

EXTRACTIONS



a newsletter from **O'CONNOR ASSOCIATES**

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OAEI OTTAWA SERVICES EXPANDED

O'Connor Associates Environmental Inc. is pleased to announce that Larry Backman, B.Sc.S., and Kathy Kitagawa, M.A.Sc., P.Eng., have joined the Ottawa office.

Mr. Backman's expertise lies in environmental compliance auditing and site assessments. Ms. Kitagawa brings to O'Connor Associates expertise in site assessments, site remediation, and air quality compliance. Together with Mark Richardson, Ph.D., risk assessment specialist, the Ottawa office now offers the full range of OAEI services.



GROUNDWATER HINTS OF EARTHQUAKE TO COME

Groundwater beneath the city of Kobe may have given out several warning signals a few months before the devastating earthquake on January 17. Radon, formed from the radioactive decay of uranium, can seep into deep groundwater from uranium-bearing rocks. If stress in the rocks just before an earthquake opens fissures, then more radon can leak into the groundwater. A team led by George Igarashi of Hiroshima University began continuous radon measurements in water from a well 30 km from the epicentre in late October 1994 when the levels of radon were slightly higher than in 1993. By January 7, 1995, radon levels surged to 12 times 1993 levels before falling back to normal on January 10.

After the earthquake, Urumu Tsunogai and Hiroshi Wakita of the University of Tokyo bought date-stamped bottles of commercial mineral water from the Kobe area. They measured chloride and sulphate ions and found that beginning in August 1994 the chloride concentration gradually increased until it was 10% above normal levels by

January 13. Sulphate concentration followed a similar pattern. They hypothesized that pre- and post-earthquake tectonic stresses created new microcracks that allowed deeper groundwater into the artesian layer.

[from *Science*, Vol. 269, July 7, 1995]

SELF-CLEANING EVERYTHING

A windshield that "washes" itself with sunshine is one of the many possibilities for a new coating technology unveiled at the 1995 annual meeting of the American Chemical Society. Adam Heller, professor of chemical engineering at the University of Texas, Austin, described how, in sunlight (or in low levels of ultraviolet light from fluorescent lights), titanium dioxide acts as a photocatalyst to strip organic matter from surfaces coated with it. Other possibilities include self-cleaning aluminum siding and other wall coverings. One Japanese company, he said, is already marketing a self-cleaning bathroom tile for hospitals and looking next to a version for public washrooms.

[from *Calgary Herald*, August 23, 1995]

OIL CONTAMINATING KUWAITI WATER AND AIR

Oil lakes formed when Kuwaiti oil wells were destroyed during the 1991 Iraqi invasion pose a serious threat to underground water reserves. Dr. Fatima Al Abdali of the Environmental and Earth Sciences Division of the Kuwait Institute for Scientific Research said that Kuwait's 205 oil lakes were slowly seeping back into the topsoil, in some locations up to 2 m deep. Some experts fear that oil-contaminated groundwater and oil-coated dust particles may subject the people of Kuwait to an increase in certain types of cancers and breathing ailments in the coming decades.

Al Abdali is calling for more research into changes in disease rates since the Gulf crisis.

[from *World Water*, December 1994]

APPLYING GEOPHYSICS TO FIND GROUNDWATER CONTAMINATION

The contamination of aquifers by immiscible organic liquids is widely recognized as a serious environmental problem.

Anthony Endres and John Greenhouse of the Waterloo Centre for Groundwater Research, University of Waterloo, have applied thermal neutron logging in boreholes to detect the presence of chlorinated solvents such as perchloroethylene and trichloroethylene. Further laboratory experiments to relate chlorine concentration to a neutron moisture gauge have given a basis for expressing the borehole data in terms of an apparent perchloroethylene saturation.

[from *Ground Water*, Vol. 34, No. 2, March-April 1996]

NEW MERCURY CLEANUP SUCCESSFUL

A new cleansing process to remove mercury from soil will save time and money while eliminating permanent storage of mercury-contaminated soil in drums at hazardous waste sites.

Clay Easterly of the Oak Ridge National Laboratory in Tennessee has invented a process that effectively extracts mercury from soil. The complex, but low-tech process consists of mixing water, pellets of copper mixed with a magnetic metal, an amoebic isolate, and mercury laden soil in a cylinder. An amoebic isolate is a "dispersing agent that separates soil particles and disperses mercury, allowing the copper to have better contact with the mercury," Easterly said. As the cylinder turns, the amoebic isolate loosens the clumps of soil, much the way that laundry detergent loosens the dirt from clothes. When the copper pellets have attracted the mercury, a magnet removes them to a vacuum oven where heat separates the mercury from the copper. The recovered mercury can then be sold to offset the cost of processing.

[from *Enviromation*, No. 10, October 1995]

SUNFLOWERS ABSORB RADIOACTIVE WASTE

Removing radionuclides from water with standard microfiltration and precipitation processes currently costs \$80 US per thousand gallons. Dr. Burt Ensley of Phytotech Inc. believes he has a substantially cheaper method using sunflowers for rhizofiltration. Rhizofiltration is a remediation technique that uses plant roots to absorb, concentrate, and precipitate toxic metals from aqueous streams. While testing varieties of sunflowers at Chernobyl in the Ukraine, Phytotech scientists demonstrated a dramatic reduction in the level of cesium (Cs-137) and strontium (Sr-90) in the groundwater in four to eight weeks. They had similar results in a groundwater site near Ashtabula, Ohio, where rhizofiltration reduced uranium concentrations by 95% within the first 24 hours.

[from *Ground Water Monitoring Review*, Spring 1996]

AND NOW FOR SOMETHING COMPLETELY DIFFERENT - DENTAL AMALGAM

Did you know that dental amalgam, the silver material used to fill most cavities in teeth, is 50% mercury by weight? Mercury, in the vapour form, is released from fillings causing continuous low level exposure. Dr. Richardson of O'Connor Associates' Ottawa office has been deeply involved in this issue, having prepared the most comprehensive exposure and risk assessment of mercury in dental amalgam for Health Canada. The assessment has just been accepted for publication in a peer-reviewed journal. Dr. Richardson was a key, invited speaker at a recent British Dental Association conference on the future of dental amalgam in dentistry, held in Edinburgh, Scotland this past May.

Results of this assessment indicate that dental amalgam is the single greatest source of mercury exposure for those Canadians with amalgam fillings. Amalgam contributes an average of 50% to total adult daily mercury intake, exceeding the average intake from air, water, soil, and foods, including fish, for the general population. The intake of mercury from amalgam also exceeds levels considered acceptable for non-occupational exposures published by the U.S. Environmental Protection Agency and the U.S. Agency for Toxic Substances and Disease Registry.

Health Canada will be releasing a revised policy statement on dental amalgam later this summer, based in part on Dr. Richardson's risk assessment.

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