



## Stop Hinkley Response to EdF's Stage 2 Consultation on Proposed Hinkley C Nuclear Power Station

### Introduction

Stop Hinkley has been campaigning against nuclear power in Somerset and beyond for more than twenty years. The group is based near the power station, holds regular meetings in Bridgwater and Taunton and currently has over 200 subscribers. We have serious concerns, mostly about the nuclear aspect of the proposal to build at Hinkley, but we also object to the development in terms of the serious effect it will have on the local environment and amenities.

We are particularly concerned about the **scale of the development**. The proposed Hinkley C construction site will be approximately four times the area of the existing Hinkley A and B power station sites combined, with an installed capacity eight times that of Hinkley A and three times Hinkley B.

We are not convinced by EdF's comparison in terms of **radioactive discharges** to those of the smaller Sizewell B nuclear plant. The high burn up fuel in the two reactors must surely produce much more in terms of radiation. The discharges will also compound those already poured into the Bristol Channel/Severn Estuary at Oldbury nuclear power station, Amersham International near Cardiff and those proposed in the leachate disposal from the contaminated landfill site at Northcliffe near Northampton

The methodology for predicting discharges from the two proposed European Pressurised Reactors (EPRs) in the EdF consultation seems simply to draw from existing local readings around the Hinkley B power station. Again, due to the more intense nature of high burn fuel we believe this approach is mistaken and likely to lead to a gross underestimate of toxic isotopes discharged by the EPRs.

We believe that the sea is not a dustbin for polluting radioactive materials and should not be excluded from conditions that restrict the discharges from other chemical industries. Moreover, the Bristol Channel is a very shallow stretch of

water, with mean depths of just twenty metres. The net discharges from Hinkley C would significantly overload the channel, dumping millions of particles on the local shorelines, with potentially harmful long-term consequences.

We also believe that the consultation skims over the issue of **spent nuclear fuel**, which is expected to stay stored in a pond on site for 160 years or more. It may end up staying permanently, as no repository (geological disposal facility) has yet been established for UK nuclear waste. The planning process should examine this issue in much greater depth.

Other issues addressed in this response include the **sustainability** of the project, its **economics**, the potential **health effects on the local population** and a range of concerns about its **impact on the local environment and infrastructure**.

## **1. Government policy on nuclear power**

EdF refers extensively in the introduction to its Preferred Proposals (“Preferred Proposals: Explanation and Assessment, July 2010”) to government policy on energy and nuclear power. Particular reference is made to the draft National Policy Statements which were issued in 2009, one of which specifically covers nuclear issues. A number of statements from these NPS’s are quoted to demonstrate both government support for new nuclear build and the suitability of the Hinkley Point site in particular.

The coalition government elected in May 2010 has since announced that these NPS’s will be re-issued in a revised form and a new national consultation will be held. It is expected that publication of the revised policy statements will happen during October 2010. EdF can therefore no longer confidently rely on the statements of government policy it quotes in support of nuclear power and the Hinkley C proposal.

## **2. Sustainability**

EdF makes much in the Introduction to its consultation documents, and in its Sustainability Evaluation, about the contribution which the Hinkley C proposal will make to sustainability, and the “sustainable legacy benefit” that it will leave to the local community.

Nuclear power as a means of generating electricity cannot conceivably be described as sustainable. Sustainability, if it has any strength as a concept, must involve both durability and the ability to be self-sufficient, “living within your means” and not requiring artificial outside assistance for its continuing operation. Even EdF, defending its nuclear corner, defines sustainability in its Sustainability Evaluation, para 4.2.1 as achieving the “integration of social, economic and environmental issues to ensure a better quality of life for people today, *without compromising the needs of future generations*” (our emphasis).

Renewable energy can therefore be viewed as sustainable, for example, because its originating sources, such as the wind and sun, are constantly renewed in a natural way and, at the end of its operation, it does not leave any substantial aftermath to be cleared up.

Nuclear power fails on both these counts. Its fuel is neither indigenous nor everlasting. Uranium has to be imported from other countries and is finite: it will run out at least within a century from now. And at the end of its life a nuclear reactor leaves a trail of radioactive waste which will have to be cared for and protected for thousands of years, quite possibly longer. Nuclear power therefore fails the sustainability test.

### **3. Nuclear as a low carbon fuel**

EdF repeatedly claims, for example in its Sustainability Evaluation para 8.3.1, that “nuclear power is a low carbon technology, with operating CO<sub>2</sub> emissions comparable to wind energy”. This is a meaningless comparison. Any scientific analysis of carbon emissions must take into account the lifecycle operations of a particular power generation technology, including the mining and production of its fuel and the emissions involved in the construction and eventual decommissioning of its plant. For nuclear power this would include, for example, the mining of uranium, its preparation and enrichment, the concrete and steel involved in building the power station, the decommissioning process and the long term management of radioactive waste.

An assessment of 103 lifecycle studies of the nuclear fuel cycle by Benjamin Sovakool from the National University of Singapore<sup>1</sup> has shown that, even when only the most methodologically rigorous of these studies were selected, the average lifecycle emissions from nuclear plants amounted to 66 grams CO<sub>2</sub>equivalent/kWh of electricity generation. Although this is less than the estimate of 112–166g CO<sub>2</sub>e/kWh reported by Storm van Leeuwen and Smith<sup>2</sup>, it is more than ten times the nuclear industry’s estimates, and far worse in terms of carbon emissions than all the renewable alternatives, including solar PV.

### **4. Nuclear economics and moral hazard**

There is mounting evidence that any new development at Hinkley will get through, financially speaking, by the skin of its teeth. There is therefore a risk that the project will not be built at all, or may end up half-built and abandoned, due to the complex nature of financing nuclear projects. If the project is started, with the involvement of numerous local, national and international companies, but then runs out of funding part-way, this would have a profound effect on the local communities and would draw the UK government into a decision about a rescue or bale-out. Local contractors, pending any such decision, would remain unpaid and businesses, who may have invested

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<sup>1</sup> Energy Policy 36 (2008) pp2940-2953

<sup>2</sup> see [www.stormsmith.nl](http://www.stormsmith.nl)

heavily in plant and other resources, might go to the wall, with disastrous effects on the local economy and individual households.

EdF last month recorded a debt of 56 billion Euros compared to last year's debt of 30 billion and against a profit of just 1.7 billion this year. They are a highly leveraged company and their credit rating has consequently been reduced from AAA to A. The loans to pay this 'mortgage' are not from the French government, as this would foul EU competition law, but must be found on the open market. The current sale of the company's UK energy distribution arm will meet just 5 bn Euros of their debt, but may simultaneously jeopardise their credit rating further as the relatively 'safe' distribution section of the enterprise has vanished, leaving more risky nuclear production as a greater proportion of the business.

Moreover, EdF must also set aside funds to pay for repairs and maintenance to its ageing fleet of French reactors. Nuclear generation in France is approaching its nemesis. Of EdF's nuclear power stations, 37 will be 30 years old by 2015, each requiring a three month outage for inspection prior to licensing for their last ten years of operation. For their life to be extended for a further ten to 20 years thereafter they will have to be upgraded at an estimated cost of 500 Million Euros each – or replaced with 20 new build EPRs by 2020.

### **European Pressurised Reactor in crisis**

These risks are compounded by difficulties experienced with the current building of two single EPR reactors at Olkiluoto in Finland and Flamanville in France. The Olkiluoto project, run jointly by the EPR manufacturer Areva and the Finnish power utility TVO, has run into scandalous numbers of construction mistakes, about 3,000 in a count taken last year and recorded by Greenpeace Sweden. It is three years overdue and a vicious legal fight is ongoing between the two major constructors over whose fault this is. If TVO loses the battle the company is likely to go bankrupt. The Flamanville project is two years over its expected construction schedule. The cost of building a single EPR is now estimated by EdF at 5 billion Euros, up from 3 billion originally.<sup>3</sup> Energy Minister Charles Hendry puts the figure even higher, at an alarming and potentially crippling £6 billion per reactor, or 7 billion Euros. That would put the cost of Hinkley C at roughly £12 billion.

The French Government was so worried by these delays and cost over-runs, characteristic of all nuclear build, that it commissioned a report by a former CEO of EdF. The Roussely Report slammed the EPR as too complicated, giving the example that the Dubai government had turned down the so-called Generation 3 reactor design in favour of an older model on offer from a Korean company.

In fact the Control and Instrumentation system of the EPR has been criticised in an unusual joint communiqué by all three UK, French and Finish nuclear

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<sup>3</sup> <http://www.bloomberg.com/news/2010-08-30/edf-has-welding-problems-at-flamanville-epr-reactor-french-watchdog-says.html>

safety regulators. The US nuclear regulator has also recently added its weight to the concern that a malfunction in the normal control system could dangerously override the shut-down system. The Nuclear Installations Inspectorate has said this may be part of a list of 'exceptions' to any licence they provide to operate the reactors. So EdF would have to resolve this entrenched problem before the eventual start-up. There are considerable uncertainties here, as the only other available 'hard-wire' alternative is from the 40-year-old N4 design.<sup>4</sup>

The Roussely Report could offer no effective answer to the EPR's potentially financially fatal complexity, however, other than to try and learn from the errors at Olkiluoto and Flamanville.

Adding to EdF's financial worries is the company's expensive £12 billion investment in the ageing fleet of British Energy reactors, of which more than a quarter are currently off-line, including their flagship and newest reactor Sizewell B. This has now been under repair for more than six months since its original breakdown in mid-March.<sup>5</sup>

### **Economic meltdown**

Energy economist Professor Stephen Thomas has produced an authoritative analysis of the risks and uncertainties resulting from EdF's current plight, for example in his response to Vermont Law School's review of the risks of importing the French nuclear project to the US. Commenting on the study, Thomas, who is Professor of Energy Studies, University of Greenwich (and a member of the editorial boards of Energy Policy, Utility Policy, Energy & Environment and the International Journal of Regulation and Governance) said:

*"The French nuclear power industry is in crisis on three counts: its new reactor technology, the Evolutionary Power Reactor (EPR), is proving expensive and difficult to build and gaining safety approval is proving slow and problematic; the existing 58 reactors are far less reliable than its European and US peers; and its flagship nuclear companies, the utility Electricite de France (EDF) and the reactor vendor, Areva, are struggling to control their levels of debt... This experience suggests that, far from being a model to emulate, the French experience is a cautionary tale of overdependence on nuclear power and on the state becoming too embroiled in commercial decisions."<sup>6</sup>*

The original Vermont Law School report, entitled "Policy Challenges of Nuclear Reactor Construction: Cost Escalation and Crowding Out Alternatives. Lessons from the US and France for the Effort to Revive the US

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<sup>4</sup> <http://www.platts.com/RSSFeedDetailedNews/RSSFeed/HeadlineNews/Nuclear/8909086/>;  
<http://www.telegraph.co.uk/finance/newsbysector/energy/7964429/Safety-regulator-tells-nuclear-reactor-makers-to-redouble-efforts.html>;

<http://www.guardian.co.uk/business/2010/aug/25/nuclear-reactors-behind-schedule>

<sup>5</sup> <http://www.platts.com/RSSFeedDetailedNews/RSSFeed/HeadlineNews/Nuclear/6411367/>

<sup>6</sup> <http://www.digitaljournal.com/pr/109960>

Industry with Loan Guarantees and Tax Subsidies", was written by Senior Research Fellow Mark Cooper.<sup>7</sup>

Professor Thomas was even more forthright about EdF's disintegrating policy of exporting the EPR to Britain in a recent parliamentary briefing to Parliament, in which he said: "*The issue that Roussely fails to address, and the one the British government needs to face up to, is whether the EPR design is salvageable... Unless things start to go right for the EPR soon, the UK is in danger of backing a design that could prove unlicensable, unaffordable and unbuildable.*"<sup>8</sup>

In summary, there is an undeniable risk that the massive £10 to £12 billion Hinkley C project could collapse at several stages from investment snags to regulators' objections. The supply chain under the EdF project would be affected with dire consequences to construction and other small and medium size firms in the area with a ripple effect to local communities and families. And West Somerset could have a huge monument to nuclear folly sitting half-built on its beautiful coastline.

## 5. EdF's safety record

In EdF's summary document, "Preferred Proposals: Explanation and Assessment, July 2010", the company says that the operation of the power station will be "undertaken in a manner consistent with the highest standard of safety, reliability and sustainability" (para 1.1.7). However, EdF's track record on these measures is poor. Professor Stephen Thomas from Greenwich University, for example, has said that the company's reliability is worse than comparative operators in the rest of Europe and the United States.<sup>9</sup> Last year France was in the humiliating position of having to import electricity from other countries as 30 per cent of its nuclear plant was under repair or closed because of industrial disputes.<sup>10</sup>

The safety of EdF nuclear has been under considerable media scrutiny, especially during 2008, when 100 workers were contaminated by a leak at the Tricastin power station.<sup>11</sup> The incident was taken so seriously by the local vineyard that it decided to change its "appellation" to avoid association with

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<sup>7</sup> <http://www.vermontlaw.edu/energy/news>

<sup>8</sup> <http://www.parliamentarybrief.com/2010/09/really-mr-huhne-you-should-brush-up-on-your-french>

<sup>9</sup> <http://www.parliamentarybrief.com/2010/09/really-mr-huhne-you-should-brush-up-on-your-french>

<sup>10</sup> [http://www.lemonde.fr/cgi-bin/ACHATS/acheter.cgi?offre=ARCHIVES&type\\_item=ART\\_ARCH\\_30J&objet\\_id=1105450;http://www.lemonde.fr/economie/article/2009/11/17/la-france-importatrice-nette-d-electricite-une-premiere-depuis-27-ans\\_1268549\\_3234.html](http://www.lemonde.fr/cgi-bin/ACHATS/acheter.cgi?offre=ARCHIVES&type_item=ART_ARCH_30J&objet_id=1105450;http://www.lemonde.fr/economie/article/2009/11/17/la-france-importatrice-nette-d-electricite-une-premiere-depuis-27-ans_1268549_3234.html)

<sup>11</sup> <http://www.telegraph.co.uk/news/worldnews/europe/france/2454654/French-nuclear-leak-prompts-urgent-security-review.html>;  
<http://www.guardian.co.uk/environment/2008/jul/25/nuclear.industry.france>;  
<http://www.independent.co.uk/life-style/food-and-drink/french-radioactive-wine-gets-new-name-1999221.html>

radioactivity. The operation of other EdF plants has also resulted in radioactive leaks. Under the newly acquired ownership of EdF, Hinkley Point B was the focus when eight workers were sufficiently contaminated for them to be sent to the scientific laboratory at Harwell for further investigation.<sup>12</sup> No doubt the worker and environmental safety at EdF plants contributed to the industrial unrest last year, which forced the management to raise salaries by 4.4 per cent.<sup>13</sup>

EdF internal documents submitted to the French campaign group Sortir du Nucleaire appear to show that safety has been compromised in the ongoing construction of an EPR at Flamanville. A combination of design problems and engineering methods are said to potentially lead to a Chernobyl type explosion.<sup>14</sup>

In short, we are not convinced by the safety claims made by EdF. Although the risks from an accident at a future Hinkley C power station might be remote, the consequences would be unthinkable.

In this respect, if consent is eventually given for the power station, we would like to see the implementation of a wide-scale programme of pre-distribution of potassium iodate tablets. We consider the existing radius of 3.4 kilometres to be inadequate in the event of a serious accident. Fifty miles would be more appropriate, especially given the intense radioactivity of the high-burn fuel. One report suggests that seven times more radioactive iodine, and eleven times more caesium, would be blown out of the reactor in a serious accident than from a standard PWR.<sup>15</sup>

As the *Guardian* newspaper reported in 2008: “The problems inside France’s nuclear industry could not come at a worse time for Britain. They may be officially ‘anomalies’, as some say, but they raise questions about the safety and efficiency of the two giants Electricite de France (EDF) and Areva, entirely or largely state-owned.”<sup>16</sup>

## 6. Security of the power station

Although Stop Hinkley raised the issue of the security risks associated with a new EPR power station in its response to the Stage 1 consultation, including details of a letter written by Bruno Lescouer from EdF to the French government, there appears to be no reference to this in the Stage 2 consultation. The most important point made by Lescouer was that an EPR could not be guaranteed to withstand the impact of a large airliner but only

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<sup>12</sup> <http://beta.thisissomerset.co.uk/news/Hinkley-nuclear-leak/article-1205595-detail/article.html>

<http://news.bbc.co.uk/1/hi/england/somerset/8166557.stm>

<sup>13</sup> [http://www.lemonde.fr/cgi-bin/ACHATS/acheter.cgi?offre=ARCHIVES&type\\_item=ART\\_ARCH\\_30J&objet\\_id=1115526](http://www.lemonde.fr/cgi-bin/ACHATS/acheter.cgi?offre=ARCHIVES&type_item=ART_ARCH_30J&objet_id=1115526)

<sup>14</sup> <http://www.sortirdunucleaire.org/english/presse/affiche.php?aff=725>

<sup>15</sup> <http://www.stophinkley.org/NewsPages/news090208Ind.htm>

<sup>16</sup> <http://www.guardian.co.uk/business/2008/jul/26/britishenergygroupbusiness.utilities>

that of a small fighter plane. In the current period of international terrorist activity and in the aftermath of the 9/11 attacks, we therefore view the current application as remarkable.

## 7. Health risks from radiation

The Health Impact Appraisal section of the consultation document does not even attempt to describe the current debate over the effects of low level radiation on nearby communities. There is no attempt to show both sides of the argument over the suitability of the ICRP (International Commission on Radiological Protection) model to chronic ingestion of radioactive particles near a nuclear power station.

ICRP bases its risk model on the epidemiology following the Hiroshima explosion. Many argue that a single blast of radiation is not equivalent to chronic ingestion over perhaps years of low level radiation and extrapolation is not justified. An ICRP official has also recently stated that their model will not stand up in the case of a serious accident at a nuclear power station.

This extract from the Low Level Radiation Campaign website demonstrates the problem:

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### Flaws in ICRP's scientific model

ICRP's scientific model is used as the basis of radiation protection almost everywhere. It depends on studies of the survivors of the Hiroshima A-bomb. NRPB says these studies are "pivotal".

#### External vs internal

The group considered to be "exposed" consisted of people who were in the open at the time of the explosion. Their exposure was therefore

- a large dose of
- externally delivered
- gamma rays,
- at high dose rate.

The control group consisted of people who were elsewhere at the time or were shielded. The problem is that both groups, by definition, lived in the bombed cities, and were therefore exposed to ingesting, inhaling and absorbing fallout. This means the studies are silent on internal radiation and the very different types of exposure involved:

- chronic low doses from
- internal
- alpha and beta emitters,
- at low dose rate.

Early reports of cancer incidence at Hiroshima <sup>(1)</sup> using an uncontaminated control group were seriously out of line with those later used to set risk factors.

Other studies which are supposed to inform on risk are mostly of external x-rays. A couple of small internal studies are included, but these are of natural isotopes, not including Uranium.

**It is astonishing that estimation of risk from internal contamination has such an irrelevant and inadequate basis.**

### **Physics vs biology**

The ICRP / NRPB model is essentially a physics based one. As far as the epidemiology is concerned all that has been done is to extrapolate the exposed group's high dose data points in a straight line down to the low dose region. This assumption that risk is directly proportional to dose has been widely criticised on various grounds. For example, Goodhead calls the extrapolation "a large region of uncertainty"<sup>(2)</sup>, while others question the validity <sup>(3)</sup> and relevance <sup>(4)</sup> of bomb survivors' data.

### **Average dose vs local dose**

A further shortcoming is that doses are averaged over large volumes of tissue, although it is well known that radiation damage to body cells is caused by discrete tracks which either hit vital structures or miss them altogether. The fact that cancers are monoclonal (i.e. they start with mutations to one cell) ought to alert us to the inadequacy of the averaging approach.

It is becoming widely realised that concepts such as average energy transfer, absorbed dose, and relative biological effectiveness are useless at the low doses resulting from environmental contamination. <sup>(5)</sup>

### **References**

1 Harada T, Ishida M, *First Report of the Research Committee on Tumour Statistics, Hiroshima City Medical Association, Japan, Journal of the National Cancer Institute* 29 1253-64 cited in ICRP 8 91965):- *The first reports on the survivors ... were contradictory. A large excess of cancer among the heavily irradiated was reported by the Hiroshima Cancer Registry ... but not by the Atomic Bomb Casualty Commission [i.e. the Americans]*

2 "The Health Effects of Low Level Radiation: Proceedings of a Symposium held at the House of Commons, London 24th April 1996" R. Bramhall (Ed): Green Audit ISBN 1 897761 14 7 page 45

3 Stewart, A. M. 1982 Delayed effects of A-bomb radiation: a review of recent mortality rates and risk estimates for five-year survivors. *J. Epidemiology and Community Health* 26/2: 80-6

4 Radiation Roulette: *New Scientist* 11th October 1997 reporting Professor Eric Wright at MRC

5 See for example Proceedings of a meeting of the Society for Radiological Protection, 10 October 2000; SRP Bulletin report expected in Spring 2001, but LLRC report already in *Radioactive Times*, Vol. 4 No. 2 [Report](#) and [Editorial](#)

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The website then continues its argument, extending it to the mechanisms by which people become harmed by radiation:

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## CERRIE Majority Report says dose is meaningless

**“...There are important concerns with respect to the heterogeneity of dose delivery within tissues and cells from short-range charged particle emissions, the extent to which current models adequately represent such interactions with biological targets, and the specification of target cells at risk. Indeed, the actual concepts of absorbed dose become questionable, and sometimes meaningless, when considering interactions at the cellular and molecular levels.”**

(CERRIE Majority Report Chapter 2.1 paragraph 11).

In other words, where hot or warm particles or Plutonium or Uranium are located in body tissue or where sequentially decaying radionuclides like Strontium 90 are organically bound (e.g. to DNA) **“dose” means nothing**. This is massively significant. Official radiation risk agencies universally quantify risk in terms of dose. If it means nothing the agencies know nothing and can give no valid advice.

Their public reassurances fall to the ground. They can no longer compare nuclear industry discharges with the 2 millisieverts we get every year from natural radiation, or the cosmic rays you'd receive flying to Tenerife for a holiday.

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This case against the ICRP model, upon which the nuclear industry and the Environment Agency base their supposed safe doses, is backed up by the United Nations Scientific Committee on the Effects of Atomic Radiation in its most recent publication, which says:

*“Risk estimates for the induction of human disease are obtained primarily from epidemiological studies. These studies can clearly distinguish radiation effects only at relatively high doses and dose rates. To gain information at low doses and dose rates, which are more relevant to typical human radiation exposures, it is necessary to extrapolate the results of these studies. To be valid, this extrapolation requires a detailed understanding of the mechanisms by which radiation induces cancer and genetic disorders.”<sup>17</sup>*

The European Committee on Radiation Risk has been particularly critical of underestimations in the ICRP model, revising its estimates by hundreds of times the effect predicted.<sup>18</sup>

### **Local studies round Hinkley Point and other nuclear sites**

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<sup>17</sup> UNSCEAR 2000: Sources and Effects of Ionizing Radiation; Vol II, Effects: Para 1 p2 Introduction

<sup>18</sup> [www.llrc.org/health/subtopic/icrpabdicates.htm](http://www.llrc.org/health/subtopic/icrpabdicates.htm)

It is also important to understand the significance of local studies showing excess cancers and mortality near Hinkley Point and other nuclear plants in the context of challenges to the ICRP model. When Somerset Health Authority and Green Audit studies (Stop Hinkley commissioned) have shown significant health effects, the official response has been that the radiation doses are too low for the health impacts to have been caused by radiation – the cause must be something else or the clusters are ‘random’.

In 1983, 1985 and 1988 Dr Cameron Bowie of Somerset Health Authority found that the incidence of leukaemia among young people in West Somerset was a quarter higher than the national average. He suggested the increases were linked in some way to Hinkley Point’s routine discharges and considered accidental releases may have played a part.<sup>19</sup>

In 2000 Stop Hinkley commissioned a study by Dr Chris Busby (now Professor) of Green Audit to examine the health risk of living near Hinkley. He studied the Office of National Statistics figures on breast and other cancers, finding a doubling of breast cancer mortality in Burnham-on-Sea over a five year period. The suspicion was that the large mud-flats off Burnham had become a depository for radioactive particles which at low tide were exposed and blown downwind to the town. Studies in Cumbria had already shown sheep droppings as far as twenty miles from Sellafield contained radioactive particles.<sup>20</sup>

In 2001 Dr Busby found a leukaemia cluster near Oldbury nuclear power station. Children were found to be at a risk eleven times greater than average in Chepstow, just five miles across the river Severn from Oldbury – the same distance as Burnham from Hinkley.<sup>21</sup>

In 2006 breast cancer rates were found to be 15 times higher than normal near Trawsfynydd nuclear power station in mid-Wales.<sup>22</sup>

In 2007 the earlier breast cancer mortality findings in Burnham were corroborated by a study extending to a ten year period, where cancers were found to be 70 per cent above average.<sup>23</sup>

In 2008 a study commissioned by Stop Hinkley found infant deaths were three times higher and perinatal deaths six times higher than normal in coastal communities from Hinkley to Burnham.<sup>24</sup>

In 2009 Stop Hinkley refuted the findings by South West Public Health Observatory that health risk was not a problem near Oldbury, criticising a report that omitted Chepstow cancers.<sup>25</sup>

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<sup>19</sup> <http://www.stophinkley.org/Health/Leukaemia%20Incidence%20In%20Somerset1988.pdf>

<sup>20</sup> <http://www.stophinkley.org/Health/CancerMortPart%201.pdf>

<sup>21</sup> <http://www.stophinkley.org/NewsPages/news010429.htm>

<sup>22</sup> <http://www.stophinkley.org/NewsPages/news060613.htm>

<sup>23</sup> <http://www.stophinkley.org/NewsPages/news070426.htm>

<sup>24</sup> <http://www.stophinkley.org/NewsPages/news080301.htm>

In 2009 a German government report found excess cancers near all of the country's nuclear power stations.<sup>26</sup> This study, known as the KiKK report, showed a more than doubling of leukaemia in children living within five kilometres of nuclear power stations, with an effect as far away as 50 km. This created an understandable public outcry and many pregnant women moved away from nuclear plants. It is interesting to note that the German government has not joined the so-called 'nuclear renaissance' to build more new reactors. There is an ongoing national policy against new nuclear construction.

COMARE, the UK's Committee on Medical Aspects on Radiation in the Environment, has yet to publish its response to the KiKK study. This will no doubt provoke a serious debate on the safety of communities even if COMARE sticks to its track record of exonerating the nuclear industry.

### **Misrepresentation of COMARE statement on PCAH study in EdF consultation**

In 2002 the Parents Concerned About Hinkley (PCAH) group undertook a massive door-to-door survey of people's health in the Burnham north area. They collected 100 per cent of survey responses from the one third of the population they asked to take part, considered scientifically to be a very high sample. COMARE mistakenly said the study was a 30 per cent response to a 100 per cent survey, which would be much less significant scientifically. COMARE corrected their original mistake but EdF has still published the mistaken and misleading claim in its Stage 2 consultation.<sup>27</sup>

### **Summary on health issues**

There are numerous studies showing a significant health risk from nuclear reactors to the local community which EdF has failed to address in its Stage 2 consultation. It has not even attempted to outline the pivotal debate around low level radiation and, as an attempted example of showing studies to be flawed, has misrepresented COMARE's response to a Green Audit report.

The health issue will not go away just because EdF wants it to, and eventually radioactive particles will be considered the 'new asbestos' and generally agreed to be too dangerous to expose to public communities.

## **8. Radioactive waste storage**

In its Stage 2 Consultation document "Preferred Proposals: Explanation and Assessment, July 2010", EdF refers to "interim spent fuel storage facilities". "Interim" in fact means storing 3,600 tonnes of spent (used) nuclear fuel for a period estimated to be 100 years after the reactors have stopped operating. This means for more than 160 years from now. "Spent fuel" is the technical

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<sup>25</sup> <http://www.stophinkley.org/NewsPages/news090513.htm>

<sup>26</sup> "Leukaemia in young children living in the vicinity of German nuclear plants", Kaatsch 2008, International Journal of Cancer (KiKK report)

<sup>27</sup> [www.llrc.org/health/subtopic/comareburnhamcockup.htm](http://www.llrc.org/health/subtopic/comareburnhamcockup.htm);  
[http://www.comare.org.uk/statements/comare\\_statement\\_burnham.htm](http://www.comare.org.uk/statements/comare_statement_burnham.htm)

description for fuel whose energy has been extracted in the reactor, but in reality it is radioactive waste. EdF has no proposal to do anything else potentially useful with it, such as reprocessing to reclaim uranium.

The result is that Hinkley Point will have a long term radioactive waste store in addition to a nuclear power station. This transforms the application into something quite different from an electricity generating plant. Apart from the obvious risks associated with a waste store (breach of containment, aircraft crash, flooding, terrorism, climatic changes over such a long timescale) there is still no certainty that this waste will be removed to a permanent repository.

Discussions have been taking place since the 1980s about such an underground repository, which is fraught with technical issues even if a willing host community can be found. In the 1990s an application to construct a test “rock laboratory” for a repository in Cumbria was turned down at a public inquiry. The government now suggests that a repository could be operational by 2040, but only initially for existing waste from the UK’s Magnox (such as Hinkley A) and AGR (such as Hinkley B) reactors. The model proposed for this repository, known technically as a “geological disposal facility”, is the one currently under discussion in Sweden. This has yet to receive approval from the Swedish authorities, let alone be constructed.

### **Search for a geological disposal site**

As government funding has dried up to assist local authorities in Cumbria (the only ones currently interested) to determine whether their locality is suitable for a “Deep Geological Repository”, it is impossible to say with any certainty that a community will step forward under the “voluntarism” scheme. In any case this approach is fundamentally flawed, as the geology should come first in any such decision.

This was the conclusion of the evidence by Professor David Smythe of Glasgow University to the Department for Food and Rural Affairs (DEFRA) consultation on voluntarism in 2007<sup>28</sup>. Professor Smythe was also a key witness at the 1990s (Nirex) inquiry referred to above and has worked as a Nirex contractor. He concluded that:

1. There are no suitable disposal sites in West Cumbria.
2. The British Geological Survey (BGS) geological criteria, which would allow inclusion of West Cumbria sites, are flawed.

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[http://docs.google.com/viewer?a=v&q=cache:P8GDNS\\_yk5cJ:davidsmythe.org/personal/research-career/pdf/Defra%2520statement%2520oct2007.pdf+British+Geological+Survey+report+nuclear+disposal&hl=en&gl=uk&pid=bl&srcid=ADGEEsG2BYlesA-5DfkN-fDi6Y0ofvJc\\_vQXRBjgmdVTo1WfdTzhfN1qilvQrP\\_far5ekjThHsuAa-nPpDSI5dlwctjQLlvqP7mO18ITG5oryI1kgL-JsEmggaNtgpS4emy2wOwfOa&sig=AHIEtbQAROSEa8CQ2\\_dJ6MVx9108SFJcZA](http://docs.google.com/viewer?a=v&q=cache:P8GDNS_yk5cJ:davidsmythe.org/personal/research-career/pdf/Defra%2520statement%2520oct2007.pdf+British+Geological+Survey+report+nuclear+disposal&hl=en&gl=uk&pid=bl&srcid=ADGEEsG2BYlesA-5DfkN-fDi6Y0ofvJc_vQXRBjgmdVTo1WfdTzhfN1qilvQrP_far5ekjThHsuAa-nPpDSI5dlwctjQLlvqP7mO18ITG5oryI1kgL-JsEmggaNtgpS4emy2wOwfOa&sig=AHIEtbQAROSEa8CQ2_dJ6MVx9108SFJcZA)

3. The government's "voluntarism" process is flawed, as it does not prioritise scientific safety considerations.

Professor Smythe's prediction in October 2007 is crucial in relation to the current (Summer 2010) BGS short-listing process:

*"Once volunteered sites have been proposed, the British Geological Survey will apparently be employed to apply the exclusion criteria to the short-list of volunteered potential sites, 'in order to eliminate... any that are obviously unsuitable'. By employing the specified criteria West Cumbria would be back in the picture. This demonstrates that the current geological criteria are fundamentally flawed."* (Section 8, page 6)

The overall conclusions to be drawn from this study are:

1. The appropriate order for site selection should be firstly, geology and hydrogeology (and hence long term safety) and *then* the involvement of local communities.
2. Notwithstanding the order of site selection, West Cumbria has been proven to be geologically unsuitable.
3. Site selection has to be based on scientific principles, before applying any socio-political considerations.
4. The current consultation exercise should be considered to be fundamentally flawed, unless and until volunteer communities, **excluding any in West Cumbria**, come forward from districts which are known to have geological potential for hosting a waste repository.

With considerable doubt cast over whether a suitable location to receive "spent fuel" from Hinkley C will be available at any given time in the future, EdF should at least be forced to delay its proposal for a new power station until such time as the repository is operational.

## **9. Local impacts during construction and operation**

The construction of Hinkley C will have a major impact on the transport and services infrastructure of West Somerset and Sedgemoor district council areas. This is the largest nuclear power station ever considered for construction in the UK, with a generating capacity over twice as large as the existing Hinkley B. The area to be taken up by the building and associated works is more than 430 acres.

Although EdF has "re-arranged the furniture" in its Stage 2 proposals in the sense that the location of various facilities, such as accommodation hostels and traffic-related provisions, have been moved around, this does not alter the fact that this is one of the largest construction projects ever in this region and will have multiple negative effects.

## **Transport**

EdF's Stage 2 proposals, including the park & ride and freight consolidation centres, fail to address the fact that the A39 is a relatively narrow, already very busy road and cannot accommodate the amount of traffic envisaged without severe disruption to other road users. Although it doesn't resolve the issue of the additional pollution that would be created by this increased traffic, it is still imperative that the developers construct a new road from Dunball to the Hinkley Point road (as envisaged for the original 1980s Hinkley C proposal), which would bypass some of the worst bottlenecks. The fact that this would delay EdF's plans is irrelevant.

Despite its claimed support from the urgency of government policy (see 1. above) there is no statutory obligation on the company to build a nuclear power station. It is simply responding as a commercial enterprise to the government's policy framework. If building the new bypass delays the project then that is the price the company will have to pay for ensuring that it meets its commitment to recognise the concerns of the local community.

More broadly, although the developers should be encouraged to seriously consider all options for minimising road transport movements, there is no avoiding the fact that the construction of Hinkley C will involve a major increase in vehicle journeys, and their associated air pollution and increased greenhouse gas emissions.

## **Employment**

Although a commitment has been made to encourage the employment of local people, the vast majority of those employed in the construction of Hinkley C are expected to come from outside the area and live in temporary accommodation. The Stage 1 documents stated that 50% of the construction workforce could be local "if appropriate training and recruitment activities are put in place".

The Stage 2 documentation is less positive about the prospects of local employment, concluding that only about 30% of the peak construction workforce of 5,000 workers are likely to be "home-based", i.e. travelling from home. According to research commissioned by EdF, home-based workers can be expected to travel for up to 90 minutes to reach the Hinkley C site. People who travel for 90 minutes to reach Hinkley Point cannot conceivably be described as "local".

The arrival of a large number of workers from outside the area will inevitably place additional pressure on local services at a time when budget cuts are already likely to limit their effectiveness to meet existing demands.

When complete, Hinkley C is expected to employ about 700 people on average during normal operation. This compares with the existing Hinkley B power station, where 530 people are employed full-time. Hinkley B is due to close in about 2016, when the majority of the staff will presumably be laid off. The number of new full-time jobs created by Hinkley C is therefore not as substantial as might appear from the scale of the proposed development.

### **Isolated foreign worker communities**

A Swedish report into conditions at the Olkiluoto nuclear construction site in Finland shows that immigrant workers are exceedingly and despairingly isolated, unable to effectively access local infrastructure such as medical services. As a result they become highly dependent on the nuclear employer.<sup>29</sup> Although the EdF consultation points to supporting local health services there is an omission in terms of facilitating the immigrant workers' inclusion and integration into the local community. This would seem to be imperative to enable some cohesion.

### **Public rights of way**

Many public rights of way, both footpaths and bridleways, will be lost if this development goes ahead. In terms of footpaths we propose that, as well as the Green Lane through route, another public access route should be allowed between the decommissioned Hinkley A site and the proposed Hinkley C location, allowing better public access around the area.

### **Effect on local environment**

The total area affected by EdF's construction activity for Hinkley C covers 435 acres. This is approximately four times the land area of the existing Hinkley A and B power station sites combined.

This area, described as the Development Site, includes attractive farmland and woodland, falling away from a central ridge to the Bristol Channel to the north and to the village of Stogursey to the south. There are long established areas of woodland, footpaths overhung by thick hedgerows and attractive views across the countryside to the sea and the Quantock Hills. If you stand in the middle of this area at the moment, before serious development work has taken place, it is possible to imagine that there is no industrial site in the vicinity, despite the nearby presence of the still operating Hinkley B complex.

Among the bird species which breed in or frequent this area are Peregrine Falcon, Cetti's Warbler, Lesser Whiethroat, Nightingale, Reed Bunting and a range of other songbirds and warblers. A number of bat species, including the relatively rare Lesser Horseshoe, have also been registered.

All this habitat will be erased and the wildlife displaced if the Hinkley C proposal goes ahead. In addition, there is no proposal to create any alternative habitat for these or other species until well after the construction period has passed and the power station has become operational.

### **Proximity to Protected Areas**

The coastline bordering the Hinkley C site is part of the Bridgwater Bay Site of Special Scientific Interest (SSSI). Bridgwater Bay's shallow waters and

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<http://www.hs.fi/english/article/Foreign+workers+at+nuclear+construction+site+live+isolated+likes/1135259776592>

mudflats are a sanctuary for thousands of waders, ducks and other sea birds, especially in winter.

The site is also bordered by Special Protection Areas, Special Areas of Conservation and a National Nature Reserve. Bridgwater Bay is designated as a wetland of international importance under the Ramsar Convention.

Part of the construction site itself falls within a County Wildlife Site designated because of its conservation value.

Construction activity of this extent, covering a total area of 435 acres and running over a period of up to seven years, and then the installation and operation of the largest nuclear power station ever proposed in the UK, will inevitably impinge on these protected areas and the wildlife which inhabits them.

However, the Environmental Appraisal prepared by EdF (Volume 2) is concentrated on the construction site itself and does not present any detailed information about how the proposed development could affect the adjacent protected habitats and species.

### **Effects on Marine Life**

Once the power station is operating, large numbers of fish and other marine species will be killed as millions of litres of water are sucked into the new power station's cooling water intake. This will happen either by what is described as "impingement" – getting caught in the mesh filters at the entrance to the cooling system – or by "entrainment" – passing through the filters and then dying from a range of stress factors, including "mechanical, hydraulic, pressure, temperature and chemical related stressors".

According to EdF's Environmental Appraisal, Volume 2 (Table 19.25), the annual predicted losses of "juvenile fish" as a result of entrainment will amount to almost 7.5 million individuals. This includes shrimps, sprats, whiting, prawns, sole, bass, herring, cod and other species. Other large numbers fish will be killed by impingement.

The company accepts that the effect could be "significant" on the particular species European eel, river lamprey and sea lamprey.

It is hard to see how any mitigation measures can easily stop these species from being caught in the filters which defend against their entering and fouling the power station's turbine generators, or subsequently dying as they pass further into the pipe network.

EdF also accepts that marine species are likely to be affected by the raised temperature of the sea water resulting from heated water returning to the sea from the power station, especially if both Hinkley B and C stations were operating together.

## 10. Preliminary works

EdF is proposing to apply to West Somerset Council (and other relevant authorities) for planning permission to undertake “preliminary works” in advance of the main construction programme. These works include:

- Removal of the majority of trees and hedges.
- Blocking off all badger setts (already agreed).
- Closure of existing footpaths and bridlepaths, including the coast path.
- Security fencing round an area of more than 400 acres.
- Stripping topsoil and vegetation to make terraced area for the proposed nuclear reactors. English Heritage says expressed concern this work could destroy old artifacts.
- New roads being built across the site.
- Underground streams re-routed.
- The excavation of more than 3.2 million cubic metres of soil, sub-soil and rocks. This is more than has been excavated to prepare the site for the 2012 London Olympic Games.
- Noise from up to 12,000 vehicle movements per month.
- Construction of a new protective sea wall along the coast.
- Construction of a jetty out into the sea.

EdF says it will “restore” the site to its original state if it does not receive planning permission for the power station. This is impossible – you cannot recreate a landscape that has taken hundreds of years to mature.

These works will effectively prepare the site for the construction of Hinkley C. This should not be allowed until permission has been agreed for the power station itself. Despite EdF’s use of the argument that national need for new power supplies demands an urgent response, there is no reason why the company should be allowed to take this precipitate action. There is plenty of evidence, for example the analysis conducted for the No Need for Nuclear campaign<sup>30</sup>, that it is possible for Britain to keep the lights on without nuclear power. The Department of Energy and Climate Change has also recently produced a series of scenarios for Britain’s energy supply up to 2050, entitled “2050 Pathways”<sup>31</sup>, one of which, Pathway Gamma, assumes that no new nuclear power stations are built.

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<sup>30</sup> [www.noneedfornuclear.org.uk](http://www.noneedfornuclear.org.uk) includes fully referenced projections of UK electricity demand and supply up to 2050 showing that nuclear can be phased out by about 2030.

<sup>31</sup> [www.decc.gov.uk/assets/decc/What%20we%20do/A%20low%20carbon%20UK/2050/216-2050-pathways-analysis-report.pdf](http://www.decc.gov.uk/assets/decc/What%20we%20do/A%20low%20carbon%20UK/2050/216-2050-pathways-analysis-report.pdf)

## 11. Consultation process

We consider the EdF Stage 2 consultation process to be flawed for the following reasons:

1. Failure to create a clear and easily accessible website. Although it is relatively easy to locate the EdF standard questionnaire (with its extremely limited set of questions on e.g. landscaping and the site boundary) it is much more difficult to discover how to make more substantial and detailed comments. The section of the EdF website which contains the consultation documents is firstly difficult to locate and then extremely difficult to navigate.
2. The Freepost address for postal comments also did not encourage confidence of delivery, since it made no mention of either EdF or Hinkley Point. What is the likelihood that all of these comments will have arrived with such a general address – “Freepost Consultation Response” - and no postcode?
3. Lack of engagement with the population of Bridgwater, with virtually no public meetings.
4. Lack of clarity about the proposed developments at Comwich Wharf, resulting in belated realisation by local residents that not only would the wharf be enlarged and extended by EdF but a major fabrication plant would be built right in the middle of a quiet rural community.
5. Reluctance to engage effectively with the residents of Cannington, at one point preferring to hold one-to-one sessions with residents rather than an open public meeting at which the strength of local feeling could be effectively registered.
6. Causing unnecessary anxiety and concern to local residents, for example round Cannington, by unexpected visits to ascertain whether they would sell their property in preparation for the proposed EdF/Hinkley C works, and with the scarcely veiled threat of compulsory purchase.
7. Inadequate facilities for accessing and studying the relevant documentation at the EdF offices in King Square, Bridgwater.
8. Belated consultation with the community of North Petherton about the potential effect of the nearby lorry park (freight consolidation centre).
9. Lack of consultation with the residents of Stockmoor Village, outside Bridgwater near Junction 23 of the M5. Many people either living there, or planning to live there, had no idea that a large park and ride site connected to the Hinkley C development was proposed on their doorstep. The issue has also exercised the developers Persimmon Homes, who are extremely concerned that prospective home-owners will be dissuaded by the unexpected discovery of the adjacent development.

## **Conclusion**

Overall, the conclusion of Stop Hinkley is that, despite any perceived benefits to be obtained by the local area from the construction and operation of Hinkley C - such as increased employment over the period of construction - the negative aspects of this proposal, from radioactive waste storage right through to the destruction of wildlife habitats, will have a disastrous impact on both the local and wider environment for many generations to come.