A Note to the Lafarge Sustainability Stakeholder Panel on my Visit to the Ravena, NYS, USA Plant 10 July 2012 – by Alastair McIntosh

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Summary

The focus of this visit was mercury because that is how the Ravena plant came to the Panel's attention. I was given access to whatever information I requested from Lafarge, and every assistance was given by both the Paris and the American staff. I also asked local environmental groups/representatives for their views and information and I was impressed by their concern to see Lafarge operate to maximum achievable emission standards, while at the same time recognising the economic contribution that the company makes to their region. My sense is that Lafarge are dealing with the mercury issue at Ravena in a transparent manner. The level of such emissions appear to be well within recognised health parameters, though there may be wider technical or medical questions, as with many industrial processes, about the "cocktail" effects of multiple pollutants. A new regulatory framework is currently being implemented by the EPA and Lafarge's new dry-process plant is planned to conform accordingly. Progress with its construction depends on the economic environment and achieving certainty as to the requirements of the currently-emerging regulatory framework.

Background

For several years now Lafarge have appraised the Panel about mercury emissions at its Ravena plant in New York State. This was consequent to the matter having been raised with me by Friends of Hudson (FoH) following a visit I made to the state when FoH were spearheading opposition to a proposed cement plant extension by Holcim.

I was invited back the Hudson area this summer by FoH while en route with my wife to a series of speaking engagements in Nova Scotia. Visiting Ravena was not the purpose of my visit, but I took the opportunity to do so along with Chris Reed, the President of FoH. The visit was facilitated by Kareen Rispal and Alan Kreisberg in the Lafarge Paris office, and Alan provided me with good email briefings in response to my advance questions.

Also in attendance during the visit were Jeff Baker the attorney to Friends of Hudson, Jim Travers of the Citizens' Environmental Coalition, Roger Downs the Conservation Director of the Sierra Club and two of the locally elected members of Lafarge's community liaison group. Roger and Jeff came at the suggestion of Chris Reed with the agreement of John Roughan. John invited the community representatives.

We were welcomed at the Plant by Craig Campbell, Lafarge's Vice-President for Environment and Government Affairs in North America, John Reagan the Environmental Manager at Ravena, Martin Turecky the Plant Manager and Ran Tamir the Quarry Manager. Along with other management and plant workers there were about 20 of us in all.

John Reagan opened with a presentation about the Ravena plant. It was an impressive showing, though I commented afterwards that it focussed strongly on the plant's charitable and community engagement and not as much as I would have liked on the contentious issue of mercury emission and the progress of plans for the new kiln.

When I later asked for critical feedback on my own presentation , both Martin and Ran said that they felt I had been a little over-forceful in making this point. To them, such charitable engagement reflects the extent to which the Plant is integrated in with the community where most of them live. I accepted that as a fair point while, at the same time, repeating the care that needs to be taken over real or perceived "greenwash", and that this can best be countered by tackling contentious issues head on.

I gave a presentation (attached to my email) on how I came to be involved with Lafarge, the work of Lafarge's Sustainability Stakeholder Panel, and how mercury is now an issue strongly flagged up by UNEP on the agenda of global concern. I described the Panel's role as critical friends, and laid out some key points from the 2020 vision statement expressing the kind of company Lafarge is seeking to become in terms of societal and environmental obligations.

Site Visit

I was impressed by:

1. The attention given to health and safety. (Frank Rose will be pleased to hear that one visitor remarked how striking it was to arrive and see all the vehicles parked facing outwards on realising that she'd not followed suit!).
2. The level of dust control. I arrived thinking that the stack was emitting particulates. It proved only to be steam manifested by transient local atmospheric conditions, and I had been misled in my perception by the fact that Ravena currently uses a wet process, whereas other Lafarge plants I have visited have been dry. Although there had been a long spell of dry weather I

could see no visible signs of dust on plant leaves, local vehicle roofs or the black asphalt roof of the local school … though of course, that does not mean that there is no dust problem.

3. There was not opportunity to see many management-operative interactions, but those I did witness were relaxed, respectful and convivial.
4. Outwardly at least, everything had the air of a very well run Plant. The scale of operations was much too large for there to have been a speedy tidy-up in anticipation of my visit. The place had as good a feel to it as any I've experienced on Lafarge site visits.

Discussion of the Issues

We returned to the Board room for discussion. The management gave all the time that was needed, extending a scheduled 2 hour visit into 4 ½ hours.

My focus was on mercury as the pressing concern of local environmental groups, and linked to that, their concern that the new dry-process kiln that should cut emissions is completed as quickly as possible.

Craig told me at the start of the meeting that he would have to be careful what he promised, because he did not want to make statements that the company might not be in a position to follow through on. I accepted the need for such reserve.

My questions were:

1. How great is the risk posed by Ravena to the local community and what is the mercury fallout distribution cone?
2. What measurements are made of mercury levels in local people and/or wildlife?
3. When can the new dry-kiln process be expected to be completed?

I will take these in turn.

1. **How great is the risk posed by Ravena and what is the mercury fallout distribution cone?**

Making this site visit required me to do some background research into the nature of mercury toxicity – both before and more particularly, after the visit. I stress that I am not an expert on this and that my views as expressed in this document should not be cited as such.

Since 2003 UNEP have run a global mercury programme and their mercury awareness-raising package can be downloaded here. In 2009 UNEP's governing council agreed on the need to develop a global legally-binding instrument to control mercury emissions. The Lafarge Panel, spearheaded on this issue by Jean-Paul Jeanrenaud of WWF, therefore advised Lafarge that mercury is an upcoming issue that should be factored into all future planning where limestones or fly ash sources are known to have raised mercury levels.

In parallel to rising global concerns about mercury, the US's Environmental Protection Agency (EPA) is currently setting acceptable emission standards. Many industries in NYS emit such heavy metals, and a long-range source are coal burning power stations in the Midwest. At one point Ravena was listed as NYS's top mercury emitter, and Lafarge is determined not to appear in such a position again.

I have struggled with trying to grasp how much of a health issue mercury really is under the circumstances emitted by Ravena. The EPA only considers a spill of elemental mercury to be reportable if it exceeds "two tablespoons" - about one pound in weight. The same EPA report on mercury toxicity suggests, surprisingly, that human mercury levels are not necessarily correlated with proximity to industrial areas because it is largely down to diet, especially fish that are high up the food chain. However, where high levels of mercury are found in mothers, there is evidence of correlation with stillbirth and birth defects. As such, and as a persistent pollutant, every effort should be made to minimise mercury emissions.

While much of the literature that I have seen dealing with industrial mercury emissions appears to address plants that produce tons, tens of tons and even (in Africa) thousands of tons, the amount concerned at Ravena is relatively small. Currently Ravena is capped to 176 pounds per annum. (In the USA there are 2,000 pounds to a ton). Also, 98% of the Ravena mercury is elemental. I initially made the assumption that this would condense and deposit locally in a fallout cone according to the square of the distance from the plant. However, Craig informed me that this was an incorrect assumption. I have since seen several mentions in the literature that suggests he is correct, for example, UNEP's Global Mercury Assessment which states: "The majority of air emissions are in the form of gaseous elemental mercury, which is transported globally to regions far from the emissions source." This does not mean that mercury is not a problem. Elemental mercury enters the global mercury cycle, and some of it will eventually become dangerous methyl mercury in the food chain. But it does suggest that Ravena's emissions may be less of a local problem than I had assumed.

Most of us carry mercury on our persons in the form of dental fillings. The debate around these has raised public awareness of mercury, but arguably, in ways that may sometimes be hypersensitive. Some non-conventional health therapists allege that the dangers of mercury have been covered up. One dental campaigner who offers his own "natural mercury detoxification programme" in California claims that: "Mercury is the most poisonous, naturally occurring, non-radioactive substance on the planet! There is no safe level of mercury! One atom of mercury is poisonous to your body. That's right, just one atom! We're not talking about a truck load of mercury here. We're talking about a single, minute atom of mercury doing some harm to your body." Such a view would find no conventional scientific support. As a natural element sourced especially from volcanic activity, mercury is always present in the environment. The body tolerates a certain level of such toxins. However, any company that emits mercury needs to be aware that it is, for reasons both scientifically sound and unsound, a concern in public consciousness and this raises the vulnerability of emitters. It could affect future license to operate.

2. **What measurements are made of mercury levels in local people and/or wildlife?**

It would seem that the most definitive document on public health arising from Ravena's operations is the November 2010 Phase One *Health Consultation* by the NYS Department of Health. To my eye, this left a number of questions not adequately addressed or flagged up as requiring further study. I am neither qualified nor have the time to carry out a proper evaluation of this report, but here are two examples of where I felt loose ends were left hanging:

1. There have been limited evaluations of health outcomes in the community and among workers at the Ravena cement plant. In 1989, the NYS DOH conducted a cancer investigation for the Town of Coeymans, including the Village of Ravena, for the years 1976–1986 (NYS DOH, 1989). The investigation found cancer incidence was similar to what would be expected for an area with similar size and population density in NYS. In another evaluation, mortality among workers at the Ravena cement plant was reviewed based on union records supplied to the NYS DOH spanning a period from approximately 1964–1988 (personal communication). Although the proportion of workers who died from cancer seemed higher than normal, many of the causes of death could not be verified through searches of mortality records or Cancer Registry reports, and no formal study was conducted. (P. 45, and note the dating of this worker study, which may have been under very different conditions than today, and may not have disaggregated other known factors such as shift worker effects.)

2. The proximity of the Ravena cement plant to the RCS Middle-High School illustrates the need to consider children as a potentially vulnerable population in phase two of the health assessment. An available health risk assessment evaluated the effect of lead released to air from the proposed use of TDF at the cement plant on children's blood lead levels and estimated that a very small, clinically insignificant, increases in blood lead might occur. However, potential vulnerability of children to other chemicals released from the plant has not yet been explicitly considered. The health effects evaluations conducted during phase two of the health assessment will consider the unique physical and behavioral qualities of children that might make them more vulnerable to chemicals from the Ravena cement plant. (Pp. 46-47.)

This Phase 1 report also has an appendix about toxin levels reportedly found by a wildlife expert, Ward Stone. As I understand it, a number of issues surround Stone's study which may leave his methodology in doubt. I heard this not just from the Plant officials but also from one of the environmentalists who was in our group.

My bottom line question was: "If Ravena has nothing to hide, why not test local school children, plant workers and/or wildlife?" According to the *Health Consultation*, an attempt was made to do so in 2010:

In May 2010, Dr. Michael Bank of the Harvard School of Public Health invited adults and children seven years of age or older living within an approximate ten mile radius of Ravena to provide hair and blood samples for heavy metal analyses, including mercury. Volunteers were also asked to complete a questionnaire focusing on possible exposures to mercury, including indoor mercury spills, dietary seafood and occupational exposures. According to a summary of the research Dr. Bank shared with the NYS DOH, this research is being conducted in collaboration with CASE who "is seeking to identify and quantify the potentially hazardous substances being emitted from the Lafarge stacks and the quarry. Additionally, CASE is seeking information related to source apportionment, fate, and transport of the identified pollutants of concern and their potential health effects on community members, particularly children." According to the consent form provided to volunteers for this study, the purpose of this research study is to "measure environmental contaminants, such as mercury in [your] hair and blood samples; to increase awareness among participants and the general public about these contaminants." Aggregate results of the biological samples collected by Dr. Bank are anticipated

to be shared with the public.

However, nobody who I spoke to, including the environmental groups, had further information on this except to suggest that the study had run out of funding. The Plant staff were very wary of the reliability of testing as, they said, there are so many other sources of mercury in the local environment that it would not be easy to pin it on one point of emission. One of the environmentalists present suggested that this objection could be overcome by isotopic fingerprinting. Somebody else said you'd be looking at levels near the threshold of detectability, so there would be no point.

I am not able to assess that debate, but it does seem that there are recognised issues with the limits of detectability and reliability. Also, there are many confounding sources of mercury such as from a high fish diet, coal power stations, spillage from instruments such as barometers in the home, dental sources, etc.. In the litigations American environment, companies are wary that if they carry out studies, the results may be used unfairly, and not just fairly, against them. I can understand that concern. At the same time, if I was a parent near a smokestack that emitted mercury vapour I would find it reassuring to have my child tested.

Several times the comment was made that we are dealing with levels of mercury that are on the threshold of detectability. This may be valid. For example, in a 2009 Powerpoint presentation (supplied by John Reagan), Thomas Gentile of of the Bureau of Air Quality Analysis & Research of the New York State Department of Environemtal Conservation said of the Ravena plant: "The annual impact of the metal emissions (including mercury) were below 1% of the annual guideline concentration values used by the Department." If that is the case, I can understand why the Ravena management feel that there is no point carrying out testing, since anything untoward that might be found is theoretically very unlikely to be their responsibility.

It appears that some of these areas of uncertainty will be taken further in a forthcoming Phase 2 *Public Health Assessment* study by the state authorities. Personally, I would be interested to hear Dr Frank Rose's opinion on all this (Frank is the Panel's expert on industrial medicine, and was appointed by Lafarge on the recommendation of WWF. I hold his independence of opinion in high regard).

3. When can the new dry-kiln process be expected to be completed?

Nobody that I spoke with seemed to be suggesting that the Ravena plant should be closed. Quite the contrary. What was being asked for was that *maximum achievable control technology* (MACT) be implemented as quickly as possible via the Ravena Plant Modernisation Project which will bring in the new dry kiln process. The new EPA *Proposed Rules* for regulations that the industry must comply with by September 2015 were published in the *Federal Register* only a week before my visit. The technical debate laid out there, about which the industry is currently in a 60 day consultation period, is beyond my competence to discuss. I do note, however, that this document confirms the dearth of reliable research into the human toxicology of mercury, including the statement (p. 42392): "Overall, human data regarding reproductive, renal, and haematological toxicity from MeHg are very limited and are based on either studies of the two high-dose poisoning episodes in Iraq and Japan or animal data, rather than epidemiological studies of chronic exposures at the levels of interest in this analysis." It is this uncertainty that justifies a MACT approach to emissions regulation (based, presumably, on the precautionary principle) rather than, as would be more preferable for all stakeholders, an evidence-based epidemiological approach.

Work has already started on the new kiln, but the rate of progress has currently been "slightly delayed" for 2 reasons:

- The economic crisis in Europe and America. At the moment, Lafarge at Ravena do not have the £500 million authorisation from Paris to proceed with the new plant, which has to be built in a bespoke manner. However, emissions have currently fallen because the slowdown in demand has cut production.

- As just mentioned, only on 18th July did the EPA publish their revised NESHAP guidelines which will regulate for future emissions. While these are out for their 60 day comment period, implantation of the upgrade must wait so

that Lafarge (and the industry as a whole) can be certain of what the regulators will expect of then. This seems to me to be reasonable reason for delay.

I also had explained to me why Lafarge has been working with the Portland Cement Association to limit the severity of the new regulations. As Alan Kreisberg put it to me, "Today the lowest ELV limits are in Europe and the US NESHAP legislation is establishing limits for a number of criteria that are between 10% and 30% of the European limits. The debate and lawsuit by the PCA was not about trying to stop responsible legislation, but whether the value established should be 10% of the European limit or 25% of the European limit, still the most stringent limits in the world." I have to say, this sounds like a reasonable position for Lafarge to hold, especially given that until now, the USA has had no limits. It is encouraging that, at last, the EPA and the industry are on a path for developing limits.

Conclusions

My visit was only for one afternoon, and this report is based on a non-professional's reading of what he saw and a number of technical reports. With that caveat, my overall sense is that Lafarge has kept its Sustainability Stakeholder Panel properly and fairly informed about Ravena. I have been given no cause to suspect that Lafarge has things to hide.

I do, however, think that transparency around issues of concern at Ravena could be made more explicit … perhaps via a dedicated web page. This would track what the issues are, host key documents such as those which John Reagan sent to me (and cc'd to FoH and the Sierra Club), and in particular, keep people posted on progress with the new kiln.

I thank all those who have made this visit possible including Friends of Hudson, the Ravena Plant management, Craig Campbell and Lafarge head office staff in Paris. At no point have I been denied information that I sought. In many ways it was remarkable that Lafarge were willing to host a meeting with me as a "critical friend" insider, and key local environmental groups including the FoH attorney. I heard at least 2 people say "this kind of meeting is very rare in America."

My only regret is that my capacity to analyse the technical data is so limited. In this respect, it is important to remember that I serve on the Panel in a general capacity, and on a purely voluntary basis.

Lastly, I would like to say that I was by no means alone amongst the visitors that day in being hugely impressed by the human calibre of the Ravena Plant's management. Martin Turecky, John Reagan and Ran Tamir were all people who could look you straight in the eyes, give straight answers to straight questions, and clearly had passion for their work and its connection with their local community. It was a privilege to meet them and they were a credit to Lafarge.

Alastair McIntosh, 28 July 2012; Revised 2nd August 2012.
Presented to Lafarge Executive & Sustainability Stakeholder Panel meeting, 20 November 2012, chaired by CEO Bruno Lafont, with supportive reception from Dr Frank Rose (industrial medicine expert) and several other Panel members).