

# Geological Waste Disposal

*A Working Paper for LTC by Dick Houghton*

## 1. Safety aspects of a GDF

### Dangers

The argument that our residents would be less safe with a GDF nearby is real enough. These radioactive substances are highly dangerous and, if released, would kill and disable many thousands of people and make this part of East Anglia uninhabitable for centuries. Chernobyl was a terrible warning.

The worst form is  $\alpha$  (alpha) radiation, from decaying plutonium for example, which does not penetrate more than a few millimetres into our bodies (it is a bulky group of sub-atomic particles of 2 neutrons and 2 protons like a helium nucleus) but has a major effect on our cells if ingested or inhaled, causing organ failure in high doses and cancer in lower ones.  $\alpha$  radiation is rarely found in nature but occurs near deposits of uranium ore. The other kinds of 'ionising' radiation are  $\beta$  (beta),  $\gamma$  (gamma) and neutron radiation. These are also associated with radioactive waste and which penetrate more deeply and damage us in a similar way. These do exist fairly widely in nature in low doses.

### Natural exposure

We are already subject to radiation which occurs naturally from cosmic 'rays' and from radioactive substances in the Earth's rocks. Cosmic 'rays' are really particles; they are a different kind of radiation and so the comparison is not entirely correct. They pass through with high energy and cause similar damage to our cells as  $\alpha$ -radiation which our bodies normally repair naturally. It is a little recognised fact that the source of much of the heat that creates molten rock upon which the continents float is created by the radioactive decay of uranium and other radioactive elements. Granite rocks produce the radioactive element radon (a gas) and inhabitants of Cornwall for example can be exposed to it in their homes.

### Underground and sealed

A radioactive waste disposal underground is a very different situation to a working reactor or storing it on the earth's surface. We may be against nuclear power whilst still accepting that legacy waste needs to be stored safely. We have some of the best scientists and engineers in the world in this country and we can ensure that any design is as safe as we want it to be. A GDF would not necessarily increase the level of exposure that we experience every day.

## 2. Civic duty

### Storing it over ground

No matter whether one supports nuclear whether for power generation or making bombs, the fact is that the UK has a large stockpile of radioactive waste made over the past 70 years. It is stored overground where it is vulnerable to release by accident and by the lunatic acts of fringe groups. Any such release would be species-threatening. Keeping it underground in a well- designed and defended facility is infinitely less dangerous.

Life of radioactive substances and the human species

The radioactive half-lives of these substances range from a few years to many millions of years and present a grave danger of release when stored on the surface. Some of us think that the human race will be lucky to survive until 2100. Putting these substances in a GDF constructed in rocks that have been stable for 75 million years (as with our Cretaceous chalk beneath our feet) makes our early final demise far less likely. Building a national facility for underground storage is our civic duty and we should allow BEIS/RWN explore all possible locations for this use, including our own area.

### **3. Parallels with Gisleham Tip**

As Councillor Green reminds us, the Gisleham pit debacle was a disgraceful mis-planning by Waveney District Council and involved illegal tipping of toxic wastes. However the issue was used by the Labour Party as a rallying cry and much nonsense was talked about it at the time; this seems to be continuing.

A spurious comparison

The parallels with Gisleham tip raised by Norman Castleton with Councillor Patience are spurious on a number of grounds. The fears of toxic waste leaking into the sea via the shallow surface sediments have never been realised. There is certainly a shallow aquifer in these gravelly sediments which could conduct materials towards the beach and seabed and the fears were real enough but have been unfounded so far.

An aquifer in the chalk

Any GDF would be constructed in the much deeper chalk rocks which lie between 50 and 500m underground and materials would not naturally flow to the surface if there was a leak. However these rocks also contain an aquifer which is used as a water supply in some parts of our region. This is a problem and we have to ensure that engineering solutions are found to prevent contamination.

### **4. Benefits to the local area**

Misconceptions about employment

It has been said (e.g. Councillor Barnard) that any related jobs would not be filled by locals and would not have local benefit. That may well be true initially. We should note that many of our brighter students get qualified elsewhere and never return to their home town because of poor employment prospects. A GDF here would counter this. Not only that, the

'600' permanent jobs to run it (some say 200) would exist in perpetuity. In 20-30 years time many of the children of the people who will work at the GDF would become qualified and would have something at home to employ them and a reason to return. As with CEFAS, the existence of a well-qualified and industrious workforce at a local GDF would be of great benefit to the town.

Financial benefits to be negotiated

The total cost of building the GDF would be £4,400m with running costs on top (£398,300 for a canister of High Level Waste and £9,170 for Low Level Waste). Participating landowners are being offered £1m a year rising to £2.5m if they get to the borehole stage. This is a tiny and inadequate amount. We should ask for much more – say £10-30m a year or more during its development and then get rent in perpetuity. Such levels of compensation have been granted in France and other countries.

Potential civic benefits

Think what even £10m could do - refurbishment of the Marina Theatre and the Town Hall, a civic centre and museum for the town's assets, repairs to the Denes Oval, better planting and facilities in our parks, improvements to the appearance and public use of the inner harbour, better litter and refuse collection, a purpose-built record office, purchase of the Magistrates Court, a living beach village, a street market, buying out ABP, a road tunnel to by-pass Oulton Broad North, new walls for front gardens along our major roads, more allotments, grants for refurbishment of privately-owned historic buildings, new toilets everywhere, better schools, better recreational facilities for our youngsters - perhaps skate or BMX parks on the South Beach; the list is endless. With good management by the Town Council the town would be transformed.

## **5. Impact on the local area**

A GDF in Lowestoft

One can envisage the high impact-proof metal 'flasks' arriving from the south by rail. Such flasks have been routinely used to transport radioactive waste around the country for many decades, even through central London. A new line built on the old rail route to Yarmouth could take these flasks to an entrance tunnel under the north cliff in the area of the Ravine and onto the North Denes. They could then be taken deep underground using a lift to the GDF built say 500m beneath the seabed in stable chalk. The facility could be constructed almost entirely under the sea where it would have to be several kilometres square in plan. As Councillor Green indicated, there would be some need for very temporary storage above ground whilst the transfer from rail and lift takes place.

A more rural location

This is just one extreme scenario of building a GDF close to us and using Town Council land. Its proximity would not cause me to lose sleep at night but I know that is not true of everyone. It is likely that a more rural situation would be sought but even then, by

supporting and welcoming such a development, we can make sure that the town receives substantial benefits from it.

## 6. Some links

From the opposition (i.e. Together Against Sizewell or tasizewell - Peter Lux, Emma Bateman)

[http://www.nuclearwasteadvisory.co.uk/wp-content/uploads/2013/12/Nuclear\\_Waste\\_paper\\_StockholmNovember\\_2013\\_A\\_Wasted\\_Future.pdf](http://www.nuclearwasteadvisory.co.uk/wp-content/uploads/2013/12/Nuclear_Waste_paper_StockholmNovember_2013_A_Wasted_Future.pdf)

<http://www.nuclearwasteadvisory.co.uk/>

<http://www.plux.co.uk/nuclear-power/>

<https://www.tasizewellc.org.uk/>

From the proposition (UK Government, NDF, BEIS, RWM)

<https://geologicaldisposal.campaign.gov.uk/>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/590971/Making\\_Sense\\_of\\_Geological\\_Disposal\\_ENG\\_ONLINE.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/590971/Making_Sense_of_Geological_Disposal_ENG_ONLINE.pdf)

<https://rwm.nda.gov.uk/publication/geological-disposal-overview-of-international-siting-processes-2017/>

Neutral links

[https://en.wikipedia.org/wiki/Alpha\\_particle](https://en.wikipedia.org/wiki/Alpha_particle)

<https://en.wikipedia.org/wiki/Radiation>

Dick Houghton  
Lowestoft Town Councillor  
29<sup>th</sup> April 2018

