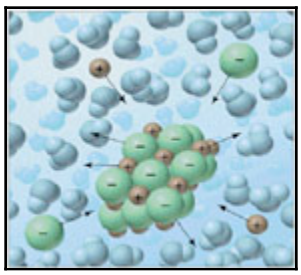
The Northwest Environmental Training Center presents:



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

Course I.D. CHEM-403A (Course 1 of 2 in a Series)
August 23, 2006, 8:30 A.M. to 5 P.M. (1 Day)
Ecotrust Conference Center
721 NW 9th Avenue, Portland, Oregon

Instructor: Erick McWayne, Northwest Environmental Training Center

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.

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, August 24 - 25, 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

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. He currently serves as Executive Director of the Northwest Environmental Training Center and teaches workshops in transport and fate, environmental chemistry, and hydrogeology across the country.

Education Level: Introductory/Review

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

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

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

Continuing Education Units: 0.7

Registration: $195 ($150 for Native American Tribes; nonprofits; government employees; students; and NAEP, NEBC, and NWAEP members). An additional discount applies when registering for both CHEM-403A and CHEM-403B. A registration form has been included with this PDF file. You may also register via phone by calling the Northwest Environmental Training Center at 206-762-1976.

To request futher information, please call us at 206-762-1976 or email us at info@nwetc.org.

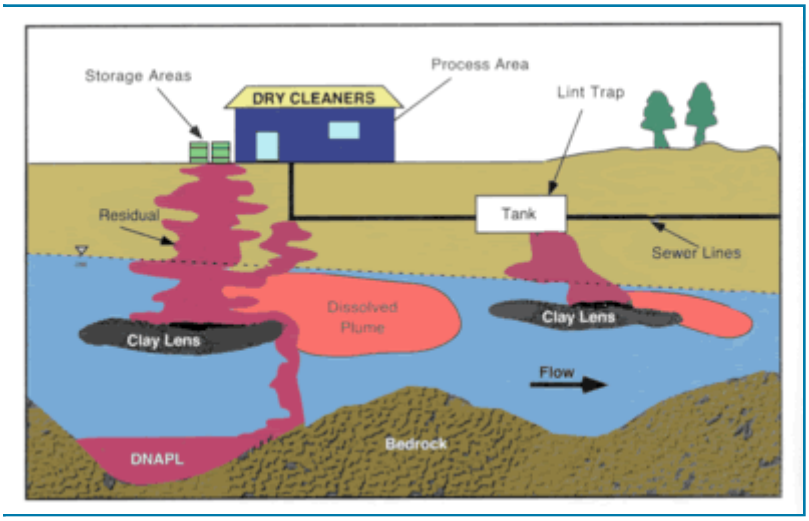
Northwest Environmental Training Center, *501(c)(3)*

Fostering an ecologically sustainable world through education

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 I.D. CHEM-403B (Course 2 of 2 in a Series)
August 24 - 25, 2006, 8:30 A.M. to 5 P.M. (2 Days)
Ecotrust Conference Center
721 NW 9th Avenue, Portland, Oregon

Instructor: Erick McWayne, Northwest Environmental Training Center

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.

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 *Kd, Koc, foc, Kow*, and KH

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

- NAPL One Percent Rule	- Cation Exchange
- Molar Fraction Calculations	- Complexation, Chelation, and Ligands
- Contaminant Mass Fraction Calculation	- Hydrated Metals as Acids
- Residual Saturation Calculation	**Focus on Hydrocarbon Contamination**
- Mechanical Dispersion	- Gasoline and Diesel Chemistry
- Diffusion	- BTEX, Additives, and Other Potential Concerns
Groundwater Transport	- Cosolvation
- Hydrogeology Review	- Plume Behavior
- Three Point Problem	- Geochemical Indicators
- Groundwater Velocity Calculations	**Focus on Chlorinated Hydrocarbon Contamination**
- Retardation and Solute Velocity Calculations	- Chlorinated Solvent Chemistry
Nonaqueous Phase Liquid (NAPL) Transport	- Reductive Dechlorination
- Capillary Fringe Interactions and Smear Zones	- Plume Behavior
- Estimating LNAPL Thickness from Well Free Product	- Geochemical Indicators
- Estimating DNAPL Critical Height	**Summary and Review**

This course is part of a series and is preceded by the Fundamental Contaminant Chemistry Workshop, August 23, 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

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. He currently serves as Executive Director of the Northwest Environmental Training Center and teaches workshops in transport and fate, environmental chemistry, and hydrogeology across the country.

Education Level: Introductory to Intermediate

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

Continuing Education Units: 1.5

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

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

Registration: $350 ($295 for Native American Tribes; nonprofits; government employees; students; and NAEP, NEBC, and NWAEP members). An additional discount applies when registering for both CHEM-403A and CHEM-403B. A registration form has been included with this PDF file. You may also register via phone by calling the Northwest Environmental Training Center at 206-762-1976.

To request futher information, please call us at 206-762-1976 or email us at info@nwetc.org.

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Fostering an ecologically sustainable world through education
650 S. Orcas Street, Suite 220, Seattle, WA 98108
www.nwetc.org, 206-762-1976

PORTLAND AREA HOTELS

The following are hotels within close proximity to the Ecotrust conference building. When booking rooms, please request the Ecotrust preferred rate, or enquire about business and government rates.

The Mallory

Ecotrust Preferred Rate, $60 (for their most basic room, rates go up from there.).
Toll Free: 800-228-8657
Local: 503-223-6311
Fax: 503-223-0522
info@malloryhotel.com
729 SW 15th Avenue at the Corner of SW 15th and Yamhill
Portland, Oregon 97205

The Mark Spencer (similar to the Mallory, w/kitchenettes)

Government Rate: $71//Corporate rate: $69
409 SW 11th Avenue & Stark Street, Portland, OR 97205
TEL: (503) 224-3293 FAX: (503) 223-7848
Toll Free US & Canada: (800) 548-3934
hospitality@markspencer.com

The Governor Hotel

Ecotrust Preferred Rate: $125
611 SW 10th at Alder
Portland, Oregon 97205
800-554-3456
503-224-3400
www.govhotel.com

DRIVING DIRECTIONS

From the North:

▶ I-5 South ▶ I-405 South
▶ Exit# 2B towards Everett Street
▶ Straight (South) on 16th Avenue
▶ Left onto NW Everett Street
▶ Left onto NW 9th Avenue

From the East/Airport
(11 miles, 23 minutes):

▶ Airport Way ▶ I-205 South
▶ I-84 West ▶ I-5 North
▶ I-405 Fremont Bridge
▶ Exit #2B towards Everett Street
▶ Straight (South) on 16th Avenue
▶ Left onto NW Everett Street
▶ Left onto NW 9th Avenue

From the South:

▶ I-5 North ▶ I-405 North
▶ Exit #2B
▶ Left (North) onto NW 14th Avenue
▶ Right onto NW Everett Street
▶ Left onto NW 9th Avenue

From the West:

▶ US-26 East (Sunset Highway)
▶ North on I-405 ▶ Exit #2B
▶ Left (North) onto NW 14th Avenue
▶ Right onto NW Everett Street
▶ Left onto NW 9th Avenue

FOR MORE INFORMATION, PLEASE CALL
503.227.6225

ecotrust

JEAN VOLLUM NATURAL CAPITAL CENTER
721 NW 9TH AVENUE, SUITE 200
PORTLAND, OREGON 97209
TEL 503.227.6225 | FAX 503.222.1517
WWW.ECOTRUST.ORG

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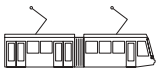
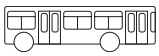
DIRECTIONS

721 NW 9TH AVENUE, PORTLAND, OREGON

Ecotrust's Jean Vollum Natural Capital Center is centrally located in Portland's Pearl district between NW 9th and 10th Avenues, and Irving and Johnson Streets. The Center is accessible by:



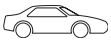
PORTLAND STREETCAR Running from Portland State University (PSU) through downtown and the Pearl district, the Portland Streetcar stops at the Natural Capital Center (exit at NW 10th Ave. and Johnson St.). Visit www.portlandstreetcar.org for more information.



TRI-MET BUS Ride the #77 Broadway to NW 9th & Hoyt and walk one block north. Visit www.tri-met.org for more information.

UNION STATION Within walking distance from the Center, Portland's Union Station services Amtrak trains from a variety of origins. From the station, walk south to NW Hoyt, turn right, walk west to NW 9th Ave., turn right, and walk one block to the Center. Visit www.amtrak.com for more information.

BICYCLE The Center has ample bike parking at the NW 10th Avenue entrance.



CAR There are public-pay lots available at NW 12th and Hoyt, NW 10th and Hoyt, NW 14th and Kearney, and NW 8th and Flanders, as well as on-street parking nearby. See directions at left.

NORTHWEST ENVIRONMENTAL TRAINING CENTER
650 S. Orcas Street, Suite 220, Seattle, Washington 98108
Ph: (206)762-1976, Fax: (206)762-1979
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) $ _____
August 23, 2006 at the Ecotrust Conference Center, Portland, Oregon. $195 ($150*)

Contaminant Chemistry and Transport Workshop (CHEM-403B) $ _____
August 24 - 25, 2005 at the Ecotrust Conference Center, Portland, Oregon. $350 ($295*)

*Reduced rates for Native American tribes; nonprofits; government employees; students; and NEBC, NAEP,NWAEP members. An additional $50 discount applies to all registrants when registering for both classes.

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

Credit Card or PO #: _____ **Exp:** _____

Cancellation:

Registration fees are fully refundable up to 30 days 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.