October 11, 2005

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Dear John:

Thank you for your letter of September 30. Since your concerns directly relate to the information presented at the public forum of September 26, I thought it would be best to ask the presenters you mention to respond.

You wrote: *"I'm very concerned that some of the information presented at "Victoria's Sewage: Separating Myth From Fact", sponsored by the Victoria Sewage Alliance, may not be valid.*

For example, the presentation by Dusan Markovic, of his thesis on copper metal deposition, ignored any alternative explanation for how the copper got to be in the area off Victoria Harbour, other than through Macauley Point outfall.

Markovic really needed to look at more than a century of industrial manufacturing and shipbuilding in both Victoria and Esquimalt Harbours and then explain why all of the toxics released into the Harbour (and from paint-chipping on thousands of ships moored at Royal Roads over that time)wouldn't easily migrate into the area he mapped. As well, you may be aware of the decades of solid waste dumping in this area, and also all of the storm drain outlets around the area. He didn't consider ANY of those alternatives in either his thesis or his presentation (http://geosea.ca/MarkovicThesis.pdf)"

Dusan Markovic, MSc replies: Mr. Newcomb claims that my research has failed to account for other possible sources of copper contamination in Victoria Bight. In my brief presentation, it was difficult to capture all of the ideas in my thesis, so I appreciate the opportunity to clarify some points for you.

The findings related to my research are based on the weight-of-evidence of:
1) The physical characteristics of the receiving environment
2) Statistical analysis
3) Geospatial analysis

Sediment transport studies performed by GeoSea Consulting Ltd. in Victoria and Esquimalt harbours indicate that the harbours are largely depositional areas. This implies that contaminants that originate in the harbours tend to stay in the harbours. The sediment transport regimes described by GeoSea Consulting Ltd. are supported by the current and tidal characteristics in, and at the entrance, of the harbours. As such, the historical contamination of the harbours is not the source of contamination in Victoria Bight.

Through Geospatial, and rigorous statistical analyses, evidence indicates that the Macaulay Point outfall is very likely the major source of metal contaminants in Victoria Bight. Statistically, all of the metals studied in my research are from the same source. The spatial distribution and concentration of metal contaminants in sediments fits best with the physical dynamics of the area when the Macaulay outfall is tested as the input source. While storm drains, old copper paint chips and the historical solid waste dump may contribute to the contaminant loading – these inputs are insignificant compared to the outfall. While Mr. Newcomb does his best to distract from the most obvious source, one simply cannot ignore the contaminant loading caused by the daily discharge of 120,000m^3 of raw sewage.

Finally, Mr. Newcomb claims that CRD triggers should be used to implement better source controls and not sewage treatment. As I said in my talk, the CRD's triggers are completely un-protective, which is explained in detail in my thesis.

You wrote: *"Next, Mr. Wong of DFO showed a map of the DFO's shellfish closure in the area off Victoria Harbour and he implied clearly that it was due to the lack of sewage treatment in the Macauley Point outfall. However, the truth is that DFO sanitary shellfish closures include secondary sewage treatment areas too, such as the DFO shellfish closure around Sidney's Bazan Bay (http://www.pac.dfo-mpo.gc.ca/ops/fm/shellfish/Biotoxins/closures/area19/19.12_e.htm)"*

Phil Wong, MSc, PEng of Environment Canada responds; What I said was:
There has been a shellfish harvesting closure off Victoria since the 1970s because of sewage discharges, potential land-based sources of contamination and paralytic shellfish poisoning. The closure was extended in 1983 to include offshore scallop trawling grounds following reports that faecal coliform contamination extended 2.5 km from the Macaulay Point sewage outfall. The closure was further extended in 1992 on a precautionary basis to reflect increased sewage loading to the system from the Macaulay Point and Clover Point outfalls. The sanitary shellfish closure was again expanded in 2002 on a precautionary basis. Effluent plume modelling results coupled with CRD water quality data indicate the standard for direct shellfish harvesting is exceeded outside the previous closure boundaries during certain times of the year. The 2002 expansion increased the closure area from about 42 km^2 to 60 km^2 of Juan de Fuca Strait adjacent to the core areas of the Regional District.

Victoria Fishery officers and Trial Island lighthouse keeper report that expansion may only have a minor impact on shellfish harvesting since only a few pocket size beaches with clams or cockles (if any) are known to exist on Trial Islands.

Mr. Newcomb is correct that there are shellfish harvesting closures around secondary effluent discharges as well. The Canadian Shellfish Sanitation Program requires there to be a minimum 300 metre closure in the immediate vicinity of major point source discharges such as sewage and outfalls. These prohibited areas are where shellfish harvesting is

prohibited for any purposes and the level of treatment is not considered. The Saanich Peninsula treatment plant outfall has a 4.0 km^2 closure area within Bazan Bay based on computer modelling of effluent dilution and dispersion.

You wrote: *"Some of the other presentations seemed to only project more myths and slanted option. Dr. Ishiguro's biographical website at UVIc doesn't even mention ANY research interest in sewage or sewage treatment (http://web.uvic.ca/biochem/faculty/ishiguro.html). Dr. Ishiguro's course on introductory microbiology doesn't focus on sewage treatment, and applied microbiology (if that is where it is hidden?) is only included as one of seven emphases (http://web.uvic.ca/calendar2005/CDs/MICR/200.html)."*

Dr. Ishiguro of the University of Victoria responds: Mr. Newcomb's main thesis is "serious source controls". This is a typical response. Too many people think the only problem with sewage are the "poisons" (e.g., pesticides, solvents, etc.) that can end up in it. My thesis is that is that this is only part of the problem, the other part being the components that cannot be source controlled. I am referring to the enormous amount of small particulate and soluble organic matter that are not removed by screening.

My concern is that we do not know the exact fate of this material once it leaves the outfall simply because it is technically impossible to make such measurements (I will entertain any challenges to this statement). Every attempt made to date has been an indirect one, e.g., environmental impact on target organisms, and I maintain that this is not good enough. In short, we do not know where this material goes and what happens to it. I do not do research on sewage treatment but I understand the process very well. Moreover, I am a microbial biochemist with an expertise on the activities of microorganisms in nature; these are the subjects I teach. In this respect, it is important for everyone to understand that one of the main functions of secondary sewage treatment is to break down the organic matter, and that this process is carried out by the metabolic activities of microorganisms, a process I understand very well.

I present two possible scenarios concerning the fate of the organic matter in the sewage we release in the ocean. (1) It is possible the ocean is a secondary treatment plant and the organic material is being efficiently broken down. If so, it will be important to know the fates of inorganic metabolites, e.g., nitrate, ammonia, phosphate, etc. Accumulations of these compounds could have serious environmental impacts ranging from algal blooms to oxygen-deficient dead zones. (2) On the other hand, it is possible that the organic matter is not being efficiently decomposed and is therefore accumulating somewhere. This notion is strengthened by the fact that the local ocean temperature is low year-round, and we know that microbial metabolism is not efficient under these conditions. Again, I emphasize that we do not know the fate of the sewage we release into Victoria Bight because it is not possible to measure this material directly. Also note that neither of the two scenarios has a positive side to it. We who live in Victoria therefore have the following choices: (1) don't take chances on our environment and treat, or (2) take a chance.

I will be attempting to contact Mr. Newcomb and will volunteer to meet with him. I will also invite him to take my course.

You wrote: *"I am no less concerned about our environment than the Victoria Sewage Alliance, but I know that spending a half-billion dollars (it will probably be higher, given construction and energy cost increases) on a sewage treatment system that won't solve the problem of marine pollution is just an enormous waste.*

Also, many millions in operating costs each year, and the huge problem of all that sewage sludge. Will the CRD incinerate the sludge (more air pollution and costs!), or bury it at Hartland (can Hartland even take it?),or putting it on golf courses and park lands.

Stephen Salter's presentation amounted to just "low-balling" the cost of the unnecessary further sewage treatment and his fantasy of recovering millions of dollars from sewage sludge was unrealistic, to say the least.

I'm sure that Esquimalt residents near Macauley Point won't like all the smells (just like the hundreds of odour complaints about the Saanich Peninsula plant since 2001!), nor all the trucks taking the sludge, or the bigger power lines, etc.

No, the worst thing is that the governments may now spend many millions but it won't help the marine environment. Look at the problems of cities such as Vancouver and Seattle, where for all their expensive sewage treatments, they have ongoing serious marine pollution problems.

The ONLY way to reduce toxics is by really serious SOURCE CONTROLS. The CRD toxic level "triggers" should be used to implement more and better SOURCE CONTROLS, not secondary sewage treatment."

John Newcomb

Stephen Salter, PEng of the Victoria Sewage Alliance responds:

Sludge. My presentation stressed that we need the right kind of treatment. Traditional, aerobic treatment plants have disadvantages, including sludge production, odour, and consumption of space, electricity, and chemicals. As I explained, the anaerobic, resource recovery options take less space, contain odours in sealed vessels, and digest sludge to produce biofuels. Dumping sludge on land, in landfills, or in the ocean would be far too polluting and wasteful of the resources in sludge.

Fortunately for us, the resource recovery fantasy is reality in over 3,000 biogas plants in Europe; Sweden alone runs over 5,000 vehicles on biogas from anaerobic sewage treatment and municipal waste plants. If public policy makers, scientists, and technologists in Europe, Asia, Australia and elsewhere can use the right kind of sewage treatment to

fight climate change and inner-city air pollution, why can't we? If this is realistic for communities around the world, why is it unrealistic for us? If you're curious to know more about this creative side of sewage, you can enter "sewage" and "biogas" into Google and explore 138,000 pages showcasing environmental and social leadership around the world.

Odour. As I explained in my presentation traditional, aerobic treatment plants can smell, but enclosed anaerobic ones do not. Consider that the planned Dockside Development will convert sewage from 2,000 tenants into biofuels with an anaerobic plant - in the basement. There's no reason we can't co-locate the right kind of plant with other land uses.

Marine pollution. No one at the CRD can say on record that untreated sewage complies with existing Federal and Provincial environmental legislation. Although the CRD publishes its own "Sediment Quality Guidelines", the Guideline for copper for example, is set at three times the Federal standard for *contaminated sites*. This is an administrative approach to the environment, not a scientific or legal one. We could talk at length about the documented impacts of outfall pollution on water quality, marine sediments, and biodiversity as well as the risks sewage presents to human health, but these have already been extensively described in correspondence to the CRD from scientists at Environment Canada and the Ministry of Environment. Our situation and the waste of resources it represents is unsustainable.

Vancouver and Seattle. I don't think one can argue it both ways; does sewage cause "ongoing serious marine pollution problems", or not? I'm not familiar with the facts of Seattle's sewage pollution, but remember the GVRD's Iona and Lions Gate plants provide only primary treatment. Effluent from primary plants still fails Environment Canada's acute lethality test; it's still toxic to fish.

Cost. The cost estimate you refer to comes from a July 6, 2005 memo written by the CRD's Acting General Manager, Environment Services, based on unknown design constraints for a traditional aerobic plant - the wrong kind of treatment. This often-repeated number includes the cost of upgrading underground piping to cope with estimated flows in 2045, and assumes no cost sharing with other levels of government. When discussing costs we need to be clear about the difference between the cost of treatment/resource recovery and the cost of maintaining our aging sewer pipes. For example, several years ago the CRD estimated the cost of repairing underground piping at over $100 million, and Oak Bay alone estimates $25 million for their work.

My estimate of $150-180 million is based on interviews with wastewater treatment plant managers and operators throughout BC, including the CRD's $20 million Central Saanich WWTP. In addition, Halifax will build three treatment plants for $180 million before infrastructure grants. As I pointed out in the presentation, anaerobic, resource recovery plants are less expensive to build and operate than traditional treatment plants. Finally, even the CRD's LWMP anticipates cost sharing for eventual treatment of 1/3 each by the Federal and Provincial governments. Stéphane Dion has indicated his willingness to help, but we first need to ask. And when you refer to power lines, do you mean the lines

delivering energy *from* the treatment/recovery plant? Perhaps we could offer local residents subsidized or free electricity, heat, and biofuels as a way of overcoming any initial concerns about living near a plant.

If we held a design competition at minimal cost, we could invite Canada's resourceful minds to offer us their best solutions. We could take these options to the public for open discussions about costs and benefits. Discussions of costs must account for the social, economic, and environmental benefits of converting an environmental liability into a resource, as in running buses on biofuels from sewage.

Source Control. The CRD's work on source control is vital; it makes tremendous sense to conserve water (as you've advocated through your contributions to the *CRD Water Advisory Committee*), and to not put chemicals down the drain in the first place. I think the problem is that some have stated publicly that source control is better than secondary treatment, which is incorrect. As Environment Canada told the CRD: *"Treatment's not only more effective in reducing contaminants, it is effective immediately upon implementation and will remove a wide array of contaminants not targeted under source control"*. For example source control can't deal with all contaminants (emerging chemicals of concern, metals picked up through our piping) and controlling the organic component of sewage is currently impractical.

Environment Canada further wrote to the CRD in 2000: *"Thus, Environment Canada is concerned that the public has not been provided with balanced information related to environmental considerations for sewage treatment and disposal for CRD."* And finally from the CRD LWMP: *" It is the MMAG Environment Canada member's position that Environment Canada cannot endorse the trigger process as a means of determining the level of sewage treatment in the absence of any reference to the need for effluent to be in compliance with the Fisheries Act on point of discharge."*

You'll recall from the presentation by John Werring, MSc RP Bio that the administrative triggers you mentioned are wired backwards, since they are based on populations of sewage-tolerant species. You may want to talk with John directly about this.

I hope source control will soon extend to a significant source of pollution; the acutely toxic leachate from the CRD's Hartland Landfill, which still flows untreated to the ocean through the Macaulay Point outfall. A small treatment plant at Hartland could also convert some of the 46,000 tonnes per year of organic waste into biofuels. All of the municipal sewage treatment plant managers I've spoken with in BC also run good source control programs, and to them it's not a false dilemma of either/or, but both. Source control can't get our buses running on biofuels.

It wasn't long ago that some experts denied climate change; now we're all looking for solutions. Recovering biofuels from sewage can be part of our home-grown answer. If you'd like to know more, I once again extend the invitation I made to you last summer to discuss pollution and resource recovery in person.

Mr. Newcomb, I hope these responses have helped to address your fears. I think open, constructive dialogue on this subject is very valuable, and I hope people in the academic community will energetically contribute their ideas for thoughtful and creative options.

Yours truly,

Denise Savoie
Councillor, City of Victoria and Member, CRD Environment Committee

Copies to:
CRD Environment Committee
CRD LWMP Committee
CRD Board
Dr. Edward Ishiguro, Department of Biochemistry and Microbiology, University of Victoria
Dusan Markovic, MSc
Phil Wong, MSc, PEng, Environment Canada
Randy Alexander, PEng, Ministry of Environment
John Werring, MSc, RP Bio, Sierra Legal Defence Fund
Stephen Salter, PEng, Victoria Sewage Alliance