HARDY STEVENSON AND ASSOCIATES

Note from Stan R. Blecher:

In this document, for ease of reading I show my original questions, as repeated by Mr. Hardy, in green, Mr. Hardy's answers in black, and my responses to Mr. Hardy's answers in red. In addition, each of my comments is prefaced by the word "comment", and is indented.

Date: December 5, 2013

To: Dr. Stan Blecher

Re: Questions to the Municipal Peer Review Team

Dear Dr. Blecher,

I wish to thank you for your comments to the Municipal Peer Review Team (MPRT). We have reviewed all the publications that you identified in your email. The following provides our response.

Q 1: ***Why did Mr. Hardy use Entech-Rem's statements about the nature of the Entech technology, rather than using the official definitions?***

COMMENT:

The sentences in the next paragraph are not relevant to Q1. They belong to Q2. Why are they inserted here?

..... At the presentation in City Hall on 29 October a member of the HSPR team indicated that expected levels of emissions of the proposed facility would be within safe limits. When asked how this conclusion had been reached the Reviewer indicated that the figures offered by the proponent had been accepted, as presented by the Company in the HHRE. But the actual emission levels of a plant such as that indicated in Entech-Rem's proposal are in fact totally unknown, and the company Entech-Rem has no way of predicting them. All that is known is that lethal toxins will be emitted, and that there are no safe levels of these.

COMMENT:

End of displaced section.

Dave Hardy used the official definitions from the Environmental Study Report (ESR) as prepared by ENTECH-REM that are part of the work being reviewed. ENTECH-REM have provided a description of the gasification process that will be used in the facility, and that is what was described at the Oct.29, COW meeting.

COMMENT:

But therein lies the problem - you simply passed on to the Council the Entech-Rem misinformation, instead of ascertaining the correct information and informing the Council appropriately. You state here that you used "the official definitions from the Environmental Study [sic] Report (ESR) as prepared by Entech-Rem" BUT THESE ARE **NOT** THE **OFFICIAL DEFINITIONS**, AND IT IS SURPRISING THAT YOU DID NOT DISCOVER THIS at that time, **and even more surprising that you continue to maintain this here**. [NB ESR stands for Environmental Screening Report, not Environmental Study Report].

You referred to the Entech process as "pyrolysis-gasification", as the company says in some documents, but pyrolysis and gasification are two different processes. The former is performed in the absence of oxygen and the latter is not. The two are mutually exclusive. Why did you not discover this misleading error of the Company's and report it to the Council?

You also repeated the company's attempts to imply that gasification is a process less dirty than incineration, a claim they make by insisting that gasification is not incineration, but as I have documented repeatedly in the material you say you have "reviewed", gasification is by all official definitions a form of incineration.

The ESR provides comparisons of predicted air concentrations to air quality guidelines, in addition in Section 6 of the report, the predicted air concentrations are compared to toxicity reference values that are protective of health effects. Table 7 of the ESR provides a comparison of the predicted air concentrations to Air Quality Standards as well as to the values that are considered to be protective of health.

COMMENT:

But, as I have explained and documented, this statement is false. No levels of carcinogens (substances that cause cancer) are "protective of health". If a high level of lethal poison kills 100% of people and a lower level kills less than 100% it remains absurd to describe the lower level as "protective of health". Furthermore, as I have explained at length in the documents you have "reviewed", and as I will return to below, the estimates of Table 7 of the ESR are not drawn from any real data and are therefore fictitious.

Most of the toxicity reference numbers were obtained from the Ministry of the Environment (MOE) and others from the U.S. Environmental Protection Agency. The maximum predicted concentrations at the fence line provided in Table 7 for the constituents of concern were two

orders of magnitude to six orders of magnitude below these health based numbers that are considered to be protective of susceptible individuals indicating that there will be no risks to human health.

COMMENT:

"Considered to be" by whom? Not by the scientific community. As I have pointed out in the documents I sent you and that you state you have "reviewed", **THERE IS NO SAFE LEVEL OF CANCER-PRODUCING EMISSIONS** - I provided ample documentation of the scientific facts on this issue, and by not informing the Council of this you have merely passed on the misinformation that the Company provided.

Similarly for carcinogenic compounds, the MOE indicate that risk levels below one in a million are considered to be essentially negligible.

COMMENT:

See above. There is no negligible level of carcinogens. I explain this more fully below, also in the context of bioaccumulation.

This means that if a million people are exposed to the chemical then one person in that group of a million people may have an incidence of cancer. Health Canada indicates that the one in a million cancer risk is the most commonly used risk level for the management of risks posed by environmental contamination. To put a perspective on this, Health Canada indicates that the lifetime risk of developing cancer in Canada is four in 10 people or 0.4. Thus an increase in cancer risk of one in a million increases a person's lifetime cancer risk from 0.4 to 0.400001.

COMMENT:

As you stated, these are estimates, albeit based on fictitious "concentrations", for **one** "chemical". I will return to this below.

Your argument appears to be that only very few in Port Hope will get cancer from this cause, and the "system" can not concern itself on account of so few. But I concern myself with these few, Mr. Hardy - I'm a doctor; and my grandchildren live here. **The only situation in which it is reasonable to argue that an increase in cancer risk is acceptable because it is small, is if there is a clear advantage to be obtained in taking that risk. A rare example of this would be medical X-rays, which carry a risk of causing cancer, but in some cases it can be argued that the potential benefit outweighs that risk, IF THERE IS NO ALTERNATIVE TO DOING THE X-RAY. But with polluting incinerators there is no perceivable benefit, and there is the clear alternative available of recycling of waste.**

Thus a risk of one in a million cancer risk represents a 0.00025 percent increase over the

background cancer risk and will be undetectable using available epidemiological data and statistics, especially in a small community such as Port Hope.

COMMENT:

Exactly correct - because it is a small community it would take a long time for sufficient data to be accumulated to **DEMONSTRATE** the lethal effects - I explain the statistics of this in detail in my letter to the Minister of the Environment (page 7 and Appendix of my letter). This is not a reason to condone these lethal effects - precisely the opposite: because it is difficult to demonstrate the effect, we should be following the Cautionary Principle of health protection. You are using a reverse NIMBY argument here, that goes like this: because of the small size of the town no one would notice the effect, so lets do it in Port Hope. I do not condone the NIMBY argument - I don't want this in anyone's back yard. I want to stop incineration all over Canada (and the world). But this reverse NIMBY is no more acceptable.

Health Canada considers that a 1 in one hundred thousand risk as being essentially negligible. The risks associated with the maximum predicted concentrations were in the order of one in 100,000 to one in 1,000,000,000.

COMMENT:

If we for a moment accept the so-called "maximum predicted concentrations" you refer to (which as mentioned are fictitious), and if we use the highly theoretical risk statistic you site (1 in 100,000 to 1 in a billion) then this would give an estimate of up to 350 cases of cancer a year in Canada **for one "chemical"**. Incinerators such as the one proposed would probably put out at least 250 carcinogenic "chemicals" (Jay and Stieglitz, 1995, reference previously provided), giving a total rough estimate of 87,500 unnecessary extra cases of cancer per year in Canada - a best case scenario in light of the fictitious data, but still a totally unnecessary blight on our nation's health. But as I indicated in my letter to the Minister of the Environment (page 6), some international government agencies, including the National Environment Protection Council of Australia, are recognizing that the allowable levels of cancer-producing emissions should be zero.

Q 2: Why did the Reviewers accept Entech-Rem's so called emission information at face value?

ENTECH-REM will be required to meet Ministry of the Environment (MOE) Guidelines such as Guideline A7 Air pollution control, design and operation guidelines for municipal waste thermal treatment facilities, PIBS 7883e (MOE, October 2011) and O.Reg 419/05 - Air Pollution - Local Air Quality. When reviewing the documentation, the information shows how emissions will meet the criteria pertaining to these regulations.

COMMENT:

The information can "show" no such thing - there is no concrete information available re what emissions would be for a plant not yet constructed, and for which Entech has no comparable plant anywhere in the world, to be constructed by a company that has never constructed an incinerator of ANY kind, type or dimensions anywhere in the world.

Furthermore, as you know or should know from information provided to you, statements about "low levels of emissions" that would "meet criteria" do not take into account the following:

1. Statements indicating that levels would meet criteria consider the predicted emissions of the proposed plant but not of the pre-existing background pollution. Your own "Review" pointed out that the **"background concentrations [of particulate matter pollution, $PM_{2.5}$] in the area are in the order of 20 µg/m^3..."** i.e. **already 33% above the Canadian Federal "reference level for health effects" of 15 µg/m^3 and nearly three times the level of 7 µg/m^3 indicated by the California Environmental Protection Agency Air Resource Board (see your own Review, page 19).** And this is before the new Clarington incinerator begins spewing out its full blast of contamination; to this one must add the effects of the nearby St. Mary's cement plant. Your Review does not clarify that the significant additional pollution that a new incinerator would produce has to be **ADDED** to the existing background pollution. You did not inform Council of the fact that any additional contamination would take levels even further above the already far too lenient "reference levels" we have here.

2. There is no safe level of carcinogenic (cancer producing) emissions. Even minute amounts can cause cancer. As mentioned above, the argument of "low numbers" of cancer cases is only defensible if there is a compelling argument to use the cancer-producing agent in the first case. Where, as in this case, there is no perceivable benefit and an excellent alternative (recycling) available, it is cynical not to recommend avoidance of the harm and devastation that those "few" cases of cancer would cause.

3. I explained and documented in great detail, in my letter to the Minister of the Environment (which you say you have "reviewed"), the issue of bioaccumulation. The "small" amounts of carcinogens that are released every second, 24 hours/day, 365 days/year, accumulate in crops and in then again in livestock, resulting in highly significant concentrations in the vegetables, milk and meat we eat. The issue of bioaccumulation of carcinogens including dioxins has very serious implications for the effect that the advent of

an incinerator would have for the agriculture industry, the major industry of the area, with probability of loss of large numbers of jobs in the Municipality.

Why did you ignore these facts and not inform the Council that this is a fatal flaw in the Company's claim of "low levels of emissions"?

However, the draft version of the ESR prepared for ENTECH-REM, the MPRT noted that there was insufficient information in the supplied documents to allow for independent verification of the emission rates. This comment formed part of the submission made to ENTECH-REM for the draft report. A final version of the ESR was supplied to the MPRT in September 2013. Yet, this version of the ESR did not contain more information on how the emissions were calculated.

In order to continue with the peer review of the supplied documents it was assumed that the supplied emissions were correct based on the fact that there is a requirement that a facility of this type must meet MOE Guideline A-7 Air Pollution Control, Design and Operation Guidelines for Municipal Waste Thermal Treatment Facilities.

COMMENT:

Here again we have the same problem - **YOU ASSUMED** that the supplied emissions were correct. But on what basis did you make this assumption? As Reviewer your task is surely to evaluate what the ESR stated, not just to repeat it.

Thus the in-stack contaminant concentrations and their subsequent emission rates must be low and well controlled. According to Table 2 in Appendix M of the ESR, Entech REM estimates their in stack concentrations to be less than 41 percent of any of the A-7 Guidelines.

COMMENT:

Here again you are merely repeating Entech-Rem statements - this does not in any way explain why you accepted, without any concrete evidence, the Company's assertions of what their emissions WOULD BE.

According to Table 3 of Appendix M, the resultant maximum point of impingement (POI) concentrations are less than six percent of any of the applicable MOE standards and guidelines.

COMMENT:

ARE less than…? The concentrations **ARE?** The plant does not exist - its concentrations "**ARE" therefore not anything - they are non-existent**. Your responsibility is surely not to repeat to the Council what the company has stated - the members of the Council can read. Your responsibility is surely to CRITICALLY REVIEW what the Company says, and evaluate for the Council the validity of their claims. These claims

are based on fictitious data, and you should have underscored this in your Review.

Thus even if the proponent designed the facility to simply meet the A-7 requirements, the maximum POI concentrations would still be well within provincial standards and guidelines.

It should be noted that the MOE will require the backup calculations for both the review of the ESR documents and well as the processing of the Environmental Compliance Application (ECA). The MOE will not accept either of these submissions without further information from ENTECH-REM.

COMMENT:

But Entech-Rem **can not** provide any further information - as mentioned above, there are no previously existent plants from which data can be obtained, and the company has never built a plant previously.

Q 3: ***Why did the Review not expose the fact that the Company has no relevant track record from which to obtain the data it claims to have?***

The data depicted in the ESR pertains to the Port Hope facility. It was not our mandate to examine data beyond what was presented in Appendix P - ENTECH Facility Experience and Approvals Documents.

COMMENT:

I do not know the exact wording of your contract with the Council, but as a citizen of Port Hope I believe most citizens would have the understanding that your mandate was to review the ESR, and inform the Council of its validity. This would surely include notifying the Council of errors, flaws, omissions, and of misinformation.

That the Council has even considered this proposal by Entech-Rem is clearly based in part on the Company's claimed "track record". This is for example indicated by the fact that Entech-Rem statements, including the claims of track record and "tested technology", were published and circulated to all households in Port Hope on Municipality of Port Hope Letterhead paper.

When I realized that the Company was talking of building a plant that would process about 500 tons of waste per day, and that the plant that representatives of the Municipal Council were shown was the plant in Kuznica, Poland, which processes 3.5 tons per day, I undertook to explore what other "track record" the Company had. I am surprised you did not think it part of your mandate to have this information available to the Council, to help them decide whether Entech-Rem truly has a track record that would give confidence to impose this experiment on the citizens of Port Hope. You mention Appendix P of the ESR and there, up front on page 1, is featured the plant in Hong Kong.

How can it be that you did not discover that they have no plant in Hong Kong, nor in Australia, the home base of Entech - despite claims of plants in both Hong Kong and Australia? This is clear misrepresentation of credentials. In my profession, a doctor would get struck off the role for a similar misdemeanor.

Q 4: ***Why did the Reviewers not state that because there is no way of knowing what the emissions will be, the numbers given in the ESR HHRE are invalid, and the proposal is therefore fatally flawed, since all that is known about emissions of this proposed plant is that such a plant would put out lethal toxins and nanoparticles in uncontrolled amounts.***

See response to Q2 above. ENTECH-REM stated that emission estimates were based on similar facilities and mass balances.

COMMENT:

But you know or should know that **THERE ARE NO SIMILAR ENTECH FACILITIES, so this statement that you cite here is patently incorrect**.

The MOE will require supporting information for emission estimates.

COMMENT:

The Company will still not have this information at that stage - there will still be no similar Entech facilities.

The MPRT will review this information when it is available.

As stated in the response to Question 1, the predicted concentrations at the fenceline were orders of magnitude lower than available health based numbers and thus the reviewer did not expect a comprehensive evaluation. Additionally this is an Environmental Screening Report and a human health risk assessment is not a requirement of the Environmental Assessment process.

COMMENT:

But the ESR did contain a section entitled Human Health Risk Evaluation. Furthermore, I am sure that most citizens of Port Hope would agree with me that in fulfilling your responsibilities to the Council, who represent us the citizens, you should have pointed out health risks to the Council. **Where and when else were health issues to be addressed if not here and now, considering that there was and is no certainty that any other systematic assessment would or will take place?**

Q 5: ***Why would the Reviewer imply that it is given that a plant will be built in Port Hope?***

The MPRT did not imply this. An ESR has been submitted regarding a proposed plant in Port Hope and we were asked to review the material. That decision is up to the Ministry of the Environment and the Municipality of Port Hope.

COMMENT:

To the average citizen reader, the wording of your Review does imply this. For example, under the heading Conclusions (page 39) you state: "Generally, the methodology, type, volume and quality of the data

collected and conclusions of the ENTECH-REM CRA ESR are valid." You then point out: "However, there are areas that are missing:", and you then list 6 “areas” in which you merely request that the Company provide more “information” or “discussion”.

The average reader will find truly remarkable that your Review of the ESR, including the HHRE, can reach this conclusion when other reviews of the same material find so many glaring problems and so much misinformation in this material. The other reviews I am referring to here are my Review of the HHRE, and the reviews contained in the request for elevation to Environmental Assessment submitted by the Port Hope Residents 4 Managing Waste Responsibly. The latter document includes appendices containing statements from such leading and internationally acknowledged experts as Professor Vyvyan Howard of the UK, and Alan Muller of the USA.

Quite aside from all the Health problems that were revealed, several reviewers have pointed out that based on the engineering information provided by the Company, its calculations concerning the relationship of feedstock input, production of energy, and amount of residuals are simply incorrect, but you evidently did not discover this - in any event you did not report it to the Council.

Q 6: ***Why would the Reviewer consider it a sufficient condition that the proponent merely be seen to have considered the potential effects associated with emissions?***

A health risk assessment is not a requirement of the Environmental Assessment process and thus in the review, statements cannot be made to indicate that the proponent has to provide a health assessment. In most EA submissions in Ontario, proponents are beginning to provide a qualitative or quantitative human health risk assessment as a prudent measure even though there is no requirement for the documentation. We said that the lack of the human health risk assessment is a gap.

COMMENT:

But the Medical Officer of Health had requested a health assessment, and the ESR **did** include a Human Health Risk Evaluation. However, it contained egregious errors and misinformation that would be misleading to the Council, and you did not comment on this. As mentioned, the Council is entitled to be alerted to the health problems inherent in the Entech-Rem proposal, irrespective of precisely what the formal requirements are.

Q 7: ***In light of the fact that there is no safe level of these cancer-producing poisons, why didn't the Reviewer indicate that any level of these chemicals is unacceptable?***

As indicated previously, for carcinogenic compounds, the MOE indicate that risk levels below one in a million are considered to be essentially negligible.

COMMENT:

You forgot to add here "per chemical". See my comments above.

We prefer to use MOE and Health Canada guidelines where there is no safe level. This means that if a million people are exposed to the chemical then one person in that group of a million people may have an incidence of cancer. Health Canada indicates that the one in a million cancer risk is the most commonly used risk level for the management of risks posed by environmental contamination. To put a perspective on this, Health Canada indicates that the lifetime risk of developing cancer in Canada is four in 10 people or 0.4. Thus an increase in cancer risk of one in a million increases a person's lifetime cancer risk from 0.4 to 0.400001. Thus a risk of one in a million cancer risk represents a 0.00025 increase over the background cancer risk and will be undetectable using available epidemiological data and statistics, especially in a small community such as Port Hope. Health Canada considers that a one in one hundred thousand risk as being essentially negligible.

COMMENT:

Here you are repeating what you said above - it does not become more valid by repetition. See my comments above.

Q 8: ***Why did the reviewers not indicate that there is no safe dose of cancer-causing chemicals, and why didn't it reject the HHRE statements about levels of poisons such as dioxins being "low" and within "guidelines"?***

As indicated above, Provincial and Federal regulation are not premised on the basis of no safe dose.

COMMENT:

This is not a valid reason for you to not inform the Council of the medical and scientific facts of the situation. It is a fundamental basic law of mutation genetics that THERE IS NO SAFE DOSE FOR MUTAGENS. I provided detailed documentation of this in my letter to the Minister. The council should be informed of this, and confounding misinformation from the Company should have been identified as such by you.

For carcinogenic compounds, the MOE indicate that risk levels below one in a million are considered to be essentially negligible.

COMMENT:

Again, you forgot to mention "per chemical" - as mentioned there would probably be at least 250 carcinogenic chemicals emitted by the proposed incinerator, though of course the ESR mentions only 18 emissions, and falsely states that most are not carcinogens.

For dioxins, the maximum predicted concentrations at the fenceline are five orders of magnitude below the health based toxicity value provided by the MOE.

COMMENT:

First, the Company has absolutely no basis for "**predicting"** what the "concentrations at the fenceline" of dioxins would be, and accordingly you too have no way of knowing this, and should have so informed the Council. **Second**, bioaccumulation of carcinogens, discussed above and which has been best studied for dioxins, underscores that there not

only is no safe dose, in addition, minute amounts also accumulate and become large amounts.

Furthermore, use of the term "fenceline concentrations" is a bizarre attempt to mislead - as I explained and documented fully with scientific literature references in my letter to the Minister, dioxins originating in Florida are detected here in the Great Lakes. **DIOXINS DO NOT STOP AT FENCELINES**.

Nanoparticles are very small particles which can be emitted from natural sources, wood burning stoves, cooking sources, power plants, cars and trucks, industrial sources, non-road vehicles and forest fires to name a few. The U.S. EPA indicates that fast-food restaurants and roadways are a major source of nanoparticles.

COMMENT:

But there are two major differences between nanoparticles produced by incinerators and those produced elsewhere - you have systematically avoided mentioning this. **First**, incinerators (and specifically including the Entech technology) produce **vastly greater amounts** of nanoparticles than any other source - the production would be in the untold billions and billions, constantly 24 hours/day, 365 days/year. **Second**, nanoparticles produced in incinerators **pick up carcinogens from the large array that are also and uniquely produced in vast amount by incinerators, and can carry these carcinogens in to the internal organs of the body** that nanoparticles reach.

At a 2013 Air Quality Workshop on Ultrafine particles hosted by the B.C. Lung Association. Dr. S. Sarnat from Emory University in Atlanta summarized the epidemiological evidence related to exposures from nanoparticles and human health. Please see the following publication for more details:
http://www.bc.lung.ca/association and services/documents/7-StefanieSarnatWEBPOST.pdf

COMMENT:

I tried to open this link of yours and got the following on my screen: **"Page Not Found. Our apologies. The page you requested cannot be displayed"**

Irrespective of this: You are citing as your authority **a paper presented at a workshop**. I do realize, Mr. Hardy, that since you are not a research scientist, I cannot expect you to immediately understand the significance of this, so I will explain it carefully: **Papers presented at workshops have not been through scientific peer review.**

Since your own Report to the Port Hope Municipal Council is called a "Peer Review" I should remind you here of the difference between your usage of the term and its usage in science. The term "peer review"

originates from the academic and scientific world, and in that arena the peer review process is totally "arms' length". With respect to the so-called "Peer Review" produced by your company, where you are an agent hired by the Municipality, and in this case paid for by Entech-Rem, the term is used in a totally different sense. Here is a copy of the explanation of **scientific peer review** that I provided in my Review of the ESR HHRE:

In the world of science, the legitimacy of claims and statements in documents or articles is judged by the extent to which those claims and statements are backed up by documentation in what are known as peer-reviewed journals. The term "peer-reviewed" has a totally different meaning in science, to the meaning implied in non-scientific use. In science, the process is very rigorous, and in the case of the best journals, known as prestigious journals, most articles submitted do not get accepted. The process is arms' length and anonymous - the author has no choice in selection of reviewers, and is not told who they are. The journal's Editor evaluates a submitted manuscript to determine whether it is worthy of review, and if deemed to be so, the Editor decides on the referees (reviewers) and submits the article to them with no input from the author.

A **workshop** presentation may make statements that have not been fully evaluated in the rigorous process described above. Workshop presentations are works in progress, also known in science as Preliminary Reports. While I do not discredit any particular workshop paper, no serious scientist would consider workshop material as a valid refutation of the fully scientifically peer reviewed papers I cited in my letter to the Minister.

Her summary indicates that there are a growing number of studies over the past 10 years on the effects of nanoparticles and human health. All the studies are related to short-term exposures and there are no studies assessing long-term effects.

COMMENT:

Of course: we have not known about the problem long enough to have long-term studies.

The primary research indicates that there could be potential health effects related to cardiorespiratory mortality, morbidity as well as cardiovascular and respiratory effects.

COMMENT:

Cardiovascular (and other) effects are well established - this is not a "could be" situation - see the peer reviewed references I have previously cited. That the effects on the heart have become well known and well studied earlier than those in other organs, in the short history of nanoparticle medicine, will be easily understandable to any with an elementary knowledge of human anatomy. Nanoparticles enter the body mainly through the lungs. Blood receives its oxygen in the lungs,

and from there passes directly to the heart. Nanoparticles, like oxygen molecules (and **unlike** PM2.5, see below) can also pass through the minute pores in the lungs and in to the blood, and thus also go directly to the heart. This is why the heart is the internal organ that is most often infested by nanoparticles.

However, there are inconsistencies in the results of the studies related to a given health outcome.

COMMENT:

Of course; different studies and in particular preliminary reports, give different results. This does not in any way detract from the data I have cited.

In addition, based on the literature studies it is difficult to discern the independent effects of nanoparticles from other co-pollutants. She also indicated that the risks are in the same range as for PM2.5.

COMMENT:

First, it appears that you are at great pains to downgrade the seriousness of the nanoparticle problem by indicating that they are not so bad, because they are just like PM2.5. But PM2.5 are potentially lethal in their own right, and incinerators also produce PM2.5 in highly dangerous levels.

Having said that, the statement that risks for nanoparticles are in the same range as for PM2.5 **is incorrect**. There is a very substantial literature on nanoparticles in the peer-reviewed literature, some of which I cited in my letter to the Minister, that shows that **nanoparticles can and do enter the blood stream, and get deposited in internal organs such as the brain, heart, kidneys, liver and all other organs. I am here quoting peer reviewed medical literature on the subject. PM2.5 does not do this - PM2.5 are particles over a thousand times larger than the small nanoparticles. The latter can pass through the pores in the alveoli of the lung; PM2.5 can not.**

Of course we have only known about these facts for a relatively short time, and so of course there is a less enormous literature on the subject of nanoparticles in for example the kidney than there is on the subject of PM2.5 in the lungs, where those larger particles lodge. The argument that "there are few long-term data" is a pernicious trap, similar to what the tobacco industry argued for the first decades after the harmful effects of tobacco smoke became known, and still argues in the less developed parts of the world.

There is, from the medical point of view, no justification for defending the pollution of the air we all breathe with incinerator produced nanoparticles, just because we have not known about them long enough to have fully documented the havoc they will produce in the

long term. **Medical doctors, recalling past examples of polluting industries arguing that "the jury is still out", do not need another 20 years of such irresponsibility to be able to envisage what will happen, as millions of nanoparticles accumulate in a child's brain**.

The implication that there are only known effects of nanoparticles on the cardiovascular system, and not on other systems, is false and ridiculous. Below I give a small sampling of peer-reviewed studies on **effects of nanoparticles on the nervous system**. There are scores of such relevant recent articles - I do not want to take up even more space on this, but the fact that you are not aware of the literature on nanoparticles and the nervous system, as well as other systems, indicates that also here you have not done your research, **and it underscores the dangers of relying on non peer-reviewed preliminary reports as your source of scientific information**. Here follows the sample of articles on nanoparticles and the nervous system mentioned above:

Block ML and Calderon-Garciduenas L (2009). Air pollution: mechanisms of neuroinflammation and CNS disease. *Trends in Neurosciences* 32/9; 506-515.
Calderon-Garciduenas L et al. (2008). Systemic inflammation, endothelial dysfunction, and activation in clinically healthy children exposed to air pollutants. *Inhalation Toxicology* 20/5; 499-506.
Calderon-Garciduenas L et al. (2008). Air pollution, cognitive deficits and brain abnormalities: a pilot study with children and dogs. *Brain and Cognition* 68/2; 117-127.
Peters A et al. (2006). Translocation and potential neurological effects of fine and ultrafine particles: a critical update. *Particle and Fibre Toxicology* 3; 1-13.
Thompson EL et al. (2007). Air pollution alters brain and pituitary endothelin-1 and inducible nitric oxide synthase gene expression. *Environmental Research* 105/2; 224-233.
Tarantini L et al. (2009) Effects of particulate matter on genomic DNA methylation content and *iNOS* promoter methylation. *Environmental Health Perspectives* 117/2; 217–222.
Calderon-Garciduenas L et al. (2008). Long-term air pollution exposure Is associated with neuroinflammation, an altered Innate immune response, disruption of the blood-brain barrier, ultrafine particulate deposition, and accumulation of amyloid β-42 and α-synuclein in children and young adults. *Toxicologic Pathology,* 36; 289-310.

As mentioned there are scores more.

At this same workshop, Dr. Daniel Costa from the U.S. EPA conducted a Bradford Hill evaluation to judge the causality of exposure to nanoparticles and health effects. See the following publication:

http://www.bc.lung.ca/association and services/documents/8-DanielCosta.pdf

COMMENT:

Again, as mentioned above, you are here citing a paper presented at a "workshop" - this is not peer-reviewed scientific material.

The assessment determined that:

- The epidemiological data on nanoparticles is inconsistent;
- It is difficult to separate the effects from nanoparticles and PM2.S;
- There is some evidence to suggest that nanoparticles target the cardiovascular system;
- Invitro studies show effects;
- Animal studies show acute and chronic effects; and
- Some epidemiological data show cardiovascular impacts.

In the U.S. EPA's causality summary they indicate that the studies of short-term effects due to nanoparticles indicate that there are suggestive effects related to cardiovascular and respiratory effects and that there is in adequate evidence to infer mortality effects. In addition, there are inadequate studies to infer causality for long term exposure.

COMMENT:

See above for my refutation of this argument. Of course there are not long-term studies - we have only known about the problem for a short period of time. Where there are propagandists for the incinerator industry who, like the propagandists for the tobacco industry before them, say that there are insufficient studies to infer causality, as a doctor I remind you that the Precautionary Principle must apply. You or others who are not doctors may see this issue differently, but you ought to advise the Council on the basis of the Precautionary Principle, and according to what could arise if a potential polluter such as this were allowed to set up their activity in our beautiful town.

These findings are the same as those discussed above from the researcher at Emory University. Based on this evidence, the U.S. EPA concluded that PM2.S be retained as the indicator for all fine particles. Thus the statement in the peer review was based on and is supported by this evidence.

COMMENT:

It is not supported by the majority of the evidence. You have cited a couple of Preliminary Reports from a workshop - this is not acceptable in science.

Based on current science, the health effects related to nanoparticles are captured within the analysis of PM2.S.

COMMENT:

This is absolutely not a correct summary of the current scientific view as expressed in the peer-reviewed literature - **a workshop presentation does not trump a vast bibliography of peer-reviewed articles**.

Q 9: ***Why did the HSPR not refer to the findings of the Synergetics study, quoted above, that there is no way to prevent escape from Entech plants of deadly nanoparticles in to the environment in uncontrolled amounts?***

Our peer review report provides a technical compendium of all the regulations and guidelines that the reviewers use to assess the ENTECH-REM ESR. We have reviewed this document, but our conclusions stand.

COMMENT:

On what basis do you assert that your "conclusions stand" when a published study on the Entech process declares that this process produces nanoparticles and that there is no available technology that can prevent the escape of these in to the environment?

Please see Ql0 for our understanding of particulate matter as it relates to the ENTECH-REM
facility.

Q ***10: Why does the HSPR not conclude, as a consequence of the results of the Synergetics study, that the deadly release of nanoparticles is a problem that can not be solved in any other way than by rejecting the Company's application?***

Background concentrations of PM2.S in the area are in the order of 20 ~g/m3.

COMMENT:

Exactly - as mentioned above, **already 33% ABOVE THE CURRENT LOCAL STANDARDS AND ABOUT THREE TIMES THE STANDARD DECLARED IN CALIFORNIA.** This already outrageously high level of background contamination is totally unacceptable. **Why would you recommend acceptance of EVEN MORE?**

The maximum predicted concentration of PM2.S at the fenceline provided in Table 7 of the ESR is 0.112 ~g/m3. This represents 0.5 percent of the background concentration. Based on the proximity of the site to a major transportation route and source of PM and the measurement equipment available, the concentration of PM2.S from the facility will not be measurable or discernible from background.

COMMENT:

This argument is totally unacceptable - you are arguing that because the levels are already totally egregious, we should accept that a further

increase would not be of concern. This is the equivalent of saying that because major crimes already occur in Ontario, it would not be a big deal if a few more took place.

In Ontario, 50 percent of the background air concentrations of PM2.S and other pollutants come from the Ohio Valley. The regulatory agencies acknowledge that these background concentrations may cause health effects in sensitive individuals but use risk management approaches in setting the air quality standards.

COMMENT:

The statement that background concentrations affect "sensitive individuals" implies that an inherent state of "sensitivity" exists in some people, and only individuals in this category are affected. **No genetic research in support of this claim is cited, and I know of no such research**.

It should be noted that they revisit these values and the Canada Wide Standard for PM2.5 has been lowered based on the available health studies.

Q 11: ***Why does the HSPR not indicate that with background levels of PM2.5 pollution already way above acceptable levels, the Company Entech-Rem's application to install a plant that would be an additional massive source of "fine particulate" pollution, and on top of this would also produce unlimited nanoparticle pollution, is just not acceptable to the community?***

As stated in the response to Ql0, background concentrations of PM2.5 in the area are in the order of 20 µg/m3.

COMMENT:

Yes, again, as mentioned above, **already 33% ABOVE THE CURRENT LOCAL STANDARDS, AND ABOUT THREE TIMES THE STANDARD DECLARED IN CALIFORNIA.** This already outrageously high level of background contamination is totally unacceptable. **Why would you recommend acceptance of EVEN MORE?**

The maximum predicted concentration of PM2.5 at the fenceline provided in Table 7 of the ESR is 0.112 µg/m^3.

COMMENT:

But again, as explained above, the "maximum predicted concentration" is a fictitious number.

This represents 0.5 percent of the background concentration. Based on the proximity of the site to a major transportation route and source of PM and the measurement equipment available, the concentration of PM2.S from the facility will not be measurable or discernible from background.

COMMENT:

It is truly disturbing that you again here argue that **because an unacceptable level of pollution already exists this is a reason to let it get worse**. There already is gross background pollution, an ongoing source of increased pollution from the neighbouring highway 401 (which would be further aggravated by garbage trucks on Wesleyville Road every 12 minutes of the day if the incinerator were allowed), and further pollution coming soon from the Clarington incinerator. The existing unacceptable level of pollution should be seen as **AN ABSOLUTE ALARM SIGNAL TELLING US THAT WE SHOULD CAUSE NO FURTHER HARM**. **It is truly scary that you are advocating the opposite to the citizens' representatives in the Municipality of Port Hope Council**.

Q 12: ***Why did the HSPR not call the Entech-Rem HHRE on this misleading statement, which falsely minimizes the risks?***

Please see our response to Question 1 that discusses toxicity reference numbers, predicted concentrations and cancer risks.

COMMENT:

Curiously, **you did not provide, for the benefit of those to whom you copied your answers, the misleading statement I referred to in this question**. I provide it here:

The statement I referred to was the one in which the HHRE of the ESR **provides a list of** (only) **18 chemical emissions** (of the probable ~ 250 that such an incinerator would produce), **and states that only 4 of these are carcinogens. In fact, as I indicated and documented, 16 of the 18 are carcinogens**, and only carbon monoxide (which is lethal in acute exposure, and therefore not carcinogenic), and tin, are not.

Your answer to Question 12 in no way addresses the fact that the Company Entech-Rem made a blatantly misleading statement, and you evidently failed to notice this, or if you did, you failed to point this out to the Council.

The Company first understated the number of toxic emissions that would be released, enumerating about 7% of those that probably would be emitted, and then it admitted to only less than a quarter of those 7% being carcinogens, whereas in fact about 90% are.

Here again I do not think it is reasonable to expect Councillors to have

to dig out this scientific information, but I do think that my elected representatives, having appointed you to inform them, have the right and the need to be informed that, first, the Company **has only acknowledged ~ 7% of the ~ 250 emissions** that would probably be released; second, that **most** of the emissions that the Company has acknowledged will be released **are carcinogens**; and, third, that **the Company has attempted to mislead the Council, the Ministry and the public** on this issue too.

Q 13: ***Why did the HSPR not expose Entech-Rem's failure to disclose the relevant information on accumulation of poisons like dioxins?***

The ESR document provides predicted maximum concentrations of dioxins at the fenceline. These predicted concentrations are 5 orders of magnitude below the health based toxicity value provided by the MOE.

COMMENT:

As pointed out above:

1. Without any hard data from previous comparable plants to draw on, these "Predictions" are fictitious.
2. Dioxins do not respect fencelines.
3. Dioxins have been shown to be transported from Florida to the Great Lakes.
4. Having pointed all this out: my question here referred to ACCUMULATION of poisons like dioxins - the issue is the **bioaccumulation** of dioxins. You studiously ignored this issue in your Review, and you have done so again here - but the fact of bioaccumulation, on which I have provided full documentation, renders absurd any arguments about levels of carcinogen being below "health safety" values. The minutest amounts emitted accumulate to produce big amounts. This is really not very complicated - it should be relatively easy to understand.

Q 14: ***In Summary, does the HS team have any good reason to not recommend to the Municipality of Port Hope that the protagonist's application should be rejected at this stage?***

That decision is up to the Ministry of the Environment and the Municipality of Port Hope.

COMMENT:

This does not answer my question. **YOUR** decision on what you recommend to the Municipality of Port Hope is not up to the Ministry of the Environment and the Municipality of Port Hope - I was asking you whether **YOU** have a reason to NOT recommend rejection.

In our technical memo dated October 23, 2013, we offer the following recommendation to have the Municipal Peer Review Team complete a review of progress post-MOE approval and before the Municipality is asked to approve rezoning. We also pointed out that a Human Health Risk Assessment was missing and that there were gaps in some of the analysis pertaining to air emission and hydrogeology. If these studies are not conducted by ENTECH-REM, we concur with the Municipality of Port Hope's request for an elevation to an Individual EA.

COMMENT:

You assume that MOE-approval is a given. Also, you imply that if Entech-Rem filled these "gaps" you would find the ESR satisfactory, despite all the fatal and uncorrectable flaws that I have pointed out. Furthermore, this reply of yours does not seem to comply with what I and others believe we recall as having transpired at the meeting of 8 November.

Sincerely,

Dave Hardy, R.P.P.
Principal
Hardy Stevenson and Associates Limited
364 Davenport Road
Toronto, ON MSR 1K6
Tel. 416.944.8444 x222
Email: davehardy@hardystevenson.com

Cc: Mr. Carl Cannon
Mr. Ron Warne
Dr. Harriet Phillips, SENES
Mr. Chris Marson, SENES
Ms. Danya Braun, HSAL