Why PFA should be recycled as cement

by
Dr Peter Harbour

Who should read this? This article should be read by those who are interested in

- reducing CO_2 production to avert climate change,
- reducing the amount of mineral extraction,
- reducing the amount of waste disposed to landfill
- avoiding the flooding problems related to operation of waste disposal sites in the floodplain.

The ideas developed are of local importance everywhere that coal-fired power stations operate, and therefore have global implications which should not be underestimated.

PFA, pulverised fuel ash, is produced in very large quantities by coal-fired power stations. Until recently it has been regarded as something to be disposed of as waste, but this is wrong, very wrong. In our campaign to save a wildlife site at Radley in Oxfordshire, a lake that the owners of Didcot power station wish to fill with PFA, we have become aware of how a potential saving of CO_2 production, an avoidance of landfill AND a reduction in mineral extraction might be simultaneously achieved if the power companies were forced to recycle their PFA as a cement substitute. One calculation by Dr Chris Goodall suggests that Didcot produces a quantity of ash, which if recycled correctly has the potential to save annually 4 tonnes of CO_2 production per capita in Oxfordshire.

The disposal of PFA to landfill is counter-productive at every level and yet government does almost nothing to help. Hilary Benn wrote to me at the end of last year saying he hoped that PFA could be reclassified between the time it is produced and the time it might be used. At present it is classified as waste and therefore has to be handled under the Waste Directive. This must change. Power stations should be required to sell to the cement industry and the cement industry should be required to use a certain fraction of PFA in their input. That would reduce the demand for limestone and clay, reduce the CO_2 produced from limestone (and coal) during the kilning of limestone, reduce the demand for landfill sites and reduce the real risk of pollution when PFA is stored in (imperfectly) clay-lined pits. The benefits to all inhabitants, human and animal, in the areas where extraction and landfill are carried out would be enormous.

An example of good practice is the Scottish Power station at Longannet. There they have a 50:50 partnership between Scottish and Lafarge cement, running Scotash, a business which concentrates on reuse of power station waste. In April 2008 Scotash received a Queen's Award for Industry, conferred by Her Majesty the Queen on the recommendation of the Prime Minister. It recognises ScotAsh's production of sustainable construction products, including blended cements, grouts and waste stabilisation materials, from power station ash. See http://www.scotash.com/news_info/08_04_21.html

Our protest group, see www.saveradleylakes.org.uk , has produced a report on PFA http://www.saveradleylakes.org.uk/documents/documents/SRLReports.htm , which gives, in rather a lot of detail, the story of the problem at Didcot. We show that PFA can be used to make a wide range of products, including blocks, bricks, tiles and cement. They are lighter in weight than their cement or clay equivalents, leading to a transport saving. PFA can even be combined with slag to make "E-crete", see http://nextbigthingaward.com/2008_finalists/e-crete.html avoiding the use of Portland cement altogether. A recent development in Oxfordshire is that the waste disposal company, WRG, has decided, after talking last year to representatives of Save Radley Lakes, to develop a storage cell for PFA at their site at Sutton Courtenay, with the aim to take all the PFA that the power station is unable to dispose of. PFA is used by WRG to cap household waste on a daily basis, a requirement which will continue well beyond the end of life of Didcot A power station. WRG will apply for planning permission for the waste disposal cell in June 2008.

What I propose is that the arguments we have developed in our protest group, Save Radley Lakes, arguments which have been adopted by Scotash and recognised, but not yet promoted by the Prime Minister, should be developed by those in Oxfordshire who are responsible for waste (Oxfordshire Waste Partnership), for mineral extraction and for responding to climate change, as well as those aiming to reduce causes of flooding. Oxfordshire should aim to be the first county to evolve a sustainable policy with regard to recycling of PFA. It should aim to promote this policy on a regional and national level and eventually internationally.

Peter Harbour, M.A., Ph.D., 12 June 2008
43 South Avenue, Abingdon, Oxon, OX14 1QR
01235 526678

Comments received from colleagues

1. Have you mentioned that PFA could be manufactured in many ways to build the Olympic Village?

Answer: It can also be used for concrete barriers on motorway/dual carriageways.

2. I suggest it might be worthwhile adding something on the importance of coal. (Four new coal power stations a week in China etc etc). Give a global total for the amount of ash and how much cement it could replace? *Answer: sounds like a good idea, but a bit of work needed!*

3. You might think about taking out the bit about the floodplain (that's very specific to Radley).

Answer: I'll leave that to the Guardian to decide. Landfill is often into gravel pits which are nearly always in floodplains. If the gravel pits are bunded and therefore raised above grounfd level, then they reduce the available space in the floodplain.

4. You could also add in that householders are being enjoined to recycle, and potentially fined if they don't, but lucrative energy companies can dispose of hundreds of thousands tonnes of reusable stuff to landfill without any problem.

I also think that the figure of 1 tonne of CO2 saved per tonne of PFA recycled into cement (I think that's the figure?) has more impact than Chris' '4 tonnes per capita in Oxon'. It's slightly unclear what that means, and if you don't know what the population of Oxon is it doesn't mean so much. Also, that's a local way of looking at things - the Guardian will want a national take.

5. Well written. Could you be a bit more specific about your proposals,

Answer: What specifically can be made more specific within the overall length of two pages?