

WRITTEN REPRESENTATION

SIZEWELL C PLANNING EXAMINATION

SUBMITTED BY WAYNE JONES - RR 20026801

My relevant representation was as follows

“Safety Concerns about EPR design . Is the reactor safe from aviation disasters and threat of military action ? Suitability of Development Platform. What are the uncertainties regarding future predictions of tidal range and storm surge . Inadequacy of Waste Management Options .Has the legislation been complied with regarding radio-active waste management ? Pollution Aspects of Operation of Reactor . Is the coolant safe to discharge to ocean ? Radio-logical Protection during Reactor Operation and During Decommissioning . Which radio-nuclides are likely to be present within the outer reactor housing and how will this affect maintenance staff and what will it's effect be for decommissioning operatives ?

I am Wayne Jones and have taken part in several processes down the years that have attempted to scrutinize various aspects of nuclear energy projects in the UK and the Republic of Ireland . Amongst the most relevant to this examination was the Sizewell B Public Inquiry and the Hinkley C Cross – Border Consultation For The Irish Republic . Also worth mentioning is my Consultation Response to the Welsh Government Policy on Highly Active Wastes and the fact that I was an official objector to Sizewell C in the 1990's and would have presented evidence to that inquiry that had not been fully covered at the initial Sizewell B Inquiry , if the programme of Westinghouse PWR's not been abandoned .

I will cover the topics in the order presented in my Relevant Representation , followed by a few brief comments on what the effect of building Sizewell C may have considering the views of the Welsh Rural Affairs Select Committee's report on Nuclear Power in Wales , to which I made a small contribution .

- 1) Safety of reactor operation of Sizewell C from potential air transport accidents .
- 2) Uncertainties in predicting future oceanic extreme events and the possible effects on the Sizewell C Development Platform .
- 3) The management of radioactive wastes in the UK and how legislative processes should govern the future production of nuclear waste from Sizewell C .
- 4) Radio-active and chemical discharges from Sizewell C and radiological implications for the local environment and site .
- 5) Final Comments and Overview

1) Safety of reactor operation of Sizewell C from potential air transport accidents .

1.1 In the Hinkley Point C Pre-Application Consultation document 3 , it states at 3.1.4. that :-

The reactor pressure vessel, steam generators and pressuriser are all contained within a reinforced concrete structure, designed to withstand the crash of a commercial airliner. Other essential buildings including the main control room and fuel building are also protected to the same extent.

At 3.1.10 the following is stated :-

third level: arrangements for mitigating the consequences of failures and preventing core meltdown. There are four safeguard buildings, each capable of performing the essential safety functions and designed to maintain cooling of the core under all circumstances. The probability of a severe accident leading to core melt is therefore extremely remote, but the UK EPR reactor unit is designed to contain such an event and to minimise the environmental consequences. There are also segregated diesel-powered generators to provide back-up electrical power in the event of a loss of off-site electrical supplies. (my underline)

1.2 In the Environmental Statement for The Sizewell C Project 6.3 Volume 2 Chapter 27 , at 27.4 .45. lists the potential risks to the reactor site and qualifies aviation accidents as being of medium risk .

In the table provided at 27.7 Assessment of MA& D Risks During Operation , aviation risks are not mentioned and become conspicuous by their absence .

1.3 The Hinkley C design has two emergency generator buildings located on either side of each reactor , as opposed to older reactor designs which have one . The electrical off-site transmission lines and substation are located at the South East corner of the site , with the reactor building to the North East of that . The two emergency back up generators are located directly on either side of the pressure vessel building . This might afford the possibility of some protection to one of the emergency generator buildings in the event of an aircraft impact , but a large airliner, travelling at velocity , and from the direction of the Southeast , having collided with the electrical transmission facilities , could then cartwheel , somersault or spread debris in the direction of the reactor building and emergency generators . It would be exceptional circumstances for both emergency generator buildings to be hit by large enough debris , such as jet propulsion engines , but the chances that large amounts of aircraft

fuel could engulf either generator , or both , is a definite possibility . See EN010001-005230-HPC Development Site - Site Plan 1 , The Hinkley Project .

- 1.4** There can be no doubt that such an accident occurring would have the potential to damage off-site power , physically destroy one emergency generator , and melt the equipment associated with the other emergency generator , as well as detonate the fuel for those generators . **This is but one scenario .**
- 1.5** How such a scenario might pan out for the intended Sizewell C project is a matter for the present planning Inspectorate to decide , but it is not realistic , in my estimation , to expect the present safety criteria incorporated into the EPR design to successfully prevent disaster .
- 1.6** As I stated in my public address during the Open Floor Hearings for this examination , I expect EDF to submit evidence detailing debris fields from aircraft crashes to show just how their infrastructure at the intended nuclear sites are expected to survive , as well as statistical data on frequency of uncontrolled aircraft impacts, especially those like the Concord crash in Paris , in which the fuel tanks were full after take off . This is particularly relevant to Sizewell where the locality hosted many air bases , which fuelled local fears of aviation accidents happening during Sizewell B's planning process , when the skies were filled with F-111 , A 10 , and military transport aircraft , as well as local air traffic .
- 1.7** It was my experience at the Sizewell B Inquiry that this issue was never addressed properly , which is why we have a legacy of danger today . The risks associated with reactor accidents from aviation are increased as both the volume of aircraft and the number of reactors predicted by the World Nuclear Association during the present replacement programmes increase . The WNA have reported an expected increase in reactors from under 500 to 1500 over the next decades , roughly in line with known uranium reserves , but probably out of line with economic trends , though not reflecting some governments unpublished nuclear goals , such as the UK Governments Pathways Report highlighting an intended further increase in nuclear generating capacity to between 50 and 70 GW .
- 1.8** Relevant to this high risk , as opposed to EDF's medium one , I ask the Inspectors to look at File Number 1 in which I have placed a photo of what a crashing freight airliner can do as opposed to a

passenger commercial flight . I concede that Sizewell and Hinkley are not busy air flight path lanes like Kraaiennest in Amsterdam but the nuclear documentation makes no comparison of aircraft types and only mentions 'commercial aircraft'. Also , the following video shows how risk estimates do not give much real idea of potential accidents . The chances of the event in this video happening to that particular place in Belgium are probably infinitesimally small , but happen it did.

<https://youtu.be/sdX2PndqPcc>

- 1.9** The possibility of a deliberate attack on a nuclear installation is discussed in my cross – border consultation document for Hinkley C . I don't want to discuss this here , but it suffices to say I conclude that warmongering and nuclear reactor safety are mutually exclusive and you can't have both .
- 1.10** It is not unreasonable to conclude that a Fukushima type accident , where power was lost to the site , is not a remote possibility if an aircraft crashed into the Sizewell or Hinkley sites . However , the Fukushima accident occurred during reactor shutdown after the safety systems , in responding to the earthquake , had inserted the control rods . A sudden impact , on the other hand , that might result in loss of site power and compromise reactor cooling , would likely result in a full meltdown and fire in a large reactor core like the EPR , an accident that has not yet happened in the world . The potential exists in the EPR , as it did in the Sizewell B PWR , for an accident that was described in the Sizewell B Safety Case as a Level 10 accident , in which a radioactive plume would kill thousands if the wind direction was inland , and many more , as far away as the 70 miles to London , if the wind carried it in that direction , from cloud-shine associated with massive release of caesium 137 , and those deaths would be immediate for people caught outdoors .
- 1.11** **I await EDF's submission proving that their project is safe from the described events .**

Uncertainties in predicting future oceanic extreme events and the possible effects on the Sizewell C Development Platform .

- 2.1** The timescales over which a meaningful prediction of the effects of oceanic extreme events are vital coincides with the three phases of reactor site occupancy in the case of those reactors which are near and on the coastline . The sites that have been chosen for new development are all sites that have reactors already , some in operation , some being decommissioned , for the economic reasons of having infrastructure already in place ie electrical grid connection and railway connection .
- 2.2** The new EPR sites at Hinkley and Sizewell will include 10 years of construction , the possibility of between 30 to 60 years of operation and a hundred years before final removal of the reactor cores . It is not unreasonable to assume that there will be major changes to climate that will effect the oceans in that time .
- 2.3** Expected changes in ocean level due to ice cap and glacier melt are the subject of thousands of research papers and no-one has any doubt that global temperatures are increasing and that sea levels are following suit . The expansion of ocean volume due to heating and the potential expansion due to atmospheric gas absorption have been talked about since the 1980's . The climate effect of temperature inversion resulting in sudden warming and cooling has also been known since then , with it's obvious result of erratic weather patterns .
- 2.4** The increased frequency and severity of storms was announced by the Obama administration in the US on the 16th January 2015. Since that time , a number of tropical storms have had disastrous effect , especially in the Phillipines and Bahamas , where storm surges up to 6 metres high have wiped out whole communities.
- 2.5** Massive storm surges are not new , however , and the North Sea coasts were hit by a deadly surge in 1953 , particularly inundating low lying coastline in places where the sea is constricted like the Rhine Delta , The Thames Estuary , The Wash etc. where a high number of drownings were recorded . The Severn Estuary has many records of major flood events caused by high sea levels , but none as worrying as the flood of 1607 . This storm surge , caused by a low pressure system sitting over Ireland and driving the sea eastwards up the Bristol Channel , caused severe inundation and led to huge loss of life in Somerset Devon and Gwent .

- 2.6** Evidence for this storm surge can be found in the Gaelic records on the Dingle Peninsular as well as in Welsh and English accounts from the affected regions .
- 2.7** Storm surges are caused by weather systems that record high continuous wind speeds , and aren't necessarily accompanied by strong damaging wind gusts . An example of this was the St Stephens Day 2013 (December 26th) storm that affected the West Kerry and Cork coastlines in Ireland . The features of this were experienced by myself and are as follows . There was very little recorded damage on land because the gusts were not particularly evident . I witnessed a full size unattached metal horse box being pushed steadily across a farm yard until it's progress was stopped when it ran into the side of the barn . The electricity transmission lines were continually sparking along the entire visible length , which was several miles in the local mountainous terrain . A neighbour witnessed a whole series of black shapes being blown through the air above his house , after a while realizing that they were birds that could not find their way out of the continuous powerful wind flow . The next day we were told that the storm had destroyed the massive sand dune system at Glenbeigh . Several beaches on the Dingle Peninsular had all their sand stripped off completely , and the road around Sleah Head was closed because of storm damage . Two other roads , one at Minard and one near Kinnard , were also damaged and completely closed . The water had come right in at Inch and waves were breaking along the main Dingle to Killarney road .
- 2.8** There was virtually no damage caused on land to any houses or farm buildings that I heard of , Nor was there damage to the town . Glenbeigh beach however was reported by Kerry County Council to have had an estimated 1million tons of sand removed , opening up the sea level houses on the coastline behind the sand spit to ravages from future storms . An article in the local press reported on worried house owners asking the government to provide funding to bolster up the sea defences behind Glenbeigh but they were refused . It was their property and the government had no responsibility – they were on their own .
- 2.9** That , then , in 2013-14 , became the state of play , with no-one wishing to cause any undue alarm to anybody about future climate problems like storm surges and sea flooding , because it might affect property values and be an embarrassment to governments .

- 2.10** Two more storms hit Kerry that winter , the first blew the school gymnasium roof off in Dingle Town , and ripped a church roof off near Ballydavid . It blew over a record number of trees in the county including massive oaks in the Killarney Park and caused untold damage to power lines , leaving thousands without electricity . The damage was still being cleared two years later , yet there was no news of any further damage to the coastline . The second storm accompanied record swells on the Atlantic with a low of 932 recorded , causing wave heights to reach monstrous proportions that could be seen dwarfing rooftops on the sea front at Lahinch, County Clare . This storm , although a danger to people getting too close to the seas edge , did little direct damage to the coast either .
- 2.11** The definition of a hurricane, as well as the achieving of various wind speeds, is that it creates a storm surge of 3 metres or more . It is a well known fact that hurricane force winds blow the sea flat , so that wave damage is not necessarily very pronounced . The wind , rain and flooding do the damage . A storm with a surge of 2 metres however is a very different proposition , that can be accompanied by violent wave formations . This was more like the St Stephen's Day storm of 2013 , that coincided with high spring tides . Combine this type of storm with a foot or more of ocean level rise and we could be looking at serious coastal damage .
- 2.12** A further factor has to be looked at in relation to predicting oceanic extreme events . That is how increased sea levels will affect tides . I have tried to research this since 2005 after talking to the Green Party energy spokesman who had been promised a Public Inquiry into the Hinkley EPR by the Labour minister at the time . His thoughts were that nuclear sites were going to have to be cleared rather than built on because of rising sea levels . I realised that the tides may very well be something to with that . In 2011 , I raised the concern in questions to the Irish Representative to the London Dumping Convention of the International Maritime Organisation in a series of questions relating to the Fukushima pollution but got no answer . She was based at the Marine Institute in Galway so was in a good position to know . I got no answer .
- 2.13** **The question I raised was whether inertia or momentum would be the over-riding factor in determining the relationship between ocean level rise and tidal range increase .** Several years later I questioned an ex member

of the UN Panel on Climate Change if he thought the relationship between an increase in ocean level rise and the subsequent increase in tidal range was linear or exponential , and he said he didn't know but thought it was linear (the accepted unproven wisdom) . He then came up with one word – **momentum** . I realized then that he had been party to knowledge of the original conundrum . Indeed, a marine expert informed me that little is known about sea processes , whereas a scientist who operated a tidal gauge said it would take 15 years more measurement to ascertain with certainty this relationship due to both local coastal and sea bed influences affecting the data until enough ocean level rise had accumulated to cancel these factors . That was in 2015 . I therefore believe we are at least 9 years ahead of this knowledge , and probably 10 to verify the data stays on track

- 2.14** I reject completely this notion of basing predictions on the 100 year maximum flood event idea as not having any validity , but suggest that this uncertainty over tidal range should have forestalled the building of Hinkley Point C and put back the examinations of the plan for Sizewell C by 9 – 10 years .
- 2.15** In the operating lifetime of the EPR reactors , ie by 2070 , the risks are far too great that an increased frequency of storms , especially those resembling the St Stephens Day storm of 2013, combined with an unanticipated rise in ocean level , may mean we might have to consider clearing the low lying nuclear sites like Hinkley Point and Sizewell altogether , rather than building on them , especially if it is found that the uncertainties regarding tidal range that have so far been ignored turn out to be important and that the relationship to ocean level rise is a somewhat more exponential one .
- 2.16** EDF's contemplation of providing protection using shingle , is daft for the Sizewell site , whereas building higher walls at Hinkley everytime someone tells them something they hadn't thought of, is contemptuous considering a surge or a tsunami cannot retreat backwards or go sideways because of the mass of water moving in behind it , and the only direction it can travel is to stack up on itself .
- 2.17** A short narrated film of the aftermath of the St Stephens Day storm can be found in Folder No 1.
- 2.18** CCTV footage of a small storm surge , unaffected by wave action , was captured at Dingle Coastguard Station
<https://youtu.be/VRksD8fQPIQ>

The management of radioactive wastes in the UK and Legislative Processes

- 3.1** EU Directive 2011/70 was presented to the EU Council of Ministers in July 2011 . It was an important document in that it attempted to legislate several important problems relating to nuclear waste . It's objectives were to standardise management concepts in the Community relating to the disposal export and import of nuclear wastes , particularly highly active and heat generating wastes , and spent fuel to be designated as nuclear waste .It laid ground rules on where nuclear wastes could be exported to , and how nuclear waste producing states should manage wastes . Controversially , it committed states to geological disposal as the only acceptable end strategy and irreversible closure of repositories as the only end result. This would ensure any fissile material left in spent fuel would be unobtainable in future . It's rule that only export to other states would be allowed if the necessary regulatory apparatus was already in place in the receiver state was intended to deter exploitation and the practise of illegal dumping . In these respects it was important legislation .
- 3.2** The Directive was also intended to allow for nuclear replacement by requiring states to follow a timetable for the implementation of measures to achieve final disposal of highly active wastes . It was , in fact , a form of justification , and a controversial one for the UK , which had a stipulation by Royal Commission , more or less enshrined in stone , that 'no new nuclear power programme should be commenced unless the problem of nuclear waste disposal had been dealt with ' . The Directive would more or less replace this stipulation – providing the timetable for construction of what was now termed a GDF (Geological Disposal Facility) had been adhered to .
- 3.3** The timetable laid down was as follows -
- Member States shall bring in to force the laws , regulations and administrative provisions necessary to comply with the Directive by 23 August 2013.
- the Minister for the Environment signed it into UK law in August 2013 .
- From 2013 -15 , member states were required to draw up plans for a GDF design and present them to the Commission.

From 2015-17 Member States were to commence exploratory drilling to find a site for the GDF .

From 2017 construction on a GDF was to commence .

No timetable for licensing or closure of a GDF was given as this would not be practical .

- 3.4** Up until 2015 there was few problems for the UK government as the ground had long since been covered . Uk strategy for Highly Active Waste centred round a host community being offered money to accept a GDF , and local meetings were set up to this purpose . The Government then decided to hold online meetings (pre-covid) . The meetings , their contents and the venues then appeared to disappear off the radar and have not been heard of since . UK strategy for HAW , apart from a 2016 policy document , which has little to add , seems to have been buried in the ground .
- 3.5** The UK policy for a GDF is to create one for all the UK's HAW's and all the merits of this , the technical and political problems and the background and results of the last search for sites for geological disposal are in my consultation response to the Welsh Government Policy on HAW which is in Folder No 2 .
- 3.6** To cut a long story short , the nuclear industry are offering the very cheapest option of a GDF , not deeper than the height of an average hill in Wales, with little or no answers to the problems of groundwater movements and pollution in the medium to long term . Even in the very short term it is unlikely to assure isolation , and even the pro-nuclear Radiological Protection Institute of Ireland have been gearing up to measure the Iodine 129 , the first radionuclide that will cross the Irish Sea , should a GDF be built on Ynys Mon , as has long been expected.
- 3.7** In anticipation of coming events , I ask the Inspectors to reject Sizewell C on the grounds of nuclear waste disposal being utterly disliked by the UK population , and the likelihood of someone accepting a disposal facility near them might end up by them being prejudiced to accept it by deterrent towards other , more acceptable economic activity .
- 3.8** I finally wish to add that adherence to EU Directives, though still UK Law , is not necessarily a 100% certainty considering this Governments attitude towards the EU , but ignoring the

conditions laid down , may lead to other considerations of an important document like EU Directive 2011/70 being ignored by governments who might see their economic interests more important than safeguarding the Worlds population from nuclear exploitation .

Radioactive and chemical discharges from Sizewell C

- 4.1** In 1984 I attended the Sizewell B Public Inquiry to cross examine witnesses and present a case on nuclear waste . One of the issues that concerned me most was how the pressurised coolant inter-acted with the fuel rods , creating both liquid and gaseous discharges . One facet of the PWR operation was the problems attributed to failed fuel . With 6000 gallons of water under pressure passing through the reactor each second , the coolant must receive heat evenly across the fuel rod assemblies otherwise perturbations in the coolant stream will result in 'leaching' of soluble radionuclides . The failed fuel has not undergone fission , and is measured by a 'rate' , which in the Sizewell B design was expected to be 0.02 % of fuel rods , and the resulting iodine 131 in the coolant could be expelled from the reactor , because the perturbation would result in an increase in pressure in the coolant , leading to automatic venting of contaminated steam through the Pressure Operated Release Valves (PORV).
- 4.2** Knowing that data from American PWR's was reported as being doctored , especially in Ralph Readers Critical Mass magazine , which regularly reported on accounting (nuclear) errors by American companies , and having seen articles in the Ecologist magazine on the terrible abuses of standards in American fuel fabrication plants , I decided to examine the possibilities that the figures for iodine spiking may be over confident . It did seem like a cause for concern that uncontrolled pollution might spill out as steam from a reactor , and it had already been explained that the water coolant in an LWR picked up more radioactivity in normal operation than did a gas cooled reactor , making discharges of radio-activity higher .
- 4.3** Furthermore , health physicists at the inquiry such as Bonnell and Pepper had given evidence on radiological protection in normal operation and one of them , probably Bonnell , but I.m not sure which , in explaining the experimental wind rose data in relation to releases from the PORV's , had said in

cross-examination by counsel that he regarded it as adequate protection for adults that they were outside the perimeter fence , but that for children under two years of age a distance of a mile away might prove more prudent . I have not seen signs warning parents of this on Sizewell beach .

- 4.4** My investigations at inquiry amounted to asking the CEGB to produce a document showing spiking levels if the failed fuel fraction was increased from between 0.02 to 0.2 % . I no longer have this document . I tried on Day 275 of the inquiry to cross-examine BNFL , the fuel rod manufacturers , if water mobile actinides were also present in the coolant due to failed fuel , but he refused to be drawn . I kept on at him and he more or less accused me of 'teasing him with this problem'. As an official objector to the earlier attempt to build a second PWR as Sizewell C , I would have raised these points once more had that programme not been abandoned .
- 4.5** In the EPR design the principal valves used for depressurisation of the coolant no longer eject steam to the atmosphere , but are housed within the secondary containment of the reactor . That means contaminated steam will be released into areas requiring access by operatives and during decommissioning . It is therefore pertinent that the possibility of long lived and highly lethal actinides in that housing be appreciated . Frankly , I did not believe what BNFL told me about the leaching from fuel rods due to failed fuel . It is not the failed fuel itself that leaks so the reply I got that if the fuel had failed , it would not have achieved it's design life , therefore the water mobile actinides would not be present , was an inaccuracy designed to put me off the subject .
- 4.5** I would appreciate it if the present examination researched this issue properly and correctly ascertain whether the maintenance and decommissioning of this area of the EPR turns out to be a potentially 'dirty' area in terms of internal and external dosage should the chemical coolant treatments fail to mitigate the problems associated with spiking , especially if mixed oxide fuels are to be produced in future and especially in relation to long burn ups being achieved .
- 4.6** In chapter 25 Of the environmental statement , a report cited the discovery of Am 241 in mussels . As Am241 is water mobile and is not accompanied at nuclear power stations by it's parent Pu241 which lies stationary on discharge , it is expected that the

liquid discharges of this substance from cooling ponds and in coolant discharges to be completely diluted and diffused . Hence the expectation that filter feeders on the bottom like mussels would have undetectable amounts . So , why is it that the tables showing the results of sampling for the intended removal of sediment for the construction of marine jetties on the site show detectable levels of Americium 241 . Can EDF please explain this , as it is an unsatisfactory situation , it being admitted at Public Inquiry that there is no safe dose of internally ingested Am 241 .

Final Comments and Overview

The report of the Welsh Rural Affairs Committee on Nuclear Power found that a new power station at Wylfa be rejected if the cost of the electricity did not come considerably lower than that for Hinkley C Hitachi soon pulled out of the Wylfa project , leaving the project without backers . Could the same be said of Sizewell C . The needs of Wales can easily be met by the large renewable and storage potentially available , though that is not the situation in East Anglia where demand is high in the South East generally and climatic variations unique to the North Sea coastal areas locally make it difficult to meet demand without reliable baseload . However , should Wales be expected to accept increased cost in electricity because England wants nuclear power . The possibilities of storage in Wales to help meet the demand in Southern England is a possibility if we are not asked to face the prospects of another Chernobyl , this time on our doorstep again . Another possibility if England continues it's rush into costly nuclear replacement is for Transmission Grid divorce altogether which would suit a large portion of Welsh society .

BULLETIN POINTS SUMMARY

- **EDF evidence for Sizewell C says that aviation crash risks are medium**
- **Design is different in the EPR but damage to vital equipment is still possible**
- **In some scenarios onsite and offsite power could be lost**
- **A full meltdown and uncontrolled fire could result in an EPR**

- **The dangers are so great that the risk should not be taken**
- **EDF must prove their safety case by entering evidence on debris field of aircraft crash sites .**
- **Both the Hinkley and Sizewell sites are prone to devastating extreme ocean events within the operating lives of the reactors**
- **Uncertainties as to the predictions of expected tidal ranges mean that the processes to license and build have come 10 years too early**
- **Nuclear waste problems have not been dealt with and the past and present stipulations of UK law have been ignored**
- **There are problems associated with all LWR's in coolant discharges that have not been properly investigated and may be a problem in future for contamination in the EPR design**
- **Marine sampling for Sizewell C has shown disturbing results**
- **Wales stands against the costs of baseload electricity from the EPR**

Welsh Government Consultation on Nuclear Waste Disposal

Comments on WG23160

My name is Wayne Jones

I have taken a strong interest in nuclear waste issues since 1983 when I presented evidence on High Level Waste disposal to the Sizewell B Public Inquiry and questioned witness's on their evidence . I appeared at the Cardiff sessions of the Hinkley C Public Inquiry and presented evidence to the Dounreay Inquiry into the European Demonstration Reprocessing Plant for the fast breeder fuel cycle . I have produced briefing notes for the Welsh Anti nuclear Alliance , Nuclear Free Zone Local Authorities , The Green Party of Wales ..Parliamentary Questions on Nuclear Waste Disposal and Parliamentary Questions for the Dail Eireann on Euratom Directive 2011/70 . I am a citizen of Great Britain and was born in Gwent . I am originally from Abersychan , Mon .

Question 1 : The Welsh Government should retain it's existing neutral position of neither supporting or rejecting a disposal option .

The reasons are as follows :

1. at ix , The consultation document sets out that it has taken no final decisions(but) has decided that it should review it's current policy with a preferred option of adopting a policy for the disposal of HAW .

2 Euratom Directive 2011/70 at 20 states in regard of spent fuel 'Whatever option is chosen , the disposal of high level waste , separated at reprocessing or of spent fuel regarded as waste should be considered.'

3 The Directive at 21 states - 'The storage of radio-active waste ,

including long-term storage, is an interim solution , but not an alternative to disposal.'

4 at 23 the Directive states -'deep geological disposal represents the safest and most sustainable option as the end point of management of high -level waste and spent fuel considered as waste .'

5 and again at 23 'Member states , while retaining responsibility for their respective policies in respect of the management of their spent fuel and low , intermediate and high level waste , should include planning and implementation of disposal options in their national policies .

6 and again reversability and retrievability as operating and design criteria may be used to guide the technical development of a disposal system . However, those criteria should not be a substitute for a well- designed disposal facility that has a defensible basis for closure .

7 The Directive therefore requires the UK, as a member state and co-signatory , to 'dispose' of it's HAW and spent fuel regarded as waste . No other option than end disposal is given in the Directive .

8 However, Wales , although within the UK and seen as a government with devolved responsibilities for HAW management , is not in itself a signatory, or regarded as a separate member state from the UK , and is only party to the Directive in that it should engage with the UK Government in that Governments' required implementation of the Directive as laid out in paragraph 28 of the Directive .

9 There is nothing in the Directive that requires regional governments to adopt the requirements of the Directive , but the policies of the Welsh Government , in this commentators opinion , is a matter for the Welsh Government and must be seen as existing alongside the policies of the UK Government , and within that governments framework , but reflecting the unique position of Wales , in the management of radio-active wastes .

10 The Directive does not substantiate any claims to licensing that the Welsh Government may feel it has , but it does leave scope for jurisdiction and scrutiny

over the way radio-active wastes are to be managed .

Question 2 : No , the Welsh Government should not adopt an alternative disposal route for higher activity radio-active waste and spent fuel regarded as waste for the following reasons :

1 at 1.2 the consultation document states : 'A disposal solution would obviate the need for future intervention and would ensure no harmful amounts of radio-activity are released to the environment in the future.'

That has yet to be ascertained and the process we see being discussed is designed to ascertain whether that situation pertains to the Welsh and UK environments .

2 The Directive 2011/70 is a policy statement that requires member states to follow a time schedule by which disposal of HAW is to be implemented . Firstly , a schedule has been set by which the policy has to be incorporated into law by each member state . That was by August 2013 and each Environment Minister was required to sign up to that process . From August 2013 till August 2015 , each Member State has to consider how the national regulating structure would be set up and present the Commission with a repository design . Up to this point it has been done many times before . The stage beyond August 2015 , however, is less certain as there is very little experience of searching for sites for HAW in this country .

3 Desk studies give little indication of what radiological protection can be afforded, and predictive modelling can never be a real substitute for collecting data in the field . Hence the need for test drilling , mainly to ascertain the flow of groundwater around a repository , and detect the route of nearby aquifers . I believe the present wisdom is 1Km square of boreholes , although in the past it was reported that '....such investigations , usually involving the drilling of boreholes , could extend many kilometres away from the proposed repository site.' - National Environmental Research Council British Geological Survey – Evidence to the House of Commons Environment Committee on Radio-active Waste 1986 .

4 Nuclear industry experts and government departments disagreed on the

need for test drilling during the initial search for sites for HAW disposal . The Department of the Environment explained to the Sizewell B Public Inquiry that the government had curtailed test drilling programme because 'it was satisfied that technically this disposal option on land was practicable , but the decision had been taken to defer disposal to make the waste more amenable when it was eventually put underground , because the heat generating capacity would be reduced , and , therefore there was no need to carry out a generic test drilling programme in the UK.' (1)

5 Questioning the operators of Sellafield who store and treat the HAW Council for the Inspector at the Sizewell Inquiry asked : ' Is this the root of the debate.....between the geologists and those who are concerned with the final disposal of high level waste , that really they have got to investigate whether there are particular rocks in this country , if high level waste disposal is to be carried out in this country , because of the importance which is attached to the quality of rock in which the disposal chamber is eventually to be built in contrast to all other technical considerations ?'

BNFL : ' Yes , I think that is right . Again , I must make it clear that I am speaking personally , but I entirely endorse the reservations which the committee (2) expressed over the decision to effectively indefinitely postpone the site specific work in relation to high level waste disposal. It has to be done at some time . We shall learn something from whatever site specific work we do and the sooner we can learn.... the better.'(3)

6 This disagreement had erupted in the Radio-Active Waste Advisory Committee's annual report when they stated that they were 'unable' to carry out their responsibilities ... (to advise the Government) ' if the test drilling programme was stopped . (2)

The issues were re-examined by the House of Commons Environment Committee in 1986 .Recommendation 9 stated :

(I) Research on a fully constructed deep geological site in this country is urgently needed and should be implemented .

(ii) Such a site should be designated as an experimental facility , explicitly excluded from being a potential operational facility .

Command 9852 in response says at paragraph 55 :

‘ The next step will be for NIREX (Nuclear Industry Radioactive Waste Executive) to identify potential sites for detailed investigation so that a site can be chosen to put to a public inquiry and , if approved, developed..... There will be no need for the prior construction of a separate experimental facility . This would only raise concern in the area affected without yielding any compensatory benefit . Nor, within the relatively restricted area of the UK , is it likely that such a number of suitable sites will be identified as to make it sensible to abandon a site that is good enough for ultimate disposal.’

7 Here , then , the UK Government signifies that it is political , not technical , considerations that led to decisions taken at the time of the last search for sites for HAW disposal, and these are the considerations that have led us to the kind of policies we have before us today

8 We can only make reasonable assumptions about what the technical difficulties may be in relation to HAW repository selection, as site specific work is essential to assess radiological protection potential.

Predicting earth movements and groundwater movements through the host rock is part of this process and the knowledge of the presence of nearby aquifers . Test drilling will be required to ascertain these fundamental conditions in the environment of the disposal facility , but may well in itself cause problems . A series of holes through the rock will affect the water movement , and increase the potential for fissures forming from percussion through the rock strata .

9 Mr Feates , the Department of the Environments technical witness told us at the Sizewell Inquiry that even small earthquakes , with tremors the size of those experienced on Ynys Mon in 1983 would make the groundwater flow in the host rock of a repository unpredictable .

This has cosequences for package design in HAW disposal and the latest designers have borrowed from the earlier plan for LLW and ILW repositories , which were earmarked for shallow burial in clay deposits, such as at Bradwell in

Essex , because of that host geologies impermeability to water . The idea of a clay jacket surrounding the waste has been incorporated into designs . Mining experience shows that tunnels will experience both rock falls and flooding as a matter of course , but what is peculiar to the HAW disposal option is that within the length of time that isolation is required there is the potential for drying out and re-flooding, which would render the package as breachable . The possibilities of a below ground fire have also got to be estimated on the basis of the inventory , decay heat , potential damage from rock fall and natural underground hazards . I therefore challenge the regulators , developers and policy makers in that their plans for disposal of HAW in Wales are not guaranteed to be safer than other options at present , and the Welsh Government should remain doubtful whether a repository is likely to qualify for licensing after a risk assessment is carried out to show that any escape of radio-activity will be within limits laid down by the authorising departments , under the guidelines set out by the IAEA and International and National Radiological Protection Authorities .

10 For these reasons I ask the Welsh Government not to change its policy to one of supporting disposal , but to leave it as it is and stay neutral as regards plans to dispose of HAW in the Welsh environment are concerned. Other benefits of choosing this policy commitment are explained in the answers to questions 3 and 4 . Other potential options are shown in answers to Question (b) 2 and 3 below , but would require a similar validation procedure as shown in this section .

The Answer to Question 3 is that the Welsh Government should adopt a three tier policy

(a) In light of the fact that HAW disposal will be highly risky at best and downright unacceptable if it wasn't for the fact that wastes had already been created by the commencement of a means of producing electricity that hadn't been thought through properly and relied on future advancements and breakthroughs that never came, the first policy component should be that nuclear waste disposal will only be considered for what could be called a ' finite' amount .

The reasons are as follows :

1 Wastes originally intended for other forms of disposal than geological disposal on land , now have no other option , but were never intended for land

-based disposal . The ending of the practice of sea dumping in 1984 meant that many ILW's , all decommissioning wastes , and some HAW's and LLW contaminated with plutonium and other dangerous actinides had no disposal option and had to be considered for storage and eventual disposal on land .

2 The amount of wastes for eventual burial , if it is shown that that method can be carried out within acceptable radiological protection standards, will have a direct bearing on the level of risk, the number of people expected to take the risk, the number of repositories needed for development , and the overall level of risk associated with all areas of storage , transport , treatment , management and disposal . By setting a 'finite' limit , genuine intergenerational equity can be achieved .

3 The radiological impact of high burn-up wastes from the new reactors , whether spent fuel or treated HAW , will have serious implications for operator exposure , in all storage, transport , and disposal options , as well as increasing the chance that damaged packages in the repository emplacement stage could render the repository unworkable . This is due to the increase of the high gamma emitter plutonium 241 in high burn up wastes .

The contention that Sizewell B produces high burn-up wastes so the New Build wastes will also be manageable is eronious .The burn-up of Sizewell B PWR fuel is nowhere near the intended burn-up in the new reactors. Whether such burn-ups are achieved or not is an unknown factor and is dependant on the radiological integrity of the coolant-core performance . The new reactor types are unlike any Wales has experienced before , and water-moderated and cooled reactors have different tendencies .

Water picks up more radio-activity from the fuel than CO2 gas coolant found in Magnox and AGR cores , and so discharges to atmosphere tend to be higher . Automatic release of radio-active steam can be triggered by various conditions within the core , and working at high burn-ups can lead to contamination both within the core , ancilliary works and local surroundings . Spent fuel management , transport , disposal and radiological protection will all be negatively impacted on by the new reactor systems .

4 Spent fuel was never intrended for disposal . American experience with reprocessing civil spent PWR fuel led to it's cessation because of difficulties at West Valley and Hanford (2) . US waste policy has since been in

suspended animation , and decisions are still being made as to whether the wastes should be treated by separation or not . There may be some sense in this as some wastefoms may be more suitable for land disposal and some for indefinite storage .

Certain elements within the spent fuel may be inappropriate for geological disposal because of their longevity of half-life . The study by Sir William Halcrow and Partners of a preliminary design of a HAW repository , presented as part of its supporting documentation by BNFL to the Sizewell B public inquiry , gave reservations as to whether technetium 99 and Iodine 129 could be safely isolated in a repository for long enough periods of time to be considered safe . It is with dismay that we note that technetium 99 was discharged in large amounts from Sellafield from 1994 on, after the commissioning of EARP , leading the Irish authorities to complain of its build up in the Irish coastal environment. (4) In any rate , safety should always come first , and if needs must , we should look at all possibilities for dealing with problem wastes , and not be shoving them out onto someone else's coastline . That there are unsolvable problems that may need otherwise unwanted solutions will be more easy to solve from a political standpoint if admissions of such are made , and one of the things standing in the way of this is the intention to keep producing more wastes .

(b) The second tier of the new radio-active waste policy, for reasons shown above , should centre on 'qualitative' aspects of radiological safety , and not just quantitative aspects .

The reasons for this are :-

1 Fear of unknown properties of radio-nuclides in waste streams. The problem of americium 241 contamination in the environment is documented as being 'unexpected' when first reported in the media , and through the journalistic efforts of Anthony Tucker of the Guardian newspaper , admissions were made by Frank Windsor , technical witness of the DoE at the Sizewell B Inquiry , as to the factual accuracy of these reports as to the unanticipated physics and medical uncertainties relating to americium 241 . This is not the way we should learn about the physical properties of nuclear waste . We know that during decay , elements change their physical characteristics and so can 'migrate' in the environment . This presents very real , and often surreal , problems for containment . We know much research has centred on chemical treatment to mitigate these problems , but awareness of

the complexities of dealing with a soup of transmutating elements that are not stable as solids, liquids or gases , is one reason that most people distrust nuclear waste and it's disposal into the environment . A qualitative approach will be necessary to improve understanding .

(c) Third tier – openness . Clearly , as the Welsh Government is not a waste producer, it should not be charged with the job of deciding which waste disposal method should be adopted , although it has been given responsibilities for legacy wastes , the job of eventual disposal or continued storage will be 'outside the remit' of the offices of state and advice from organisations with the dedicated task in hand will be sought . The Welsh Government should keep options open on waste management simply because it may eventually occur that different options will be suitable for different wastes . One single cure all approach of putting everything down a hole in the ground may be appealing on economic grounds , but may not be the best practicable option for some wastes .

2 Given that a finite amount of waste has been guaranteed from all sources , permission could be sought from world governing bodies to relax conventions and rules that are at the moment unavailable , for the reasons of attaining greater safety . Indeed , it is understandable why constraints should be made as fly-tipping is and has been a feature of nuclear waste management and is one reason some people think a Directive on radio-active waste such as Euratom 2011/70 , and the standardisation that goes with it , is needed. That is not to say developers should be able to take advantage of such .

3 An open policy on which disposal method could be adopted , would best suit the requirements of the problem . Those methods that are possible given the curtailment of nuclear power are emplacement beneath the sea bed in deep ocean , and to a lesser extent , gradual dispersion into deep ocean over a long period of time , of wastes of great longevity , but with small , low-energy activity associated with them . Without the curtailment of nuclear power , only the manufacture of synroc and storage with the possibility of emplacement in suitable environments springs to mind , but this depends on world co-operation and nuclear power is not a causative factor of co-operation with its' connection to military activities and capitalistic socio-economic status .

4 Further reasons for an open policy is in respect of planning law and is discussed in the answer to question 4 .

In Answer to Question 4 Other Comments .

1 I have endeavoured to show policy makers that nothing is new in HAW management from when serious discussions took place in 1983-7 . Only the words have changed and some are indeed an attempt to persuade people and limit the choice of options . The way in which questions are limited to choice of disposal only makes it impossible for people to take part in the consultation unless they are knowledgeable of the issues involved in HAW disposal , and there has been very little discussion of this topic for a long time now .

2 The word 'safest' as used in the Euratom Directive 2011/70 (5) does not imply 'safe' . At 2.8 of this document discussion is made of factors that disposal will make HAW safe from . It is an irrelevance to make safe nuclear waste from climate change , societal breakdown , war , human error , terrorism and extreme bad weather , if the waste producing facilities themselves are compromised by any of the same (6) . Having been in possession of Peter Taylors' report into the consequences of a HAW tank release at Sellafield and its' effects , being in possession of the entire IAEA log of the Fukushima accident , having been a member of the Welsh Anti Nuclear Alliance office staff at the time of the Chernobyl accident and having sat through all the evidence on severe accident scenarios , degraded core analysis and emergency planning at the Sizewell B Public Inquiry , I would very much like to know how the Welsh Government is going to store , treat , and eventually dispose of radio-active wastes caused by a severe accident at Wylfa B nuclear site , considering the possibilities of an accident are no longer remote , but that it is likely to happen to at least one reactor worldwide every eleven years , and that reactor might be Wylfa B ?

3 There is strong indication in support of central storage prior to disposal , espoused by greenpeace in the 1980's , involving monitored retrievability . Personally I think a facility in the Bedford region , semi -underground , for all Britains present wastes prior to disposal options becoming available, except for some of the wastes now stored at Sellafield and Dounreay from reprocessing , should be constructed for the following reasons :-

4 Coastal nuclear sites are at risk from a combination of rising sea levels and storm events, as well as tsunamis . Concern has not been shown that each

of the sites that have a single magnox reactor being decommissioned , or to be decommissioned soon will have a new station built next to them, except for Berkely . There is a paucity of data concerning the expected effect of sea level increase on tidal range , but as it is a liquid , it is not unreasonable to assume that the effect will be in some degree exponential , not linear . Proffessor John Sweeney , said he expected it to be linear but admitted that he didn't really know ; the Institute of Marine Studies in Galway were unable to answer ; Tim Deere-Jones , well known marine consultant with the NFZ Local Authority Forum didn,t know , and said little was understood of these mechanisms . We are faced with record swells on the Atlantic associated with deep low pressure , and savage winter storms that have caused unprecedented damage to the coastlineas I type , a violent storm 11 is sweeping in off the ocean , after the experience of several storms last winter of similar or greater proportion , storms normally only expected to happen once in every few years .

5 The threat of hurricane storm surges are coming ever closer , with most of the sand stripped off West County Kerry beaches by the St Stephens day storm last winter which resembled a hurricane with very high consistent wind speeds . The time has come to consider clearance of coastal nuclear sites altogether, not building on them . Decomissioning wastes will need to be moved away from Wylfa and stored somewhere prior to a decision on the eventual fate of the activation products and graphite core. Hence the need for a central store . Stores for ILW will not be appropriate .

6 It should be a policy of the Welsh Government that coastlines that become inundated by the rising sea levels should be left in a condition suitable for re-habitation by the next life forms that take up residence .

7 Some activation products from decomissioning are long lived and may have to be considered for geological disposal in deep repository if that route becomes available , and unless it proves that there are qualitative reasons against it . but should be removed from the coastline as soon as possible . However , if new power stations are built we will be faced with uncertainty about the future of the coastline and may have to deal with a rapidly changing climate situation affecting the site , as climatic changes happen very quickly over a short period of time , say a few decades , according to experts in climatic history .(7)

8 Welsh Government policy , if supporting the adoption of geological

disposal as the policy option , will have a very negative response from the Welsh people, for several reasons . Firstly , if the UK retains its' policy of having only one deep repository for all Britains HAW , and the Welsh Government supports disposal as its' policy , and retains a policy of supporting communities who volunteer for

a repository , then the Welsh Government will be volunteering the landscape and people of Wales to take all of Britains' HAW , not just that created in Wales . Paragraph 3.9 of this Consultation states that ' current generations have benefitted from the energy generated by existing nuclear power stations' ! As a grandson and nephew of South East Wales coal miners , who never saw compensation arrangements from the NCB , and considering the lucrative indemnity clauses enjoyed by nuclear employees , and considering the amount of energy wealth taken out of Wales in the last 200 years , it can be said with confidence that it is unlikely that any of the present members of the Assembly will retain their seats after the next election , if Welsh policy reflects an undertaking to take all of Britains HAW from the nuclear programmes .

9 Welsh Government policy should , therefore, represent the views of the whole of the Welsh community , and not just a community that volunteers for whatever reasons they might feel they are justified in doing so . If the local planning authority is neutral , which means there is a prejudice towards the developer , unless objections are upheld , then the extra prejudice towards the developer created by a Welsh Government decision to support the volunteer community and the disposal option as the owner of legacy waste , will create a 'legal bulldozer' which many ordinary , timid people may feel they cannot oppose if they do not want to accept the proposal . The true disposition of the public of Wales is , in my opinion , that those who wish to use the geology of Wales for such a purpose as the burial of HAW , must first 'convince me' , and for reasons set out in the answer to question 2 , this remains to be done .

10 The crux of acceptability of geological disposal of HAW depends on whether people believe it is possible to contain wastes in a repository over the timescales needed to protect the environment , aquifers and groundwater in situ . It is possible also that gaseous discharges may escape , polluting the air , even though the depths may be as much as 1000 metres . In some host rocks , the gaseous discharge will be in addition to the natural radon gas emanating from the rock , and there is plenty of evidence that this type of host rock is favoured by the nuclear industry .

11 Nuclear experts were not so convinced at the time of the last test drilling , as they seem to be now from looking at CoRWM responses , without the advantage of a test drilling programme , as to the validity of the notion that isolation of HAW could be achieved for the timescales required . BNFL's expert witness had this to say to the Sizewell B public Inquiry :-

'There obviously have been many views expressed as to the time over which one should integrate collective doses at least for doing cost effective assessments of which treatments are appropriate . I am not saying it is a general view , but certainly there is a school of thought that 10,000 years seems to be about the upper limit that one can imagine you can give some sort of guarantee , and 10,000 years still seems a long time to me to guarantee isolation of any material that is available for either discharge or storage anyway , and therefore when one is evaluating methods of treatment in order to introduce an element of cost into the process , there seems a lot of sense in really disregarding doses received beyond 10,000 years , because it is highly unlikely that you will be able to isolate materials for much longer anyway ' (8)

100,000 years of isolation was a figure being thrown about by the proponents of deep disposal then . Now , 250,000 years suddenly appears and (surprise, surprise) roughly corresponds to the length of time the most important hazards are likely to be a problem in the HAW – except , of course for the already mentioned iodine 129 and technetium 99 .

12 The reason for this sudden confidence may well be found in Friends of the Earth's reply to the Beijer Report in 1984 , commissioned by the Swedish Board for Spent Nuclear Fuel :-

' ...it will become impossible to carry out a cost -benefit analysis to optimise protection for all future generations , and that therefore a cut-off time will have to be assumed in order that the cost-benefit analysis may be done' (9)

We have every reason to be sceptical because the arbitrary placing of the isolation time limit may signal just the kind of cost limitations that the developers would like to see in place.

13 Intergenerational equity is less than a reason for choosing swift , cheap burial of HAW simply because the storage facilities are in decline and the operators don't want the cost of replacing them . It is more likely that future generations will say - ' why didn't they stop when they realised that they had under-estimated the harm that comes from radiation '(10), than - ' why didn't they make themselves more electricity from nuclear power when they didn't need to , ' !

14 And what will those far future generations think of the totem poles that attempt to tell them that something deadly has been buried , so don't drill here ? CoRWM has not offered any advice to the builders of Pentre Ifan on just what it is that will satisfy the Euratom Directive 2011/70 Article 5 , Paragraph (e) over ' ..the concepts or plans for the post- closure period of a disposal facilities' lifetime , including the period which appropriate controls are retained and the means to be employed to preserve knowledge of that facility in the longer term ' .

References :-

(1) Sizewell B Public Inquiry Transcript Day 280 , page 24 A-D

(2) Radioactive Waste Management Advisory Committee ,
Annual Reports Nos 1, 2, and 3

(3) Sizewell B Public Inquiry Transcript Day 275 , page 94 C-D

(4) See Documents A

(5) Euratom Directive 2011/70 (23)

(6) Quote from Member of the Scientific and Technical

Committee of Euratom , (the committee that drew up the Directive) Mr Tom O'Flaherty on environmental threats to nuclear waste : Document B Note – Mr O'Flaherty believes that if nuclear wastes were buried the world might avoid some of the problems he mentions – obviously he has become a victim of the propoganda that tells us we can avoid the effects of global climate change by choosing nuclear power . The effects of C02 increase have long been known to have a delayed action and the choosing of options that allow a cosy retention of

present lifestyle norms and be supportive of the economic status quo will only serve to deny us a real long term solution to the problem .

(7) The Ecologist , July 1976 ,Vol 6, No 6, page 205 ; The Lessons of Climatic History – Reid A. Bryson .

(8) Sizewell B Public Inquiry Transcript Day 275 page 92 F-H

(9) High Level Waste – A Review of the Beijer Report , FoE UK .

(10) See BNFL's excuses for undesirably high doses from Irish

Sea discharges relating to ICRP 26 , Sizewell B Public Inquiry Transcript , Day 275 , cross examined by Mr Jones . Also The WANA Briefing Note -The Evidence of Richard Sterne, Section 2 , page 3 included as Document C .









