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# Living with Nuclear Power in Britain: A Mixed-methods Study.

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Venables and Peter Simmons.

Cardiff University and the University of East Anglia.



**The Leverhulme Trust**

**Summary Findings Report: 30<sup>th</sup> September 2008**

Copies of the report can be downloaded from the SCARR website:

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# **Part A: Project Background Information**

## **Section 1: Introduction**

### 1.1 Project funding

This project (*Living with Socio-Technical Risk: A Mixed-methods Study*) is a 5 year project (2003-2008) funded primarily by the Social Contexts and Responses to Risk (SCARR) priority network of the Economic and Social Research Council (ESRC). The ESRC has provided core support of £2.8 million (GBP) to nine projects in the SCARR network under grant no. RES-336-25-0001. The SCARR network is comprised of 14 Higher Education Institutions (UK) investigating multiple typologies and aspects of risk<sup>1</sup>. For the third empirical phase (survey) a small contribution towards survey administration was provided by the Leverhulme Trust under grant no. F/00 407/AG to the *Understanding Risk* research group.

### 1.2 Project team members

Our research is a collaborative interdisciplinary project (between Cardiff University and the University of East Anglia), directed by Professor Nick Pidgeon (social psychologist in the School of Psychology, Cardiff University). The other team members are:

- Co-Principal Investigator: Dr Karen Henwood (Reader in social psychology in the School of Social Sciences, Cardiff University).
- Co-Principal Investigator: Mr Peter Simmons (Senior Lecturer in environmental science in the School of Environmental Sciences, University of East Anglia)
- Research Associate: Dr Karen Parkhill (human geographer with expertise in qualitative research methods, in the School of Psychology, Cardiff University)
- Research Associate: Mr Dan Venables (social psychologist with expertise in quantitative research methods, in the School of Psychology, Cardiff University)

We are all members of the Understanding Risk research group <sup>2</sup>.

### 1.3 Project background: previous nuclear power research and findings

Nuclear power is generally thought of as a uniquely worrying technology capable of generating intense emotional states such as fear and dread, due to the largely invisible and long-lasting effects it is presumed to have in the event of something going wrong, concerns about radioactive waste, and a historic association with atomic weaponry (see for example, Weart, 1988; Slovic *et al.*, 1991; Joffe, 2003). In particular, national surveys have shown that dread of nuclear power stems

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<sup>1</sup> For more information on the SCARR priority network and individual projects involved, please go to [www.kent.ac.uk/scarr/index](http://www.kent.ac.uk/scarr/index)

<sup>2</sup> The Understanding Risk research group is made up of a network of researchers who study risk in an interdisciplinary manner and have a particular focus on examining risk within real life, applied situations. Please go to [www.understanding-risk.org](http://www.understanding-risk.org) for more information

from continued fears regarding potential contamination from radioactive material, health fears (such as developing cancer), and the Chernobyl and Three Mile Island accidents (Slovic, 1987; 1993; Slovic *et al.*, 1991; also see Masco, 2006). National surveys also show that, in recent years, there have been decreasing levels of opposition to nuclear power (Knight, 2005), although in research conducted in 2005 it was found that, on balance, more people in Britain are still against nuclear power than support it (Pidgeon *et al.*, 2008). It has also been consistently found in survey research, that the acceptability of nuclear power and radioactive waste is closely related to levels of institutional trust.

Research which has focused on communities living in very close proximity to nuclear facilities, has found that proximity is associated with somewhat higher levels of support for nuclear power (Eiser *et al.*, 1995). A commonly voiced explanation is that acceptance of, or refusal to overtly criticise, nuclear power by those living close to an existing nuclear facility, stems from the perceived economic benefits it brings to a host community, in particular where a community is otherwise economically marginalised (Blowers and Leroy, 1994; Wynne *et al.*, 2007 [1993]). However, qualitative research on local communities living in very close proximity to the nuclear reprocessing plants at Sellafield and Cap le Hague suggests that even where support and acceptance is expressed, this can be highly qualified with a degree of underlying unease always present (Macgill, 1987; Zonabend, 1993).

The complexities of understanding local communities' thoughts, feelings and perceptions of living close to such industrial developments have also been explored extensively in research on other major socio-technical and environment hazards. Within such work, there are again a number of assertions made about the perceived impacts such developments have on local communities in close proximity. First, local people may feel that their area is geographically stigmatised due to the presence of a hazardous facility and that they by association are also stigmatised by people outside the area (Edelstein, 1987; Bush *et al.*, 2001; Flynn *et al.*, 2001). Second, local people may reject suffering any negative effects of living close to a socio-technical or environmental hazard, in an effort to prevent being stigmatised, leading to the creation of a so called "halo effect" (Bickerstaff and Walker, 2001). Finally, whilst the apparent negative features of a local place such as an industrial development, may be striking to those who live outside the area, for those living there it may just be seen as a 'part of the local experience' (Burningham and Thrush, 2004).

Key to research which has focused on specific nuclear facilities as well as other forms of socio-technical and environmental risk issues present within local communities, is that local context, values and place are all essential components for understanding how people live with (or resist) the notion that they are exposed to risk. From such a perspective 'place and space' are constituted by particular socio-cultural, geographical and political characteristics, that are vital to understanding how people construct, perceive and reflect on their experiences of

living in close proximity to such hazards (cf. Bickerstaff, 2004; Bickerstaff and Walker, 2001; Masuda and Garvin, 2006; also see Burningham and Thrush, 2004; Howel *et al.*, 2002). Such studies reflect an emerging *interpretive perspective* within socio-cultural risk research more generally (see Pidgeon *et al.*, 2006).

Eyles *et al.* (1993) neatly tie the importance of place to risk and studies of risk perception by stating:

“Risk is now widely recognised to be socially constructed; appraisal and management [of risk] are determined by people’s place in the world and how they see and act in the world. All ideas about the world are in fact rooted in experience and different forms of social organization and their underlying value systems will influence risk perceptions” (pp. 282).

Clearly, while social, cultural and political factors represent important aspects of risk perception, also pertinent is the role of the individual. Inherent in the above quote by Eyles *et al.* (1993) is the notion that perceptions of risk are sedimented through individuals’ life experiences. As such, perceptions of risks and associated social constructions of socio-technical and environmental hazards cannot be seen as divorced from the values people develop, as well as processes of identity formation. Emphasised in risk research is the importance of grounding risk perceptions in everyday life and, as such, visualising people as “risk subjects”, necessitating the examination of people’s “risk biographies” (Tulloch and Lupton, 2003; Hollway, and Jefferson, 1997a). Intrinsic to such notions, is that risk perceptions are subjective and subject to change in ways that are mediated by social, cultural, political, geographical and psychological processes. Thus when examining risk perceptions, research also needs to be open to and allow for, reflexive discussion by risk subjects, so that further grounding of risk subjectivities can occur not only in place, but also through time.

#### 1.4 Project rationale

There are three reasons why this project is both timely and informative. First, as the above discussion demonstrates, multiple-dimensions of context play an important role in risk perception. However, whilst past research on both nuclear and non-nuclear industrial developments has been informative, and parallels can be expected, such insights should not be assumed to transfer in their entirety to local communities living in close proximity to nuclear power stations within Britain today. Second, particularly since the late 1980s very little research has taken place in Britain on perceptions of nuclear power in communities who host or are in very close proximity to such facilities. Finally, for the first time in almost two decades, the British Government has signalled a desire to encourage new nuclear power stations to be built within the United Kingdom (BERR, 2008), driven in part by concerns over meeting climate change targets and maintaining energy security. This is likely to impact not only at sites already hosting nuclear reactors, but also new sites. As such, conceptualising some of the complex

ways in which people currently living with nuclear power stations view this technology will be important for understanding the unfolding dynamics of risk perception around this issue, as well as the possibilities for constructive engagement between varied other stakeholders to the nuclear debate and such communities.

### 1.5 Project research aims

The theoretical, empirical and policy interests described in the previous sections led to the development of a broad research question and aim:

1. How do people residing in close proximity to a major socio-technical hazard/site (nuclear power plant) 'live with risk' in their everyday lives?

To address this primary aim, we have completed three empirical phases (narrative interviews, Q-method sort and survey) across three case study areas. In addition, the initial phase of the project (narrative interviews) had the methodological objective to investigate whether eliciting people's biographical narratives – their storied identities – can contribute to an understanding of living with risk.

## **Section 2: Case Study Areas Overview**

### 2.1 Case study area 1: Oldbury

Oldbury nuclear power station is located in South Gloucestershire, England, on the southern bank of the Severn Estuary. Oldbury-on-Severn itself is a small, rural village (population approx 708)<sup>3</sup>. The nearest towns are Thornbury (population approx 12500), about 4 miles from the power station, and Chepstow (population approx 11000), which is on the opposite bank of the Severn. The site is relatively close to the M4 motorway, the Severn Bridge crossings, and the major conurbation of Bristol (population approximately 400,000). In addition, there is significant industrial activity, primarily petrochemicals and shipping, within 10 miles further down the estuary. The power station itself consists of two Magnox gas-cooled reactors, and began generating in 1968. We identified no major local incidents or past instances of major organised opposition; although a 'Stop Hinkley, Close Oldbury' campaign has existed since 2000. This emerged as an expansion of a long-established campaign opposing the Hinkley Point power station some 40 miles further down the Severn Estuary, rather than originating in the community local to Oldbury. At the time of data collection the plant was operational, with decommissioning due to start at the end of 2008.

### 2.2 Case study area 2: Bradwell

Bradwell-on-Sea is a small village in Essex, England, with a population of approximately 550 adults. The main towns in the district are Maldon (population approx 13,000), Heybridge (approx 6,500) and Burnham-on-Crouch (approx

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<sup>3</sup> All population statistics have been taken the 2001 Census available from [www.statistics.gov.uk/census2001](http://www.statistics.gov.uk/census2001)

7,500), all about 9 miles from the power station. There is also a small town about 2.5 miles away across the Blackwater Estuary at West Mersea from which the power station is highly visible (population approx 6500). However, most people adjacent live in small rural villages, many of which originally drew their livelihoods from the coastal or agricultural economy. Although just under 50 miles from the centre of London the area, being on a peninsula, remains quite isolated, with poor transport links. Opened in 1962, the Bradwell nuclear power station is a very early example of the Magnox type. The initial siting proposal was contested at a short public inquiry held in 1956 (Welsh, 2000), and subsequent industry efforts to investigate the feasibility of a repository for low and intermediate level waste adjacent to the Bradwell site prompted intense local opposition in the mid-1980s, but this was not directed at the local power station. The reactors were shut down in March 2002, and the lengthy decommissioning process is ongoing

### 2.3 Case study area 3: Hinkley Point

Hinkley Point nuclear power stations (Hinkley A and Hinkley B), are located in the county of Somerset, England. The nearest large town is Bridgwater (population 36,892), approximately 10 miles from the power station. Manufacturing is a key source of employment for those in Bridgwater (approximately 21% of those in employment between the ages of 16-74). Whilst Bridgwater is the nearest town to the power stations, there are a number of smaller villages and hamlets in closer proximity; for example, the village of Stogursey (population approximately 400) which is approximately 2.5 miles from the power stations. Hinkley A (currently managed by Magnox South on behalf of the Nuclear Decommissioning Authority), a twin reactor power station, began generating in 1965 and ceased producing electricity in 2000. It is currently into its lengthy decommissioning phase. Hinkley B (owned by British Energy), comprises an Advanced Gas-cooled Reactor (AGR) which started producing power in 1976. The estimated decommissioning date for Hinkley B is 2016. In 1987 the Central Electricity Generating Board applied for planning permission for a Pressurised Water Reactor (Hinkley C), causing local contestation. Planning consent was eventually granted by the Secretary of State, but no C Station was ever built. Two further noteworthy incidents were the publishing of the paper "Incidence of leukaemia in young people in the vicinity of Hinkley Point nuclear power station, 1959-86" by Ewings et al. (1989) in the British Medical Journal, and the report by Chris Busby and Helen Rowe entitled: 'Cancer in Burnham on Sea North Results of the PCAH [Parents Concerned About Hinkley] Questionnaire' (Occasional Paper 2002/5, Green Audit, Aberystwyth). Both papers caused, at the time, local concerns over an alleged relationship between the nuclear power stations and the incidence of cancer and leukaemia. An active local protest group named Stop Hinkley Expansion started in the mid 1980s to protest against the proposed Hinkley C, and was renamed Stop Hinkley in 1996 after these plans were shelved.

# **Part B: Empirical Stages (Methods & Results)**

## **Section 3: The narrative interviews**

### **3.1 Rationale**

The rationale for following a narrative approach in the initial interview phase stems from three adjacent literatures in relation to: environmental values; biographical risk research; and, qualitative methodology (narratives), and each of these will now be briefly discussed.

Our initial interest in the use of narrative was stimulated by the insightful and thought provoking work on narrative elicitation techniques by Terre Satterfield (2001). Satterfield, an anthropologist unhappy with techniques for direct measurement of individuals' environmental values (for example, surveys or contingent valuation methods<sup>4</sup>), sought to develop a method which would be sensitive to the importance of intangible meanings and values. She advocated the use of "narrative elicitation methods" for examining such judgement and decision-making processes, including people's values and subjective preferences, embedded in meaningful, contextually and morally rich, value laden and affectively charged stories about risk<sup>5</sup>.

Previous contextual risk research had tended to rely upon either quantitative survey or group discussion methods, with little attention to the benefits that narrative approaches might bring. The search for innovative methods also stemmed from critiques of the theoretical sociological work under the broad conceptual umbrella of the *Risk Society* (Beck, 1992; 1994; 1998; Giddens, 1998; 1999; also see the edited texts by Franklin, 1998; and, Adam *et al.*: 2000). A prevalent argument here is that theorising around Risk Society has become divorced from empirical research, and is accordingly in danger of overstating the significance of risk in everyday life. In particular, Tulloch and Lupton (2003) suggest that people's risk discourses need to be examined in the context of their everyday lives, with the study of "risk biographies" a key strategy (see also Hollway and Jefferson, 1997a; 1997b). At the core of risk biography is the idea that people's thoughts, feelings, perceptions (and so forth) of risk, should not be detached from their everyday lived realities: how people experience their lives, their local (and other) social identities and values, and spatial and temporal relationships all matter to the processes involved in the formation and construction of risk – processes that, in turn, can make risk salient and meaningful to people and demand that they engage with it as an issue (or not) in their lives. Risk biographies, whilst not synonymous with narratives, are nonetheless inherently and intimately linked.

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<sup>4</sup> Contingent Valuation is a technique within environmental economics, by which people indicate their preference by stating the amount they are willing to pay for environmental 'goods' (see for example, Fischhoff and Furby, 1988).

<sup>5</sup> The research team wish to thank Terre Satterfield for the numerous discussions and insights which have contributed to the conception of this project.

The more generic social sciences methods literature also held some compelling reasons for adopting a narrative approach to the in-depth interviews. Firstly, by using a narrative approach, which echoes the conventions of 'normal' conversation, interviewees will be more at ease, thus reducing (but not necessarily eliminating) incidents of conversational reluctance, and prompting greater disclosure. Secondly, through the active, interpretive process of producing narratives, everyday lived realities can be made intelligible (Czarniawska, 2004). Thirdly, using a narrative approach can prevent the artificial fragmentation of interviewees' experiences (Elliott, 2005). Finally, a narrative approach does not necessarily mean using a single question to elicit a holistic life narrative; narrative approaches can be combined with more focused questions to avoid the use and production of bland assessments by the narrator to produce more succinct "episodic" narratives (Flick, 2006).

It is for all of these reasons, that we deemed a narrative approach to be most capable of fulfilling the aims and objectives of the first phase of the research. Our approach (design) and procedure for the interviews will now be briefly discussed.

### 3.2 Design and procedure

In the development of our interview schedule, it was a key aim to investigate people's narrations about risk in ways that seemed appropriate to them, as lived in specific cultural and social contexts. Accordingly, in the development of our interview schedule, we aligned ourselves within the field of interpretive qualitative inquiry (Lincoln and Guba, 1985; Denzin, 1989). By this we mean that we kept central to our research, the aim of attending to our participants' ways of representing their experiences to themselves and others, by following their ways of narrating about it. Therefore, whilst we used an adapted version of the "episodic" narrative approach endorsed by Flick (2006), as outlined above, our schedule remained flexible and adaptive to the emergence of new fields of inquiry revealed in the production of narratives by the interviewee and responsive to the conventions of normal conversations. As such, it was less a schedule and more of a *guide*.

To elicit narratives which encompassed all of our research aims, objectives and interests, we developed three broad types of question, designed to draw out shorter, more focused, yet experientially relevant (to the interviewee) stories about their experiences of living near to a nuclear power station. The first broad type of question aimed to elicit everyday narratives about the power station, and prompt reflexivity about the role it played and had played previously, in their lives/area<sup>6</sup>. The second broad type aimed to introduce life journey, biographical

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<sup>6</sup> For example: Could you tell me about your daily experiences of living near to Oldbury/Bradwell nuclear power station? What difference (if any) would you say it makes to your life? Did you know about the power station before you moved here/could you tell me about the building of the power station?

choices narratives, to firmly put their risk perceptions in context<sup>7</sup>. The final broad type of question prompted for experientially relevant narratives surrounding possible sources of risk issues and focused inquiry around specific events. Such events included: localised sources of possible controversy (for example, in Bradwell the late 1980's NIREX proposals to identify a nuclear waste storage facility; anecdotal health studies proposing a link between nuclear power and cancer/leukaemia levels); national issues of interest (for example, the potential for new nuclear power stations); and, international issues (for example, climate change).

The Bradwell interviews<sup>8</sup> took place in late 2004 and early 2005. In 2007 we returned to as many of the original interviewees as possible for the Q-sort stage (see the following section). After completing the Q sort, Bradwell interviewees were briefly asked to update us on their views. New Q participants were also asked for background information relating to their views on the local power station, nuclear power and their area. The Oldbury interviews took place in 2007. In total 83 participants (Bradwell n=43, Oldbury n=39; total n=82) took part across 61 in-depth narrative interviews (Bradwell n=30, Oldbury n=31; total n=61) in the two case study areas. For the majority of the Oldbury interviews, the Q-sort preceded the interview. All of the interviews took place in participants' homes. All (with the permission of the interviewees) were recorded using audio equipment. All of the interviews were then professionally transcribed, ready for qualitative analysis. Subsequent to transcription, all original names and identities were exchanged for pseudonyms within the interview transcripts. The form of qualitative analysis will now be briefly discussed.

### 3.3 Analysis

To analyse the interviews, we have used the well established technique of interpretive thematic analysis, in which we organised and subsequently interrogated data for themes and patterns within and between the interview transcripts (Miles and Huberman, 1994). For this a coding framework was created. The codes were created, as is usual (see Coffey and Atkinson, 1996), from a number of different sources: first from theoretical literatures pertinent to our research; second from our own research aims and interests; and third, from the transcripts themselves. The coding framework was refined through an iterative process that involved applying the three sources of the coding framework to the data, to ensure that the codes used remained congruent and responsive to the data throughout (Henwood and Pidgeon, 2003). Coding and data management utilised the CAQDAS (Computer Aided Qualitative Data Analysis Software) NVivo™ (version 2). Whilst use of a computer package in qualitative analysis does not inherently ensure greater rigour (Fielding, 2002), it does facilitate, particularly with a very large data-set such as this, rapid and systematic retrieval of data according to particular themes or demographic

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<sup>7</sup> For example: What are your thoughts and feelings about living in the area generally? How does living here compare with other places you have lived?

<sup>8</sup> We wish to thank Niamh Moore and Matthew Cotton for assistance with the Bradwell fieldwork.

categories. The application of the codes was evaluated through intensive group discussions within the research team, to ensure that “blanket coding” had not occurred (Fielding, 2002).

Other forms of analysis were utilised as required, including narrative approaches for understanding biographical material and discourse analysis of certain aspects of the language used by participants. The latter was particularly important in relation to the section below (*Meta-theme 2*), in which careful attention was paid to how participants talked about affectively charged states; a practice suggested by Macgill (1987). For the former, careful attention was paid to “emplotted narratives” (Polkinghorne, 1995), enabling the structure, plot developments and characterisations used by our interviewees to be examined in some depth.

### 3.4 Results

After extensive analysis of the data corpus, we identified two broad meta-themes associated with living with (nuclear) risk in everyday life. This section will examine these themes (and the sub-themes within) more closely, before concluding with reflections on using a narrative approach. However, before exploring our results, we would like to make an initial observation. Despite extensive development of a narrative-based approach collecting such data was not unproblematic. At times, our interviewees did not necessarily feel directly engaged with (elements of) the research topic and therefore there were periods where the discussion of ‘risk’ occurred less as a result of biographical accounting, but rather through prompts supplied by the interviewer.

#### **3.4.1 Meta-theme 1: Making risk ordinary**

In contrast to the generic assumption that nuclear power is the archetypal dread and feared technology (Weart, 1988), our interviewees often expressed sentiments which *denied* the uniqueness of living close to a nuclear power station. Indeed, the ordinariness of living close to either a nuclear power station, or any another socio-technical ‘risky’ development for that matter, was present in the majority of the interviewees’ narrations. The process of making the power station ordinary, or perhaps more accurately articulating a lack of noteworthiness of the presence of the power station, was revealed in two sub-themes; familiarisation and making risk normal.

##### *3.4.1a Familiarisation*

“...it used to be a pleasant sight if you were at sea, you had a bit of a rotten voyage, you could see that power station and [think/say] ‘thank god we’re nearly home’”  
(Trevor, Bradwell).

Within this sub-theme, ordinariness is apparent in the interviewees’ familiarity with the nuclear station over the period of their life in the area, as well as the longevity of the presence of the power station. There is a clear contrast between the findings emerging from research on *proposed and new* socio-technical

developments (such as the siting of wind farms; see for example, Woods, 2003; Devine-Wright, 2005; Parkhill, 2007) and those (such as ours) which focus on *existing* developments already hosted by communities for a significant period. Critical to this sub-theme is the emphasis placed by our interviewees on the physicality of the nuclear power station fading into the background and simply becoming part of the landscape; it is seen frequently, and through its prolonged relationship with residents and place has become an unremarkable feature of the area. For a small number of our interviewees who had moved to the area as a child or had been born in the area, familiarity was engendered through 'growing-up' with the power station; it was something that had *always* been there and had been (physically at least) part of their everyday lives.

Some of the interviewees also suggested functions which for them constructed the power station as a *benign entity*. One such example is the power station being used as a navigational aid, for sailors returning home on the Blackwater Estuary (Bradwell) and the Severn Estuary (Oldbury). Such constructions of the power station go beyond the functionality of being a navigation aid, as in some accounts the power station becomes representative of home, a significant symbolism given the often cited (yet not wholly undisputed) belief that home is a "haven and refuge" (Mallett, 2004: 70).

Being used to the presence of the power station in terms of its physical presence was not the only source of familiarisation to which our interviewees pointed. It was also the case that the familiarity, and ordinariness, of the power station were reinforced through social networks. For some this came from direct experience of working at the power station. For others, it was through having a family member, a friend, a neighbour or even knowing a more casual acquaintance who worked at the power station. Thus interviewees could express a sense of having insight into how the power station worked, or of those who make the power station work, enabling a judgement that it must also be safe.

A further source of social familiarity, accrued from processes of imaginary positioning (Wetherell and Edley, 1999), by which we mean that even if the interviewee did not have direct contact, however infrequent or brief, with any power station workers, they *could imagine* how such workers think and feel. Inherent to such insights, was the demystification of the power station as a distant institutional organisation. Through such social networks, social trust was built and the power station workers seen as ordinary people and not "others". Intrinsic to this "de-othering" (a term borrowed and adapted from Buller and Morris, 2003 who study human-animal relations), is our interviewees' assertions that power station workers have the same or similar value systems or moral ordering as they have themselves.

Two further lesser used forms of de-mystification also occurred. First, some interviewees equated domestic technologies (such as kettles) with the technology underpinning the nuclear power station. Secondly, a small number of

interviewees intimated that they had some insight into the working practices of the power station due to their knowledge of health and safety, and work practices, in adjacent industries. Such knowledge, led them to once again de-other the practices of the power station and see it as just another industry, rather than a unique development.

In all of the above forms of 'familiarisation' and 'ordinariness' was the notion that the power station is a taken-for-granted part of everyday life, with very little, if any, engagement with issues of risk.

#### 3.4.1b Making risk normal

*"I think we just knew that there's not really very many places that haven't got an element of risk particularly now we're faced with risk everywhere"*  
(Audrey, Bradwell)

In contrast to the previous sub-theme, in *making risk normal* the power station is no longer an entirely benign presence. Interviewees, who set about normalising the risk the power station represented to themselves and others, did so not by denying that risks exist, but by attenuating risk (Pidgeon *et al.*, 2003). It is as Simmons (2003: 13) suggests; "to enact a safe, 'normal' environment...[one]...cannot, therefore, avoid enacting a risky[...] environment".

A particular emphasis was that living in close proximity to a nuclear power station did *not* represent a unique risk. Rather, living with risk was part of everyday life in the sense that risk is everywhere and a possibility in everything that we do. So to these interviewees the risk that the power station represents is no more a threat than (for example) using a mobile phone, driving a car or living near to another industrial development.

Even particular threats the power station is alleged to hold were normalised. Take for example, the possibility of developing cancer. Many of our interviewees were aware of the contested claims of associations between nuclear power and cancer incidences. Even if awareness of such alleged (and highly contested) associations were a product of our interview, they suggested that such illnesses are simply part of everyday life.

As well as being normalised our interviewees used "strategies of normification" (Bush *et al.*, 2001: 54) to stress the ordinariness of living close to a nuclear power station. Bush *et al.* (2001) assert that strategies of normification consists of the disassociation from risk via two elements; invocations of differences *and* sameness.

In normification strategies of differences, interviewees narrated their experiences or imaginings of living near to other developments, or being involved in other activities to assert that there are far *more* risky endeavours than the power

station, or that the threat of the power station as being a far *less* risky possibility. Two such examples were, living near to other socio-technical developments such as coal-fired power stations or chemical works. Such developments were suggested to be more detrimental to one's wellbeing (social, physical and mental) than the nuclear power station. Making comparisons continued to be an important element in the strategies of difference. Biographical narratives particularly around their own (former) work practices demonstrated how other activities and industries are comparatively riskier than the nuclear power station, and once again reiterated that risk is a part, and has been a part, of their everyday lives.

Even radiation – the aspect of nuclear power most heavily attributed with anxiety - was both normalised and normified (through strategies of differences). First in normalisation, radiation was depicted as being a natural phenomenon, with levels being present everywhere. Second, through strategies of difference, exposure to radiation was suggested by some as being not unusual due to air travel, x-rays and (by one) volcanoes. Implicit in these, is once again the idea that nuclear power and its by-products are not unusual, and that the technology is interwoven into everyday lived experiences and not unique to individual geographical locations.

In expressing sameness, participants accepted the nuclear power station as a potential threat but denied this was limited to areas in close proximity to the power station itself. An example of this was the claim that, in the event of some sort of large explosion resulting in the leakage of radioactive material (however unlikely this was deemed to be), the consequences would not be limited to local communities, that radioactive clouds do not respect geographical and political boundaries. The Chernobyl disaster was called upon (at times) to illustrate this. This is reminiscent of the “democratisation” of risk issues discussed by Beck (1992). Indeed, in the event of such an incident some interviewees suggested that being in very close proximity may actually be advantageous, as they envisioned that they would be killed in the initial blast, while those living further away would suffer more unbearable consequences.

Closely allied to such discourses were beliefs about the proximity of *other* nuclear power risks. In particular, France was constructed as a nation with a number of nuclear power stations in relatively close proximity to Britain (and thus the interviewees). As such, their local areas are already ‘at risk’ from nuclear power, and the particular threat of ‘their’ power station is rendered less material.

#### *3.4.1c Conclusion to meta-theme 1*

What we would like to emphasise, before moving on to examples where the power station is explicitly constructed as a threatening presence, is the prevalence of the discourses of ordinariness in both the Bradwell and Oldbury interviews. Furthermore, due to the popularity and multiplicity of such discourses, the social construction of the power station as benign, normal and

ordinary could be viewed as being the dominant discourse articulating normative beliefs, assumptions and values, and facilitating the uninterrupted flow of daily life. As Tulloch and Lupton (2003) also found, our interviewees clearly have a heightened awareness of risk, as is particularly clear from the *Making risk normal* sub-theme, but in general the nuclear power station was seen as *one of many* sources of threat - routinely encountered and seen as not personally or socially disabling. However, the interviews also contained important interruptions to the dominant or normative discourses.

### 3.5 Meta-theme 2: Noticing the extraordinary – risk, threat and anxiety as part of everyday life

*“No not about the area but I have thought many times you know when there were terrorist bombs in London and other places, I have thought the most obvious place for a nuclear, for a terrorist attack would be a nuclear power station and that made me really quite scared”  
(Sara, Oldbury)*

Let us first begin by stating we are *not* using a clinical definition of anxiety. When we use the term anxiety, this refers to occasions when our interviewees have either explicitly or *implicitly* indicated that they are worried about (a facet of) the nuclear power station. In this respect our use of the term anxiety is closer to the notion of risk as *feeling* or *affect* which has recently been extensively discussed in the risk literature (cf. Slovic et al, 2004). Explicit uses of the noun anxiety were rare in our data corpus. It was more often the case that people used adjectives describing some degree of apprehension, unease, nervousness or agitation. Therefore, this meta-theme was analysed via both interpretive thematic analysis, and discourse analysis. Careful attention was paid not only to *what* issues or circumstances induced threat, but also the *language* used by our interviewees. This is important as ‘the language that people use (or have at their disposal) reflects, conditions, and reveals the terms in which they (are able to) think about things’ (Macgill, 1987: 53). Thus whilst language is not an exclusive indicator of perceptions of risk, threat or riskiness, it is nevertheless a powerful one (ibid.). Key terms as used by our interviewees were “worried”, “horrified”, “concerned”; all indicative of affectively charged framings and moments of fear, distress or indeed frustration (however fleeting).

Other language tropes also implied and revealed sources of apprehension. This included metaphors revealed in narratives and more dramatic story telling of incidents. It was also the case that through risk biographies, our interviewees made known through small stories how anxiety may not be felt in the present, but as a past emotional state (or vice-versa). Finally, imaginary positions were envisaged to indicate that if their biographical circumstances were different (for example, being a parent), then they might be more reflexive about the risk the power station represents.

However, key to *all* of the language tropes used was how it was, in a certain set of circumstances rendered in place, time and biography, that the nuclear power station was socially reconstructed from being *ordinary to extraordinary*. It is these extraordinary moments which we will now discuss in more detail.

### 3.5.1 Intersection of risk and biography

“Years ago when it was first built and for the first few years, well up until probably ten years ago, they used to come round here, always on a Sunday, whether they got paid overtime I don’t know to do all these checks, but the worrying thing was they’d park outside here and they’d all get out in their white suits, like a space suit, helmet and everything to do all the testing, well there we were sort of just ordinary...”  
(Brandon, Oldbury)

Moments of reconstruction of the power station as risky and threatening do not occur outside of a biographical and temporal vacuum. Irwin (2001: 175) asserts:

“Environmental problems do not sit apart from everyday life (as if they were discrete from other issues and concerns) but instead are accommodated within (and help share) the social construction of local reality”.

The present empirical analysis suggests that it is when events or symbols of risk and threat intersect with interviewees’ everyday lives that discourses of anxiety can arise.

We would argue that a threat or risk becomes salient when the interviewee deems it to be relevant to their circumstances and lives. We call this process the *intersection of risk and biography* as a way of emphasising the role that temporal and other forms of context play in recognition of the extraordinariness of the power station. Intrinsic to this, is that whilst non-specific ‘dread’ and fear was indeed articulated by some of our interviewees, it was far more common for highly *specific*, often very concrete risk issues to be associated with affectively charged language, thoughts and feelings. There were four main issues which were narrated as primers of anxiety, specifically:

- terrorism;
- large explosions or Chernobyl-like events;
- health threats;
- and local experientially relevant threat issues.

Other risks and threats were articulated by the interviewees, spanning a plethora of different issues (including contamination, proposed nuclear waste facility siting, proposed new nuclear power stations, the legacy of nuclear power and even more anecdotally, aesthetic, decommissioning and stigma concerns). However, these four held the most prevalent and pervasive associations with anxiety discourse within the data.

The four risk issues depicted above fell into two categories through which they intersected the biographies of our interviewees. First, terrorism, large explosions and knowledge of certain health issues appear to be primarily mediated risk issues. That is, interviewees articulated that they had been made aware of such issues via either the mass media, or from their social networks (for example, a family member/friend/neighbour) recounting a threatening experience. The preoccupation in both Oldbury and Bradwell with large explosions/Chernobyl type events and terrorist incidents is particularly interesting. With the one exception of the 1957 Windscale fire, no major reactor accident has occurred in the UK. Equally, a terrorist attack has never (to our knowledge) taken place at a nuclear power station. This seemed to be irrelevant, as the threat had been experienced vicariously through witnessing or hearing about the events of Chernobyl, 9/11 (the attack on the twin towers in New York, USA) and July 7<sup>th</sup> (the London bombings in 2005). What this reveals is how risk framings and sources of anxiety and concern are dynamic entities, often constructed through reference to external events (nuclear *and* non-nuclear) in ways which appear to disrupt the usual (ordinary) framings of risk.

Second, intersections of risk and biography occurred through direct experiences of threat, and, once again, included health issues. But rather than hearing of anecdotal studies or media reports of cancer and nuclear power, or stories from other people about individuals developing cancer, in this case health issues were more immediate; either they themselves had developed cancer, or another loved one (such as a family member, friend or neighbour). Cancer was not the only health issue leading to uncertainty regarding the possible effects of living close to a nuclear power station. Any illness whose cause could not be immediately identified was also a source of unease. Nor were experienced threats only related to health issues. Our interviewees narrated stories of unexpected intersections of risk and biography which had led them to experience concerns in multiple ways. This included times when the power station was a source of unanticipated disruption to their lives or environment: for example, when a minor incident at the plant had caused the local roadway to be closed. Anxiety was recounted as, in part, stemming from uncertainty due to a lack of information and not being kept informed as to why the road had been closed. Even normal working practices at the power station were capable of generating concern. One such example was the release of steam, which took place annually. For some interviewees, the infrequency of this event led them to temporally question whether it was safe, largely due to the unfamiliar sounds that were produced. Another example, again related to the (past) normal working practices of the

nuclear power station, was the practice of testing in areas adjacent to the power station. Through the use of imagery, some interviewees described how power station workers would come dressed in white “space suits” to conduct tests on or near their land. It was the incongruity of the use of such safety gear juxtaposed with the interviewees wearing simple everyday clothing that made temporarily salient the extraordinariness of the power station’s presence.

It is beyond the scope of this report to discuss every such example. However, what was common was that both mediated and direct experiences of threat occurred spontaneously and were situated in time, space and biography. It would be misleading for us to say that our interviewees were in a constant state of anxiety, or that such incidents always led to the permanent re-conceptualisation of the power station as threatening (although this did sometimes occur). Instead it is more accurate to state that such incidents were largely *moments of anxiety*, which bubbled to the surface and led, however temporarily, to the power station being viewed as a risk, until such a time as the risk was deemed no longer a threat, or the anxiety was in some way resolved.

### 3.5.2 Living with anxiety

“...it's like living with a bit of a birthmark. You know it's there, you get used to it, you don't take any notice of it and then something will focus your mind if there's an issue and you think about it a little bit more...”  
(Audrey, Bradwell)

In Social Representations Theory (SRT) the concept of “anchoring” is used to show how people incorporate ideas, meanings and framings from past events to understand present day unknown risks. Through this process, the unknowable is made more knowable, and uncertainty is reduced:

“As a consequence of anchoring, when a new event must be understood, its integration is accomplished by moulding it in a way that it appears continuous with existing ideas (Moscovici, 1984b)” (Joffe, 2003 :63).

“Anchoring is not purely an intrapersonal process of assimilation. Rather, the ideas, images and language shared within groups steer the direction in which members come to terms with the unfamiliar. This makes the alien event imaginable. However, it removes from the new event both its specificity and its potentially threatening quality” (Joffe, 2003: 63).

Whilst Joffe and others who engage with SRT clearly indicate anchoring can be a mechanism to *reduce* uncertainty and risk, our data shows that anchoring can also be a *source* of anxiety and threat. That is, by anchoring current knowledge in what is known of past risky events, risk and threat are made salient. Yet as was discussed in the first meta-theme, the power station is viewed by many as ordinary and unremarkable. If this is the case, then how do people continue to

enact the ordinariness of the power station and live with risk when faced with such pervasive and sometimes powerful moments of anxiety?

Zonabend (1993: 124) suggests that anxiety is “furtive”, “muted” and repressed but always under the surface of people’s discourses and “is not difficult to detect when you are talking to the people of la Hague”. She further suggests that this repression of anxiety is “a hidden suffering on a modest yet real scale, indicating the stubborn persistence of a sickness in our civilisation” (Zonabend, 1993: 124). Our analysis here is congruent with that of Zonabend, in that ‘being anxious’ appears not to be a constantly felt state, but one which ebbs and flows: that it is an undercurrent. Our interviewees voiced a number of responses to the presence of anxiety, for some they “bracketed” (Wynne *et al.*, 2007 [1993]) it off by refusing to think about it; pushing it to the back of their minds. For others, the particular issue of threat was eventually deemed as irrelevant due to either distancing through time passing, or through another biographical risk issue taking precedence, and thus superseding, the previous issue (this could be a nuclear, or non-nuclear event, including personal issues). Third, there was also some indication that whilst the threat issue and anxiety might remain, this was an accepted state. That is, some of our interviewees became reconciled to its existence and simply *moved on*. Yet another possibility, indicated through our interviewees, was that anxiety and threat were coped with via the use of humour.

### 3.5.3 *Laughing it off: an exploration of the multiple roles of humour*

“... we have the warning system, which can be a bit scary because unfortunately they haven’t got it quite right; it starts off by telling you there’s a major problem and then saying it’s just a test, I’d prefer it to do it the other way round [laughs] scariest thing there is that, ‘run for your lives, actually it’s just a test’ [laughs]”

(Oscar, Oldbury)

Where humour is discussed in risk research, it tends to be limited to that of ‘black (macabre) humour’, or focussing on the absurd, and considered as a distancing technique, to prevent the build-up of anxiety (see for example, Zonabend, 1993; Irwin *et al.*, 1999; Wynne *et al.* 2007). Whilst this is certainly present within our data (mostly centred on the consequences of a large explosion or Chernobyl-type incident), this is just *one* way that humour is evidently utilised by our interviewees. Among our interviewees humour appeared to be a means of disclosing difficult to reveal matters and (at times) to divert conversation away from what was perceived as being too much of a morose subject.

However, interpreting humour simply as a distancing technique does not seem to do it justice. Our data shows that whilst humour may act as a personal coping mechanism, it can also, as Brannagan (2007) suggests (albeit in relation to environmental protest groups), through the use of irony, highlight discrepancies between concepts and reality, and with underlying serious meanings (also see

Szersynski, 2007). For example, two of our interviewees used flippancy and satirical imagery to describe how a proposed wind farm might be able to blow a radioactive cloud from the power station (in the event of such a release), revealing a sense of futility and powerlessness, not only about the consequence of such an event (their inability to protect themselves from an indiscriminating radioactive cloud), but also the proposition of an unwanted wind farm. Yet another interviewee told an ironic story of the rigid adherence to safety regulations resulting in a greater number of people being put 'at risk' when nuclear waste was transported. It is beyond this report to fully explore and theorise the use of humour in the context of risk. However, we do suggest that while the role of humour has been typically unexplored in risk (perception) research, it can be an important aspect of people's risk subjectivities and biographies.

#### 3.5.4 Examining why anxiety remains

*"...There is this little history of Bradwell people you know, actually, not wanting things to be steam-rolled through. I think lots and lots of people living here, don't like people, don't like feeling people in authority like, you know the Government agencies actually think we're "local yokals" and don't know what the hell is going on in the world and that we don't need to be taken notice of, but in fact there's lots of very wealthy people who live round here, lots who've worked in the city and dealt with things, and they've come out here for an easy life or they still commute in and you know, as I say lots of quite vocal people. So what would happen if we had another power station proposal I don't know, no doubt there would be people who would oppose it as well. It would depend on how it was sort of, how the proposal was delivered as well I think."  
(Gemma Turner, Bradwell)*

Risk subjects are complex beings and risk subjectivities are not static. Our interviewees (as has been shown) do not rely on technical "probability" risk assessments in their evaluation of what risk the nuclear power station represents to them or their communities. Neither are evaluations of threats and the risk reliant solely on issues related to nuclear power. Just as Chernobyl, the archetypal industrial disaster, is "deployed on a number of occasions to reinforce an argument about the risks associated [with other industries]" (Irwin *et al.*, 1999: 1315), so too are adjacent publicised non-nuclear risk issues (for example, terrorism) incorporated into our interviewees' social constructions of the power station. Therefore risk is constantly being socially constructed and what constitutes a threat to and by the power station is constantly being re-negotiated.

Other reasons for the persistence of anxiety are found in our interviewees' perceptions of the institutional bodies involved in the regulation of the power stations. In particular, our interviewees at times articulated distrust of Government and Government bodies. Sometimes this was based on generic

sentiments: notions of not being able to trust politicians, the civil service and other Government bodies because of disenfranchisement. However, particularly in Bradwell, previous specific (and unfavourable) dealings with Government bodies were pointed to as a source of distrust. Once again, even specific incidents were not necessarily related to the power station per sé: Bradwell interviewees pointed to a proposed wetland flooding plan and a wind farm, as well as a proposed nuclear waste incinerator and nuclear waste repository. These proposals were perceived unfavourably not only due to the perceived flaws of the proposals themselves, but also through the way they had been presented to the community. It was felt by some Bradwell interviewees that these proposals were presented as a “done deal” rather than through any desire on the behalf of Government to meaningfully engage local residents. When this occurred, interviewees expressed feelings of being under-valued both as citizens and community members. Other (non-local) failings of Government also formed a basis for distrust, including the BSE (mad cow) crisis and the more recent outbreaks of Foot and Mouth disease.

In general, particularly surrounding issues of health, our interviewees expressed uncertainty about who they could trust to give impartial information and advice. Once again Government was distrusted and was perceived by some as being self-serving and incapable of objectivity, or as being focused only on the possible economic benefits nuclear power might bring, rather than on the safety and wellbeing of people. Thus Government, in particular, was seen as being unwilling to reveal ‘the truths’ about nuclear power. The nuclear industry was also distrusted, although here there seemed to be an absence of the betrayal that was present in discourses of distrust of Government. Problems of epidemiology were also discussed as reasons why any denial (or claim) of a link between cancer incidences and nuclear power could not be wholly believed.

The final explanation for the perseverance of anxiety and possibility that the power station could be a threat was due to the very composition of such socio-technical systems. For some interviewees, once humans enter a system it becomes fallible: short-cuts would be taken and the morals and values of some involved (the nuclear industry and Government) would be questionable. For others, stories of their own mistakes and fallibility served not as a source of accusation of human error, but to suggest that anyone is capable of making an honest mistake.

### 3.6 Reflecting on using the narrative approach

Using a narrative approach has been a valuable way of inquiring into how risk issues associated with the nuclear power station feature in the lives of people living close to such facilities. Our inquiries, drawing upon Tulloch and Lupton's (2003) approach, have pursued biographical, place-based narratives, making the dynamics of temporal and spatial context central to analysis. They have eschewed overly limiting models of risk subjectivity that reduce it, for example, to the idea (often found in risk studies) that living with risk amounts to people

making probabilistic assessments involving more or less rational judgements about risk stimuli, based on whether they are in possession of, or lack, objective (technical) sources of risk knowledge.

Other researchers, focussing on people and communities living close to large scale socio-technical and environmental hazard sites, as our work does, have established the need to “locate research within a more multifaceted discussion” of interviewees’ lives within place (Irwin et al., 1999: 1314). Our narrative approach has done this, resulting in an account highlighting, among other things, how:

- dominant discourses circulating within communities can provide ways of framing issues as risky or not;
- biographical experiences, dynamically unfolding in and through space and time, are interrupted by risk events (mediated and direct, real and symbolic) to disrupt the usually taken for granted normality surrounding a power station’s presence in a particular locality;
- people’s assessments and judgements as risk subjects can be made ‘reflexively’, that is, by taking up positions contingently based on what they know and imagine about the risk issue and the actions and motives of other people and regulatory regimes;
- risk subjects dynamically use language and linguistic techniques such as conversational tropes (for example, analogies and metaphors) and humour to indicate issues considered, intermittently, to be troubling.

As a result of our narrative inquiries, discourses of the ordinariness of the nuclear power stations have been identified as a central part of people’s ways of orienting to their lives and worlds. Without taking such an approach in our study, these discourses might have been omitted in their entirety. The initial, meta theme, of everyday ordinariness and unremarkability of the power station, within our data, provided a further context for our observation about the perceived extraordinariness of risk and threat. In this way, it has furthered our understanding of how risk and threat operates within a temporally defined, spatial context, establishing the ebbs of flows of issues and risk as a constructed feature of the power station.

Our narrative approach has also offered some alternative ways of exploring ‘risk subjectivity’, making it possible to engage with the way (some) people respond more emotively and anxiously to risk than others. Work not reported here (but see Henwood, 2008) involving a temporal, narrative analysis of the dynamics and interweaving of narrative themes, and how they are accounted for by interviewees, is able to focus in more depth and detail on explaining a key emotive theme (of betrayal), specifically avoiding flattening out the rich stream of emotive data in the interviews, and illuminating some of the more elusive psychological and social dynamics that may be underlying findings about institutional distrust.

### 3.7 Conclusion to the narrative interviews

A central two-part question which we aimed to answer throughout this empirical stage is: how do people living in close proximity to a nuclear power station live with risk, and can studying the ways in which people narrate about their experiences biographically, and dynamically through time contribute to such understandings? Through this empirical phase we have examined how people relate and represent their experiences of risk in their everyday lives, as 'risk subjects'. As was depicted in the above section, we have found that a narrative approach to interviews has proven useful in focussing attention on specific processes involved in the formation and constitution of the meanings of risk associated with the nuclear power station. Our interviewees have revealed a dynamic intersection between risk, time and biography, and our approach has also avoided 'flattening out' rich seams of emotion which occur from time to time in people's accounts through attending to participants' conceptualisations of the nuclear power station through language use and humour.

We have clearly shown through our interviewees' accounts that living with risk involves processes which make the power station ordinary; these include seeing it as a familiar part of daily life, demystifying it as a distant social organisation, and deemphasising the significance of the power station's local proximity, such that it is not presented as a unique risk. Nonetheless, coexisting with this dominant mode of conceptualising the power station's local presence as ordinary is the intermittent reconstruction of the nuclear power station as extraordinary and indeed, as threatening (cf. Masco, 2006). Our interviewees have shown that prompts for noticing the extraordinary occur through both mediated and direct experiences of threat. Additionally, our interviewees have revealed that it is not only nuclear events and threat issues which foster their conceptualisations of extraordinariness; past and present non-nuclear events (for example, terrorist activities) are also highly pertinent to how they reveal and view the riskiness of the power station. We use the phrase 'risk-biography intersections' to draw attention to these dynamic ways in which the power station's extraordinariness is recognised in specific circumstances relating to place, time and biography. A further theme which runs through the interview data is that trust and distrust (of those responsible for managing nuclear power) and the ways in which this can at times reinforce confidence, and at others powerfully reinforce anxiety and concern amongst some local people.

## **Section 4: The Q-sorts at Bradwell and Oldbury**

### **4.1 Q-Method rationale**

It is clear from the detailed analysis of the interviews that there were a multitude of ways in which individuals could perceive and live with the two nuclear power stations at Bradwell and Oldbury. The interviews were well placed to reveal the qualitative complexities and intricacies involved in how people construct the local power station as 'risky' or not and how this had featured in their everyday lives and over time. However, although analysis of the narrative interviews highlights the obvious complexities involved, it is not able to easily reflect how individual conceptualisations might lead to distinct configurations in understandings across broader social groupings. Stage 2 therefore utilised a method which retains a degree of qualitative flexibility and contextual sensitivity but is also capable of exploring such configurations, alongside an exploration of issues which might be key in any overall evaluations of the power station (and nuclear power in general). Q-method approach is a technique through which people's opinions can be examined through a more structured medium, and enables a wide variety of expressed opinions and value positions to be condensed into a simplified form. In essence, Q allows us to gain an understanding of which aspects of living close to a nuclear power station were most important, and which were least, as well as a means through which we could 'summarise' main configurations of belief (or points of view) amongst the participants. The Q stage also represents a point of departure from the initial methodological objectives of the project, to explore the usefulness of narrative, as well as a move from a more retrospective (i.e. as viewed in the past, biographical) consideration of living alongside Oldbury and Bradwell stations to a more prospective consideration of past, present and the future.

### **4.2 Introducing the Q-method approach**

The Q-method approach (also referred to as Q-methodology), is a long-established technique for identifying and differentiating between shared viewpoints amongst a given group of individuals (Brown, 1980; McKeown and Thomas, 1988). Participants in a Q-study are required to sort a set of predefined statements (the Q-sort) with respect to the issue at hand, which are then subjected to statistical analysis and further interpretation by the researcher. Q method is particularly well suited to the study of the complexities and distinct configurations in understandings common to sub-sets of participants within well-defined populations or expert communities, and has recently been utilised in a range of risk studies (see Simmons and Walker, 1999; Niemeyer *et al.*, 1995; Tuler *et al.*, 2005; Chess and Johnson, 2006).

### **4.3 Q participants**

Data for the Q-study were collected in locations close to both Oldbury and Bradwell between April and October 2007. The majority of participants in the Bradwell sample had originally been recruited for the interview phase of the

project in 2004-5, and were re-contacted for the present stage. Most other participants, particularly at Oldbury, were identified using professional recruitment agencies which used local press advertising, canvassing (door to door and at local events), and social networking to construct a sample of local people. The final samples were designed to represent an approximate cross section of gender, age group and length of residence at both locations, and comprised 84 participants; a total of 42 from each location (Table 1).

To reflect the local population, individuals with specific affiliations to the local nuclear power station, such as past or present employment, were explicitly included in the sample (n=16). Individuals who described themselves as having had past or present involvement with organised anti-nuclear groups were also included in the sample (n=4, Bradwell) although we were unable to identify any such participants during recruitment in the Oldbury area.

Table 1: Demographical Information of Q Participants

| Characteristic | Category      | Oldbury n (%) | Bradwell n (%) | Total (%) |
|----------------|---------------|---------------|----------------|-----------|
| Gender         | Male          | 23 (55%)      | 19 (45%)       | 42 (50%)  |
|                | Female        | 19 (45%)      | 23 (55%)       | 42 (50%)  |
| Age group      | 18-29         | 6 (14%)       | 2 (5%)         | 8 (10%)   |
|                | 30-39         | 8 (19%)       | 8 (19%)        | 16 (19%)  |
|                | 40-49         | 8 (19%)       | 8 (19%)        | 16 (19%)  |
|                | 50-59         | 8 (19%)       | 10 (24%)       | 18 (21%)  |
|                | 60+           | 12 (29%)      | 14 (33%)       | 26 (31%)  |
| Affiliation    | Power Station | 7 (17%)       | 9 (21%)        | 16 (19%)  |
|                | NGO           | 0 (0%)        | 4 (10%)        | 4 (5%)    |
| <b>Total</b>   |               | 42 (50%)      | 42 (50%)       | 84        |

#### 4.4 Design and procedure

Statements for the Q-sort were drawn initially from an inspection of the transcripts of the 30 biographical interviewees with people living close to Bradwell nuclear power station (see the previous section for more information) collected in 2004/5. The interviews were mined for an initial sample of statements reflecting as wide a diversity of views on the power stations as possible, generating an initial corpus of 400 statements also known as the 'concourse'. Selection of the final concourse ended when no new insights or perspectives could be identified in the statements being generated (i.e. theoretical saturation was reached). Examination of the main themes within the selected statements enabled a sub-sample of statements (the 'Q-sample') to be identified which reflected the overall concourse. A small number of additional statements were then added by the research team, to reflect national policy and

other developments, leading to a final Q-sample of 62 statements. The study was then conducted primarily at participants' own homes and was administered according to procedures described by McKeown and Thomas (1988). The statements were printed on cards and participants sorted these onto a grid, graded from 'Least-' to 'Most like my point of view'.

#### 4.5 Analysis

Data were analysed using PQmethod version 2.11, and were subjected to principal components analysis with Varimax rotation. This revealed four factors, or 'Points of View' in the sample. Prototypic sorts were then generated for each factor.

#### 4.6 Results

Factor meanings were interpreted from the prototypic sorts, with additional reference to interview transcripts and individual sorts of people who loaded highly on each factor. The highest (+5 and +4) and lowest (-5 and -4) ranked statements for each factor (or 'Point of View') are also presented in Table 2 at the end of this report (Appendix 1), representing items that were most strongly endorsed or rejected within a particular point of view. As the factor solutions from both the Oldbury and Bradwell sorts were broadly similar, the two sets of data have been pooled in the analysis we present. We describe each point of view in turn, and the four factors are also summarised in the Text Box 1 below.

#### **Text Box 1: Factors (Points of View) Arising from the Q-Study at Bradwell and Oldbury**

##### *Factor 1: Beneficial and Safe*

- Emphasised the local and national benefits of nuclear power
- Felt that we should increase the UK's energy security through nuclear power
- Felt confident that we could trust the local power station operators to keep us safe

##### *Factor 2: Threat and Distrust*

- Emphasised the risks of nuclear power
- Felt that nuclear power was not 'clean'
- Did not trust the nuclear industry, and to a lesser extent Government
- Considered that we should stop using nuclear power, and switch to renewable forms of energy production as soon as possible

##### *Factor 3: Reluctant Acceptance*

- Gave *conditional* support to nuclear power. Regarded nuclear power as having drawbacks, but accepted that it may be necessary to address climate change and national energy security
- Unsure about who to trust
- Would *reluctantly* accept new build locally on the basis of a sense of 'civic duty': The idea that 'we should all do our bit'

##### *Factor 4: "There's No Point Worrying"*

- Regarded the power station as 'just part of the landscape'
- Critical of Government, nuclear industry and regulators
- Felt that the media exaggerate risks and blow small nuclear incidents out of proportion
- Regarded the 'greens' as getting in the way and blocking progress

#### 4.6.1 Point of View 1: Beneficial and safe

This point of view was characterised by two main constructs: the benefits that nuclear power brought both locally and nationally, and safety associated with relatively high levels of trust in the competence of the power station operatives and moderate confidence in the regulators. Supplementary questions regarding attitudes to nuclear power indicated that almost all participants flagged on this factor were positive about nuclear power in general, with 30 (81%) indicating that they would support the building of a new nuclear power station on the existing nuclear site.

Nuclear power was regarded as both safe and clean in this point of view, and respondents were also emphatic (ranking +5; Table 2) that they would rather live near to a nuclear power station than a coal fired one or by a dirty industrial site. Nuclear power was considered necessary for the UK's energy security, although the need for renewable sources of energy production running alongside nuclear was not dismissed. At a local level the nuclear power station was regarded as an asset which brought benefits to the community, and people with this perspective did not feel that the area would be contaminated and stigmatised by its presence. Trust within this perspective was placed primarily in the competence of the power station operatives to ensure nuclear safety. These were regarded as 'ordinary people just like us' who could be relied on not to cut corners or take chances, whilst fear amongst the public was regarded by these participants as 'irrational' and borne of a lack of understanding about nuclear power. Interestingly, although clearly a perspective that views nuclear power as highly beneficial, the highest ranked statement (ranked +5; Table 2) nevertheless expresses a degree of *ambivalence*, acknowledging that while nuclear power is not perfect and has drawbacks it is the best option available.

#### 4.6.2 Point of View 2: Threat and distrust

This point of view was based strongly on themes of threat, distrust and, to a lesser degree, social mobilisation. There was also a negative correlation with point of view 1 of moderate strength (-.56; Table 3). This factor produced the most unequivocal sort pattern overall, and as such represented a clear anti-nuclear stance, with 24 of 29 (i.e. 86%) of the grouped respondents indicating that they were opposed to nuclear power in general, and 28 (96%) indicating that they were opposed to the building of a new nuclear power station locally, on the general attitude measures.

Table 3: Correlations between factor scores

| Factor               | 1    | 2    | 3    | 4    |
|----------------------|------|------|------|------|
| Beneficial and Safe  | 1.00 | -.56 | .33  | .44  |
| Threat and distrust  |      | 1.00 | .13  | -.08 |
| Reluctant Acceptance |      |      | 1.00 | .25  |
| Normalisation        |      |      |      | 1.00 |

This perspective emphasised, above all, a perceived need to stop using nuclear power and to move towards using renewable sources of energy as soon as possible. Nuclear power was regarded as risky, and neither clean, nor a 'necessary evil' which might be required to help combat climate change or improve energy security. There was a marked sense of distrust, particularly of the nuclear industry, and terrorism and day to day emissions were major concerns for people with this point of view. The storage of radioactive waste on the site following decommissioning was a strong concern and there was a clearly stated willingness to mobilise against any attempt to establish a permanent waste facility on the site, and, to a lesser degree, to protest against new power station proposals.

#### **4.6.3 Point of view 3: Reluctant acceptance**

This point of view was defined by fewer flagged sorts (8) than the previous two perspectives. It retained elements of the other main points of view but very clearly placed strong emphasis on particular aspects of nuclear power and in doing so defined a unique stance. Unlike factors 1 and 2, the perspective was dominated by a cluster of similar statements with high factor scores indicating the *reluctant* acceptance of nuclear power. The majority of people associated with this factor (7 out of 8) were either neutral or positive about nuclear power in general, while half of these respondents were neutral on the issue of a new power station locally.

The reluctant acceptance of nuclear power captured by this factor showed the respondents holding this point of view were persuaded that nuclear power may be necessary in order to combat climate change and ensure a secure energy supply. Nuclear power appeared to be regarded as clean and efficient, and although the existence of associated risks was acknowledged, these were presented as something best not dwelt upon. It was notable that individuals with this perspective appeared to be uncertain about whom to trust about potential risks, distrusting the nuclear industry on the matter and to some extent the Government too. Holistic reading of the sort suggests that the perspective expresses a sense of civic duty to look beyond individual concerns in order to see 'the bigger picture'. In other words, a feeling that as nuclear power may be necessary in the future whether people like it or not, a new station might be tolerated in the locality since they would have to go somewhere.

#### **4.6.4 Point of View 4: There's no point worrying**

As with factor 3, this emerged as a minority position among our sample, with only 4 sorts flagged, but one defined by consistently high factor scores of a small number of similar statements. There was no clear pattern with regard to support or opposition to nuclear power. Again, as with factor 3, people associated with this point of view acknowledged that there may be risks associated with the

nuclear power station but appear to adopt a pragmatic, normalising, approach to having to live with them.

For individuals with this outlook, the power station was 'just part of the landscape'. It was not something that they worried about particularly and they barely noticed it was there. Nuclear power was regarded as a relatively clean source of energy. Although there seemed to be some concern about emissions to the local estuaries on which the stations were sited, minor incidents at the power station were dismissed as inconsequential and subject to media exaggeration. Nevertheless, the perspective captured by this factor did take a critical view of institutions, expressing a lack of trust in Government and the nuclear industry in particular, and little confidence in the nuclear and environmental regulators. Closer to home it does express, in common with Factor 1 and to a lesser extent Factor 3, *relatively* more confidence in the workers at the local power station, but there was no sympathy for local critics of the power station, who were seen as having the choice to live elsewhere, while 'Greens' generally were seen as blocking progress.

#### 4.7 Q-method conclusion

The Q study has investigated, in a contextually sensitive manner, the distinctive points of view that exist in the two local communities at Oldbury and Bradwell. It is beyond the scope of this report to discuss the theoretical implications of the findings in great detail (see Venables et al, 2008). Participants were able to sort the statements in ways that defined their own perspectives while also utilising the analytical power of principal components analysis. The approach and the commonalities and differences identified thus bridge the methodological divide between qualitative and quantitative research philosophies – and as such Q-method has much to commend it for interpretive and contextual risk perceptions research. The patterns of results from the analysis were broadly similar in both Oldbury and Bradwell, suggesting at least some degree of transferability of the findings, at least to other UK nuclear communities living in similar circumstances, and further research would clearly be desirable to investigate this possibility.

The Q study has successfully identified 4 distinctive points of view amongst the participants, which we have labelled 'Beneficial and Safe', 'Threat and Distrust', 'Reluctant Acceptance' and 'There's no Point Worrying'. However, while the Q is extremely capable for identifying distinctive qualitative *configurations* of belief, it is unable to give any indication of the *distribution* of such beliefs, a question that we follow up in the following (survey) stage of the research. An important consideration to arise from the detailed analysis of the emergent points of view is that the 'landscape of beliefs' about nuclear power do not conform to simple (e.g. anti- or pro-nuclear) opposites – the revealed perspectives were complicated and nuanced in nature. That this is so is reflected in a number of features of the obtained factors, but most clearly in the orientation of the respondents to the issue of who to trust. In factor 1 (Beneficial and Safe) it was the operators of the local plant who were relied upon to keep the plant and local community safe –

they were seen both as competent and ordinary people just like us. In this way, and congruent with the narrative interview findings, social networks provide the basis for shared confidence. By complete contrast individuals who sorted in terms of 'Threat and Distrust' were highly sceptical of the nuclear industry more generally (and not local operators) in terms of its lack of honesty and openness regarding incidents, the integrity of its consultation efforts, and a perception that it engaged in propaganda regarding plant safety. Distrust was also expressed, although to a lesser extent, towards both the Government and the Environment Agency. These findings indicate that there might exist, in this particular case, a *qualitative asymmetry* between trust and distrust, and that in theoretical terms we may need to revisit the notion of trust and distrust in risk management as *separate* constructs, rather than being at the opposite end of any single continuum (see also Lewicki, McAllister and Bies, 1998). The following (survey) stage of the research is also designed to further explore this somewhat unexpected finding.

## **Section 5: The survey: Oldbury and Hinkley Point**

### 5.1 Rationale

The design and implementation of the large-scale survey at Oldbury and Hinkley Point power stations builds upon the previous two phases of the project. It facilitates a degree of methodological triangulation across the project phases, through a quantitative examination of some of the key findings to date. In particular, the survey was designed to investigate the degree to which each of the four 'Points of View' which had emerged from the Q-study might be evident in a wider local sample, as well as judgements of trust in the Government's regulation of nuclear power; in the nuclear industry; and the ability of local plant operators to run the nearby nuclear power station safely. This approach also facilitated an attempt to quantitatively measure people's personal 'place attachment' and the extent to which the nearby nuclear power station was considered part of local place and identity. It also enabled an examination of the factors that predict respondents' support for the construction of a new nuclear power station in the local area, as well as permitting an indirect comparison between the 'local' results and those obtained from a national sample in 2005.

### 5.2 Design and procedure

The survey was divided into six main sections and contained (a) items on general environmental concern; (b) a vignette task examining the extent to which each of the four points of view from the Qstudy matched the respondent's own point of view on nuclear power; (c) items eliciting judgements of trust in the institutions responsible for nuclear power (Government, nuclear industry and local plant operators); (d) risk/benefit judgements and judgements of the acceptability of nuclear power and new nuclear build, both locally and nationally; (e) place attachment and judgements relating to the presence of the nearby nuclear power station in the local community; and finally (f) policy preferences with respect to future national decisions about energy choices.

Questionnaires were distributed to communities near to the nuclear power stations at Oldbury (Oldbury-upon-Severn; Oldbury Naite; Thornbury) and Hinkley Point (Stogursey; Nether Stowey; Stockland Bristol; Cannington; Fiddington; Spaxton; Four Forks; Comwich; Bridgwater) between June and August 2008. The Hinkley Point site was chosen as the comparison to Oldbury primarily because more time had passed (in total 6 years) since the generation of electricity at Bradwell, and we wished the survey to elicit beliefs around *currently operating* stations. A researcher called at private addresses at each location on a weekday, between 4pm and 8pm, and asked the respondent if they would be willing to complete the questionnaire. Completed questionnaires were then collected 3 days later. Participants who had not completed the survey by this collection date were given a stamped, addressed envelope and asked to post the completed questionnaire back at their earliest convenience. In small villages such as Oldbury-upon-Severn and Stockland Bristol, a researcher called at all

households, while in larger conurbations, every third household was selected. As Bridgwater was too large to cover in its entirety by this approach, approximately 150 residences were visited randomly in each of the 6 main districts in the town (Hamp; Parkway; Chiltern Trinity; Wembdon; Durleigh; Colley Lane).

### 5.3 Analysis and results

#### 5.3.1 Survey sample

Table 4 shows a detailed breakdown of the characteristics of the survey samples and illustrates that there were few significant demographic differences between the Oldbury and Hinkley Point samples. The mean length of residence was longer in the Hinkley Point sample, whilst at Oldbury, there were slightly more households with dependent children, and the questionnaire was answered more frequently by the primary caregiver. The Hinkley Point sample comprised a greater number of respondents with family or friends who worked, or had worked at a nuclear power station or for the British Nuclear Industry, and significantly fewer with no connections.

Table 4: Demographic Information of Survey Participants

| Demographic Category      | Demographics   | Place         |                     | Total n (%) | Sig        |
|---------------------------|--|---------------|---------------------|-------------|------------|
|                           | Demographic Information  | Oldbury n (%) | Hinkley Point n (%) |             |            |
| Age                       | 18-24  | 16 (2.4%)     | 21 (3.3%)           | 37 (2.9%)   | ns         |
|                           | 25-34  | 35 (5.1%)     | 38 (6.1%)           | 72 (5.6%)   | ns         |
|                           | 35-44  | 121 (18.3%)   | 92 (14.6%)          | 213 (16.5%) | ns         |
|                           | 45-54  | 121 (18.0%)   | 114 (18.2%)         | 235 (18.2%) | ns         |
|                           | 55-64  | 161 (24.3%)   | 158 (25.2%)         | 319 (24.7%) | ns         |
|                           | 65+  | 210 (31.7%)   | 205 (32.6%)         | 415 (32.1%) | ns         |
| Gender                    | Male   | 341 (52%)     | 321 (48%)           | 662 (51%)   | ns         |
|                           | Female   | 322 (51%)     | 307 (49%)           | 629 (49%)   | ns         |
| Dependents                | Households with dependent children                                     | 216 (57%)     | 164 (43%)           | 380         | $p < .05$  |
|                           | Age of children:   |               |                     |             |            |
|                           | 0-14   | 163 (55%)     | 134 (45%)           | 297         | ns         |
|                           | 15-18  | 90 (64%)      | 50 (36%)            | 140         | ns         |
|                           | Questionnaire completed by primary caregiver                           | 180 (58%)     | 133 (42%)           | 313         | $p < .01$  |
| Length of Residence       | Mean length of residence in years [range in years]                     | 26.1 [0-83]   | 30.3 [0-84]         | 28.1 [0-84] | $p < .001$ |
| Power Station Affiliation | Work /have worked at nuclear station/for BNI                           | 70 (10.3%)    | 82 (12.7%)          | 152 (11.5%) | ns         |
|                           | Have family or friends who work/have worked at nuclear station/for BNI | 262 (38.6%)   | 332 (51.4%)         | 594 (44.8%) | $p < .001$ |
|                           | None   | 347 (51.1%)   | 232 (35.9%)         | 579 (43.7%) | $p < .001$ |
| Total (n)                 |  | 680           | 646                 | 1326        | -          |

### 5.3.2 Response rates

Table 5: Survey Participants Response Rates

|   | Oldbury    | Hinkley Point | Total       |
|---|------------|---------------|-------------|
| Addresses visited                           | 1839 (47%) | 2079 (53%)    | 3918 (100%) |
| Doors answered                              | 1129 (47%) | 1273 (53%)    | 2402 (100%) |
| Questionnaires distributed                  | 813 (50%)  | 824 (50%)     | 1637 (100%) |
| Questionnaires returned                     | 680 (51%)  | 646 (49%)     | 1326 (100%) |
| <b>Response rates – as a proportion of:</b> |            |               |             |
| Addresses visited (a)                       | 36.9%      | 31.1%         | 33.8%       |
| Doors answered (b)                          | 60.1%      | 50.7%         | 55.1%       |
| Questionnaires distributed (c)              | 83.5%      | 78.4%         | 80.9%       |

A total of 1326 useable questionnaires were returned from both survey areas (Oldbury: n=680; Hinkley Point: n=646). Response rates were calculated in three ways: returned questionnaires as a proportion of (a) the number of addresses visited (b) the number of doors answered, and (c) the number of questionnaires distributed. We consider that the second of these figures (b) is the most informative, as it includes those who actively refused to participate, having answered the door, but excludes those who were not at home, and who therefore did not have a chance to consider participating in the study. On this measure the response rate was a respectable 55% in aggregate.

Although the data set also allows us to make comparisons between the two areas (Oldbury and Hinkley Point) many of these were not significant, and we only comment where an important significant result does occur.

### 5.3.3 Comparisons of Oldbury/Hinkley survey with 2005 national survey

In presenting the results of the present study, we draw a series of comparisons with data obtained with identical questions from a nationally representative (GB) poll conducted for us by Ipsos-Mori in October 2005 (Poortinga et al., 2006). These comparisons are primarily illustrative, rather than definitive, being intended to show possible differences between the beliefs of communities living close to nuclear power stations, and those of the British population in general. There are a number of limitations to this comparison approach which mean that any conclusions drawn should be tentative.

First, although the present survey incorporated a large number of people across a range of local towns and villages, the sample in aggregate is not fully representative of the local population. In particular, younger people were under-represented in our samples from both Oldbury and Hinkley Point. Thus, the 18-24 age bracket comprised approximately 3% of our total sample, and the 25-34 years age bracket comprised 5.6%. We estimate from census data (2001) that representative figures in the Oldbury and Hinkley Point areas would be closer to 9.45% (Oldbury: 8.9%; Hinkley Point: 10.0%) and 16.2%, respectively (Oldbury: 14.0%; Hinkley Point: 18.5%). Similarly, approximately 56.8% of our sample was aged 55 years or over, whilst a representative proportion would be closer to 36.2% (Oldbury: 37.5%; Hinkley Point: 34.8%). The analysis presented here

does not explicitly weight the local data to correct for this, although we have been able to inspect the breakdown of question responses by age to look for major differences, and we comment on these where appropriate. In addition, the regression analyses reported below did include age as an independent variable, and generally this was a non-significant factor.

Second, the nationally representative data with which the comparisons are drawn were collected in 2005, approximately 3 years earlier than the local data. Clearly, national opinions might have changed over time, particularly in regard to nuclear power, for which policy has developed rapidly over the last few years. However, national results from recent Ipsos-Mori tracking surveys suggest that opinions on nuclear power and related issues remained relatively stable in Britain at least between 2005 and late 2007 (Knight, 2007).

Finally, unlike the 2005 Ipsos-MORI poll, we did not include a 'Don't know' option in our questionnaire. In the October 2005 poll, however, responses in this category for comparator questions used here were not higher than 6% on any of the questions we replicated, so the omission of this category in the present survey is unlikely to have had a major impact on our results.

#### **5.3.4 General environmental concern (see Appendix 2, Tables 6-8)**

The questionnaire commenced with a number of items asking about general environmental concern, asking participants to answer a series of issues on a 4-point scale from 'not at all concerned' to 'very concerned'. Tabulated frequencies are shown in Appendix 2, Tables 6-8.

##### *5.3.4a Nuclear power*

Concern about nuclear power in the current 2008 Oldbury and Hinkley Point survey stood at 41% very or fairly concerned (44% amongst those aged under 35). Perhaps not surprisingly, this was lower than found in the 2005 nationally representative figures where 59% were very or fairly concerned.

##### *5.3.4b Radioactive waste*

Despite the differences between the two surveys with regard to concern about nuclear power, there was far less difference on the issue of radioactive waste. In the Oldbury/Hinkley Point samples, 77% were very or fairly concerned about radioactive waste (73% amongst those aged under 35), compared with 80% in the 2008 national sample. However, a smaller proportion of the local Oldbury/Hinkley Point sample was very concerned (42% in the local samples versus 50% in the national).

##### *5.3.4c Climate change*

Our survey suggested that the majority of people in the Oldbury/Hinkley Point sample were concerned about climate change, with 81% very or fairly concerned (82% amongst those aged under 35). The 2005 national sample gave a similar figure at 82% concerned. However, fewer respondents (32%) were very

concerned in the Oldbury/Hinkley Point sample, compared with the 2005 national sample (44%).

### **5.3.5 Energy policy attitudes (see Appendix 2, Tables 9-12)**

#### *5.3.5a Tackling climate change*

In the Oldbury/Hinkley Point sample, 76% agreed or strongly agreed that they were “willing to accept the building of new nuclear power stations if it would help to tackle climate change” (72% amongst those aged under 35), and this can be compared with only 53% in the 2005 national survey. By contrast only 44% in the Oldbury/Hinkley Point sample agreed or strongly agreed that “promoting renewable sources, such as solar and wind power is a better way of tackling climate change than nuclear power” compared with 78% in the 2005 national survey. However, in the local Oldbury/Hinkley Point sample, agreement that renewables should be promoted over nuclear power was much greater amongst respondents aged 18-34 years (66%) than in those aged 35 or over (42%;  $p < .001$ ).

#### *5.3.5b Increasing energy security in the UK*

We found strong support in the Oldbury/Hinkley Point samples (82% agree or strongly agree; 80% in those aged under 35) for the development of a mix of energy sources to ensure a reliable supply of electricity, including nuclear power and renewables. This compares to 65% found nationally in 2005. Agreement with this statement was particularly high at Oldbury (84% agree or strongly agree) compared to only 79% at Hinkley Point ( $p < .001$ ).

#### *5.3.5c Scepticism about Government policy and ‘imposition’*

There was more strong general agreement in the Oldbury/Hinkley Point sample (73% ‘Tend to agree’ or ‘Strongly agree’; 64% amongst those aged under 35) with the statement “it doesn’t matter what we think about nuclear power. Nuclear power stations will be built anyway”. This compares with 62% found nationally in 2005. There was also a significant difference between sites on this question, with more agreement in the sample at Hinkley Point (77%) than at Oldbury (69%;  $p < .001$ ).

### **5.3.6 Judgements of risks and benefits (see Appendix 2, Tables 13-15)**

#### *5.3.6a ‘There are risks from having nuclear power stations in the UK’*

Surprisingly, the differences between local and national samples on judgements of risk from nuclear power stations in the UK were relatively modest. A clear majority of people in the Oldbury/Hinkley Point samples (69%; rising to 77% amongst those aged under 35,  $p < .01$ ) agreed or strongly agreed that there were at least some risks from having nuclear power stations in the UK, compared to 72% from the nationally representative sample obtained in 2005.

### 5.3.6b *'There are benefits from having nuclear power stations in the UK'*

On the issue of the benefits of nuclear power, however, the differences between the two surveys were more marked. Overall, fully 80% of respondents in the 2008 Oldbury/Hinkley Point survey (72% amongst those aged under 35) indicated that they strongly agreed or would tend to agree with this item, compared with 49% in the nationally representative 2005 survey.

### 5.3.6c *'How would assess the benefits and risks of nuclear power in general?'*

There were very large differences on the above item, which asks for a relative judgement of 'risks versus benefits'. Fully 62% of the 2008 Oldbury/Hinkley Point samples considered that the benefits of nuclear power far or slightly outweigh its risks, compared with only 32% in the 2005 national survey. Interestingly however, in our Oldbury/Hinkley Point samples, only 43% of respondents aged under 35 felt that the benefits far, or slightly outweigh the risks, compared with a figure of 64% amongst those aged 35 years or older ( $p < .001$ ).

## 5.3.7 New build (see Appendix 2, Tables, 16 & 17)

### 5.3.7a *'In the UK'*

Unsurprisingly, there was a far greater degree of support for the building of new nuclear power stations in the UK amongst our Oldbury/Hinkley Point sample of people (58%; although this falls to just 39% amongst those aged under 35,  $p < .001$ ), compared to the nationally representative sample (34%). However, despite the general support for new build in the UK found in the 2008 Oldbury/Hinkley Point sample, it is notable that 21% of local people remain opposed to such a development (rising to 29% amongst those aged under 35).

### 5.3.7b *Locally versus 'In the UK'*

We asked local people living near to the nuclear power stations at Oldbury and Hinkley Point to indicate the extent to which they would support new build, both nearby (i.e. "at Oldbury" or "at Hinkley Point") and nationally (i.e. "In the UK"). Despite the generally positive judgements expressed in the 2008 Oldbury/Hinkley Point survey about the nearby nuclear power stations, only just above half said they would support the building of a new nuclear power station locally (55% 'Tend to' or 'Strongly' support, falling to just 41% amongst those aged under 35,  $p < .05$ ). Although levels of support in the Oldbury/Hinkley Point sample were similar for both new build locally (55%), and 'In the UK' (58%), the difference was significant ( $p < .001$ ). *Opposition* to local new build (those who would 'Tend to' or 'Strongly' oppose new build) was significantly greater at Oldbury (31%) than at Hinkley Point (23%;  $p < .001$ ).

## 5.3.8 Q-Perspectives: relative proportions and characteristics (see Appendix 2, Tables 18 & 19)

Respondents read four vignettes, each describing elements of one of the four 'points of view' identified in the Q-study, and were asked to indicate which was closest to their own point of view on nuclear power. We found that 38% of local

people identified most with the 'Reluctant Acceptance' point of view (491 respondents), and 34% with the 'Beneficial and Safe' perspective (430 respondents). The 'Threat and Distrust' point of view was chosen as closest to their point of view by 16% of the sample (203 respondents), and 12% chose the 'There's No Point Worrying' perspective (150 respondents).

There were significant differences between these four 'Points of View' on the overall trust ratings; That is, in the Government's management of nuclear power; in the nuclear industry; and in local plant operators; (all  $p < .001$ ) and in their risk-benefit judgements regarding the acceptability of nuclear power in the UK (all  $p < .001$ ; Tables 18 & 19).

Respondents who indicated that the Beneficial and Safe point of view was most like their own tended to be male (68%;  $p < .001$ ), had the highest mean levels of trust in the various institutions responsible for the regulation, management and safety of nuclear power stations, and gave, on average, the most favourable risk-benefit judgements.

Respondents who indicated that the 'Threat and Distrust' vignette was closest to their own point of view tended to be women (63%;  $p < .001$ ), and also gave the lowest trust ratings and the least favourable risk-benefit judgements.

Levels of trust, and risk-benefit judgements were similar in those who identified most with the 'Reluctant Acceptance' and the 'There's No Point Worrying' points of view, falling on average close to the overall scale mid-point of 3, whilst risk-benefit judgements suggested that on average, respondents who identified with these points of view considered that the benefits of nuclear power slightly outweighed its risks. In addition, respondents who identified most with the 'There's no Point Worrying' point of view tended to be women (61%;  $p < .001$ ).

### **5.3.9 Trust**

We found that respondents at Oldbury/Hinkley Point trusted most in the local power station operators, and least in the Government ( $p < .001$ ), with their level of trust in the nuclear industry intermediate between the two ( $p < .001$ ). This pattern was consistent between sites (Oldbury and Hinkley Point samples) and also between all 4 Q-perspectives.

There were, however, slightly higher perceptions of openness and honesty of the plant operators at Oldbury, compared to Hinkley Point ( $p < .05$ ).

### **5.3.10 Place attachment**

We constructed two reliable 'Place Attachment' scales from a series of nine questions intended to measure the extent to which (a) respondents regarded themselves as integrated into, or part of the local 'place' ('Personal place attachment'; Cronbach alpha=.791); and (b) the nearby nuclear power station as part of the local 'place' ('Place attachment: Power Station'; alpha=.836).

Participants at Oldbury had higher levels of Personal place attachment than those at Hinkley Point ( $p < .001$ ), and the power station was considered more a part of 'local identity and place' at Hinkley Point than at Oldbury ( $p < .01$ ).

### **5.3.11 Predictors of support for local new build (see Appendix 2, Table 20)**

Multiple regression analysis suggested that support for local new build was predicted by: the power station being viewed as a part of local identity and place; trust in the nuclear industry (but not the current plant operators or Government); low levels of concern about climate change; male gender; a perception that the nearby nuclear power station at Oldbury or Hinkley Point brings benefits to local people; and a perception that risks to local people from the nearby nuclear power station are low. Age and length of residence were included as independent variables in this analysis, and were found to be non-significant.

### **5.3.12 Involvement in siting decisions (see Appendix 2, Table 21)**

We found that, regardless of people's opinions on nuclear power and new build, local people wanted to be fully involved in any siting decisions about any new local nuclear power station. Overall, 84% of respondents either 'Tended to' agree or 'Strongly' agreed with this statement. There was a small difference between sites in this respect, with general agreement at Oldbury being 85%, compared to 82% at Hinkley Point ( $p < .05$ ).

## 5.4 Conclusions to survey

From our 2008 data it was clear that there was less overall concern about nuclear power in the two samples with a nuclear power station in very close proximity (Oldbury and Hinkley Point), when compared to a nationally representative sample which was obtained in 2005. Indeed, overall, local people at Oldbury and Hinkley Point emphasised that the benefits of having nuclear power stations in the UK outweigh its risks, although this was significantly less likely to be the case amongst those aged under 35. However, many local people at Oldbury and Hinkley Point felt that there are risks associated with nuclear power, and in particular, the majority of our samples remain concerned about the issue of radioactive waste

Our findings also suggest that there is considerable variation in opinion, which is masked when looking at average levels of support for nuclear power. Indeed we have found that between 10 and 20% of local people surveyed at both Oldbury and Hinkley Point remain strongly opposed to nuclear power. Furthermore, in the vignette task the most popular point of view was one that we have labelled 'reluctant acceptance', which was chosen by 38% of local people. Such individuals give only *conditional support* to nuclear power. One implication here is that if such people consider that the development of nuclear power is not delivering on the outstanding issues that concern them, or if there is a major nuclear accident anywhere, a more concerted level of opposition could quickly arise.

Finally, trust, perceived risks and benefits, as well as views on the 'place of the existing power station in the locality' all predict residents' support for new build – economic factors, while important, appear not to be the whole story. However, regardless of their opinion on nuclear power, it was clear from our survey that the majority of local people want to be fully involved in any siting decisions about new nuclear power stations, a finding that we view as particularly important in the context of current Government policy on nuclear energy.



# Part C: Conclusion

## **Section 6: Conclusions**

### **6.1 Summary of conclusions from the empirical stages**

To recap the study's main aims our broad research question was:

1. How do people residing in close proximity to a major socio-technical hazard/site (nuclear power plant) 'live with risk' in their everyday lives?

In addition, the initial phase of the project (narrative interviews) had the methodological objective to investigate whether eliciting people's biographical narratives – their storied identities – can contribute to an understanding of living with risk.

To address these questions, between November 2004 and July 2008 we completed three empirical stages, with residents in close proximity to the existing British nuclear stations of Bradwell (Essex), Oldbury (Gloucestershire) and Hinkley Point (Somerset). The empirical phases comprised:

- A total of 61 in-depth narrative interviews with residents living near Bradwell and Oldbury.
- A Q-sort procedure with 84 residents living near Bradwell and Oldbury
- A major household survey (n=1326) of residents living near Oldbury (n=680) and Hinkley Point (n=646).

The three stages, each using slightly different methodologies, provide for a degree for methodological triangulation for our overall conclusions. The research as a whole underlines the complexity of the views people hold about a local power station, and about nuclear power in general.

*A first, and clear conclusion is that the majority of our participants view the existing station through a dominant frame of 'ordinariness' and are also supportive of nuclear power in general.* However, each empirical phase has shown how a broad categorisation (i.e. pro- or anti- nuclear) is far too simplistic: there are intricate processes continually at work and differing dimensions to local residents' risk perceptions.

The narrative interview stage at Bradwell and Oldbury has revealed a dynamic involving intersections between people's awareness of and engagement with risk, time and biography, and is methodologically valuable in, for example, avoiding flattening out rich seams of emotion in people's accounts through attending to the study of participants' language use and humour. 'Living with risk' involves several processes:

- The dominant discourse across much of our interview data from Bradwell and Oldbury is one which represents the nuclear power stations as both *ordinary and normal*: this includes, viewing them as a familiar part of everyday life and the local place; deemphasising the significance of proximity, such that the local station is not presented as a unique risk or one which is any worse or threatening than the many other risks in life. These are all underpinned by a form of *social trust*, in that the local station personnel (through personal and other contacts) are known and trusted to do a competent and safe job.
- Nonetheless, coexisting with the dominant mode of relating to the existing power stations are an intermittent set of discourses which disrupt the dominant view and do construct the existing station as threatening. This can be thought of as a process of *noticing the extraordinary*. Disruption could occur either at moments when media and other sources heightened for people related risk issues (Chernobyl, terrorist bombings) leading them to reflect upon their local situation, or when more personal events arose such as a case of cancer in a family member or friend, or when small incidents or drills triggered highly visible actions by station or other personnel. These disruptions could bring with them moments of anxiety for our interviewees, despite the dominant discourses of the power stations being familiar and normal. In addition, some of the language and humour used in the interviews was indicative of affectively charged meanings associated with moments of uncertainty, unease, even anxiety. We use the phrase *'risk-biography intersections'* to draw attention to ways in which the power station's extraordinariness is recognised in specific circumstances relating to place, time and biography.
- The interviews at Bradwell and Oldbury also revealed important aspects the ways in which *trust and distrust are manifest at the local level*. As noted above, trust in the station's operators was often associated with confidence in the safety of the local plant. However, distrust could also lead to persistence of anxiety about the risks of the stations, founded on our interviewees' perceptions of the institutional bodies involved in the regulation of the power stations. In particular, our interviewees at times articulated distrust of Government and Government bodies. Sometimes this was based on generic sentiments: notions of not being able to trust politicians, the civil service and other Government bodies because of disenfranchisement. At other times it was founded in a perception that various authorities had failed (particularly at Bradwell) to meaningfully engage local people over the years regarding planned developments. In addition, particularly surrounding issues of health, our interviewees expressed uncertainty about who they could trust to give impartial information and advice, with 'Government', in particular, seen as being unwilling to reveal 'the truths' about nuclear power.

The narrative interviews were well placed to reveal the qualitative complexities and intricacies involved in how people construct the local power station as 'risky' or not and how this had featured in their everyday lives over time. However, interview analysis was not able to easily reflect how individual conceptualisations might lead to distinct configurations in understandings across broader social groupings. The Q study was designed to investigate the distinctive points of view that exist at Oldbury and Bradwell, and the patterns of results were broadly similar at both, suggesting at least some degree of transferability of the findings, at least to other nuclear communities in Britain living in similar circumstances. In particular the Q study identified 4 distinctive points of view amongst the participants, which we have labelled:

- Beneficial and Safe',
- 'Threat and Distrust',
- 'Reluctant Acceptance'
- 'There's no Point Worrying'.

Detailed analysis of these points of view suggest that the 'landscape of beliefs' about nuclear power does not conform to simple (e.g. anti- or pro-nuclear) opposites – the 4 revealed perspectives were complicated and nuanced in nature. For example, the 'Beneficial and Safe' and 'Threat and Distrust' points of view were not polar opposites, seen most clearly in the orientation of the respondents to the issue of who to trust. In factor 1 (Beneficial and Safe) it was the operators of the local plant who were relied upon to keep the plant and local community safe – they were seen both as competent and ordinary people just like us. In this way, and congruent with the narrative interview findings, social networks provide the basis for shared confidence. By contrast individuals who sorted in terms of 'Threat and Distrust' were highly sceptical of the nuclear industry more generally and to a lesser extent of both the Government and the Environment Agency. Equally, the 'Reluctant Acceptance' point of view expressed support for nuclear energy at both local and national levels in ways that were *highly conditional* (e.g. upon its contribution to climate change, and upon the parallel development of renewable energy) rather than being unequivocal or certain.

While the Q is extremely capable for identifying distinctive qualitative *configurations* of belief, it is unable to give any indication of the *distribution* of such beliefs, a question that we follow up in the final (survey) stage of the research. This led to the design of the major survey in 2008 at Oldbury and Hinkley Point. The Hinkley Point site was chosen as the comparison to Oldbury primarily because it held an operational station, and we wished the survey in particular to elicit beliefs around *currently operating* stations.

Taken as a whole, the survey results paint a picture, broadly in line with the narrative interview findings, of a local population which is broadly accepting of nuclear power. For example, there was less overall concern about nuclear power in the Oldbury and Hinkley Point samples, and far more people thought the benefits of nuclear power outweighed its risks, when compared to a nationally representative (GB) sample obtained in 2005. However, notwithstanding this, the majority of local people in the Oldbury and Hinkley Point samples still felt that there are risks associated with nuclear power, and in particular, many remain concerned about the issue of radioactive waste. The survey findings also suggest that there is considerable variation in opinion, which is masked when looking at the (broadly positive) average levels of support for nuclear power at these locations. In particular:

- We found that between 10 and 20% of local people surveyed at both Oldbury and Hinkley Point remain strongly opposed (depending upon the precise question asked) to nuclear power as a national or local development.
- Furthermore, in the vignette task the most popular point of view was one that we have labelled 'reluctant acceptance', and was chosen by fully 38% of survey respondents. Such individuals give only *conditional support* to nuclear power.
- Finally, and as highlighted in the earlier stages and in other research (e.g. on radioactive waste siting) trust and distrust are important mediators of perceived risks, benefits and acceptability. Congruent with the narrative and Q findings, trust in the the local operation of the station appears for many to be a critical factor in their confidence, while distrust in Government and the nuclear industry is associated with underlying concern in others.

One implication here is that if people consider that future plans for local development of nuclear power (if they ever do arise) are not delivering on the outstanding issues that concern them, or if there is a major nuclear accident anywhere over the ensuing 5-10 years, then local confidence and trust could be lost and a very concerted level of opposition might quickly arise.

As a final comment on the research, and regardless of their opinion on nuclear power, it was clear from our survey that *the majority of local people want to be fully involved in any siting decisions about new nuclear power stations locally*, a finding that we view as particularly important in the context of current policy on nuclear energy. Failing to consult in a proper manner, or in a way that does not to fully recognise and respond to a local population's ambivalences and concerns, would almost certainly serve also to undermine local confidence, something which has clearly been painstakingly built up in all locations studied over a considerable period of time.

## 6.2 Implications for future research

The research has highlighted several issues for further inquiry. In particular:

- We have collected a rich range of baseline data at three sites, at least one of which (Hinkley Point) is now involved in proposals by the energy generators for new nuclear power stations. Accordingly, in-depth follow up research to see how views in these locations evolve over time would be very valuable.
- Our findings indicate that there might exist, in the particular case of nuclear energy, a *qualitative asymmetry* between trust and distrust, and that in theoretical terms we may need to revisit the notion of trust and distrust in risk management as *separate* constructs, rather than being at the opposite end of any single 'trust' continuum. Further research on this theoretical issue is also warranted.
- As noted above, the patterns of results were broadly similar in both Oldbury and Bradwell (interviews and Q) and Oldbury and Hinkley (survey), and further research with other nuclear communities in Britain living in similar circumstances might be desirable to investigate the further transferability of our findings.
- There are some indications from the survey analysis that age might be a factor in beliefs about nuclear power in such communities (with younger people, in the 18-35 age bracket, voicing more opposition compared to older residents). We note that it was difficult to engage large numbers of younger people in the research using the present recruitment methods and as a result the sample of younger participants is relatively restricted. Clearly, further research on the beliefs and attitudes of younger compared with older populations is warranted at such locations.
- Finally, across the three empirical phases of the project, we have generated findings relating, specifically, to the significance of the power station's 'place' in the local geographic and social fabric. In the narrative interviews, the power station's proximity was not seen as presenting a unique risk, and thus risk becomes attenuated. The perception of local benefits from the power station, and seeing it as 'just part of the landscape, were items defining two of the Q sorts ('beneficial and safe' and 'there's no point worrying', respectively). And in the survey, seeing the power station as part of the local place, and as contributing to local identity, was a factor significantly predicting support for new build. These findings are novel and, as such, require further detailed research in relation to proximity (spatial and psychological) to socio-technical hazards (nuclear and non-nuclear).

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## **7.2 (4.6) Appendix 1: Table 2: Highest and lowest ranked statements for the Q factors**

|                                    | Position | Nuclear safety via social trust  | Threat, distrust and social mobilisation  | Reluctant acceptance of nuclear power  | 'There's no point worrying'  |
|------------------------------------|----------|--|---|--|--|
| <b>Most like my point of view</b>  | +5       | I'd rather live close to a nuclear power station than a coal fired one, or a factory billowing out toxic fumes   | We need to move towards using renewable energy sources as soon as possible  | Nuclear power has drawbacks but at the end of the day it will be necessary if we want to have a secure energy supply – we can't rely on imported gas and oil | There's no point worrying about the risks, otherwise you'll spend your whole life worrying   |
|                                    | +5       | I'm confident that this nuclear power station is safe  | There are far less risky ways of generating electricity than nuclear  | I don't like the idea of nuclear power but I reluctantly have to admit that we may need it if we are to have any chance of combating climate change          | I've never given the power station a thought – it's just part of the landscape   |
|                                    | +5       | Nuclear power has drawbacks but at the end of the day it will be necessary if we want to have a secure energy supply – we can't rely on imported gas and oil | If they tried to put a permanent radioactive waste store on the power station site, I for one would do whatever I could to stop them  | I don't really want nuclear power here, but these things have got to go somewhere  | According to the news, everything is going to give you cancer, so I don't let it worry me  |
|                                    | +4       | Nuclear power is one of the best forms of electricity generation. The country needs it and will have to build more nuclear power stations                    | I don't like the idea of radioactive waste being stored on the power station site after decommissioning   | Nuclear power is one of the cleanest ways of producing energy  | Any little incident is blown out of proportion by the media and treated as a major nuclear catastrophe   |
|                                    | +4       | Nuclear power is one of the cleanest ways of producing energy  | When you get a study that shows there's more cancer here than there should be, they just say it's a 'statistical blip'. You get the feeling they are trying to hide something | I don't like the idea of radioactive waste being stored on the power station site after decommissioning  | Nuclear power is one of the cleanest ways of producing energy  |
|                                    | +4       | The power station has been a great asset to the community over the years   | The nuclear industry doesn't really consult – they go through the motions but the important decisions have already been made  | There's no point worrying about the risks, otherwise you'll spend your whole life worrying   | There's nothing to stop terrorists crashing a plane into the power station and causing a major disaster  |
|                                    | +4       | People are only worried about nuclear power because they don't understand it   | The nuclear industry tries to brainwash people into thinking that nuclear power is safe and acceptable  | If there was a major incident at the power station, it would affect me wherever I lived  | People are only worried about nuclear power because they don't understand it   |
| <b>Least like my point of view</b> | -4       | The nuclear industry tries to brainwash people into thinking that nuclear power is safe and acceptable   | Nuclear power is one of the cleanest ways of producing energy   | Because of the power station, this will be a polluted, hazardous place forever   | If they tried to put a permanent radioactive waste store on the power station site, I for one would do whatever I could to stop them   |
|                                    | -4       | I worry something will go wrong because of people cutting corners or making mistakes   | I find the power station quite comforting rather than a threat  | I would welcome a new nuclear power station being built here   | If there was a problem, there is a very good, fail-safe system. The power station would just cut out, like pulling a plug out of the wall. It would just shut down, and that would be that |
|                                    | -4       | A lot of people are unhappy about the power station but they don't do anything about it. Only a few of us are willing to stand up and be counted             | The nuclear industry is open and honest   | The power station has provided good jobs for the area - without it, this place would have ceased to exist  | We can trust the industry to come forward and tell the truth about any discharges and incidents  |
|                                    | -4       | There's just something about nuclear power that makes me feel uneasy   | I'm confident that this nuclear power station is safe   | The Chernobyl accident focused my mind on the fact that I was living with that potential danger  | I am reminded of the potential risks of the power station only when I see it, or when someone nearby has got cancer  |
|                                    | -5       | The power station is a terrible eyesore  | We can trust the industry to come forward and tell the truth about any discharges and incidents   | I find the power station quite comforting rather than a threat   | Because of the power station, this will be a polluted, hazardous place forever   |
|                                    | -5       | There are lots of cancer risks associated with the power station   | Nuclear power is one of the best forms of electricity generation. The country needs it and will have to build more nuclear power stations                                     | The presence of the power station is just another example of this area being picked on   | There are lots of cancer risks associated with the power station   |
|                                    | -5       | Because of the power station, this will be a polluted, hazardous place forever   | I would welcome a new nuclear power station being built here  | A lot of people are unhappy about the power station but they don't do anything about it. Only a few of us are willing to stand up and be counted             | The Chernobyl accident focused my mind on the fact that I was living with that potential danger  |

## **7.3 Appendix 2: Tables from Survey Section<sup>9</sup>**

### **(5.3.4) General environmental concern**

*Question: "How concerned are you, if at all, about the following issues?"*

*Table 6: Nuclear power*

|                                   | <b>Not at all concerned (%)</b> | <b>Not very concerned (%)</b> | <b>Fairly concerned (%)</b> | <b>Very concerned (%)</b> |
|-----------------------------------|---------------------------------|-------------------------------|-----------------------------|---------------------------|
| <b>2005 National GB</b>           | 11                              | 27                            | 31                          | 28                        |
| <b>2008 Oldbury/Hinkley Point</b> | 22                              | 37                            | 27                          | 14                        |

*Table 7: Radioactive waste*

|                                   | <b>Not at all concerned (%)</b> | <b>Not very concerned (%)</b> | <b>Fairly concerned (%)</b> | <b>Very concerned (%)</b> |
|-----------------------------------|---------------------------------|-------------------------------|-----------------------------|---------------------------|
| <b>2005 National GB</b>           | 3                               | 14                            | 30                          | 50                        |
| <b>2008 Oldbury/Hinkley Point</b> | 6                               | 17                            | 35                          | 42                        |

*Table 8: Climate change*

|                                   | <b>Not at all concerned (%)</b> | <b>Not very concerned (%)</b> | <b>Fairly concerned (%)</b> | <b>Very concerned (%)</b> |
|-----------------------------------|---------------------------------|-------------------------------|-----------------------------|---------------------------|
| <b>2005 National GB</b>           | 3                               | 12                            | 38                          | 44                        |
| <b>2008 Oldbury/Hinkley Point</b> | 4                               | 16                            | 49                          | 31                        |

### **(5.3.5) Energy policy attitudes**

*Table 9: Question: "I am willing to accept the building of new nuclear power stations if it would help to tackle climate change"*

|                                   | <b>Strongly Disagree (%)</b> | <b>Tend to Disagree (%)</b> | <b>Neither Agree nor Disagree (%)</b> | <b>Tend to Agree (%)</b> | <b>Strongly Agree (%)</b> |
|-----------------------------------|------------------------------|-----------------------------|---------------------------------------|--------------------------|---------------------------|
| <b>2005 National GB</b>           | 9                            | 16                          | 16                                    | 44                       | 9                         |
| <b>2008 Oldbury/Hinkley Point</b> | 4                            | 6                           | 14                                    | 49                       | 27                        |

<sup>9</sup> All 2005 National Survey figures do not total 100% as we have not reported the "Don't Know" category.

Table 10: Question: “Promoting renewable energy sources, such as solar and wind power, is a better way of tackling climate change than nuclear power”

|                            | Strongly Disagree (%) | Tend to Disagree (%) | Neither Agree nor Disagree (%) | Tend to Agree (%) | Strongly Agree (%) |
|----------------------------|-----------------------|----------------------|--------------------------------|-------------------|--------------------|
| 2005 National GB           | 1                     | 5                    | 10                             | 37                | 41                 |
| 2008 Oldbury/Hinkley Point | 9                     | 23                   | 24                             | 23                | 21                 |

Table 11: Question: “Britain needs a mix of energy sources to ensure a reliable supply of electricity, including nuclear power and renewable energy sources”

|                            | Strongly Disagree (%) | Tend to Disagree (%) | Neither Agree nor Disagree (%) | Tend to Agree (%) | Strongly Agree (%) |
|----------------------------|-----------------------|----------------------|--------------------------------|-------------------|--------------------|
| 2005 National GB           | 3                     | 10                   | 18                             | 47                | 18                 |
| 2008 Oldbury/Hinkley Point | 2                     | 6                    | 10                             | 47                | 35                 |

Table 12: Question: “It doesn’t matter what we think about nuclear power. Nuclear power stations will be built anyway”

|                            | Strongly Disagree (%) | Tend to Disagree (%) | Neither Agree nor Disagree (%) | Tend to Agree (%) | Strongly Agree (%) |
|----------------------------|-----------------------|----------------------|--------------------------------|-------------------|--------------------|
| 2005 National GB           | 3                     | 14                   | 14                             | 50                | 12                 |
| 2008 Oldbury/Hinkley Point | 2                     | 9                    | 16                             | 52                | 21                 |

### (5.3.6) Judgements of risks and benefits

Table 13: Question: “There are risks from having nuclear power stations in the UK”

|                            | Strongly Disagree (%) | Tend to Disagree (%) | Neither Agree nor Disagree (%) | Tend to Agree (%) | Strongly Agree (%) |
|----------------------------|-----------------------|----------------------|--------------------------------|-------------------|--------------------|
| 2005 National GB           | 1                     | 8                    | 14                             | 48                | 24                 |
| 2008 Oldbury/Hinkley Point | 5                     | 12                   | 14                             | 51                | 18                 |

Table 14: Question: "There are benefits from having nuclear power stations in the UK"

|                            | Strongly Disagree (%) | Tend to Disagree (%) | Neither Agree nor Disagree (%) | Tend to Agree (%) | Strongly Agree (%) |
|----------------------------|-----------------------|----------------------|--------------------------------|-------------------|--------------------|
| 2005 National GB           | 7                     | 12                   | 25                             | 40                | 9                  |
| 2008 Oldbury/Hinkley Point | 3                     | 6                    | 11                             | 53                | 27                 |

Table 15: Question: "How would assess the benefits and risks of nuclear power in general?" (%)

|                            | The benefits of nuclear power far outweigh the risks (%) | The benefits of nuclear power slightly outweigh the risks (%) | The benefits and risks of nuclear power are about the same (%) | The risks of nuclear power slightly outweigh the benefits (%) | The risks of nuclear power far outweigh the benefits (%) |
|----------------------------|--|---|--|---|--|
| 2005 National GB           | 13   | 19  | 20   | 16  | 25   |
| 2008 Oldbury/Hinkley Point | 41   | 21  | 20   | 9   | 9  |

### (5.3.7) New Build

Question: Please indicate the extent to which you would support or oppose the following:

Table 16: The building of new nuclear power stations in the UK

|                            | Strongly Oppose (%) | Tend to Oppose (%) | Neither Support nor Oppose (%) | Tend to Support (%) | Strongly Support (%) |
|----------------------------|---------------------|--------------------|--------------------------------|---------------------|----------------------|
| 2005 National GB           | 22                  | 20                 | 21                             | 23                  | 11                   |
| 2008 Oldbury/Hinkley Point | 9                   | 12                 | 21                             | 34                  | 24                   |

Table 17: The building of a new nuclear power station at Oldbury/Hinkley Point vs. 'In the UK'

|                       | Strongly Oppose (%) | Tend to Oppose (%) | Neither Support nor Oppose (%) | Tend to Support (%) | Strongly Support (%) |
|-----------------------|---------------------|--------------------|--------------------------------|---------------------|----------------------|
| Oldbury/Hinkley Point | 14                  | 13                 | 18                             | 33                  | 22                   |
| In the UK             | 9                   | 12                 | 21                             | 34                  | 24                   |

### (5.3.8) Q Perspectives

Table 18: Mean trust scores by Q-perspective and institution

| Institution           | Q-perspective        |                     |                     |                             | Sig        |
|-----------------------|----------------------|---------------------|---------------------|-----------------------------|------------|
|                       | Reluctant Acceptance | Beneficial and Safe | Threat and Distrust | 'There's no Point Worrying' |            |
| Government            | 2.98                 | 3.52                | 2.35                | 3.07                        | $p < .001$ |
| Nuclear Industry      | 3.23                 | 3.90                | 2.51                | 3.39                        | $p < .001$ |
| Local Plant Operators | 3.45                 | 4.05                | 2.78                | 3.58                        | $p < .001$ |
| <b>Sig</b>            | $p < .001$           | $p < .001$          | $p < .001$          | $p < .001$                  |            |

(Higher score=more trust, the midpoint on the scale=3)

Table 19: Mean acceptability (risks vs. benefits of nuclear power stations in the UK) scores by Q-perspective (Point of view)

| Point of View               | Mean Score |
|-----------------------------|------------|
| Reluctant Acceptance        | 2.25       |
| Beneficial and Safe         | 1.46       |
| Threat and Distrust         | 3.92       |
| 'There's No Point Worrying' | 2.08       |
| <b>Sig.</b>                 | $p < .001$ |

Higher score=risks increasingly outweigh benefits

Midpoint on scale (the point at which benefits and risks are judged equal) = 3.00

### (5.3.11) Predictors of support for local new build

Table 20: Predictors of support for new build locally

| Variable                         | Beta coefficient (standardised) | S.E. of Beta | Sig.       |
|----------------------------------|---------------------------------|--------------|------------|
| Place attachment (Power station) | .429                            | .007         | $p < .001$ |
| Trust in Nuclear Industry        | .301                            | .003         | $p < .001$ |
| Perceived local benefits         | .078                            | .030         | $p < .001$ |
| Female gender                    | -.093                           | .051         | $p < .001$ |
| Concern about climate change     | -.090                           | .033         | $p < .001$ |
| Perceived local risks            | -.053                           | .026         | $p < .03$  |

Model:  $r^2=.625$ ; Adjusted  $r^2=.623$ ;  $df=1057$ ;  $f=292.637$ ;  $p < .001$

### (5.3.12) Involvement in siting decisions

Table 21: Question: "The Government and nuclear industry should fully involve local people in any decisions about siting a new nuclear power station here"

|                                     | <b>Strongly Disagree (%)</b> | <b>Tend to Disagree (%)</b> | <b>Neither Agree nor Disagree (%)</b> | <b>Tend to Agree (%)</b> | <b>Strongly Agree (%)</b> |
|-------------------------------------|------------------------------|-----------------------------|---------------------------------------|--------------------------|---------------------------|
| <b>2005 National GB (not asked)</b> | -                            | -                           | -                                     | -                        | -                         |
| <b>2008 Oldbury/Hinkley Point</b>   | 1                            | 4                           | 11                                    | 40                       | 44                        |

### **Appendix 3: Additional tables from the survey**

**2008 Oldbury/Hinkley Point Survey: Comparisons of local people's risk/benefit judgements about Nuclear Power locally ('At Oldbury'/At Hinkley Point') vs. generally ('In the UK')**

*Table 22: Perceived risks: 'There are risks...'*

|   | Strongly Disagree (%) | Tend to Disagree (%) | Neither Agree nor Disagree (%) | Tend to Agree (%) | Strongly Agree (%) |
|---|-----------------------|----------------------|--------------------------------|-------------------|--------------------|
| 'From having nuclear power stations in the UK'                            | 5                     | 12                   | 14                             | 51                | 18                 |
| 'To local people from the nuclear power station at Oldbury/Hinkley Point' | 11                    | 24                   | 17                             | 38                | 10                 |

*Table 23: Perceived benefits: 'There are benefits...'*

|   | Strongly Disagree (%) | Tend to Disagree (%) | Neither Agree nor Disagree (%) | Tend to Agree (%) | Strongly Agree (%) |
|---|-----------------------|----------------------|--------------------------------|-------------------|--------------------|
| 'From having nuclear power stations in the UK'                            | 3                     | 6                    | 11                             | 53                | 27                 |
| 'To local people from the nuclear power station at Oldbury/Hinkley Point' | 4                     | 8                    | 15                             | 50                | 23                 |

*Table 24: Risk/Benefit judgements (acceptability): Question: 'How would you assess the benefits and risks of...?'*

|   | The benefits far outweigh the risks (%) | The benefits slightly outweigh the risks (%) | The benefits and risks are about the same (%) | The risks slightly outweigh the benefits (%) | The risks far outweigh the benefits (%) |
|---|---|--|---|--|---|
| Nuclear power stations in the UK            | 41                                      | 21   | 20  | 9  | 9                                       |
| Oldbury/Hinkley Point nuclear power station | 39                                      | 19   | 21  | 11   | 11                                      |