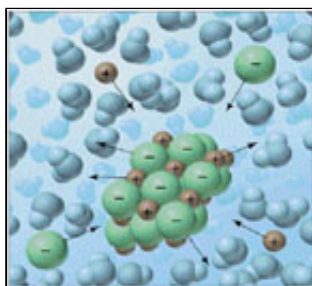


The Northwest Environmental Training Center

Presents:



Fundamental Contaminant Chemistry - A Review of Chemistry Principles Essential for Understanding Contaminant Behavior in the Environment

Course No. CHEM-403A

March 14, 2006, 8:30 A.M. to 5 P.M. (1 Day)

Mission Valley Resort

875 Hotel Circle South, San Diego, California

Instructor: Erick McWayne, Northwest Environmental Training Center

Description:

This course provides participants with an overview of key chemistry concepts associated with environmental contamination and provides a foundation for understanding contaminant transport and fate. This material is intended for environmental professionals who are not chemists, but who require a fundamental understanding of chemistry principles for their work. This course is recommended for all environmental professionals working with contaminated soil and water with minimal formal training in the subject. The course material will greatly enhance on-the-job training. It is also recommended for project managers seeking a review of the subject.

About the Instructor:

Mr. McWayne has extensive experience with soil, groundwater, and geophysical investigations for the characterization of contaminant transport and fate. As an environmental consultant, Mr. McWayne served as a project manager for remedial investigation and feasibility studies at numerous Department of Defense and other client sites, conducted environmental compliance audits, and performed pollution prevention audits and siting studies for electrical power plants. He currently serves as Executive Director of the Northwest Environmental Training Center and teaches workshops in transport and fate, environmental chemistry, and hydrogeology in Alaska, California, Idaho, Montana, Oregon, and Washington.

Course Topics:

Overview of Physical and Chemical Properties of Chemicals	Chemical Equilibrium, Kinetics, and Thermodynamics
Electronegativity and Electron Affinity	Empirical, Chemical, and Structural Formulas
Chemical Bonding	Mass-Based and Mole-Based Concentrations
Mono and Polyatomic Ions	Properties of Carbon and Organic Molecules
Solubility and Precipitation (Polarity and Bonding of Solvents and Solutes)	Functional Groups - Alcohols, Aldehydes, Amines, Aromatics, Ethers, Ketones, and Organometallics
Chemical Reactions	Organic IUPAC Nomenclature
Stoichiometry (balancing reactions)	BTEX - Benzene, Toluene, Ethylbenzene, and Xylene
Oxidation States and Oxidation-Reduction Reactions	Organic Reactions

This course is part of a series, and is immediately followed by the [Contaminant Chemistry and Transport in Soil and Groundwater Workshop](#), March 15 - 16, 2006. Attendees are encouraged to request both courses when registering. Courses will begin each day at 8:30

A.M. and end at 5 P.M. Attendees will be given the opportunity to apply the course material during hands on exercises offered throughout the course.

After completing this course, participants will be able to:

- Apply chemistry principles to environmental issues
- Describe ionic and covalent chemical bonding
- Understand chemical solubility in polar and nonpolar solvents
- Identify common physical and chemical properties that affect chemical fate and transport in soil and water
- Express contaminant concentrations in terms of mass and moles
- Understand the concepts of chemical equilibrium, kinetics, and thermodynamics
- Describe the structure of common organic chemical contaminants using diagramming methods such as the condensed structural formula
- Identify and name simple organic chemicals using the International Union of Pure and Applied Chemistry nomenclature system

Prerequisites: Some college level chemistry is helpful, but not required.

Education Level: Introductory/Review

Continuing Education Units: 0.7

Course Materials: Each participant will receive a copy of the course proceedings including notes and reference material on the first day of the course.

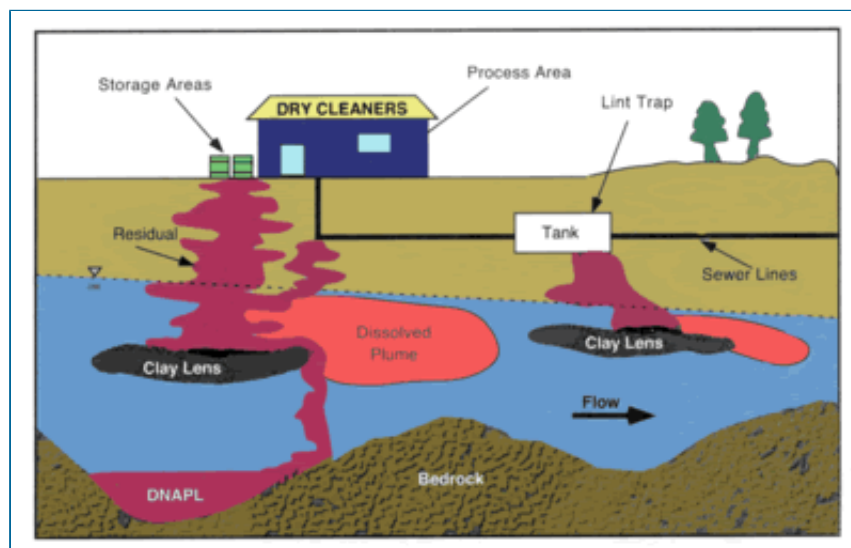
Tuition: \$195 (\$150 for Native American Tribes; nonprofits; government employees; students; and NAEP members).

What to Bring: Scientific calculator, mechanical pencil, coffee mug, and water bottle (to reduce waste). Please wear comfortable clothing appropriate for the prevailing weather.

Northwest Environmental Training Center, 501(c)(3)
Alaska - Idaho - Montana - Northern California - Oregon - Washington
650 S. Orcas Street, Suite 220, Seattle, WA 98108
www.nwetc.org, 206-762-1976

The Northwest Environmental Training Center

Presents:



Contaminant Chemistry and Transport in Soil and Groundwater

Course No. CHEM-403B

March 15 - 16, 2006, 8:30 A.M. to 5 P.M. (2 Days)

Mission Valley Resort

875 Hotel Circle South, San Diego, California

Instructor: Erick McWayne, Northwest Environmental Training Center

Description:

This course provides participants with an overview of key concepts essential to understanding environmental contamination and provides a fundamental understanding of the release and transport of chemicals in soil and groundwater. This material is intended for environmental professionals who are not chemists, but who require a fundamental understanding of contaminant behavior and monitoring parameters for their work. This course is recommended for all environmental professionals working with contaminated soil and water with minimal formal training in this subject. The course material will greatly enhance on-the-job training. It is also recommended for project managers seeking a review of the subject.

About the Instructor:

Mr. McWayne has extensive experience with soil, groundwater, and geophysical investigations for the characterization of contaminant transport and fate. As an environmental consultant, Mr. McWayne served as a project manager for remedial investigation and feasibility studies at numerous Department of Defense and other client sites, conducted environmental compliance audits, and performed pollution prevention audits and siting studies for electrical power plants. He currently serves as Executive Director of the Northwest Environmental Training Center and teaches workshops in transport and fate, environmental chemistry, and hydrogeology in Alaska, California, Idaho, Montana, Oregon, and Washington.

Course Topics:

Contaminant Chemistry Overview

- Functional Groups, Chemical Properties, and Hazards

Transport Mechanisms

- Advection
- Mechanical Dispersion
- Chemical Dispersion

Contaminant Solubility Rules

3- and 4-Phase Equilibrium Partitioning

- Adsorption and Absorption
- Definitions of K_d , K_{oc} , f_{oc} , K_{ow} , and K_H
- NAPL One Percent Rule
- Molar Fraction Calculations
- Contaminant Mass Fraction Calculation
- Residual Saturation Calculation
- Mechanical Dispersion
- Diffusion

Groundwater Transport

- Hydrogeology Review
- Three Point Problem
- Groundwater Velocity Calculations
- Retardation and Solute Velocity Calculations

Nonaqueous Phase Liquid (NAPL) Transport

- Capillary Fringe Interactions and Smear Zones
- Estimating LNAPL Thickness from Well Free Product
- Estimating DNAPL Critical Height

Vapor Transport

- Vapor Pressure, Solubility, Molecular Weight, and Vapor Density
- Contact Surface and Vapor Diffusion
- Vadose Zone and Air-Filled Porosity

Natural Attenuation

- Overview of Natural Attenuation Processes
- Biodegradation Pathways for Common Contaminants

Focus on Metals Contamination

- pH and Mobility
- Dissolved and Particulate Forms
- Cation Exchange
- Complexation, Chelation, and Ligands
- Hydrated Metals as Acids

Focus on Hydrocarbon Contamination

- Gasoline and Diesel Chemistry
- BTEX, Additives, and Other Potential Concerns
- Cosolution
- Plume Behavior
- Geochemical Indicators

Focus on Chlorinated Hydrocarbon Contamination

- Chlorinated Solvent Chemistry
- Reductive Dechlorination
- Plume Behavior
- Geochemical Indicators

Summary and Review

This course is part of a series and is preceded by the [Fundamental Contaminant Chemistry Workshop](#), March 14, 2006. Attendees are encouraged to request both courses when registering. Courses will begin each day at 8:30 A.M. and end at 5 P.M. Attendees will be given the opportunity to apply the course material during hands on exercises offered throughout the course.

After completing this course, participants will be able to:

- Understand basic soil and groundwater chemistry
- Calculate chemical partitioning
- Understand the significance of temperature, redox potential, pH, DO, and other monitoring parameters
- Apply soil chemistry principles to soil investigations
- Apply water chemistry principles to groundwater investigations
- Understand the chemical and biological aspects of natural attenuation
- Estimate partitioning coefficients and calculate solute average linear velocity
- Demonstrate an improved overall understanding of environmental chemistry

Prerequisites: Completion of [CHEM-403A - Fundamental Contaminant Chemistry](#) workshop, equivalent course work, or on the job experience.

Education Level: Introductory to Intermediate

Continuing Education Units: 1.5

Course Materials: Each participant will receive a copy of the course proceedings including notes and reference material.

Tuition: \$350 (\$295 for Native American Tribes; nonprofits; government employees; students; and NAEP members).

What to Bring: Scientific calculator, mechanical pencil, coffee mug, and water bottle (to reduce waste). Please wear comfortable clothing appropriate for the prevailing weather.

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www.nwetc.org, 206-762-1976



NORTHWEST ENVIRONMENTAL TRAINING CENTER

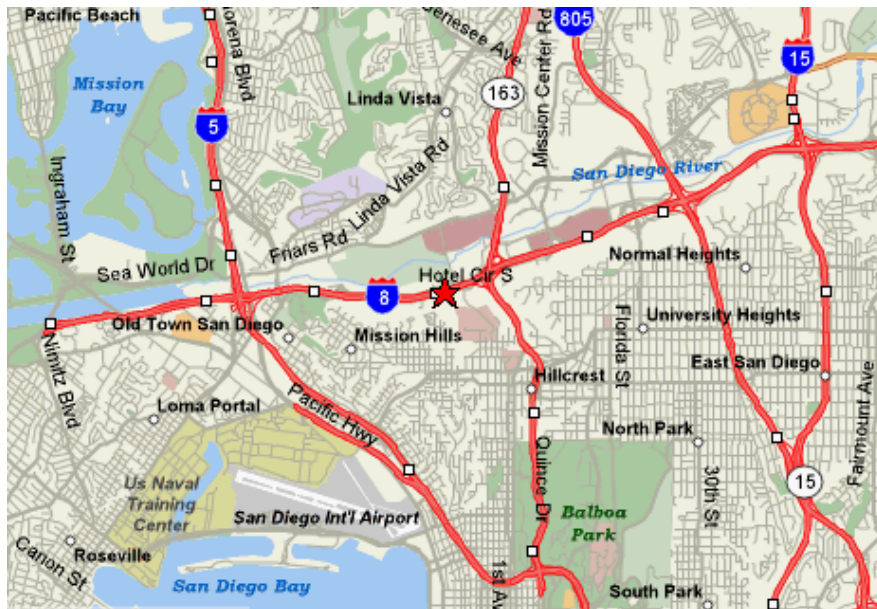
A Nonprofit 501(c)(3) Program of the Northwest Environmental Education Council
650 S. Orcas Street, Suite 220, Seattle, Washington 98108
206-762-1976, Fax: 206-762-1979, www.nwetc.org

Directions to:

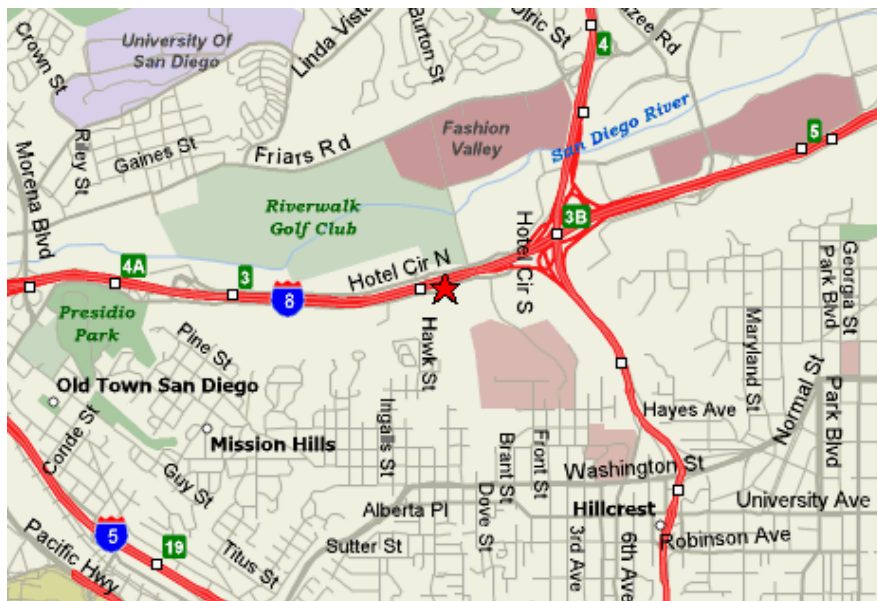
Mission Valley Resort
875 Hotel Circle South, San Diego, California

From Interstate-8 Eastbound: Exit Hotel Circle off-ramp - the Mission Valley Resort is directly in front of you.
From Interstate-8 Westbound: Exit Hotel Circle off-ramp. Turn right, go 1/2 mile around to Hotel Circle South - the Mission Valley Resort is on your left.

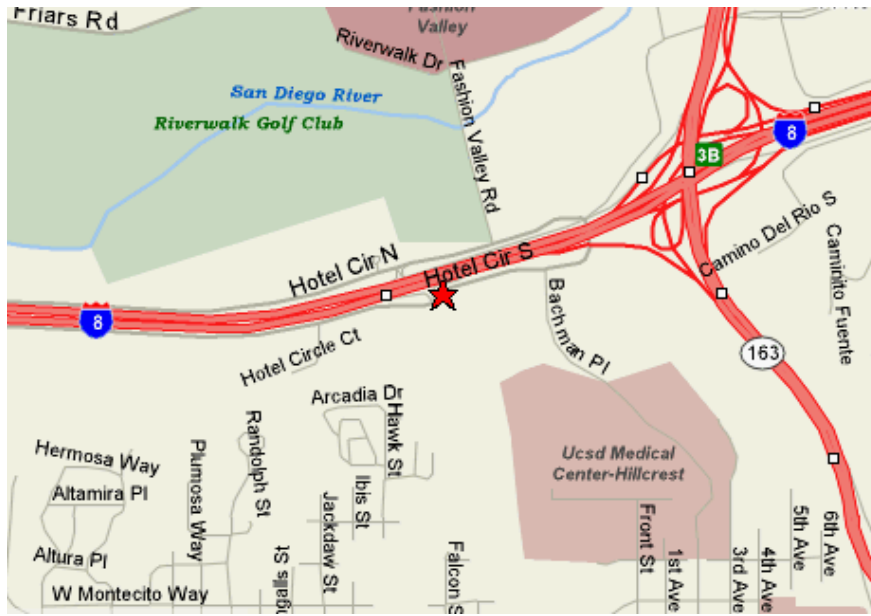
GREATER SAN DIEGO MAP



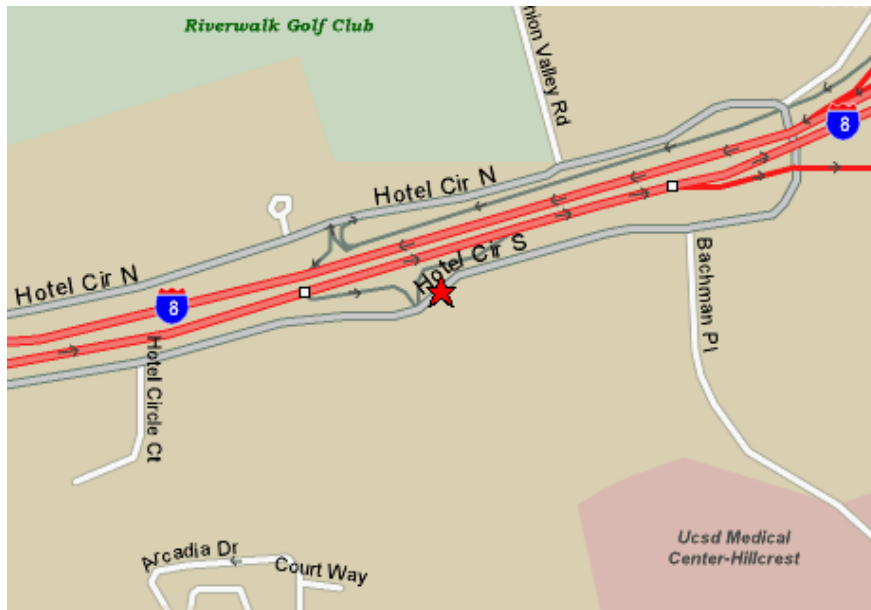
REGIONAL MAP



STREET MAP



VICINITY MAP



PARKING

Parking at the Mission Valley Resort is free.

Please feel free to call us at (206)762-1976, if you have any questions regarding directions.

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Accommodations Near:

Mission Valley Resort
875 Hotel Circle South, San Diego, California

Please feel free to call us at (206)762-1976, if you have any questions regarding lodging.

This workshop will be held at the Mission Valley Resort. Information for nearby hotels (within 1/4 mile) is also given based on distance from the Mission Valley Resort. Reservations should be made directly with the hotels.

Mission Valley Resort

875 Hotel Circle South
(800) 362-7871 (619) 298-8281

<http://www.missionvalleyresort.com/>

Notes: This is the location of the workshop.

Handlery Hotel and Resort

950 Hotel Circle North
(800) 843-4343 (619) 298-0511

<http://www.handlery.com/sd/home.html>

Vagabond Inn Hotel Circle

625 Hotel Circle South
(800) 571-2933 (619) 297-1691

<http://www.vagabondhc.com/>

Travelodge Mission Valley

1201 Hotel Circle South
(619) 297-2271

<http://www.missionvalleyhotel.com/>

Days Inn - Hotel Circle by SeaWorld

543 Hotel Circle South
(619) 297-8800

http://www.daysinn.com/DaysInn/control/Booking/property_info?propertyId=04192&brandInfo=DI

Kings Inn Hotel - SeaWorld/Zoo

1333 Hotel Circle South
(800) 785-4647 (619) 297-2231

<http://www.kingsinnsandiego.com/!/?ea9d33ec6bcccd91fb792cf248dfcf5f>

Super 8 Motel - San Diego SeaWorld/Zoo

445 Hotel Circle South
(619) 692-1288

http://www.super8.com/Super8/control/Booking/property_info?propertyId=13893&brandInfo=SE

Best Western Seven Seas

411 Hotel Circle South
(800) 328-1618 (619) 291-1300

<http://book.bestwestern.com/bestwestern/productInfo.do?propertyCode=0528>

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www.nwetc.org

REGISTRATION FORM

Name: _____ Today's Date: _____

Agency/Organization: _____

Street Address: _____ Mail Code: _____

Street Address (cont.): _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____

Email: _____ Title: _____

Indicate Course(s):

Fundamental Contaminant Chemistry Workshop (CHEM-403A) - \$195 (\$150*) \$ _____
March 14, 2006 at the Mission Valley Resort - San Diego, CA

Contaminant Chemistry and Transport Workshop (CHEM-403B) - \$350 (\$295*) \$ _____
March 15 - 16, 2006 at the Mission Valley Resort - San Diego, CA

*Reduced rate for Native American Tribes; nonprofits; government employees; students; and NAEP members.
An additional \$50 discount applies when registering for both classes (\$495/\$395*).

Payment Method: Check PO Credit Card (Visa or Mastercard) Total: \$ _____

Credit Card or PO #: _____ Exp: _____

Cancellation Policy:

Registration fees are fully refundable up 2 weeks prior to the event and 50 percent refundable thereafter up to the day prior to the event. Registration may occur up to the day prior to the event provided that space is available.