



## Dust Study Results Announced



SARA Group staff sampling soil as part of indoor dust survey.

Last November, 100 residents in the Sudbury area allowed the SARA Group to collect samples of dust from their carpets using a high-efficiency vacuum cleaner. The samples were analyzed for 20 metals, including arsenic, cobalt, copper, lead, nickel and selenium. The analysis showed there was a general relationship between metal levels in indoor dust and metal levels in outdoor soil.

Health-based regulatory standards for metal levels in household dust do not currently exist in Ontario. However, it is known that lead can accumulate in dust over many years from several sources, including lead-based paint, cigarette smoke, household products, outdoor air and soil entering the home, crafts and other common activities.

After reviewing the results of the independent laboratory analyses, the Sudbury & District Medical Officer of Health, Dr. Penny Sutcliffe, concluded that 90 percent of the samples were considered to be an

acceptable range for lead, and no further action was required.

In a small number of homes, elevated levels of lead were detected, and those residents were advised to contact the Sudbury & District Health Unit (SDHU) for information on further testing and how to reduce exposures. "There is very low potential for any health risk associated with metal levels that were detected in the dust samples," said Dr. Sutcliffe. "We are following up with a small number of the study participants, on a voluntary basis, just as a precautionary measure." Since the

10 homes with elevated lead levels were found at different locations throughout the region, a common source has not been identified.

Lead in indoor dust has been observed in many Canadian communities and is not specific to the Sudbury area. However, since elevated lead can present a potential health concern for young children and expectant mothers, the SDHU provides information on reducing exposures in the home. This information can be found on the SDHU website at [www.sdhu.com](http://www.sdhu.com).

The results of the household dust survey will be used in the Human Health Risk Assessment (HHRA) component of the Sudbury Soils Study, which will be reviewed by an independent international expert review panel. The final results of the HHRA are scheduled to be released in early 2006.

The SARA team extends appreciation to all of the residents who participated in this important part of the Sudbury Soils Study.

### Between the covers

#### A look inside the Sudbury Soils Study

When the Sudbury Soils Study is completed in 2006, it will be released as a three-volume document that summarizes three years of scientific study. This article provides an overview of the kind of information you can expect to find between the covers of the final document.

The purpose of the risk assessment is to:

- Identify potential chemicals of concern (COCs);
- Determine the levels of COCs in the environment;
- Examine various exposure pathways, which are the ways in which we might come in contact with COCs;
- Calculate the potential health risks and impacts to the environment; and
- Determine what, if any, further action is needed to minimize exposure and ensure the protection of human health and the environment.

#### VOLUME I

The first part of a risk assessment is often referred to as the 'problem formulation' in that it summarizes the conditions and background information that led scientists to conduct the study.

Volume I of the Sudbury Soils Study report will provide a detailed summary of historic information, emission records, and other environmental data relating to past mining practices.

continued on page 2 ►

# Peer-Review: Process Begins with TERA

To ensure that sound, reliable scientific practices are applied throughout the Sudbury Soils Study, all results and reports produced by the SARA Group will be peer-reviewed by an independent, international expert review panel. Members of the panel will be selected by Toxicology Excellence for Risk Assessment (TERA) based on their knowledge of either ecological or human health risk assessment. The TERA Group will form the panel to conduct the peer review later this summer, and will conduct the reviews early next year. The panel will interact directly with members of the Technical Committee, and will provide their findings to the community in a report early next year.

Representatives from TERA were recently in Sudbury to meet with the Technical and Public Advisory Committees, and to hear presentations by members of the SARA Group. After their visit to Sudbury, the TERA Group requested that the following information about their organization be made available to the community. Jacqueline Patterson of TERA has prepared this brief outline of the group's mandate.

In 1995, TERA, a non-profit, independent corporation, was founded to improve the science of risk assessment by focusing on partnerships among all members of the risk assessment community.

TERA President and founder, Dr. Michael Dousson, had a vision of toxicology excellence for risk assessment to protect public health. His vision would be accomplished by developing and communicating risk assessment information, sponsoring peer reviews and consultations, improving risk methods through research, and educating interested parties on risk assessment issues.

TERA's focus on high quality science and bridges between government, industry, and environmental groups has led, ten years later, to an organization conducting work with a diverse group of partners that include state, provincial and federal agencies, environmental groups, private companies and trade associations.

By actively seeking partners from all sectors of the risk assessment community, TERA gains a broad perspective and understanding of the scientific issues of risk assessment. Because TERA is not dependent on any single sector for its funding, the company is able to conduct independent, high-quality science and prepare work products that reflect the best, up-to-date scientific judgment, which is not influenced by any particular partner. The value of this independent, third-party approach is recognized by diverse sponsors who individually and jointly approach TERA to play a key role in their risk assessment projects.

TERA is comprised of three administrative staff and 13 scientists – six with PhDs and five with Masters degrees in their respective fields. Four members of the scientific team have been certified by the American Board of Toxicology. Combined, the TERA group offers Sudbury more than 125 years of experience in the fields of risk assessment, environmental science, and regulatory toxicology.

TERA has its origins in U.S. Environmental Protection Agency (EPA) risk assessment programs and continues to produce cutting-edge risk assessments following the guidelines of EPA and other respected authorities.

As a non-profit company, TERA is committed to serving the needs of the risk assessment community. TERA provides sponsors and the public with independent and objective opinions through the following activities:

- Establishing high quality risk assessment values through the Verifiable Estimates for Risk Assessment (VERA) program;
- Compiling and distributing peer reviewed risk values through the International Toxicity Estimates for Risk (ITER) database;
- Sponsoring expert peer consultation and review of risk values;
- Improving the underlying methods for risk assessment through research and publication;
- Educating diverse groups through training courses and scientific support; and
- Facilitating improved risk assessment and management decisions through informed and neutral guidance.

TERA provides both peer consultation and peer review services to meet the needs of government and private organizations. TERA has conducted over 40 independent peer reviews since the Peer Review Program was started in 1996. These reviews have evaluated a wide variety of work products including chemical assessments, risk assessment methodologies, guidance documents, study protocols, and research plans.

TERA's procedures for selecting reviewers and conducting meetings are consistent with the guidance provided by the U.S. government and professional organizations.

Visit [www.tera.org/peer](http://www.tera.org/peer) for more information about peer consultations and peer reviews organized by TERA.

## Between the covers: A look inside the Sudbury Soils Study (continued from page 1)

In order to analyze the COCs in the local environment, the study team conducted a comprehensive soil survey in 2001. This information will be contained in Volume I, along with a summary of the community involvement and consultation process undertaken by the study team.

As the report will explain, the Sudbury Soils Study is composed of detailed human health and ecological risk assessments that are being conducted to determine whether the levels of metals in Sudbury soils pose any unacceptable risks to human health or the environment.

### VOLUME II

The second volume of the study will focus on the Human Health Risk Assessment (HHRA) and will provide more information on the methods used to determine potential risks to human health. This section will also include conclusions from the study team.

To identify exposure pathways for humans, the team investigated different ways that people could potentially come in contact with COCs, leading to the following studies:

- Vegetable garden survey
- Air monitoring program

- Drinking water survey
- Food consumption survey
- Livestock survey
- Fish tissue survey
- Indoor dust survey

In Volume II, you'll find the results of each of these investigations, including the potential impacts on human health through daily lifetime exposure to the COCs.

### VOLUME III

The Ecological Risk Assessment determines the potential impact of COCs on plants and animals in the Sudbury area.

The final volume of the report will include the results of fieldwork, detailed laboratory testing and assessment of potential risks to address ecological impacts of metals in the environment.

Many studies have documented environmental impacts from smelter emissions in the Sudbury area. This report will more accurately measure these effects and evaluate specific risks of metals to terrestrial ecosystems in the Sudbury area. The aquatic ecosystems (lakes and rivers) are outside the scope of work for the Sudbury Soils Study.

Three approaches have been used to evaluate ecological risks. These include:

- Detailed field surveys to document existing habitat conditions
- Computer modeling to predict risk to Valued Ecosystem Components
- Laboratory toxicity testing to measure soil toxicity

The results of these different approaches will be pulled together using a "weight of evidence" approach.

If unacceptable risks are found, a fourth Volume will also be written to recommend options to reduce risk.

To review the table of contents for each Volume of the Sudbury Soils Study final reports, please visit our website at [www.sudburysoilsstudy.com](http://www.sudburysoilsstudy.com).

**For more information on what you'll find in the Sudbury Soils Study final report, call us toll free at 1-866-315-0228, visit the website, or email us at [questions@sudburysoilsstudy.com](mailto:questions@sudburysoilsstudy.com).**



# “Cumulative Effects” in Risk Assessment

The Sudbury Soils Study is one of the most comprehensive assessments of its kind in Canada. We are using the most up-to-date scientific information available, and will provide valuable conclusions on the assessment of health risks associated with the identified Chemicals of Concern.

During a recent presentation of sampling results at a meeting of the Sudbury Soils Study Public Advisory Committee, a community member raised the question of ‘cumulative effects’ and the impact this might have on results of the human health risk assessment.

Cumulative effects are chemical interactions, and the potential for increased health risk from exposure to several chemicals, over time or at the same time. Considering cumulative effects in determining health risk is a complex issue that continues to challenge scientists and health experts around the world.

We may know that the health risk associated with short-term exposure to one chemical is low. However, health impacts may be increased (or even decreased) if an individual is also exposed to other chemicals or medications.

As an example of how one substance can directly affect another, consider the chemical reaction of anti-venom following a snake bite, or using an antidote to treat an accidental poisoning. One chemical changes the health effect of the other.

## Doing the math

The biggest challenge in identifying cumulative effects of exposure to several chemicals in the environment is the sheer number of possible combinations. If we assume there are only five chemicals in the environment, there would be 120 possible combinations. With 10 chemicals, that number climbs to over 3.6 million. And if you want to examine the cumulative effects of each chemical at various levels, the possibilities can be countless.

Now, consider that there are potentially thousands of substances in the environment at any given time, all existing at different levels. And when you add individual lifestyle variables into the mix (such as eating habits, smoking, medications, and occupational exposures), the possible combinations are infinite.

While we can make some conservative assumptions about the impacts of certain chemical reactions, based on available studies, science has yet to develop a reliable means of testing all possible combinations.

## Work in progress

Between 1998 and 2002, Health Canada’s Toxic Substances and Research Initiative (TSRI) contributed \$40 million and funded numerous research projects to study cumulative effects.

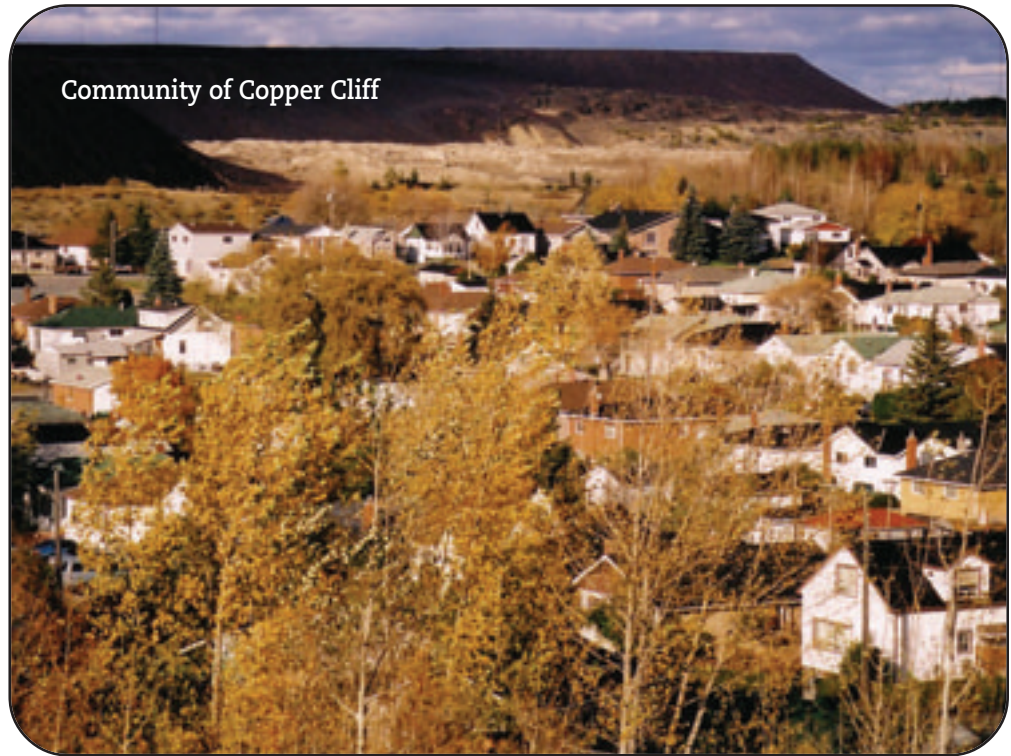
In the United States, the Centers for Disease Control (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR) continue to study this issue. But more work is needed to answer all the questions this concept can generate.

## Scientific best practices

The Sudbury Soils Study is much more than just a study about soil. Among other things, we have

effect than what might be normally expected from the sum of the individual chemicals. Or, in some cases, they can reduce (negative synergistic effect), or even cancel out, the effects of each other, as in the anti-venom example. But to accurately predict the countless potential interactions of six COCs is beyond the limits of the scientific methods available to this study.

Risk assessments provide important, valuable, actionable information that supports a community’s goal of health protection.



collected data on metal concentrations in the air, garden vegetables, fish, drinking water and household dust.

The risk assessment is examining the potential health risks associated with six different metals, or Chemicals of Concern (COCs): arsenic, cobalt, copper, lead, nickel, and selenium. The potential human and ecological effects of each of these COCs will be evaluated and conclusions will be drawn concerning their potential impact on health.

But will the risk assessment take into account the possible “cumulative” interactions between these different chemicals? The reality is that we will consider these effects to the extent that current science can provide answers. We will also build in certain safety factors to account for this uncertainty.

The science of toxicology and risk assessment is largely based on understanding the toxic effects of one chemical at a time, sometimes two at a time, but rarely more. Scientists understand the interactions between different chemicals, and that those interactions can vary significantly depending on which combination of chemicals is present.

In some cases, exposure to more than one chemical can have a greater, or synergistic,

However, no risk assessment to date has been able to answer all the questions, particularly with respect to cumulative effects. This is not due to lack of effort or desire to understand these various interactions. The scientific tools are simply not available at this time.

As we continue our work on this important study, community members are encouraged to continue to keep asking these important questions. The goal is to provide as many answers as possible, within the framework of the study and the best available science.

By Dr. Christopher Wren, Director, SARA Group  
(As seen in *The Sudbury Star*, May 27, 2005)

For more information on cumulative effects in Canada, visit Health Canada’s TSRI website at: [www.hc-sc.gc.ca/hecs-sesc/tsri/cumulative.htm](http://www.hc-sc.gc.ca/hecs-sesc/tsri/cumulative.htm)

For information on the research concerning ‘interaction profiles’ being undertaken by the U.S. Centers for Disease Control, Agency for Toxic Substances and Disease Registry (ATSDR), go to: [www.atsdr.cdc.gov/interactionprofiles/ipga.html](http://www.atsdr.cdc.gov/interactionprofiles/ipga.html)

# Public Sessions at Technical and Public Advisory Committee Meetings

A number of community members have asked about the process for presenting information at Public Advisory Committee (PAC) and Technical Committee (TC) meetings. Below is a general outline for how to provide information to these committees.

## PAC Protocol

The PAC is your liaison with the Sudbury Soils Study, and is designed to keep you informed as the study progresses. You are invited to attend these meetings to hear updates on the study, or take a more active role in the process. Meetings are held every second month, with details published in local papers before each meeting.

## The Terms of Reference for the PAC states:

“...the PAC will provide opportunities for members of the public to express their concerns or to ask questions about any aspect of the Sudbury Soils Study, such as questions related to scientific or technical matters or to process or procedural issues.”

Questions and concerns can be raised by the audience at the end of the open forum and again at the close of the meeting. All comments are recorded as part of the minutes of the PAC meeting and a response or status report will be provided no later than the next PAC meeting.

## TC Protocol

The public is invited to make submissions/presentations or ask questions to the Technical Committee (TC) at their monthly meetings, which are normally held on the second Thursday of each month at Tom Davies Square, Room C11 in Boardroom C/D of the Provincial Tower, 199 Larch Street.

The public portion of the TC agenda is designed to ensure that the public has an opportunity to share their comments and concerns with the technical team.

# Have your say

contact us

## Here's how:

- Attend the public sessions at TC and PAC meetings
- Attend workshops and open houses
- Call our toll free project information number at **1.866.315.0228**
- Send an email with your comments to:  
**questions@sudburysoilsstudy.com**
- Send written comments by mail or fax to:

**The SARA Group**  
64 Baker Street  
Guelph ON N1H 4G1  
Fax: 519.766.4360

*If you would like copies of previous newsletters, please contact us or visit [www.sudburysoilsstudy.com](http://www.sudburysoilsstudy.com)*

Further information and frequently asked questions can be found at the project website [www.sudburysoilsstudy.com](http://www.sudburysoilsstudy.com).

Public sessions are scheduled between 9:30 and 10:30 a.m. at each monthly TC meeting and are facilitated by TC Chair Dick DeStefano. While not every question can be answered immediately, every effort is made by the TC to ensure that outstanding questions receive a response within a reasonable timeframe.

The TC will continue to accommodate requests for presentations from the public during the one hour morning period at each TC meeting. The TC will also attempt to accommodate special requests for a presentation from the public outside of the above dedicated period. To insure that the Q&A sessions are productive, all questions to the TC members or the SARA Group should be provided two weeks in advance of each TC meeting.

If you wish to submit a question or request time on the agenda at a TC or PAC meeting, please contact the SARA Group:

- Web site: [www.sudburysoilsstudy.com](http://www.sudburysoilsstudy.com)
- Toll-free: **1.866.315.0228**
- Email: [questions@sudburysoilsstudy.com](mailto:questions@sudburysoilsstudy.com).

The SARA Group will contact the PAC Chair, who, in consultation with the TC Facilitator, will decide which committee should hear the issue. The SARA Group will contact the requestor to confirm the time and place of the next meeting.

To ensure that the TC and PAC are not in possession of confidential information, presenters wishing to provide written materials will need to sign a waiver declaring that the information is publicly available or provide signatures to document the owner's permission to distribute the information.

*For more information on the member organizations of the Technical Committee, and their roles and responsibilities on that committee, please visit our website at [www.sudburysoilsstudy.com](http://www.sudburysoilsstudy.com).*

## Upcoming Events

### 2005 Technical Committee Meetings

- Thursday, August 11
- Thursday, September 8
- Thursday, October 13
- Thursday, November 10
- Thursday, December 8

### Public Advisory Committee Meetings

- Tuesday, September 20
- Tuesday, November 15



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