

Comments on the EdF Hinkley C  
Pre-Application Consultation *Stage 1*  
November 2009

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

# Introduction

Our group strongly objects to the building of a new nuclear power station at Hinkley Point, or elsewhere, on several important grounds:

- health risk to the local population;
- health risk to a much wider population in the event of a serious accident or act of terrorism;
- that dangerous nuclear waste from the reactors will be stored on site for at least 160 years and having at present no ultimate repository site to be sent to;
- and on the basis that these risks do not need to be faced as there is no need for nuclear power.

I will expand on these and other issues in the following pages.

## Health risks to local people

The following commentary by Richard Bramhall from the Low Level Radiation campaign puts clearly the case that there is a serious flaw at the heart of the advice on the health effects of radiation. The International Commission on Radiological Protection seems most at fault here.

*"Much of the evidence about health risk from radiation is post-Chernobyl, which ICRP entirely ignores in formulating its advice. A substantial book full of evidence suggesting that this oversight might be foolish is free to download at <http://www.euradcom.org/publications/chernobylinformation...htm>. See also <http://www.llrc.org/health/subtopic/russianrefs.htm> and a new book just published in the Annals of the New York Academy of Sciences (see <http://www.nyas.org/Publications/Annals/Detail.aspx?cid=f3f3bd16-51ba-4d7b-a086-753f44b3bfc1>). This latest one includes a review of studies of the deaths attributed to Chernobyl fallout in Europe; they total nearly 1 million up to 2005.*

*The ICRP approach treats radiation as if it were homogeneous. That's like regarding all poisons as if they were of equal toxicity, weight for weight. "How much poison do you think would kill you?" asks the idiot. "Well it depends what poison you're talking about", says any half-way intelligent person. In terms of radiation exposure, the idiot question is "What dose is safe?", and the intelligent answer is "that depends; where is the radiation coming from? .. is it a source stuck on my DNA? ... is it stuck in my lymph nodes? is it delivering all its energy into a tiny bit of me and leaving all the rest unirradiated?"*

*The nub of the issue is that there are some kinds of radiation exposure which it is valid to regard as uniform, homogeneous, well-averaged, evenly distributed in the body (however many synonyms one needs). Examples are x-rays and cosmic rays.*

*But there are other kinds of exposure which are never evenly distributed, so that all their damage is concentrated into microscopic volumes of tissue. Hot particles are one example and there are many others. In these circumstances, the CERRIE committee advised in 2004, the very concept of dose may be meaningless at the cellular and molecular level.*

*So there is a massive caveat that should be posted on any expression involving the word "dose". One of the main reasons the nuclear establishment sticks to using dose is for the administrative convenience of lumping all kinds of exposure together. Well that's just not scientifically valid.*

*Here, <http://www.llrc.org/wobblyscience/subtopic/singtonsaspirin.htm> , is an example of the kind of nonsense scientifically illiterate journalists spout because they don't understand these caveats.*

*If you want to see the history of how the radiation protection community got stuck in the "average dose" model, look at [www.llrc.org/switcheroo.htm](http://www.llrc.org/switcheroo.htm).*

*ICRP has recently admitted*

*[<http://www.llrc.org/health/subtopic/icrpabdicates.htm>] that their risk model cannot be used for post-accident exposures.*

*By inescapable extension neither can it be used for routine releases of the same radio-isotopes, and operators can't use it to demonstrate compliance with regulations expressed in terms of numbers of cancers per year, which is what they're actually required to do. The big questions are "Where will they get their advice in future? Will it stand up under scientific examination?" The nuclear lobby may be able to dupe the occasional journalist and some of the public but the investors and the courts are another matter. If operators go ahead in spite of the evidence there will be huge bankruptcies on the asbestos model (only far larger).*

*The idea has been put forward that fear of radiation is a greater risk than radiation-induced diseases. What WHO and IAEA **have in fact** said about the fear factor is in the Report of the Chernobyl Forum (where they were the lead agencies). The report cites [4] a small number of studies where "Chernobyl exposed" populations had higher rates of "mental health symptoms, medically unexplained physical symptoms and subjective ill-health". The mental health symptoms were "mostly subclinical and did not reach the level of criteria for a psychiatric disorder", but they had "important consequences for health behaviour, specifically medical care utilisation and adherence to safety advisories." In other words, these people took up a lot of time at the advisory centres set up to help them.*

*Big surprise then. Doctors call them "the worried well". Their subjective and subclinical presentations are no basis for dismissing the increases in clinical diagnoses of conditions such as cancers, congenital malformation, stillbirth, cataracts, and so on and on reported by many workers in the affected territories. One of these scientists observes "We have seen, since the accident, clear and diverse effects of irradiation in plants over time ... we bear in mind that these late effects in plants could not be related to 'radio-phobia'." [5] The radiophobia thing is just absurd, unscientific spin. "*

## Footnotes

[1] <http://www.guardian.co.uk/commentisfree/2010/jan/07/nuclear-power-weapons-radiation-defence> (Simon Jenkins' book review 7<sup>th</sup> and 8<sup>th</sup> January 2010)

[2] 7<sup>th</sup> - 11<sup>th</sup> January 2010

<http://www.guardian.co.uk/environment/2010/jan/10/nuclear-power-irrational-fears>

[3] <http://www.guardian.co.uk/environment/2010/jan/10/chernobyl-nuclear-deaths-cancers-dispute> - John Vidal recycles radiophobia

[4] *Health Effects of the Chernobyl Accident and Special Health Care Programmes: Report of the UN Special Expert Group "Health"*; pp 93-4

[5] D.M.Grodzinsky, General Secretary, Division of Biology, Ukrainian National Academy of Sciences, "Reflections of the Chernobyl Catastrophe on the Plant World: Special and General Biological Aspects" - Chapter 7 in <http://www.euradcom.org/publications/chernobylebook.pdf>

Source:

Richard Bramhall

Low Level Radiation Campaign

## Local Studies

**“Leukaemia incidence in Somerset with particular reference to Hinkley Point”** Dr Cameron Bowie, Somerset Health Authority 1983, '85, '88. The three reports studied leukaemia incidence in West Somerset, finding a 24 percent excess in those aged under 24 years over a seventeen year period, suggesting a link to Hinkley Point. There was a suggestion in the reports that accidental unrecorded discharges might have accounted for the higher numbers recorded.

Having our own doubts about the ICRP model, discussed above, Stop Hinkley decided in 1999 to commission a local cancer mortality study. The Office of National Statistics were able to provide figures of cancer deaths for all the Somerset wards and we asked Dr (now Professor) Chris Busby to examine the figures and see if they correlated with radioactive discharges from Hinkley Point.

**“Breast cancer mortality and proximity to Hinkley Point nuclear power station 1995-98”** Dr (now Professor) Chris Busby Green Audit 2000. Found an 89 percent excess of breast cancer deaths on Burnham-on-Sea north over a four year period. Follow up studies later confirmed the excess.

We asked the South West Cancer Intelligence Service for details of cancer *incidence* as opposed to deaths in the area but they were reluctant to provide the figures, saying they were concerned about the confidentiality of individual cases. We argued that many people might actually want more information to

help them ascertain what factors might have been involved in their illness. In the end we decided to set about our own doorstep survey, visiting the homes of about 3,000 people in Burnham North electoral ward. Stop Hinkley funded the survey and analysis while members of Parents Concerned About Hinkley undertook the door-to-door health questionnaire. Dr Busby of Green Audit analysed and published the results:

**“Parents Concerned about Hinkley survey, 2002”** doorstep survey by volunteers analysed by Dr Chris Busby. 100% response from 30% of Burnham north population between 1996 and 2001 showed: leukaemia incidence 2.7 times the England & Wales average; breast cancer 98% above average; kidney cancer 4 times average; cervix cancer 5.5 times average. A Government committee wrote off the study saying wrongly it was a 30% response of a 100% population and therefore unrepresentative.

In 2004 we issued the following press release:

**“Burnham breast cancer rate still high”** 10th Jan 2004

Breast cancer in Burnham and surrounding towns is a fifth more prevalent than the national average, according to a scientist and campaigner who has studied new figures provided by the Cancer Intelligence Service.

Dr Chris Busby from Green Audit has examined the latest figures published by the South West Cancer Intelligence Service (SWCIS) and confirmed that, in thirteen years between 1990 and 2002, breast cancer registrations were 21 per cent higher than should be expected.

Last month SWCIS updated its annual cancer rates for Burnham North and South, Berrow and Highbridge, following its pledge in May 2003, and issued three years' figures on its website. But campaigners are unhappy with the way the statistics were presented, saying the agency spun the figures by presenting them in isolation, thus reducing their statistical significance. They say in best practice, the last three years should have been added to the previous ten years' figures to give increased statistical power.

Ironically the text of the SWCIS report warns about interpreting long-term trends on the basis of just three years' data but then goes on to say the figures provide reassurance. The one-page report shows local breast cancer to be almost ten per cent higher than average in three recent years 2000 to 2002 but says this is not statistically significant. Dr Busby added this fresh data to previously published SWCIS figures for 1990 to 1999 to give more meaning to the total.

Chris Busby said: “It is a very wrong use of epidemiology to take an isolated short period some considerable time after the main exposure and use it to argue there is no effect. No breakdown is given for individual wards but we might assume from past research that Burnham North would have an even greater incidence rate that has been averaged out in the report.”

Jim Duffy, campaigner from Stop Hinkley said: "This confirms once again the breast cancer link to an environmental cause. If we believe the agency figures then the effect might be reducing slightly. This trend may continue with the closure of Hinkley 'A' as has happened near American decommissioned nuclear power stations. But no marks go to SWCIS for their trustworthiness, just when their Director has been appointed to COMARE, supposedly the country's top research unit on the health effects of radiation."

PCAH spokesperson, Julian Plested said: "We're very concerned about the figures but not surprised as they confirm the findings of our doorstep survey. We should now turn our attention to Hinkley 'B' which may possibly contain cracks in its reactor core. If this is the case it could lead to a large accidental release of radiation on top of its routine discharges."

Jim Duffy, Stop Hinkley Coordinator

The following article was published in 2008 highlighting a Stop Hinkley commissioned Green Audit report on infant mortality near Hinkley Point:

## **"N-PLANT CANCER FEARS HIGHLIGHTED"**

Western Daily Press, 1st March 2008

Infant mortality is almost three times more likely to occur in Severn Estuary towns and villages downwind of Hinkley Point power station than inland parts of Somerset, a report says. Details of the study by Dr Chris Busby, of Green Audit, which was supported by a former director of the South West Cancer Registry, were aired last night on the BBC's Inside Out West programme.

Using Government figures, Dr Busby found there was an almost three times greater risk of infant mortality between 1996 and 2001 in the estuary wards of Brean, Berrow, Burnham, Highbridge, Huntspill, Comwich and Pawlett, compared with inland wards.

The rate of deaths in under one-year-olds was found to be 10 per 1,000 compared with 3.5 per 1,000 further inland. Campaigners said the findings added weight to the theory dangerous radioactive particles discharged into the sea and air at Hinkley were ingested by residents downwind from the power station.

Neonatal deaths (in children up to 28 days old) were also found to be high, particularly in Burnham North during the period 1993-98 at six times the rate expected.

Dr Chris Busby was commissioned by campaign group Stop Hinkley to follow up earlier cancer studies that had shown high numbers of breast cancer and leukaemia in the area near contaminated mudflats between Hinkley and

Burnham-on-Sea. Dr Derek Pheby, former head of Cancer Registry, said the findings were significant.

Jim Duffy, spokesman for Stop Hinkley, said: "The tide is turning with more scientific support for the compelling evidence that radiation is harmful to local communities and particularly to vulnerable infants.

"COMARE, the Government watchdog assigned to monitor health trends near nuclear plants should now be disbanded."

<http://www.stophinkley.org/NewsPages/news080301.htm>

The health officials at South West Public Health Observatory argued that children were safe near the power station but in later 'replicating' the Green Audit study they added one electoral ward and removed another from the study population. We believe this 'tampering' affected their results.

In the same year a very large childhood cancer study was undertaken in Germany:

**"Leukaemia in young children living in the vicinity of German nuclear plants"**, Kaatsch, 2008 International Journal of Cancer (KiKK report). A very large German Government study showed more than doubling of leukaemia in children living within 5 kilometres of nuclear power stations with an effect as far away as 50 kms. Created a public outcry and many pregnant women moved away from nuclear plants.

The above studies seem to confirm what a lot of local people suspect: that living near Hinkley Point, especially in coastal and estuary areas downwind of the plant carries a health risk. We have had reports that patients in oncology departments in Bristol have discovered that others in the waiting room came from Burnham or nearby, against all statistical expectations.

It should be pointed out that the 1988 Somerset Area Health Authority report above, which was never challenged, only covered upwind areas of West Somerset and Bridgwater. Their catchment area did not include Burnham-on-Sea which was part of the Weston-super-Mare catchment at the time. Had the study covered the downwind towns, we suspect the figures would have been even more disturbing.

## Summary

The difficulty with the conventional approach to radiation risk is that the model does not allow sufficiently for *internalised* radioactive particles. The International Commission on Radiological Protection who advise on this, base their predictions on Hiroshima survivors but a single blast of radiation should be treated differently from long term exposure to inhaled particles. So experts predict low, statistically insignificant health effects. When these turn out to be higher than expected in epidemiological studies, they wrongly say it cannot be

connected to the radiation. This is an unscientific approach, based on expected outcomes not on real outcomes.

The Committee Examining Risks from Internal Emitters (CERRIE, 2004) reported that radioactive 'dose' is now irrelevant, so radioactive discharges in millisieverts will not accurately predict whether individuals will be harmed. They also recommended that regulators should recognise that children are particularly vulnerable.

We submit that two very large nuclear reactors pouring radioactive articles into the Bristol Channel will result in continued excesses of cancers in the area. We support Sedgemoor District Council's request for EdF to conduct a Health Assessment of the vicinity. We would be very prepared to assist with the design of such a study, for example basing it on data on a post-code basis which would furnish more information than much broader electoral ward data.

Nonetheless we believe there is sufficient information to reverse the proposals to construct two or even one nuclear power stations at Hinkley.

## **Risks from a serious accident or terrorism**

### **Introduction**

We believe that there are real safety risks associated with operating a European Pressurised Reactor (EPR). We note the recent misgivings of the Nuclear Installations Inspectorate Generic Design Assessment team with regard to the Control and Instrumentation systems in the EPR design. Nuclear Consultant John Large has written in some detail about the risks to an EPR from an aircraft attack as well as the consequences in terms of fallout in the event of a containment by-pass accident.

On the grounds that effective landscaping can reduce the accuracy of an aircraft attack on the plants, we contend that the spoil from excavations should be built up not just on the south side of the station but in each compass direction. However we feel the residents of the village most affected should be given a choice in an official referendum.

We explore the safety issues below.



## **Regulator criticisms of the EPR design**

Stop Hinkley issued the following press release on 27 November 2009:

### **Safety regulator slams reactor design**

The Nuclear Installations Inspectorate (NII) today announced they have major concerns over key aspects of the safety systems in the EPR reactor proposed for Hinkley Point. They state they would not issue a license for the reactor unless the Control and Instrumentation system is fixed. A top nuclear consultant suggests the error could hold up the UK nuclear project by up to three years. (1)

In their Part 3 Report of the Generic Design Assessment, the safety regulators claimed that in the Control and Instrumentation system the computerised shut-down systems were not sufficiently separated from the normal operating systems. Consequently they aired their concern that a fault could affect the performance of crucial safety systems. They raised a 'Regulatory Issue' or red flag over the issue, the highest warning they can give to a nuclear operator.

The Control and Instrumentation system, if not acceptable, could be replaced with a version from an older reactor the 'N4' but the N4's control system was itself found to be faulty and so it used an even older version from an earlier reactor, the '1300 MWe' built in the 1980's. EdF have suggested using a hard-wired system to replace the computerised control of the safety systems but this is an early proposal with no detail attached.

The NII pin-pointed other areas of concern with the reactor design:

- More work was required on the prevention of cracks in the fuel cladding due to thermal stress. This is very important as the 'high burn up fuel' which will be deployed in the EPR is hotter and more radioactive than fuel used in previous Pressurised Water Designs. It is crucial that the fuel is effectively contained within its cladding.
- Analysis of the human factor in the safety of the reactor was seen as being unclear in the design proposals. This section deals with how workers or others might deliberately or for other reasons sabotage the reactor. EdF were told to put more effort into their arguments to back up their safety claims.
- Managing radioactive waste: an assessment on the disposability of the highly radioactive spent fuel arrived too late for consideration for this part of the assessment. Campaigners are keen to examine this area as the spent fuel will be twice as hot and twice as radioactive as from conventional PWRs and will need to stay on site at Hinkley for an estimated 160 years before it can be physically put in 'permanent' containers for eventual movement to a hoped for (but as yet unplanned) Deep Geological Repository.

- Design changes: The regulators state they find it difficult keeping track with a reactor design which is not complete. As it is currently being built on two sites in Finland and France , the designs are frequently changed. The regulator has asked for a 'frozen' design as of 2008 but acceded that changes can be incorporated.
- Categorisation & classification: The EPR design has been found to be not entirely in alignment with international good practice eg on mechanical systems where there is no classification system for delivery of a safe function.
- Exclusions: The regulators have conceded that construction could conceivably go ahead despite outstanding areas of concern but only up to the point where the specific concern becomes relevant. There is some risk to EdF here but also the regulator would be under mounting pressure to give way once the momentum of the project had reached a certain point.

Jim Duffy, spokesman for Stop Hinkley said:

"This reactor has had an unlucky history. It was based on the earlier 'N4' reactor of which only four were ever built due to thermal fatigue flaws in the important heat removal system. They took between 16 and 19 years to reach operational output."

"Its construction in Finland is nearly four years late with 3,000 recorded building errors(2). The French version is currently two years behind schedule and now the UK regulators are as critical as they can be over the risks with its computerised safety system. EdF may need to apply a thirty year old system to replace it or simply hard-wire it. This is hardly 'state-of-the-art' that EdF boasts of their new reactor design. It makes you wonder how it got approval to get as far as it has in Finland and France ."

"We could avoid a great waste of time and money by a change of direction and fully backing renewables before that's too late to help stop climate change."

Jim Duffy, Stop Hinkley Coordinator

A comparison has been made regarding the C & I system that it is like having a fault in your car steering that means the brakes also stop working. It does not inspire confidence that the EPR has got so far without this potentially dangerous fault being rectified. We were very surprised that the normally restrained French nuclear authority ASN were equally critical of the system as well as the Finnish regulators, STUK.

On the issue of human factors, I worked as a psychiatric nurse at Southwood House at 13 King Square, Bridgwater in the 1980's. One of my clients for counselling was a shift manager at Hinkley Point B. Although he did not have a 'mental illness' as such he was very

preoccupied with family problems. One session he reported having made an important mistake in operating the reactor which had led to a discharge of radioactive gasses. The accident was reported in The Guardian at the time in which Dr John Large suggested it was the worst UK accident since Windscale.

Colleagues reliably informed me at the time that another Hinkley worker with safety responsibilities had Alzheimer's Disease and was effectively being 'carried' by co-workers.

I discussed this event at the Hinkley C public inquiry. I raise the question now as I still am concerned that human factors could contribute to a serious accident at a reactor. The fact that the NII have pointed out the inadequacies of EdF's analysis in this area is of great concern.

### **John Large reports:**

#### 1. Vulnerability of the EPR to terrorism:

In 2006 a letter from EdF to the French Government was leaked to a French campaigner and consequently published. The letter was on the question of the EPR's vulnerability to a deliberate aircraft attack. John Large was asked to write a report on the contents of the letter. Here is the summary of his report. The full report is available on:

<http://www.largeassociates.com/3150%20Flamanville/R3150-aircraft%20impact%20-%20FINAL.pdf>

The EdF letter referred to is below.

### ***OPERATIONAL RISKS AND HAZARDS OF THE EPR WHEN SUBJECT TO AIRCRAFT CRASH***

#### ***SUMMARY***

*This is a brief review of a confidential EdF document that has been leaked to the public domain in France.*

*The EdF document relates to the projected performance of the AREVA designed Generation III EPR reactor. The first of this reactor type is presently being built at Olkiluoto in Finland and construction of a second EPR is expected to commence shortly at the established nuclear power station site at Flamanville in France.*

*In or about 2003 it seems that EdF prepared a statement to the Direction Générale de la Sûreté Nucléaire et de la Radioprotection in response to its request to demonstrate the safety of the EPR design against the deliberate crashing of a large civil aircraft onto the nuclear island. The resulting EdF document endeavours to prove the ability of the plant to withstand such attack and it claims to do so by comparing the footprint and time sequencing of the impact of a small military (fighter) aircraft to that of a large, fully fuelled commercial airliner.*

*However, this leaked EdF document shows the claim to be flawed in a number of important respects: First, in that the impact signatures of the small military fighter and very much larger commercial passenger aircraft are unlikely, contrary to the reckoning of EdF, to be sufficiently similar in both time span and magnitude for the design resistance of the EPR to an accidental military aircraft strike to equally apply to a passenger airliner intentionally targeted the nuclear island of the plant – indeed, the basis of reckoning the resistance of the built structures is so grossly simplified that it is inapplicable to a real impact situation. Second, the EdF assumption that the 100 or more tonnes of aviation fuel spilt during the moment of impact would ignite and burn itself out within 2 minutes or so is entirely without justification and unproven, with there being a good possibility that highly explosive vapour would be formed within and around the structures, the deflagration of which could be severely damaging to the EPR building structures and nuclear equipment within. And, quite incredibly, one line of mitigation proposed by EdF is that the terrorist would have insufficient skills to pilot the aircraft onto the intended target, this being quite contrary to the dedicated training undertaken by the terrorists who masterminded the 9/11 attacks.*

*The EdF document draws on a poorly constructed argument of the resilience of the EPR design against the international terrorist threat – it has been drawn up on the basis that the terrorist has limited knowledge of the EPR plant, little capability to acquire the necessary skills to launch and successfully see through the attack, and that a determined terrorist group will not intelligently and intentionally seek out the vulnerabilities of the EPR design. Not only is it an entirely unjustified postulate that the present military aircraft accidental crash safety case is adequate to cover the damage severity caused by an intentional attack with a large passenger airliner, also the claim that the resulting radiological consequences to the public will be within the existing prescribed statutory limits for accidents cannot be demonstrated at all sound by the EdF document.*

*Indeed, it has to be hoped that considerably more valid thought and preparation has gone into improving the resilience of the EPR design since the 2003 date of the EdF document and, one might muse, if the paperwork design of the EPR is showing such shortcomings, what of the resilience to terrorist action of the many operational nuclear plants scattered across France and elsewhere in Europe?*

*Finally, I am not surprised at the hoo-ha generated within the French nuclear industry by this leaked document. This is not because it reveals*

some highly sensitive details about the EPR design, which it certainly does not, but more because it reflects what seems to be an almost total lack of preparation to defend against the inevitability of terrorist attack. Moreover, EdF admits that it does not consider itself responsible for providing protection against all conceivable acts of terrorism this being, according to EdF, the responsibility of the French state

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To The Director of Radioprotection and Nuclear Security  
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Paris, August 12th 2003

Dear Sir,

In your letter, you ask me to examine the EPR reactor capacity of resistance to/to withstand an potential commercial plane crash, and then to make any necessary suggestions. Very quickly after the September 11th attacks in the USA, the EDF made a point of analysing the problem and in particular with regards to the conception/design of the EPR.

As you note in your letter, the new project takes into account resistance to a military plane crash, which is already a heavy charge. For this, the designers have chosen functional and geographical building plans taking account of such accidents. The project has 4 trains which are completely separate, and a part of the construction is "bunkerised": in particular the buildings containing the reactor and used nuclear fuel, and one building containing 2 of the 4 safeguards trains (electrical and mechanical parts).

The "bunkerised" part, designed to resist to the impact of a military plane, presents a high resistance and especially with regards to perforation: a military plane is considered to be the equivalent of a perforating missile.

All this gives to the EPR an important capacity to resist to the impact of a commercial plane, so no change has been made in the construction plans.

Despite this capacity for resistance to plane accidents, it is nevertheless necessary to note that **EDF is not in a position to ensure resistance to eventual war or terrorist action. Prevention or limitation of such action and its possible results involve State responsibility** In this case

- The controls concerning resistance to such accidents and any necessary supplementary measures are to be considered as outside the (normal) design basis of the building, and I am obliged to place this situation amongst the "Risk Reduction Categories"

- The study of different possibilities concerning an impact should induce a **reasonable response to the risk incurred and will not be able to take into consideration/cover each and every possibility**. Furthermore, the measures should, in my opinion, be in complete coherence with the measures adopted

*internationally, and should not be too different from the measures adopted for other industrial risks. I also consider that the different scenarios studied, the rules and analysis used to do so should not appear in the security reports immediately available or which could become available to the public.*

*Precisions concerning this general logic are to be found in the joined annex. And, added to this, in order to decide or control the design basis of the protective construction/shear wall of the "bunkerised " part of the building, it will be necessary to define a reference impact load. This reference, whilst generally covering the case of the sort of planes which could crash in the event of an intentional action, should not be associated directly to a particular plane nor to a particular speed of impact. It should correspond to a general hypothesis based on criteria and calculation of a general and conventional nature.*

*For this reason I propose to retain as the reference the impact charge given in the annex*

*which represents the risks reasonably considered possible by the sorts of planes in European skies.*

*Yours faithfully,*

*B. LESCOEUR.*

Note: [Stop Hinkley emphasised **in bold** certain key phrases]

Our concerns here are obvious. It is not at all clear that the EPR could withstand a terrorist attack. EdF have claimed that in this short time-span they have reinforced the reactor designs to the level that it could withstand such an attack but this seems difficult to believe. In his fuller report John Large goes on to say:

*“Obviously, to safeguard against intentional aircraft crash the only effective measure (other than security at the departure airports) is to physically enhance the structure of the building enclosures although, since the fundamentals of the building design are committed to at an early stage of the design process, other than a radical change of the building structures and/or layout (for example, building underground), little can be done to improve the resilience of the existing EPR containment design. There are no apparent signs that the post 9-11 EPR designs have undergone such a radical enhancement.”*

## 2. Effects of a serious accident at Hinkley C.

John Large gave a presentation in Bridgwater in 2008 which illustrated his concerns that the projections for a worst-case accident in an EPR were very probably badly understated and that a fallout plume could contaminate people a long distance from Hinkley.

An accident projected for weather patterns on the day of Chernobyl showed Devon then Wales, Ireland and Iceland becoming covered with the (invisible) radioactive plume. On a second random date Bridgwater was contaminated within an hour, then the Isle of Wight within four hours before the plume moved on to Northern France.

**HINKLEY NO BUILD?  
IS HINKLEY POINT A SUITABLE SITE FOR TWO NEW EUROPEAN  
PRESSURISED REACTORS (EPR)?  
JOHN LARGE, LARGE & ASSOCIATES, CONSULTING ENGINEERS,  
LONDON**

**British Legion, Castle Street, Bridgwater Somerset -7:30 PM Monday  
13 October 2008**

*The present operational nuclear power station at Hinkley Point B comprises two Advanced Gas-Cooled Reactors (AGR) but plans announced (24 September 2008) by EdF at its takeover of the present Hinkley operator British Energy, suggest that of the 4 European Pressurised Reactor (EPR) nuclear plants that it has planned for the UK, two will be built alongside the existing nuclear plants at Hinkley Point, with the other two at Sizewell, Suffolk.. The first EPR is planned to be in electricity generation by 2017 so, with the expected retirement of the fault ridden and troubled existing Hinkley AGRs within a few years, the spare electricity distribution grid capacity from Hinkley strongly favour this first EPR being commissioned at Hinkley Point.*

*Compared to the AGR reactors, each of 600MWe capacity, the EPR is rated at about 1,600MW<sub>e</sub> generating capacity. With a projected operational life of 60 to 65 years, the EPR nuclear plant is capable of utilizing uranium based nuclear fuel to much higher irradiation (burn-up) levels and also of being fuelled with plutonium based fuel (MOX).*

*In 1982 the then National Radiological Protection Board (NRPB but now part of the Health Protection Agency) published the results of its comprehensive analysis into a radiological incident at the proposed Sizewell B pressurised water reactor (PWR) nuclear power station. For this analysis it was assumed that a severely damaging incident would rupture the reactor containment dome (containment failure) giving rise to a very significant release of radioactivity into the environment, yielding a maximum of 2,600 (130 probabilistic expected value) or so deaths in the short term and around 31,000 (3,300 expected) deaths in the longer term.*

*This projection of health detriment assumed that countermeasures would be judiciously implemented, including the speedy evacuation of about 300,000 (24,000 expected) members of public from the locality around the Sizewell site. However, for its mortality and morbidity projections the NRPB relied upon the then ICRP 26 standard that is now superseded by the universally adopted ICRP 60 recommending a x4 increase in the causal effect of radiation exposure, so much so that the 1982 analysis is now considered to be an under-estimate of the potential consequences of such a release.*

*The next projection for the radiological consequences of a PWR reactor accident carried out in the UK was in 1988 for the PWR nuclear plant proposed at Hinkley Point in Somerset. For this study, obviously in account of the Chernobyl disaster two years earlier, the damage and worse case incident considered to be credible comprised a very limited release of radioactivity with the reactor containment remaining intact throughout and following the incident, thereby constraining the radioactive release to a containment bypass for which no early or longer-term deaths were projected.*

*For the EPR the designer, AREVA, reckon that the nuclear plant is entirely protected from accidents and malicious acts that could result in significant release of radioactivity. In making this claim AREVA place extraordinary reliance on its failsafe engineered systems and containment, so much so that, in the very worst and most severe incident, the release would be limited to just 0.03% of the reactor fuel radioactive inventory. Put another way, over the six days following the explosion at the Chernobyl Unit N<sup>o</sup> 4 reactor, it is reliably estimated that at least 30% of the total reactor fission product radioactivity released uncontrolled into the atmosphere. The equivalent worst case reactor incident release from an operational EPR at Hinkley Point would, according to AREVA, result in no more than (6 x 0.03%=) 0.18% of the radioactive inventory. John Large will give an illustrated presentation that provides an up to date prediction of the radiological consequences of a severely damaging incident at Hinkley Point, this being the first time since 1982 that a revised radiological impact assessment for PWR has been publicly aired.*

*Based on EdF's undertaking that two EPRs, will be commissioned at Hinkley Point, the radiological health consequences of these larger nuclear plants will be analysed taking into account upwards revisions to the causal factors linking radiation dose to health detriment, the larger core mass of nuclear fuel, the increased irradiation or burn-up of uranium fuel rendering it more radiotoxic, and the impact of MOX (plutonium) fuelling, all in account of the lessons learnt from Chernobyl.*

*The modelling and analysis will draw upon the outcome of highly confidential terrorist attack exercises carried out on nuclear plants in the United States, it will assume the same capabilities of the terrorist to penetrate the security at Hinkley Point, seek out the vulnerabilities of the nuclear plant, and to contrive effective means by which a radioactive release will take place; and for the radioactive dispersion and consequences the European standard COSYMA software has been deployed, together with NOAA satellite data to provide real time imaging of the dispersion and radioactive fall-out in the aftermath of the release.*

*The analysis and projections for Hinkley Point will be expressed in terms of the risk of any one individual sustaining health harm in the aftermath of a radioactive release and, related to the increased health risk from the larger EPR plant operating with a greater extent of irradiation (burn-up) and/or with a plutonium based fuel core, the need to extend both the range and resources allocated to the local authority off-site plan (under the Radiation (Emergency Preparedness and Public Information) Regulations 2000)*



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

## **Summary**

In view of the serious questions posed by this report and the presentation that came with it, we strongly contend that no reactors should be constructed at Hinkley. Should a decision be made to go ahead with the project, then we feel that emergency arrangements must be enhanced to allow better public protection. For example the current practice of pre-distributing potassium iodate tablets just within the 3.4 kilometre radius around Hinkley should be enhanced to take account of the fast pace that weather patterns can deliver radiation to locations much further away. As the Isle of Wight is about eighty miles from Hinkley we suggest the iodate tablets should be pre-distributed to all homes, schools, offices and factories within 100 miles.

We are concerned generally that emergency measures would break down. At Three Mile Island ninety percent of medical staff left their posts after the accident.

A police report to the Nuclear Industry Association at Oldbury power station in 2002 said that protective breathing gear had a life limit of just twenty minutes in a contaminated environment. Police officers would in any case be advised to voluntarily abandon their kit as it would panic the local population. We were also told that police officers had a smaller maximum dose in such circumstances than ambulancemen and even council officers.

## **Nuclear waste and spent fuel**

We are concerned at the prospect of highly radioactive spent fuel being stored at Hinkley Point during and for a long time after the operation of the two proposed EPRs at Hinkley. The fuel will be 'high burn up fuel' which means it must be stored in mechanically cooled water for one hundred years before it is capable of being handled in preparation for the next stage of its management.

This problem so far into the future means we are leaving a serious legacy to future generations. Part of the risk is that of a terrorist attack and we do not know whether terrorism will have become more accurate and sophisticated. Nor do we know whether the economy and social cohesion will have collapsed with unthinkable consequences in terms of managing the hot spent fuel. The fuel management process is not a 'passive' one.

Another issue is that because of the very heat of the fuel, its containment is more likely to splinter or corrode, creating potential local contamination and a headache of a problem to solve.

We support the recent paper submitted to EdF by Hugh Richards of Wales Anti-Nuclear Association which delves into much greater detail on the subject referring to the US regulator's long term concerns about the spent fuel.

We are also concerned that the advice given by the former committee looking into nuclear waste has been ignored. The Committee on Radioactive Waste Management came down against Deep Geological Disposal for new build nuclear waste. This was because, while 'legacy' waste had to be dealt with in some way despite obvious risks, 'new build' spent fuel did not need to be created in the first place as there are alternate means of generating electricity.

CoRWM's proposal that communities should only volunteer to host the Repository looks shaky now that the Government has stated it may force Cumbria or other communities to accept the nuclear waste dump if they do not volunteer. The whole process is very flawed and has produced no results thus far in terms of any agreed permanent site or solution.

## **The Need for Nuclear Power**

Various authors and groups have described how it is possible to meet our future energy needs without resorting to nuclear power. These included the report of the 2003 Energy Review which came down strongly against nuclear power. Secretary of State Patricia Hewitt said that we would be mad to go down that route.

The Sustainable Development Commission in their 2008 report "Is nuclear power the answer?" endorsed that view, saying that for example UK carbon reduction would be a mere four percent even if all nuclear generation was replaced. They contended that a concerted programme of renewable energy supported by sufficient energy conservation measures would have the net effect of providing all our needs.

<http://www.sd-commission.org.uk/pages/is-nuclear-the-answer.html>

The theme was elaborated in another SDC report: Nuclear power in a low carbon economy:

<http://www.sd-commission.org.uk/publications.php?id=344>

Government advisor and former Friends of the Earth Director, Professor Tom Burke CBE also outlined his views in 'Decoding Nuclear Nonsense, 2, the real

evidence' where he suggested the two Government principles behind backing nuclear power: climate mitigation and bridging the energy gap were flawed. He elaborated on his publication at a public meeting at Bridgwater town Hall on 6<sup>th</sup> January 2010.

<http://www.e3g.org/archive/archive-article/decoding-nuclear-nonsense-ii-the-real-evidence/>

As nuclear power now produces just 13 percent of the UK's electricity (DECC figures for 2008) and the Government aims to produce thirty percent by renewables by 2020 it seems very logical that we don't need to endure the risk of nuclear new build.

We note that West Somerset District Council has a long existing but standing policy to allow any new build at Hinkley not to exceed the current generation output ie of Hinkley A plus Hinkley B. The projected output from two EPRs would greatly exceed that figure.

## Other issues

We are not convinced by the case made in the EdF documents that the heat plume from cooling water discharges into the Bristol Channel would not have an adverse impact on life in the channel. Although the reactors' electricity output is 1650 MW its heat output is 3500 MW per reactor ie 7,000 MW. The Bristol Channel despite its appearance is very shallow at about twenty metres (less at low water springs). Pouring so much hot water into the channel must have an adverse effect.

We also believe that biocides used in the cooling pipes to stop fouling build-up would also add to the toxic mixture of radionuclides as well as hot water to have a health impact on fish and other organisms.

Cooling towers as have been proposed at Oldbury could be a partial solution but are unlikely to be acceptable given the already **ugly** outline of the proposed plant at Hinkley.

As the DECC consultation document agrees that Combined Heat and Power is feasible for nuclear power stations, we believe this should be a feature if Hinkley C goes ahead, furnishing hot water to local homes. To reduce any risk of contamination, several layers of cooling pipes could be used.

We understand the vital need for an Emergency route to and from Hinkley but feel Shurton village would be a poor place to put this. The suggested alternative road from the M25 at Dunball put forward by hundreds of angry Cannington residents would be much more appropriate. We would support

this by-pass in the least-best scenario that Hinkley C goes ahead. Cannington residents wishes should be completely respected in terms of their wish not to have their village traumatised by new infrastructure proposed by EdF.

At the same time we understand the OCNS security concerns of having thousands of workers accommodated on site during construction. The risk of sabotage is a real threat especially given the high expected turn-over of workers in the Olkiluoto model. The scale of the project should therefore be cut right back to one reactor built over a much longer time-scale, thus reducing the weight on local communities of so many outside workers. During the construction of Hinkley B many fights and brawls were reported in local villages and Bridgwater.

## **Report Summary**

We contend that the risks of building a new pair of reactors at Hinkley Point are too great, bearing in mind many experts have made the case that we do not need nuclear power. The health risks, though contended by some, have been demonstrated and led in Germany to a decision not to go for new nuclear build. The risks from terrorism are yet to be played out but we do not wish to see Somerset targeted in this way.

The long-term solution to nuclear waste has not been agreed or resolved, leaving us with the prospect of having to guard the spent fuel not just for 160 years but millennia.

We repeat our strong objection stated at the beginning, to this proposal to build more reactors at Hinkley Point.

**Jim Duffy**

**Stop Hinkley Coordinator**

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