phase I Environmental Site Assessments
 - a. What are they
 - b. When are they used
 - c. Topics within Phase I
 - d. 40 CFR 312
- XVI. Other
 - a. Basic math and geometry (volumes, areas, how to do unit conversions)
 - b. Use of USGS Topo Quads
 - c. [EPA's Basic Concepts in Environmental Science](#)

The exam will be given from 9:00am –1:00pm. The exam has a total of about 200 questions. The examination is **CLOSED BOOK**. There is only **ONE** correct answer for each question. Scientific calculators will be provided. No personal calculators will be allowed.

The above outline covers suggested areas of study for the exam and is NOT all inclusive.

Suggested Geology and Hydrogeology References:

<http://pubs.er.usgs.gov/usgspubs/wsp/wsp2220>

<http://www.epa.gov/swerust1/cat/sitchasu.pdf>

http://pubs.usgs.gov/sir/2006/5127/PDF/SIR2006_5127.pdf

<http://pubs.usgs.gov/sir/2006/5100/>

<http://pubs.usgs.gov/sir/2004/5131/sir2004-5131.pdf>

<http://pubs.er.usgs.gov/usgspubs/wri/wri964087>

<http://pubs.er.usgs.gov/usgspubs/wsp/wsp2320A>

<http://pubs.er.usgs.gov/usgspubs/wsp/wsp2320B>

http://pubs.er.usgs.gov/djvu/WSP/wsp_2220.pdf

http://www.dtsc.ca.gov/SiteCleanup/upload/SMP_Aquifer_Testing.pdf - AQUIFER TESTING

Water-Supply Paper 2220, USGS, http://pubs.er.usgs.gov/djvu/WSP/wsp_2220.pdf

How To Evaluate Alternative Cleanup Technologies For Underground Storage Tank Sites: A Guide For Corrective Action Plan Reviewers Chapter X In-Situ Groundwater Bioremediation and Chapter XII Enhanced Aerobic and Bioremediation. (EPA 510-B-94-003; EPA 510-B-95-007; and EPA 510-R-04-002). <http://www.epa.gov/swerust1/pubs/tums.htm>

[Ground Water Issue, Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies](http://www.epa.gov/nrmrl/pubs/540s02500/540s02500.htm), EPA 2002, EPA/540/S-02/500,
<http://www.epa.gov/nrmrl/pubs/540s02500/540s02500.htm>

<http://www.atsdr.cdc.gov/mrls/index.html>

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm#parameters

Interstate Technology & Regulatory Council Bioremediation of DNAPLs Team (2005) Overview of In Situ Bioremediation of Chlorinated Ethene DNAPL Source Zones. Washington, DC.

<http://www.itrcweb.org/Documents/BioDNAPL-1.pdf>

USEPA Drinking Water Contaminants.

<http://www.epa.gov/ogwdw/standard/setting.html>

<http://www.epa.gov/ogwdw/hfacts.html>