Hinkley Point C Nuclear Power Plant Project

Comments on Article 37 Submission

Professor John Sweeney,
Emeritus Professor of Geography, Maynooth University

Article 37 of the EURATOM Treaty stipulates that:
"Each Member State shall provide the Commission with such General Data relating to any plan for the disposal of radioactive waste in whatever form as will make it possible to determine whether the implementation of such plan is liable to result in the radioactive contamination of the water, soil or airspace of another Member State.

Within the meaning of Article 37, a *plan for the disposal of radioactive waste* covers any planned discharge or accidental release of radioactive substances, in gaseous, liquid or solid form into the environment.

A review of the Article 37 submission by Her Majesty's Government raises several serious issues concerning potential transboundary impacts on Ireland which are inadequately considered and give cause for concern.

1. **The meteorological environment at Hinkley is inadequately described.**

   Table 1.4 purports to characterise the wind environment for 1999-2002 from Hinkley Point. Three years of data, even 10 years of data, is insufficient to characterise the wind climate at an individual location and any modelling based on this is highly suspect. The World Meteorological Organisation recommends that climate averages are computed over a 30 year period of consecutive records to smooth out year to year variations.

2. **Estimates of Extreme high and low water levels fail to take account of climate change.**
   Table 1.6 purports to show estimates of extreme low water level for 2002. It is not clear whether the mean values listed are relative to 2002 or whether the dataset was that of 2002. In any event the ability to estimate a 1:10,000 year return period from even several years of data is statistically highly suspect. Firstly, it based on an assumption of stationarity in the sea level and storm surge regimes which is patently not occurring. Secondly the statistical extension of frequencies beyond about a century are of dubious validity.

   Table 1.7 purports to show extreme high water levels with return periods of 1 to 10,000 years. Similar comments to Table 1.6 apply. The unsound nature of the estimates provided is further exemplified by the fact that the difference between the annual return period and the once in 10,000 years return period for high water is stated to be 1.3m. This does not take account of ongoing or projected sea level rise. The UK's principal tide gauge is located relatively close by at Newlyn in Cornwall where sea level rise is presently occurring at 3.8mm/year. Furthermore, the IPCC report that it is virtually certain that global sea level rise will continue for many centuries, with ultimate rises of up to 3m possible. This means that the high-water levels risk table 1.7 cannot be considered credible in its estimates of an increase of 1.3m as a one-in-10,000-year occurrence.

3. **A known flood risk is not acknowledged in the UK Government Submission.**
   The table below, published in a UK national newspaper in 2012, following a Freedom of Information request, confirms that knowledge concerning the flood risk at Hinkley (and other projected new nuclear sites) has been available to the UK government for some time. A flood risk is identified by this UK report as existing from 2010 onwards, becoming high by

the 2080s. These confirmed flood risks have serious implications for the safety of spent fuel at Hinkley, which is intended to be stored on site for up to a century.

Nuclear power generation, waste and decommissioning sites – Summary of data

Site	New site?	Waste Store?	NDA site?	In IFP?[1]	Elev.[2]	HAT?[3]	Flood Risk 2010	Flood Risk 2020s	Flood Risk 2050s	Flood Risk 2080s	Comment
Berkeley				Edge	0 to 10	8.6	Yes (low)	Yes	Yes	Yes (medium)	Coast. Sea wall 9.72m AOD
Bradwell				Edge	0 to 5.5	3.0	Yes (low)	Yes	Yes	Yes (high)	Coast. Sea wall 4.6 to 5m AOD
Capenhurst				No	High		No	No	No	No	
Chapelcross				No	High		No	No	No	No	
Culham				No	High		No	No	No	No	
Dounreay				Small	9 to 15	3.0	No	No	No	No	Coast. Long term erosion risk
Drigg				No	High	5.3	No	No	No	No	
Dungeness				Part	2 to 6	4.2	Yes (high)	Yes	Yes	Yes	Coast. Flood and erosion risk. Relies on defences
Hartlepool				Yes		3.3	Yes (high)	Yes	Yes	Yes	Coast
Harwell				No	High		No	No	No	No	
Heysham				No		5.6	Yes (low)	Yes	Yes	Yes	Coast
Hinkley Point				Edge	10 to 14	6.8	Yes (low)	Yes	Yes	Yes (high)	Coast. Relies on defences. Flood and erosion risk.
Hunterston				No	5 to 21	2.0	No	No	No	No	Coast. Erosion risk
Oldbury				Edge	4 to 10	8.4	Yes (medium)	Yes	Yes	Yes (high)	Coast. Relies on defences
Sellafield				No	5 to 30	5.3	Yes (medium)	Yes	Yes	Yes (medium)	Coast. Flood and erosion risk to part of the site.
Sizewell				Edge	3 to 10	1.7	Yes (high)	Yes	Yes	Yes	Coast. Flood and erosion risk. Relies on defences
Trawsfynnydd				No	High		No	No	No	No	
Winfrith				No	High	1.5	No	No	No	No	
Wylfa				No	9 to 13	3.8	No	No	No	No	Coast

[1] Indicative flood plain
[2] Elevation in m Above Ordnance Datum (AOD)
[3] Highest Astronomical Tide

The risk posed by a tsunami in the macrotidal environment (maximum range 13m) of the Bristol Channel is not adequately considered. It is noted that the 1607 flood in the Bristol Channel and Severn Estuary is considered the worst ever recorded in the British Isles. Some 570km of coast were affected and 500 deaths occurred. The water level at nearby Kingston Seymour, Somerset was estimated as 7.74m AOD.

4. **Models employed for assessing potential atmospheric transport of hazardous material to Ireland do not represent state of the art science in dispersion modelling**
   The atmospheric model used to evaluate the dispersion of planned or unplanned release of radioactive material into the atmosphere was based on an assumption that effluent would disperse vertically and horizontally downwind according to a conical (Gaussian) pattern. This model was developed in 1981 and subsequent caveats to its use were published by its author 5 years later. Many of these caveats would apply to the Hinkley situation and would render the model suspect for evaluating long range transport of radioactive material to Ireland. The Arrival of Chernobyl radiation to Ireland would not have been foreseen by such a simplistic model and much more sophisticated models were subsequently developed. These were available to the UK authorities 20 years before the Article 37 submission was made. The Met Office Nuclear Accident ModEl (abbreviated to NAME) was in use by 1988 with a major upgrade (NAME II) operational from 1994.

It may be concluded that several aspects of the Environmental assessment submitted by the UK authorities under Article 37 do not provide an adequate risk assessment for flooding and atmospheric dispersion of radioactive effluent in the unlikely event of a worst case scenario occurring. Combinations of rare events do occur as was demonstrated by Fukushima where total atmospheric releases from are now estimated to be between 5.6 and 8.1 times that of Chernobyl. For Ireland questionable reliance must exist regarding the then UK's Secretary of State's contention regarding Hinkley that:
" ..such accidents are so unlikely to occur it would not be reasonable to "scope in" such an issue for environmental impact assessment purposes".