SEMINAL COURSE
EVALUATION OF INDOOR INHALATION PATHWAY

Who Should Attend

The course will benefit professionals from industry, consulting, and regulatory agencies who perform site investigations; oversee or review health risk assessments for remediation of contaminated sites; establish and negotiate environmental cleanup levels. The curriculum includes a comprehensive review of technical, regulatory, and state-of-the-practice issues related to this pathway.

Course Location, Date, and Time

The training will be held in Room 4D at the Alabama Power Corporate Headquarters at 600 18th Street N in Downtown Birmingham, AL, located at the intersection of 18th Street N and 6th Avenue N. Public parking is available on 18th street between 5th and 6th Avenue North or in the public lot on the corner of 8th Avenue North and 19th Street. Students are not to park in the Alabama Power Company decks.

Date & Time: March 7, 2006 from 8:00 A.M. to 5:00 P.M.

Course Description

This one-day course presents comprehensive, **in-depth, and state-of-the practice information about the evaluation of data and estimation of indoor inhalation risk at sites affected with volatile chemicals**. This course offers an excellent balance between quantitative evaluation, fundamental concepts, and practical applications. The course will present:

- factors that affect vapor migration from soil and groundwater to indoor air,
- scientific basis and assumptions underlying models used to estimate risk from this pathway,
- protocols for measuring soil vapor and indoor air concentrations,
- significance of background and ambient air concentrations,
- comprehensive evaluation of USEPA and several state guidelines for evaluating this pathway.

Throughout the course site-specific examples and case studies will provide practical insights. The effect of site hydro-geological conditions on risk management decisions will be presented. The course will discuss the vapor migration issues for both chlorinated solvents and petroleum hydrocarbons.

Upon completion of the course, participants should be able to:

- understand the significance of indoor air pathway within the risk-based decision making process,
- understand the scientific basis and assumptions underlying the relevant fate and transport models,

- understand the issues associated with indoor air and soil vapor measurements,
- identify the data needs significant for evaluation of this pathway,

- understand USEPA and state guidance available on this topic,
- conduct site-specific evaluation of this pathway, and
- identify sites where this pathway is truly a concern.

Participants will earn 8 Continuing Education Units.

Course Instructor

Dr. Atul M. Salhotra, Founding Principal and Director of the Risk Assessment & Management (RAM) Group, Inc. has over 20 years of experience in the consulting industry and has earned an international reputation for his important work in this field. Many US regulatory agencies have adopted his work for their standards. He also has excellent teaching skills. To date over 6600 students have taken his continuing education courses to benefit their careers.

Dr. Salhotra is an American Society for Testing and Materials (ASTM) certified trainer for the Risk Based Corrective Action Process (RBCA). He has conducted training programs for many different State agencies, trade organizations, and industries. He has helped several states in the US develop customized RBCA process to manage impacted sites by: providing technical assistance to the regulators; training the regulators; performing RBCA demonstration projects; writing RBCA guidance documents; supervising the development of customized software, and training consultants to implement the process. Dr. Salhotra has also developed guidance for evaluating the indoor inhalation pathway for several states.

In addition to his teaching credentials, Dr. Salhotra has supervised site-specific application of RBCA process as well as provided technical support at a variety of sites across the nation. These sites include petroleum retail facilities, solvent sites, RCRA, CERCLA, and Voluntary Cleanup sites.

Dr. Salhotra received his Bachelor of Technology degree in 1979 from the Indian Institute of Technology, New-Delhi, India; Master's in Technology in 1981 from the Asian Institute of Technology, Bangkok, Thailand; and Doctoral degree in 1985 from the Massachusetts Institute of Technology, Cambridge, MA, USA.

Course Material

Each participant will receive a comprehensive set of lecture notes including a list of references on this topic.

How to Register

Please register by submitting the attached course registration form. Registration fee per person is $395 (by Check) and $415 (by Credit Card – MasterCard/Visa). Cancellation fee is $100 if cancelled within 5 working days of the course. Substitutions are acceptable. Registration is on a first-come-first serve basis. Total number of participants is restricted to 30. RAM Group reserves the right to cancel the course if the number of participants is less than 8.

EVALUATION OF INDOOR INHALATION PATHWAY
AGENDA

8:00 Welcome, Agenda Overview, and Introductions

8:15 Background and Overview of the pathway

- Description of pathway and definition of problem
- Risk based indoor (residential and non-residential) air target concentrations
- Background indoor air quality
- Background ambient air quality
- Overall decision making framework for this pathway
- State of regulatory practice
- Guidance documents from several states and other key references

10:00 Coffee Break

10:30 Technical basis of indoor air intrusion models

- Relevant chemical specific properties
- Relevant soil properties
- Relevant properties of buildings (building height, A/c systems, basements and subsurface parking)
- Pressure differences between soil and homes
- Barometric pressure and seasonal differences
- Qualitative and quantitative understanding of diffusion
- Qualitative and quantitative understanding of advection
- Three and four phase equilibrium theory for single solutions and mixtures
- Solvents vs. petroleum hydrocarbons

12:00 Lunch

1:00 Models available to evaluate this pathway

- Farmer's model,
- Thibidoux Hwang Model
- Johnson and Ettinger (J&E) Model
- Jury's Model
- Concept of attenuation factors

For each model the basic assumptions, input parameters, available models, and results will be discussed. Primary focus will be on J&E Model.

2:30 Break

2:45 Measurement of soil vapor concentrations

- Passive and active sampling
- Flux chamber measurements
- Sampling Methodology
- Analytical methods
- Volumetric vs. gravimetric air concentrations
- Use of data for risk evaluations and attenuation factors

3:45 Snack Break

4:00 Case studies and Regulatory Guidance

- Indoor air sampling
- Soil vapor sampling
- Nationwide regulatory guidance (USEPA and several states)
- Vapor barriers

Primary focus will be on USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Surface Soils (Subsurface Vapor Intrusion Guidance).

5:00 ADJOURN FOR THE DAY