



# **The Justification of Practices involving Ionising Radiation Regulations 2004**

**Consultation response  
from Stop Hinkley**

**March 2008**

Owen Jenkins  
The Justification Assessment Centre  
Office for Nuclear Development  
Department of Energy and Climate Change  
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Dear Sir,

## **The Justification process for new nuclear reactors**

### **Reactor types**

Of the original four reactor types outlined in the Nuclear Industry Association (NIA) application, only two are currently in the running through the Generic Design Assessment Process (GDA): the Westinghouse AP 1000 and the Areva/EdF European Pressurised Reactor (EPR) also known as the Evolutionary Pressurised Reactor.

### **The AP 1000**

This has novel and untested safety features based on gravity, hence the 'AP' acronym for 'Advance Passive'. About 75 percent of safety systems including pumps, valves, pipes and reinforcement concrete originally considered to be essential for the last UK built reactor, Sizewell B, have been omitted. Sizewell B was also a Westinghouse design, which took many years to finalise through the planning process and Nuclear Installations Inspectorate intervention. In the AP 1000 these safety systems have largely been replaced with a gravity fed water dousing system which would aim to keep the reactor cool in the event of overheating. A large tank of water sits atop the reactor for this purpose.

The Chief Executive of Westinghouse was reported in 2006 to have boasted that he had managed to cut the costs of the reactor by reducing these systems and reinforcement concrete. However no full tests of this novel system on a prototype reactor have been performed.

Moreover the lack of reinforcement concrete gives rise to concerns that the reactor would be especially vulnerable to terrorist attack. Should the reactor be subject for example to a deliberate attack there would be a major release of radiation affecting hundreds of thousands of people. Existing Emergency Planning arrangements are not likely to stand up to the demands that would be put on them.

Although the design has reached the interim stage in the GDA assessment process it does seem highly unlikely that it would be adopted by power companies in the UK.

In the unlikely event that the design succeeded in the assessment process, its reactor internals and spent fuel pond are likely to be affected by age related corrosion over the predicted 60 year life span of the reactor, requiring major but highly impractical engineering solutions.

See the 'Justification' submission by John Busby for more details.

## European Pressurised Reactor

The EPR has been beset by construction problems in Olkiluoto and Flamanbourg, where it appears that engineering supervision of the required standard was not available for crucial elements such as concrete foundation mixing and building the steel containment vessel (at Olkiluoto). The former could lead to too much moisture and condensation problems in the reactor, which could accelerate age related problems in the plant. The containment vessel construction contract was apparently given to a Polish shipyard with no previous experience in nuclear build. The result was a wavy line not a straight edge at its base and wrongly positioned holes which needed welding up and remaking elsewhere.

See: [http://weblog.greenpeace.org/nuclear-reaction/2008/08/breaking\\_news\\_safety\\_procedure.html#more](http://weblog.greenpeace.org/nuclear-reaction/2008/08/breaking_news_safety_procedure.html#more)

### Effects of an accident

The EPR will be utilizing 'high burn-up' uranium fuel which has concerns linked to it. There is an issue with containing the fuel in engineering terms while it is being 'burnt'. As the more efficient mode of utilizing the fuel creates more radiation, it is imperative that there should not be an escape or containment 'bypass' of radiation in an accident or deliberate attack. When the spent fuel from an EPR is taken from the reactor it has double the amount of radiation than a 'standard' Pressurised Water Reactor such as Sizewell B: 60,000 units of radiation per tonne compared with 30,000 units at Sizewell.

EDF's own documents show that an accident at an EPR would release far more radiation than existing reactors and one study consequently shows 28,000 deaths would occur instead of 16,000 in the worst case.

See: <http://www.independent.co.uk/environment/green-living/new-nuclear-plants-will-produce-far-more-radiation-1604051.html>

Independent on Sunday, 8<sup>th</sup> February 2009

Large Associates have outlined the worst case scenario at Hinkley Point should a severe containment bypass occur. Their plume predictions show radioactive clouds over southern England and northern France in one weather scenario and Devon, Wales and Iceland when replicating the weather and wind directions on 26<sup>th</sup> April 1986 the day of the Chernobyl accident.

See: <http://www.largeassociates.com/Hinkley/Hinkley%20-%20October-final-summary.pdf>

### Early corrosion of key components

During the predicted sixty year lifetime of the EPR it is likely to be dogged by internal corrosion of stainless steel components linked to tritium and boron exposure. This will require laborious if not impossible remediation. The same corrosion process is likely to occur to the spent fuel ponds with even greater engineering difficulties to repair. Despite the replacement of one type of stainless steel with another, it is too early to predict when the corrosion will occur.

See: John Busby's response to this consultation and:

<http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0353/br0353r1.pdf>

and

[http://www.sandersresearch.com/index.php?option=com\\_content&task=view&id=1391&Itemid=105](http://www.sandersresearch.com/index.php?option=com_content&task=view&id=1391&Itemid=105)

### **'Disposal' issues with EPR spent fuel**

Due to the 'high burn-up' quality of the fuel it is difficult to gauge how long the fuel will take to both cool down and reduce in radioactivity to allow it to be made ready for the Government's preferred option of Deep Geological Disposal. In answers to Hugh Richards from the Committee on Radioactive Waste Management (CoRWM) in September 2008, CoRWM said that they have not yet investigated how to package and transport spent high burn-up fuel from EPR plants to the Deep Geological Repository. They plan to look into this next year.

Hugh Richards has contacted the US nuclear regulatory authorities on the issue who seem to suggest the spent fuel may need to remain in the cooling ponds for up to or over fifty years. Given the sixty year lifetime of the EPR there could be spent fuel on site for one hundred and ten years. It is astonishing that this burden could be left to future generations when methods have not yet been devised for encapsulating and 'disposing' of the nuclear waste. I put disposal in parentheses as the fuel will of course remain radioactive and toxic for one million years, given the half-life of plutonium of 24,000 years. This in turn puts a burden on thousands of future generations who may not have the resources to manage radioactive leaks or even detect them.

There is no credible or satisfactory plan for the management and disposal of high burn-up spent fuel which will remain on local sites for over a century. No information is provided by the NIA to demonstrate that the nuclear plants can withstand terrorist attacks.

Any benefits of lower electricity costs from leaving fuel in the reactor for longer will be more than offset by an escalation in the cost of managing the spent fuel. The generations that have to retrieve the spent fuel from long term storage, condition it, encapsulate it and place it deep underground, will be most exposed to the health detriments. This transfer of cost, effort and radiation dose to future generations is unacceptable and cannot be justified.

## **Health effects of low-level radiation**

The Nuclear Industry Application for Justification of new nuclear power stations presents a misleading case for determining the health effects of radiation discharged locally from nuclear power stations. The ICRP model referred to is based on epidemiological studies of Hiroshima survivors. More recent epidemiological studies show an excess of cancers in populations near nuclear power stations and following the Chernobyl accident. Thus it should be concluded that the ICRP model is unsafe, probably because the after-effects of a single blast of radiation may be different to the chronic ingestion of low level radioactive particles over a period of years. So the NIA comparison of external radiation exposure from flying at high altitudes is also inappropriate.

See: The Committee Examining Risks from Internal Emitters (CERRIE) Minority Report 2004 which explains the thinking here.

A recent report published by the New Scientist outlines the flaws in the scientific modeling put forward by ICRP. In particular it examines mistakes made in predicting the biological effects of uranium.

See: <http://www.stophinkley.org/Health/ICRPModel.htm>

A summary of 100 papers on the health effects of Chernobyl shows greater evidence of cancer incidence than previously acknowledged, mostly in translated Russian studies:

See: ECRR '*Chernobyl 20 Years On: Health Effects of the Chernobyl Accident*'  
European Committee on Radiation Risk

The German KiKK 2008 study showed a doubling of childhood leukaemia within five kilometres of all German PWRs, similar to reactors being assessed for new build in the UK.

See: <http://www.stophinkley.org/Health/HlthNews080110C4.htm>

Excess breast cancer and infant mortality has been found near Hinkley Point:

See: [www.stophinkley.org/health](http://www.stophinkley.org/health).

## **Summary**

Our group believes that the reactor types on offer suffer from various safety flaws from the design, construction, operation and fuel disposal stages and will create an impact on human health during their operation, their decommissioning, and the very long term management of spent fuel. We also support the arguments put forward in Dr David Lowry's submission to this consultation, that uranium mining in the Third World is unacceptable.

The relatively short spurt of electricity production does not justify in our opinion, the overall health impacts and safety risks.

## **Call for a public inquiry**

For meaningful and realistic examination of all the evidence a public inquiry should be held. The Energy Secretary, Ed Milliband, with his known bias, should not adjudicate on this matter. Recent news reports state that he is in a relationship with a top lawyer in EoN who plan to build nuclear reactors. That obvious flaw aside he has already made his support for nuclear power patently clear. Such a major issue with such long term ramifications in terms of safety, health and costs, should be decided more fairly by a public inquiry with an independent adjudicator.

**Jim Duffy**  
**Stop Hinkley Coordinator**

**25<sup>th</sup> March 2008**

**[www.stophinkley.org](http://www.stophinkley.org)**