



City of Richmond
Emergency and Environmental Programs

Memorandum

To: Mayor and Councillors **Date:** February 16, 2004
From: Suzanne Bycraft **File:** 6175-06
Manager, Emergency & Environmental Programs
Re: **Requested Additional Information on Proposed Soil Treatment
Demonstration Project – 13511 Vulcan Way**

At their meeting on February 10, 2004, the Community Safety Committee requested that Council be provided with the specific comments of the City's Advisory Committee on the Environment and the Richmond Health Department pertaining to their respective reviews of the Sonic Environmental Solutions proposed soil treatment project. This memo responds to that request.

Advisory Committee on the Environment (ACE)

ACE considered this issue at their November 19, 2003 meeting. The committee's minutes for this item are contained in Attachment 1.

Richmond Health Department

Sonic Environmental reviewed their proposal with Richmond Health Services. Their evaluation is provided in Attachment 2.

In addition to the above, Dr. Adrian Wade (ACE member from 1996 to 2003), addressed the February 10, 2004 Community Safety Committee on the proposed demonstration project. A letter from Dr. Wade outlining his comments on the proposal by Sonic Environmental Solutions is contained in Attachment 3.

If additional information or clarification is required, please contact me at 604 276-4166 or Margot Daykin at 604 276-4130.

Suzanne Bycraft
Manager, Emergency & Environmental Programs

SJB:
Att. 3

Excerpt of Minutes from City's Advisory Committee on the Environment Meeting

ADVISORY COMMITTEE ON THE ENVIRONMENT

**Held Wednesday November 19, 2003. 7:00 PM
Anderson Room
Richmond City Hall**

In Attendance: Suki Badh, Dalip Sandhu, Evelyn Feller, Gordon Kibble, David Crook, John Hopkins, Adrian Wade, Eric Sykes, Louis Zivot

Absent: Councillor Sue Halsey-Brandt, Paul Schaap, David Moon, Amador Remedgio, Tom Chan

Staff: Eric Fiss, Margot Daykin

5. Presentation by Sonic Environmental Solutions Inc.

- Presentation by Sonic Environmental, a public BC company proposing a pilot project in Richmond to use low frequency sonic waves to remediate soils contaminated with PCBs.
- Discussion by Committee noted that members of Advisory Board are recognized leaders in the field. Post remediation soils to be only removed from site after review and clearances. General support for pilot program.

Committee to reflect on presentation and advise M. Daykin if further involvement or review is requested.

Comments Provided by Richmond Health Services

Report To File:

**Sonic Soil Demonstration Project
13511 Vulcan Way**

Findings of Fact:

Sonic Soil Solutions Inc of Vancouver have proposed carrying out a small scale PCB treatment demonstration project at 13511 Vulcan Way. The property is owned by Hazco Environmental Services and is currently permitted for Special waste storage by the Ministry of Environment, Air Land and Water under the Special Waste Regulations.

The demonstration project is intended to treat approximately 2 tonnes of PCB contaminated soil from a site on Annacis Island using a process by which PCB related contaminants are separated from the soil matrix. Treated soil is to be returned to the originating site as remediated to either residential or industrial use quality.

The project has received conditional approval from MELP as a demonstration project and will require similar approval from the GVRD in terms of air quality control.

Comments:

Exposure pathways of potential concern involve primarily air emissions and to lesser extent soil and/or water. A preliminary assessment suggests a low risk for airborne emissions from the proposed technology although the GVRD air emissions permit application has yet to be submitted for review. A monitoring program will likely be recommended as condition of GVRD approval to determine emission levels from the process. Dust control should be a prime consideration in the transport and movement of soils both to and within the site.

Exposure risk to the public should be low due to soil or water contact from the site. Soil storage standards are expected to be maintained at levels consistent with the sites Special Waste Storage permit requirements in order to prevent any localized soil, ground or storm water contamination.

Post treatment analysis of the soil will determine its potential use based on contaminant levels and Provincial regulatory requirements. It is understood that the soil from Annacis Island is to be returned to that site following treatment.

Brent Zaharia
Environmental Health Officer
Richmond Health Services

Letter Received by Dr. Adrian Wade

Ursa Technologies Ltd

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E-mail: info@ursatech.com

19 January, 2004

To Adam Sumel, Sonic Environmental Solutions Inc.,
and Others Whom It May Concern:
Sonic Environmental Solutions Inc.,
1778 West 2nd Ave, Vancouver, BC, V6J 1H6, Canada

Dear Adam:

Firstly may I personally thank you for the presentation you and your staff made at the December meeting of Richmond's Advisory Committee on the Environment. I served on that Committee continuously from 1996 to 2003, including two years as Co-chair. That was my last meeting, at least for now, and it was a real pleasure to see such an environmentally useful technology being developed right here in Richmond. At the meeting I commented on the high technical capability of your Advisory Committee, which includes world expert in sonochemistry, Prof. Timothy Mason, and analytical experts out at BC Research Inc. for whom I have the highest professional respect.

I also wish to thank you for the opportunity to tour your site last week, view first hand the pilot scale process equipment under construction there, and meet your staff. I was impressed both by the robustness of construction and by the extensive work experience of your engineers. This visit confirmed to me the soundness of your approach to the problem of PCBs in soils - not just removing them, but actually destroying them. I was particularly pleased that, since your intent is that your systems go to the problem, rather than the problem going to the technology, you will succeed without the need to truck large quantities of contaminated soils long distances or through urban communities.

It is clear that a great deal of forethought and experience has gone into the project. As I understand your process, it begins with a screening to remove oversize solids (rocks, metal, etc) from the contaminated soils, and analytical testing to assess the initial contamination level. Your process then entrains contaminated soils in a recycle loop with an inexpensive, environmentally acceptable solvent, and uses very high power low frequency acoustic energy to aggressively break up the soil and maximize contacting between solvent and soil. The solvent chosen solubilizes organic contaminants such as PCBs, which prefer to be in the organic solvent matrix rather than the soil. This extraction process effectively washes them from the soil. The solvent, now containing the PCBs, is passed to a reactor where the very stable PCB molecules are exposed to the necessarily harsh chemical conditions needed to remove their chlorine, which ends up as sodium chloride (salt). The solvent is then recycled to the process. Any waste solvent would contain no chlorinated organics and as such could be disposed of by

burning in a power plant. The soil is further washed to remove residual solvent and is then tested to ensure it has been adequately cleaned of PCBs. Since detailed analytical work is to be carried out both before and after treatment, the extent of removal of the PCB's will be quantified. If there were any question that the resulting cleaned soil did not meet environmental standards for PCB's, it would be returned to the unit and processing would be repeated until it did.

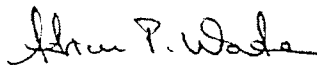
I am aware from Ph.D. and M.Sc. work that I supervised whilst on faculty in the UBC Chemistry Department that high power acoustic energy can provide an order of magnitude better mixing than regular stirring alone. I am also well aware of the extreme chemical stability of PCBs, and therefore the intense chemical conditions needed to destroy them. I believe your system will provide these conditions, safely, efficiently, and at scale. The combined approach is unique and likely to be effective, given sufficient process optimization based on data obtained by accredited methods of chemical analysis, and with appropriate methods checks done by independent laboratories.

The process is only designed to handle organic pollutants that can be destroyed by the secondary chemical process. If heavy metals (such as lead or cadmium) or bulk inorganic contaminants (iron oxide, calcium sulphate, etc.) were present, these would remain in the soil. However, even where contaminants other than PCBs are present, there remains a clear advantage to owners of contaminated sites (including federal and provincial governments) to have their PCB problem solved at or near site, and then have the PCB-free soil returned to their site, even if it still contains other contaminants.

I have offered to write this letter because I believe you are well along the path to having a way to help rid the industrialized world of the scourge of PCB contaminated soils, thereby preventing cancers in humans and animals, and returning land to useful purpose. Moreover, I am aware that even Richmond, which recently won a major international environmental award, has its own places with PCB contaminated soils, and it would be a very good example to the rest of the world to clean these up. Who knows, it could even help us win the next award.

It is my hope that soon Sonic Environmental will be manufacturing proven, semi-portable and medium scale PCB destroying, soil reclamation process plants and exporting them to locations of need throughout Canada and into other countries. I am aware that there will be multiple opportunities for this technology at Superfund sites in the USA and can foresee a number of ways the approach can be modified to address further hazardous contaminants in a similarly environmentally friendly manner.

Sincerely,



Adrian P. Wade, Ph.D. C.Chem. MRSC MCIC
President, Ursa Technologies Ltd, Richmond, BC

Note: I have neither received nor requested any personal benefit from writing this letter.