ABILITY OF PLASMA GASIFICATION TO HANDLE CONSTRUCTION AND DEMOLITION WASTE

Addition to the Coalition Brief

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Many briefs presented during the BAPE hearings between 12 June and 16 June, 2007, referred to Plasma Gasification as the preferred approach for dealing with municipal solid waste, instead of burying it in landfills. The Coalition against the Danford Megadump included in its written brief a detailed plan for plasma gasification as a solution for the long-term treatment of waste in the region.

During the presentation of briefs the Commissioners asked several times whether plasma gasification was capable of handling construction and demolition waste. Their concern was justified since all dry dumps, which normally take this type of waste, are to be closed and there will be approximately 50,000 tons per year to be treated in the Outaouais.

On June 16, 2007, I intervened and attempted to provide a simple answer to this question, and indicated that I would submit a follow-on document to enlarge on this. The present document is the follow-on.

The simple answer to the question is that plasma gasification can treat this type of waste. However, is it justified to feed any and all waste into the system? The answer to this last question is no.

A plasma gasification system should be optimized to produce as much energy as possible to create electricity. Any waste that has no net energy content requires electricity to be used in its treatment, but does not produce electricity, so this reduces the overall efficiency of the facility.

Non-Energy Containing Materials

It does not make sense to feed such building materials as stone facing, bricks, mortar, and concrete into a plasma gasification plant. These materials are generally stable, so landfilling them does no harm to the environment. Similarly rock and gravel from excavations should not be hauled to a plasma gasification facility for treatment. It is better to haul this type of material to other construction sites or to other locations which need landfill to bring them to the desired grade. Alternatively, the above-mentioned materials can be crushed and fed back into

concrete and asphalt as aggregate material. By this means we could reduce the amount of new materials dug from "sand/gravel pits" and crushed for aggregate. Scars on the landscape could be reduced from this measure.

We may not yet have the infrastructure in place in all locations to enable both these approaches to be used. However, it should not be difficult to establish in each municipality a registry of sites requiring landfill for grade establishment – the construction firm would need only to consult the list and make arrangements to haul the material to a site ready to receive it. There are also rock crushing facilities in most areas where construction is being carried out. These could be mandated to crush the materials which are not landfilled.

Metals such as rebar rods, i-beams, copper piping, copper and aluminium wires, etc., should be removed from the waste and recovered for re-use or melting down and then reformed into suitable building materials. It may not, however, always be possible for all metals to be removed from demolition material – in this case, the plasma gasification plant can handle it and the molten metal can be drawn off to be sent to suitable smelters for reforming. The amount should be small, so the efficiency of the plant in generating energy is not substantially impacted. Some heavy metals would have to be sent to hazardous waste treatment centers.

Energy-Containing Materials

In excavation sites, there are often tree stumps which have to be removed. During excavation, these can be removed and set aside for hauling to facilities that have shredders and chippers. The tree stumps are then cut up into small chips and sent to be composted. There are many such facilities available to do this now, and this capability should be extended to all areas. Alternatively, since tree stumps are wood, they contain energy and can be cut into smaller sections or shredded and used in the plasma gasification process.

All construction/demolition materials which contain energy and are beyond re-use in their current form should go to a plasma gasification plant. Energy-containing construction materials (as high as 60% or more of wood frame housing) that have been demonstrated to be safely and effectively treated by the plasma gasification process include: wall paper, cardboard, plastics, fiberglass insulation, **asbestos**, wood, rubber, asphalt shingles, used roadway asphalt, composite materials containing resins, linoleum, tires (including those that have completed their useful life as blasting containment barriers), plastic piping, plus many others – in short all materials with a carbon content. Such materials enable control over the synthetic gas (syngas) generated in the plasma gasification plant to ensure that it always has the same energy content and can generate electricity efficiently.

The energy-containing construction materials contribute to the generation of electricity from the syngas.

The solid material which emerges from a plasma gasification facility (typically 150 kg for every 1000 kg fed in) is a stable glass-like material. Cooling it rapidly with water can allow this material to break into small chunks suitable for use as aggregate in concrete and in pavement. Larger chunks can be crushed and used for the same purpose and also embedded in flooring materials. So we would have some of the original construction materials converted back into new construction materials, and some into electricity.

Excess stable solid material could be safely landfilled if necessary

Should there be too much building or grading material generated by the two approaches ((a) material removed at source and crushed before waste goes to plasma gasification, and (b) the glassy material from plasma gasification), they could be safely placed in an ordinary landfill site since they are stable and non-polluting. **The amount would be sufficient only for a small disposal site**.

With this type of organized approach, there would be no need for engineered landfills to handle construction and demolition waste.

An organized approach such as referred to in this document, together with the composting of organic material from municipal waste would allow treatment of virtually all waste in the Outaouais, making large engineered landfills a thing of the past.

Final Comment

Mr. Mbaraga of MDDEP, in his final comments at the BAPE hearings referred to his ministry treating plasma gasification as a form of incineration. This needs to be clarified. Plasma gasification, while a thermal process, does not burn waste, since it is done in an atmosphere starved of oxygen. Thus it is not incineration. The ministry does not have any specific regulations regarding the allowable emissions from plasma gasification, Thus in the absence of emission standards for plasma gasification, it applies the incineration standards to it. Since the performance of plasma gasification from the point of view of emissions is so much better than incineration, incineration standards are easily met, so it should be easy to allow permits for the technology. (www.plascoenergygroup.com lists emissions from the Plasco's plasma gasification facilities compared to incineration standards) Eventually new standards will need to be adapted reflecting the better performance of plasma gasification.

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