
# Stop Hinkley response to

# Generic Design Assessment

# UK EPR nuclear power plant design

# Consultation document

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# Introduction

Stop Hinkley is a local campaign group committed to closing down all nuclear plant at Hinkley Point and supporting similar groups elsewhere. We have over 200 members with many more informal supporters.

In this response we focus on the EPR design put forward by EdF for construction at Hinkley Point but many of our points are general and would apply equally to the Westinghouse AP1000 design.

We have campaigned for many years on out health concerns about Hinkley Point for which the Environment Agency has responsibility. In this respect our group has commissioned several epidemiological studies which all point to a link between local cancer excesses and the constant routine discharges of radio-isotopes flowing from the existing power stations. We believe it is wrong to allow the building of any more nuclear plant on the site.

Some of the questions as laid out in the consultation document have considerable overlap. Therefore we have answered some key questions in a way which will show our opinion on the remaining points.

# Q.1 Management systems

We are concerned about reports relating to EdF's management processes both in France and in the UK, with particular regard to ensuring the safe containment of radio-isotopes.

The EdF operated Tricastin plant two years ago was found to have contaminated one hundred workers. Two other plants were also found to have leaked radiation into the environment and industrial unrest has ensued with EdF needing to settle higher than expected (4.4% on average) salary scales for its nuclear workers.

The recently EdF acquired plant at Hinkley B was also where eight workers were contaminated two years ago, needing to be sent directly to Harwell for more detailed analysis of their contamination.

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.[1] 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.[2]

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.[3] The incident was taken so seriously by the local vineyard that it decided to change its "appelation" to avoid association with 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.[4] 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.[5]

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.[6]

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

In this respect, if a license 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 for example at Hinkley Point, 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

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[1] http://www.parliamentarybrief.com/2010/09/really-mr-huhne-you-should-brush-up-on-your-french

[2] 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

[3] 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

[4] 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

[5] http://www.lemonde.fr/cgi-bin/ACHATS/acheter.cgi?offre=ARCHIVES&type_item=ART_ARCH_30J&objet_id=1115526

[6] http://www.sortirdunucleaire.org/english/presse/affiche.php?aff=725

radioactive iodine, and eleven times more caesium, would be blown out of the reactor in a serious accident than from a standard PWR.[7]

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.”[8]

## Qs. 2 and 7 Radioactive waste and spent fuel strategy

In the consultation document the EA 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 description for fuel whose energy has been extracted in the reactor, but in reality it is radioactive waste. The consultation repeatedly refers to the 100 year timescale which is misleading.

The result is that Hinkley Point or other EPR sites will have a long term radioactive waste store in addition to a nuclear power station. There is also an alarming suggestion in paragraph 178 of the consultation that a spent fuel store might be shared between several sites. This would mean the unacceptable transportation of highly radioactive fuel by rail or road, passing through communities.

This transforms the consultation into something quite different from deciding on 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.

No mention is made in the consultation about the staggeringly high level of radiation in the EPR spent fuel which is due to its ‘high burn up’ nature in the reactor. At 6,000 MWd/tU the fuel will be twice as hot and twice as radioactive as from a standard PWR such as Sizewell and is the reason that the spent fuel must be cared for such a long period.

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

[7] http://www.stophinkley.org/NewsPages/news090208Ind.htm
[8] http://www.guardian.co.uk/business/2008/jul/26/britishenergygroupbusiness.utilities

by 2040, but only initially for existing waste from the UK's Magnox (such as Hinkley A) and AGR (such as Hinkley B) reactors.

CoRWM only made recommendations for 'legacy' nuclear waste declaring vehemently (Gordon McKerron chair of the committee) that new build spent fuel raised altogether different ethical considerations. The consultation (paragraph 176) has made the same mistake as the Government in misinterpreting CoRWM's conclusions.

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. Problems have recently arisen in West Cumbria, the only local community which is considering the option to host a repository. The geological report examining the local rock formations has seemingly found most of the ground to be unsuitable for the process.
http://www.whitehaven-news.co.uk/work-restarts-to-find-suitable-nuclear-dump-site-in-cumbria-1.766799?referrerPath=home/2.2837

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[9]. 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.

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:

9http://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=ADGEESg2BYIesA-5DfkN-fDi6Y0ofvJc_vQXRBjgmdVTo1WfclTzhfN1qilvQrP_far5ekjThHsuAa-_nPpDSl5dlwctjQLIvgP7mO18lTG5oryI1kgL-JsEmgqaNtgpS4emy2wOwfOa&sig=AHIEtbQAROSeA8CQ2_dJ6MVx9108SFJcZA

*"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 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.

In conclusion the consultation has not spelled out the real possibility that not only will EPR sites have spent-fuel stores with radioactive waste twice as hot and twice as radioactive as that from standard PWRs but also that these stores may exist in perpetuity as there is still no agreed location for a repository.

**Intermediate Level Waste**

We note with considerable concern and reservation that EdF are planning to incinerate Intermediate Level Waste. Our group is already strongly opposed to the incineration of Low Level Waste and campaigned successfully against a new incinerator at Hinkley Point B in 1995. We are appalled at the prospect that Edf with the support of the EA might consider the use of this technique just to reduce their volumes of waste.

"*The assumption in the reference case for ILW conditioning that any evaporator concentrates that are ILW can be incinerated leaving no radioactive residue needs further explanation. Incineration of lower activity wastes (e.g. hospital wastes) is common practice in the UK but incineration would be novel."*

EA GDA consultation
"UK EPR Assessment report - Disposability of ILW and Spent Fuel"
(page 12 - para 41) [10]

We also note with the same level of consternation that the NDA are considering incineration of reactor core graphite:

NDA Report Higher Activity Waste Summary of options for waste graphite September 2010 [11]

We are appalled at this strategy with its obvious risks to local communities and oppose it in the strongest terms.

**Concentrate and contain**
On the other hand we applaud the preference for the principle of 'concentrate and contain' not 'dilute and disperse' referred to in paragraph 166. Unfortunately the text does not seem to receive 'ownership by the Environment Agency, who we believe should approach all radioactive waste issues with this as the primary principle rather than BAT or ALARP.

**Balancing costs against public doses from discharges**
In paragraph 170 the consultation promotes balancing costs against public doses from discharges, then concludes in paragraph 173 that EdF has provided a reasonable radioactive waste strategy for all waste streams. Although we would not concur with increased doses to nuclear workers in the equation, we believe that even with the extra costs of high level protective gear that the industry should take every conceivable measure to incur NO doses to the public.

**Decommissioning**
We note the EA's intention in paragraph 195 to obtain more detailed information from EdF/Areva on how exactly the EPR can be decommissioned safely. The outcome of the Magoxes not being designed with decommissioning in mind is a long and fraught process for engineers, as discussed in the BNFL Magox decommissioning dialogues, attended by Stop Hinkley.

[10] https://consult.environment-agency.gov.uk/file/1349284
[11] http://www.nda.gov.uk/documents/upload/Summary-of-options-for-waste-graphite-September-2010.pdf

## Q. 3 Best techniques to minimize the production of radioactive waste

We are interested to see in paragraph 209 that EdF have several proposals to reduce the emissions of tritium. Tritium does seem to be a more harmful isotope than previously considered perhaps due to the small size of the molecule which can penetrate DNA.

We note that in the first proposal (a) that Edf cannot quantify the potential reduction and in proposal (c) that the EA has discarded the idea. Proposal (b) seems to have the disadvantage that a 'burnable poison' gadolinium oxide would be deployed. Although we applaud any motive to reduce, or better still to prevent, discharges of tritium, we do have some concerns about the extensive use of toxic chemicals which may interact with radionuclides to produce further health impacts. We would like to see more evidence of the potential synergetic effect of this particular chemical with radio-isotopes.

Despite the claimed reduction the EPR is still expected, according to EdF's predictions, to discharge a massive 0.16 TBq per day. As the EPRs are expected to be built in pairs then this figure is doubled in practice but should be added to discharges from neighbouring plants such as Hinkley B, subject to a likely life extension by EdF or Sizewell B. In the Bristol Channel Amersham International also discharges big volumes of tritiated water, considered more dangerous than tritium in gas form.

We disagree with the EA's conclusion in paragraph 386 that tritium discharges have a low impact on the environment and believe that any abatement techniques should be applied to this isotope ubiquitous in the nuclear industry.

**Stainless steel corrosion**
The metal in the EPR must perform a near impossible task of maintaining integrity over the estimated sixty years life of the reactor. No previous reactors have accomplished this but several have produced radioactive leaks due to the failure of stainless steel components. As the steel is continually bombarded by tritium and other agents, its integrity must be assured. However John Busby makes the case that even with upgrades to Inconel 690 or 800 and with weld metal replaced by alloy 52/153, the changes are still experimental and could still conceivably incur corrosion and cracks in vulnerable areas including the pressure vessel and cooling pond liner.
http://www.after-oil.co.uk/GDA.htm

## Q.8 Monitoring radioactive waste

We are very concerned to read that the EPR design does not include what the EA considers to be the best techniques to measure and assess radioactive disposals (paragraphs 551 to 557) and so agree with the conclusion in 558 (a) that BAT has not been demonstrated in respect of gaseous emissions. This applies equally to aqueous emissions as outlined in paragraph 566. We are also concerned that insufficient information has been supplied by EdF/Areva on sampling lines and achieving representative samples. We are greatly discouraged to read that these areas seem to be a low priority for EdF.

## Q.9 Impact of radioactive discharges

The Health Impact section of the consultation document does not even attempt to describe the current debate over the effects of low level radiation on communities near nuclear power stations. 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.

The consultation also uses the term ‘dose’ extensively and without reference to the CERRIE committee’s reservations below about the uncertainty surrounding the term regarding health impacts.

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

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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 [(1)] 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"[(2)], while others question the validity [(3)] and relevance [(4)] 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. [(5)]

**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 EdF 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."*[12]

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.[13]

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

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 (the latter commissioned by Stop Hinkley) 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.[14]

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.[15]

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[12] UNSCEAR 2000: Sources and Effects of Ionizing Radiation; Vol II, Effects: Para 1 p2 Introduction

[13] www.llrc.org/health/subtopic/icrpabdicates.htm

[14] http://www.stophinkley.org/Health/Leukaemia%20Incidence%20In%20Somerset1988.pdf

[15] http://www.stophinkley.org/Health/CancerMortPart%201.pdf

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.[16]

In 2006 breast cancer rates were found to be15 times higher than normal near Trawsfynnydd nuclear power station in mid-Wales.[17]

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.[18]

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.[19]

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.[20]

In 2009 a German government report found excess cancers near all of the country's nuclear power stations.[21] 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 also much public controversy over a recent reversal of national policy to close existing nuclear power stations over a short time-span.

COMARE, the UK's Committee on Medical Aspects on Radiation in the Environment, has yet to publish its response to the KiKK study, despite expectations this would happen in the early autumn. 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.

**Summary on health issues**

There are numerous studies showing a significant health risk from nuclear reactors to the local community which the EA has failed to address in its

[16] http://www.stophinkley.org/NewsPages/news010429.htm
[17] http://www.stophinkley.org/NewsPages/news060613.htm

[18] http://www.stophinkley.org/NewsPages/news070426.htm
[19] http://www.stophinkley.org/NewsPages/news080301.htm
[20] http://www.stophinkley.org/NewsPages/news090513.htm
[21] "Leukaemia in young children living in the vicinity of German nuclear plants", Kaatsch 2008, International Journal of Cancer (KiKK report)

consultation. It has not even attempted to outline the pivotal debate around low level radiation.

The health issue will not go away just because EdF and perhaps the EA wants it to, and already the evidence exists that radioactive particles will be considered the 'new asbestos', too dangerous to expose to public communities.

## Q.10 Abstraction of water

Once the EPR 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 on the Hinkley proposal, 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.

## Summary of the Stop Hinkley response

Our group is concerned primarily over the health impacts a twin reactor EPR would have on local communities. We are dismayed that the consultation document does not discuss the scientific debate over the risk model which governs the routine discharges from nuclear reactors.

We are also concerned about the potential risks from accidental discharges and leaks caused by the management of the plants by EdF whose track record in France and the UK has become increasingly poor.
We have no faith in the nuclear waste and spent fuel strategy espoused by the consultation. EPR sites such as Hinkley Point look set to become de facto nuclear dumps as the spent fuel will remain there for generations. Those who are deciding these strategies will be long gone with future generations carrying the burden of their mistaken policies. We are also opposed to the idea of incinerating intermediate level waste, which we believe comes about as the industry is under mounting pressure to reduce its escalating stockpile of solid waste.

We are worried that the introduction of novel forms of stainless steel in the fabrication of the plant may not withstand the passage of time and permit premature leaks.

We are concerned about the high levels of fish and other sea-life which will be destroyed by the water intake process for cooling the reactors. And about the thermal plume from discharged water which will also impact on the Bristol Channel ecology.

**We submit that the application should be turned down by the Environment Agency in the interests of the local and wider environment and the health of local communities.**