

Public Opinion and Nuclear Power - A West Cumbrian Case Study

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University of Liverpool for the degree of Doctor in Philosophy by
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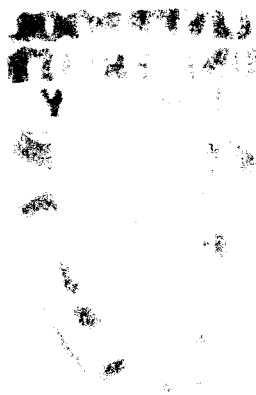
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Abstract

This work investigates the factors which might influence public opinion regarding the nuclear power industry, and the accuracy of existing theories about that opinion. West Cumbrian opinion is of particular interest, because the area has the highest concentration of the nuclear power industry in the UK, and might thereby represent a potentially 'nuclear-friendly' area which would contrast with the increasing scepticism reported in the rest of the country, and indeed across much of the industrialised world.

The factors which may influence public opinion are analyzed in three ways. Firstly, historical factors are presented in an account of the development of the nuclear power industry. Next, the socio-economic situation and traditions of West Cumbria are examined, in order to assess particular local influences on public opinion. Thirdly, the public relations methods of important local and national groups are examined in the light of public relations theories, in order to assess the ability of such groups to influence public opinion (a new avenue of research related to nuclear power).

In order to discover the state of West Cumbrian opinion in 1994, and to assess the impact of the above factors upon that opinion, a survey was conducted using a representative sample of the population of Cockermouth, chosen as a typical Cumbrian town. The scope of questions employed in previous studies was broadened to analyze attitudes towards anti-nuclear groups as well as towards the industry. Great attention was paid to the methodology of the new survey, the findings of which were analyzed in the light of a comparative analysis of existing research and theories related to West Cumbrian opinion. Local opinion was contrasted with that of a national 'public' consisting of political, environmental and energy orientated organizations.

This study confirmed some previously held ideas about public opinion, but also found several differences which suggest flaws in the methodology of previous research. One very important finding was that it is important not to overstate the existence of controversy surrounding the nuclear industry in West Cumbria. Overall, the West Cumbrian population appeared to be relatively nuclear friendly, but not as strongly pro-nuclear as might have been thought. A surprisingly large number of people displayed a lack of knowledge about the subject, and

many showed feelings of apathy and alienation. Nuclear power and coal were found to be controversial choices of fuel supply. Wind power received more support and less opposition. Environmental groups were seen to perform a watchdog role, for which they were welcomed in West Cumbria by more people than supported the presence of either BNFL or NIREX. Levels of political activity amongst local people were low.

The particular socio-economic situation in West Cumbria appeared to have had an impact upon local opinion. Support extended to the local industry, and to BNFL in particular, far more than it did to the nuclear industry in general. The insular aspect of West Cumbrian culture has affected attitudes towards those groups perceived as 'outsiders', including the national media and environmental groups. It has also affected attitudes to the industry where public relations campaigns have been targeted at a national rather than a specifically West Cumbrian audience.

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Paul Wainwright (October 1995)

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List of Abbreviations

AGR	Advanced Gas-cooled Reactor
ALARA	As Low As Reasonably Achievable
ANC	Anti-Nuclear Campaign
ASLEF	Association of Locomotive Engineers and Firemen
BGS	British Geological Survey
BNFL	British Nuclear Fuels plc.
BP	British Petroleum
BPEO	Best Practicable Environmental Option
BT	British Telecom
BUAV	British Union for the Abolition of Vivisection
BWR	Boiling Water Reactor
CEGB	Central Electricity Generating Board
CMI	Cumbria Marketing Initiative
CND	Campaign for Nuclear Disarmament
CORE	Cumbrians Opposed to a Radioactive Environment
CPRE	Council for the Protection of Rural England
DFR	Dounreay Fast Reactor
DoE	Department of the Environment
DSIR	Department of Scientific and Industrial Research
EC	European Communities
EDF	Electricité de France
ENEA	European Nuclear Energy Agency
EU	European Union
FBR	Fast Breeder Reactor
FoE	Friends of the Earth
GMBU	General, Municipal and Boilermakers Union
HLW	High Level Waste
HMIP	Her Majesty's Inspectorate of Pollution
HSE	Health and Safety Inspectorate
HTGR	High Temperature Gas-cooled Reactor
HWR	Heavy Water Reactor
IAEA	International Atomic Energy Authority

ICBM	Inter-Continental Ballistic Missile
ICI	Imperial Chemical Industries
ICRP	International Commission on Radiological Protection
IGS	Institute of Geological Sciences
ILW	Intermediate Level Waste
ITC	Independent Television Commission
LLW	Low Level Waste
MAFF	Ministry of Agriculture, Fisheries and Food
MAGNOX	Magnesium oxide
MPH	Miles Per Hour
MOD	Ministry of Defence
MOX	Mixed oxide
NIABY	Not In Anybody's Back Yard
NII	Nuclear Installations Inspectorate
NIMBY	Not In My Back Yard
NIREX	Nuclear Industry Radioactive Waste Executive
NNC	National Nuclear Corporation
NPT	Non-Proliferation Treaty
NRPB	National Radiological Protection Board
NUM	National Union of Mineworkers
NUS	National Union of Seamen
PCM	Plutonium Contaminated Material
PFR	Prototype Fast Reactor
PPI	Paternal Pre-conceptual Irradiation
PR	Public Relations
PWR	Pressurised Water Reactor
RAF	Royal Air Force
RCF	Rock Characterisation Facility
RDG	Rural Development Grant
RSA	Regional Selective Assistance
RWMAC	Radioactive Waste Management Advisory Committee
SALT	Strategic Arms Limitation Treaties
SCRAM	Scottish Campaign to Resist the Atomic Menace
SDO	Special Development Order

SDP	Social Democratic Party
SGHWR	Steam Generating Heavy Water Reactor
SIXEP	Site Ion Exchange Plant
SSEB	South of Scotland Electricity Board
START	Strategic Arms Reduction Treaty
SVC	Sellafield Visitors Centre
TCPA	Town and Country Planning Association
TUC	Trades Union Congress
TGWU	Transport and General Workers Union
THORP	Thermal Oxide Reprocessing Plant
UKAEA	United Kingdom Atomic Energy Authority
UN	United Nations
VPEF	Vitrification Plant Export Facility
WCDA	West Cumbria Development Agency
WCDF	West Cumbria Development Fund
WCI	West Cumbria Initiative

Preface

The British nuclear industry neglected public relations for many years. The tense international situation of the Cold War demanded secrecy, there was a lack of domestic political stimuli which might have forced greater consideration of popular attitudes, and perhaps there was also a touch of arrogance on the part of the industry. Such a lack of concern for public opinion was perhaps less than prudent, for when flaws began to be seen in both the industry's economic prospects and more importantly, in its safety record, popular concern and opposition to the industry grew. This concern proved hard to dispel for several reasons, not least the failure of the nuclear industry to have already created a solid, trustworthy public image which would stand up to criticism when problems eventually arose. The majority of the general public had no personal experience of the nuclear industry upon which to make their own judgments, and had not been given any detailed information from the industry itself. They merely heard an increasing number of stories of accidents involving radioactivity, a mysterious phenomenon which can be neither seen, touched, heard, smelled nor tasted. More importantly, many stories linked radioactivity with one of the twentieth century's *bêtes noires*, cancer. When public concern became more vigorous as the list of nuclear near-disasters lengthened, it actually began to delay the development of Britain's nuclear programme. It then became apparent that more co-operation from the public was needed, and that better public relations would be required, with a successful public information campaign to win back the political legitimacy lost as a result of anti-nuclear campaigns by groups such as Greenpeace and Friends of the Earth.

In the early 1990s, West Cumbria appeared to be one area in which that public information battle was being won by the nuclear industry. The local authorities there had accepted the opening of a new reprocessing plant called THORP, and work on a scheme to site a radioactive waste repository there also appeared to be proceeding without significant local protest. Although in the early 1980s it had been observed that 'the image portrayed in much media coverage had been one of local [West Cumbrian] unrest towards BNFL and a great deal of local anxiety about health risks' (Macgill & Phipps 1987, 220), by the late 1980s and early 1990s, media depictions of West Cumbrian attitudes had altered, to include the notion of a local populace which was

strongly in favour of the industry's presence for economic reasons. This case study will endeavour to examine whether this latter view truly was the case.

After an introduction into the scientific principles behind the industry, this study begins with an outline of the development of the British nuclear power industry. There have been a great number of books written about the industry, but there do not appear to have been any which provide a simple yet comprehensive and unbiased outline of the chronological development of the British experience. The existing literature repeatedly appears to fall into one of several traps. Often it is highly polemical, tending to over-emphasize the description of certain events which support the author's pro-nuclear or anti-nuclear argument, and to play down or ignore those which contradict the author. Some authors attempt a more balanced view but do so by looking at certain current 'issues' and outlining the pro-nuclear and anti-nuclear arguments around those issues, rather than by providing a chronological account of the industry's development, with the result that the reader is given no historical context, and is left with little sense of how and why these issues arose, making it difficult to judge whether the pro-nuclear or anti-nuclear arguments are the more valid. An additional problem is found in many of these works in that they focus upon one aspect of nuclear power alone, such as waste disposal or the choice of reactor design for electricity production. It is hard to comprehend the overall picture, and the place into which public attitudes fit, from these partial descriptions. Another type of work is provided by academic historians of the nuclear industry. Although these portray the development of the industry in a chronological and non-polemical fashion, their major flaw is that the accounts they provide are very detailed, often written from a scientific rather than a political perspective, and include many technical terms which make them more than a little inaccessible to the reader who is new to the subject of nuclear power. The aim of the first part of this research is to synthesise the information available from all of these different sources of information, and to provide a chronological account which is factual, comprehensive, clear and unbiased and which will therefore provide the best possible context into which to place the subsequent research into popular attitudes to nuclear power. This aspect of the study can also improve upon existing work simply by being the most recent piece of research, and therefore the only one which can chart the development of the nuclear industry up to 1995.

The next major way in which this work can improve upon existing studies is by improving the methodology employed in researching popular attitudes. Several studies have already been made into public opinion about nuclear power in West Cumbria, using both quantitative and qualitative methods of research. These studies suffer from several flaws which raise doubts about how accurately they represent the real views and attitudes of the West Cumbrian population. By giving careful thought to research procedure, this research tries to advance the body of knowledge on this subject by providing a more methodologically sound study. Some existing studies have also been overtaken by the passage of time. For example, since most of these studies were carried out, construction of THORP has been completed and the local populace have been exposed to countervailing arguments about whether the plant should be allowed to open, which have brought into question many aspects of the whole nuclear power industry. This exposure of the West Cumbrian public to arguments from both the pro-nuclear lobby and its opponents (possibly to a greater degree than they had ever experienced before), may have had the effect of altering previously held attitudes.

One new technique used in this work was the inclusion of montages of newspaper cuttings from 1993 and 1994, which have been inserted throughout this document. The cuttings are predominantly from the West Cumbrian press. Their inclusion will give the reader an insight into the media coverage to which the local public have been exposed during the year preceding this research, and perhaps give a taste of the political-cultural atmosphere in which the research took place.

Another innovation was the broadening of the scope of the study of popular attitudes by examining the resources available to certain groups which might seek to alter local opinion, and investigating the communication techniques which they employed in the light of communications theory. These groups' opinions were contrasted with those of local people, in order to assess how successful these groups' communications had been. Previous research had only examined what local attitudes were, and had not investigated the effect of public information campaigns upon local opinion.

The researcher was born in Carlisle and has lived in West Cumbria virtually all his life, attending schools in Maryport, Workington and Cockermouth. He is not a member of

any environmental organization, and has no direct personal links with the nuclear industry. This research grew out of a desire to learn more about one of the most controversial issues to be found in his home county, and a belief that both the narrative accounts of the development of the nuclear industry, and existing research carried out into the opinions of people in West Cumbria, could be developed and improved.

Chapter One

Introduction

1.1 Introduction

In order to understand the debate about the development of nuclear power and its effects on public opinion, it is important to understand some of the fundamental concepts which are involved. This chapter shall provide a brief overview of some of the themes and technical terms which are central to this study. It begins with a brief overview of the role of nuclear power in modern society, before outlining the scientific principles of nuclear physics upon which the whole industry is based, the effect of radiation upon human health, the variations between different reactor types, and how spent fuel is dealt with in the UK.

1.2 The role of nuclear power

It is now over two hundred and fifty years since Thomas Newcomen invented the first commercially-successful steam engine. Since that time, the spread of industrialisation has seen a huge increase in the number of ever-more sophisticated machines providing consumer goods and services for an ever expanding world population. To maintain and improve modern standards of living, supplying all these machines with power has required ever-increasing levels of concentrated energy. Together with land, labour and capital, energy supply could now be seen to be one of the four main factors of production in modern society.

As the twentieth century draws to a close, questions are being asked about the fuel resources for the future, because many existing fuel sources are now thought to be in danger of exhaustion. Oil resources are expected to be exhausted in forty-five years, natural gas in sixty-five years, and coal in two hundred and thirty years (Figures from BP energy review 1993, cited in BNFL, 1994). Concerns also exist about the environmental effect of the burning of fossil fuels to produce electricity, and in particular about the effect of carbon dioxide emissions upon global warming.

Renewable sources of energy, such as solar power and wind power, are not yet developed on a large enough scale to replace fossil fuels (King 1990, 13), and some, such as tidal barrages, entail other kinds of environmental damage themselves. As a result, in many people's eyes, the only option which is certain to be viable in the future is nuclear power. Nuclear power is seen to offer a fuel supply which is secure in the long term. This is because it is possible to recycle (*reprocess*) spent fuel and it may also be possible to provide an almost inexhaustible fuel supply through the use of *breeder reactors* (see below). In addition, nuclear power does not entail the release of 'greenhouse gases', and does not directly contribute to

'acid rain'. At present, nuclear power can be a vital element in providing a balanced mix of different energy sources.

1.3 Simple nuclear physics¹

The nucleus of an atom contains *protons* (positively charged) and *neutrons* which have no charge (electrically neutral). Although the positive charges of the protons makes them repel each other, both protons and neutrons are held in place by a *strong force* which holds the nucleus together. Negatively charged *electrons* orbit the nucleus. Some (unstable) elements such as carbon-14 and uranium-135 cannot maintain the balance between protons and neutrons which holds the nucleus in a stable form, and they change (*decay*) to reach a more stable form. To reach a more stable state, atoms must release energy, and this energy release is known as *radiation* (Gowing 1974a, 453).

There are four types of radiation. *Alpha* radiation consists of groups of two protons and two neutrons released from the decaying atom, which remain together as a *particle*, which is relatively large. Alpha particles remove electrons from other atoms to balance the positive charge of the protons, giving up their own energy quickly, but changing the nature of the atoms which they encounter, giving them a positive electrical charge (*ionising* them) by stripping them of their electrons. They can only travel short distances through air before they run out of energy, and will not penetrate human skin or pass through sheets of paper. However, if they are ingested or inhaled they can do great damage to living tissue. *Beta* radiation consists of fast moving electrons, which are far smaller than alpha particles. They are harder to stop than alpha radiation and can penetrate the skin but are stopped by thin sheets of metal. Once inside the body, beta particles do less concentrated damage than alpha particles. *Gamma* radiation does not consist of particles. It takes the form of rays expelling any excess energy from unstable atoms which is left after the discharge of particles. Gamma rays lose their energy less easily than alpha and beta particles and can travel long

¹ This research is concerned primarily with the political dimensions of the development of civil nuclear power. The scientific principles behind nuclear power are mentioned here briefly, but a more complete explanation of the technological / scientific basis of nuclear power would probably be best left to the plethora of purely scientific literature on the subject, eg Pedersen, E. Nuclear Power, Ann Arbor Science, Michigan 1978, and Murray, R. Nuclear Power, Pergamon, Oxford, 1993. For similar reasons, the development of the military uses of nuclear power is charted here only as it affects the civil sphere, leaving literature dealing specifically with the arms race to provide more detail.

distances in the air and require thick layers of metal or concrete to prevent their progress, but cause relatively little damage at any particular point on their route (May 1990, 28-29). *Neutron emission* is another form of radiation which occurs when very heavy unstable atoms split (*nuclear fission*) creating two large fragments (*fission products*) and several free neutrons. Like gamma rays, neutrons can travel far in air, and are very penetrating.

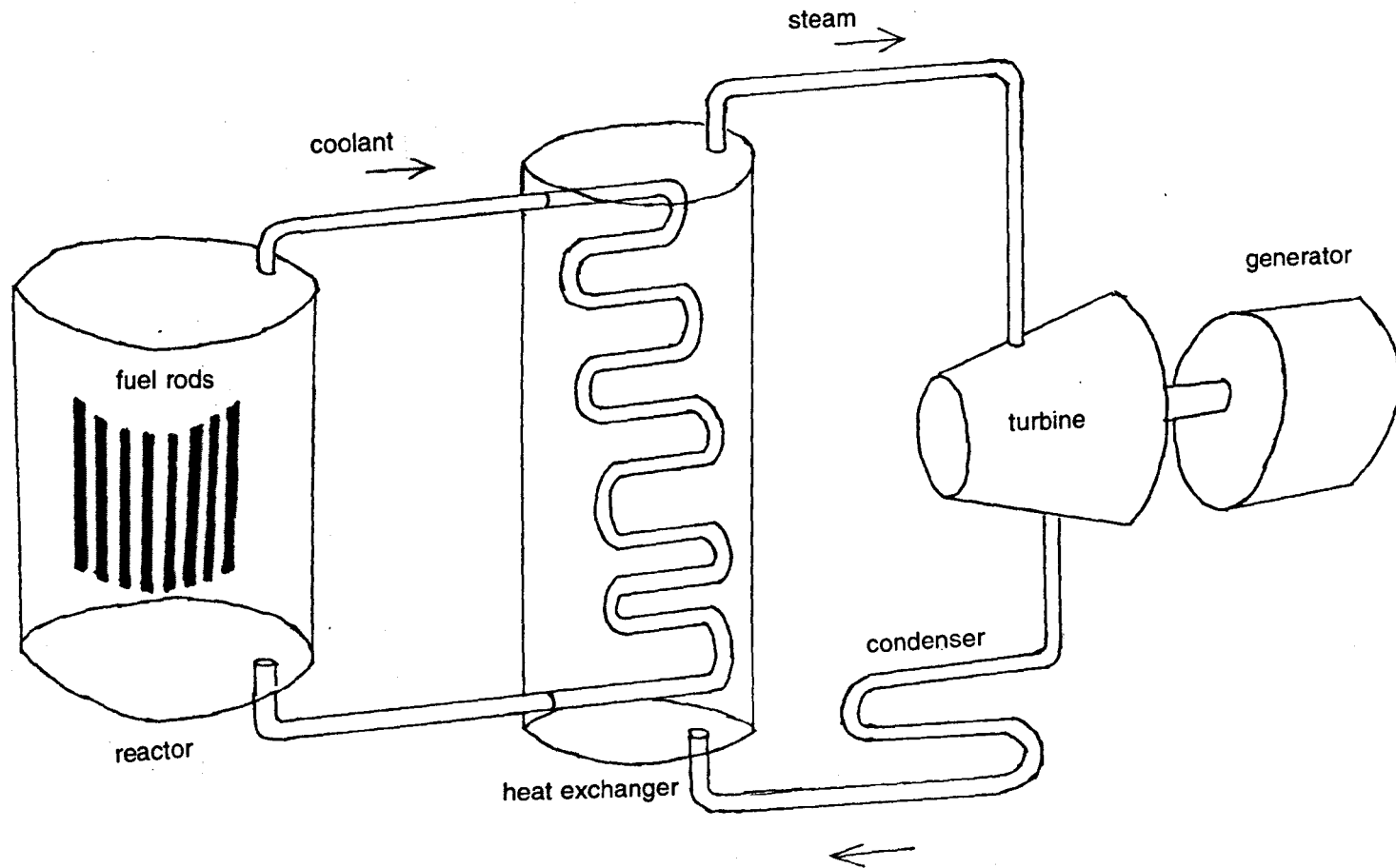
The timing of decay is completely random, but there are average rates at which samples of the same element will decay. *Half-lives* refer to the amount of time it would take half the atoms in a sample of an element to decay to a stable form. For example, it would take 28 years for half the atoms of a sample of strontium-90 to decay to a stable form. Uranium's half life is over four billion years (Gowing 1974a, 454).

1.4 Radiation and health

The passage of alpha, beta, gamma or neutron radiation into the cells of the human body is an influx of energy which can be harmful to living tissue. The effect of ionising radiation upon the atoms of the body can kill cells or can affect cell multiplication and cause cancer. Large doses of radiation can do substantial harm. Vulnerable organs such as the stomach, intestines or reproductive organs can be damaged so badly that cells cannot replace themselves. A breakdown of cell replacement in the gut may be followed by death within a matter of weeks. Extremely high doses of radiation can harm the central nervous system, bringing death within days.

After a low level of exposure to radiation, organs can normally replace damaged cells, but the long term effect of small doses upon living tissue is hard to measure. It is thought that radioactive contamination can cause leukaemia up to five years later, and that it may cause other cancers up to twenty years later. Some effects of radiation manifest themselves in the exposed individual (*somatic effect*), but even one gamma ray can damage the chromosomes of a reproductive cell, which may have an effect on the descendants of the exposed individual (*genetic effect*) if that cell is used in reproduction (Patterson 1983, 232-33). Monitoring the long term effects of exposure to low levels of radiation is a complex and controversial business (May 1990, 34).

Figure 1.1 **A Nuclear Power Station** (Reproduced from Patterson 1976, 40)



1.5 The nuclear reactor

In a nuclear reactor, electricity is generated by inducing nuclear fission. A small amount of neutrons are fed to uranium fuel. When a neutron hits the nucleus of a uranium atom, the atom splits into two major fragments with the release of more free neutrons and large amounts of heat energy. These new neutrons hit the nuclei of other uranium atoms, and a chain reaction thus occurs (BNFL 1994, 4). The two main fragments (fission products) of the split atom are *isotopes*² of other elements such as iodine-131, caesium-137 and strontium-90. Fission products such as strontium-90 are themselves unstable and emit radiation to become more stable. Strontium-90, for example, emits beta particles to become yttrium-90, which emits further beta radiation to become the stable isotope zirconium-90 (Patterson 1976, 29).

The heat energy released in the fission process can be as much as thirteen thousand times more per tonne of fuel than that produced by conventional fuels. The energy is removed from the reactor by a coolant system which (as Figure 1.1 shows) carries the heat energy away from the reactor core to electricity generating turbines, via a system of heat exchangers (HMSO 1981, 6). Different designs of nuclear reactor use different *coolants* such as water, heavy water (an isotope of ordinary water known as deuterium), air, carbon dioxide, sodium and helium.

The reaction must be carefully controlled in several ways. To begin with, the correct amount of neutrons must be introduced, so that each neutron which is lost to excite a fission reaction within the uranium is replaced by exactly one more. This is so that the chain reaction can be sustained (when this sustained chain reaction occurs, the reactor is said to be *critical*). It is also important to control the free neutrons within the reactor. Ordinarily, the neutrons freed in nuclear fission would move too fast to collide with the nuclei of other uranium atoms, and so a *moderator* is needed to slow down the freed neutrons. Moderators include graphite, beryllium, ordinary water, and heavy water. *Control rods* are another vital part of nuclear reactors. These rods are made of materials such as cadmium and boron steel, and they absorb excess neutrons. They are withdrawn from the reactor to speed up the reaction, or inserted to slow it down. When the control rods are fully inserted, the fission process cannot occur because there will be an insufficient supply of free neutrons. A *scram* is a last resort

² Atoms of the same chemical element can have different numbers of neutrons, and these different atoms are known as isotopes of that element (May 1990, 27).

safety measure whereby all the control rods are rapidly inserted fully, thus shutting down the reaction (BNFL 1990, 6).

1.6 Reactor types

There are four main types of design for nuclear reactors. These designs evolved through the different requirements for nuclear power in various nations.

Light water reactors are the most common design in operation in the world today (May 1990, 41). They use enriched³ fuels and were originally designed in the USA. There are two main variations of this design, both of which employ ordinary water as both a coolant and as a moderator. In the boiling-water reactor (BWR) (Figure 1.2) the water coolant circulates through the reactor core, and boils, with the steam turning a turbine and creating electricity (May 1990, 41). In the pressurised water reactor (PWR) (Figure 1.3), the water coolant is kept at a high pressure so it cannot boil, and a secondary water system removes the heat from the coolant, turning to steam and driving the turbine (May 1990, 43). Although the PWR has a more complicated cooling system than the BWR, thus increasing the risk of technical difficulties, the BWR requires a larger reactor vessel, and also has its control rods introduced from below meaning that gravity alone cannot induce a scram of the reactor (May 1990, 43).

The graphite-moderated pressure tube boiling water reactor (RMBK) originated in the Soviet Union, and is a variation on the light water design. It uses low-enriched uranium fuel and, like the BWR, it relies upon the water coolant boiling within the core to generate steam for the turbine, but it has a more complex pressure tube design than the BWR.

Heavy water reactors use heavy water as both a moderator and coolant. It is a better moderator than ordinary water because it slows neutrons more effectively, and it is also more efficient as it is less likely to actually absorb the neutrons, leaving more free neutrons for the fission process (May 1990, 44). Because they are more efficient, heavy water reactors do not need to use enriched uranium. The main design type is the Canadian deuterium uranium reactor (CANDU) (Figure 1.4). A British design, the steam generating heavy water reactor (SGHWR) combined elements of the CANDU reactor with the BWR, using a heavy water

³ Uranium occurs naturally in two isotopes, uranium-235 and uranium-238. Fission occurs more readily with the U235 isotope, but natural uranium is only 0.7% U235, and 99.3% U238. Enriched uranium has its U235 content artificially increased to facilitate more efficient nuclear fission (BNFL 1994, 8; May 1990, 38).

Figure 1.2

Boiling Water Reactor (Reproduced from May 1990, 42)

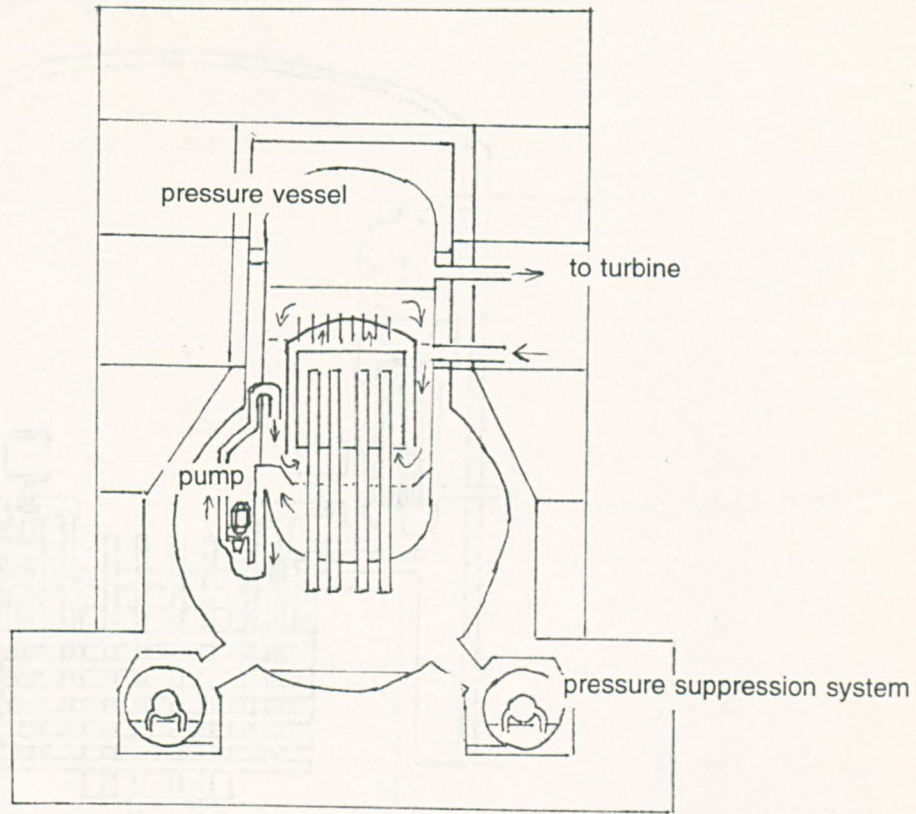


Figure 1.3

Pressurised Water Reactor (Reproduced from May 1990, 42)

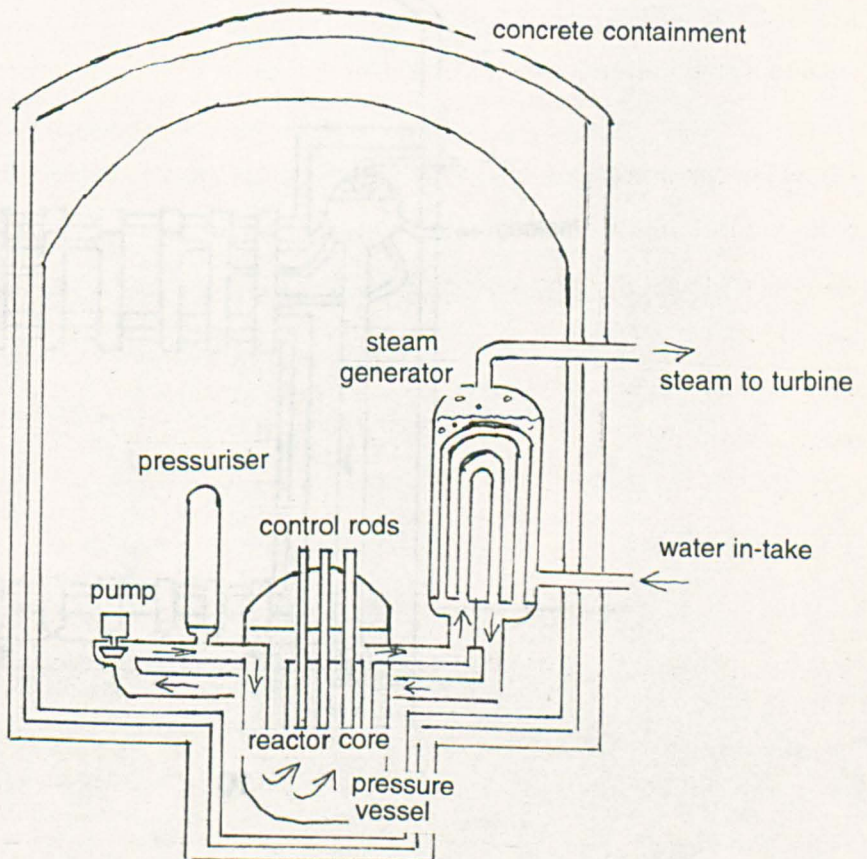


Figure 1.4

CANDU Reactor (Reproduced from Patterson 1976, 71)

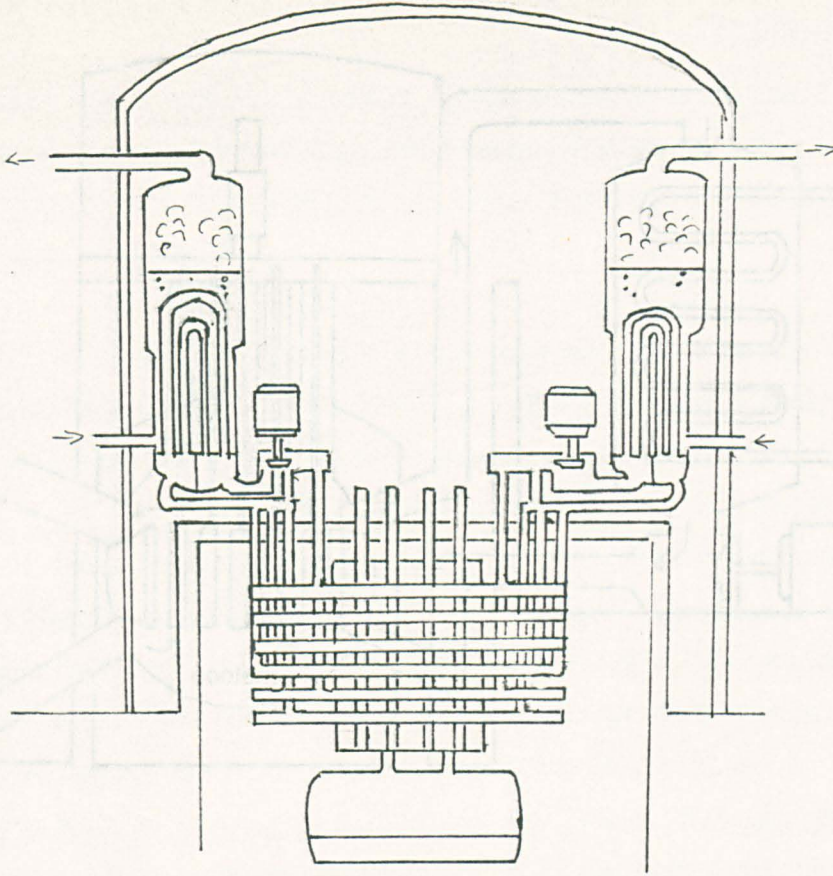


Figure 1.5 Advanced Gas Cooling Reactor (Reproduced from Patterson 1976, 58)

Figure 1.5

Steam Generating Heavy Water Reactor

(Reproduced from Patterson 1976, 74)

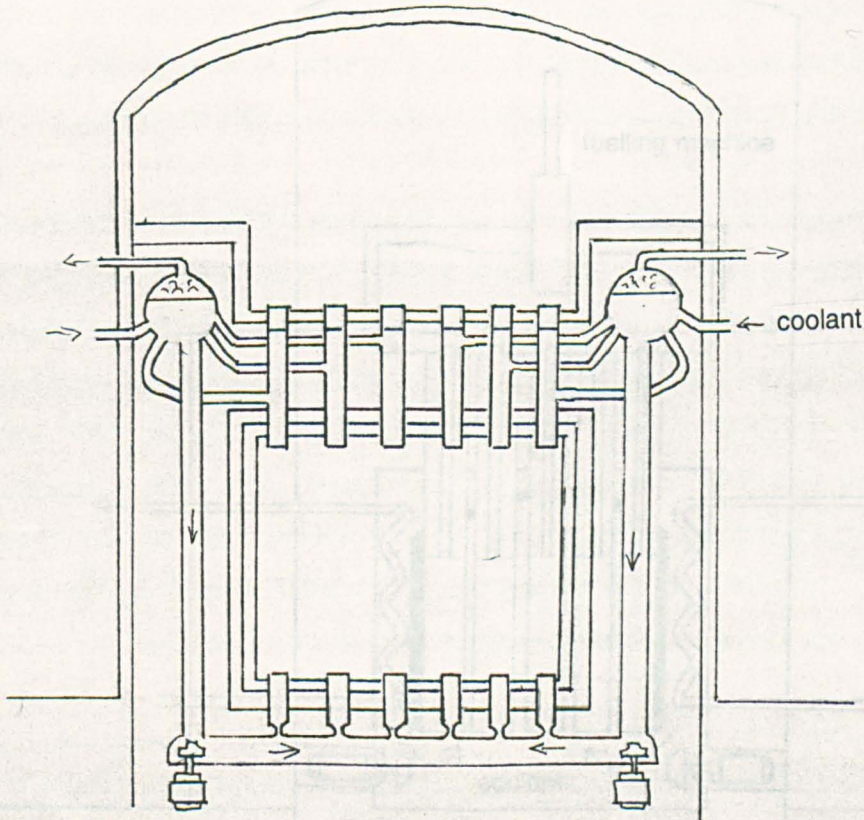


Figure 1.6

MAGNOX Reactor (Reproduced from Patterson 1976, 51)

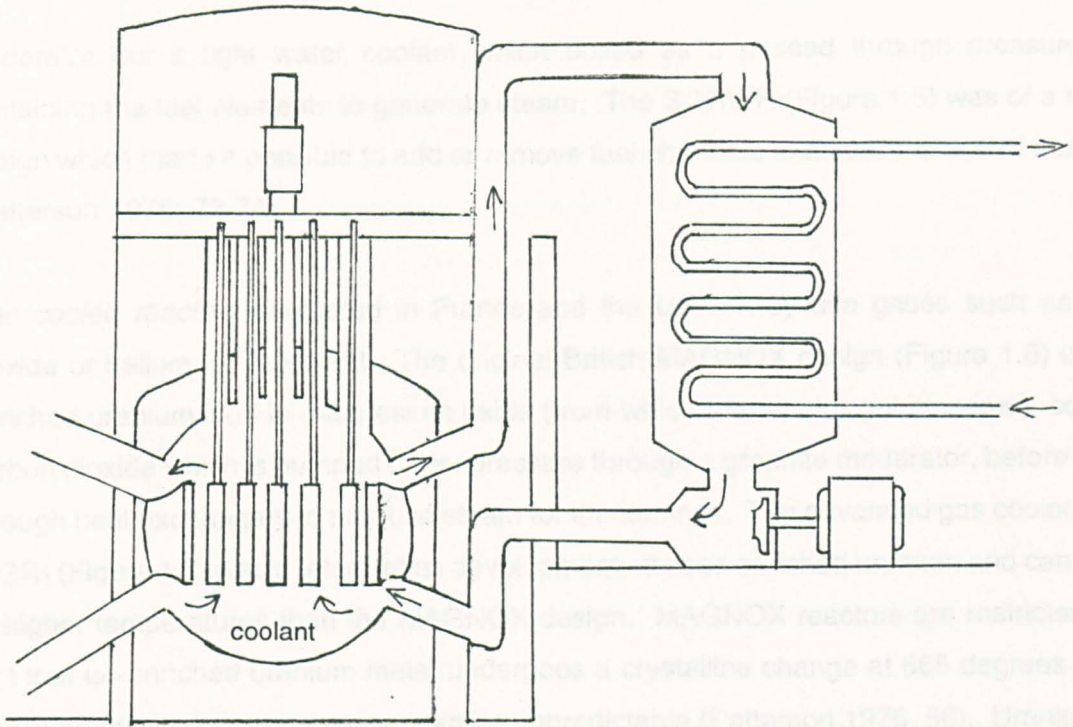
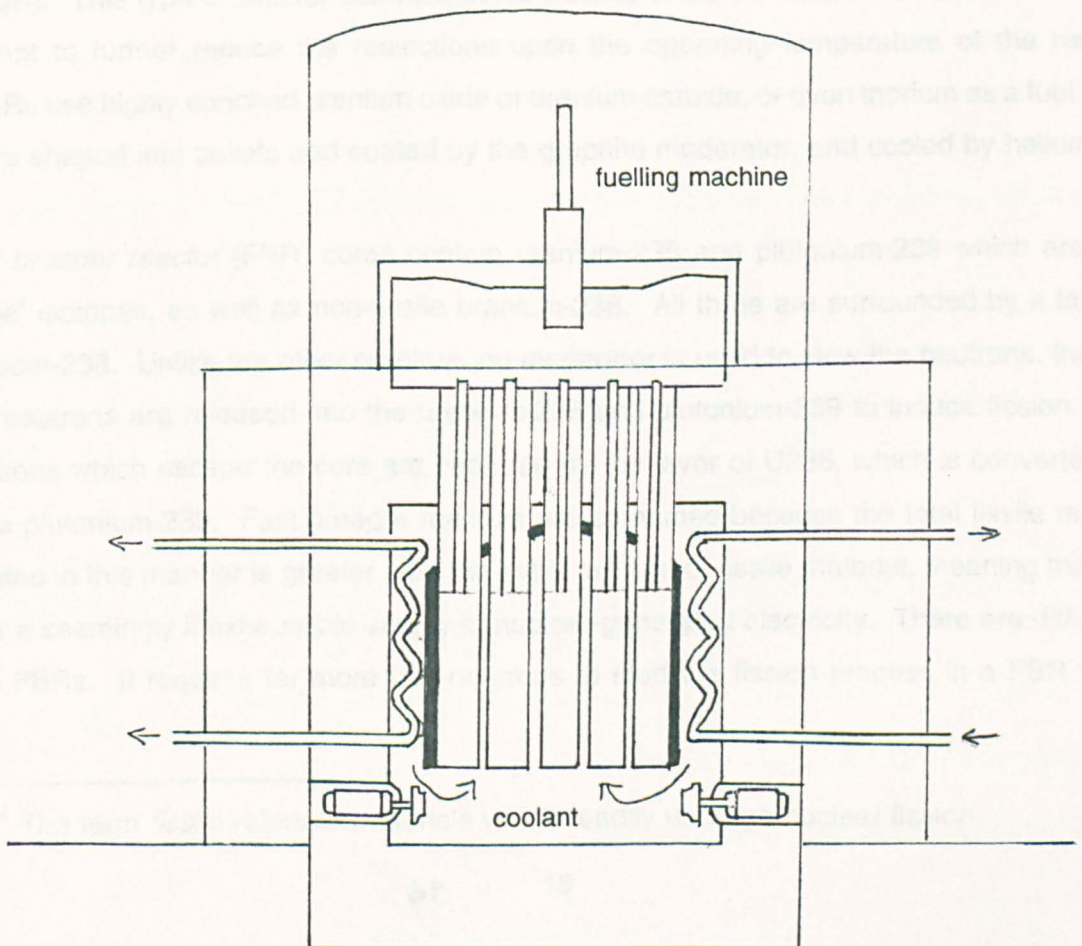


Figure 1.7

Advanced Gas Cooled Reactor (Reproduced from Patterson 1976, 58)



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moderator but a light water coolant which boiled as it passed through pressure tubes containing the fuel elements to generate steam. The SGHWR (Figure 1.5) was of a modular design which made it possible to add or remove fuel channels to adjust the size of the reactor (Patterson 1976, 73-74).

Gas cooled reactors originated in France and the UK. They use gases such as carbon dioxide or helium as a coolant. The original British MAGNOX design (Figure 1.6) uses un-enriched uranium clad in magnesium oxide (from which the reactor got its name), cooled by carbon dioxide which is pumped under pressure through a graphite moderator, before passing through heat exchangers to produce steam for the turbines. The advanced gas cooled reactor (AGR) (Figure 1.7) was a later British development. It uses enriched uranium and can operate at higher temperatures than the MAGNOX design. MAGNOX reactors are restricted by the fact that un-enriched uranium metal undergoes a crystalline change at 665 degrees Celsius, and even below that its behaviour can be unpredictable (Patterson 1976, 56). Uranium oxide also has a higher melting point (2800 degrees Celsius) than uranium metal (1130 degrees Celsius). With the extra heat which can be generated in an AGR, more steam is created, and more electricity produced. The third gas-cooled design is the high temperature gas reactor (HTGR). This type of reactor used ceramics instead of metals within the reactor core in an attempt to further reduce the restrictions upon the operating temperature of the reactor. HTGRs use highly enriched uranium oxide or uranium carbide, or even thorium as a fuel. This fuel is shaped into pellets and coated by the graphite moderator, and cooled by helium.

Fast breeder reactor (FBR) cores contain uranium-235 and plutonium-239 which are both *fissile*⁴ isotopes, as well as non-fissile uranium-238. All three are surrounded by a layer of uranium-238. Unlike the other reactors, no moderator is used to slow the neutrons. Instead, fast neutrons are released into the uranium-235 and plutonium-239 to induce fission. Fast neutrons which escape the core are captured by the layer of U238, which is converted into more plutonium-239. Fast breeder reactors are so named because the total fissile material created in this manner is greater than the initial amount of fissile material, meaning that they offer a seemingly inexhaustible supply of nuclear-generated electricity. There are difficulties with FBRs. It requires far more fast neutrons to start the fission process in a FBR than it

⁴ The term *fissile* refers to materials which readily undergo nuclear fission.

requires slow neutrons in a conventional reactor. In addition, neutrons must not collide because this would slow them down, and so the core must be designed in a very precise and compact manner (Patterson 1976, 77). FBR cores are thus technologically demanding. FBRs also have a high power density in the core, and require more effective coolants than water. Most use liquid sodium as a coolant, which has the advantage of being capable of absorbing more heat than water, but which also has the disadvantage of being highly inflammable with air, explosive with water, and forming intensely radioactive sodium-24 if it absorbs a fast neutron. It must also be kept above 97.5 degrees celsius or else it will solidify (May 1990, 45). Retrieving the plutonium from the FBR core is also problematic due to the presence of highly radioactive fission products.

All reactors are surrounded by shielding, usually thick concrete, to prevent radiation entering the atmosphere. The reactor building also functions as a secondary shield.

1.7 Nuclear power in Britain

In Britain, there are three organizations which operate commercial⁵ nuclear reactors - Nuclear Electric⁶; Scottish Nuclear⁷; and British Nuclear Fuels plc (BNFL)⁸. The fuel for the reactors owned by these three companies is manufactured by BNFL at their Springfields plant near Preston, where uranium ore from abroad is purified and either converted into metal rods and clad in magnesium oxide for use in MAGNOX reactors, or transferred to another BNFL plant at Capenhurst in Cheshire, where it is enriched by the URENCO company (owned jointly by BNFL and Dutch and German partners) into uranium oxide before returning to Springfields to be made into uranium oxide fuel which can be used in AGRs and PWRs (HMSO 1981, 16).

1.8 Spent fuel

After a while, the fuel in conventional reactors must be replaced. This is not only because the number of fissile uranium-235 nuclei has been reduced by the fission process, but also

⁵ The United Kingdom Atomic Energy Authority (UKAEA) also operates reactors for research and development purposes.

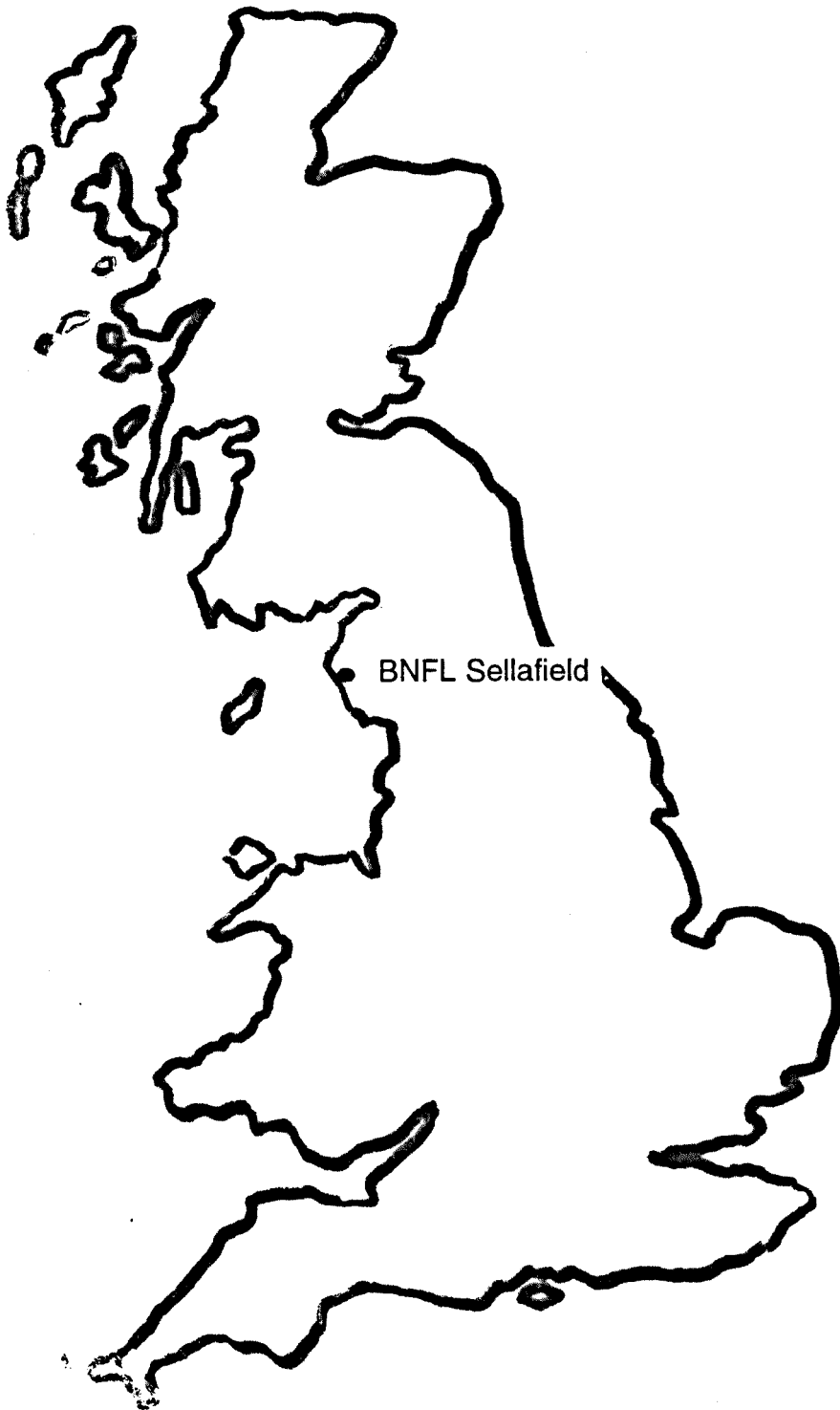
⁶ Formerly part of the Central Electricity Generating Board (CEGB)

⁷ Formerly part of the South of Scotland Electricity Board (SSEB)

⁸ Formerly British Nuclear Fuels Limited

Map 1.1

Location of BNFL Sellafield



because of the build up of fission products. Because the new fission products are constantly decaying and absorbing neutrons until they become stable, it becomes difficult to keep track of which fission products are present within the reactor, how many neutrons are being absorbed by those fission products, and consequently, how many neutrons are required for the uranium fission process itself to function properly. It is essential to know just how many neutrons are required, for if the supply is too low, criticality will not be reached, and if the neutron supply is too great, the reactor may become out of control. In addition, some fission products are gases, and the build up of gases such as krypton and xenon increases the danger of leaks of radioactivity from the reactor. The fission process itself also affects the crystal structure of the fuel, the cladding and moderator and so all three must eventually be replaced (Patterson 1976, 38-39). Dealing with spent fuel and radioactive waste is known as the *back end* of the nuclear fuel cycle. The procedure for closing the nuclear fuel cycle varies from country to country. After use in a nuclear reactor, spent nuclear fuel is very radioactive and produces a lot of heat (May 1990, 38). It is stored for some time to allow it to cool and allow some of the short lived radioactivity to decay. In Britain, spent fuel is then sent to BNFL's Sellafield site for *reprocessing*.

1.9 Sellafield

Sellafield (previously known as Windscale), is situated on the west coast of Cumbria (Map 1.1), and is the largest nuclear installation in Britain, covering an area of one square mile. In the early years of the nuclear industry, the main function of nuclear reactors was to create the plutonium-239 needed to manufacture nuclear warheads. Only available through artificial means, this plutonium was to be recovered from the reactors by reprocessing spent uranium fuel (Patterson 1976, 100). Another reason for reprocessing was that whenever the build-up of fission products meant that the fuel in a reactor had to be removed and replaced with a fresh load, there was still much uranium-235 which had been left unused within the spent fuel rods. This was a valuable commodity which could also to be retrieved for re-use.

In reprocessing, the fuel assemblies are broken up, and the different components of the fuel are separated by chemical processes (HMSO 1981, 17). At Sellafield, MAGNOX fuel elements are picked up by remote control and stripped of their cladding by machine. The cladding is put into a concrete storage bin, and the fuel itself is dissolved in nitric acid. An organic solution known as *Butex* is added to the acid solution. Uranium and plutonium enter

the Butex stream, and the fission products stay in the acid. Further chemical procedures follow, with the end result that separated uranyl nitrate solution and plutonium nitrate solution are produced (Patterson 1976, 102). Uranium (ninety-six percent of the spent fuel) is returned to Springfields for re-use in Britain's nuclear power stations. Between 1952 and 1994 Sellafield reprocessed thirty thousand tonnes of MAGNOX fuel, recycling fifteen thousand tonnes of uranium. Plutonium (one percent of spent fuel) is stored, or mixed with uranium to make mixed oxide fuel (MOX). A new reprocessing plant, the Thermal Oxide Reprocessing Plant (THORP), has recently been constructed for reprocessing enriched fuels from British AGRs, foreign AGRs and PWRs, and future British PWRs.

1.10 Nuclear waste

The nuclear industry is authorised by Her Majesty's Inspectorate of Pollution (HMIP) and the Ministry of Agriculture, Fisheries and Food (MAFF) to dispose of gas and liquid of low levels of radioactivity into the environment (BNFL 1993, 9). There are three main categories of radioactive waste:

Low Level Waste (LLW) consists of radioactive materials which cannot be disposed of with domestic refuse. It mainly consists of clothing and laboratory equipment. It is currently disposed of at Drigg, the UK's current site for land disposal of LLW, six kilometres from Sellafield, where it is buried in sealed containers in a shallow burial site (ERM 1993b, 27-28).

High Level Waste (HLW) is the concentrated product of reprocessing spent fuel. It contains ninety-five per cent of all the radioactivity in nuclear waste, and is in the form of a heat generating liquid. It is stored in stainless steel tanks before undergoing a process known as *vitrification* whereby it is converted into a glass-like solid to facilitate storage and handling. It is stored at Sellafield for fifty years to allow reductions in heat and radioactivity. The volume of HLW produced is small in relation to the other two categories of waste. At the time of writing, no decision had been made about the final fate of HLW.

Intermediate Level Waste (ILW) has a lower heat output than HLW and so does not need to have special facilities designed to take its temperature into account. ILW includes reactor materials such as fuel cladding. ILW is classified in two groups -

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plutonium contaminated material (PCM) and non-plutonium contaminated material. PCM has little fission product radioactivity, but various degrees of plutonium contamination. Non-PCM has no plutonium but higher levels of fission product radioactivity. The nuclear industry radioactive waste executive (NIREX) are responsible for the disposal of ILW and more active LLW, and currently seek to dispose of it in an underground repository. At the time of this research, Longlands Farm, midway between Sellafield and the nearby village of Gosforth, was being investigated by NIREX for a possible Rock Characterization Facility (RCF) which may eventually lead to it being chosen as the site for a permanent LLW / ILW repository, to be accessed from the Sellafield site.

The six major producers of British nuclear waste are BNFL (fuel enrichment, fabrication and reprocessing), Amersham International, (research, industrial and medical uses), Scottish Nuclear and Nuclear Electric (nuclear power reactors), United Kingdom Atomic Energy Authority (UKAEA) (research) and the Ministry of Defence (MOD) (defence purposes).

Nuclear power is not the only source of radiation to which the public is exposed. Radioactivity is a natural phenomenon. Individuals are exposed to radiation from rocks, from space, and even from their own bodies. Other exposure can come from fallout from nuclear weapons testing or from exposure to radiation for medical reasons (May 1990, 26). The nuclear industry, therefore, argues that radioactivity is a natural phenomenon, and that industrial discharges are insignificant in relation to other sources of radiation, amounting to less than one percent of the total radiation exposure to the UK population.

Chapter Two

The development of the British civil nuclear power industry

2.1 Introduction

To understand the nature of current popular opinion relating to the British civil nuclear power industry, either in West Cumbria or elsewhere, it is essential to be aware of the history of that industry. This is because events which have shaped public opinion and policy decisions in previous years may still echo in the mind today whenever the word 'nuclear' is mentioned, and upon these memories today's attitudes and prejudices can be formed.

In order to demonstrate possible historical factors which might influence public opinion, this chapter sets out the chronological development of the British nuclear power industry up to the date when this research was carried out. Events since the summer of 1994 could not have influenced opinions at that time, and so later developments are detailed in Appendix A rather than here. The account aims to avoid the flaws in previous histories mentioned in the preface above. It takes a neutral standpoint, and traces not only the development of electricity producing reactors but also the development of a system of dealing with the 'back end' of the nuclear fuel cycle and international events which have had a bearing upon the British nuclear industry. A knowledge of all these aspects of the industry is essential to understand public opinion in Cumbria, a county which not only contains Britain's original nuclear power station, but is also the centre of the 'back end' of the fuel cycle, and which, in THORP, perhaps also contains the nuclear installation most affected by international events. A vast number of books exist on this subject, and articles appear regularly in newspapers and magazines. The aim of this section is to draw from these resources to provide a concise, informed and informative outline of the development of the nuclear industry.

In order to give some structure to this historical account, the time period covering the development of a civil nuclear power programme in Britain, stretching from the end of World War Two to the present day, will be split into several sections, each representing a different phase in the fortunes of the British nuclear industry.

2.2 1940s -1950s

2.2.1 The Second World War

Britain's first attempts to harness the power of the atom came about for military reasons. In 1941, standing alone against what were then the all-conquering Axis powers, and with no indication of any forthcoming American involvement, the UK looked to nuclear energy as a means of redeeming its dire predicament (Pierre 1972, 9). Information on the research needed for development of the 'atomic' fission bomb had been freely available in international scientific print before 1938, and so there was also a sense of urgency that Britain should prevent Germany from being the first to realise the potential of nuclear energy. British scientists worked on atomic energy research under the responsibility of the Department of Scientific and Industrial Research (DSIR). When the United States eventually became more involved in the conflict, the development of an atomic bomb became a joint American, British and Canadian project, carried out in the USA, where the risk of attack from the Axis powers was lower (HMSO 1969, 2).

Nuclear power entered the public eye for the first time in August 1945 when the uranium weapon, Little Boy, and the plutonium bomb, Fat Man, were detonated over Japan, killing forty-five thousand people on August 6 at Hiroshima and twenty-two thousand people at Nagasaki three days later. Thirty-six thousand more people died over the next four months from the effects of the bombs (May 1990, 45,74-75). The violent arrival of nuclear power may have had a permanent effect upon popular perceptions of nuclear energy, in that the image of the first mushroom clouds fifty years ago has perhaps placed an irrevocable association in the public mind between any kind of nuclear power and the horrifying destruction of the Bomb: 'It has been a case of guilt by association' (Sherfield 1972, 2).

The military origins of nuclear energy had other implications for public opinion. The fact that it was an integral part of the war effort against the Axis powers meant that nuclear energy remained wrapped up in the tightest secrecy - keeping it away from public scrutiny, comprehension, and everyday acceptance (Cottrell 1981, 1; Sherfield 1972, 2). Because the atomic bomb was initially seen as essential to the defence of the nation, and had also seemingly precipitated the end of the Second World War, there was little if any public opposition.

2.2.2 Mounting tension

The development of an independent British civil nuclear programme began in 1946. In that year, American weapons testing began at Bikini Atoll in the Pacific, and once this was under way, the US Congress passed the McMahon-Douglas Act (Atomic Energy Act 1946) which banned British and Canadian scientists further access to the nuclear project. Now the war was over, there was less need for co-operation amongst the allied powers, and by excluding the others, the US would be given a great head start in the development of this most powerful source of energy.

America's refusal to scrap their nuclear arsenal because of their desire for dominance doomed to failure the Baruch plan⁹ of 1946, and signalled the beginning of a nuclear arms race between the USA and the USSR. In the years immediately following the end of the war, the political situation changed from one of co-operation between the Western allies and the USSR to one of mistrust and tension. America's light war damage contributed to making it the dominant economic power, and the Soviets resented the fashion in which aid to the USA's former allies was made available only in accordance with US strategic goals (Vadney 1992, 56-57). Stalin set out to make the Soviet Union independent and secure from the West. In terms of military strategy this meant that if the USA were to have nuclear weapons, it would be essential for the Soviets to develop them too, to ensure their independence. Other developments ensured that this schism between East and West deepened. In the late 1940s, Communist governments gradually took control of Eastern Europe, and trade links between the Soviet sphere of influence and the West declined. On June 23 1948, the Soviets set up a land blockade around Berlin, intending to halt the American moves to reunite Germany and make it part of the Western bloc. After nearly a year of Western airlifts, the blockade was lifted, but Germany had been divided into the Federal Republic and the German Democratic Republic, and Europe had been confirmed as a divided continent, with the two halves distrustful of each other. On April 4 1949, the division of the western world into two mutually suspicious groups was confirmed with the signing of the NATO treaty. The creation of the communist People's Republic of China in 1949 increased the unease in Western minds.

Thus it was that international events left Britain with the choice of developing its own nuclear capacity or being left behind in an increasingly uncertain world in which the military

⁹ The Baruch plan proposed that the United Nations (UN) should regulate atomic energy, and that such energy should only be used for civil power purposes.

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commitments of a declining empire might bring them into conflict with other nations who might develop the Bomb. In 1946, Attlee's Labour government, concerned at the Soviet Union's possible intentions and the USA's monopoly of nuclear weapons (and the uncertain relations between the USA and a Labour government), planned a British capacity of two hundred nuclear bombs. Technological development was seen as the only way to maintain parity with the two other nations, which had far larger human resources (Gowing 1974, 228). The Atomic Energy Bill received Royal Assent on November 6 1946, moving responsibility for British atomic development from the DSIR to the Ministry of Supply. The Atomic Energy Research Establishment was set up at Harwell in Berkshire, and the Division of Atomic Energy Production was established at Risley in Lancashire for the production of fissile material (HMSO 1969, 2). The cross-party consensus of support for nuclear development was evident here - although it was the war-time Conservative premier, Churchill, who had initiated research in the nuclear field, it was the Labour Party who implemented the exclusively British scheme. The generation of civil nuclear power was not a political priority in Britain at this point, although it was an intention of the scientific community (Gowing 1964, 105).

The covert nature of Britain's nuclear programme was also very much in evidence at this stage. 'The UK public - and that includes almost all of Parliament - knew, it must be said, virtually nothing of the creation of a British strategic force.' (Patterson 1983, 111-12). Those who were involved in the project were not to inform the public in any way, on pain of a prison sentence of up to five years (Gowing 1974b, 135). The only acknowledgement of the plans came on 12 May 1948, in a House of Commons answer by the Minister of Defence:

'Research and development continue to receive the highest priority in the defence field, and all types of weapons, including atomic weapons, are being developed.' That was all, the Minister would not elaborate, since it was 'not in the public interest' to do so (Patterson 1983, 111-12).

The production organisation established 'atomic factories' to develop Britain's missiles. Springfields in Lancashire was to be used for extraction of uranium metal from uranium ore, and for the fabrication of fuel elements (HMSO 1969, 2). Sellafield, on the coast of West Cumbria, which had been used since 1941 by the Ministry of Supply as a Royal Ordnance factory, and had only recently been sold to the firm Courtaulds for the manufacture of rayon, was nominated for the production of plutonium. Courtaulds agreed to vacate the site in September 1947, and the land returned to the hands of the Ministry of Supply, who entitled their new plant the Windscale Works, taking the name from a group of trees on the banks of

the River Calder called Windscale Nook (BNFL Information sheet assistan/056, undated). At the Windscale Works, construction began on two 'piles'. These were nuclear reactors, using natural uranium clad in aluminium, with a graphite moderator and cooled by the circulation of air, whose sole purpose was the production of plutonium.

In September 1949, the USSR made its first atomic weapons test, ending the West's monopoly on the destructive power of the Bomb, and surprising those in the UK who thought that Britain was most likely to become the second atomic nation (Gowing 1974a, 4). The 'need' for larger nuclear arsenals in the West, (and consequently for greater supplies of plutonium) was dramatically increased.

In 1950 the first plutonium producing atomic pile went critical at Windscale. By mid-1951 the second pile had also come on line (Atom, December 1987, 14). With the Soviet Union now a nuclear power, and international tension escalating when communist North Korea invaded South Korea at the turn of the decade, the pressing need to create a British strategic force intensified. British defence spending rose by some four hundred percent, and in 1949 construction began upon a reprocessing plant, known as B204, which was to retrieve more plutonium from irradiated uranium (Pierre 1972, 123). It was also to retrieve unused uranium, because at that time supplies of raw uranium were uncertain (Gowing 1974b, x). The perceived failure of 'weak' defence policy in the 1930s meant that there was 'little evidence of opposition' to Britain's nuclear programme amongst policy makers (Gowing 1974b, 10), while the need for secrecy in a Cold War standoff with Eastern Europe meant that nuclear energy remained shrouded from the public eye.

In 1952 the B204 plant opened. West Cumbria now had not only nuclear reactors, but also the first industrial-size reprocessing plant in Western Europe. On October 3 1952, Britain confirmed her position upon the international playing field with her first nuclear bomb test. The test destroyed the frigate HMS Plym in the Monte Bello Islands in the Pacific, and demonstrated the success of the Windscale piles and reprocessing in creating materials for nuclear weapons (Gowing 1974a, 449). The fact that Britain was so heavily involved as one of the first practitioners in the nuclear industry may perhaps account in some way for the strength of the nuclear lobby in Britain. In a post-war world, where the Empire was crumbling, and the country was suffering a decline in relative world importance, it might have been easier to gain government support for an industry which was demonstrably 'leading the pack' and

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showing the way for the rest of the country. Secrecy was still of the utmost importance though. Those who wished to publicise the success of technological progress at Windscale were told by the Ministry of Supply that the 'very highest authorities are allergic to publication of details about atomic energy projects' (cited in Gowing 1974b, 129).

2.2.3 Waste

In 1949, before the first reactor went critical, Windscale began dumping radioactive waste at sea (Berkhout 1991, 138). The authorities saw the natural environment as available for the use of the nuclear industry. The Minister of Supply, Duncan Sandys, saw the marine environment as a safety net in case of accidents - 'if any sudden release of radiation should occur, the sea [is] close at hand' (Cited in Berkhout 1991, 144). Other important figures in the nuclear industry felt that the sea was there for routine exploitation.

"The sea has always been regarded by coastal and seafaring peoples as the ideal place to bury their waste, and this, of course, is a very reasonable and proper attitude" (H.J. Dunster cited in Cassidy & Green 1993, 25).

The Admiralty already disposed of unstable ammunition and similar materials into the Hurd Deep in the English Channel. Solid radioactive waste soon followed it in drums. Deep sea dumping offered not only a route for the disposal of current radioactive waste, but it occurred in an area where there was considered to be no light, no life, and opportunities for great dispersal of materials should any container leak. It promised a future destination for more active waste from reactors, and for the produce of decommissioning (Berkhout 1991, 141). For more than thirty years, the sea was to be used for routine waste disposal.

There were those who felt unease at the safety aspects of the nascent British nuclear industry. The Minister of Works, Richard Stokes, commissioned a report from the chief engineer at Windscale, Christopher Hinton. Hinton felt that the military plants 'gave grounds for considerable concern' (cited in Berkhout, 1991, 144), but the findings fell on deaf ears. Duncan Sandys said the only way to be totally safe would be to take the 'unacceptable' step of abandoning the whole nuclear programme (Berkhout 1991, 144). This may be seen to be one of the first signs of the way industry attitudes towards risk would develop - to seek 'acceptable' levels of risk rather than absolute safety.

The waste disposal route received the traditional secretive approach of the authorities. Attlee saw the release of information regarding Windscale marine discharges as 'undesirable', whilst Sandys felt that it 'would be better for us to keep our light hidden under a bushel' (cited in Berkhout 1991, 140).

2.2.4 Chalk River

On December 12 1952, one of the first major nuclear accidents in the world occurred at the experimental Chalk River NRX plant in Canada, where a technician mistakenly lifted three control rods out of the reactor. This was serious enough, but was exacerbated when his supervisor, despite realising the problem, telephoned the wrong instructions to his assistant, which meant that yet more rods out were removed, instead of replacing the first set. When the assistant realised that there was still a problem, he took action to *scram* the reactor (i.e. shut it down immediately), but the appropriate mechanism failed to work. Some uranium fuel melted, water was stripped of its oxygen content and there was a hydrogen explosion. This explosion, combined with the chemical reactions which occurred, 'pretty much demolished the reactor core' (Patterson 1983, 121). In order to shut down the reactor, the heavy water moderator was drained out, but in doing so radioactivity was leaked into the basement (Patterson 1983, 121).

The entire incident had been caused by operator error and technology malfunction and had lasted only seventy seconds. Radioactivity was leaked only in the dumped moderator, and in the clean up only minor exposure was suffered. Nevertheless, the incident had demonstrated the possibility of a nuclear accident¹⁰. Chalk River had been the original centre for the advancement of nuclear power (HMSO 1981, 5), but now it represented the start of a catalogue of nuclear incidents which the industry's opponents would use to argue a case against the industry. These themes - human and technical error, and dramatic problems caused by events of minute detail on a short timescale - were to repeat themselves many times over the years.

¹⁰ Chalk River became the focus of controversy once more on 25 May 1958 when a new NRU plant, like the NRX before it, suffered technical difficulties. An irradiated fuel element broke and caught fire, with a metre of radioactive fuel falling out of a refuelling machine and into a maintenance pit. Four hundred thousand square metres around the NRU plant was contaminated.

2.2.5 Atoms for Peace

By October 1953, the USSR had detonated its first fusion ('hydrogen') bomb, thus matching a similar American feat a year earlier, and many scientists were becoming increasingly 'uneasy at their part in bringing the nuclear weapon to fruition' (Sherfield 1972, 2). On 8 December 1953, at least partly in a response to the increasing voices of concern, President Eisenhower of the USA made an address to the General Assembly of the United Nations (UN), on the theme of 'Atoms for Peace', trying to publicise beneficial uses of civil nuclear power. 'Peaceful power from atomic energy,' he said, 'is no dream of the future. That capability, already proved, is here-now-today' (Mullenbach 1963, 15). He called for increased co-operation between the nuclear powers to develop civil uses of the technology. With the death of Stalin in 1953, some of the tension of the Cold War had eased, and in August 1955 nuclear scientists from around the world met at Geneva. For the first time, research in nuclear physics could be compared and new ideas sparked without the barriers thrown up by national security considerations. Professor H.J. Bhabha made the first public reference to civil nuclear power and began the process of 'putting the H-Bomb into dungarees.' Utopian visions of the potential of nuclear power were given free reign:

"So called 'atomic power' would run a car on an engine the size of a fist; we would soon live in houses heated by uranium; 'atom-powered' aircraft would be able to remain aloft indefinitely; 'atom-powered' rockets would enable us to cross the ocean in three minutes - and so on.' (Patterson 1983, 15-16).

There would be 'as much power as there is deuterium in the seven seas' (Bhabha, cited in Ritchie-Calder 1972, 81). Less developed countries would make a 'leap across the centuries' as nuclear power's flexibility would make up for fossil fuel shortages, and industrialise the Arctic, the deserts and the jungles. Low temperature heat from the reactors would even be used to desalinate seawater, and relieve drought stricken nations and solve food shortages (Ritchie-Calder 1972, 80-81). These were the visions around which public support could be built.

It has been argued, however, that even at this peace-orientated conference, foreign policy considerations were present. In offering nuclear energy as a solution for 'the power-starved areas of the world' (Mullenbach 1963, 15), the major powers could perhaps be seen to be using nuclear energy as a bargaining tool with which to secure the loyalty of nations hitherto uncommitted in the Cold War (Mullenbach 1963, 19). The Atoms for Peace Conference was

to meet again in 1958, 1964 and 1971, each time providing more exchanges of technological information.

2.2.6 From a military to a civil nuclear programme in Britain

From the early 1950s, the British nuclear research centre at Harwell in Oxfordshire had begun investigating the possibilities of a civil nuclear power programme, using heat from reactors to produce electricity, rather than merely letting the heat disperse wastefully into the atmosphere. Taking into account the capital and running costs of fossil-fuelled and nuclear power stations, it seemed that a unit of nuclear electricity would cost only about one-fifth as much as a unit of fossil fuel electricity, and so nuclear power stations looked to be a solid investment. Contemporary difficulties in increasing coal production provided further incentive for the introduction of a successful civil nuclear power industry. It was originally intended to develop British reactors for use by the Central Electricity Authority which would produce plutonium only as a secondary by-product to electricity (HMSO 1957, 19), but military considerations caused a significant alteration to this plan. The arms race had intensified as both superpowers had increased their nuclear capabilities and the British Chiefs of Staff did not want to be left behind. In August 1952, the British military demanded an increased supply of weapons-level plutonium, diverting Harwell from its research into peaceful applications. Although the idea of civil nuclear power became increasingly enticing when Egypt's President Nasser nationalised the Suez canal in 1956, leading to great uncertainty over the world's oil supplies (Vadney 1992, 223), the ensuing Suez Crisis, when Israeli, British, and French troops invaded Egypt, and the USSR warned that it could launch rockets at the UK and France, whilst the USA was perhaps not as supportive of Britain as it might have been, also added to the 'need' for a strong British nuclear force. The plans for the electricity orientated reactors were thus abandoned in favour of a dual purpose reactor, producing plutonium first and electricity only as a by-product.

The reactor design which Britain chose to develop was the MAGNOX reactor. The MAGNOX system was chosen because Britain had no facilities for the manufacture of enriched uranium oxide fuels, and to import enriched fuel for other reactor types would be expensive. Designs using a heavy water moderator were also rejected on cost grounds, as it would be a troublesome process to manufacture the heavy water. MAGNOX reactors had a higher capital cost relative to output, but in the 1950s when interest rates averaged around five percent, this was not a major problem. The MAGNOX design was an extension of the Windscale Piles

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design, and so the facilities existed for reprocessing. With doubts about the future availability of uranium (given the lack of any indigenous supply in Britain), a system which would facilitate the re-use of available spent fuel seemed prudent. Perhaps the most important factors in the choice of MAGNOX reactors though, was that as successors of the Windscale Piles, they were very good plutonium producers.

In 1954, the Ministry of Fuel and Power announced a programme of nuclear power, a ten year plan of MAGNOX power stations. Construction was to be undertaken by consortia of manufacturing companies and civil contractors, using skills supplied by the United Kingdom Atomic Energy Authority (UKAEA), which had been established by the Atomic Energy Act of 1954 to relieve the Ministry of Supply of responsibility for the rapidly expanding nuclear industry¹¹. The first reactor was to be named the Calder Hall reactor, and was to be situated on the same site as the Windscale Works. In the long term the British authorities awaited the development of Fast Breeder Reactors which would supercede the MAGNOX reactors.

There was no initial public opposition to the plan of developing nuclear power stations. Memories of factories closing through lack of a power source after the war were still fresh, the immediate post-war winters had been particularly bleak (January 1947 being the coldest month of the century), and the new technology of nuclear energy offered an apparently abundant supply of power which could not be ignored. Discussions of the drawbacks of nuclear power were at that stage 'limited almost exclusively to technical meetings and publications' (Professor George Weil, cited in May 1990, 11).

2.2.7 The spread of reactors across the globe in the 1950s

The attractions of electricity generated by nuclear power were noticed elsewhere in the world. In 1954, the world's first civil nuclear power station came into operation at Obninsk in the USSR. That same year, the US Atomic Energy Act opened the American nuclear industry to private enterprise, with government grants for research and development to stimulate expansion of nuclear capacity. The mood of optimism for the nuclear industry swept the globe, and it seemed that 'the possession of a nuclear reactor, however modest, became a

¹¹ The UKAEA was to be responsible for production of atomic weapons for the Ministry of Defence (MOD), for developing civil electricity-generating reactors and for developing reactors for naval propulsion (HMSO 1969, 3-5).

symbol of prestige for every nation, great or small, developed or undeveloped' (Sherfield 1972, 3). By 1955, the UK, the USA, France, the USSR, Canada, Norway and Belgium all had experimental nuclear power stations at the very least. They were followed by India (1956), Israel (1957), Sweden, (1963) and China (1964). However, the addition of communist China to the list of those possessing nuclear technology did little to ease world tension.

The spread of reactors was matched by an increase in the number of institutions to oversee nuclear development. In 1956 a draft statute for the International Atomic Energy Agency (IAEA) was drawn up by the UN. The agency's headquarters in Vienna became a centre for the promotion of nuclear energy across the globe (Patterson 1976, 173). In 1957 international co-operation advanced once more with the establishment of the eighteen nation European Nuclear Energy Agency (ENEA). Later, Japan, the USA and Canada joined and the organization became known as the OECD Nuclear Energy Agency. The ENEA encouraged reactor development, establishing an international project at Winfrith in Dorset to build a high temperature gas cooled reactor (HTGR) entitled 'The Dragon', the Halden boiling heavy water reactor programme in Norway, and a reprocessing project at Mol in Belgium. It also set up committees to deal with the health and safety aspects of nuclear development, but it did not attempt to address the question of waste (Patterson 1976, 59).

2.2.8 The Lucky Dragon and a fast breeder incident

On March 1 1954, nuclear energy encountered fresh controversy when the Japanese fishing vessel *Fukuryu Maru* (Lucky Dragon) was inadvertently caught within the test zone at Bikini Atoll. A bomb which the Americans were testing proved to be twice as powerful as had been expected, with radioactive dust covering a far wider area than had been anticipated. Twenty-three fishermen were exposed to radioactive contamination from the blast, and one of them died. Two hundred and thirty-six residents of the Marshall Islands were also caught by the blast. Twenty-one inhabitants of Rongelap island alone developed thyroid abnormalities, with eighteen of them requiring thyroidectomies. Fish from the Southern Pacific were contaminated with radioactivity, and the USA paid out two million dollars in compensation (Patterson 1976, 133-34).

On November 29 1955, operator error nearly caused total meltdown at an experimental fast breeder reactor at an American testing station in Idaho. During tests of the reactor's performance under increasing power levels, a staff scientist was to give the verbal order to

scram the reactor instantaneously. However, when the command was given, the operator pressed the wrong button, pressing one for slow shut-down rather than scram. It took only a few seconds to redress the error and hit the correct button, but in that time, nearly half the fuel rods melted into the bottom of the containment vessel. Once more operator ineptitude had nearly caused disaster. The American industry displayed the same secretive attitude as their British counterparts and the incident was so well covered up that when the chairman of the owners, AEC, was questioned about the incident by the Wall Street Journal, he was found to be ignorant of the event (May 1990, 126).

2.2.9 Breakthrough and disaster - Calder Hall and the Windscale fire

The British industry continued to progress very well. In 1956 Queen Elizabeth II linked the Calder Hall dual-purpose reactor to the national grid. For the first time in the world, a full-scale civil nuclear power station was helping in the supply of energy for a nation. It was another great advance for the British nuclear industry, and a potential source of pride for the UK as a whole. That year the West Cumbrian site was renamed the Windscale and Calder Works (Pierre 1972, 127; BNFL information sheet assistan/056).

1957 was another momentous year for the British nuclear industry. In May, the British exploded their first Hydrogen bomb. In October, the Windscale and Calder Works hit the headlines for a different reason - Britain's first large-scale nuclear accident. Like Chalk River before it, the accident was based on a combination of technological malfunction and human error. A physicist was carrying out a procedure known as a Wigner Release in the Number One plutonium producing pile¹². On this occasion, when the operator halted the operation, he believed that the energy release had been completed. However, the temperature meters were not in the hottest part of the core and so did not reveal that in fact the Wigner Release continued after the reactor had returned to normal operation. When the operator withdrew control rods to raise the power level again, the high aggregate temperature caused the fuel

¹² E.P. Wigner had discovered that in these reactors, some atoms in the graphite moderator were altered in the fission process, and became capable of storing energy (Wigner energy). It was necessary to ensure that this energy was released in a controlled manner to prevent its spontaneous release during reactor operation. In a Wigner Release the reactor was heated to a predetermined temperature, and the temperature monitored. When the temperature rose from that level, (indicating a release of the extra energy), the heating was halted.

rods to ignite (Atom December 1987, 15). The problem was only noticed some forty-two and a half hours later when excess radioactivity was detected in filters at the top of the chimneys through which the air coolant was discharged. By this time as much as eleven tonnes of uranium fuel, cladding and graphite coolant were on fire. It took a further day before the fire was controlled by over a million gallons of water. Further human error was displayed when workers originally fed carbon dioxide to the blaze, intensifying rather than mollifying the situation (Patterson 1983, 124). Despite the filters, large amounts of iodine-131 (which is absorbed by the human thyroid) escaped over five hundred square kilometres of Cumberland. Two million litres of locally produced milk had to be thrown away as a health precaution (King 1990, 54-55).

In dealing with the public, the industry's secretive nature was again in evidence. It was over a day before the press were informed that anything was amiss. There was an official inquiry, but the resulting report was never published. Newsreels played down the event. Ironically, the filters, which had 'probably kept a major accident from becoming a catastrophe' (Patterson 1983, 123-26) had originally been seen as unnecessary, and were installed only at the insistence of Sir John Cockcroft, the head of research at Harwell, and had been nicknamed 'Cockcroft's Folly'.

Despite the shock which the fire brought, the industry's failsafes had held, and no fatalities had occurred. A design change would be necessary to ensure that the plant could operate safely with no chance of a recurrence of the problem, but, as it was simpler and would save money, both of the piles were simply closed, encased in concrete and sealed. Virtually all the fuel was removed from Pile Two but, about ten percent (seventeen tonnes) of the uranium fuel in Pile One had to be left in the reactor, with a temperature monitor and alarm to safeguard it (Atom December 1987, 15). The MAGNOX design which was used in the dual-purpose reactors did not need Wigner Releases and so was seen to be unaffected by the event at Pile One.

The MAGNOX programme itself actually progressed well. The first two commercial reactors, at Berkeley (Gloucestershire) and Bradwell (Essex), took only fifty-five months to be ready for fuel loading, and were ready for commercial service in twelve more (Tombs 1980, 3). The overall mood of the industry was still one of optimism, and although there were problems,

these were merely seen as 'exciting' challenges, which were 'faced and overcome in the midst of emerging designs of increasing ambition' (Tombs 1980, 3).

2.2.10 The waste question is raised

On March 31 1959, three boys in Wishaw, Lanarkshire were exposed to radioactive contamination from wastes dumped by the luminizing workshop of a local clock factory. With atmospheric levels of radiation increasing due to the numerous bomb tests in the Pacific, the memories of the Windscale fire still fairly fresh, and public concern rising at that time regarding the medical effects of exposure to radiation, the event at Wishaw formed the basis of calls for new legislation. Mrs Judith Hart, MP for South Lanarkshire, raised the question of radioactive materials at the Scottish Labour Party Conference. The administration of such things was, she claimed, in 'complete chaos' with no less than eleven different authorities having some degree of responsibility but no single one having any final responsibility (Berkhout 1991, 1). These events also came only a year after J.H. Dunster of the UKAEA, had revealed to the UN that in 1956 Britain had deliberately increased the radioactivity of marine discharges in order to ascertain the effect on the environment, in effect using Britain's coastal waters as a giant laboratory (Blowers & Lowry 1987, 135).

At this time the Keys Report was published. Although it had actually been commissioned a couple of years earlier to help plan the future of a civil nuclear programme, it included several principles which were to form the basis of British waste strategy, and it defused the mounting concern of the time. Its proposals included the introduction of one central body with regulatory control, and the *As Low As Reasonably Achievable (ALARA)* principle. Keys accepted that nuclear power must intrinsically entail the release of ionising radiation into the environment but felt that every effort should be made to ensure that discharges should be kept 'As Low As Reasonably Achievable', and not just below whatever safety limits were set. Discharges should also be controlled 'irrespective of cost' so as not to endanger the health of the nearby population or the genetic well-being of the nation. Nevertheless, the Keys report did not provide a comprehensive solution to the question of radioactive waste. For example, the issue of High Level Waste was merely skirted around, with a passing reference that it should be kept in 'inaccessible parts of the Earth's surface'. Superficially though, it seemed that Britain had an emerging waste policy. West Cumbria widened its range of nuclear services with the beginning of shallow land burial of solid Low Level Waste at Drigg, six kilometres south of the

Windscale site, and High Level Waste was stored on site at Windscale, whilst research began into the principle of vitrification. It should be noted however, that the policy was not as comprehensive as it might appear. If it cost too much to transport radioactive waste from the research stations to Drigg, it was simply dumped at sea (Berkhout 1991, 141). Further regulation for the British nuclear industry arrived in 1960 when the Radioactive Substances Act gave Her Majesty's Inspectorate of Pollution (HMIP) responsibility to give authorization for the discharge of radioactive materials. The on-site management of radioactive waste by commercial users came under the jurisdiction of the Nuclear Installations Act of 1965 which required nuclear sites to obtain licences from the Nuclear Installations Inspectorate (NII), granted in relation to safety and radiological protection (Berkhout 1991, 134-36).

2.2.11 Summary

By the end of the 1950s, the British nuclear industry was one of the most advanced in the world. Although the plutonium producing piles had brought a shock to the industry in 1957, they had succeeded in their task of providing a British nuclear capability for the Cold War. The piles had now been superseded by the dual purpose MAGNOX reactors which were progressing well. Britain was even beginning to show signs of having a policy for radioactive waste disposal and British regulatory bodies had been established.

2.3 1960s

2.3.1 Continued expansion ... and problems with MAGNOX

The turn of the decade was a promising time for the nuclear industry. In 1959, America opened a new reactor at Morris, Illinois, and the ENEA's Halden Heavy Water Reactor opened in Norway. In the USSR, not only did the Troitsk reactor open in 1958, but a year later, the world's first sea-bound nuclear reactor was launched aboard the icebreaking ship, *The Lenin*. In Britain the eventual ideal of a self-perpetuating nuclear programme looked a step nearer on November 14 1959, when an experimental fast breeder reactor, the DFR, went critical at Dounreay in Scotland. By 1961, it was the first FBR to have produced electricity for public use (HMSO 1969, 18). Spurred on by this success, the government approved a prototype fast reactor, the PFR, for the same site in 1966.

The rest of the British civil nuclear programme was not proceeding quite so smoothly. The MAGNOX design was coming under pressure from the outside factors which had earlier been its very *raison d'être*. In the late 1950s the oil price had fallen, increasing the competitiveness of one of nuclear power's rivals, and interest rates rose, pushing all power stations, nuclear or not, towards economies of scale - larger capacities and a larger output. The relatively small MAGNOX design with its high initial capital outlay, found itself outdated (Tombs 1980, 5). This problem was exacerbated as difficulties were being encountered with steel reactor components with low silicon content. Those which were regularly exposed to temperatures of above 360 degrees Celsius were suffering rapid corrosion. As existing British reactors could not be modified without rebuilding them, all existing MAGNOX reactors had to be derated, and the maximum operation temperature set at 360 degrees. This represented a twenty percent reduction of maximum output at a time when greater output was sought (Tombs 1980, 6). Despite this setback, the British MAGNOX design was not abandoned. It was merely altered, with a move to a larger reactor, with a concrete pressure vessel replacing the earlier steel vessels. The first concrete pressure vessel was at Oldbury in Gloucestershire, which first powered up in 1967, with coolant pressure three times greater than that permissible at Calder Hall. The future still seemed relatively hopeful, as output from the new reactor at Wylfa in Anglesey was three times greater than that at Berkeley which was constructed nine years earlier (Tombs 1980, 6).

There was a problem over waste disposal though. In 1958, the UN conference on the Law of the Sea gave the International Atomic Energy Authority (IAEA) responsibility for the standards and procedures of sea dumping of radioactive waste. Three years later, the IAEA's technical guidelines were published in the Bryneilsson Report. It opposed the sea dumping of HLW and recommended that all other waste be dumped at depths of greater than two kilometres so as not to endanger fishing. The report thus posed a problem for the British nuclear industry. For one thing it left a large question mark over the options for HLW disposal (the Keys report, the basis of existing British policy, had been opposed to land disposal of radioactive waste) and for another it put other British waste management policies in doubt because the Hurd Deep in the English Channel was less than two kilometres deep. Dumping in the Hurd Deep therefore ended within two years because it contravened the Bryneilsson guidelines. Not that this signalled a British move away from sea dumping, they merely moved to deeper waters in the Atlantic (Berkhout 1991, 141).

2.3.2 SL 1 Idaho

On January 3 1961, came perhaps the most dramatic instance of the dangers of operator neglect, at the SL 1 military plant in Idaho. Three servicemen, Messrs Legg, Mckinley and Byrnes, were reassembling control rod drives after a maintenance shut-down - 'a straightforward procedure which the three had carried out many times' (Patterson 1983, 131-32). The refit had been completed, when, for some inexplicable reason, one serviceman pulled the central control rod out of the core. The rod became stuck. The men tried to shift it manually but in doing so moved it too far out of position (King 1990, 55). According to Patterson (1983, 131-32):

"The result was catastrophic. The core almost instantly went supercritical, the fuel fried itself, and the resulting steam explosion blasted a virtually solid slug of water at the roof of the reactor. The reactor vessel rose three metres, right through the pile cap. Legg and McKinley were killed instantly; McKinley's body was impaled in the ceiling structure on an ejected control rod plug. Byrnes was cut down by a withering flash of radiation."

Byrnes died on his way to hospital. It took twenty days before the bodies were safe to handle and even then they had to be buried in lead-lined coffins in lead-lined vaults. Fourteen men received radioactive contamination in the clean up. The event did not directly affect the UK, but it was another example of the way that events could go tragically wrong at nuclear installations.

2.3.3 Doubts

In the 1960s, dissenting voices began to be heard once more, claiming that nuclear energy's peaceful applications had 'disappointed'. The question of waste disposal was as yet unresolved, worrying nuclear accidents had occurred and claims were made that due to its complexity, nuclear power was in fact 'less than suitable' for the less developed countries which Eisenhower had hoped to assist (A.Heckschecker cited in Mullenbach 1963, vii). Perhaps most importantly, a growing worry was nuclear proliferation. The arms race which the nuclear industry had fuelled had continued to escalate. The USSR and the USA had developed intercontinental ballistic missiles (ICBMs) by 1957, and France had become the fourth nation with 'the Bomb' in 1960. The tension between the two superpowers had increased with the construction of the Berlin Wall in 1961. The tension culminated in Cuba where Fidel Castro and Che Guevara had led a successful revolution in 1959. The Soviets supported the revolution, to which the Americans were hostile. The Soviets saw in Cuba a chance to establish a threat in the western hemisphere equivalent to that offered to Moscow by American missiles in Western Europe (Vadney 1992, 292), and began construction of a Soviet nuclear weapons site in Cuba. The Americans attempted a naval blockade to prevent them doing so, and the threat of a war between the two superpowers became all too real. Although eventually defused, this threat of imminent holocaust reminded many people of the risks of increasing the availability of fissile materials, and made a future in which every nation had a nuclear capability seem less appetizing. At the level of the superpowers, the Cuban crisis seemed to demand an increase in detente. A hotline was established between Washington and Moscow to facilitate communications between the leaders. In December 1961, the United Nations General Assembly passed a resolution establishing an 18 nation disarmament conference (Patterson 1983, 194). Work was speeded up on a treaty between the USA, the USSR and the UK banning the testing of atomic weapons in the atmosphere or oceans, which was signed on August 5 1963. Part of the reason for the ease of consensus on this issue may have been that the need to create plutonium was perhaps less pressing amongst the superpowers by the early 1960s - by 1962 even the British had already achieved a satisfactory military stockpile. Attention now moved to preventing other nations developing nuclear capabilities. France, under the leadership of General De Gaulle, stayed aloof from such co-operation (Vadney 1992, 295).

2.3.4 Continuing expansion - Oyster Creek

Despite the beginnings of doubts in some quarters, investment in civil nuclear power continued apace. In 1963, that investment seemed to have been prudent when Jersey Central Power and Light of America ordered a reactor for Oyster Creek from General Electric. It was to be the first US reactor constructed without subsidies, making civil nuclear power generation appear not only possible, but profitable. Oyster Creek promised a very high rate of output at a very low cost. Over thirty American orders for reactors were made in response to the Oyster Creek order, including two in the heart of Tennessee coal mining areas.¹³ Worldwide, between 1960 and 1965 there was a dramatic addition to the small number of power station reactors in service. America added ten new operational reactors, France four, the USSR three, Canada and Japan two each. West Germany, Italy, Puerto Rico, Czechoslovakia, Sweden, East Germany and Belgium all gained one functional reactor apiece. There were also some twenty-five experimental reactors in operation worldwide (Mullenbach 1963, 48-51). At this time, nuclear powered trains were seen as being of possible commercial realisation within two decades (Mullenbach 1963, 35).

In Britain, the Hunterston A, Dungeness, Hinkley A and Transfynydd reactors all went critical in the first half of the 1960s. A second reprocessing plant, B205, opened at Windscale in 1964. With a design capacity of 1,500 tonnes annual throughput, it would reprocess the spent fuel from the expanded MAGNOX programme (Berkhout 1991, 144). The ENEA's Dragon reactor at Winfrith also started up in 1964 (King 1990, 24; Patterson 1976, 61).

2.3.5 Moving on from MAGNOX to AGRs

The need to compete with the success of Oyster Creek put added pressure upon the British civil nuclear programme. Despite the improvements made to the reactor design from Oldbury onwards, the low output MAGNOX design was increasingly seen as anachronistic. By 1964 the UKAEA had developed a plant at Capenhurst in Cheshire which was capable of supplying enriched uranium, meaning that Britain could now develop higher intensity reactors using uranium oxide fuels without having to rely on foreign supplies of fuel. In 1963 the UKAEA had opened a prototype Advanced Gas-cooled Reactor (AGR) at Windscale. Although

¹³It was later discovered that the apparent financial security of Oyster Creek had been founded upon subsidy from General Electric itself. At the time however, no-one knew this, and the perception of the high output Oyster Creek as a financially successful reactor was a driving influence in the design of other reactors, a fact which was to have harmful consequences for the British nuclear industry in particular.

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technologically demanding, the government chose to develop a new programme of AGRs rather than abandon the British nuclear industry's gas-cooled designs in favour of water-cooled reactors because of the 'undoubted success of the constantly evolving MAGNOX programme and the relative ease with which its many problems have been surmounted' (Tombs 1980, 7). On May 25 1965 Fred Lee, the Labour Minister of Power announced the Second British Nuclear Power Programme, a programme of British designed AGRs. He told the House of Commons that he was 'sure we have hit the jackpot this time ... here we have got the greatest breakthrough of all time' (Cited in King 1990, 43; Burn 1978, 10). The choice of the AGRs had been helped by the fact that since the nationalisation of electricity supply in 1946, the UKAEA had enjoyed close links with the government, and was able to influence the policy process towards British designs.

Management of the back-end of the nuclear fuel cycle advanced in 1962 when Harwell had opened a pilot vitrification plant in 1962 to encapsulate HLW, thus bringing the promise of an eventual solution to one of the industry's most difficult problems (Berkhout 1991, 138).

2.3.6 Problems with the AGRs

The first of the new programme of British AGRs was to be built by Atomic Power Constructions at Dungeness. Originally it was intended to base the reactor upon the prototype which had been in operation at Windscale. However, because British reactors were attempting to compete with (unrealistic) schemes such as the Oyster Creek plant, this led them towards more extravagant designs, and the Dungeness project eventually decided upon a plan some twenty times larger than the original Windscale AGR. The far larger scale of the design, plus the inexperience and limited resources of Atomic Power Constructions led to many costly delays and modifications (Tombs 1980, 7). Eventually, after prolonged difficulties, Atomic Power Constructions went bust, throwing the Dungeness project into disarray. Hinkley Point B, Hunterston B, Hartlepool and Heysham retained their builders, but also struggled with the challenges of the AGR (Tombs 1980, 8). By 1967, Britain had generated more electricity by nuclear means than the rest of the world, including the United States, put together (Pierre 1972, 127). However, as the AGR programme stuttered, other countries overtook it. It has been argued that 'the UK's impressive head start into civil nuclear power foundered so badly on the AGRs that it has never recovered' (Patterson 1983, 138).

2.3.7 Proliferation concerns

The rapid spread of reactor technology meant that the mid to late 1960s saw further increases in concern about the spread of nuclear technology. In 1965, the American Nuclear Materials and Equipment Corporation revealed that over six years at a plant in Apollo, Pennsylvania, sixty kilogrammes of enriched uranium, enough for several bombs, had simply gone missing (Patterson 1983, 197). Sam Edlow, a consultant on the transport of nuclear materials, told the April 1969 meeting of the Institute of Nuclear Materials Management that from his experience, material enough for dozens of bombs, was

"routinely lost, mis-routed and overlooked by airlines, trucking companies and freight terminals. A shipment of his, thirty-three kilogrammes of 90 per cent enriched uranium travelling from New York to Frankfurt was mistakenly offloaded at London Airport and left there unattended until the shippers asked the airline about it. A US domestic shipment from Ohio arrived in St. Louis with one of three containers of strategic materials - gross weight 385 kilograms - missing. Not until nine days later did the missing container finally turn up - in Boston under a load of shoes" (Patterson 1983, 199).

This lack of control over fissile material and the addition of China to the list of countries possessing nuclear weapons in October 1964 had added to concerns about weapons control, as had increasing Arab-Israeli tension in the Middle East where President Nasser had attempted to draw the USSR into a defence treaty with Egypt in the aftermath of the six day war of 1967. This would have placed the Soviets in direct confrontation with the USA who were aiding the Israelis.

Some steps were taken to allay the increasing concern. By 1967, the IAEA had seventy-seven nations as members, and an extension of the 1963 test ban treaty barred test explosions in space. On June 12 1968, the UN General Assembly commended a joint USA-USSR non-proliferation treaty (NPT) first proposed in 1965. It included the following:

- barring the transfer of nuclear weapons
- barring the assembly of nuclear weapons
- regulating the transfer of fissile materials between nations
- making non-nuclear nations accept the IAEA as a watchdog to prevent the development of covert bomb programmes
- allowing international co-operation for peaceful electricity
- moving towards disarmament.

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There were two main drawbacks to the NPT. Firstly, many nations, including France and China, did not become signatories, and secondly, any nation had the right to withdraw having given three months notice, but it would take them less than three months to make a nuclear weapon if they had access to the right information.

2.3.8 Summary

In contrast to the optimism which still pervaded the global nuclear industry in the late 1950s and early 1960s, the British industry encountered problems as the years progressed. The Bryneillson Report had forced change in waste disposal policy, the MAGNOX design had been made unattractive by external economic and political developments, and the AGRs had proven more technically challenging than expected. Perhaps most importantly, seeds of doubt had been sown over the whole British gas-cooled reactor - reprocessing cycle, as Cuba and other tensions highlighted the dangers of overproduction of fissile material. Although the nuclear industry was expanding successfully elsewhere around the globe, this very success was leading to increased concern over the issue of proliferation.

2.4 1970s

2.4.1 More problems abroad

In the 1970s, difficulties with reactors became increasingly common across the globe. In January 1969, carbon dioxide coolant escaped after a pressure tube failed following a two month maintenance shut down at the underground Lucens reactor in Switzerland, meaning that radioactivity leaked through several caverns, and it took years to decontaminate and dismantle the plant. The caverns had to be left as a dump for radioactive waste (King 1990, 54-55). By 1970, eight of the first generation of US reactors had closed permanently because they were either inoperable or uneconomic (Patterson 1983, 180). Another problem for the American nuclear power industry arrived in 1970 when the US National Environmental Policy Act was passed, which said that major development projects must include environmental impact statements, including alternatives and cases against proposed projects as well as those in favour. With this in place it became harder to get permission to build nuclear plants, and in July 1971 came the first legal judgement against a proposed nuclear power plant, at Calvert Cliffs in Maryland. Nuclear power was developing a reputation for accidents, and it was clearly not as desirable as once it had been.

2.4.2 The beginnings of organized opposition

Proliferation concerns continued to mount in the 1970s. Problems were encountered with the NPT, as less developed countries grew indignant at the way in which they were denied access to nuclear technology whilst the superpowers were making little headway in reducing their nuclear arsenals. The major powers themselves feared that 'irresponsible, possibly criminal or fanatical groups' could gain access to fissile material (Patterson 1983, 198). Such fears had been partially realised in October 1970 when a fourteen year old hoaxed Orlando in Florida, claiming to have a nuclear bomb and demanding a million dollars (Patterson 1983, 198). America proposed to launch a National Fissile Material Security Service, similar to the CIA or FBI, but the difficulty of regulating valuable fissile materials was illustrated in February 1973 when William T. Riley, a former chief security officer of the US Atomic Energy Commission (AEC), was sentenced for borrowing \$239,000 of AEC employees cash, mostly for gambling on horses, and failing to return over \$170,000 of it (Patterson 1983, 214). If security officers had gambling habits, would it not be easy to bribe them for fissile material?

In the late 1960s and 1970s, popular protest movements had grown which diverted political attention from intensifying the Cold War (and thus legitimising the nuclear materials industry)

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to dealing with internal affairs. The USA had to contend with internal protests against the Vietnam War, the civil rights movement, and race riots. France faced the problems of the student and worker protests and general strike of 1968. In Britain, the troubles in Northern Ireland were just beginning to escalate. The Eastern Bloc had its own troubles, not least of which were the confrontations precipitated by the reforms of the 'Prague Spring' in Czechoslovakia, and the strikes in Poland. The counter-culture which had begun questioning the status quo in many sections of western society soon began to turn its focus upon nuclear power. A new generation was coming of age who had not lived through the second world war or the fuel shortages which followed it, but who had lived through the tensions of the cold war, and who did not view nuclear power with the same reverence as did their elders (Blowers and Lowry 1987, 139-40). A rise in the use of nuclear terrorism and nuclear disasters as themes in books and films in the 1970s did little to boost public confidence in the industry. Popular anti-nuclear sentiments were given a new direction by the emergence of organized groups such as Greenpeace. They first entered the arena in 1971 when they sailed to the American bomb testing site near Alaska. Bringing much media attention with their demonstrations, Greenpeace would become an increasingly important foe of the nuclear industry worldwide, civil as well as the military. Friends of the Earth (FoE) were another group who emerged at the forefront of the anti-nuclear movement. Using less militant tactics than Greenpeace, they attempted to develop their scientific credibility, and by 1974 they had succeeded in doing so to such an extent that they were selected to give evidence to a House of Commons Select Committee on Science and Technology regarding the safety of light water reactors. The swell of popular environmentalism was also increased by events such as the UN Conference on the Human Environment in Stockholm in 1972. This brought a more environmentally concerned focus upon many spheres of Western life, including nuclear energy.

Mass anti-nuclear protests began to take place in Europe. In April 1970, one and a half thousand people demonstrated against French proposals for a new plant at Fessenheim, and in July fifteen thousand people demonstrated against a new site at Bugey. Some months later, forty people squatted at the proposed Bugey site for fifty days, before a two thousand strong demonstration marched to Lyon. These were the first of a series of massive demonstrations in France and Germany which set the trend for protests elsewhere, and which could have inspired similar British anti-nuclear activity.

The German nuclear programme had started later than the British and French schemes, due to Allied restrictions on post-nazi Germany's eligibility to develop nuclear power. As a result, the German nuclear industry missed out on the public optimism of the 1950s and only emerged at the same time as the new, critical, counter-culture (Turner 1986, 441). When the government of Baden-Wurttemberg announced plans for a nuclear power station near Wyhl in 1972, local farmers feared the effect of radioactivity on their vineyards, and an (unsuccessful) campaign rose against the power station, involving meetings, petitions and demonstrations. On February 17 1975, after a local referendum brought a narrow majority in favour of the development, construction began. The next day a hundred and fifty protestors occupied the site, being violently removed three days later by the police. On February 23, twenty thousand people returned to occupy the site and began to settle there. Anti-nuclear scientists and politicians led an 'open university', educating people about the issues involved. After four months a compromise was reached - the protestors would leave the site and the authorities would not make claims for any damages during the occupation. No development would take place until a final court decision had been taken. In March 1977, the administrative court banned construction on a technical point. The success of the Wyhl protest was another step in the evolution of the anti-nuclear movement, and it inspired further protest elsewhere (Nelkin and Pollack 1981,3).

In 1974, a new French nuclear programme was unveiled. It proposed thirteen new plants by 1980 and no less than fifty reactors in twenty locations by 1985. The decision 'was announced as a *fait accompli*, leaving no opportunity for meaningful parliamentary debate' (Nelkin and Pollack 1981, 2). Popular protest was stimulated by the seemingly autocratic policy community of central government and the nuclear industry, and in 1975, farmers protested against plans to develop four reactors at Braud-et-Saint Louis. Construction work began before permission had officially been given, annoying protestors still further. A bomb exploded at the house of the *conseil-general* and trucks belonging to Electricité de France (EDF) were destroyed, and an EDF building occupied. Twelve farmers were arrested under the anti-demonstration laws of 1968. Protesters responded by setting up a camp next to the site until the riot police (CRS) intervened (Nelkin & Pollak 1982, 69).

State violence became an increasingly common factor in European nuclear protests in the 1970s. At Brokdorf in Germany in October 1976, eight thousand people occupied the site of a proposed reactor. The police expelled them using horses, water cannon and chemical

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mace. Fifty-two people were arrested, and several were wounded. The incident gave little evidence of the success of resolute state intervention in quelling popular protests. The next day, four thousand people marched in protest at police violence. Protestors returned to the site in November that year. Between thirty thousand and forty-five thousand marched to the site where violent confrontations with police resulted in injuries to five hundred people and a hundred arrests (Nelkin & Pollak 1981, 66). Before another demonstration could take place, the administrative court revoked permission for the Brokdorf plans, saying that provision for waste disposal was inadequate. This precedent tied development of nuclear power in Germany to the solution of waste disposal in a way which did not happen in Britain.

Similar events took place at Grohnde, near Hanover, in March 1977.

"Both sites looked like prison camps, ringed with barbed wire and watch-towers. The police used helicopters, tear gas, water cannon, and baton charges. Most of the protesters were local people; but there were also small cadres of protesters clearly equipped to meet violence with violence ... the spectacle of helmeted police and masked protesters in frenzied combat was splashed on front pages all over the world." (Patterson 1983, 154).

Perhaps the inevitable consequence of the increasing violence occurred in July 1976 when sixty thousand people demonstrated against a fast breeder reactor proposed for Creys-Malville in France. Police used force to clear the site and a pitched battle occurred between police and demonstrators, during which one demonstrator was killed (Patterson 1983, 154).

A change in the tactics of anti-nuclear protestors came from the USA. Around the middle of the 1970s came a flurry of American state referenda on nuclear issues. All were resolved in favour of the nuclear industry. The industry viewed this outcome as a democratic endorsement of its activities. Its opponents felt that the industry's greater financial resources had allowed it to buy support through extensive advertising campaigns, and began to question the value of following legal attempts to counter the industry, and to take to the streets instead (Patterson 1983, 157). The first major American anti-nuclear group Critical Mass was established in 1974. In Seabrook, New Hampshire, the Clamshell Alliance was formed when the go-ahead was given for a nuclear plant after protests through the legal system had failed. The Clamshells differed from the protestors of the European mainland in that they trained in non-violent opposition. Their first demonstration, in October 1976, led to 1414 protestors being arrested. Their tenacious, yet peaceful, tactics began to be emulated elsewhere

(Patterson 1983, 157-58). In September 1977 at Kalkar, on the German-Dutch border, the new pacifist approach defused the European nuclear debate. German police stopped and searched vehicles on the roads to a disputed reactor site, even a train was blocked by an armoured car and all the passengers searched. Four hundred French citizens were denied entry to West Germany. Police confiscated all possible weapons, and even bottles of lemon juice which could be used to protect against tear gas. Following the example of the Clamshell Alliance, the objectors responded this time with passive resistance, making it more difficult for the authorities 'to claim that the objectors were all extremists and subversives' (Patterson 1983, 154).

Pacifist protest did not become universal immediately. The most violent conflict with nuclear power occurred in Spain, where a reactor was proposed for Lemoniz, twelve kilometres from Bilbao, in Basque territory. Local people saw it as an imposition from central government in Madrid, an insult to their separatist traditions. Accordingly, Lemoniz was blighted by the largest demonstrations ever seen anywhere, involving between a hundred and fifty and two hundred thousand people chanting against the reactor development and in favour of Basque separatism and the Basque separatist terrorists, ETA. In December that year, demonstrators attempted to break through police to reach the reactor and one protestor was shot and killed. Three months later, a bomb exploded in the reactor core, killing two workers and causing seventy thousand pounds worth of damage which delayed construction by two years. On Whitsunday in 1979, a twenty-three year old woman was shot through the head by police at a sit-in by five thousand protestors near the site, provoking ETA to kill two policemen in Madrid. The next day a general strike brought Basque industry to a standstill. ETA continued their protests, kidnapping the commissioner of Industry and Energy. Two days after his release a second bomb at Lemoniz killed a maintenance worker. On November 11 1979, five men armed with pistols and sub-machine guns invaded the factory which was repairing the reactor, and blew it up with plastic explosives, causing six million dollars worth of damage (Falk 1982, 205-08). In 1981, the chief nuclear engineer was kidnapped and murdered, as was his successor the following year.

The European experience was not shared in the UK, where the authorities took a more pragmatic and less controversial stance (perhaps as a response to such continental events). Nevertheless, it is worth remembering events on mainland Europe, as a reminder of how proceedings might have developed in the UK.

2.4.3 Windscale - Leaks

In 1971, there were institutional changes in Britain. The National Radiological Protection Board (NRPB) was established to give independent advice on dangers from radiation. That same year the UKAEA separated its production group and renamed it British Nuclear Fuels Limited (BNFL). The radiochemical group was also separated to become The Radiochemical Centre Ltd, later known as Amersham International. BNFL was to be responsible for the supply of fuel for the civil nuclear programme, including fuel enrichment and reprocessing, and for the export of uranium. It was not long after their formation that BNFL were faced with a near-crisis in their reprocessing operations at Windscale.

In reprocessing, a solvent called tributyl phosphate was employed. Unfortunately, this solvent led to the formation of solids which settled to the bottom of the storage tanks and produced 'hot spots' of increased corrosion and vapour releases. A new type of tank was designed which would remove these phosphates and would also allow the liquid to be concentrated to far below its original volume¹⁴. Eight tanks of this design were to be introduced, but, in 1971, the cooling jacket on the first of these new storage tanks was found to be leaking. In order that repairs could be made, the tank was shut down for six months. The problems did not end then. Problems began to be found in the cooling jackets of the other new tanks. The situation was further exacerbated by another factor - the higher operational temperatures in the newer reactors such as Oldbury were causing more of the MAGNOX cladding to enter the fuel itself, meaning that not all the magnesium oxide was removed in the de-cladding stage. The presence of magnesium oxide in the later stages increased the precipitation of solids, and lowered the practical levels of concentration of liquids. New tanks simply could not be built at the speed with which waste was arriving. By September 1972 reprocessing itself had to be halted pending the construction of new storage tanks (Berkhout 1991, 145; Cassidy & Green 1993, 26-27).

¹⁴ About four and a half thousand litres of liquid HLW were produced per tonne of fuel processed at Windscale, and the storage of this initial volume of liquid would have caused considerable inconvenience, and would also have placed excessive demand upon the steel industry for the manufacture of stainless steel tanks (Berkhout 1991, 145). Volume reduction therefore was an integral part of reprocessing.

The problems did not cease when the leaking tanks were repaired. The original timetable for reprocessing spent fuel was that, after eighteen months in a reactor, it would be stored on site for six months, then transported to Windscale where it would be reprocessed within the next eighteen months. This timing was essential, for one of the main problems with the magnesium oxide cladding of the MAGNOX reactors was that it corroded relatively rapidly in water and thus any delay could be problematic (Berkhout 1991, 137). While reprocessing had been halted, a backlog of up to eighteen months worth of spent fuel from the nation's MAGNOX reactors had built up. The problems of the three day week which afflicted all of British industry in 1973-4 and a further strike at Windscale in 1973 did nothing to help clear this backlog (Berkhout 1991, 148). By 1974, when reprocessing eventually resumed, the fuel had begun to corrode, causing more problems, meaning that the process took longer, causing more delays, thus causing yet more corrosion (Cassidy & Green 1993, 26-27). By 1975, BNFL had to refuse new loads of spent fuel from the electricity companies. The higher radioactivity of the water was resulting in increased discharge levels, and increased doses to staff. Eventually, it became hard to see through the cooling pond water due to the corrosion. To improve visibility it was necessary to speed up the rate at which the contaminated water from the ponds was discharged into the sea and replaced by fresh water. The rise in discharges into the sea greatly increased marine radiation levels, despite a rudimentary ion-exchange filter which was put in place in 1975 to reduce the radioactivity of discharges. A new Site Ion Exchange Plant (SIXEP) was planned, but this did not come into operation until 1984 (Berkhout 1991, 148-50). It seemed that once again technical problems had confounded the industry. The Health and Safety Executive (HSE) said that plant conditions had

'deteriorated to an unsatisfactory level ... because of insufficient investment in plant and equipment in previous years' (cited in Cassidy & Green 1993, 26).

Overall, the incident did little for newly-formed BNFL's reputation.

2.4.4 Head End Plant

In the late 1960s, the new B205 reprocessing plant at Windscale had been found to have greater capacity than MAGNOX reprocessing demanded of it. In reviewing its facilities, BNFL saw a chance to use this excess capacity to begin reprocessing enriched fuel from AGRs and light water reactors (May 1990, 188). In order that B205 would be able to reprocess enriched fuel, that fuel would have to be treated first, and so the disused B204 building was revived as a treatment plant in which to dissolve enriched fuel in Butex prior to reprocessing in B205. This 'Head End Plant' went into operation in 1969 and ran until the closure of B205 in 1972

for repairs. When the Head End Plant re-opened on September 26 1973, an accident occurred. Before it had been shut down, there had been a build up of tiny granules of insoluble radioactive fission products in the process vessel. The heat from these granules had evaporated the last remaining liquid during its shut down, and heated the floor of the process vessel. When the plant re-opened and new solvent was poured into the vessel, it reacted with the hot surface, producing a steam explosion, and releasing a cloud of radioactive gas into the air. Thirty-five workers received skin and lung contamination. BNFL eventually conceded that the building could never be used again and it was closed permanently (May 1990, 188-89; Patterson 1983, 89). British attempts to reprocess enriched fuels were therefore abandoned for the time-being, and BNFL's reputation was further tarnished.

Other problems continued around the world. In 1972 seawater was let into the primary coolant of Millstone 1 reactor in the USA, irretrievably corroding all one hundred and twenty instruments used to measure the temperature of the reactor. On March 22 1975 at Browns Ferry, Alabama, an electrician was checking airflow through cable holes in a wall with a candle when a draught caught the candle flame and set fire to foam insulation, a fire which spread to the reactor building, causing an eighteen month shut down. The ever-lengthening catalogue of nuclear accidents bolstered the industry's detractors.

2.4.5 The industry receives a boost, the CEBG demands PWRs

Despite its problems, the nuclear industry continued to expand because it was seen as economically important. Once more, the stimulus to the industry came from rival fuel sources. On October 6 1973 Egypt and Syria attacked Israel. A combination of Arab concern at Western support for Israel, falling pressure in the Saudi oil fields, and the disruption caused by the war itself led to a quadrupling of the price of oil. In response to this, nuclear power plants were ordered around the world. In Britain, the CEBG demanded a programme of thirty-two American style PWRs to be built between 1974 and 1983. The scale of the plan surprised many, coming so soon after the problems of the AGRs (Patterson 1983, 145). The CEBG were unhappy with the exclusive use of British reactor designs. An experimental SGHWR at Winfrith which had been established in 1967 was only producing a relatively small amount of electricity, the FBR was making slow progress, MAGNOX reactors were far more expensive than PWRs, and the HTGR design was still in an initial experimental stage (Williams 1980, 209-10). The reasons for turning to the PWR were fourfold. Not only did the PWR reactor

produce electricity more cheaply than AGRs, but because there were more PWRs than AGRs across the globe, the CEGB hoped to be choosing a more tried and trusted system, which would have a wider network of information and experience available should things ever go wrong. This network was seen to be important after the problems of the AGR which the British had been developing on their own. The third advantage of the PWR was that the reactor would be constructed in a factory rather than on site, thus eliminating many of the problems which had beset the AGR construction schemes (Tombs 1980, 9). By developing PWRs, and becoming proficient in their construction and development, it was also hoped that Britain would at last have a reactor industry which could export technology abroad even if it was not originally their design. After two initial sales, to Japan and Italy, MAGNOX reactors had failed to sell abroad, AGRs had stimulated little foreign interest, and the decision of France to abandon gas-graphite reactors for PWRs in 1970 seemed to signal the end of international confidence in designs other than the PWR (Patterson 1976, 188).

The nuclear policy community was not unanimously in favour of the choice of American reactors. Their opponents pointed out drawbacks to the PWR. It had potential for technical difficulties in the form of a two phase coolant, and also, because of the use of water as coolant, higher dose rates were likely for operators (Tombs 1980, 11). The safety and productivity record of light water reactors abroad was open to question, and although PWRs were common globally, the particular design which the CEGB was demanding was as yet untried anywhere in the world. There was also concern about the effect of imported components on the balance of payments (Patterson 1983, 145). In this climate, where even the nuclear establishment was divided upon the best course to take, FoE and others such as the Institution of Professional Civil Servants, as well as much of the media, and some trade unions, began to arouse public concern about the nuclear industry. The decision to abandon the British design caused elements of dissent amongst the British nuclear scientific community, adding scientific criticism to the voices of opposition, and in February 1974 the parliamentary select committee released a 'terse and hostile report' on the contemporary state of the nuclear industry (Patterson 1983, 145). It should be noted that the debate over the safety and economic viability of different reactor designs also provided a wealth of technical and policy literature upon which protest groups could feed.

A crucial turning point in the debate about the CEGB's proposals came in February 1974 when the Heath government, which had shared the CEGB's liking for light water reactors, was

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replaced by the Wilson government, which did not (Patterson 1983, 145). After prolonged deliberation, the Labour government announced on July 10 1974 that the new British reactor programme would not be PWRs or even AGRs, but British-designed SGHWRs. The Winfrith Dragon was cancelled, as there were insufficient resources to develop a full scale demonstration plant, and the project was falling behind German and American competitors anyway (Burns 1978, 246). The decision to develop the as yet unproved SGHWR alone, effectively delayed the development of a new programme of British reactors until such time as the SGHWR was fully practical, leading to allegations that the decision of the minister responsible, Eric Varley, had been influenced by his links with the National Union of Mineworkers (NUM), and his consequent desire to support the coal industry (Burns 1978, 246).

Permission for SGHWR reactors were granted for Sizewell and Torness, but the programme encountered difficulties. Electricity demand fell in 1975, general economic difficulties led the government to seek public expenditure cut-backs, and technical problems began to afflict the project, which was deferred for a year (Williams 1980, 241). At the same time, the AGRs were finally in place, with Hinkley Point B and Hunterston B reactors producing electricity in 1976. With the technical problems of the SGHWRs forcing up the cost of the electricity which they generated, pressure continued to mount to reverse the policy decision and adopt PWRs as the third generation of British reactors, because they would produce electricity more cheaply than the SGHWRs (Burns 1978, 249). With AGRs now operational there was even a case for them to be adopted. On January 25 1978 the SGHWR was formally abandoned, with permission given to the CEGB and SSEB to order one AGR each, and a pledge given that the government would order a PWR in the near future (Williams 1980, 258).

The wasted years which the nuclear authorities spent in schism over PWRs, AGRs and SGHWRs had harmed the British nuclear industry's status and reputation once more, but ironically, the drawn-out debate over the new nuclear programme in Britain stifled protest in a way which did not occur elsewhere. With the lengthy delays in the AGR programme and then this hold up in the development of its successor, British anti-nuclear protests were robbed of a target around which to mobilise. To use an extreme example, it was not until 1982, seventeen years after it was ordered, that Dungeness B finally went critical. The consequence was that although the industry's development was hampered, the conflicts with the public

found on mainland Europe were avoided. The delay in reaching a final decision had been possible because of other factors such as the natural resources of substitute fuels, such as coal, oil and natural gas, which Britain possessed and which gave the government an amount of flexibility which governments in countries less abundant with fossil fuels did not have (Turner 1986, 440-41).

2.4.6 Karen Silkwood

On November 13 1974, a new kind of controversy rocked the nuclear industry worldwide. Karen Silkwood, a worker at the Cimarron plant in Oklahoma had arranged to meet a reporter from the New York Times and a representative of her trade union (the Oil, Chemical and Atomic Workers Union) with a dossier on malpractice at her workplace. She did not make it to the meeting. Her body was found in her car, which had driven off a straight road at speed. The dossier was not there. Her union investigated and found that both Silkwood and her apartment bore traces of plutonium, and that her car may have been rammed from behind. Her family sued the owners of the plant, Kerr McGee, and received several million dollars. The plant closed permanently shortly after her death (Patterson 1983, 156). The publicity from the Silkwood case, not least from the film *Silkwood*, starring Meryl Streep, tarnished the industry's reputation once more.

2.4.7 The Atomic Industry Conference 1975

The nuclear power industry held a meeting in San Francisco in 1975. There were several problems which confronted it. On top of the perennial technical problems, and the rising amount of opposition, the economic depression afflicting the western industrialised nations was leading to reactor orders being cancelled. Two weeks before the conference, General Atomic, one of America's largest nuclear firms, had withdrawn from the reactor business. Their vice president Richard McCormack told the conference

"Front line (nuclear) vendors to the electrical utility industry have yet to make a dollar for certain, after some twenty years of effort" (cited in Falk 1982, 27)

and queried the sense of investment in the industry. One block away from the atomic industry conference, the 'Conference for a Non-Nuclear Future' represented the first international meeting of anti-nuclear movements (Patterson 1983, 162). To some commentators, 1975 symbolised the transformation of an industry which was once buoyant with optimism into one struggling under constant pressure from politicians, markets and public alike (Falk 1982, 25).

2.4.8 Exports

With domestic orders for nuclear reactors slowing down, companies increased their attempts to sell reactors to less developed countries. Brazil alone received eight reactors, a reprocessing plant and an enrichment plant from the German firm KWU. These attempts to stimulate the industry did not proceed without problems. Not only did these exports to new countries increase concerns about proliferation of nuclear materials and nuclear technology, but there were also some rather dubious economics involved. Nuclear exports often involved making initial loss-making 'turnkey' deals and some also involved offering long term preferential access to fuel. The long term nature of these deals caused problems for the industry in mid 1975 when the price of uranium quadrupled. The American firm Westinghouse for example, had offered its customers contracts for a lifetime's supply of fuel at fixed prices, and were caught out by the price rise, having failed to keep adequate uranium stocks. In June 1975 Westinghouse was forced to tell its clients that it did not intend to honour its supply commitments, and consequently received 29 lawsuits from its irate customers. The reason for the dramatic rise in the price of uranium was later revealed to be the fact that Australia, Canada, France, South Africa and the Rio Tinto-Zinc mining Company had formed a cartel with the intent of pushing up the price of uranium. Westinghouse attempted to sue all those involved. Eventually the situation was resolved, but the affair further discredited the industry, and did little to establish an air of harmony within the nuclear community. There were also other curious examples of a lack of forethought on the industry's part, such as Westinghouse's plan to build a nuclear reactor at Bagac on the Philipino island of Bataan, near an active volcano, and the manner in which the sites for the Angra 2 and Angra 3 reactors which KWU had exported to Brazil had been chosen by the military rather than geologists, and were later found to be in a rather precarious and unsafe location, with the foundations of the reactors in danger of subsiding (Patterson 1983, 164). Although these incidents did not involve the British nuclear industry directly, they did little to bolster the reputation of the industry.

2.4.9 The end of the American dream?

The American nuclear industry did not really recover after the Atomic Industry Conference. In February 1976, three senior engineers from General Electric and one from the Nuclear Regulatory Commission all resigned, because they were unhappy with the safety of nuclear plants. Technical difficulties were still proving awkward to resolve. It had been expected that the nuclear industry would experience a 'learning curve', and that as operators came to terms

with initial problems, the difficulties would be surmounted, and that output would gradually increase. However, this did not seem to happen, instead new problems arose. In 1974, the US Nuclear Regulatory Commission announced that of forty-two commercial plants operating in 1974, the average availability (to work) was only 68.5% of the year. Output per annum was only 57.2% of possible maximum output (Patterson 1983, 181).

There was also the matter of proliferation. On May 18 1974 India had become the sixth nation to harness the deadlier side of nuclear power, adding to American concern at the spread of nuclear materials. The main concern centred upon the increasing availability of plutonium for missiles through reprocessing. America's one reprocessing plant, General Electric's Midwest Fuel Recovery Plant had opened in 1968 to reprocess enriched oxide fuels, but by 1974, the plant had proved a costly failure and driven General Electric out of the reprocessing business. With no indigenous reprocessing industry to harm, American President Gerald Ford attempted to deter other countries from developing reprocessing facilities. He publicly stated that neither reprocessing nor the use of separated plutonium was desirable or even necessary for civil nuclear power. On April 7 1977, new President Jimmy Carter reiterated this stance. America's concern with nuclear proliferation caused a degree of intergovernmental conflict with the other nuclear powers in the late 1970s as the USA became increasingly vociferous in its opposition to the other nations exporting nuclear technologies. In 1978 the USA passed a non-proliferation act establishing an embargo on the supply of enriched uranium to other countries. It was now possible for anti-nuclear groups to claim the agreement of the US government in their anti-reprocessing campaigns.

2.4.10 THORP in the 1970s

Having come through the immediate problems of the liquid waste tanks at Windscale in the early 1970s, the managerial flexibility provided by separation from the UKAEA enabled BNFL to make plans to expand reprocessing facilities and to look towards taking foreign orders too. A review of British reprocessing requirements concluded that facilities could be improved in three ways - strengthening capacity for reprocessing MAGNOX fuels (because the steady performance of MAGNOX reactors was demonstrating that there would be a need for MAGNOX reprocessing into the next century), constructing vitrification and encapsulation plants to deal with intermediate and high level wastes, and, (given the failure of the Head End Plant), the construction of a new plant to reprocess the enriched uranium oxide fuels from the newer AGRs, and any PWRs which were developed.

In response to this review, BNFL proposed to construct new waste vitrification and encapsulation plants, and to expand the MAGNOX reprocessing capacity. They also took a determined step to address the question of reprocessing oxide fuel. They proposed a Thermal Oxide Reprocessing Plant (THORP) to reprocess fuel from the newer British reactors, and from utilities using uranium oxide fuel around the world, to whom it would return both uranium and the waste arising from reprocessing (THORP The Facts, BNFL undated, sheet one). After the oil price rises of the time, the price of uranium had been rising. Reprocessing spent oxide fuel would offer a supply of fuel for reactors in the future (THORP The Beginning, BNFL April 1994, 2). The plutonium could be used in fast reactors or in mixed oxide (MOX) plants (THORP The beginning BNFL April 1994, 2), or in nuclear weapons. Perhaps part of the reasoning behind the new plant was that Cap La Hague, the French reprocessing plant in Normandy was also proposing to reprocess enriched fuel from PWRs, and Britain feared losing trade to their rivals.

THORP gave a fresh impetus to the British nuclear debate. The plant was to be partly paid for by foreign countries, and was the first British nuclear project to involve foreign companies in a major way. The idea of marketing reprocessing services intensified fears of nuclear weapons proliferation, with THORP seen as a stepping stone to a massive expansion of Fast Breeder Reactors. Perhaps the most controversial idea was that foreign waste would be coming to Britain. The media seized upon this last aspect, and in October 1975 the Daily Mirror ran a story under the headline 'Plan To Make Britain World's Nuclear Dustbin' (Patterson 1983, 160). Public concern about the nuclear industry was aroused by the media attention given to THORP. Conservation groups such as the Town and Country Planning Association (TCPA), the Council for the Protection of Rural England (CPRE), Friends of the Earth and The Conservation Society, were joined by groups such as Half Life (from Lancaster), and the Scottish Campaign to Resist the Atomic Menace (SCRAM) in demanding a public inquiry into THORP (Rudig 1990, 14). The USA too, following its new anti-reprocessing line, put pressure on the British government not to give THORP the go-ahead, and the matter tainted the IAEA conference at Salzburg, Austria in May 1977.

Cumbria County Council refused to approve BNFL's initial planning application and so the application was referred to the Environment Secretary, Peter Shore. There followed a period of government hesitation about whether or not to hold an inquiry, until events forced the

government's hand. High levels of radioactivity had been discovered in soil at Windscale during excavation work in 1975, and on October 10 1976, it was discovered that radioactive water had been leaking into the ground from silo B38 which contained MAGNOX fuel cladding. An inquiry by the NII (published in 1980) found that the leak may have started as early as 1972 (May 1990, 189).¹⁵

This discovery tipped the balance in the Cabinet, and on December 22 1976 it was announced that Mr Justice Parker would chair an inquiry into the proposals for the oxide reprocessing plant¹⁶. It lasted from June 16 1977 to November 4 1977 (one hundred days of hearings) (Parker 1978, 1).

The Windscale Inquiry was different from other public inquiries which are 'designed to deal with purely local objections' (Rudig 1990, 15). On this occasion, the groups opposing THORP were principally non-Cumbrian, and the proceedings became a matter of national concern, and received national media coverage. The opponents of THORP argued against not just the THORP project, but against reprocessing in general. They argued that storage of spent fuel presented a viable alternative to reprocessing (Berkhout 1991, 158) and that the reprocessing of oxides itself was an unproven technology - all THORP's predecessors had failed either financially or technically¹⁷. Another argument against THORP was that the costs of recovering uranium and plutonium from spent oxide fuel would be greater than the market price for fresh fuel, and that reprocessing merely complicated the already tricky question of radioactive waste by increasing its volume. FoE also pointed out the danger for world security of THORP setting a precedent - if Britain argued they must recover plutonium for fuel, so too could India,

¹⁵ A similar incident was discovered in 1979. A tank in building B701 had been accidentally receiving high level radioactive waste liquid diverted from the complex system of piping. By February 1979, the liquid had been leaking from the tank through the side wall of the building and into the ground for at least three years (May 1990, 190).

¹⁶ The application for THORP had also included proposals for a waste vitrification plant and Cumbria County Council approved this in March 1977, so the only section which went to the enquiry was the oxide fuel reprocessing plant.

¹⁷ As mentioned above, American attempts to reprocess oxide fuel had ended in failure in 1974, BNFL's own Head End Plant had closed ignominiously, and Cap La Hague was having its fair share of problems too. A series of incidents had resulted in the contamination of its workforce, and this health risk, plus fears over job security following privatisation from Electricité de France to Cogema in 1973, culminated in a strike at the plant from September 1976 to January 1977.

Pakistan, Argentina, Brazil, South Korea or any other nation who might use it for weapons development. The main argument against THORP however, concerned the increased health risk of further radioactive discharges (Patterson 1983, 161-62).

The fissile material which THORP would produce was also a worry for those unhappy with attempts at weapons control in the 1970s. The first Strategic Arms Limitation Talks treaty (SALT I), and protracted negotiations over a SALT II treaty had between them restricted numbers of delivery systems but in practice they simply allowed the stockpiling of more complex delivery systems which would use fissile materials more efficiently (Vadney 1992, 422-23). The traditional British argument that reprocessing was necessary to recover valuable uranium and plutonium for future use in FBRs was weakened by the existence of a sufficient stock of plutonium ready for the first British FBR, and indeed by the growing doubts that a viable FBR would ever be realised. Instead BNFL's argument for the necessity of THORP centred upon the idea that merely storing steel-clad oxide fuel would be unwise for the length of time necessary, as oxide fuel pellets would corrode more rapidly than vitrified reprocessed materials. Storage would also require the construction of extensive storage facilities (Berkhout 1991, 158). Disposal of vitrified HLW was seen as preferable to direct disposal of spent fuel, because of the lower plutonium content. They also argued that no extra risk was given to the British public through radioactive waste from reprocessing, since the HLW originating in foreign reactors would not remain in Britain but would be returned overseas. Other arguments included the notion that if Britain offered the service of reprocessing foreign fuel, there would be less justification for other nations to develop such facilities.

Justice Parker eventually accepted BNFL's argument that plutonium represented a source of energy too valuable to waste, especially in the light of the recent oil crisis, that plutonium from THORP would not add to the proliferation of nuclear weapons, and that reprocessing was environmentally sound, with the direct disposal of solidified liquid waste preferable to the direct disposal of spent fuel. Accordingly, on January 26 1978, BNFL received permission to build THORP.

In terms of controlling popular protest the Windscale inquiry had proved a mixed blessing. At first it had created the image of a reasonable government willing to hear all points of view, and in doing so removed the *raison d'être* of several protest groups (Rudig 1990, 14-17). It had

also 'tamed' the anti-nuclear lobby by enticing them to express their dissatisfaction through a formal procedure rather than by the direct action used on the continent (Rudig 1990, 17). In another way though, the inquiry had radicalised opposition in Britain. In effect the report of the inquiry rejected all the anti-THORP arguments out of hand, and offered practically nothing in the way of consolation. Some sections of the anti-nuclear lobby, which had hoped for so much from the inquiry, were thus disillusioned with official channels of protest (Patterson 1983, 162). The adversarial nature of the inquiry also helped strengthen the anti-nuclear lobby by forcing many organizations to choose sides (Rudig 1990, 18). Confidence in regulatory bodies had also been brought in to question by the manner in which the debate over the risk from dose rate limits was intensified by the inquiry, which brought the assertions of bodies such as the NII and NRPB into public scrutiny for the first time (Berkhout 1991, 159).

2.4.11 The Flowers Report

The proliferation question was becoming a matter of concern for many institutions. Not only had it been raised at the Windscale Inquiry but it had been highlighted in September 1976 by the Sixth Report of the British Royal Commission on Environmental Pollution - Nuclear Power & The Environment, (the Flowers Report). Indeed, the committee's main concern was the issue of proliferation -

"The dangers of the creation of plutonium in large quantities in conditions of world unrest are genuine and serious. We should not rely for energy supply on a process which produces such a hazardous substance as plutonium, unless there is no reasonable alternative." (Cited in Patterson 1983, 160).

The Flowers Report also revived the issue of radioactive waste. At the time British policy involved the disposal of LLW at Drigg, and at Ulnes Walton in Lancashire. ILW was stored at nuclear power stations, HLW at Windscale, and plutonium contaminated material (PCM) was stored to allow radioactivity to decline prior to being put in drums for sea disposal which was to commence in 1990. The Flowers Report recommended that a radioactive waste management advisory committee, and a nuclear waste disposal company (to dispose of LLW and ILW) be established. Accordingly, the Radioactive Waste Management Advisory Committee (RWMAC) was set up in May 1978, and the possibility of a waste disposal company was acknowledged (ERM 1993b, 8). In addition, British responsibility for waste disposal was shifted from the Department of Energy to the Department of the Environment (DoE). Although these new institutions seemed to signal further advances in British control over the back-end of the nuclear cycle, there were still important questions which had not been answered. Most importantly, the final fate of HLW had not been decided. The Flowers

Report recommended that no further expansion of the nuclear industry should occur until the problem of safely controlling HLW had been resolved (Blower & Pepper 1987, 10).

"There should be no commitment to a large programme of nuclear fission power until it has been demonstrated beyond reasonable doubt that a method exists to ensure the safe containment of long lived highly radioactive wastes for the indefinite future" (Cited in Berkhout 1991, 139).

With the waste question a possible threat to the security of the whole industry, more steps were taken to resolve the situation. Action had begun at an international level with the formation of the OECD's Radioactive Waste Management Committee in 1975 (Berkhout 1991, 151-52). Britain's status as a member of the European Community (EC) gave added impetus to investigate waste disposal, because the EC had launched a project investigating land disposal sites, which was intended to compete with the OECD's initial investigations into sea dumping. The UKAEA were nominated to take responsibility for Britain's contribution to the project, and at Harwell it was decided that a new body, the Environmental Protection Unit, would work with the Institute of Geological Sciences (IGS) to carry out a survey of the geology of the British Isles, with a view to finding sites for the disposal of HLW. There were ambiguities in the process, however. It was not made clear whether the surveys were intended to be interpreted at a general level to find out whether HLW disposal was possible within the UK, or whether they were actually forming the first part of a site-specific selection process. Confusion existed even between the UKAEA, who, it seems, had no real desire to develop a site-specific programme, and the IGS who were more committed to finding a specific practical land disposal site. With awareness of nuclear issues heightened by recent media coverage of the Windscale Inquiry, local opposition mounted around the UK through fear of site-specific investigations, afraid of a first investigation which would offer the industry a 'foot in the door' (Blowers & Lowry 1987, 141). Three applications to proceed with drilling boreholes for testing were submitted in early 1978 but, in order to diffuse local concerns, the overall goal was redefined as one of examining the potential of a wide range of different geological environments in the UK. The climbdown represented a government action atypical of other European policymakers. Six more applications were made in July 1979 so that all rock types were seen to be under investigation.

2.4.12 Slowdown, Accidents and Three Mile Island

The future of nuclear power across the globe seemed uncertain as the 1970s drew to a close. Australia, Denmark, Indonesia, Israel, Kuwait, Norway, New Zealand, Malaysia, Saudi Arabia

and Thailand, who had all planned to develop civil nuclear programmes in 1975, had all either scrapped or deferred such plans by 1978. The USA had halted expansion to its nuclear programme, and in Canada, Japan and Italy too, 'electricity utilities became increasingly reluctant to buy reactors' (Patterson 1983, 166). Problems also persisted with existing exports to less developed countries. To use one particular example, the Iranian revolution of 1979 caused disruption for several nuclear companies, because Germany's KWU, the French company Framatome and the UKAEA all had stakes in the Shah's nuclear programme. Iran even held shares in the French enrichment consortia Eurodif and Coredif.

Meanwhile, worrying incidents continued to demonstrate just how a small error could cause large problems with nuclear reactors. On March 22 1977, at the Rancho Seco power station near Sacramento in California, a technician replacing a twenty-five cent bulb behind a lighted push button dropped the bulb into the control panel. The bulb shorted the electrical connection to the reactor's instruments and caused a shut down of the reactor (Patterson 1983, 167; May 1990, 241). In Britain, another embarrassing incident occurred in September 1977 at Hunterston in Scotland, when a temporary pipe in the cooling system gave way and poured six thousand gallons of sea-water into the stainless steel core of the reactor. Fortunately, the reactor was shut down for maintenance at the time, but the cost of refitting the reactor was still around fourteen million pounds. The cost of interest payments during the two and a half years for which the reactor was subsequently shut down, and the cost of producing replacement electricity totalled around fifty million pounds. This all came after the South of Scotland Electricity Board (SSEB) had distributed a leaflet to its customers 'describing how nuclear power was helping to keep down electricity costs' (Patterson 1983, 165-66). Further technical difficulties occurred at Hinkley Point, where in June 1977, a major cooling water pipe broke, and staff had to hose down the concrete shielding to keep the temperature below safety levels. In Germany, on June 18 1978 the Brunsbuttel reactor near Hamburg suffered a leak in a steam line, emitting radioactive steam into the atmosphere. Iodine-131 emissions exceeded safety limits. The reactor continued to operate for nearly two and three quarter hours after the leak began because an automatic shutdown system had been switched off to save money (May 1990, 242). At the Palisades reactor in America, several valves were found to have been locked open for a year and a half. If an accident had occurred during that time the valves would have leaked radioactivity into the atmosphere.

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Perhaps the most serious incident in the late 1970s occurred at the Beloyarsk complex in the Soviet Union. An electrical short circuit caused a massive fire which nearly burnt out the station computers and, if it had done so, would have caused a meltdown of two reactors. Twelve hundred firemen eventually controlled the blaze, but not before the ceiling above one of the generators collapsed due to the extreme heat. The government of the USSR never admitted that the incident had occurred, and it was never reported to the International Atomic Energy Authority (May 1990, 213-14).

The incident which brought the most attention to the nuclear industry in the late 1970s, occurred at 4 am on March 28 1979 at unit 2 of Metropolitan Edison's plant at Three Mile Island on the Shenandoah River, Pennsylvania. Several feed water pumps and emergency feed water lines to the PWR reactor failed, causing the turbine to shut down automatically. Alarms sounded and warning lights went off, but the operators did not panic as similar events had happened eight times in the previous six months during refuelling of unit 1 and the attempts to bring unit 2 on line. Although no longer generating electricity, the reactor did not stop operating until the temperature and pressure rose sufficiently to open a certain valve. At this point the reactor scrammed automatically (King 1990, 56). The relief valve should have closed when the pressure fell, allowing the reactor to start up again. However, it failed to do so, although a panel light indicated erroneously that it had. Despite being shut down, the reactor was still generating heat at around six percent of normal operating levels, and with the valve open, steam was allowed to escape from the coolant, lowering the water level around the core and filling a drainage vessel with radioactive water. Back-up systems, which should have poured water into a secondary cooling system, also failed. They had been closed for maintenance, with tags blocking their console warning lights, so the operators were unaware of their failure (King 1990, 56). At this point, an emergency system came into action, pumping high pressure water directly into the primary system, but the operators, incorrectly diagnosing the situation, turned off this pump. As steam continued to escape, the water level fell below the core, and the core cladding melted, stripping oxygen from the water. Radioactive gas was released into the atmosphere and the fuel itself began to melt. At 5 am the site representative of the reactor's builders identified the problem and had the faulty valve closed - total meltdown was prevented only by the presence of a small remainder of cooling water. Nevertheless, a possibly explosive bubble of hydrogen had formed.

With unknown quantities of radioactive gas expelled to the atmosphere (the plant's environmental measurement controls were not working) and a lack of coherent advice from the 'experts', the Governor of Pennsylvania evacuated 3,500 children and pregnant women within a five mile radius of Three Mile Island. It took him two days to decide upon this policy. Another two hundred thousand people fled voluntarily (Patterson 1983, 170-71). For three days experts worried about the hydrogen bubble, but in the end, it 'quietly dissipated of its own accord' (Patterson 1983, 171). The report on the incident by Michael Rogorin of the National Radioactivity Commission said 'a catastrophe had been avoided mainly by dumb luck' (King 1990, 57). By 1989, over twenty thousand lawsuits had been filed against Metropolitan Edison over the incident's effects on local people. The President's Commission, however, found that there were no detectable effects of the incident upon the health of the populace (Wilkinson 1990, 57).

It was not surprising that popular opinion of the safety of nuclear power, and especially of PWRs, suffered a turn for the worse after this incident. Ironically, the film *The China Syndrome*, depicting a near-disaster at a nuclear power station caused by pump failures and faulty gauges, was on general release at the time of the incident and did little to foster the image of a competent industry in the mind of the general public. The film also portrayed the plant management as having covered up the truth about various events at the fictitious plant, and this, too, mirrored reality. A House of Representatives Committee report published in 1981 found that :

"managers did not communicate information in their possession ... [which] prevented State and Federal officials from accurately assessing the condition of the plant ... Three Mile Island managers presented State and Federal officials misleading statements that conveyed the impression that the accident was substantially less severe and the accident more under control than what the managers themselves believed and what was in fact the case" (cited in May 1990, 219).

2.4.13 Torness

At the end of the decade, with anti-nuclear protestors organised and then radicalised by the Windscale Inquiry (Rudig 1990, 18-19), and experience of protest gained through the opposition to the IGS/UKAEA search for waste disposal sites, mass demonstrations began to take place in Britain against reactor developments. Torness in Scotland, which had an inquiry for a SGHWR in 1974 with little fuss, found itself the focus of the national nuclear debate over a new SSEB proposal for an AGR. A Torness Alliance campaign was organised at a national level against the proposed reactor and in May 1978 the Scottish Campaign to Resist the

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Atomic Menace (SCRAM) attempted to occupy the site. In October that year, a small number of protestors occupied a cottage on the site, and when they were removed in November in order that construction could begin, four hundred people returned to block the bulldozers. A nearby festival attended by ten thousand people in May 1979, led to a symbolic demonstration, at which a small number of people attempted to damage site equipment. It was perhaps only through the decision of groups such as FoE to distance themselves from such direct action and the 'very patient' policy of the police than an escalation of trouble was avoided (Rudig 1990, 19-20). Nonetheless, it received 'massive press attention' (Rudig 1990, 17).

2.4.14 Summary

During the course of the 1970s the nuclear industry both in Britain and abroad had encountered increasing difficulties. Reactor sales were faltering and opposition was becoming increasingly well organized and militant. The events at Three Mile Island had made the risks of nuclear power all too apparent to the public, and had given greater credence to the substantial body of stories about nuclear accidents. Nevertheless, the industry still offered a viable alternative to the uncertainty of fossil fuels - the British nuclear industry, although hampered by the difficulties with AGRs and disputes over any successor programme, could still look to a future when THORP would increase the nuclear services which Britain could offer.

2.5 1980s

2.5.1 The New Right and the revival of nuclear power ... and of opposition towards the industry

In May 1979 the British nuclear industry received a boost when the pro-nuclear Conservative government of Margaret Thatcher was elected. In December that year, a plan for ten new reactors between 1982 and 1992 was announced. This was a contentious issue, for the Conservatives favoured the American PWR design to the British AGR (proposed AGRs for Heysham and Torness were still to be developed as planned). Not only did the PWR incite the same reasons for protest as it had in the early 1970s, but the fact that it was a PWR (albeit of a different design) which had caused so much distress at Three Mile Island further raised public concern. In line with increasing discontent with the industry, local opposition surfaced in the South West of England where the search for new nuclear sites was conducted in several greenfield areas (a departure from the British tendency to opt for areas calculated to arouse the least controversy (Turner 1986, 440)). At the Cornish village of Luxulyan, the police became involved on the protestors' side, refusing to remove locals who had chained themselves to drilling equipment. After the people abandoned their protest on a call from the regional police chief, the CEGB, after completing its tests, abandoned its plans for Luxulyan and numerous other controversial sites in the South West, opting to concentrate on areas 'where public opinion surveys had demonstrated a favourable attitude of local residents' (Rudig 1990, 24). They thus returned to traditional British policy of avoiding controversy, and began to investigate the sites of existing MAGNOX stations, opting for politically acceptable areas rather than those which might have been better in technical or economic terms (Rudig 1990, 24). According to the leaked cabinet minutes of 1979, the Conservatives were conscious that:

'The government might make more rapid progress towards its objective by a low profile approach, which avoids putting the Government in a position of confrontation with the protestors ... the existing production of nuclear electricity in Britain using MAGNOX stations had a long record of safe operation, and local people living near the various nuclear sites were generally content with them. It was important to build public confidence' (Cited in Rudig 1990, 27-28).

Other moves to de-politicise the nuclear programme could be seen in 1981 when the NII recommended that the Windscale and Calder Hall Works be renamed Sellafield (BNFL information sheet assistan /056). By changing the name, it was hoped to remove associations with the Windscale fire and the reprocessing problems of the early 1970s. In some ways, this

decision could be seen to herald the public relations considerations which came to characterise developments in the nuclear industry from the 1980s onwards.

2.5.2 Sizewell

The first reactor of the new PWR programme was to be Sizewell B. Sizewell had been the site of a MAGNOX reactor since the 1950s and therefore the CEGB was choosing a site which ought to have found comparatively little local opposition. Sizewell represented a change in the organization of the British nuclear industry, because the transition to an American design made the traditionally dominant UKAEA virtually redundant. Responsibility for the PWR programme was now placed in the hands of the electricity utilities and the construction industry. At Sizewell, it was the construction industry, in the form of the National Nuclear Corporation (NNC), which was given overall responsibility, in order to encourage a construction industry capable of competing on a world stage. The NNC began badly, by submitting design proposals several months late in April 1981 (Patterson 1983, 176). The price was greater than had been expected, and the situation was further complicated by the CEGB, indignant at the dominant role given to the NNC, clashing with the construction firm over the organization of the project (Rudig 1990, 25). One problem arose when the government asked the NII to prepare a full safety review of the PWR (in order to avoid challenges to Sizewell on safety grounds). The CEGB repeatedly found it impossible to supply adequate evidence to the NII, forcing the government to postpone the programme again and again (Rudig 1990, 26). In another attempt to pacify public concerns, a full inquiry was announced in 1979. It began in 1983. To avoid the mistakes of the Windscale inquiry, attempts were made to accommodate the anti-nuclear lobby. The chair was to be held by a lawyer who had represented these groups at the 1977 inquiry, and it was given broad terms of reference in order that no significant issue could be excluded from the debate (Rudig 1990, 30). As in 1977, the opposition had a broad base - CPRE, TCPA, a local conservation group, FoE, the Joint Ecology Parties, the Welsh Anti Nuclear Alliance, CND, the NUM and an Anti-PWR consortium of trade unions and local authorities.

Although intended to bring opposition 'within the system', the inquiry still invoked controversy. The inquiry ran into a problem with the matter of funding. As had occurred in America in the 1970s, the anti-nuclear organizations argued that as a public sector organization, the CEGB

had an unfair advantage because of the far greater resources which it had available with which to prepare its case. Some groups therefore withdrew from the inquiry, claiming it was mere window dressing. The political impact of the inquiry however, was minimal, as its exhaustive nature precluded the type of rapid developments necessary to generate extensive media coverage.

2.5.3 The miners and the ANC

The advent of the Conservative government reopened an old area of conflict in the British energy sector. Political bitterness still lingered in the ranks of the Conservative Party towards the National Union of Miners (NUM), because of the miners' strikes of the early 1970s which had helped bring down the previous Conservative government of Edward Heath. Up to this point, the NUM had been supportive of the nuclear programme, but when, in October 1979, a cabinet leak revealed that one of the reasons the Conservatives were planning an expansion of nuclear power was that 'a nuclear programme would have the advantage of removing a substantial portion of electricity production from the dangers of disruption by industrial action by coal miners or transport workers' (Cited in Rudig 1990, 22), the NUM voted to oppose any further nuclear developments (Rudig 1990, 22). The NUM also gave its backing to a national umbrella group, the Anti Nuclear Campaign (ANC), which had been established in 1979 in response to the government's new high profile plan for new reactors, and which included all the opponents of nuclear power except FoE and more moderate conservation groups.

Despite these developments, the anti-nuclear movement met with little success. With the Windscale inquiry disappointing in the 1970s, and the Sizewell Inquiry having its own problems (Rudig 1990, 23), the British anti-nuclear lobby tried a new tactic - to change the trades unions' stance on nuclear power, and then to use the unions to change the policy of the Labour Party. However, despite spirited attempts by the ANC and the Socialist Environmental and Resources Association (SERA), the trades unions of the nuclear industry put up a staunch defence and both the TUC and the Labour Party remained supportive of nuclear power. In addition to this, the anti-nuclear protest movement in Britain was still stifled in the 1980s by a lack of targets around which to motivate protestors because in the 1980s there was no vast expansion of the nuclear programme, just the continuing debate over Sizewell B. Another 'problem' was that where protests had occurred, the tactics of the law enforcement authorities were cordial rather than antagonistic (such as at Luxulyan), unlike the situation on the continent in the 1970s which had intensified anti-nuclear sentiment.

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Whilst protests against nuclear power failed to capture the radical imagination, other causes became more popular. The Soviet invasion of Afghanistan in 1979, and the election of Ronald Reagan as president of the USA in 1980, had hardened the Cold War. Reagan began referring to the Soviet Union as 'The Evil Empire', and intensified arms development, including a 'Star Wars' programme of space weapons including laser beams. By 1983, cruise missiles were sited in the UK. The growth of the Campaign for Nuclear Disarmament (CND) soon overtook protests against civil nuclear power, and CND's campaigns absorbed the more radical elements which could have mobilised around the issue of civil nuclear power.

2.5.4 Waste disposal in the 1980s

Another reason for the asphyxiation of protest in the UK was, ironically, the success of the first popular protests which had led to the failure of the waste disposal programme to be fully implemented. By the time the first local public enquiry into the assessment of geology for HLW disposal sites opened in 1980, the search had been underway for four years, and, whilst controversy had been invoked by THORP and the PWRs, local opposition had been given time to ferment, and to prepare the case against the scheme. Consequently, planning permission for test drilling was refused at seven of the fourteen sites selected, no decision was made at six and approval was given at only one. With only one area even allowing testing, on December 16 1981, the Environment Secretary Tom King announced the cessation of the test drilling for a HLW repository for at least 50 years, following new Radioactive Waste Management Advisory Committee (RWMAC) guidelines proposing storage in solidified form for half a century before disposal. All the remaining planning appeals for test drilling were withdrawn. The government was allowed to do this because there was no pressing political or technical imperative to resolve HLW disposal, now that the original impetus from the Flowers Report and the EC had subsided, and unlike some other countries, the question of future nuclear expansion was not legally tied in to resolving the question of waste disposal (Rudig 1990, 27). There was no technical need to resolve the question of HLW either, as it could be stored on site for the foreseeable future, and besides, Britain still had the option to dispose of HLW in the depths of the sea.

The question of waste disposal was not abandoned entirely. Priority would instead be given to waste with a lower level of activity (Berkhout 1991, 161-62; ERM 1993b, 8). It seemed that the government was trying a new tactic, addressing the waste question one step at a time,

beginning with less dangerous, less controversial levels first. It would also be more advantageous to devise a method of disposal of the more voluminous LLW and ILW rather than have to construct storage facilities for them, and it would also be helpful that wastes could be treated with a set disposal route in mind, without the worry that they would have to be repackaged at a later date in order to fit in with a new design of disposal route (ERM 1993b, 10). The Government Paper on Radioactive Waste Management of July 1982 stated that disposal would be just as safe as storage, that LLW and ILW disposal facilities should be developed, and the decision as to which particular wastes were to be disposed of would be made 'on a case by case consideration of what represented the *Best Practicable Environmental Option*' (BPEO) (ERM 1993b, 10).

As the focus of waste policy shifted, the waste disposal organization which the Flowers Report had suggested back in 1976 was finally established. The Nuclear Industry Radioactive Waste Executive (NIREX) was set up in 1982 by BNFL, the CEGB, SSEB and UKAEA and given responsibility for finding a method of waste disposal for intermediate and low level radioactive waste which would not entail a risk of fatality greater than one in a million (less than that posed by the varying amounts of background radiation in the kingdom). NIREX (who became known as UK NIREX Ltd in 1985 with shares held by its partner organizations and the Department of Trade and Industry) were to investigate the options presented by shallow land burial, deep land burial and sea dumping sites with a view to the creation of a new site which would replace Drigg, which was expected to reach its capacity by the end of the century.

Initially, NIREX favoured sea dumping as the final disposal option for waste (King 1989, 73), but Britain's options for sea disposal came under attack in the early 1980s. Greenpeace had been following a policy of harassing ships dumping radioactive waste at sea since 1979. In 1982, the London Dumping Convention decided upon a two year moratorium on sea-dumping, which the British authorities decided to ignore. In June 1983, it was revealed that The National Union of Seamen (NUS), the Transport and General Workers Union (TGWU) and the Association of Locomotive Engineers and Firemen (ASLEF), would boycott the next planned sea dumping of radioactive waste scheduled for July 11 that year. Despite appeals from shipowners, the unions, supported by Spanish demonstrators (the British dumping zone was five hundred miles from the British Coast but only four hundred and twenty from that of Spain), carried out their threat, saying 'we do not have to be scientists to know that any major miscalculation would be irreversible, certainly for hundreds and thousands of years' (Cited in

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King 1990, 74). Following the union action, and a TUC resolution to halt sea-dumping endorsed at conference by 7,150,000 votes to 2,764,000, the government acceded to the London Dumping Convention's moratorium on sea dumping (Blowers and Pepper 1987, 1; Blowers and Lowry 1987, 138). The publication of the Holiday Report in 1984 added to the problems of sea dumping. The report was the result of a joint trades union/government inquiry set up to defuse opposition to sea dumping by co-opting the unions. However, it did not report in favour of marine dumping. Instead, it said that the government should defer further sea dumps, and that sea dumping options should be compared with land based alternatives. The government would therefore have to prove to the public that sea dumping was the best option.

Consequently, NIREX's search for sites for low level and intermediate level waste switched to the land. In October 1983, the Secretary of State for the Environment announced that a disused anhydrite mine at Billingham in Cleveland would be investigated as a deep site for LLW disposal, and a CEGB storage depot at Elstow in Bedfordshire would be used for the shallow land burial of ILW. The populations of Billingham, already in the heart of an area containing 14.5% of Britain's registerable hazardous locations, and Elstow, whose air was already polluted with sulphur-dioxide and fluoride from the local brickmaking industry, seemed less likely to protest at the presence of the nuclear industry than the people of the greenfield sites in the South West of England who had protested at the PWR proposals. Billingham was also severely afflicted by unemployment, whilst Elstow's MP, Trevor Skeet, was a strong supporter of nuclear power. The technical reasons for the selection of Elstow seemed somewhat dubious. A CEGB study in 1982 researching suitable clay formations near power stations in Bedfordshire, Worcestershire and the Thames Estuary found that of these areas, the best site was in Worcestershire or a combination of Worcestershire and north of the Thames Estuary, not Bedfordshire. The Elstow clay, moreover, was overlain by thin rock containing the Water Table and underlain by permeable rock. It was also one of the thinnest areas of clay in Bedfordshire. The DoE guidelines, given to NIREX in 1982, said that the chosen site should be unlikely to be needed for future development of natural resources, yet the Elstow clay was likely to be wanted for brick making - already the London Brick Company were developing land all around the proposed site for just that purpose. There was also a population problem with Elstow, where no less than one hundred and twenty thousand people lived within five miles of the proposed site.

The choice of just two sites was intended to facilitate a concentration of resources, but it reduced the apparent legitimacy of the search, making it appear somewhat of a *fait accompli*. As in the earlier search for a HLW site, speculation had abounded in both places before the official announcement was made, and local opposition sprung up quickly, protesting at the lack of consultation, and the methodology of site selection (Blower and Pepper 1987, 1,10). In Billingham, an organization called Billingham Against Nuclear Dumping (BAND) campaigned with public meetings, leaflets, vigils, and a petition of eighty-five signatures. They also threatened to flood the mine with water should approval be given, and there was also a threat that local workers in the chemical industry would go on strike if ICI continued to co-operate with NIREX. In March 1984, ICI, owners of the Billingham mine, and the largest employer in the area, withdrew its co-operation from the NIREX proposal, leading to NIREX abandoning their plans for Billingham in January 1985. In Elstow, although an organization Bedfordshire Against Nuclear Dumping (BAND) was established, the lead was taken by the county council, encouraging London Brick to apply for the site, and taking out an injunction to prevent NIREX from taking soil samples. The potential power of popular protests, and the importance of public opinion, had thus been demonstrated.

The waste question took another turn in 1986, when the Environment Committee of the House of Commons (the Rossi Committee) produced a report on radioactive waste disposal. The Rossi Committee looked at various methods of waste disposal such as sea disposal, near-surface storage, deep land storage, and off-shore boreholes. They condemned the poor state of research in the UK which they felt meant that it was impossible to recommend any disposal option with total confidence. They recommended that near-surface facilities be only for short lived LLW, thus contradicting the current NIREX project. The committee also insisted that disposal projects should adopt a 'Rolls Royce' attitude of utmost care in design, so as to minimise risk, and felt that the idea of retrievability was an important notion, which had perhaps not been considered in enough detail by NIREX. The report demanded that more research should go into the options of sea bed disposal, especially tunnels from land under the sea bed (ERM 1993b, 15). The committee was not demanding a halt in the waste disposal programme, but rather that it should be improved. The committee said that 'indefinite storage presents unacceptable risks' (ERM 1993b, 17) and worried that what limited British experience of underground waste disposal existed would be lost abroad, and suggested a site-specific investigation to develop knowledge. They noted that in-situ research was required above research into generic rock types and proposed that 'such a site be designated as an

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experimental facility, explicitly excluded from being a potential operational facility' (ERM 1993b, 18). They also suggested that NIREX's remit be extended to include HLW.

At the same time as the work of the Rossi Committee, the Department of the Environment was carrying out investigations into the new Best Practicable Environmental Option principle regarding the disposal of radioactive waste. The DoE examined the same options as the Rossi Committee, looking at them in relation to cost, risk of accident and exposure risks to workers and the public. They found that they were all practical and within financial reach, but that long term storage would only be desirable if retrievability were a priority. Otherwise it was 'least attractive on economic and radiological safety grounds', for it would require longer duration of site operations, a greater risk to the workforce and a longer commitment to monitoring (ERM 1993b, 16). It said the BPEO for most LLW and some short lived ILW was shallow trench burial. Longer lived ILW would require deep disposal either on land or off-shore, requiring site specific studies to decide. It also said that sea disposal could be used for about 15 percent of ILW (ERM 1993b, 15-17).

Driven by these two pronouncements against storage, the government committed itself to the development of a deep disposal facility in order to take more types of waste, with NIREX to investigate potential sites for detailed investigations, so a site could be put to public inquiry and developed. They did not propose the separate construction of an experimental facility as 'This would only raise concern in the area without any compensatory effect' (ERM 1993b, 19). They also declined to transfer the responsibility for HLW to NIREX 'until a clear option for disposal is identified' (Cited in ERM 1993b, 19). In February 1986, a second NIREX programme was announced. The new project had several differences from its predecessors. The site which was eventually selected would only contain LLW and short lived ILW. In this way, NIREX hoped to make the dump seem less dangerous. Instead of proceeding through a number of awkward public inquiries, the government would issue a single Special Development Order put before parliament to authorise the whole geological research stage, thus avoiding (hopefully at least) any struggles for legitimacy. Elstow was still a possible site for the deep ILW/LLW dump, but it was still necessary to find other sites which could be compared with it. While the search progressed, opposition to NIREX continued to fester in Bedfordshire (Blower and Pepper 1987, 11). The sites eventually nominated as alternatives to Elstow were South Killingholme in South Humberside, Fulbeck in Lincolnshire and Bradwell

in Essex. All four sites were under the parliamentary representation of a Conservative MP and therefore they were politically expedient choices (Blower and Pepper 1987, 13).

Still the programme did not proceed as planned, because not only did the populations of these locations object to the dump, but they were further antagonised by the use of a Special Development Order which removed any democratic features of the selection process. The result was an outbreak of NIMBY protests, inspired by the successful Billingham Against Nuclear Dumping campaign (BAND) and involving site occupations and roadblocks. The opposition consisted almost entirely of local people and it was successful. The overwhelming local opposition forced the four Conservative MPs to oppose the schemes. At first the government backtracked and said that the dump would not contain any ILW at all, merely a shallow burial site for LLW. Then, in 1987 the four local groups began to contact each other to form a national umbrella group, which could have rekindled the debate on nuclear issues at a national level at a time immediately before a general election. In order to prevent this from happening, the programme was withdrawn completely (Rudig 1990, 34-36). The reason given was that recent research had shown that, taking transport costs into account, deep disposal for both waste categories would be more economical (ERM 1993b, 20). It seems likely however, that public protest had an important role in the reaching of this decision.

In 1988, the government also announced that sea disposal of drummed waste would not be carried out, but that the possibility of larger items from plant decommissioning being disposed of at sea were still a possibility (ERM 1993b, 20).

2.5.5 Sellafield in 1983 - The Nuclear Laundry and the Radioactive Slick.

In November 1983, there was a flurry of events which brought Sellafield into the public eye once more. A television documentary made by Yorkshire Television entitled '*Windscale - The Nuclear Laundry*' was shown nationally on ITV, drawing attention to incidences of leukaemia in children living in the vicinity of Sellafield. The programme claimed that leukaemia cases were as much as ten times higher amongst under fifteens in the nearest village of Seascale than elsewhere in the country, and drew links with Sellafield by saying that radiation was the only known cause of leukaemia in children and that Sellafield was the greatest source of radiation in the United Kingdom (Macgill 1987, 10). The programme was watched by over three million viewers, and caused a great furore, focusing, as it did, on several emotive themes: children, cancer, and radioactivity. The programme was followed up by a series of

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sensational articles in the press. The Sun printed an article 'Villages of the Damned', the first paragraph of which read, 'The spiders are big and strangely coloured, some geese are deformed, the cattle can suffer from abnormalities'. The Observer captioned a picture 'A corner of Cumbria where calves are born deformed and ramblers walk at their peril' (Cited in MacGill 1987, 16-17). In the course of a week, the story reached the second page of five national newspapers, and was covered on BBC TV, whilst an emotive interview with one of the leukaemia stricken families was featured on TV AM. The reputation of the nuclear industry was cast in doubt and, within twenty-four hours, a committee of enquiry was set up under Sir Douglas Black.

If this was not bad enough publicity for BNFL, in the same month, Greenpeace attempted to block a effluent pipeline from Sellafield to publicise discharges in to the Irish Sea. BNFL secured a court injunction to prevent Greenpeace doing so. When the pressure group went ahead they received a fifty thousand pound fine for contempt of court, (reduced to thirty-six thousand on appeal) which added more publicity to their cause. They received yet more publicity because, in carrying out the action, several of the party were contaminated by an operational error which had occurred at Sellafield only a week after the Black report was commissioned. (A mistake in control of washing the reprocessing line had led to a discharge into the sea of active liquids and suspended solids, which should have been reprocessed further, leading to a high level of radioactivity around the pipeline.) According to the Radiochemical Inspectorate's investigation into the incident, excessive discharges had occurred on November 11, 13 and 16 1983. Radioactivity was found to have washed onshore, leading to the closure of two hundred yards of beach for twenty-four hours. The Ministry of Agriculture Fisheries and Food (MAFF) investigated. Most of what they found was of little concern. Radioactivity increases in fish were 'negligible', fishing tackle 'did not differ significantly' from before the leak, levels on the beach itself were 'not significantly higher' and increased risk through the exposure of inland agriculture to coastal spray was 'insignificant'. It was discovered that mussels from near the pipeline had 'significantly higher levels of radioactivity than normal' but it was noted that even based on a consumption of these particular mussels at twenty grammes a day for a year, the additional dose would be just 1.7% of the ICRP limit and that therefore 'radiological consequences [of the leak on the safety of shellfish are] considered negligible.' The main problem was that shoreline debris did present a risk. If people handled some of the more heavily contaminated shoreline debris, they 'could

receive a skin contact dose.' Because of this chance, MAFF concluded that 'it is considered prudent that the public should continue to avoid unnecessary use of the beaches, and, in particular, to refrain from handling debris' (MAFF December 1983, 15). A year later, MAFF found that shellfish had returned to normal, and that the rate of finding more heavily contaminated debris was declining. Nevertheless, this second report, too, warned against 'unnecessary use of the beach' (MAFF March 1984, 4).

The reports from the Nuclear Installations Inspectorate (NII) and Radiochemical Inspectorate into procedures at Sellafield were published in February 1984. They criticised the monitoring, management and information procedures at the plant. The Director of Public Prosecutions was asked by the DoE to investigate, and in August 1984, decided to prosecute BNFL for breaching the ALARA principle laid out in the radioactive substances act of 1960, and for failing to keep adequate records of radioactive materials. In July 1985, BNFL were found guilty on four of six charges, and fined ten thousand pounds with sixty thousand pounds costs. Following this incident, virtually any occurrence at Sellafield became headline news (Blowers and Pepper 1987, 6-7; Macgill and Phipps 1987, 217-18). Sellafield was commonly portrayed as a dangerous polluter, a dangerous place to live or work near, and BNFL themselves were open to allegations of dishonesty and excessive secrecy (Harding 1990, 33). The 1983 incident had been embarrassing for both the government and BNFL, and, in order to restore their credibility, new discharge specifications were set out, moving towards a BAT style of regulation i.e. where discharges were kept as low as technically possible using the '*Best Available Technology*' rather than merely '*As Low As Reasonably Achievable*.' A new ion-exchange plant (SIXEP), intended to reduce the levels of marine radiation discharges by removing strontium and caesium from liquid low level waste before discharge, which had been planned since the beginning of the THORP proposals, but which had not been a high priority, suddenly took on more urgency, and opened in 1986.

The Black Inquiry itself heightened popular concerns about the health risks from Sellafield. Midway through the inquiry, Sir Douglas Black revealed that he had indeed discovered a cause for concern, and this announcement coincided with a Daily Mirror special report on the high incidence of Downs Syndrome in the Cumbrian coastal town of Maryport, which suffered from a teenage cancer rate four times the national average. When the Black Report was finally published in July 1984, it concluded that there was indeed a high leukaemia rate in Seascale, but said that the numbers involved were very small, and that there was no proven

link to establish Sellafield as the cause (cited in Blower and Pepper 1987, 7). In publicising his findings, Black gave a reassuring message:

'I would like to give a most categorical assurance to the people in West Cumbria that any risk either from living near Sellafield or from working in the plant is of the same order as many of the risks people accept in everyday life' (cited in Macgill 1987, 106).

Nevertheless, when leukaemia clusters were discovered shortly afterwards around other nuclear installations, including Winfrith, Aldermaston and Leiston, the debate over the health risk of nuclear power intensified.

2.5.6 The Sellafield Visitors Centre

In the early years of the British nuclear industry, public access to information was limited to time-consuming activities such as studying the often technical reports of parliamentary select committees (King 1990, 5). It was also possible to visit Sellafield/Windscale. People had come to the site for events such as the opening of Calder Hall in 1956, and programmed visits of the site were available from 1957 onwards, but the numbers of people on programmed visits was low, averaging less than 5,000 people a year throughout the 1960s and 1970s due to the low staffing of the department concerned. In the 1980s, following Three Mile Island, and the events at Sellafield itself, public relations work was needed to counter increasing public concern, and criticism in the media (King 1990, 5). The effect of the 'greening' of capitalism in Britain in general during the 1980s may also have been a factor, as big British companies, such as BNFL, Shell UK, ICI and British Gas undertook massive advertising campaigns to convey a message of the considerations they bore to health, safety and the environment (Robinson 1992, 59). A Sellafield exhibition centre, explaining how nuclear power worked, opened in 1982, providing facilities for the casual visitor, and the number of visitors more than doubled to over 20,000 a year (BNFL information sheet newexh/191 undated).

In 1984 BNFL became a public limited company, giving it greater administrative and financial flexibility (BNFL 1992b, 3)¹⁸. BNFL's new chairman, Sir Christopher Harding, introduced a

¹⁸ All shares are held by the government but the company is not part of the Public Sector Borrowing Requirement, instead additional funding is obtained through the money market, although the government does guarantee its loans. (BNFL 1992b, 3).

market research programme from 1986, with the aim of restoring public confidence. The tone of public relations changed from 'educating the public to speak the technical language of the industry'. Instead, 'the task was seen more as a matter of educating the industry to speak in a language which could be understood by all' (BNFL information sheet newexh/191undated). The public relations department at Sellafield was expanded, and retired company employees were brought in to guide visitors around the site. Bringing visitors directly to the site offered a way of getting the industry's point of view across without having to go through the possible distortion of the media (Tilson 1993, 429). Following the Chernobyl disaster (see below), a national advertising campaign was launched and visitor numbers rose from 29,526 in 1985 to 64,732 in 1986 and 104,310 in 1987, in which year the English Tourist Board gave BNFL an award for its achievements (May 1990, 274). The centre of the campaign was the Sellafield Visitors Centre (SVC), which was opened in 1988 by the Duke of Edinburgh as an improved version of the exhibition centre. It invited people to come and see the Sellafield site for themselves (in order to remove the secretive reputation of the industry), and to learn how the nuclear fuel cycle operated. In its first year, the SVC brought visitor numbers up to nearly 160,000 people. Attracting and educating youth was clearly a primary concern of the centre. Futuristic, and full of facts presented in a practical 'hands on' manner, with interactive models such as a walk-through fission chamber, the centre was designed to be exceedingly visitor friendly. A character called 'The Mighty Atom', whose image appeared on pencils, pens, pencil cases, sweatshirts, badges, notepaper, boardgames and even on 'nuclear fudge', aimed to impress all the family with a welcoming, wholesome image. A tremendous advertising campaign accompanied the centre, presenting an image of openness and reinforcing the message of improved safety and discharge levels since the 1970s. Advertisements appeared in many publications and, perhaps most importantly, on television, showing pictures of the Cumbrian lakes, of children visiting the site, and ending with the slogan 'open every day except Christmas day'. A free tour of the Sellafield site was offered to visitors to the centre, and during this trip, emphasis was placed upon how the presence of the site supported and encouraged local wildlife (although perhaps not to the same extent as at other visitor's centres around the world) (Tilson 1993, 425). The emphasis on attracting youngsters led to a broadening of tactics, by organizing school visits. The emphasis on education was a relatively unique tool in public relations (PR), and the importance of PR to the industry in the 1980s, highlighted by the relatively high level of executive access which nuclear public relations managers was given was also quite an innovation in industrial PR (Tilson, 1993, 419-21), but these gambles were rewarded in 1989, when the campaign won the top award from the

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Institute of Public Relations, the Sword of Excellence, for its public relations work (May 1990, 274; Harding, 1990). As the British nuclear industry attempted to restore public confidence in the industry, similar centres opened at most British nuclear sites over the next decade.

2.5.7 Another Sellafield Incident

On February 1 1986, a fire occurred at the Drigg LLW dump. BNFL denied that this had caused any increase in atmospheric radioactivity. A couple of days later, an amber alert occurred at Sellafield for the first time since the Head End incident of 1973. Plutonium nitrate mist had been released from reprocessing building B205. Seventy-one workers were evacuated, but a BNFL press release said 'no member of staff was contaminated'. The next day BNFL admitted that two workers had been contaminated, and on February 14, the HSE revealed that in fact, fifteen workers had been contaminated, one receiving his entire annual body dose of radiation. Ten workers received compensation, the highest being an out of court settlement for £120,000, and in all £244,000 was paid out. There had been other more minor incidents at the plant, and altogether, these led to the HSE to launch an investigation into the safety record of Sellafield (Flood 1986, 2; May 1990, 271-73) and made the work of the SVC still more important.

2.5.8 The Rainbow Warrior

A sign of how successful environmental groups had proved in their harassment of nuclear programmes around the globe, both military and civil, was given on October 17 1985 when senior officials of the French government conspired to sink the Greenpeace ship *Rainbow Warrior* in Auckland Harbour, New Zealand, killing crew member Fernando Ferrera. This incident shocked the public around the world, bringing home the message of the serious nature of nuclear issues once more.

2.5.9 Chernobyl

A milestone in the history of nuclear power occurred at 1.23 am on 26 April 1986 when an explosion occurred at the Chernobyl power station, on the river Pripyat, sixty miles north of Kiev. Ironically, the incident occurred whilst tests were being conducted on safety systems. The Chernobyl reactors were of the RMBK type, which was originally designed with plutonium production for nuclear weapons in mind. To facilitate plutonium production, the RMBK was designed to allow refuelling during operation. However, while this took place, there was a

chance of a *positive void coefficient*, where a loss of coolant to the core may result in rapid power rises (May 1990, 43). On that day in April 1986, an experiment was conducted to discover whether the turbine would generate enough power during a crucial forty-five second spell during a blackout before emergency diesel generators came on line. However, in a series of mistakes, the operating power was reduced to a level far less than that required for the experiment, the emergency cooling system and other safety systems were disconnected, and then the control rods were removed. The combination of these things led to the unit four reactor reaching a power level one hundred times greater than normal. Some fuel disintegrated, and the cooling water evaporated. A steam explosion blew the roof off the reactor. More water reacted with the graphite moderator forming hydrogen which caused a second explosion, throwing radioactivity a mile into the sky. The graphite caught fire, and some of the fuel melted. Iodine-131 and caesium-137 were blown away by winds at five thousand feet. It took ten days to put the fire out as five thousand tons of lead and boron were dropped onto the reactor by helicopter. Twenty-six percent of the reactor's inventory of radioactivity was lost. The Soviet authorities did not announce that the incident occurred. It was not until two days later that the world knew, when scientists in Sweden registered abnormally high radiation levels.

On May 1 the temperature of the fuel rose once more, reaching two thousand degrees Celsius and requiring nitrogen to be pumped under the building. By May 6 the temperature was declining, but it was still necessary for four hundred miners to build a cooling slab of concrete under unit four to prevent the fuel burning a hole in the reactor base, and to stop any seepage from entering the water table. Nine people died, two hundred and twenty-nine suffered severe radiation sickness and eighteen thousand were hospitalised. The town of Pripyat, two miles away, was evacuated within thirty-six hours. Chernobyl, ten miles away was not evacuated until six days later. Altogether, ninety-two thousand people were evacuated within a nineteen mile radius of the plant. Half of the fallout fell within thirty-five kilometres of the reactor. The other half spread across twenty countries worldwide. Winds carried radioactive clouds westwards across Europe, causing alarm where there was heavy rainfall. Polish children were issued with iodine, and milk sales were banned. In Scotland, people were advised not to drink rainwater. The EC banned import of fresh vegetables from seven Eastern bloc countries lying within a thousand mile radius of Chernobyl (Blower and Pepper 1987, 17-18).

Chapter Two: The development of the British civil nuclear power industry

Before Chernobyl, the industry could claim that civil nuclear power had not caused a single death (Sherfield 1972, 4; Ritchie Calder 1972, 80), and that worries were mere 'nuclear superstition' (Ritchie-Calder 1972, 83). This accident altered the situation dramatically. After Chernobyl, people wondered if the same could not happen in their country, and whether there were adequate contingency plans if it did. Chernobyl thus affected nuclear programmes across the world. The Austrian government decided to dismantle the Zwentendorf reactor, which had just been completed, but never used. Yugoslavia closed its one functioning reactor on February 19 1987. In Italy, a referendum in 1987 led to the abandoning of their nuclear programme (Nuclear Forum April/May 1992, 7). Protests continued in Germany against their nuclear programme, Denmark put pressure on Sweden to close the Barsebaeck plant twelve miles from Copenhagen. Only France continued with expansion undeterred (Blower and Pepper 1987, 21; May 1990, 280-88). In Britain, where radioactive fallout affected the hill farmers of Cumbria and North Wales, the incident at Chernobyl was referred to as something which could only have happened in the USSR because of their inferior reactor design and poor safety regulations. Prime Minister Margaret Thatcher told the House of Commons on May 1 that 'the record of safety and design, operation maintenance and inspection in this country is second to none'. The disaster did, however, resolve the indecision of the Labour Party on the issue of nuclear power, with Neil Kinnock saying in a New Socialist article that 'I ... give this clear and unequivocal guarantee that the next Labour government will not sanction the ordering of another nuclear power station' (cited in Robinson 1992, 108).

2.5.10 Renewed expansion in Britain?

Despite the shock which Chernobyl had brought, by 1987 public concern related to the incident was receding somewhat, a pro-nuclear Conservative government had been re-elected, and construction of Sizewell B was finally underway. The internal disputes between the businesses of the nuclear industry over the type of reactor which Britain should develop was virtually over, with the CEGB having asserted its dominance and PWRs established as the option for the future, and there was little political controversy at a party political level as the Labour Party was not forthcoming in its commitment on the issue, and the Liberal Party, through its merger with the SDP, had lost much of the radical anti-nuclear stance which once it had held (Rudig 1990, 37-38). In this more secure position, the CEGB made plans for four new PWRs. The first was to be at Hinkley Point, a long-established nuclear site, and planning permission was sought in August 1987.

2.5.11 Environmentalism on the side of nuclear power

Although it might have sounded strange to the anti-nuclear environmentalists of the 1970s, by the late 1980s, nuclear power's environmental credentials were being presented as one of its strongest selling points. By the mid to late 1980s, environmental issues had become important political matters, both in Britain and around the world. Amongst the most pressing concerns were the problems of 'acid rain' and the 'greenhouse effect'. First observed in the 1850s in industrial Manchester (Allaby 1989, 171), 'acid rain' is caused by airborne pollutants, such as the sulphur released when burning coal¹⁹. When 'acid rain' falls, the consequent leaching of calcium and magnesium from soil has adverse effects on plants, and the lead and aluminium it draws from the soil have harmful effects on fish. The acidity of the rain also causes damage to buildings. Nuclear power, in which energy generation does not involve the burning of sulphurous fossil fuels was offered as an environmentally friendly fuel source which would not contribute to 'acid rain'.

The 'greenhouse effect' was another issue over which nuclear power could promote itself. Increasing levels of gases such as carbon dioxide and methane in the atmosphere allow short wave radiation from the sun to reach the Earth, but trap the longer wave radiation which reflects back off the Earth's surface (acting in the same way as the glass in a greenhouse), and re-radiate the heat back to Earth once more (Allaby 1989, 136). Apart from termites, cows, and paddy fields, which contribute to the atmospheric levels of methane, one of the major causes of the 'greenhouse effect' was the carbon dioxide released through the burning of fossil fuels. The carbon thus released also causes acid rain through carbolic acid. By the late 1980s, it was estimated that doubling the levels of carbon dioxide in the atmosphere would increase the world's average temperature by some two degrees celsius, quite possibly causing polar ice caps to melt, sea levels to rise, and coastal areas to flood. Global fossil fuel use was increasing by some four percent per annum, and it was estimated that by the year 2030, atmospheric carbon dioxide levels would be double those of pre-industrial times (Gribbin 1988, 79). As with acid rain, nuclear power could (and did) offer itself as a power source which did not entail the release of carbon dioxide to generate energy, and which did not contribute to the 'greenhouse effect'.

¹⁹ The term 'acid rain' is perhaps misleading, as it is often metallic impurities, rather than any 'acid' rain as such which directly causes environmental damage.

2.5.12 Privatisation

By 1987, the Conservative Party had been in government for eight years, and had established a pattern of privatising state-owned companies in an attempt to reach a society of 'popular capitalism', and a 'share holding democracy' (Rudig 1990, 38) By 1987, the programme was encountering difficulties. Criticism of British Telecom (BT)'s monopoly was mounting, and the privatization of British Petroleum (BP) had floundered (being caught in a general stock market crash). The government, needing a new privatisation success, turned its eye to the electricity utilities. The nuclear sector, however, presented a problem. The CEGB, BNFL, UKAEA, and NNC all said that the nuclear programme could continue only in its present form, and that it would not progress if split up into the private sector. The government did not heed these warnings, and in 1988, it was announced that the CEGB was to be divided into two companies, one (Powergen) with thirty percent of the CEGB's fossil fuel generating capacity, the other, larger one (National Power), would have seventy percent of CEGB fossil fuel and all of the nuclear sector. The national grid was taken out of the responsibility of the CEGB and placed in the hands of independent distribution companies (the old area boards). Although the distribution companies could buy electricity from the cheapest source, they were compelled to take twenty percent of their supply from more environmentally friendly 'non-fossil sources' until at least 1998. Arguably, this arrangement represented a statutory subsidy for nuclear power, because other non-fossil sources were not yet advanced enough to supply twenty percent of electricity demand (Rudig 1990, 39).

Unfortunately for both the government and the nuclear industry, there were problems. In 1987, CEGB figures suggested that nuclear electricity cost 2.94 pence per kilowatt compared to coal's 4.29 pence. The City, however, cast aspersions on this figure. They wondered about the costs of reprocessing, of waste disposal, and of decommissioning. National Power would inherit all the MAGNOX reactors, which would shortly have to be decommissioned at considerable expense. Leaked reports suggested that the cost of decommissioning all Britain existing nuclear power stations would be twelve billion pounds over twenty-five years (Rudig 1990, 42). Given the sluggish nature of reactor sales in the developed world, and plentiful technical problems and delays with fast breeder technology, the future of the whole British nuclear industry seemed in doubt (Rudig 1990, 40).

The Electricity Bill reached parliament in December 1988. It was proposed that the Energy Secretary should provide a two and a half billion pound fund to cover any unforeseen price rises, as well as the costs of reprocessing, waste disposal, and decommissioning (Rudig 1990, 41). Nevertheless, the City was not convinced. Analysts argued that future governments might not be as willing to give subsidies to the industry, leaving the privatised companies to pay a hefty bill (Rudig 1990, 41-42).

On July 24 1989, the Energy Secretary, Cecil Parkinson attempted to resolve the situation by announcing that the MAGNOX reactors were to stay in the public sector, and that only the AGRs were to enter the private sphere. Demands continued, however, to keep the whole nuclear industry public, and for the government to reveal more information regarding the true costs of the industry (Rudig 1990, 42). In September 1989 it was revealed that the construction costs of Sizewell B had increased by 170 million pounds in the first two years alone. National Power also let it be known that it feared that nuclear electricity would be three times more expensive than the most efficient coal powered stations (Rudig 1990, 43), and this seemed to tip the balance. On November 9 1989, the new Energy Secretary, John Wakeham withdrew the entire nuclear industry from privatisation, establishing instead the state-owned companies Nuclear Electric in England and Wales, and Scottish Nuclear in Scotland, both to be paid a premium price for their electricity, twice that paid to the coal industry (The Guardian 22/10/94). Wakeham also announced a slow-down in the nuclear programme, with the MAGNOX reactors to be kept for another decade, removing any pressing need for new reactors to replace them. The following year the NII decided that even Calder Hall and Chapelcross, though over thirty years old, were safe to continue for another decade (King 1990, 18, BNFL plc annual report and accounts 1991/2, 16). All new stations (apart from Sizewell B), including the Hinkley Point PWR were to be postponed until the situation was to be reviewed in 1994 (Rudig 1990, 43). The debate over privatisation had brought the question of the real long term cost of nuclear power to public attention, and added an economic query to the health concerns generated by the incidents of cancer around Sellafield and the safety question raised by Chernobyl.

2.5.13 NIREX - The Way Forward

Despite the setbacks of 1987, NIREX were still concerned to find some location for the disposal of waste, and in order to increase public acceptability, they announced in 1988 that a decision on the siting of the underground dump siting was to be postponed until the public

were consulted. They published a document entitled The Way Forward which offered three choices:

- a deep mine cavity underground
- a repository under the sea bed with access from mainland tunnels
- a repository under the sea bed with access from an island or drilling platform.

Fifty thousand copies of the document were issued to public libraries, local authorities, and public and private organisations such as trades unions, environmental groups and political parties. Free copies were also available to the general public on request, with adverts placed in national newspapers. The aim of the document was to increase public understanding of the issues, and to stimulate comments which would help NIREX to determine what would constitute acceptable proposals (Kemp 1992, 55). To achieve this aim, the document not only invited comments on the different disposal options, but also asked about site selection criteria and design matters such as whether to include retrievability, as well as the compensation a host community might expect. Over the following nine months, NIREX received 2,500 replies to The Way Forward, including seventy-three petitions containing more than 76,000 signatures opposing plans to dispose of waste in their vicinity. The Way Forward thus demonstrated how public opinion had become an important concern of those responsible for waste disposal as well as those concerned with energy production and reprocessing. Greenpeace, FoE and CORE criticised NIREX for not looking into the options for storage of LLW above ground at existing nuclear sites (King 1990, 75). Analysis of the responses found that Scotland was far more strongly opposed to NIREX's plans, and favoured on-site storage of waste. There was also much opposition to the disposal of waste anywhere in the UK (a 'not in anybody's back yard' (NIABY) response) as well as the more predictable NIMBY responses (Kemp 1992, 56). Local government organizations showed antagonism towards the use of SDOs as a method of obtaining planning permission.

2.5.14 Summary

In the 1980s, British nuclear policy began to take local public opinion into account, choosing for new developments those sites at which public opinion was most likely to be favourable, and thus making progress more likely. The industry was also assisted by the relative asphyxiation of protest the Sizewell inquiry dragged on and waste programmes were deferred. Despite being foiled by the unions and ICI, technical imperatives and the demands for the Rossi Committee not to store radioactive waste drove NIREX on towards finding a final

disposal option, and they too began to take public opinion into more consideration. Events such as the radioactive contamination of Cumbrian coastal waters by BNFL in 1983, and, perhaps more importantly, the Chernobyl disaster were serious blows for the reputation and credibility of the nuclear industry, while the debate over privatisation brought the matter of the true cost of nuclear power into the public eye. To the industry's advantage, public concern about acid rain and global warming added to the reasons to choose nuclear power, and led to a virtual statutory subsidy from the regulations imposed on the privatised electricity companies.

2.6 1990s

2.6.1 The Gardner Report

In 1990 the results of an investigation conducted by Dr Martin Gardner of Southampton University into incidences of leukaemia and non-Hodgkins lymphoma near Sellafield were announced. It was found that fathers who had worked at Sellafield at the time of conception were two and a half times more likely to father children who subsequently contracted leukaemia (King 1990, 60), and that children whose fathers had been exposed to higher levels of radiation were seven times more likely than the national average to develop the disease (West Cumbrian Gazette 3/2/94, 7). Although Gardner himself said that there was a 'strong statistical correlation' between the effects of radioactivity upon the genes contained within the male sperm and the health of children (Corner *et al* 1990, 7) any causal relationship was far from proven. Gardner had also discovered the same correlation for fathers who worked in the West Cumbrian iron, steel, chemical and agricultural industries (King 1990, 60). Nevertheless, this report was enough to place a serious question mark against the health record of the nuclear industry, particularly around the issue of paternal preconceptual irradiation (PPI).

The Gardner theory opened the way for a number of legal cases to be made against BNFL from West Cumbrian victims of leukaemia and their families. The two most prominent cases were those of Victoria Hope, a young woman from Seascale who was left sterile and partially disabled after contracting non-Hodgkins lymphoma and who attributed this to her father's employment at Sellafield, and Dorothy Reay, a ten month old baby who had died of leukaemia in 1962. Her father had worked at the plant, too. The two families attempted to sue BNFL for medical harm arising from the father's exposure to radiation. The Hope/Reay claim became the most expensive legal case in British history. In order that all the evidence was heard on this complicated issue, testimony was gathered from fifty scientists around the world. Ninety days of hearings, spread over eight months finally ended in October 1993 when Mr Justice French ruled that contamination from Sellafield was not responsible for the ill-health of the plaintiffs. The judge's verdict needed an explanatory guide nine pages long (West Cumbrian News and Star 8/12/94, 18; West Cumbrian News and Star 9/10/93, 10,23; Liverpool Echo 8/10/93, 4). The judgement cast serious doubts upon the validity of the connection made in the Gardner report. The families of eight other leukaemia or non-Hodgkin's lymphoma victims asked for permission for a twelve month suspension in their cases in order to find new evidence, but, on May 9 1994, Mr Justice French declined to let

their cases proceed at all. Another thirty cases awaited hearing but they, too, seemed to be put in doubt by these judgements. It had already been announced in December 1993 that legal aid for the families of leukaemia victims attempting to sue BNFL was being withdrawn (West Cumbrian News and Star 13/12/94, 3). By the time of Justice French's ruling, no less than twelve reports commissioned since the Gardner Report had failed to prove any causal connection between PPI and leukaemia or non-Hodgkin's lymphoma (West Cumbrian Evening News and Star 15/10/93, 5) (see montage opposite). Dr Leo Kinlen of Edinburgh University had suggested that one possible cause of the diseases may be the migration of populations carrying infective agents to new settlements, such as might happen when new workers were drawn to Sellafield. Martin Gardner himself had died and his successor at Southampton University, Dr Hazel Inskip wrote to BNFL saying that his work would not be completed (West Cumbrian Gazette 12/5/94, 1; BNFL News March 1994, 13).

Although these events restored confidence in the industry's health record, this was not to say that the link between nuclear materials and ill-health had been disproved. On December 7 1993, Mr Rudi Molinari was awarded £167,000 from the MOD in compensation for leukaemia contracted after radioactive exposure when working on nuclear submarines at Chatham in Kent (Daily Telegraph 7/12/93, 4).

2.6.2 Waste disposal in the 1990s: the Sellafield repository project

Following The Way Forward, the British Geological Survey conducted a desk study into the various rock types and geological and hydrogeological environments to be found in the UK. At suitable sites, it would take a long period of time before groundwater could reach the surface. A sufficient thickness of rock was required, and the site would also be in an area of general geological stability. Off-shore sites could be no deeper than a hundred and fifty metres below the surface, for reasons of operational safety, and areas licensed for oil or gas exploration were not to be included in the search at all. After being reviewed in accordance with these conditions, the number of possible UK sites was reduced from five hundred to twelve. These twelve sites were not named (quite possibly to avoid the fermenting of opposition which had occurred earlier). NIREX were to choose two sites from those twelve, according to the criteria of safety, socio-economic impact, environmental impact, geology, transport, engineering and cost considerations. NIREX found that off-shore locations would be the safest once sealed, but that even at depths of less than a hundred and fifty metres, they entailed higher risk in construction. The best rock type was a low permeability basement

New Sellafield survey - 'set to back link report'

CANCER DADS: NEW FEARS

By JANE ELLIOTT,
Health Reporter

A NEW Government survey is believed to have found a definite link between Sellafield and childhood leukaemia in Seascale.



SEASCALE: Support for Gardner theory weakened

NEW DOUBTS OVER N-PLANT CANCER LINK

By Bryan Bone

doubt has been cast on the alleged link between exposure of Sellafield workers and an increased risk of leukaemia in their children.

published today, the Health Executive says it has weakened its study findings on the Gardner theory. The late Professor Martin suggested

ciated with the fathers being exposed to radiation.

Over the past four years other studies have discredited the Gardner theory. Now the health executive has reviewed its own original findings.

It concludes: "For children born in Seascale, the previous association between the incidence of leukaemia and the father's exposure

between the father's radiation dose before conception and the incidence of these diseases."

But the executive stresses that the main conclusions of its original study are unchanged.

These include the finding that in respect of Seascale-born children and the link in relation to the

Chapter Two: The development of the British civil nuclear power industry

rock under sedimentary cover, such as the East Midlands or East Anglia. Although technically sound, these areas did not meet with other NIREX requirements. The report which NIREX produced in 1989 entitled 'Preliminary Environmental and Radiological Assessment and Preliminary Safety Report' highlighted the fact that 'The only areas of the country where local authorities did show a measure of support were Caithness (Scotland) and Copeland (Cumbria) which were already familiar with the nuclear industry developments at Dounreay and Sellafield respectively' (cited in ERM 1993b, 34; UK NIREX Ltd 1992, 2). This political aspect appeared to take precedence, for on March 21 1989 it was announced that Sellafield and Dounreay were NIREX's preferred sites (Kemp 1993, 57). In July 1991 NIREX eventually selected the Sellafield site, despite the fact that it did not match the Basement under Sedimentary Cover environment favoured in the site selection procedure (ERM 1993b, 34). Another political influence in the choice of West Cumbria may have been that the Scottish Office were also putting pressure upon the Energy Secretary John Wakeham not to choose Dounreay (Kemp 1992, 35). NIREX announced a plan for a multi-barrier repository eight hundred metres below the surface, with waste disposed of in stainless steel containers, surrounded by a chemical/concrete grout, and the containers themselves to be 'backfilled' into the repository with a further layer of concrete grout. A final barrier would be provided by the geology of the rock itself (ERM 1993b, iii). Access during initial operation would be from eight kilometres-long drift tunnels from the Sellafield site (UK NIREX Ltd 1992, 2). Preliminary investigations necessitated a series of test boreholes of up to a thousand metres in depth (CORE leaflet - Cumbria Nuclear Dustbin).

The disposal techniques which NIREX must refine were complex - they had to produce a long-term chemical barrier which would not be adversely affected by the high temperatures of radioactive waste, or by any organic waste content, or by microbial populations. NIREX had also to design a form of concrete which would last for sufficient periods of time, and in fact, the corrosion rates of all the packaging materials had to be investigated. The ILW would also be contaminated with plutonium, and the movement of plutonium in groundwater from a deep repository was not yet known, yet NIREX had to try and take this factor into account. Making predictions about the transport of any radioactive particles through the groundwater was further complicated by the effects of scale, and of the complex hydrology of the chosen site at Sellafield, which made groundwater flow difficult to predict and model effectively. Despite these problems, NIREX had to produce a design which could be demonstrated to be safe.

enough that retrievability need not be included in the design (ERM 1993b, ii). In NIREX's original plans, they hoped to commence work on the repository in 1994, following a public inquiry, but in July 1992, they announced that they were to make more tests before submitting any planning application for a repository, as their existing data, whilst showing Sellafield to be a safe site, was 'too sparse to support a firm conclusion' (UK NIREX Ltd. Annual Report 1992-3, 2), with the date for application for a full scale repository put back from 1992 to 1996.

In October 1992 their plans were changed again. The new scheme would include a rock characterisation facility (RCF)²⁰. RCFs existed in Sweden, Canada and Switzerland but in those countries they were used purely for research, (as had been suggested for Britain by the Rossi committee in 1986). The NIREX RCF, costing one hundred and twenty million pounds could be allowed to become part of a later, full scale repository, although it would require a separate planning application and new licences to do so (UK NIREX Ltd. 1992, 4; ERM 1993b, 58). The following month planning applications were submitted for thirteen boreholes near Longlands Farm to investigate hydrology and the position of access shafts. The Lake District Special Planning Board had refused NIREX permission to drill two test boreholes within the National Park, but NIREX appealed to the Department of Environment (DoE). In February 1993 the DoE announced that NIREX's appeals would be upheld (UK NIREX Ltd. Annual Report 1992-3, 2). Other local bodies were not entirely supportive of NIREX's proposals. Cumbria County Council wished to have a public inquiry before the RCF was allowed to proceed, rather than waiting until NIREX had invested a hundred and twenty million pounds on such a scheme and a full scale repository was at stake (Cumbria County News, Number 1, Summer 1993, 2). Other opposition to the scheme came from local branches of Friends of the Earth, from Cumbrians Opposed to a Radioactive Environment (CORE), Cumbrians Against Radioactive Dumping (CARD) and national environmental organizations, but by the summer of 1994, they had not affected NIREX's policy to any great extent.

On April 11 1994, NIREX announced a reduction in the scale of the proposed repository. The maximum estimated capacity was reduced from two million cubic metres to four hundred thousand cubic metres. Part of the reasoning was that recent developments at Drigg meant that more LLW waste could be disposed of there, and another cause was the introduction of new technology which would increase the compaction of waste for the repository (West Cumbrian Evening News and Star 11/4/94, 1).

²⁰ A small underground laboratory which can examine the rock structure in detail

2.6.3 THORP in the 1990s: the issues

THORP was completed in 1992. Five hundred metres in length, its development had cost three thousand million pounds, making it the largest ever single project in UK history, equivalent to fourteen fully equipped new hospitals (THORP The Beginning, BNFL April 1994, 2). The plant consists of three sections: Receipt and Storage, where used fuel is cooled in water for between three and five years; the Head End section, where the fuel is chopped into small pieces and dissolved in nitric acid; and Chemical Separation, where chemical processes separate the uranium and plutonium, which can then be purified and recycled. 96% of the fuel can be reclaimed as usable uranium, 1% as plutonium and 3% is waste.

By the time it was ready to operate, THORP had secured advance orders worth over nine thousand million pounds (in 1992 money values) for over two decades worth of work, over half of this coming from overseas customers, mainly in Japan and Germany (THORP The Beginning, BNFL April 1994, 3). Thus, even taking into account considerable operational costs, THORP was expected to make a profit of at least five hundred million pounds in the first ten years of operation. It employed two and a half thousand workers, and will provide long-term work for over a thousand workers for between ten and twenty-five years (BNFL THORP the Facts, undated, sheet three). It was given the go-ahead for inactive testing in February 1992, and was ready for active commissioning in December that year (vitrification had begun at Sellafield in 1991) (BNFL 1993, 7; BNFL 1992b, 12). However, work did not commence immediately, because the debate over THORP had not been completely settled by the Windscale Inquiry in the 1970s. As the time neared for the plant's commissioning, the question of whether reprocessing was a sensible option began to be asked once more (see montage overleaf). Many groups pressured the government to call another public inquiry into whether THORP should open. These bodies included the governments of Denmark, Finland, Germany, Iceland, Ireland, Holland, Norway, Portugal, Spain, Sweden and the Isle of Man, campaigning groups such as Charter 88, and conservation bodies such as the National Trust, and the Cumbria Wildlife Trust, as well as 104 local authorities and ninety thousand individuals (West Cumbrian Gazette 23/12/94, 3).

The main reason why these groups thought another inquiry was necessary was that the situation of the nuclear industry had changed since the 1970s. The need for plutonium was even less evident than it had been in the 1970s. The Cold War had ended through the

internal schism of the Soviet Union and the actions of President Gorbachev. The Strategic Arms Reduction Treaties (START) signed by President Bush and Presidents Gorbachev and Yeltsin in July 1991 and January 1992 respectively had set up the prospect of both USA and Russian nuclear arsenals being slashed by over two-thirds (Daily Telegraph 19/11/93, 13). By mid-1994 Presidents Clinton and Yeltsin signed an agreement whereby all of the 1,800 warheads of the Ukraine, the world's third largest nuclear arsenal, would be scrapped. Britain's Defence Secretary Malcolm Rifkind had announced that Britain's Trident programme would consist of a smaller number of warheads, with some estimates of the cuts seeing a drop from 512 warheads to less than 200 (Daily Telegraph 16/11/93, 6). The argument of using it for FBRs was also severely weakened since the British FBR programme had been abandoned at the turn of the decade.

Nuclear power programmes had stagnated in much of the industrialised world, raising a question mark about whether there would be any new reactors to produce fuel for THORP to reprocess after its initial contracts were completed. The whole future of nuclear power was also in doubt in Britain. The price of electricity generation from oil and gas had fallen, and the outcome of the nuclear review planned for 1994 was still uncertain, although the case for nuclear power had been strengthened by the government decision in 1992 to close down many of Britain's collieries (West Cumbrian Evening News and Star 28/9/93, 2). The long term future of reprocessing for civil purposes was in doubt. With the price of uranium having fallen from \$43.40 per pound in 1978 to \$6.90 per pound in 1993 (Daily Post 30/11/93, 6), companies such as Scottish Nuclear were deciding that storing spent fuel and buying fresh replacements was more economical than reprocessing. Uncertainty began to grow as to whether Japan and Germany would even withdraw from their existing contracts with THORP (West Cumbrian Gazette 7/7/94, 1).

Cap La Hague, which had reprocessed oxide fuel since 1978 provided THORP's opponents with an example of the potential problems which an operational THORP might encounter. In January 1980 two splits were discovered in the pipe used for radioactive waste disposal, which meant that waste was discharged only twenty-five metres from shore rather than far out at sea. In April 1980, a fire cut the power supply to the ventilation system and control systems. In January 1981 a fire in a fuel storage silo had led to caesium levels in parts of the site being thirty-eight times the permissible level. Workers were allowed to go home without being checked for contamination, and the radiation detection system at the main gate was

Should we let Thorp open for business?

MY DOUBTS ON THORP - EDWIN

By NICK TURNER

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New Thorp fears over Jap contracts

REPORTS that Japan is to suspend its plutonium programme have renewed speculation that Thorp's viability could be brought into question.

motion in the House of Comr with Labour MP Llewellyn calling on the Government sider the implications of these decision and cancel But a spokeswoman Nuclear Fuels said: are concerned the ment is still co

Thorp plant in new TV film storm

FRESH doubt will be cast on Sellafield's Thorp complex tonight by the BBC's Panorama programme.

Plutonium reprocessing pledge by Ja

David Lascelles
and Kenneth Gooding

Moriguchi says today that 10-20 tonnes will be used for research and development of fast-breeder reactors, and about 10 tonnes for R&D of thermal reactors. A

Japan has two options to deal with the plutonium that is produced as part of the spent fuel from its existing reactors, Mr Moriguchi says. It can either use it to make more fuel, or dispose of it. Japan believes the environmental impact will be

the UK government is conducting a consultation on whether to give the go-ahead for the start-up of Thorp, which cost £2.8bn to build and has a number of long-term contracts with foreign nuclear utilities. Japan would be the largest foreign customer of Thorp if it came into operation.

Germans in new Thorp deal doubt

BRYAN BONE

ports cast fresh doubt e controversial £2.3 processing plant at

commend that the should cancel its ntracts for reprocessing because they are

Government, ng the plant

supposed to have begun oper January but is still idle, waiting for a Government decision. The Guardian newspaper man federal audit co reprocessing audit co "It could be expensive



Chapter Two: The development of the British civil nuclear power industry

switched off to prevent the alarms sounding continuously. Workers complained that they had not been informed and demanded checkups. Several were found to be contaminated, one having received his entire annual body dose (May 1990 261-63). The problems of transport of nuclear materials between countries had also been demonstrated by the ignominious trek of the ship the Akatsuki Maru, carrying 1.7 tonnes of plutonium nitrate from Cap la Hague plant back to Japan. The vessel, and its escort, the Shikishima, were harangued by the Greenpeace vessel the Solo and refused permission to berth at several ports around the world. This journey was a factor in Japan's decision to defer receipt of plutonium from reprocessing 'for some time' in 1993 (Greenpeace leaflets React!, Independent on Sunday Magazine 14/11/93, 7).

2.6.4 THORP in the 1990s: the events

As well as the national and international bodies mentioned above, local protest groups such as Cumbrians Opposed to a Radioactive Environment (CORE) and branches of Friends of the Earth campaigned against the new plant. Celebrities such as Kenneth Branagh, Jeremy Irons, Sting, Lenny Henry and Dawn French, political figures such as Edwina Currie and Tony Benn (who had given the plant the go-ahead in the 1970s), also spoke out against THORP (West Cumbrian Evening News and Star 1/10/93, 1). In 1992, CORE were allowed to hold a demonstration on BNFL's land. A previous event had been attended by less than three hundred people, and BNFL's permission had perhaps been granted so as to avoid needlessly antagonising their opposition. Shortly before this event however, Greenpeace and pop celebrities such as U2 became involved. They sought a music licence and the erection of a stage and seats for up to ten thousand people. BNFL became worried at the scale of the event and revoked their permission. Greenpeace refused to call off the event, and BNFL were forced to endure the embarrassment of a court proceeding to cancel the event, leaving U2 to hold a relatively private 'photo-opportunity', donning radiation suits to stand upon the Cumbrian shoreline before assembled representatives of the media.

America became involved in the debate over THORP (supplying Japan with fuel, the USA had considerable leverage upon the future of trade with THORP). Members of the Democratic Party urged the US Congress to oppose the opening of THORP and various comments from American politicians put pressure on the British government not to allow THORP to operate (West Cumbrian Evening News and Star 20/9/93, 5). The American House of Representatives

passed an amendment to the National Defense Authorization Act in September 1993 saying THORP would represent a national security threat, and called for it to be stopped (Liberal Democrat News 8/10/93). It was not until January 1994 that the Clinton administration attempted to diffuse the tension between the USA and the UK over THORP when President Bill Clinton announced that while he appreciated that THORP presented 'serious proliferation and security dangers', no action would be taken to jeopardize the plant's operation (The Independent on Sunday 21/11/93, 1). Nuclear materials which had originated in America were to be allowed to travel to THORP (The Guardian 31/1/94, 7).

The numerous voices of concern forced representatives of the German and Japanese companies concerned to make a point of confirming their commitment to THORP (West Cumbrian Evening News and Star 12/11/93, 5). Supporters of nuclear power called for the British government to do likewise, because the industry had signed contracts which would be broken if THORP were not commissioned. Pressure for a new inquiry led to a consultation period being set up by the government, running from November 1992 to January 1993, during which time any interested parties were invited to write to HMIP regarding the environmental safety of the plant. After the consultation period, HMIP decided that there were no environmental grounds for THORP not to open. A second consultation period was then established to investigate the economic viability of the plant. This was to run from August to October 1993.

BNFL themselves claimed that the delay in commissioning was costing them two million pounds a week, and proposed to conduct uranium tests in advance of the decision, which would save three months' work later, and which would keep five hundred jobs going for the time-being. If permission were not given, it would cost a quarter of a million pounds to decommission areas affected by the tests, but this was a price BNFL were willing to bear. Greenpeace attempted to block this plan by legal means, but both the High Court, and the Court of Appeal decided against them (Daily Telegraph 4/9/93 2). Accordingly, a test run using non-radioactive materials went ahead on September 2 1993. However, when this was carried out, a nitrogen oxide leak led to the evacuation of 280 people from the site (West Cumbrian News and Star 15/9/93, 6). On October 21 1993 radioactive uranyl nitrate also seeped from a pump in a contained area during testing (West Cumbrian Evening News and Star 21/10/93, 1). In May 1994 CORE claimed that these leaks, which BNFL had claimed to be inconsequential, leading only to a spillage on the floor, had actually attacked instruments

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and cables and caused all fuel shearing at the plant to halt (West Cumbrian Evening News and Star 18/5/94, 5).

October 4 1993 was a crucial day for BNFL. Not only was it the final day of the second consultation period, but Cumbria County Council had a free vote on THORP. The Liberal Democrats opposed the plant, as did nine Labour, two Independent, and two Conservative councillors (Liberal Democrat News 8/10/93, 1). The overall decision was 47 to 23 to support THORP (West Cumbrian Evening News And Star 5/10/93, 5). (In 1977 only 3 members of the council had voted against THORP.) In London, six hundred Greenpeace protestors (including three Cumbrians) staged a 'die-in' outside Downing Street, to represent the deaths from cancer which they claimed would be caused as a direct result of THORP opening. Meanwhile, the GMB union delivered a forty thousand-name petition to the Department of the Environment in favour of the plant (West Cumbrian Gazette 7/10/93, 1-2).

The GMB and other unions from the Sellafield site had been a vital tool in the 1990s in the campaign to open THORP. They organised a 'Sellafield roadshow' under the slogan 'Trust Us' to promote the human side of THORP. Over the course of eight weeks, union representatives toured anti-nuclear local authorities such as Manchester, Sheffield, Glasgow, Edinburgh and South Glamorgan, as well as the conferences of the TUC and the Labour and Conservative parties, arguing that if THORP was not to be commissioned, one thousand two hundred and fifty jobs would be lost (ERL 1992 cited ERM 1993a, 12), whilst the opening would create a further two hundred jobs. The GMB calculated that the spin-off effect of THORP not opening would see Copeland's unemployment rising from 12 to 26.4% (West Cumbrian Evening News and Star 24/11/93, 12). Political parties, however, did not become involved in the debate over THORP. In the 1994 European elections for Cumbria and Lancashire North, none of the Liberal Democrat, Labour or Green candidates made THORP an electioneering issue. Only the Conservative candidate, Lord Inglewood, said that he was 'a supporter of THORP so long as human and environmental safety is always paramount and non-negotiable' (Conservative election materials 1994).

The controversy surrounding THORP was exacerbated by the screening of the film 'Fighting for Gemma' on November 10 1993. Like 'Windscale The Nuclear Laundry' before it, (Macgill 1987, 15-47), 'Fighting for Gemma', which depicted the short and traumatic life of young West

Cumbrian cancer victim Gemma D'Arcy, whose family blamed her death upon BNFL, was preceded by much coverage in both local and national media, including an interview with Gemma's family on the Granada TV programme 'This Morning'. Viscount Whitelaw spoke out in protest at the showing of the film while the future of THORP was in the balance (West Cumbrian Evening News and Star 8/11/93, 1). Eight million viewers watched the programme, which showed the story of the D'Arcy families and their legal battle with BNFL. BNFL told Granada they were 'appalled' at the 'highly charged' drama (West Cumbrian Evening News and Star 24/11/93, 3). The screening of the film led one 77 year old Ms Caterina Barnes to protest against BNFL by cutting ropes on flagpoles at the visitors centre (West Cumbrian News and Star 20/8/94, 3).

On December 15 the Secretary of State for the Environment, John Gummer, approved new discharge authorizations, allowing THORP to start up. The THORP authorization would allow lower authorised limits for radioactive discharges, but within those limits, actual discharges would increase (Border TV Forum 1993). John Gummer told the Commons that he and Gillian Shephard, the Agriculture Minister, had decided 'not to hold a public inquiry, not least because we are satisfied that no issues have been raised which would cause us to conclude that further consultation or debate is necessary' (West Cumbrian Gazette 23/12/94, 3). The announcement of the decision coincided with the issuing of the Downing Street Declaration, which brought hopes of ending twenty-five years of troubles in Northern Ireland, and which therefore kept the THORP decision from the forefront of the national news, a co-incidence which was perhaps more than a little reminiscent of the industry's traditional aversion to publicity. The decision also coincided with an announcement regarding the possible closure of the RAF base 14MU depot at Carlisle, at a cost of over seven hundred jobs. The resultant campaign to save 14MU took THORP off the forefront of the local media too, and so the announcement passed with relatively little media controversy.

Political institutions did not let it pass though. The government of Iceland passed a resolution in protest at the British decision, Denmark considered taking legal action in the European Court. Lancashire County Council voted in an emergency session to join Greenpeace in pressing for a judicial review of the government's decision (The Observer 9/1/94), because of concern for their residents, especially the fishing industry of Morecambe Bay (West Cumbrian News and Star 11/2/94, 3). On January 13 1994, Mr Justice Laws granted Lancashire and Greenpeace permission for a full five day judicial review beginning on

BNFL threatens to sue county over Thorp

Environmental group Grepeace is pressing for a review of Environment Secretary John Gummer's decision to allow a reprocessing plant to be built at the site.

BRITISH Nuclear Fuels threatened to sue Lancashire County Council for millions of pounds to attempt to overturn the government's decision to allow the reprocessing plant to be built at the site.

Thursday, January 20, 1994

Thorp battle goes to court

By BRYAN BONE

GREENPEACE supporters were mounting an all-day vigil outside the High Court today in protest at the new Thorp nuclear reprocessing plant at Sellafield. The environmental group and Lancashire County Council launched a legal challenge to Environment Secretary John Gummer's decision to approve the plant without holding a public inquiry. The High Court would reject the attempt for British Nuclear Fuels said in a statement. "The attempt to approve the plant will be put on hold until a public inquiry is held," the High Court declared. "The attempt to approve the plant will be put on hold until a public inquiry is held," the High Court declared. "The attempt to approve the plant will be put on hold until a public inquiry is held," the High Court declared.

NEWS

Court battle over THORP

Greenpeace and Lancashire County Council to contest THORP decision

REPORT BY LYNN SKELTON

GREENPEACE and Lancashire County Council are contesting the decision to allow the reprocessing plant to be built at the site. The High Court has ruled that the government's decision to approve the plant without holding a public inquiry is unlawful. The High Court would reject the attempt to approve the plant without holding a public inquiry. The High Court would reject the attempt to approve the plant without holding a public inquiry. The High Court would reject the attempt to approve the plant without holding a public inquiry.

Sliding W...

11th hour bid to scupper Thorp

By BRYAN BONE

GREENPEACE believes it is on course to force a public inquiry into Thorp before any radioactive discharges are made. The environmental group has been granted a judicial review into the government's decision to allow Thorp to be built at the site. The High Court has ruled that the government's decision to approve the plant without holding a public inquiry is unlawful. The High Court would reject the attempt to approve the plant without holding a public inquiry.

Public consultation. New discharge levels for Sellafield, including Thorp, come into effect on Monday. But it will take at least 30 days of preparation at the plant before...

"Radioactive discharges from Thorp will kill people" - Greenpeace

halted on the brink of reprocessing until the outcome of such an inquiry is known.

But David Bonser, director of the plant, warns: "Any lengthy delay would be very serious for our business and our jobs."

THIS BRING ALONG VOUCHER AND WE WILL GIVE YOU off a game OR (after 4pm)

WOWE DON 1287

Chapter Two: The development of the British civil nuclear power industry

February 7 to question the legality of the government's decision (see montage preceding this page). BNFL threatened to sue Lancashire County Council for tens of million of pounds if the opening of THORP was further delayed (The Observer 9/1/94). Before the review took place, a BBC Panorama programme 'A very British Folly' was broadcast. It castigated the opening of THORP, pointing out that the report into the economics of THORP, made by accountants Touche Ross, and used by BNFL to justify the plant to the government, had always been kept a closely guarded secret, with not even the government allowed to see the full figures for themselves (West Cumbrian News and Star 25/1/94, 5). The programme stated that there had been no independent audit of BNFL's accounts, and no government assessment of the cost of dry storage (Financial Times 22/1/93, 15). As a result of this fresh controversy, the Panorama journalist responsible, Ian Breach, was banned for life from interviews with BNFL (West Cumbrian News and Star 3/12/94, 8).

On March 4 1994, Mr Justice Potts concluded the judicial review, announcing that a second public inquiry was not necessary as ministers had acted within their powers. He conceded, however, that the government had 'erred in law' when it licensed the plant without a new inquiry, and did not award costs against Greenpeace or Lancashire County Council (West Cumbrian Gazette 10/3/94, 3).

Given how hard the GMB and other unions had worked for THORP, it was ironical that shortly after the plant received this final go-ahead, an industrial dispute seemed likely when the Amalgamated Engineering and Electrical Union claimed that BNFL's flexible working practices at THORP were causing safety concerns, as shifts intended to be double manned were left to single operators. Overall, the debate over THORP had succeeded in bringing all the arguments over the costs and benefits of nuclear power to the public's attention once more.

2.6.5 North Korea

All through the debate over THORP, political attitudes, particularly those at an international level, had been influenced by developments in Asia. The main focus for concern regarding nuclear proliferation at the time was North Korea. As one of the few remaining communist states in the world, the nation was suffering from political isolation and a lack of economic aid. President Kim il Sung, and heir-apparent Kim Chong il had diverted the attention of their citizens to foreign policy, stating that they wished re-unification with South Korea by 1995.

Up to 70% of the 1.2 million-strong North Korean army were deployed near the border with the South, and outside observers feared that Kim il Sung wished to develop a nuclear capability to augment his threat to the South (see montage opposite). North Korea possessed reprocessing facilities, capable of plutonium extraction, and missiles capable of carrying nuclear warheads (Daily Telegraph 27/12/94, 11; Daily Telegraph 7/11/93, 27)). In March 1993, these fears seemed to be confirmed when North Korea withdrew from the Non Proliferation treaty (NPT), and from the Military Armistice Commission designed to keep peace on the Korean peninsula, and refused to allow IAEA inspectors access to its nuclear facilities (Daily Telegraph 28/12/94, 10). The USA, South Korea and Japan pressed the UN to enforce economic sanctions against North Korea (The European 17-23/12/93, 4; Daily Telegraph 3/5/94, 14). American concern arose not only at the North Korea's nuclear threat, but through concern that if they were not assisted, then South Korea and Japan might move from America's nuclear umbrella and develop a nuclear capacity themselves. The international pressure, including the stationing of thirty-five thousand American troops in South Korea, led the North to allow IAEA inspectors access to nuclear facilities in March 1994. Even then, the IAEA felt their inspectors were precluded from completely free access to all nuclear sites (Daily Telegraph 19/3/94, 11). That month the North Koreans walked out of talks, threatening to turn Seoul into 'a sea of flames' (Daily Telegraph 20/3/94, 2).

Concerns also existed over the possibility of nuclear conflict between India and Pakistan (neither of them members of the NPT) over possession of the state of Kashmir (Daily Telegraph 8/4/94 15). The idea that the production of more plutonium at THORP could make these situations more common occurrences was not an attractive one to many people.

2.6.6 MOX and other possible developments at Sellafield

In October 1992 BNFL applied for permission for a MOX plant. The plant would use separated plutonium from THORP to create mixed plutonium/uranium oxide fuel (MOX) which can be used in both boiling water reactors (BWRs) and pressurised water reactors (PWRs). BNFL already had an order from Switzerland for MOX fuel (BNFL THORP the Facts, undated, sheet one), and a small scale demonstration MOX facility was in place. There had already been problems with the scheme. When they submitted their application, BNFL were castigated by the National Association of Nuclear Free Authorities because they had not provided an environmental statement. The Association raised the matter with Copeland

Tension rises as N Korea bans nuclear inspections

By Hugo Gurdon in Seoul

NORTH Korean state radio forced the country's defiance yesterday, saying there would be no inspections of nuclear facilities that are suspected of concealing an atomic weapons programme. The broadcast said Oh Jin-won, minister, who said the Atomic Energy Agency acted "insolently" and inspected the threat of sanctions. Following its withdrawal from the week from the Pyongyang is also the pull out of the North's hard line to a Japanese declaration will increase economic pressure for Pyongyang down. Pyongyang has agreed that, if it would stop its community sending relatives living in Korea, the paper reports.

air missiles and 18 Apache "tank-busting" helicopters. The South Korean army, 650,000, supported by American troops.

N-bomb fears as North Korea threatens war

by Ambrose Evans-Pritchard in Washington

TENSION was growing at the Pentagon last night as new intelligence intensified fears that the communist regime of North Korea is preparing to launch a military strike against South Korea. If it does, the 35,000 American troops on the Korean peninsula could be engulfed in a devastating war.

extremely dangerous. He warned that North Korea "presents an ever-increasing threat".

N Korea warns Japan of war

By Maurice Weaver in Washington

NORTH KOREA threatened to go to war with Japan yesterday if Tokyo lent support to an American plan for punitive sanctions over Pyongyang's refusal to allow its nuclear facilities to be inspected.

isolated North Korean leadership. South Korea's Defence Minister, Mr Rhee Byong-tae said defiantly that his country's military was on stand-by for "all-out war", raising the spectre of a bath in a trouble thousands and British the 1950-53

day Karl Inderfurth, America's deputy ambassador to the UN, said: "The United States will not continue its discussions and will be forced to return this issue to the Security Council."

S Koreans practise for war

By Hugo Gurdon in Seoul

AIR raid sirens will wail throughout South Korea today and 43 million people will practise for an event they hope never comes. In Seoul, the teeming capital that is home to half the South Korean population, 500,000 cars will stop and pull to the side of the road. Pedestrians will rush to shelters or flee into underground shopping arcades. Those already indoors will tramp down to their basements until they get the all clear and school children will hide under their desks. In the forest of skyscrapers which have sprung up during more than a decade of prosperity, every lift will slide to a stop, illustrating the eerie suspension that will grip the city for 20 minutes.

Atomic waste threat

Koreans have endured these exercises on and off for years, but President Kim Il Sung's threat to turn Seoul into a "fire" has made them more than



Picture: R

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Council, forcing BNFL to submit a forty-four page environment impact document a year later. The Irish government was dissatisfied with this latest submission, complaining that a French MOX plant had previously been challenged because a similar document one hundred pages in length had been inadequate. BNFL was asked for more evidence and submitted twenty more pages in January, and nine more in early February 1994. When they did this, BNFL did not advertise the availability of this latest information publicly, as they should have done by International Law, earning them more reprimands (West Cumbrian Gazette 3/3/94, 2). In February 1994, Copeland Council accepted BNFL's plans for the new plant, but the Association of Nuclear Free Authorities threatened to take legal action as they said such a decision was unlawful because at the time THORP's fate was not yet certain (West Cumbrian Gazette 3/3/94, 2).

Despite the new work at THORP and that offered by MOX (six hundred full-time jobs and three thousand construction jobs), and the possibility of future plants to replace Calder Hall and THORP itself, employment at Sellafield is no longer as secure as once it was. In February 1994, it was announced that 370 white collar jobs were to be cut as part of BNFL's restructuring programme (West Cumbrian News and Star 26/2/94, 1).

2.6.7 Summary

The early years of the 1990s presented the British nuclear industry with several obstacles - the Gardner Report, the technical difficulties of the NIREX repository project and the revival of opposition to THORP, bolstered by changes in the international situation. By 1994 though, the Gardner thesis was largely discredited, the NIREX project was progressing well with little direct opposition from local people, and THORP had finally been commissioned, and now BNFL could turn to new projects. The likelihood of such projects progressing smoothly was by no means certain though, given the nascent resistance to the MOX plant.

2.7 The future

2.7.1 Options

In the summer of 1994 there were four hundred and thirty reactor units in operation in thirty-two countries around the world, with fifty-five more under construction (BNFL News May 1994, 3). Eight new reactors were due to come on-line in seven countries in 1994, including Sizewell B in the UK. At the start of the 1990s, nuclear power represented about 17% of electricity generation worldwide. 19.3% of British electricity was generated in nuclear power stations, in the USA the figure was 19.5%, in Japan 23.4%, Germany 34.0%, Finland 36.0%, Spain 36.1%, Switzerland 37.4%, Sweden 46.9%, Belgium 65.5% and France 69.9% (King 1990, 4)²¹.

The direction of future developments was uncertain. Between 1972 and 1990, 119 nuclear plants have been cancelled in the USA, no new orders had been placed in Canada since 1974, and Cuban expansion halted in 1992. Austria, Greece and Italy had all abandoned their nuclear programmes, and Belgium, Switzerland, Spain, Finland and Germany all had moratoria in place on further expansion (Greenpeace 1994, 1-2). Growth in the next twenty years was expected only in Asia, Eastern Europe, France and possibly in the UK. The legacy of Chernobyl was that nuclear companies had to invest more in safety than their competitor fuels need do. Nuclear stations were more expensive and more time-consuming to build than coal, oil or gas fired stations (Financial Times 17/1/93, 15). However, if oil and gas supplies run out in the next century as some predict (although more supplies may yet be discovered), nuclear will be in a dominant position. Countries such as Japan which lack indigenous energy supplies and are therefore vulnerable to rises in prices of fossil fuels, may develop more of a nuclear power generation capacity. Although no American orders have been forthcoming since the 1970s, the advent of newer, safer technology has led to rumours that more orders will be forthcoming, with a new reactor possibly being built in Florida (Tilson 1993, 420-21). Poorer countries may have little choice but to turn to nuclear, given the prohibitively high cost of other sources of fuel, the problem being that their safety and manpower standards are far below those of the West. This was typified by the decision of the Ukrainian government in October 1993 to reverse its decision to close the Chernobyl plant (Financial Times 17/1/93, 17).

²¹ Nuclear Power has since increased its contribution to UK electricity supply, standing at 26.4% in 1993. Coal's proportion of electricity production has fallen from 79.5% in 1985 to 54.2% in 1993. (Oil has risen from 3.6% to 6.9% and gas from 0.2% to 11.2% in the same time).

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The anti-nuclear movement had grown to a substantial size now. In 1994 in the UK there were some four hundred thousand Greenpeace subscribers, and they have a global staff of over ninety people, with worldwide revenue of over a hundred million dollars (The Greenpeace Years; West Cumbrian Evening News and Star 14/9/93, 7).

At the time this research was carried out, the situation in Britain perhaps hung in the balance more than in any other nation. In 1994, Nuclear Electric owned only six ageing MAGNOX reactors, five AGRs and just one modern PWR at Sizewell (The Guardian 22/10/94). Nuclear electric argued that new reactors would be required early next century as existing ones close and dwindling supplies of fossil fuels lead to a rise in the price of other fuels. Further reactors were therefore proposed for Hinkley Point, Chapelcross, and Sizewell (The Guardian 22/10/94). The industry had to await the outcome of a nuclear review. The review, carried out under Tim Eggar, the Energy Minister, was to examine the economic prospects for nuclear energy, its future growth, and the prospects for privatisation. In short, it would decide whether Sizewell B and THORP marked the end of British nuclear development or heralded the dawn of fresh expansion. In May 1994, Tim Eggar announced that further expansion would be conditional upon the industry being able to 'prove itself competitive' (West Cumbrian News and Star 20/5/94, 7). A new privatisation programme could leave the Magnox and AGR reactors state-owned, leaving Nuclear Electric with Sizewell B. Another reason why Nuclear Electric wanted to develop more PWRs was so that they would not be crippled when the MAGNOX reactors are eventually closed (The Economist April 9-15th 1994).

The need to resolve the question of waste does not seem urgent - LLW can be disposed at the present site at Drigg until the middle of the next century, and ILW can be stored at Sellafield until 2005, or longer if more stores are built (ERM 1993b, i). The question did however, receive fresh impetus in 1994 when a report from the health and safety commission warned of the corrosion of waste stores (West Cumbrian News and Star 2/3/94, 1). Vitrification of HLW is now a practical option, with the Sellafield Vitrification plant and the Vitrification Plant Export facility (VPEF) both operational by 1993. However, NIREX will not be applying for planning permission for a full repository until 1998/9 at the earliest.

In West Cumbria, the health and safety concerns about BNFL's activities at Sellafield persist. A report by Professor Stephen Jones for BNFL in 1993 claimed that measurements of early

discharges from Sellafield made in the 1980s could have been underestimated by up to two hundred percent (West Cumbrian News and Star 2/12/94, 3). On February 17 1994, a minute but abnormal leak of radioactive caesium-137 was detected at Sellafield (West Cumbrian News and Star 19/2/94, 1). In March and May, other small but illegal leaks occurred as a result of decommissioning work being carried out on the site (West Cumbrian Gazette 30/6/94, 2). At the same time it should be noted that in 1993, dose rates received by Sellafield workers actually fell.

For all the obstacles which it faced, the industry continued to improve in its primary tasks. Reprocessing throughput at Sellafield in 1993 was the highest ever (West Cumbrian Gazette 20/1/94, 3; West Cumbrian News and Star 21/1/94, 5). Sizewell B was completed on budget in 1994, eight months ahead of schedule; the seventy-eight months it had taken to construct being a vast improvement upon the designs of the 1960s which took nearly two decades to construct, and after the longest ever public inquiry in Britain, its safety was supposedly assured. In 1992-3, the AGRs were producing nearly half as much power again as they had been doing in 1989-90 (Financial Times 17/1/93, 15), and outperformed any other reactor design in the world in 1993 (The Economist April 9-15 1994, 25-7). Nuclear Electric reported continuing increasing output and higher profits (Daily Telegraph 3/12/93, 25).

2.7.2 Fusion - the long term future? (see montage opposite)

On December 10 1993, scientists at the Tokamak fusion test reactor at Princeton, New Jersey fused hydrogen atoms into helium, releasing the equivalent of three million watts of energy, thus improving upon a similar feat achieved by the Joint European Torus two years earlier. Nuclear fusion is held by some to be the ideal development of nuclear energy, for it leaves no radioactive waste. However, no-one has yet managed to sustain the experiment long enough to sustain enough current to power a sixty watt light bulb. It is hoped that fusion systems will be able to supply power to national grids by 2030 (The Guardian 11/12/94, 1).

US fusion power success

Tim Radford
Science Editor

CHEAP, safe and plentiful energy moved a step closer yesterday after a US breakthrough in which scientists mimicked the power from hydrogen fusion.

The Tokamak Fusion Test Reactor at Princeton, New Jersey, heated a tiny quantity of hydrogen to 20 times the temperature of the core of the sun to achieve the equivalent of 3 million watts.

Five hundred scientists watched as the vast power of the burst triggered a display on the control screen early yesterday. There were cheers and even a few tears.

The Princeton team hailed it as a clear success, saying that it was twice the output achieved two years ago by the Joint European Torus (JET) project at Culham, near Oxford.

The European team was also delighted. "This confirms and extends results predicted from JET's tritium experiments a few years ago," said Dr Don Sweetman of Culham. "When the world's large machines like JET and TFTR were designed over 20 years ago, scientists set themselves very demanding targets and today we have seen those targets achieved."

The reactor, which cost \$1.4 billion (£933 million) to build

and run, used 24 million watts to produce the heat. It will now go on to 10 megawatt experiments before fusion scientists of Japan, Russia, America and Europe join forces and build an \$11 billion (£7.3 billion) monster called the International Thermonuclear Experimental Reactor (ITER) to take the research into sustainable reaction.

Exploring what one senior physicist called a virgin field of physics, the Princeton team used a mixture of two forms of "heavy hydrogen" — deuterium and tritium — to achieve the reaction.

"Probably the most reassuring thing," said Martin Cox, of AEA Technology at Culham, "is that they really have confirmed that the design targets of 20 years ago were realistic. It has taken a lot of hard work to get where we have got."

"The vast majority of the physics issues have been addressed and we are now in a position to go on and build ITER and reach ignition with much more confidence than before."

The success of the TFTR, which takes its name from a Russian design for a fusion reactor, will reassure governments that have at times wondered aloud if the money invested in fusion experiments would produce results.

All the fusion experiments are broadly the same: heavy hydrogen is held in a kind of bottle made of magnetic fields and heated with a blast of cur-

rent. At a certain point, the deuterium and tritium nuclei turn to a brilliant plasma and then fuse into helium, showering out a supply of neutrons. These will be captured in a surrounding blanket made of lithium, and the heat from this could be fed into a generator to make power.

It is hoped — no one has ever sustained a reaction long enough to get the current to light a 60 watt bulb — there will be no danger of meltdown, very little "dirty" radiation and low running costs. After a while, the operators would be able to switch off the heat required to set the reaction going and it would sustain itself.

This process of sustaining reaction, known as ignition, has never been achieved and would be very unlikely anyway in the prototypes used so far. But the experiments at Culham and now at Princeton have confirmed that ignition is technically possible in a future design.

Deuterium exists wherever there is water. Lake Geneva alone holds enough to fuel the world for 3,000 years. Tritium exists in rocks almost everywhere. Tritium is expensive to make, but, say fusion scientist there is a bonus: when neutrons slam into lithium, they set up another reaction which makes tritium.

The target date for the fusion power into a national grid, however, remains the same as it has for a decade: 2030 AD.

Britons released by S



with a lithium wall heat energy

Wonder fuel doubt

US energy discovery rejected by British

by Steven Haynes
BRITISH scientists dismissed American claims of a breakthrough in the search for clean and limitless energy after scientists at Princeton University rejected the discovery.

Lloyd's Names 'facing further bill of £8.6bn'

Sarah Whitebloom

LLOYD'S of London's financially-stricken Names face

corporate Names have been invited to join Lloyd's for the first time next year, the extra capital they introduce will not help existing Names with these losses.

the losses stem from and bad advice professionals. Names could be hit with a massive bill of £8.6bn. A massive call is unlikely to encourage

2.7.3 Epilogue

This, then, is the history of the development of the nuclear power industry up to the time when this research was carried out²². It is hoped that this non-polemical, comprehensive account provides the best context within which to understand the nature of public opinion in 1994. Amongst the important factors to remember are the optimism surrounding the industry in its early years, the many technical problems which it has encountered, the changing international situation and the effect of the arms race upon the industry, the growing importance of public opinion and the manner in which back-tracking and careful planning has enabled the British authorities to minimize public opposition and avoid events similar to the clashes which occurred in mainland Europe, and the manner in which various aspects of the British nuclear industry came to be in West Cumbria. One must also remember the need for an energy supply which will be sustainable in the long term, and the potential revenue which the British nuclear industry might offer through construction, development and reprocessing. The rest of this study will investigate how this history has affected political debate and popular attitudes to nuclear power. Although there are many areas of the UK in which the nuclear industry has a presence, the most intense and the most controversial is in West Cumbria. As mentioned above, since the 1980s, government policy has been to site the nuclear industry in locations in which it is politically acceptable. As more aspects of the industry are located in West Cumbria than anywhere else in the UK²³, one might expect that West Cumbrians are the people most favourable to nuclear power. The remainder of this research shall endeavour to see whether that is indeed the case.

²² Appendix A details events since the actual fieldwork was conducted, so as to bring the reader as up to date as possible with developments in the nuclear power industry. It is not included here because the events of the latter half of 1994, and those of 1995, such as the outcome of the government review of the nuclear industry, are irrelevant in terms of explaining the nature of public opinion in April and May of 1994. To mention such events here might even be misleading.

²³ As well as reprocessing MAGNOX fuels, reprocessing enriched fuels, nuclear power generation, and storage of HLW, West Cumbria is also the only site under investigation for LLW/ILW disposal and a MOX plant

Chapter Three

Cumbrian History, Economy and Culture

3.1 Introduction

There are other factors besides the general history of the British nuclear industry which may influence West Cumbrian opinion towards nuclear power. Of these, perhaps the most important to examine is the specific historical, social, economic and cultural environment in which West Cumbrian people live (ERM 1993, 2).

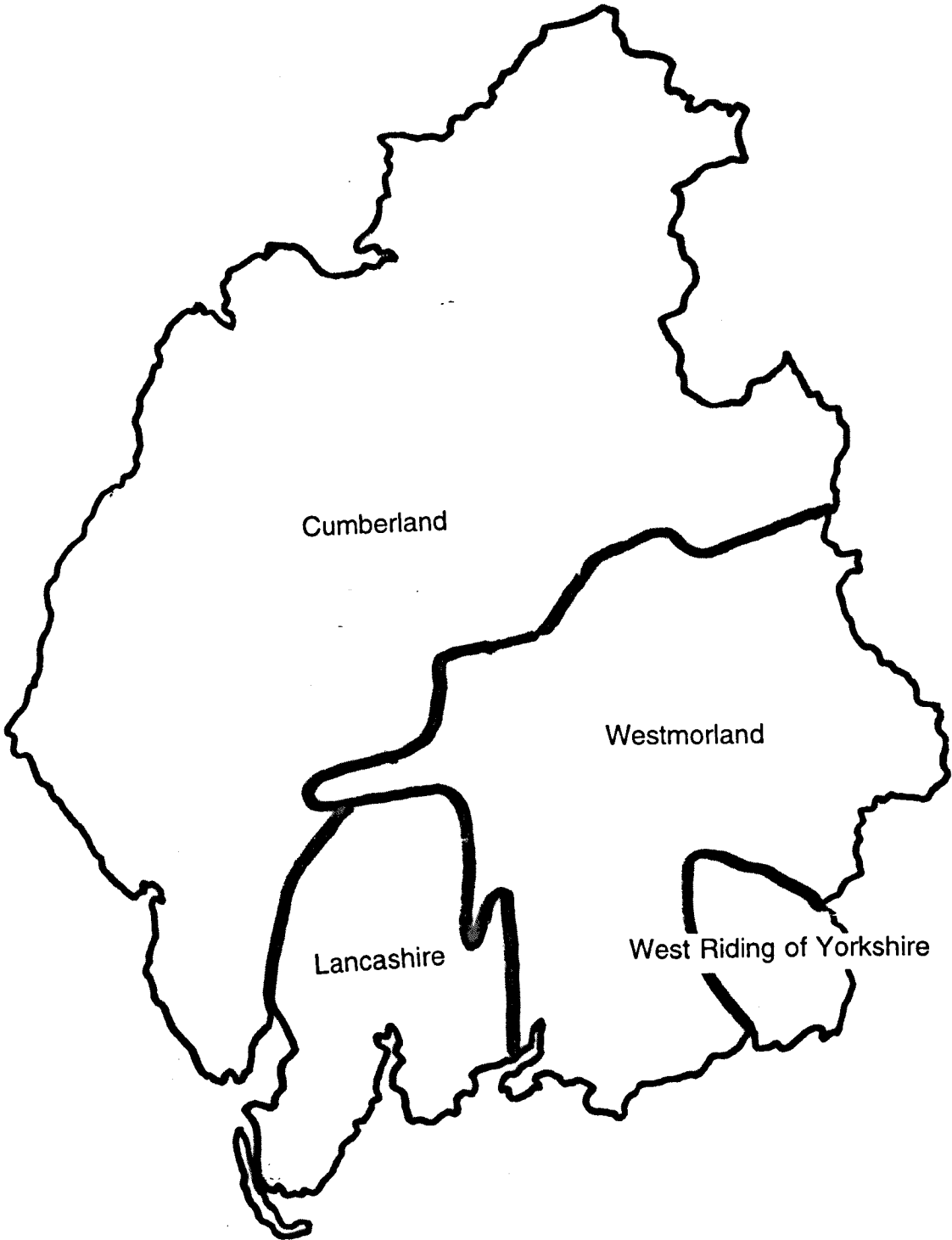
Those unfamiliar with Cumbria are reminded at this point that Cumbria is the most north-westerly county of England, and was created in 1974 through merging the counties of Cumberland and Westmorland together with part of North Lancashire and the Sedburgh district of West Riding of Yorkshire (See Map 3.1). Known to many outsiders for the beauty of the Lake District and for the controversies of Sellafield/Windscale, today Cumbria is subdivided into six local authorities: Allerdale; Copeland; Eden; South Lakeland; and the urban districts of Carlisle and Barrow (See Map 3.2). This section outlines several factors which may have a bearing upon local opinion in the western half of the county - the area controlled by Allerdale and Copeland councils and formerly known as Cumberland. It assesses the area's past economic growth and more recent decline, the importance of the nuclear industry and the difficulties which face the area in attracting other industries. Finally, this chapter passes comment upon certain observable trends in local character and culture which may have a bearing upon attitudes towards the nuclear industry.

3.2 Eighteenth and nineteenth century growth

Coal extraction has long been practised in West Cumbria, with mining carried out near St. Bees as early as the thirteenth century. In the seventeenth century coal reserves along the coast began to be exploited on a large scale, bringing substantial prosperity to the towns of Maryport, Workington and Whitehaven (Collingwood 1932, 94). In the eighteenth century this fourteen mile strip was so productive as to have 'virtually monopolised the coal trade with Ireland' (Rollinson 1978, 69). In the nineteenth century, as steam engines enabled more efficient mining practices and the advent of railways facilitated the opening of pits over a wider area, the coal industry expanded yet further (Rollinson 1978, 119-120). Between 1860 and 1900 coal output in Cumberland doubled from one million tonnes to over two million, while the number of miners grew from three and a half thousand to over eight thousand. The area knew economic growth as it had never done before, and arguably, has never done since. Coal was not the only major source of revenue. Iron ore (hematite) had been extracted on a small scale since the twelfth century, and with the industrial revolution, production increased

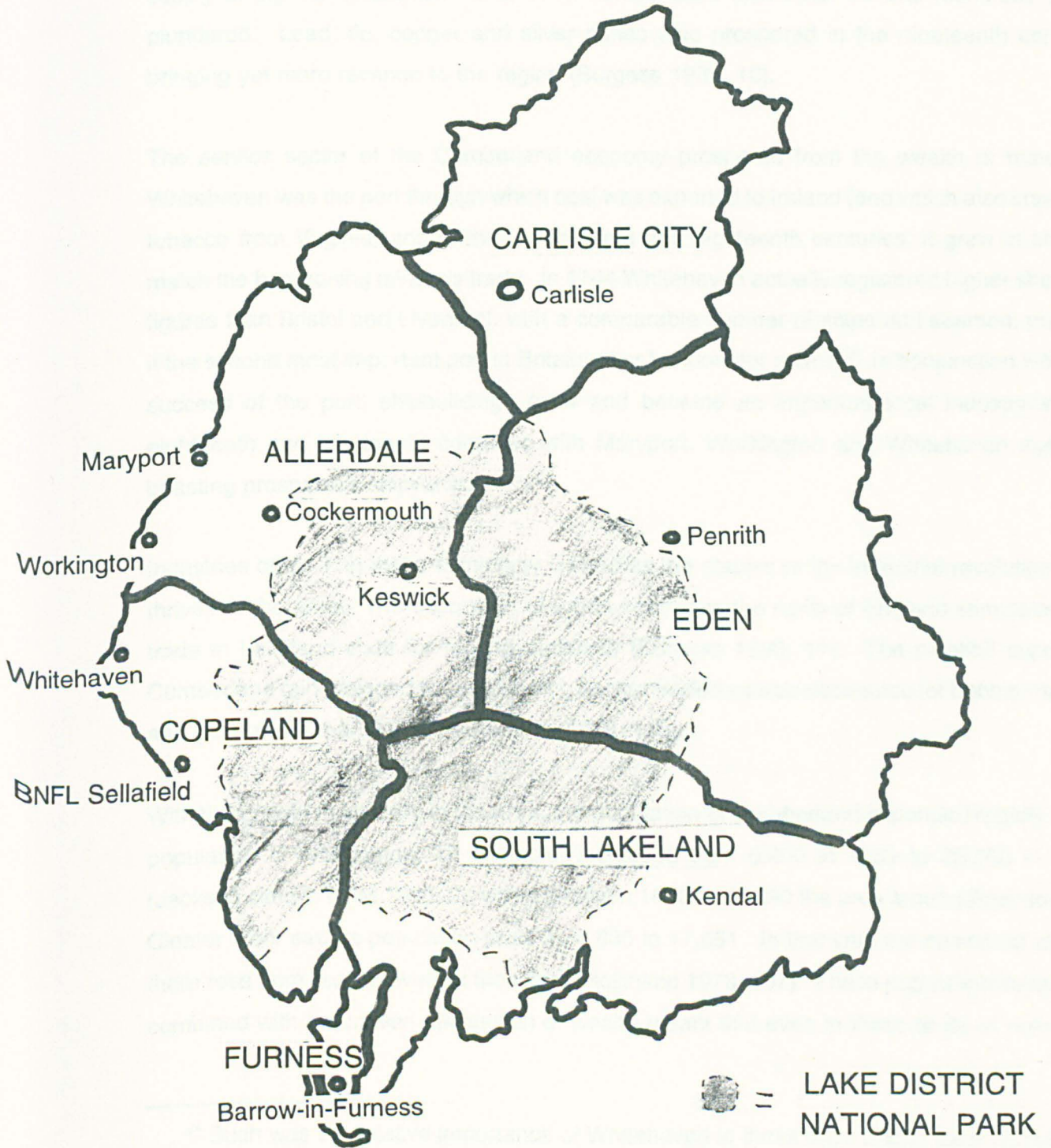
Map 3.1

The component counties of Cumbria



Map 3.2

Cumbria - Local Authorities and the Lake District National Park



Chapter Three: Cumbrian history, economy and culture

dramatically to meet demand from the rapidly expanding iron and steel industries of the north of England (Marshall 1981, 117). High grade iron ore was to be found in plenty in the area, and in the late nineteenth century, Cumberland supplied up to twelve percent of the national supply of pig iron (Rollinson 1978, 107). There were also other mineral resources to be plundered. Lead, tin, copper and silver mines also prospered in the nineteenth century, bringing yet more revenue to the region (Burgess 1989, 10).

The service sector of the Cumberland economy prospered from the wealth of minerals. Whitehaven was the port through which coal was exported to Ireland (and which also imported tobacco from Virginia) and in the seventeenth and eighteenth centuries, it grew in size to match the burgeoning minerals trade. In 1744 Whitehaven actually registered higher shipping figures than Bristol and Liverpool, with a comparable number of ships and seamen, making it the second most important port in Britain, after London, for a time.²⁴ In conjunction with the success of the port, shipbuilding grew and became an important local industry in the eighteenth and nineteenth centuries with Maryport, Workington and Whitehaven itself all boasting prosperous shipyards.

Industries other than those commonly viewed as the staples of the industrial revolution also thrived in the area. The expansion of urban centres in the north of England stimulated the trade in Lakeland slate for roofing materials (Burgess 1989, 11). The plentiful supply of Cumberland rain provided the fast-flowing becks needed as a power source for bobbin-making and gunpowder manufacture (Rollinson 1978, 115).

With the growth in industry in the area, the population of Cumberland expanded rapidly. The population of Workington, for example, increased from 6,400 in 1861 to 23,500 in 1891 (Jackson cited in ERM 1993, 9), whilst between 1840 and 1880 the area around Arlecdon and Cleator Moor saw its population swell from 835 to 17,651. In that time the number of miners there rose from sixty to over six thousand (Rollinson 1978, 107). These population increases, combined with an uneven distribution of wealth meant that even in these times of economic

²⁴ Such was the relative importance of Whitehaven in those days that in April 1778 it was actually invaded by one Paul Jones and a body of thirty men as part of America's struggle for independence from Great Britain, making it the only part of the UK which the Americans have ever invaded (Palmer 1941, 47).

growth the standards of living for the majority of Cumbrians were hampered by overcrowding and deprivation, creating

"an atmosphere and a social environment more suited to the gold-mining settlements of North America than to the north of England." (Rollinson 1978, 108)

In some ways, it could be said that a traditional characteristic of life in Cumberland has been its hardship.

Besides industry, agriculture has also been a traditionally important sector of the West Cumbrian economy and some comment must be made about it. Like that of urban dwellers, the farmers' way of life was neither easy nor highly profitable. For one thing, the environment of the far North West, with long winters, many poor soils and excessive rainfall, meant that agricultural production in the region was more costly, and less productive, than farming further south. Another handicap was the remoteness of the region, which meant that new innovations which improved farming elsewhere were slow to reach Cumberland (Burgess 1989, 8). For example, broadcast sowing was still used in preference to seed drills as late as the 1950s (Rollinson 1978, 86-87).

3.3 Twentieth century decline

The prosperity of Whitehaven, and of the smaller ports and their shipbuilding industries, declined steadily throughout the nineteenth century, as Cumberland became the victim of stiff competition from Liverpool. Liverpool, fed by the vast cotton trade of Lancashire, grew far larger than Whitehaven, and offered corresponding economies of scale which Whitehaven, surrounded only by the Cumbrian fells, could not match. The less stringent customs service in Scotland, and the existence of a greater number of banks to facilitate the buying of goods through bills of trade also diverted a large part of the tobacco trade to the port of Glasgow (Hughes 1965, 36-37).

The mining industries also fell into decline in the twentieth century. Many coal seams were exhausted, the costs of extraction in others had increased, and eventually the pits closed. The last, Haig colliery, closed in 1986. The hematite mines suffered a similar fate. Hodbarrow mine for example, which had been averaging over half a million tonnes of iron ore a year in the early 1890s, was producing only forty thousand tons a year by 1958. It was no surprise when the Cumbrian iron ore mining industry ceased in 1968 (Rollinson 1978, 109).

Chapter Three: Cumbrian history, economy and culture

Long before then a combination of a change in smelting technology, using lower grade phosphoric ore, and the import of cheaper Spanish hematite, had lowered the value of Cumbrian hematite and the profitability of the mines (Rollinson 1978, 106). The lead and silver mines which had also thrived so successfully in the nineteenth century were also exhausted in the first half of this century, and those mines had all closed by 1959.

The rural industries declined too. The bobbin industry was badly hit by the cotton depression in Lancashire in the 1860s, a problem compounded as competition grew at that time from Scandinavia. The ban of child labour after the 1867 Factory Act virtually sounded the death-knell for the bobbin industry as British production costs were made uncompetitive (Rollinson 1978, 115). Gunpowder manufacture, which had thrived since 1764, struggled after the end of the first World War, and the last powder mill, at Gatebeck, closed in 1937 (Rollinson 1978, 116-17). Other rural industries suffered similar fates. The manufacture of charcoal declined with changes in practice in the metallurgical industries. The manufacture of durable 'swill baskets', which were once sold in their thousands for ships in Liverpool, also faltered as they were superseded by containers made of polythene and the suchlike. If the way of life for the majority of local people had been a struggle in times of economic growth, the decline of the area's industries greatly worsened the situation. The social hardship to be found in the area was further exacerbated by the fact that when the area's industries entered difficulties, the population numbers did not fall. When the exhaustion of Cumberland's natural resources coincided with the depression of the 1930s, unemployment levels rose to a level of around eighty percent of the employable population in towns such as Maryport (ERM 1993, 9). It may very well be that this history of social hardship has contributed to an evident stoicism in West Cumbrian culture, a pride in being seen to be 'hard'.

3.4 The current non-nuclear situation

In order to comprehend the importance of the nuclear industry to West Cumbria today, it is necessary to understand the state of other sectors of the economy. Manufacturing industry is still the dominant sector in the West Cumbrian economy, constituting 27.8% of jobs in Allerdale, compared to a national average of 24% (1987 census of employment cited in ERM 1993, 13).

In the 1980s there was growth in some manufacturing sectors, notably the paper, textile and footwear industries (Cumbria Industry & Commerce Directory 1991-2, 30-31), helping Cumbria

to become one of the few areas of northern England which prospered during the 1980s. By the time of this study, however, the picture had changed. The area was badly affected by the national and international recession of the 1990s, and several firms closed their operations. In Allerdale alone, of the thirty-one main employers listed in Enterprise in Allerdale at the turn of the decade, more than a quarter had closed by 1994 (Economic issues in Allerdale 1993 3:5, Business and Industry Review 1993, 7). Between 1990 and 1993, employment in manufacturing industry in Allerdale shrank by 12.4%, a loss of 1340 jobs, and greater than the national rate of shrinkage of 10.9% (Economic issues in Allerdale 1993, 3).

It would be misleading to portray a picture of total gloom. The metals, minerals and chemicals sector, which shrank in the 1980s (Cumbria Industry & Commerce Directory 1991-2, 30), expanded in the 1990s (Economic issues in Allerdale 1993, 3:4), and the paper industry also continued to prosper (Cumbria Industry & Commerce Directory 1991-2, 30-31).

Despite this amount of hope, the dominance of manufacturing industry has had harmful effects for the employment prospects of many local people. The dependence of the area upon manufacturing industry has led to a predominance of semi-skilled and unskilled people in the labour force. When major manufacturing employers cut their workforce as they have done in recent years, it is hard for such people to find fresh employment. The self-employed sector of the Cumbrian economy is under-developed (in some places it is nearly half the national average) (ERM 1993, 12-13). There is also an absence of major service sector employers in health, education or financial spheres, (Allerdale Borough Council cited in ERM 1993, 13). Other sectors are also contributing to rising unemployment. Construction work is suffering in the area after the completion of both the THORP project and a series of buildings for an enterprise zone at Workington (see below). (Cumbria Industry & Commerce Directory 1991-2, 30). The end of the Cold War meant that in December 1992, an armaments depot at Broughton Moor closed, with the withdrawal of NATO weaponry and personnel, and the subsequent loss of the money they spent in the area (West Cumberland Times and Star 3/6/94, 3). The situation has been complicated by relative increases in the size of the economically active age groups, and a rise in numbers of women entering the workforce (ERM 1993, 12). These developments have meant that although the total population of the county is decreasing, the number of that population seeking work is increasing.

Coal may have pulled out of the West Cumbrian opencast sites but companies could now step into the breach to tap the vast reserves

A new reign for old King Coal?

SHAVEN firm's
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permission to
near Lamplugh
new start for
mining in West

Elliott reports

is dead — long
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NEW MINE COAL IN W. CUMBRIA

The
sell-off of
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A new Coal

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By Mark Fisher

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The sale of British Coal land, an estimated
120,000 acres, and the lifting of the 250,000
tonnes ceiling on private opencast
could result in a wave of activity.
But the changes in the law he
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Planning Commission, the
Philip Corbett, the
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said of

Chapter Three: Cumbrian history, economy and culture

Other sectors of the economy offer limited hope. Agriculture, and in particular dairy cattle and sheep grazing, is still important in the West Cumbrian economy where it is the fifth largest employment sector in Allerdale (ERM 1993, 8). Sadly, farming in the far North West is still not a secure occupation. The vagaries of the local environment persist as they did in bygone days (although the potential harm is tempered through the benefits of modern technology). Although the port of Workington offers a route for daily cargo transport both in and out of the area, the region is still ill-favoured geographically in terms of access to markets (ERM 1993, 9). At present employment in agriculture is falling by around one percent per annum (Cumbria Industry & Commerce Directory 1991-2, 30).

Although deep mining has now ceased in West Cumbria, Cumbria's untapped coal reserves were estimated to be worth one and a quarter billion pounds in 1994, with only four hundred and fifty million pounds needed for extraction costs. Potentially, coal mining could provide employment for at least twenty years (West Cumbrian News and Star, 1/8/94, 6). However, the practicality of gaining access to the remaining Cumbrian coal deposits has proved elusive. In 1985 the Potatopot opencast site near Maryport was opened with great hopes for the future, but it closed in 1993 (West Cumberland Times and Star, 10/12/94, 28). The same year another opencast site at Keekle closed, leaving Broughton Lodge as the only opencast site in West Cumbria. It may be that the privatisation of the coal industry may present new opportunities (see montage preceding this page), but at the time at which this study was conducted, the minerals sector offered little concrete evidence of being of great economic benefit to West Cumbria²⁵.

Tourism is of growing importance to the county of Cumbria as a whole. In 1983 tourist spending in Cumbria totalled an estimated 114 million pounds, employing over twenty-five thousand people both directly and indirectly, making it the county's second largest employer, after manufacturing. By 1990 tourist spending had increased to around 260 million pounds per annum, supporting thirty-one thousand full and part time jobs, and directly employing 12,900 people (Cumbria Industry & Commerce Directory 1991-2, 30-31). By 1994 the tourist industry had expanded yet further, bringing 812 million pounds worth of revenue to the county

²⁵ The Cumberland Coal and Fireclay Company had applied for a site at Kidburngill, Asby (West Cumbrian News and Star, 26/7/94, 1) but the future of this development was uncertain.

each year, including 446 million pounds in direct tourist spending, and supporting 42,160 jobs, thus representing 17% of all Cumbrian employment (Cumbria Tourist Board 1994, 4-6).

The tourist revenue, however, is not evenly spread. The main attraction is the Lake District, including towns such as Windermere, Ambleside and Keswick. The more industrialised west of the county is in many ways,

"the 70 mile coastal strip which 90% of visitors to the Lake District never see."
(The Guardian 14/6/94, 21)

It has more problems attracting visitors and the revenue which they bring. That is not to say that tourism is dead on the west coast. Maryport Developments Limited, for example, have led an eight million pound marina project at Maryport (soon to be imitated at Whitehaven also) with a complex of luxury flats and a floating museum of vintage ships. Although 19% of employment in Allerdale is supported by tourism, only 6% of Copeland employment is supported by that sector (Cumbria Tourist Board 1994, 9).

All these factors mean that West Cumbrian attitudes towards the nuclear industry must be understood within the context of extreme economic difficulty (see montage opposite). The census of employment found that between 1989 and 1991 employment in Allerdale fell by 2,896 to 29,480, a decrease of 8.9% compared to a UK average fall of 2.9%. In April 1993 unemployment in the borough stood at 4615, compared to 4081 in April 1992. This was an increase of 13.1% in that year, and an increase of 35% since 1991 (Economic issues in Allerdale 1993 3:7). This increase in unemployment was widespread, with only three of the thirty-four Allerdale wards reporting static or declining levels of unemployment (Economic issues in Allerdale 1993 3:8). Urban areas in Workington and Maryport had the highest levels of unemployment, but the highest increases were amongst the rural areas. Keswick in particular suffered a rise of 40% in unemployment between 1992 and 1993, an increase of 93% between April 1991 and 1993.

In 1993, nearly a third of unemployed Cumbrians had been without a job for over a year, and a fifth had been out of work for over two years, with fourteen people chasing every vacancy, and under thirty year olds making up 40% of the total unemployed (West Cumbrian News And Star 24/12/94, 2). When this study began in September 1993, unemployment figures for the Workington area were 3233 males (16.6%) and 932 females (7.3%) a total of 4165 (13%) of the total population of the area (PACT figures, personal communication). The importance

On the day it's revealed that Cumbria has 1,000 more long term unemployed than last year, we focus on one face behind the statistics

Barry Henney is 37, married and jobless . . . and facing his 13th Christmas on the dole

By STEPHEN DIXON
JOBLESS Barry Henney is just 37 . . . yet he's facing his 13th Christmas on the dole. The ex-factory worker from Workington says this year will be much more festive seasons



OUT of work but not out of hope . . . Barry Henney

WEST CUMBRIA faces its biggest mountain

Long, hard climb out of recession

RECESSION-battered West Cumbria has a mountain to climb to recovery, a leading economist claimed today.

The district is suffering from severe lack of inward investment in new industries, with investors put off by poor transport links, said David Kern, chief

QUOTE:

'The challenge to the local economy is to find new sources of employment'

By SIMON LEE
Business reporter

He said the delay over opening the Thorp site at Sellafield had affected the future of hundreds of permanent jobs in the region.

"The challenge to the local economy is to find new sources of employment," said Mr Kern. "The defence and nuclear industries will remain very significant, but there is considerable scope to develop new industries and services."

Mr Kern was due to address business management students at the University of Northumbria campus in Carlisle, revealing that unemployment was the biggest problem. He said: "The effects of the general

—which he said shown considerable resilience to the recession.

Unemployment across the county rose by 92 per cent between March 1990 and January 1993, although it has dropped slightly in the past few months.

But with tourism the second biggest employer in the county, Mr Kern was optimistic

QUOTE:

'West faces deep problems with reliance on nuclear and defence industries'

Henney said he could wish for nothing better than the offer of job in a warehouse or factory.

After losing his last job with former Workington company Courtaulds, he said he realised then prospects of other employment were slight, but had never contemplated going so long without work.

His time on the dole is only partly filled with hobbies such as gardening, DIY and cycling.

"You are depressed and down sometimes," he said.

"You tend to get into a rut and go round the house doing the same things over and over again and have niggly little arguments."

"The little boy has not had a decent holiday since I came out of work."

cularly almost jobless year.

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of the nuclear industry to West Cumbria can be seen in the fact that in January 1994, the end to the uncertainty over THORP contributed to a fall in unemployment in Copeland while unemployment increased in the county as a whole. A difficult economic situation still persisted by June 1994, the time by which all the surveys in this study had been completed. At that date, unemployment in Workington and Whitehaven was still at a level of around 13%. In Workington 4,300 people were unemployed out of a population of 28,000, with only 203 advertised vacancies. Even the local employment training group had laid off six of its twenty-one staff (The Guardian 14/6/94, 21).

3.5 The presence of the nuclear industry

With the minerals sector all but extinct, agriculture and manufacturing industry struggling to offer employment, and tourism not a particularly strong sector in the west of the county, the nuclear industry has an important economic role to play. In many ways, the presence of the nuclear industry in West Cumbria since the late 1940s has made a great contribution to the economic well-being of the area, and it could be seen to have taken over the role of the mining industries as the major source of revenue for the west coast.

In employment terms, BNFL's influence on the local economy is quite striking. Due to the labour intensity of nuclear reprocessing, Sellafield employs a large workforce. With the four reactors of the Calder Hall power station, the research laboratories of AEA technology²⁶, two reprocessing plants, and the storage facilities for HLW all on site, Sellafield is the largest nuclear installation in the UK in terms of the number of its employees (Macgill and Phipps 1987, 225). Periodic expansion projects, such as THORP, have also greatly increased employment in the local construction industry. Most of the workers at Sellafield, either BNFL staff or contractors, are recruited from within Cumbria. At the height of its expansion in the 1980s, Sellafield employed 7,186 people directly in industrial and non-industrial occupations, of whom 96% were recruited locally, and 7,380 contractors, of which some 61% were locals. There are also some 545 staff of AEA Technology at Sellafield. With this number of local employees, Sellafield accounts for over a fifth of employment in West Cumbria, and a third of workers in the Borough of Copeland (BNFL information sheet Sellafield and the local economy, 1990; ERM 1993, 14). Of the nine manufacturing firms listed in Copeland by the

²⁶ The high technology research and development branch of the UKAEA which was separated in 1989.

Cumbria Industry & Commerce Directory 1991-2 (AGT Ltd 1992, 24), five are based at Sellafield. Were the NIREX rock characterization facility proposal to go ahead, it would offer a further 1,400 man-years of work until 2007 (West Cumbrian News and Star 16/7/94, 3).

Sellafield also brings indirect economic benefits through the 'multiplier effect'. The wages of BNFL employees, each with an average wage of £20,000, together with the wages of non-Cumbrian contractors resident in local hotels, guesthouses and caravan sites, bring great revenue to local businesses (BNFL information sheet Sellafield and the local economy, 1990). Thus it can be seen that in the 1980s, some 15,111 people (nearly half the working population of Copeland) worked for, or were directly supported by the nuclear industry (BNFL information sheet Sellafield and the local economy, 1990). A study by the GMB trade union in 1993 claimed that if Sellafield itself were to close, 9,600 jobs would be lost, with Copeland's unemployment rate rising to 48.9%, far above the 1993 level of around 13% (West Cumbrian Evening News and Star 24/11/93, 12).

BNFL's presence also offers other benefits to the local economy, where the interests of the industry and the local community overlap. As regards infrastructure, for example, the company has invested some £7,300,000 in building roads, and a further £1,250,000 has been given in local transport subsidy. The company has also had great influence on the viability of the threatened West Cumbrian coastal railway line. Without BNFL's four million pound contract with British Rail for use of the line, it would surely be in great jeopardy (BNFL information sheet Sellafield and the local economy undated) BNFL also works to bring other companies to the area. The West Cumbria Development Fund (WCDF), which seeks to encourage local business and stimulate outside investment, receives its core funding of one million pounds per annum directly from BNFL. BNFL's presence itself also attracts investment in the area. For example, the first phase of the Westlakes Science and Technology Park, (a project funded by BNFL via the WCDF), was fully tenanted within twelve months of opening, as firms were attracted by the vast technological and knowledge resources at hand at Sellafield, and also by the opportunities for trade with BNFL itself should any firm develop a product of use to the nuclear industry (Cumbrian Newspapers Business and Industry Review 1993, 6).

The local community also benefits from BNFL's investments in public relations. According to their 1990 figures, BNFL have, amongst other things, invested some three and a half million

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pounds in restoring Georgian property in Whitehaven, one million pounds on constructing an athletics stadium in the same town, £350,000 in the Maryport Harbour Development Scheme, £100,000 in Seascale Parish council, £50,000 in the Hawse End Outdoor Pursuits Centre, £250,000 in an archaeological dig at Hadrian's Wall, £65,000 in sponsorship and donations to sports groups, and £50,000 annually in donations to other local causes. Since 1990, donations have included over £900,000 to Whitehaven harbour beacon redevelopment (West Cumbrian Evening News and Star 8/3/94, 2) and £6,000 to Muncaster parish hall repairs (BNFL News, May 1994, 4). Sponsorship provides a means for BNFL to associate their name with positive events in the Cumbrian community. Among the events which the company is directly associated with are the BNFL Pro-am at Seascale golf course, and the annual BNFL family fun day of children's sports, crafts, entertainments and Teddy Bears' picnic (attended in 1993 by over a thousand people) (West Cumbrian Gazette 18/8/94, 10-11).

Local authorities are very aware of the industry's willingness to invest in the area, and have been known to call for increased assistance at times of proposed expansion within the industry. For instance, at the end of 1993, when NIREX were pushing for the RCF, Copeland Borough Council called upon NIREX to invest in Whitehaven town centre, Copeland's rural area, to improve roads and facilities, and to provide jobs for local people if the RCF were to go ahead.

Although the industry clearly has many advantages, there are problems. For example, the importance of BNFL to West Cumbria, and to Copeland in particular, meant that the employment situation was hampered by the uncertainty over whether THORP would be commissioned. For months during 1993-94, West Cumbrian businesses were caught in limbo as they waited for a decision on the plant, thus delaying their own expansion plans. The delay was estimated to have cost over a thousand local jobs (West Cumbrian Evening News and Star 14/1/94, 9). It forced the MP for Copeland, Jack Cunningham, to write to the Prime Minister, John Major, regarding the 'crisis' in West Cumbria, which he claimed could become 'a calamity' (West Cumbrian Gazette 8/7/93).

BNFL's presence may also deter investment in the area. The good rates of pay, short working hours and long holidays which the company offers may deter other employers from coming to the area if they feel they must offer similar employment conditions. For West Cumbrian

residents, it may also inflate house prices and such like, beyond the reach of those not connected with the industry. The short term nature of contractual work at the Sellafield site has also caused problems for local businesses, especially those offering rented accommodation (ERM 1993, 14-15).

There is also a danger that the area may develop a nuclear moniker. The presence of BNFL, and latterly of NIREX and the Westlakes Science Park, (which initially targeted firms associated with the nuclear industry to be its tenants), may create an association of the Cumbrian economy as being synonymous with the nuclear industry. Although at present the millions who visit the Lake District appear to forget about the presence of the nuclear industry in the county, the risk is that the poor image of that industry may prove costly in terms of attracting investment and tourism to the area. Certainly in 1983, at the time of the controversy over the closure of the beaches, a 20-25% fall in the number of tourists visiting Copeland was noted (SERA 1986, 2).

It is also alleged that the presence of BNFL has robbed other firms of economic assistance and that this therefore creates a barrier to the development of other industries. When, in the mid-1980s, West Cumbria was divided into two Travel To Work Areas (TTWAs) for government assistance (the Whitehaven and Workington TTWAs), the whole Whitehaven section was denied aid because it was seen to be better off due to BNFL's presence. This starved Copeland's non-nuclear businesses of assistance (ERM 1993, 15). Even when the Copeland area was eligible for regional grants, BNFL may have been claiming more than its fair share of financial assistance. Between 1977 and 1985, BNFL received 136.2 million pounds in Rural Development Grants (RDGs) for investment in West Cumbria, representing 77% of all RDGs for West Cumbria during that time (SERA 1986, 1). Looking at Table 3.1, it can be seen just how much of the area's grants BNFL was usurping:

Table 3.1 BNFL gross RDG as % of grants in area, 1977-84

	Copeland	W.Cumbria	Cumbria	North
1977	63	42	32	2.4
1979	56	30	24	2.7
1981	96	66	56	16.6
1984	94	83	83	N/A

Source:(SERA 1986, 1)

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The nuclear industry may also have adverse effects on other economic sectors. The nature of Cumbrian agriculture, relying on sheep and dairy farming, means that it is vital that produce is seen to be of high quality, and certainly not tinged with doubts over radioactivity (although the harm to Cumbrian meat sales is limited by the current procedure of not labelling meat according to its site of origin). This is especially true of hill farms whose geographical position precludes them from any other options for production (ERM 1993, 8). The agricultural sector of the local economy may therefore not sit too comfortably with the nuclear sector.

The Cumbrian tourist industry also has a two-sided relationship with the nuclear industry. On the one hand, it fears that the reputation of Sellafield as a radioactive polluter may deter people away from the area, particularly the west coast, and may damage the traditional farming practices and industries which 'make an important contribution to visitors' enjoyment of Cumbria' (Cumbria Tourist Board 1994, 12). Yet, on the other hand, the SVC and the tourism centre within it provides a major attraction to encourage tourists westwards from the lakes (The 160,945 visitors who attended the SVC in 1992 made it the most popular attraction in the west of the county and the fifth most visited attraction in the whole of Cumbria (Cumbria Tourist Board 1994, 15)). It also encourages a distribution of tourists around the west coast through the tourism information which it provides on other attractions.

It is important to note that at the beginning of 1994, when this study was being set up, Sellafield's reputation as a reliable local employer which was immune to recession, began to be questioned. 370 white collar job losses were announced at the Sellafield site as part of BNFL's national restructuring programme (West Cumbrian Evening News and Star 28/2/94, 3; 20/4/94, 1). In 1993, an official of the Amalgamated Engineering and Electrical Union had already complained that the majority of jobs at a new combined heat and power plant at Sellafield had gone to people from outside Cumbria. These were not only white collar posts, but also semi-skilled and unskilled jobs (West Cumbrian News and Star 21/12/94, 3; Whitehaven News 25/11/93, 1). Furthermore, as construction on THORP was completed, the multiplier effects of the industry decreased.

3.6 Development assistance and investment

From the Special Areas Act of 1934 onwards, the west of Cumbria has received help from the rest of the UK in coping with its economic difficulties. Even the decision to locate the nuclear

industry at Windscale in 1947 was partly based upon such a scheme to relieve the area's unemployment problems.

There have been many government initiatives since then. Until the mid-1980s, all of West Cumbria was categorised as a Special Development Area, receiving Regional Development Grants (RDGs), and Regional Selective Assistance (RSA). Since 1984, when West Cumbria was divided into the Workington and Whitehaven TTWAs, the Workington TTWA (including Workington, Maryport, Silloth and Cockermouth) has been granted Assisted Area status, and continued to receive RSA, Regional Enterprise Grants and other help from the department of trade and industry enterprise initiative. Whitehaven TTWA, because of the considerable income which it received from Sellafield, was not.

The European Union offers another source of assistance for West Cumbria. Both Whitehaven and Workington TTWAs were recognised by the EU as eligible for Objective Two status in 1990. In 1992/3 the first monies from this grant arrived in Allerdale with over £210,000 available annually for a three year programme (1992-5) to develop the area. In December 1993, the Objective 2 status was extended for another 3 years (West Cumbrian News and Star 22/12/94, 3). A large part of the county has successfully applied for European Objective 5b status, rural development (Business Gazette June 1994, 4). Other support for rural areas comes from the Rural Development Commission.

However, despite this wide range of development schemes, attracting inward investment to West Cumbria is still proving rather difficult, due to the poor strategic position of the region. Even the county council admits that,

"for too long Cumbria has been seen as a nice place for a holiday but not the place to locate a business" (Cumbria County News Number 1 Summer 1993,3).

It takes six hours by rail and eight by road to reach London from West Cumbria, six hours by rail or plane to reach Paris or Brussels, and ten hours by road to Dover. It even takes nearly three hours to reach any major British city other than Newcastle.

There is also concern over the standard of road infrastructure within West Cumbria itself, which may be another hindrance to the area's economic development (see montage opposite). Many of the roads between the major urban areas are winding and narrow. It could also be argued that the area simply does not have enough roads, a legacy of the manner in which

ROADWORKS:

FIX ROUTE 66

WEST Cumbria's £30 million annual dole bill would be slashed if Whitehall

Better road would cut West dole

Enterprise Agency, said: "Com... cannot be underesti... importance to..."

New

'DEI... County rail link cut 'disaster'

Warning of new job blow

By NICK TURNER

THE Govern...ent's new time...able for road...building in Cum...bria could take...0 years to pro...vide the trans...port links need...d, it has been...laimed.

Transport secre...ary John Mac...regor announce...new set of prior...es for road...schemes yest...

It will speed up...Stainburn to G...Clifton bypass...improvements t...A595 between P...and Lillyhall.
But the Gove...has been attac...ment to make...complete d...ageway.
Barbara St...the West Cu...velopment

instead of it carrying on to Carlisle as at present.

It is understood that InterCity claim there are not enough passengers using the service between Preston and Carlisle to justify it being maintained.

The change means the last train from the capital will be the 6.30pm which gets into Penrith at 10.20pm and Carlisle at 10.44pm.

It is believed details of the new timetable have been sent to county councillors in confidence.

Bill Cameron, the county chairman, declined to be interviewed.

BY JOHN WRIG

A VITAL late-night service between Carlisle is to be cut in May.

The InterCity service has been seen as another job prospect to close RAF City MP F Lord Ing North Law protest.

A66 in Cumbria

61 accidents

46 accidents

42 accidents

61 accidents

27 accidents

49 accidents

Firms 'put off' by bad roads

WEST Cumbria is hampered by poor access which prevents companies investing in the area, according to county councillors.

Coun Stuart Askew of Keswick told the county's economic development sub-committee: "The roads are poor and in my view that has got to be addressed. The infrastructure is appalling."

But he added that people in the county did not always help improve its image. "They talk about West Cumbria as some where out of the 1930s or something," he said. "West Cumbria group leader Bill Milto accused the Government of investment pinching on investment in Cumbria."

66 Judge brands road as 'notorious' warning

Judge has...nt's killer...ious" and...iving in...are of its...eaking...ght of...

But Judge Mahon told him view of his past conviction was not too severe. "Anybody who is well aware of the A66, "Unfor"

Latest crash here

ed over a three year period on

Chapter Three: Cumbrian history, economy and culture

development schemes are opposed on aesthetic grounds whenever they near the National Park. As Map 3.3 illustrates, the West Coast suffers from poor connections with the M6. The popularity of the county, and the Lakes in particular, as a tourist resort does little to improve the quality and convenience of such road connections as do exist, especially in summer. Cumbria County Council has consequently stated that 'Without improved roads industry will not invest in Cumbria' (Cumbria County News Number 1 Summer 1993, 3), yet investment in the road system has extended only to piecemeal road repairs of small sections rather than a thorough review (Cumbria TEC Business Brief June-August 1993, 9).

Rail services are also poor compared to other areas of Britain. Internal services suffered the Beeching axe, with both the Workington-Penrith line (via Cockermouth and Keswick), and the Keswick-Windermere lines being closed, whilst connections with the rest of the country are served by the increasingly dilapidated West Coast Main Line to Scotland. According to Cumbria TEC, the West Coast Main Line is

"grossly out of date and lags far behind other major British and European rail routes" (Cumbria TEC Business Brief June-August 1993, 17).

For example, it is now impossible to reach Cumbria from London on any train which leaves the capital after 6.30 pm, which is a handicap to many businesses (West Cumbrian Evening News and Star 20/1/94, 11). The situation does not seem likely to improve in the near future. The West Coast line seems set to suffer neglect in the run-up to the privatisation of British Rail (BR), as resources are concentrated upon the South East network, and improving the East Coast line to Scotland. Although in June 1990 British Rail announced Intercity 250, a new project proposing 155 mph trains for the West Coast Main Line from 1995, in conjunction with improved tracks and signalling equipment South of Crewe, by 1992, the prospects for genuine improvements were bleak. BR allowed the tenders for the new trains to lapse, and scaled down its plans to upgrade the infrastructure (Cumbria TEC Business Brief June-August 1993, 17). This left the route short on high speed rail stock, and using 'worn out, dated equipment' (Cumbria County News, Number 1 Summer 1993, 3).

Some limited hope is provided by other forms of communications. A Carlisle-London Air service was recently revived after a six year gap (Cumbria TEC Business Brief June-August 1993, 16), and Workington is developing a reputation as 'the premier deep water port between the Mersey and the Clyde' (Enterprise in Allerdale, 4). However, this cannot detract from the

fact that although sixteen million people may well live within three hours travelling time of Workington (Enterprise in Allerdale, 4), including within that radius not only Liverpool, Manchester and Leeds but also Glasgow and Edinburgh, there are far more advantageous and more populous areas of the UK in which to invest. This not only deters new investment, but also puts pressure upon those firms which are already present in the area, in terms of the perceived advantages to be gained by relocating elsewhere (ERM 1993, 13).²⁷ A related problem is that of capital flight from within the county. According to the North Cumbria Business Club, over eighty percent of purchases by Cumbrian manufacturers are made from non-Cumbrian companies (Business Gazette June 1994, 5).

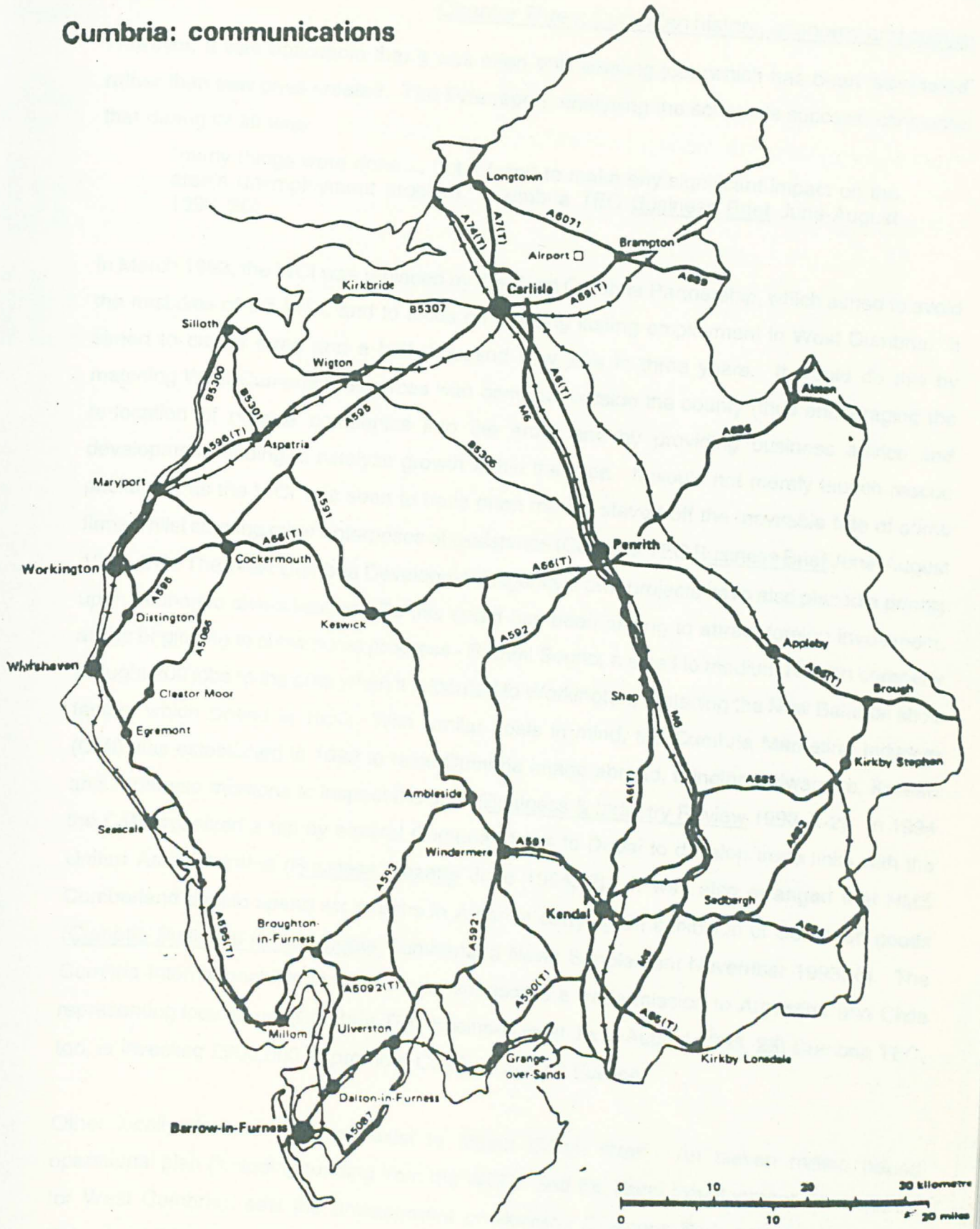
The nature of the local labour force also provides disincentives to investment. As mentioned above, a large proportion of the workforce are unskilled or semi-skilled, and are also perhaps under-educated. In January 1994, only forty percent of school leavers stayed on to full time education, compared to sixty percent in the South West (West Cumbrian Evening News and Star 9/6/94, 5). The number of firms available to offer vocational training is also perhaps too few, despite the fact that the Cumbria TEC is rated the fourth best in the country (Business Gazette June 1994, 4).

Some of the failures to stimulate growth in West Cumbria can be attributed to questionable management decisions from the local organizations responsible. A public body, the West Cumbria Development Agency (WCDA) joined with the BNFL-financed West Cumbria Development Fund to establish the West Cumbria Initiative (WCI) which offered enterprise zones for new businesses or for the relocation of existing businesses. The Workington Enterprise zone, for example, established in 1983 between Maryport and Workington offered firms rate-free premises, with hundred percent tax allowances on new buildings. It even offered the option of having buildings erected specifically to meet a client's precise requirements. By 1993, when the enterprise zone scheme expired, Allerdale Borough Council claimed that the scheme had created 800,000 square feet of new factory space and stimulated 2,500 jobs (Allerdale Borough Council Economic Issues in Allerdale 1993, 14:2).

²⁷ The isolation and poor communications between the west of Cumbria and the rest of the nation were highlighted in 1993 when an edition of the Radio Four programme 'Any Questions' was due to be broadcast from Maryport. Due to problems with both the rail and road services in the area on that day, both the Chairman of the Conservative Party, Sir Norman Fowler, and Howard Davies, the Director-General of the CBI had to partake in the programme via mobile phone as they could not reach the broadcast in time.

Map 3.3

Cumbria: communications



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However, it was noticeable that it was often only existing jobs which has been 'stimulated' rather than new ones created. The Fyfe report, analysing the scheme's success, concluded that during its lifetime

"many things were done ... but it failed to make any significant impact on the area's unemployment problem." (Cumbria TEC Business Brief June-August 1993, 20).

In March 1993, the WCI was replaced by the West Cumbria Partnership, which aimed to avoid the mistakes of the WCI, and to focus on creating lasting employment in West Cumbria. It aimed to create three and a half thousand new jobs in three years. It would do this by matching West Cumbrian resources with demand outside the county (thus encouraging the re-location of outside companies into the area) and by providing business advice and development funding to catalyze growth within the area. It would not merely launch rescue packages, as the WCI was seen to have often merely staved off the inevitable fate of some firms whilst starving other enterprises of assistance (Cumbria TEC Business Brief June-August 1993, 21). The West Cumbria Development Agency's own projects have also placed a priority upon economic diversification. To this end it has been aiming to attract foreign investment, and is beginning to show some progress - Sammi Sound, a small to medium Korean company brought 200 jobs to the area when it relocated to Workington, replacing the New Balance shoe factory which closed in 1990. With similar goals in mind, the Cumbria Marketing Initiative (CMI) was established in 1992 to raise Cumbria image abroad, bringing Taiwanese, Korean and Japanese missions to inspect the area (Business & Industry Review 1993, 1-2). In 1994 the CMI organized a trip by several Cumbrian firms to Dubai to develop trade links with the United Arab Emirates (Business Gazette June 1994, 2). It was also arranged that HMS Cumberland should spend six months in America carrying an exhibition of Cumbrian goods (Cumbria Business News Update Cumberland News Supplement November 1993, 6). The Cumbria International Trade Centre also sponsored a trade mission to Argentina and Chile representing local firms. (Cumbria TEC Business Brief June-August 1993, 28) Cumbria TEC, too, is investing £900,000 to promote Cumbria across Europe.

Other locally devised schemes exist to attract British firms. An eleven million pound operational plan (including funding from the WCDF and the Rural Development Commission for West Cumbria), saw the development of Moresby Business Park and the Westlakes Science and Technology Park (ERM 1993, 15). Opened in October 1992, Westlakes aims

to attract high technology and scientific enterprises, and to prevent a scientific 'brain drain' from the county. Tenants of the first phase of Westlakes include The Prince's Youth Business Trust, Haywood Information Technology, Gleeds Thurnall plc and NIREX, as well as BNFL offices and laboratories (Business and Industry Review 1993, 6).

Overall though, the structural problems of the labour force have led to claims that,

'the fact of the matter is that even if the economy *is* on the upturn and there *is* national recovery, West Cumbria's unemployment problems will remain' (Cumbria Business News Update Cumberland News Supplement November 1993, 2).

3.7 Local character(see montage opposite)

West Cumbria is bordered on one side by the Irish Sea, and on the other by the mountainous fells of the Lake District National Park. This topography has, in many ways, cut off the population of the area from the rest of the UK, and ensured that it is indeed 'one of England's most isolated areas' (The Guardian 14/6/94, 21). With employment prospects uncertain, and the absence of any major consumer centres near at hand, the influx of people from outside the county is perhaps lower than might be found elsewhere in the country. The population density of the whole county is only 0.7 persons per hectare compared to a national average of 3.2 persons per hectare (Cumbria County Council figures 1989). In terms of ethnic diversity, the area is still almost entirely caucasian. This isolation from the rest of the country seems to have created a strong sense of communal identity - it has been noted that there is a 'detached nature of local humour and outlook' (Macgill and Phipps 1987, 225). This sense of identity may have bearing upon local perceptions of the nuclear industry. On the one hand, local people might resent being seen as some provincial 'backwater', the dumping ground for the nuclear industry which nobody else wants. On the other (given the tradition of stoicism in the area), it might lead to the evolution of a sense of pride in being the only community brave enough to accept the industry.

The self-identification of the communities within Cumbria may also prove to be an important factor in determining people's attitudes to the nuclear industry in terms of who identifies with the area in which the industry is sited (Marshall 1981, 9). It has been observed in local history books that the people of the different counties which existed prior to 1974 each developed in different ways during the industrial revolution, and can each be seen to have different identities today (Marshall 1981, 12-16). Similar differences in attitudes also exist within the old county boundaries. There is a difference today between the culture of the more rural

CUMBRIA: Trails behind Second class citizens

By Tracey Lawson

CUMBRIANS are among the lowest paid, least qualified, hardest smoking, non-dishwasher-owning people in Britain, a damning new national survey reveals.

They have worse job prospects and higher rates of unemployment than their southern counterparts, are less likely to own a car, and leave school with the least qualifications.

The Government figures are published as part of Central Statistical Office's portrait of regional trends in Britain for 1994.

They paint a gloomy picture of life in the North Cumbria, Northumberland, Durham, Cleveland and Tyne and Wear.

At just over £285 per week, households in the North had the lowest average weekly income of any region in the 1992, except Northern Ireland.

But more than one in six households in the South East had an average weekly income of £650 or more.

In spring, 1993, one in 60 employees in the northern region had been made redundant in the previous three months — the highest proportion in Great Britain, compared to only one in 90 in the South East.

And it had Britain's highest rate of unemployment claims unemployment rate — 12.3 per cent in January 1994.

A quarter of workers were in skilled manual occupations — the highest proportion in the United Kingdom. The highest proportion of professional, managerial and non-manual skilled workers was recorded in the South-East.

It looks set to stay that way, with fewer Northern school-leavers boasting A-Levels in 1991/92 than in any other region.

Only forty per cent of school-leavers in the North intended to continue in full-time education, compared to sixty per cent in the South-West.

And the North has one of the highest proportions known offenders among under-17s — with the South West boasting the fewest.

Life's little luxuries are also in short supply in the area.

Cumbrian housewives are among the hardest done to, with less than one in ten North households owning a dishwasher — fewer than any region in Britain.

And Northern and Scottish households are least likely to own a car. Northern women have fewer full driving licences than any other area of the country.

But cold, wet winters could be responsible for the North boasting the highest proportion of centrally heated houses and washing machines, at 90 per cent.

The region also has the highest proportion of council house tenants, with over 25 per cent of dwellings falling into this category.

ORDER! WE ARE TO DISCUSS
GATHERED HERE TO DISCUSS
WORKING HERE TO TWINNING
WITH THE FRENCH TOWN
VALDE REUILLE

OUR FRENCH COUNTERPARTS
CAN OFFER US FINE WINE,
GREAT FOOD AND
SOPHISTICATED!

AND IN RETURN FOR
THEIR ART AND CULTURE
WHY DON'T WE GIVE
THEM A POUND OF
CUMBERLAND SAUSAGE!

YES, I'M SURE THEY'D
APPRECIATE A FEW POINTERS
ON FORMING A TIGHT
SCRUM MR. BOOTLE

YES, I'M SURE THEY'D
LOVE YOUR BARM CAKES
MRS. BRAITHWAITE

AND WHAT CAN WE GIVE
THEM IN RETURN?

Ch...
SAT
But
lisle for
kind and

Plus

COLOR

SA

FREE

AVAILABLE on self

SAVE UP TO £130 on TV

NICAM
SURROUND SOUND
SAVE £130

24 MTHS
0% INTEREST

"How can you mistake Carlisle for Rome? You go up there today and its still only three turnip fields and all the sheep you can catch!"

"I thought I'd get some sponsors for the school sports day. The local Indian restaurant for the 100 yards dash, Sellafield for the three legged race ..."

"Canned Carrott" by Jasper Carrott BBC1 28/7/93

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£16.26 Mth*
CASH

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areas within the national park, and those outside its borders. A survey for Allerdale Borough Council by Research and Auditing Services in early 1993 found that different levels of communal identification existed in the various towns of West Cumbria. 'West Cumbria' was a title with which the residents of the towns on the coast identified with more than the more rural villages inland. Allerdale communities furthest inland such as Keswick had by far the least sense of shared identity with West Cumbria. The launch of a new Cockermouth and Keswick edition of the local newspaper the West Cumberland Times and Star would also seem to suggest an extent to which these towns do not associate as closely with the West Coast towns and with Sellafield (Allerdale Borough Council Annual Report 1992-3, 8). This might perhaps provide some scope for individuals to disassociate themselves from the nuclear debate as they place a distance between their town, with which they identify, and the nuclear industry which they perceive as alien to their lives.

3.8 Environmental awareness

There is a chance that Cumbrians have become used to the presence of pollution in the local environment. Apart from BNFL, West Cumbria is also host to firms such as Allbright and Wilson and Ectona Fibres, which although improving their record, have long been recognised as amongst the worst industrial polluters in the UK. It is not only big business which is to blame. Lakes such as Bassenthwaite are being poisoned by phosphorus pollution from farms (West Cumbrian News and Star 8/12/94, 3). There have also been regular major pollution accidents. In March 1993, 27,500 trout and 26,000 salmon died when fourteen miles of the river Eden were contaminated with ammonium hydroxide after an agricultural accident (West Cumbrian Evening News and Star 24/5/94, 5). In January 1994 a mysterious glue-like substance killed hundreds of birds along the West Cumbrian coastline (West Cumbrian Evening News and Star 8/1/94, 1). Even at the time of the study, in May 1994, Dairy Crest leaked Caustic Soda into the river Ellen, not only killing thousands of fish but also destroying invertebrate life (West Cumberland Times and Star 20/5/94, 1). On top of this 'conventional' pollution, there is also a large nuclear presence in the county - apart from the nuclear generation and nuclear reprocessing at Calder Hall and Sellafield, and the nuclear waste dumps at Drigg and perhaps at Gosforth, nuclear warheads are stored at Longtown near Carlisle, and nuclear submarines are constructed at Barrow-in-Furness. All this has perhaps facilitated the creation of a local populace inured to environmental controversy.

On the other hand there is also much support for 'green' developments in the area. International Wind Development UK had recently proposed to site turbines on the outskirts of Workington and Silloth (West Cumberland Times and Star 3/12/94, 1). Despite the protestations of Sir Bernard Ingham and the pressure group Country Guardian (West Cumbrian Evening News and Star 8/1/94, 2), Allerdale council approved twenty-four wind turbines near Workington (West Cumberland Times and Star 25/2/94, 1). Similarly, plans for a tidal barrage across the Solway Firth, which had been discussed in the 1950s and 1960s, were revived in 1994 when Cumbria County Council's economy and environment committee commissioned a feasibility study into using the barrage as a way of bringing prosperity thorough increased access to Scottish markets and the port of Stranraer. They hoped that the barrage would assist the area in a similar way to which the M6 corridor has assisted the east of the county (West Cumbrian Evening News and Star 12/4/94, 9).

In line with the popularisation of 'green' concerns since the mid to late 1980s, grass roots environmental schemes have also flourished in West Cumbria. Environmental awards schemes, aimed to encourage and reward environmental initiatives have been run in Cumbria at both county and district level in the last few years. Allerdale was the first council in the north-west of England to comply with government proposals for recycling 25% of all waste by the end of the decade, having their scheme approved by August 1 1992. Recycling schemes in the county included those for glass, steel and aluminium, textiles and refrigerator equipment, suggesting that at a level of personal action, concern for the environment is high within the area.

3.9 Conclusions

West Cumbrian attitudes towards the nuclear industry must be understood within the context of several factors. Not least amongst these is a physical and cultural isolation from the rest of the U.K. Amongst the other factors, the area has traditionally relied upon large scale industry for its prosperity. Sadly there have been disastrous consequences in terms of unemployment and social hardship when those industries falter. Even in prosperous times the way of life in West Cumbria has been a hard one, and a culture of stoicism may have evolved as a consequence of this.

Manufacturing industry is still the dominant sector in the West Cumbrian economy, but it has suffered decline in the 1990s. This decline, combined with a lack of service industries and

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an underdeveloped self-employed sector has led to employment difficulties in the region. Unemployment increases have been widespread, affecting rural areas as well as urban zones. The options offered by mining and agriculture to improve the situation today are doubtful, whilst tourism offers less hope for West Cumbria than it does for the county as a whole.

The nuclear industry makes an important contribution to the West Cumbrian economy. It offers direct and indirect employment in both the short and long term, investment in infrastructure, incentives for further investment in the region, and investment in the local community in the cause of public relations.

The presence of the nuclear industry also brings disadvantages. Uncertainty over the industry's future could be a disincentive to investment in West Cumbria, as could the high salaries and good working conditions which BNFL offer its staff. There is a danger of West Cumbria developing a potentially unwholesome 'nuclear-friendly' image which may also deter investment. BNFL's presence has also prevented local businesses from obtaining government economic assistance, and doubts about pollution may have harmed the agriculture and tourism sectors of the economy, although the SVC has played an important role in drawing tourists to the West Coast. In the light of these disadvantages, it is worth noting that BNFL are no longer seen to offer a secure economic future for their workforce, as job cuts are beginning to be announced.

There are schemes to help the county's economic plight. Government assistance has been available for the Workington TTWA, and EU funds are available for both Workington and Whitehaven TTWAs. Nevertheless, the poor geographical position of West Cumbria, the poor standard of its internal infrastructure, and its tenuous communications links with the rest of the country, has limited the effectiveness of such aid. This is because other areas are seen as better locations for investment, both for new companies and even for those with existing bases in West Cumbria. The under-educated, under-skilled nature of the workforce is another disincentive to investment. A misplacing of priorities by local development groups has not helped the long term situation, although at the time of the study, more hope was offered by the West Cumbria Partnership. Local perceptions of the economic situation at the time of this study will also have been affected by the national recession.

The combination of geographical inaccessibility and a low population inflow has created a particularly Cumbrian culture, which sees itself as distinct from the rest of the UK, and also includes an element of stoicism. Different places within West Cumbria also show different levels of identification with the concept of West Cumbria as a geographical entity, and this may also influence their attitudes towards the nuclear industry. The mix of environmental ideas in the region may also influence local attitudes - a large presence of polluting industry and a large nuclear presence may have inured some people to environmental controversy, but 'green' developments are also popular. Chapter Seven analyses how all these various factors may have influenced public attitudes towards the nuclear industry in 1994. The following chapter includes an outline of how previous researchers have accounted for the influence of the West Cumbrian situation upon local attitudes.

Chapter Four

A review of public
perceptions of the civil
nuclear power industry

4.1 Introduction

Since the 1980s, several studies have been undertaken which attempted to understand the relationship between the general public and the nuclear industry. This chapter provides a review and analytical overview of such research, paying particular attention to research carried out in the vicinity of BNFL's Sellafield site. This overview adds to previous work by drawing together trends which link the different studies, and also, in many cases, provides fresh analysis of the statistical data collected by the original researchers, including the creation of graphs, tables and diagrams not present in the original documents. It also analyses the methodologies employed in such studies in order to discover any means by which methodological problems which did occur could be improved upon in order to obtain more accurate results.

The four main studies which are included in this section were written over a span of ten years, each with different primary concerns relating to contemporary incidents in the development of the nuclear industry. Those carried out in the early 1980s are preoccupied with the perception of health risk from Sellafield's reprocessing activities, whilst those in the early 1990s concern themselves primarily with local attitudes towards the NIREX proposals for a LLW/ILW repository. The various studies are set out chronologically below. The analysis of each of the West Cumbrian studies is accompanied by a map of Cumbria featuring the area in which the fieldwork was carried out. Each map contains a list of the precise towns and villages included in the survey.

There are certain themes which recur throughout the decade of research, and which are highlighted in this chapter. They are: the perceived economic importance of the nuclear industry to the West Cumbrian economy; the perceived health risk to local people from the activities of the nuclear industry; the overall relationship between local people and the nuclear industry in West Cumbria; the overall relationship between local people and national groups and organizations concerned with the West Cumbrian nuclear industry (including the media, environmental organizations and, indeed, the national population as a whole); levels of political activity; and the social composition of response patterns.

4.2 "The Sellafield Controversy: The State of Local Attitudes"

RESEARCHERS: Sally Macgill & Siân Phipps

DATE OF RESEARCH: April 1984

PUBLICATION: In Blowers, A. & Pepper, D. (Ed.) Nuclear Power in Crisis,
Nichols, New York, 1987

4.2.1 Overview

'The Sellafield Controversy: the state of local attitudes' was written as one of several chapters in an academic book which examined the political and social aspects of the global nuclear power industry in a largely critical fashion. Macgill and Phipps examined attitudes towards the nuclear industry held by residents of a range of large villages and towns in West Cumbria (see Map 4.1). In doing so, their research became the first study to 'elicit and interpret attitudes of local people on key issues at the heart of the Sellafield Controversy' (Macgill & Phipps 1987, 219). Previous research had concentrated upon scientific, medical and technical aspects of the industry's presence without actually asking what local people thought of these things. Media portrayals of local attitudes had hinted at a populace who were anxious about health risks from radiation exposure from the plant, and who were less than wholehearted in their support of the industry's presence. Macgill and Phipps endeavoured to discover whether such media portrayals were accurate.

4.2.2 Methodology

The sampling method used by Macgill and Phipps was extremely simple. The survey was carried out in April 1984 by twelve final year undergraduates studying energy and environmental issues. These interviewers were each given four areas to sample over two days, with a specified number of homes of different types of housing stock to visit. The researchers claimed that

"If all approaches had been successful and all the interviews had taken the same time, samples proportional to each settlement size would have emerged" (Macgill & Phipps 1987, 228)

but in practice, several interviews were lengthier than expected. As a consequence, less than the desired number of households were visited in some areas in the time available. This meant that the overall results featured disproportionate numbers of residents of different areas and of different types of housing stock (Macgill & Phipps 1987, 228).

395 residents were approached, of whom 263 (67%) completed the questionnaire. The reasons given by people for not partaking in the survey were given in a table, in which the types of reason were coded eg. busy or too frightened (Macgill & Phipps 1987, 229). There was no framework of quotas to ensure proportional representation of sub-populations, and this led to a situation where 60% of the respondents were female, and 62% of respondents were under 46 years of age (Macgill & Phipps 1987, 228).

Questions were mainly multiple choice, whereby respondents had to rank their feelings on a scale of four or five options, for example, 'anxious' / 'a little concerned' / 'not at all worried' / 'don't know'.

4.2.3 Findings²⁸

4.2.3.1 The perceived economic importance of the nuclear industry

Respondents were asked how beneficial they believed BNFL was to their livelihood. (See Figure 4.1). They were offered four responses. Of these, 'nearly half' considered BNFL to be either 'quite an advantage' or 'a great advantage' to their livelihood. Only 5% felt it to be 'a disadvantage', while around 45% felt that Sellafield had 'no effect' on their livelihood (Macgill & Phipps 1987, 231).

According to Macgill and Phipps' findings, there seemed to be little basis for opposition to BNFL on economic grounds alone. Instead there were considerable grounds for support for the company due to the far more common perception of economic benefit through the presence of the nuclear industry, although a considerable number of people perceived no economic effect on their livelihood from BNFL's presence.

4.2.3.2 The perceived health risk from the activities of the nuclear industry

Respondents were asked to rate how worried they were about the health risks posed to themselves and local children by radiation levels around Sellafield using the responses 'not at all worried' / 'slightly worried' / 'moderately worried' / 'very worried'. As Figure 4.2 shows, 45% of respondents expressed some sort of concern about the possible dangers to themselves, and as many as 61% feared to some degree for the children of the area.

²⁸ In their report, Macgill and Phipps often failed to provide the relevant statistical evidence to support their conclusions. Consequently, in this summary of their work it is not always possible to include statistical evidence with every statement.

Map 4.1

Area covered by fieldwork, Macgill and Phipps, April 1984



(Maryport, Cockermouth, Workington, Whitehaven, Cleator Moor, St. Bees, Egremont, Thornhill, Gosforth, Seascale, Holmrook, Drigg, Ravenglass, Bootle, Broughton-in-Furness, Millom)

Figure 4.1 Perceived economic importance of BNFL, April 1984 (Macgill & Phipps 1987, 231)

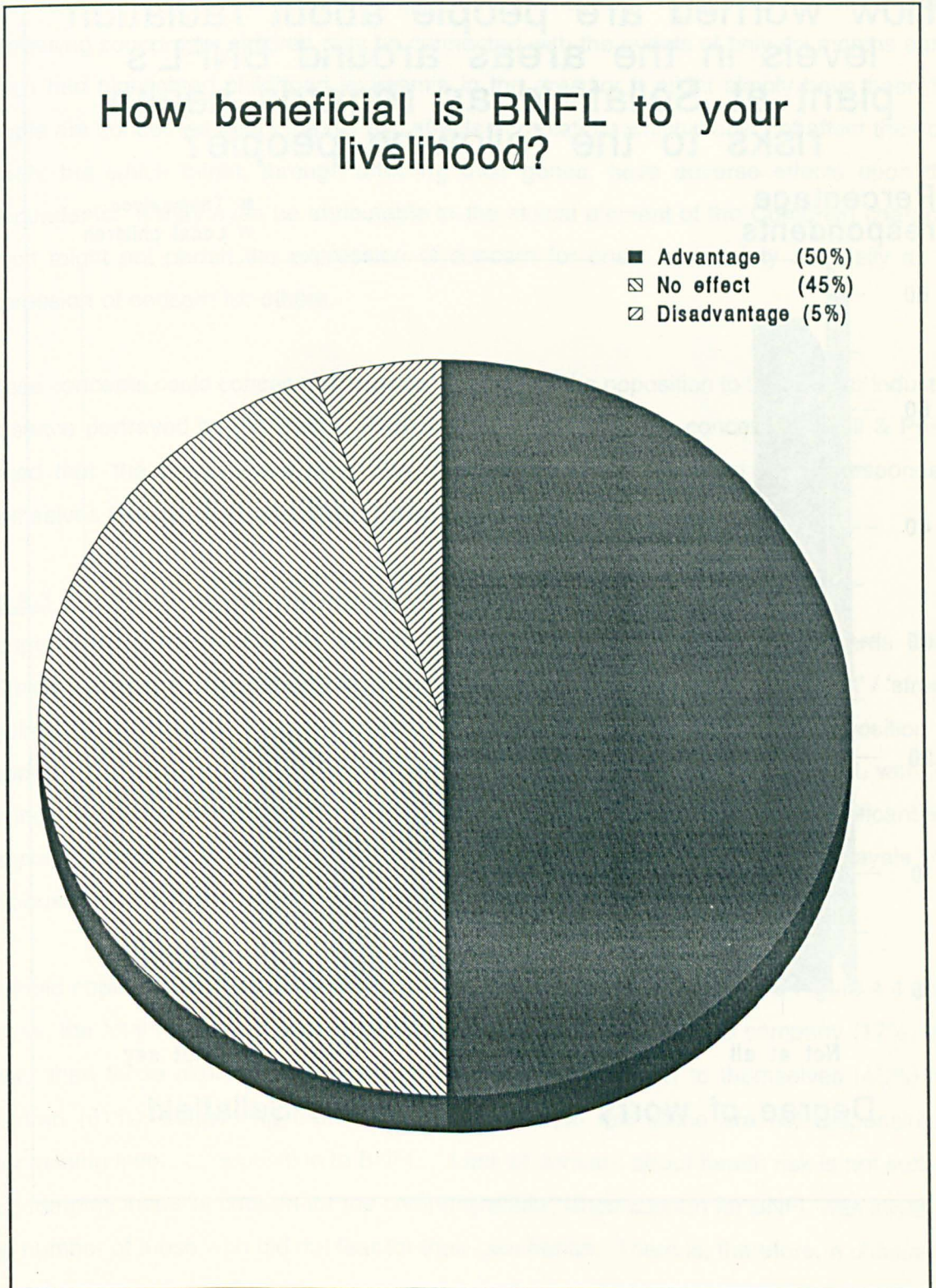
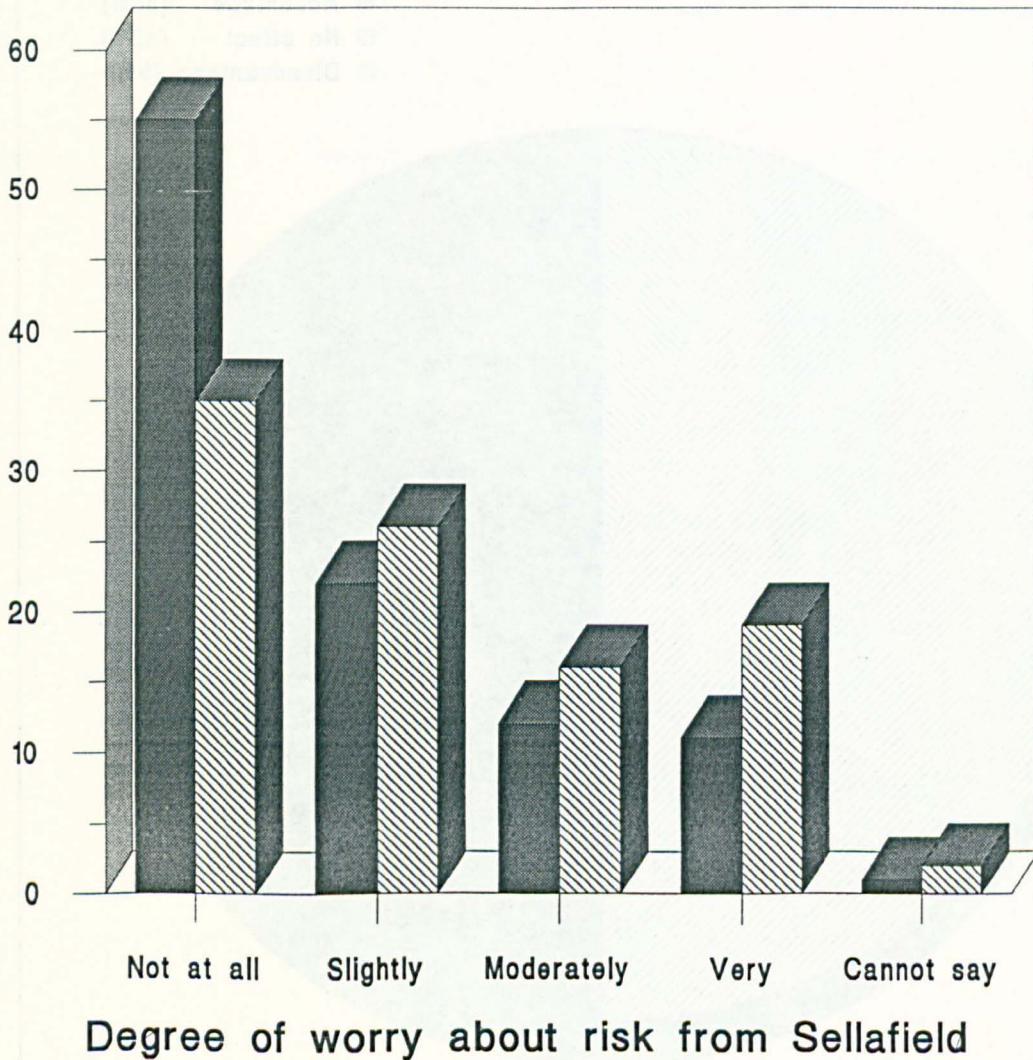


Figure 4.2 BNFL and health, April 1984 (Macgill & Phipps 1987, 233)

How worried are people about radiation levels in the areas around BNFL's plant at Sellafield as regards health risks to the following people?

Percentage respondents

■ Themselves
▨ Local children



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Concern for children was greater than for respondents themselves in each of the response levels - 'slightly worried', 'moderately worried', and 'very worried' (Macgill & Phipps 1987, 233). Macgill and Phipps did not attempt to give any explanation for the difference in attitudes towards risk for children and risks for respondents themselves. The greater number of people expressing concern for children may be connected with the events of only six months earlier which had highlighted childhood leukaemia in the area, or it might simply have been that people are concerned about the genetic effects of radiation, which would not affect their own health, but which might, through affecting their genes, have adverse effects upon their descendants. It may even be attributable to the stoical element of the Cumbrian character, which might not permit the expression of concern for one's own safety as easily as the expression of concern for others.

These concerns could conceivably provide grounds for the opposition to the nuclear industry's presence portrayed by the media. Whatever the reason for this concern, Macgill & Phipps stated that 'the predominant view was of no worry at all' regarding risk to respondents themselves (Macgill & Phipps 1987, 233).

4.2.3.3 The overall relationship between local people and the nuclear industry

Respondents were offered six options to describe their overall attitude towards BNFL. ('Strongly in favour' / 'moderately in favour' / 'mixed feelings' / 'moderately against' / 'strongly against' / 'cannot say'). Figure 4.3 combines the totals for different levels of opposition and support. It shows that nearly half (49%) were in favour of BNFL to some extent, with 30% strongly in favour of the company. Macgill and Phipps described this as "significant local support" (Macgill & Phipps 1987, 231) which contradicted previous media portrayals of an anxious and less than supportive populace.

It would appear that economic benefit had influenced levels of support. As Figure 4.4 shows below, the total number of people expressing some opposition to the company (17%) is far lower than those expressing concern on health grounds, either to themselves (45%) or to children (61%), suggesting that perceptions of health risk alone are not responsible for determining levels of opposition to BNFL. Lack of concern about health risk is not sufficient to determine levels of support for the company either, since support for BNFL was lower than the number of those who did not fear for their own health. There is, therefore, a chance that

Figure 4.3 Attitudes towards BNFL, April 1984 (Macgill & Phipps 1987, 233)

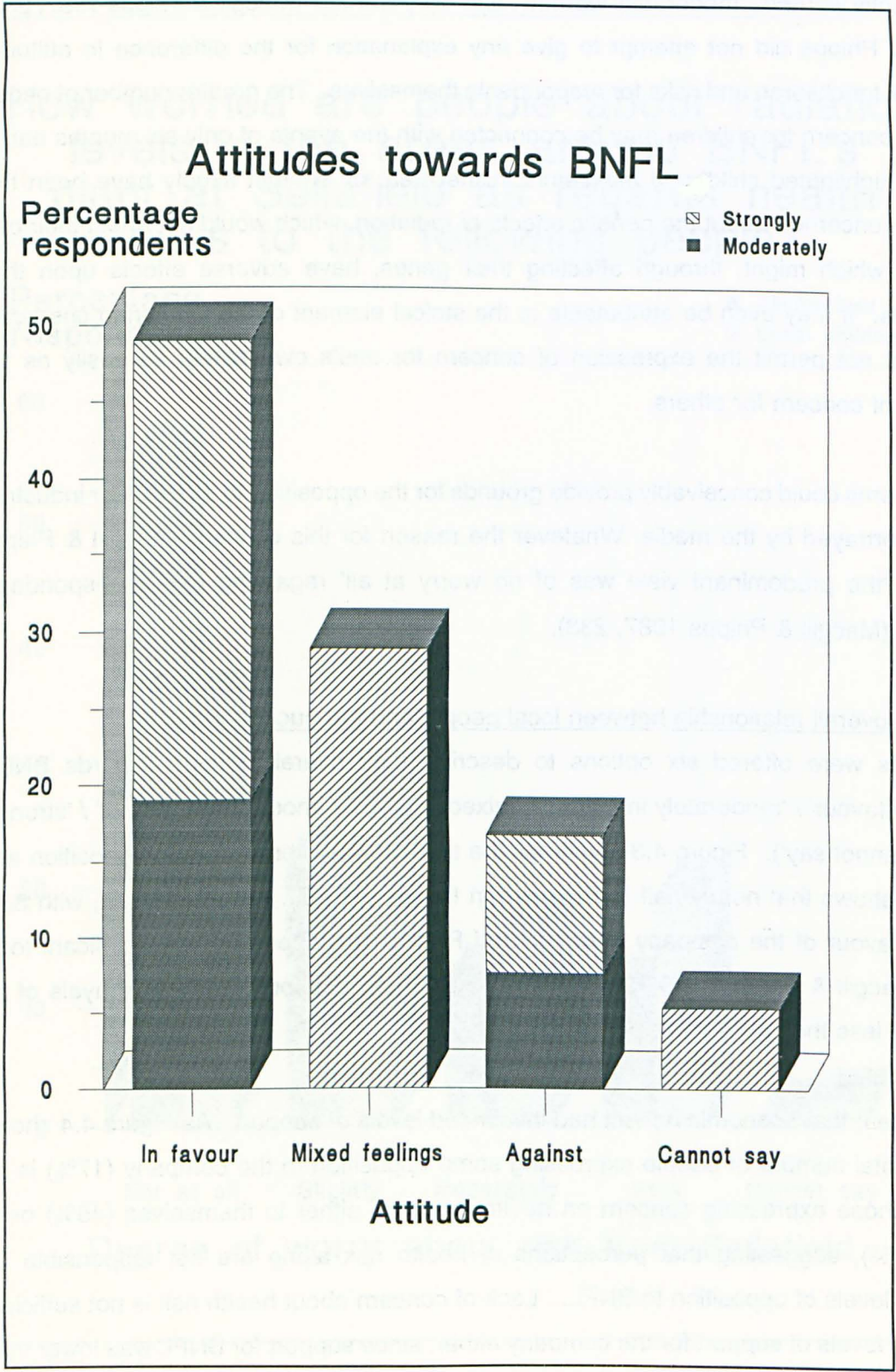
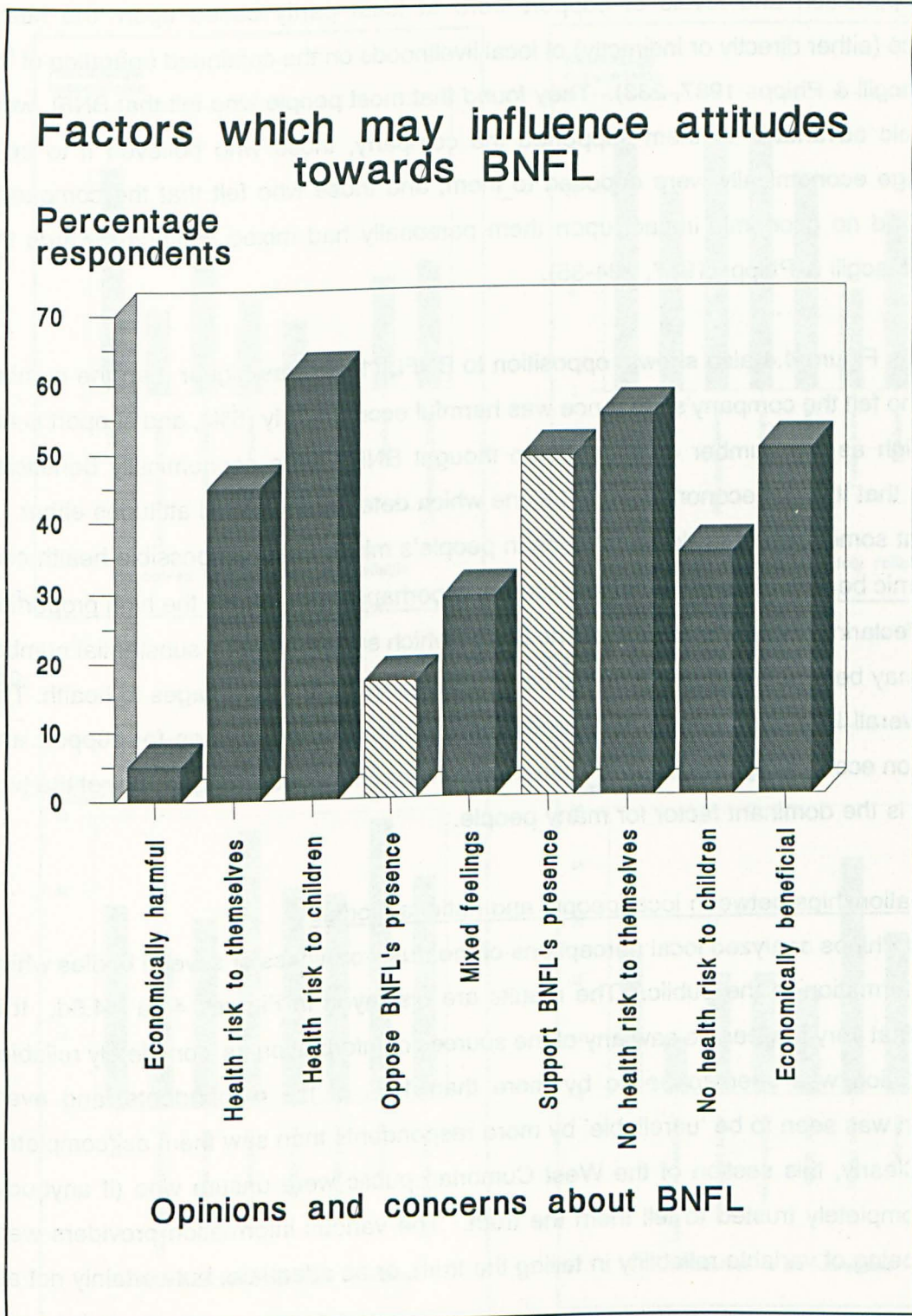


Figure 4.4 Factors which may influence attitudes towards BNFL, April 1984



economic benefit had influenced levels of support.

Macgill and Phipps suggested that rather than being dictated by perceptions of health risk, levels of opposition and levels of support were at least partly based upon 'the heavy dependence (either directly or indirectly) of local livelihoods on the continued operation of the plant.' (Macgill & Phipps 1987, 233). They found that most people who felt that BNFL were an economic advantage to them supported the company, those who believed it to be a disadvantage economically were opposed to them, and those who felt that the company's presence had no economic impact upon them personally had mixed feelings towards the company (Macgill & Phipps 1987, 234-35).

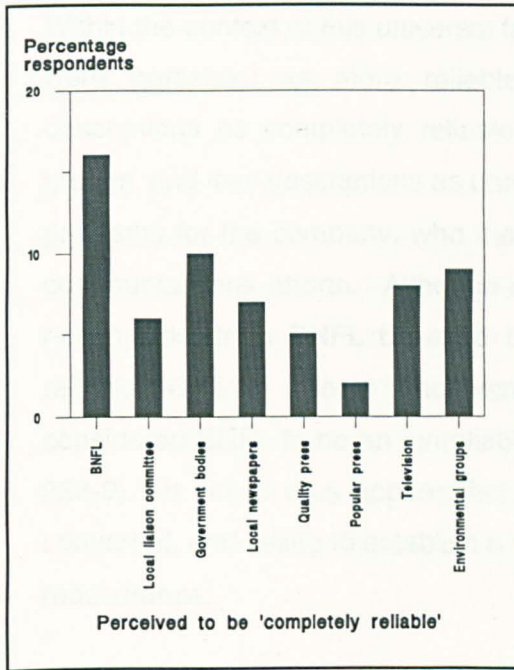
However, as Figure 4.4 also shows, opposition to BNFL (17%) was higher than the number of those who felt the company's presence was harmful economically (5%), and support is not quite as high as the number of people who thought BNFL were economically beneficial, suggesting that it is not economic impact alone which determines overall attitudes either. It may be that some form of trade-off is made in people's minds between possible health cost and economic benefit. This theory of a 'trade-off' is perhaps borne out by the high proportion of people declaring 'mixed feelings' towards BNFL, which suggests that a substantial number of people may be torn between economic benefit and possible disadvantages to health. The fact that overall levels of support and opposition are closer to the figures for support and opposition on economic grounds rather than those on health grounds suggest that of the two, economics is the dominant factor for many people.

4.2.3.4 Relationships between local people and national bodies

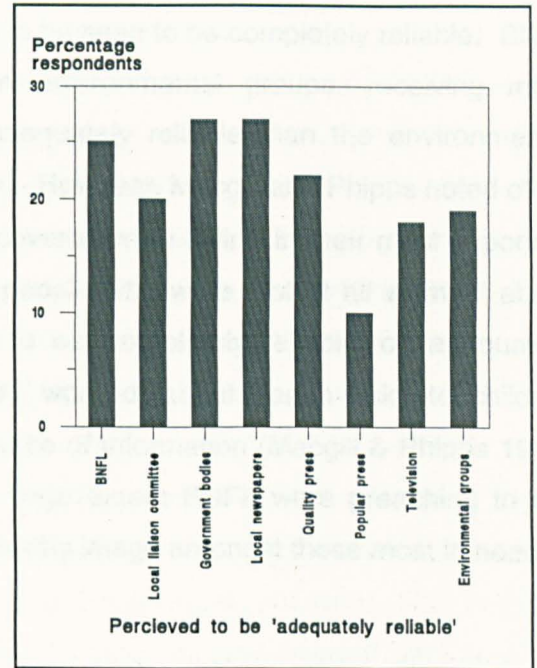
Macgill and Phipps analyzed local perceptions of the trustworthiness of several bodies which supplied information to the public. The results are displayed in Figures 4.5a - 4.5d. It is noticeable that very few people saw any of the sources of information as 'completely reliable'. No organization was seen to be so by more than 16% of the respondents, and every organization was seen to be 'unreliable' by more respondents than saw them as 'completely reliable'. Clearly, this section of the West Cumbrian public were unsure who (if anybody) could be completely trusted to tell them the truth. The various information providers were viewed as being of variable reliability in telling the truth, or as adequate, but certainly not as

Figures 4.5a,4.5b,4.5c,4.5d¹ Perceived reliability of different sources of information, April 1984 (Macgill & Phipps 1987, 238-39)

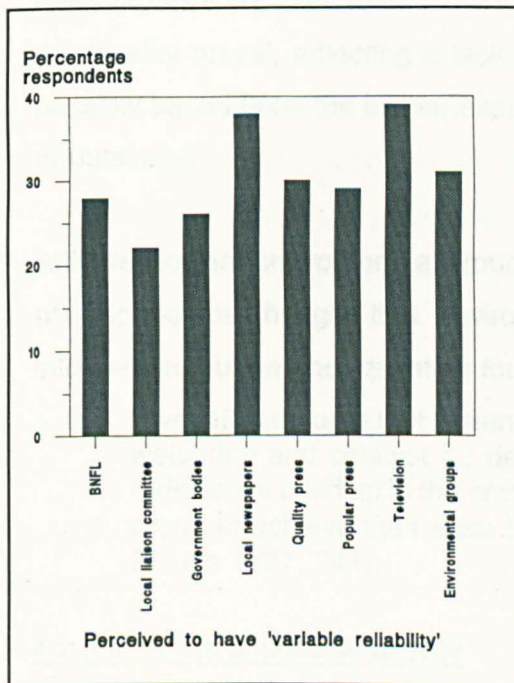
4.5a



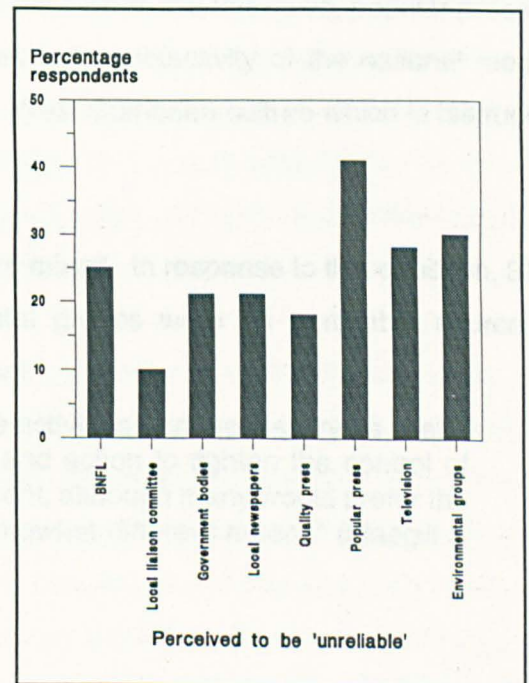
4.5b



4.5c



4.5d



¹It is important to note the different scales used in each of these graphs.

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completely reliable. As Macgill and Phipps put it, 'the picture is by no means one of unalloyed confidence in authority' (Macgill & Phipps 1987, 237).

Within the context of this universal failure to be seen to be completely reliable, BNFL were perceived as more reliable than environmental groups, receiving more descriptions as completely reliable or adequately reliable than the environmental groups, and less descriptions as unreliable. However, Macgill and Phipps noted other problems for the company, who they discovered were failing in their most important communications efforts. Although most people who were 'not at all worried' about health risks from BNFL believed BNFL to be 'completely reliable' or 'adequately reliable', 64% of people who were 'very worried' about health risks to children considered BNFL to be an 'unreliable' source of information (Macgill & Phipps 1987, 238-9). It would thus appear that to a large extent BNFL were preaching to the converted, and failing to establish a trustworthy image amongst those most in need of reassurance.

According to the findings, the 'popular press' was seen to be most unreliable of the printed media, perhaps reflecting their tendency to sensationalise stories. Local newspapers were seen to be more reliable than either the television, popular press or the 'quality press', reflecting a lack of trust in the objectivity of the national media, possibly based upon the insular aspect of West Cumbrian culture which is distrustful of outsiders.

Attitudes toward environmental groups were mixed. In response to this question, 31% of respondents thought that environmental groups were an unreliable source of information, but another question found that

"over 40% thought that Greenpeace activities were necessary - a useful watchdog and catalyst for debate and action to tighten the control of radioactive build up in the environment, although many would prefer the group to achieve their ends by somewhat different means" (Macgill & Phipps 1987, 241).

4.2.3.5 Levels of political activity

Macgill and Phipps found a high level of 'positive interest in the topic of the survey', with 90% of respondents registering either 'some interest' or 'a lot of interest' in written

articles, television programmes and other materials concerned with Sellafield (Macgill & Phipps 1987, 240). However, this level of what might be described as 'passive interest', was not matched by active participation in political debate over nuclear power. Attending meetings, signing petitions and so on was perpetrated by only 'a minority of people' (Macgill & Phipps 1987, 240), far less than the number of respondents expressing concern about health risk.

One reason for this lower participation rate could be a feeling of impotence. 35% of people claimed that there were limited opportunities for the public's voice to be heard, and a further 22% considered there to be sufficient opportunity to express one's views but that not enough notice was taken of the opinions of the public anyway. Only 28% thought that lay people could influence developments through participation (Macgill & Phipps 1987, 240). It should also be remembered that there was little reason for the 49% of people who were supportive of BNFL to become involved in political action, since there appeared to be little immediate threat to the future of the industry.

4.2.3.6 Social composition of response

Although they did not give any precise statistics with which to substantiate their claims, Macgill and Phipps said that 'women were more acutely concerned' about health risks from the activities of BNFL at Sellafield than men (Macgill & Phipps 1987, 234). They also noted that, while two-fifths of men were 'strongly in favour' of BNFL, only one-fifth of women held this view. Where a third of women held mixed feelings, only one in five men did so. Macgill and Phipps noted that BNFL has a mainly male workforce, and that this may explain the higher level of support amongst males, since they are more likely to have a direct economic interest in the firm (Macgill & Phipps 1987, 233).

4.2.4 Comments and conclusions

Although Macgill and Phipps' analysis of the survey data is sound, there are several important flaws in the methods by which the information was collected. By Macgill and Phipps' own admission, the sample failed to meet their original targets, which led to the mis-representation of different geographical areas in the sample. Furthermore, although the list of conurbations to be studied included representatives from a fair distribution of the major west coast towns, the villages selected for inclusion were almost exclusively within close proximity to Sellafield. Such villages might perhaps be

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expected to contain a population more dependent upon the nuclear industry, and more favourable towards it than might have been found had a more evenly spread selection of West Cumbrian villages been used. The fact that the area of the sample concentrated upon the industrialized west coast rather than more rural inland areas within a similar distance from Sellafield was itself another shortcoming in terms of representing all Cumbrian opinion.

The lack of a structured sample frame based upon different demographic quotas means that there was a greater chance of random sampling error affecting the survey. Certainly, there was a disproportionate number of women and young people included (Macgill & Phipps 1987, 228). Given that Macgill and Phipps found there to be a difference in attitudes between men and women, this could pose serious problems for any attempts to use this work to represent the local communities as a whole. There was also inadequate regulation over the time when the surveys took place. The researchers, who were conducting the surveys exclusively during the working day, had a greater chance of encountering those not in full time employment such as homemakers, the elderly, and the unemployed. If quotas had been set for variables such as gender and employment status, the representative qualities of the survey might have been improved. The size of the sample was perhaps also too small to be representative of the West Cumbrian populace. The 395 people approached represents only 0.23% of the combined population (168,500) of the districts of Allerdale and Copeland in which the survey was conducted (Cumbria County Council figures). Another problem was the possible effect of the use of twelve different researchers, which could have affected responses purely because respondents might react differently to twelve different questioners. The manner of ascertaining people's opinions itself was perhaps also too rigid. The subject matter of the questions was determined by the researchers, allowing no insight into which subjects were at the forefront of people's thoughts. Similarly, the multiple choice/'ranking' nature of the questions restricted possible responses to those offered by the researchers. It must be said that Macgill and Phipps were aware of many of these flaws (Macgill & Phipps 1987, 228), and claimed that this research cannot be looked upon to be statistically reliable.

Macgill and Phipps' discovery that the local populace were, in the main, supportive of BNFL, or were at least of neutral disposition, contradicted previous media portrayals of local attitudes. With opposition to BNFL particularly low on economic grounds, and a correlation between perceptions of economic benefit and support for the industry, it could be that the perceived economic benefits of the company's presence might actually outweigh levels of concern about health risks from the company's activities. This represented a significant new insight into West Cumbrian attitudes.

Another key finding was that very few local people were found to have complete trust in the various sources of information about the nuclear industry, with non-Cumbrian institutions regarded as less reliable than their local counterparts, possibly as a result of the insular element of West Cumbrian character mentioned in Chapter Three. BNFL's failure to reassure those who were most concerned about health effects represented an important communications problem in need of rectification.

It was also interesting to observe that although levels of passive interest in the topic of nuclear power were high, levels of political activity were low, with many people believing that, even if they did take action, it would not affect the development of the nuclear industry. This feeling of impotence combined with the appreciation of the industry's economic benefits could go some way to explaining the apparent lack of opposition to the industry's presence in West Cumbria.

4.3 The Politics of Anxiety - Sellafield's cancer-link controversy

RESEARCHER: Sally Macgill

DATE OF RESEARCH: December 1984

PUBLICATION: Pion Ltd, London, 1987

4.3.1 Overview

Sally Macgill followed up her collaboration with Siân Phipps with another piece of research some eight months later, eventually published in a book entitled The Politics of Anxiety. This work also investigated the level of concern in West Cumbria about the alleged health risks posed to local people by BNFL's activities at Sellafield. The book examined local reaction to both the YTV programme "Windscale the Nuclear Laundry" and the Black Report, as well as the impact of both print and televisual media in creating a 'nuclear controversy'. Fieldwork for this research was carried out up to twelve months after the dramatic period of November 1983, and was conducted over a much smaller area than that carried out by Macgill and Phipps (See Map 4.2).

4.3.2 Methodology

A sample was drawn from the populations of the towns and villages located within the six parishes covered by the Black Report (those closest to Sellafield). As with the earlier study, there were several flaws with the chosen sampling process. To begin with, the sample was disproportional to the population density of the area covered. In order to speak to those most affected by the YTV programme, which had focused upon the village of Seascale in particular, 135 of Macgill's 462 respondents were drawn from that village, giving it a sampling ratio of 1 respondent per 15 inhabitants compared to the average sampling ratio for the whole area of the survey of 1:47. No quotas for sub-populations appear to have been set in the sampling process, and consequent problems occurred. In Egremont for example, the lack of quotas meant that more retired people were interviewed when working people refused to answer the questionnaire (Macgill 1987, 71). Overall, 60% of respondents were under the age of 45, with 47.7% between the ages of 26 and 45. There was also an imbalance in representation of gender. 56% were female, and only 44% male. The reason Macgill gave as to how this 12% difference occurred was 'because more women than men were at home when the interviewing was undertaken' (Macgill 1987, 73). This

comment suggests that the same criticisms which were made about inadequate regulation of the timing of the survey in the initial study apply to this work also. Most of the questions were of a multiple choice 'ranking' nature, with one or two more open-ended questions.

4.3.3 Findings²⁹

4.3.3.1 The perceived economic importance of the nuclear industry

When asked 'a general question on this subject' (Macgill 1987, 74), the larger proportion of respondents felt BNFL to be a boon to the local economy. As Figure 4.6 shows, 65% of respondents felt that BNFL brought economic benefit (the greater part of these believing it brought 'great advantage'). Only 5% felt that the industry's presence was an economic disadvantage, showing once more that cause for dissent on economic grounds was small. The proportion of respondents reporting that BNFL had a positive economic influence was greater than in the earlier study. This difference is perhaps attributable to the shift in sampling area to a smaller one closer to the Sellafield site, which is an area which gains more economically from BNFL's presence, both in terms of direct employment, and in terms of the multiplier effect through providing goods and services for the workforce.

4.3.3.2 The perceived health risk from the activities of the nuclear industry

Respondents were asked to 'describe their feelings about radiation-induced health risks in the context of radiation levels as a result of the operations of British Nuclear Fuels Ltd at Sellafield' (Macgill 1987, 74). As illustrated in Figure 4.7, concern was highest for children, the focus of the YTV documentary, just as it had been in the previous survey. In this study, a third variable was also introduced, that of levels of concern for other adults. Concern for other adults were lower than for children but higher than for respondents themselves in both the 'concerned' and 'anxious' responses (Macgill 1987, 74). The fact that concern for other adults is higher than for respondents themselves and lower than for children would seem to support the earlier comment made in the analysis of Macgill's work with Phipps, that an element of

²⁹ As with Macgill's earlier work with Siân Phipps, precise statistical evidence was sometimes omitted from the published findings, and therefore cannot be reproduced here.

Map 4.2

Area covered by fieldwork, Macgill, December 1984



(Seascale, St.Bees, Thornhill, Gosforth, Bootle, Millom, Egremont, Beckermat, Holmrook, Drigg, Ravenglass)

Figure 4.6 Perceived economic importance of BNFL, December 1984

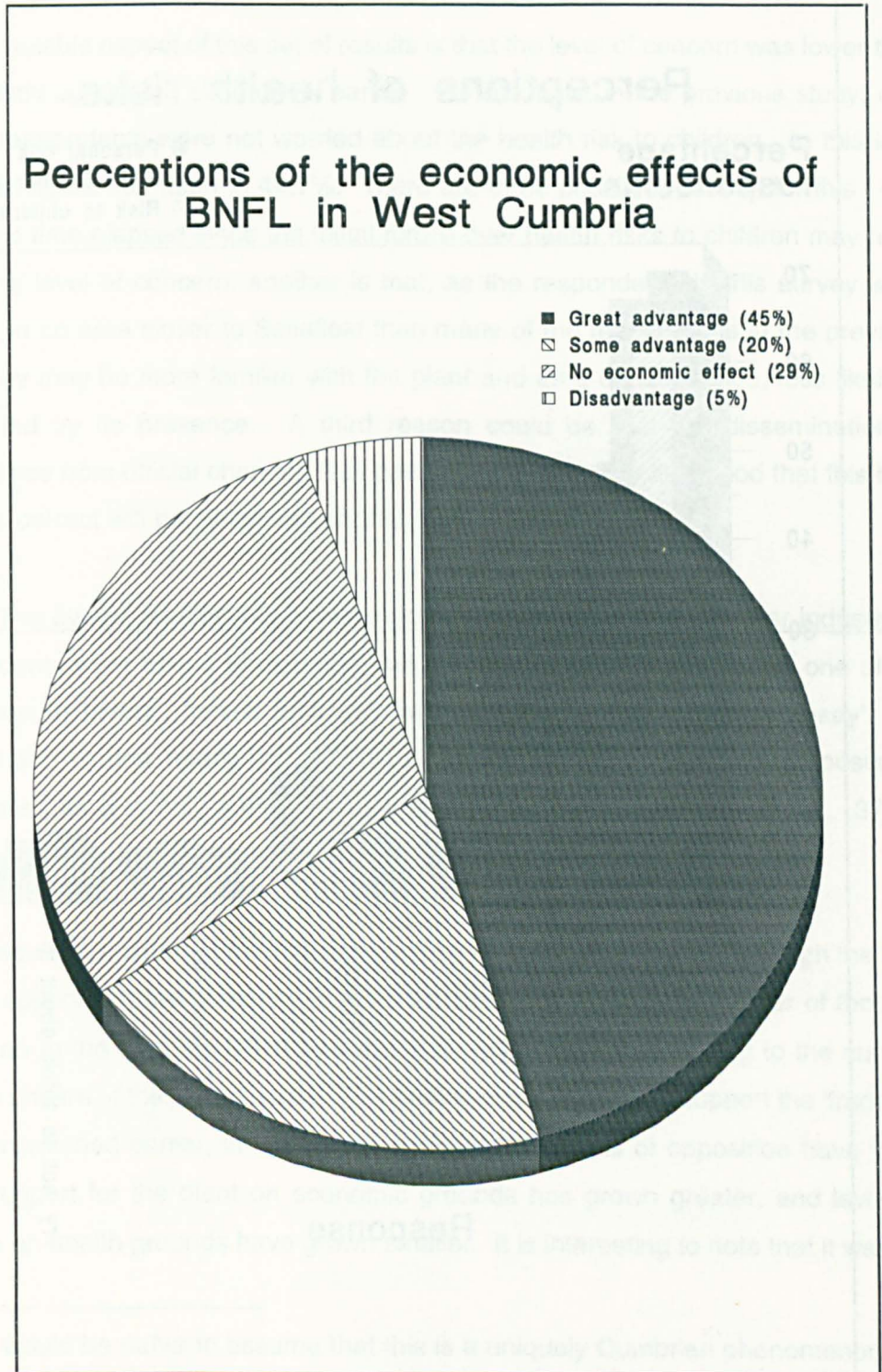
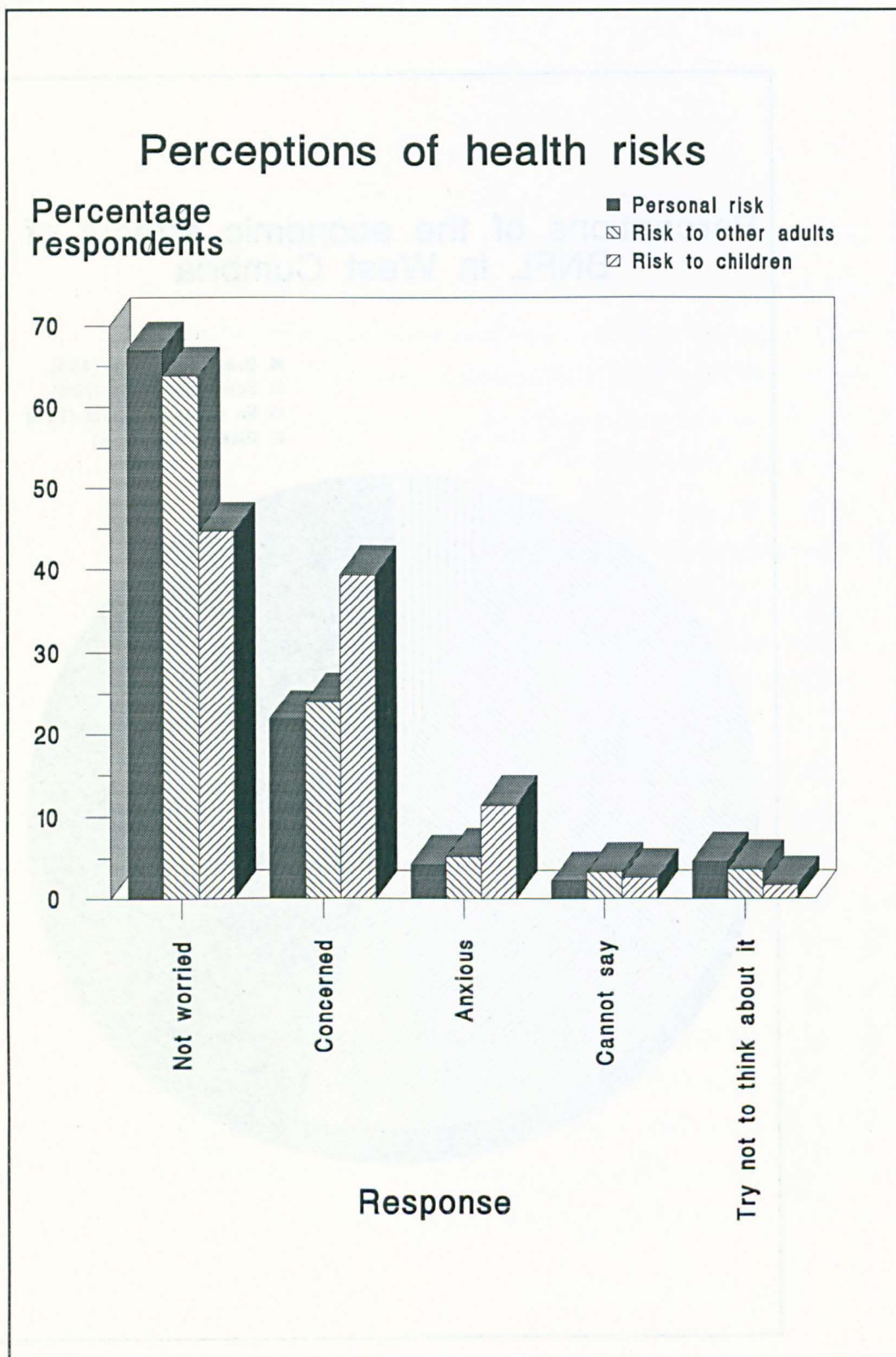


Figure 4.7 BNFL and health, December 1984 (Macgill & Phipps 1987, 74)



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Cumbrian culture allows concern for others to be expressed before concern for oneself.³⁰

Another notable aspect of this set of results is that the level of concern was lower than in the study conducted six months earlier. For example, in the previous study, only 35% of respondents were not worried about the health risk to children. In this later work, that figure had risen to 44.7%. There are three possible reasons for this - one is that the time elapsed since the initial furore over health risks to children may have dulled the level of concern, another is that, as the respondents in this survey were resident in an area closer to Sellafield than many of the respondents in the previous work, they may be more familiar with the plant and as a consequence, less likely to be worried by its presence. A third reason could be that the dissemination of reassurance from official channels has pacified concern. The likelihood that this third theory is correct will be discussed shortly.

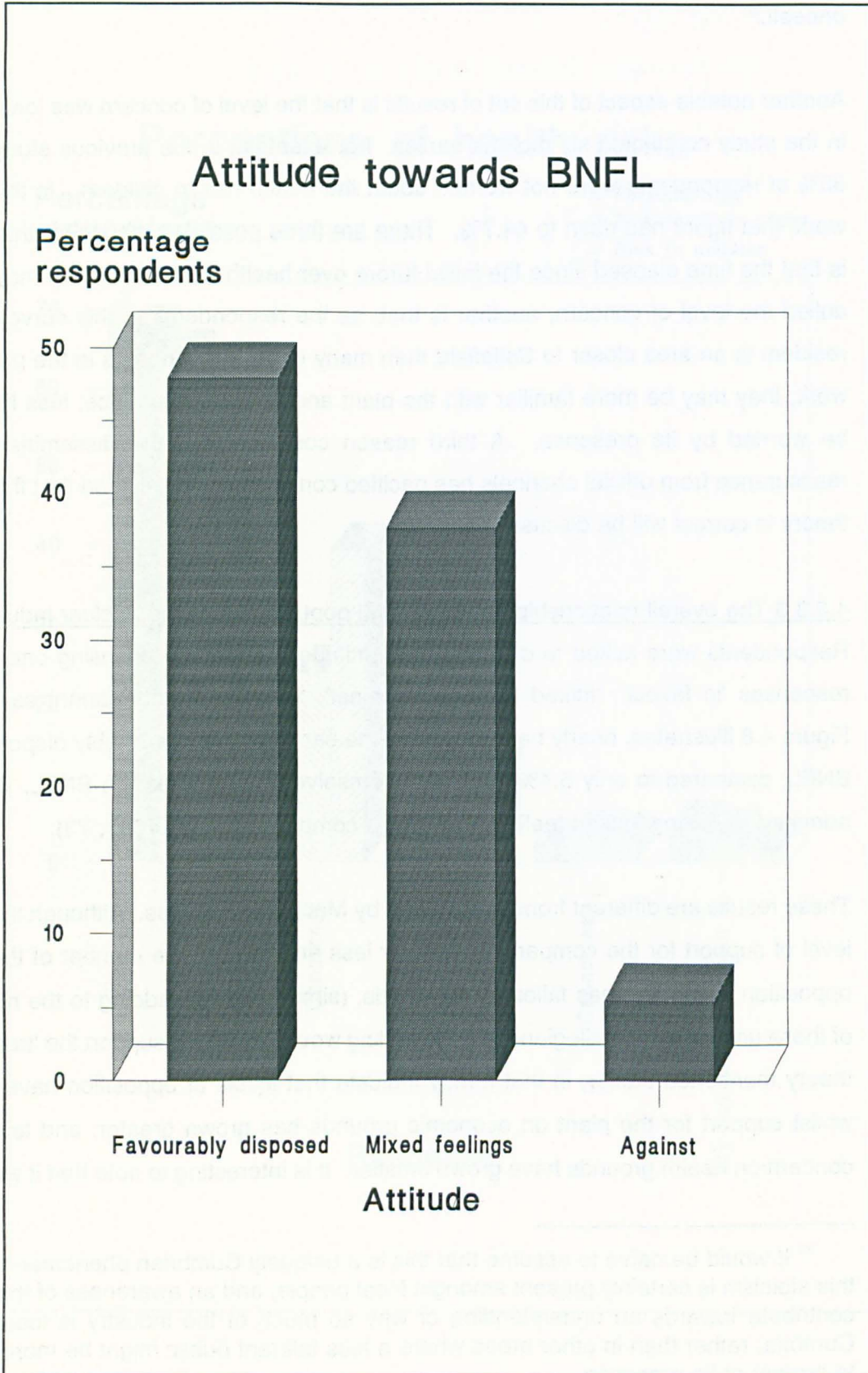
4.3.3.3 The overall relationship between local population and the nuclear industry

Respondents were asked to describe their attitude to BNFL by choosing one of the responses 'in favour', 'mixed feelings', 'against', 'indifferent' and 'cannot say'. As Figure 4.8 illustrates, nearly half (47.9%) of the sample were 'favourably disposed' to BNFL, compared to only 5.4% who saw themselves in opposition to BNFL. 37.7% admitted to having 'mixed feelings' about the company (Macgill 1987, 73).

These results are different from those found by Macgill and Phipps. Although the high level of support for the company is more or less unchanged, the number of those in opposition to the firm has fallen by two-thirds, (simultaneously adding to the number of those unsure of their allegiance). This finding would appear to support the 'trade-off' theory mentioned earlier, in that it may indicate that levels of opposition have fallen whilst support for the plant on economic grounds has grown greater, and levels of concern on health grounds have grown smaller. It is interesting to note that it was the

³⁰ It would be naïve to assume that this is a uniquely Cumbrian phenomenon, but this stoicism is certainly present amongst local people, and an awareness of this may contribute towards an understanding of why so much of the industry is located in Cumbria, rather than in other areas where a less tolerant public might be more likely to protest at its presence.

Figure 4.8 Attitudes towards BNFL, December 1984



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response 'mixed feelings' rather than support, which increased in frequency as opposition fell. It could be that although it had not increased in quantitative terms, existing support could have intensified since the first study, with an increase in the number of people feeling 'strongly in favour' rather than 'moderately in favour', but this cannot be known, because the two response categories which had been separate in the previous study, were amalgamated in this work.

4.3.3.4 Relationships between local people and national bodies

Respondents were asked the non-directional question,

*"Did you see the Yorkshire Television Programme "Windscale: The Nuclear Laundry" (broadcast on November 1st 1983)?"
"What did you think of it?"*

Respondents were allowed to make more than one comment about the documentary. Comments were coded according to the general point which they made. The most frequent type of comment (made by 259 respondents) were those critical of the programme's scientific basis and bias. Another 99 respondents criticised the 'premises methods and inferences' of the programme. As Table 4.1 illustrates, the majority of comments made by local people about the YTV documentary were of a critical rather than a supportive nature (Macgill 1987, 91-96). Macgill said that 'only 11.8% of comments were commendatory' (Macgill 1987, 97)

Table 4.1 Comments about 'Windscale the Nuclear Laundry', December 1984

FREQUENCIES WITH WHICH THE MAIN TOPIC CATEGORIES AROSE IN RESPONSES.

<u>Frequency</u>	<u>Description</u>
259	Criticism, general and specific, of scientificity and bias of programme.
99	Deep criticism of premises, methods, and inferences of the programme.
92	Remarks not coded as topics.
79	No comment.
72	Specific hostile criticism of the character of journalism.
70	Attribution of consciously 'political' motives to programme makers.
57	General appreciation of the programme.
56	Demand for better information and openness from nuclear industry.

Frequency Description

55	General criticism of 'the media'.
43	Indirect effects of the programme on local feelings, business, and image.
43	Comment on factuality and interest of programme.
38	Alarm, fright at revelations of programme.
36	General comment that programme was useful for raising the issue.
30	Confusion at the legitimacy or credibility of information sources.
28	The programme was alien to local (West Cumbrian) experience.
26	Expression of doubt about some of the programme's evidence and conclusions.
23	Criticism of the interview with BNFL representatives after the programme.
22	Comment about local personalities.
13	Criticism of the technicality of the programme.
10	Recognition of the need for further research now the problem had been highlighted.
7	Active negation of the whole programme.

Total:1158

(Reproduced from Macgill 1987, 96)

Although Macgill did not compare different sources of information, this set of reactions to the YTV documentary may be seen to exemplify the suspicions held by local people of the national media's ability to report local events accurately. At the same time, it can also be seen to reflect an uncertainty amongst some people about the trustworthiness of the industry. The reaction of a further 56 people was to call for more information from the industry, and 36 commented that the programme was useful for highlighting the issue, reminiscent of the appreciation of the role of environmental groups as watchdogs which had been found in the earlier study.

Macgill also analyzed local attitudes towards the Black Report, which was intended to investigate the association between Sellafield and local leukaemia cases, and which gave a 'qualified reassurance' to local people about the controversy (Macgill 1987, 106). Most people had learnt of the report through television coverage, half had read about it in local and national newspapers, and a quarter had read leaflets issued locally. A similar number had actually seen the document, and discussed it amongst themselves. Macgill noted that with only a quarter of respondents having either direct contact with the report itself, or local leaflets, or even just talking about it, this was

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"a relatively low percentage figure, and indicated that the Black Report was somewhat removed from ordinary people and from the very evident presence of Sellafield in everyday experience and discourse." (Macgill 1987, 107)

The failure of the Black Report, and local leaflets which publicised it, to enter into everyday life is consistent with the first study, in which official channels were found to be less successful than might have been hoped in entering into people's everyday lives. The fact that most people learnt about the Black Report through national, rather than local, channels is worth remembering, for its implications are discussed later. Macgill assessed local attitudes by asking the relatively open question

"What did you think about the presentation and the findings of the Black Report?" (Macgill 1987, 106)

Responses were coded in a manner similar to the comments about 'Windscale the Nuclear Laundry'. Of these, the most frequent was simply one of

"no comment; not interested; no knowledge." (Macgill 1987, 112)

This result suggested the failure of official channels to reach their target audience. Of the other comments, only a minority of people were favourably impressed by the report. 260 broadly favourable comments were made, but 307 broadly unfavourable comments were made as well as 291 remarks indicating uncertainty. Together these figures again support the notion that official reassurances are simply not being conveyed to the majority of their target audience.

4.3.3.5 Levels of political activity

Passive interest in the nuclear industry was once again found to be high. Macgill discovered that 80% of respondents claimed to have watched 'The Nuclear Laundry'. This figure is high when placed in the context of the total national viewing figure of only around three million, out of a population of over 50 millions (Macgill 1987, 90). Once again, more active participation in the debate was low. As mentioned above, only a quarter had gone to the trouble of reading the Black Report.

4.3.3.6 Social composition of response

Macgill found women to be more concerned about radiation-induced health risks than men. Regarding risks to children, 56.2% of women were 'concerned', or 'anxious',

compared to 44.5% of men (Macgill 1987, 81). Macgill reiterated the explanation given in her work with Phipps that the likelihood of males to have worked for BNFL would give them greater familiarity with the risks involved, and also added that 'The language of care and concern is perhaps typically more a woman's language' (Macgill 1987, 81).

As Table 4.2 shows, there was also a difference in attitudes between people from different places of employment. It was discovered that workers in the nuclear industry and retired citizens registered the least concern about the effects of radiation from Sellafield, while homemakers and those working in public administration were the most concerned.

Table 4.2 Relationship between employment and concern, December 1984

Place of employment	Percentage respondents concerned or anxious
Public administration	70.4%
Home	57.4%
Sellafield	42.2%
Retired	29.5%

Source: Macgill 1987, 82

These results supported Macgill's thesis that familiarity with the plant reduced levels of concern. In relation to the relative lack of concern about health levels amongst older citizens, Macgill reported that several of the more senior respondents had made comments to the effect that they were too old to care about health risks from radiation. It was also noted that these people 'predate modern environmentalism' (Macgill 1987, 82), and held to older notions about deference to professional expertise and of the perfectibility of nuclear technology (a belief that it can be fully controlled and that all of its effects are known). Another possible factor was that many pensioners were retired Sellafield workers and managers, who would share many of the attitudes of current Sellafield workforce (Macgill 1987, 84). Many of those 'at home' were wives of Sellafield workers, perhaps explaining why 'at homes' were less concerned than those in public administration who were 'relatively more independent' (Macgill 1987, 82) from the plant.

4.3.4 Comments and conclusions

The restrictive concentration upon the six parishes studied in the Black report limits the uses of this study. While it provides an insight into the views of people living near the Sellafield site, it does not include the views of people living further afield who may be equally at risk from the site and who are just as important in terms of local and national politics. Whilst the size of the overall sample, at 462 respondents, represents 2.1% of the population of the area to be studied, and as such was an improvement upon the 0.3% sample employed by Macgill and Phipps, the predominance of Seascale residents within the sample is a problem. Seascale was built by the Ministry of Supply in the 1950s to house workers from Windscale, and it is very much a company town, and hardly representative of the whole county. The representation of sub-populations within the sample was also open to question. For example, the lack of quotas to ensure proportional representation of gender and age groups led to misrepresentation of these groups.

As with the earlier research, the topics for discussion had been selected by the researcher, and the dominance of 'ranking' questions in the survey further restricted the respondents' free choice to fully express themselves. Macgill was aware of these problems (Macgill 1987, 62, 73) and the introduction of some open-ended questions was a more positive step to allow more freedom of expression (although there are problems with such open questions too, see below).

Despite its limitations, the book provides an excellent insight into the attitudes of people who were at the heart of the 'Sellafield cancer-link controversy', especially through their use of non-directional questions regarding the YTV documentary.

Macgill's work confirms many trends observed in her earlier work with Phipps. BNFL were once more seen to be important economically, and far more respondents were in favour of BNFL's presence than opposed it. Concern about health risk was greater for others than for respondents themselves once more, perhaps confirming the notion of Cumbrian stoicism.

Just as Macgill and Phipps had found that information providers, especially non-Cumbrian ones, were rarely seen as completely trustworthy, Macgill's finding that local people were heavily critical of the Yorkshire Television documentary, and that the Black Report had largely failed to bring a message of reassurance directly to most people once more indicated a failure in official channels of communication. The question on the YTV programme was also used by a number of people as an opportunity to stress their concerns about the excessive secrecy of BNFL.

The fact that the respondents showed higher levels of awareness of BNFL's economic impact, lower levels of concern at health risks, and lower levels of opposition to the plant than in the work conducted with Phipps is perhaps attributable to the passage of time since the original study, but it is more likely that it reflects the change in sampling area, in that people living nearer to Sellafield are more familiar with the plant, have more stake in its success, and are less in awe of it. Macgill's finding on the social composition of response types supports this theory. The area chosen for sampling in West Cumbria is therefore of critical importance in public opinion research, and had to be borne in mind in the 1994 study.

4.4 Sellafield Repository Project Public Consultation West Cumbria

RESEARCHERS: Priority Search / Research and Auditing Services

DATE OF RESEARCH: January - March 1993

PUBLICATION: Priority Search 1993

4.4.1 Overview

Priority Search Ltd were commissioned by UK NIREX Ltd.³¹ 'to consult the inhabitants of West Cumbria on a number of issues concerning the proposed underground repository at the Sellafield site' (Priority Search 1993, 2). The research was carried out in a range of West Cumbrian towns and villages (see Map 4.3) in the first three months of 1993, two years after NIREX had named Sellafield as the planned site for an underground nuclear waste repository. Since that time, NIREX had encountered difficulties in providing comprehensive evidence for the site's suitability, which had led to the scheme being delayed, and also to the introduction of a proposal for a preliminary Rock Characterization Facility (RCF). Contemporary nuclear debate in West Cumbria centred upon whether or not THORP would be allowed to open. The repository project was of secondary concern. The report was primarily a series of graphs and figures displaying the results of the research, with little in the way of written analysis.

4.4.2 Methodology

The research was organised in two phases. A primary phase consisted of a series of meetings with focus groups intended to represent a 'cross-section of the local community' (Priority Search 1993, 7). The members of the focus groups were residents of Gosforth, Seascale, Whitehaven, Workington, Cockermouth, Maryport, Cleator Moor, Egremont and Millom. In these meetings the issue of what would be necessary in order to make a repository acceptable to West Cumbrians was discussed. The second phase of the research consisted of a house to house survey. The survey followed a sample frame covering 'the whole of West Cumbria' (Priority Search 1993, 16), which was based upon the 1991 census figures for population numbers, gender, age and employment in different localities. 939 respondents were interviewed over the three months by staff of Research and Auditing Services. The published report focused primarily upon the results obtained in this second stage of the research.

³¹ The author is grateful to Geoffrey Olstead and Peter Curd of NIREX for their assistance in obtaining this document.

4.4.3 Findings

4.4.3.1 The perceived economic importance of the nuclear industry

Levels of belief in the beneficial effects of BNFL's presence was high. Respondents were offered the statements

"Sellafield makes a positive contribution to the economic well being of West Cumbria"

and

"The nuclear industry is important to the future of West Cumbria"

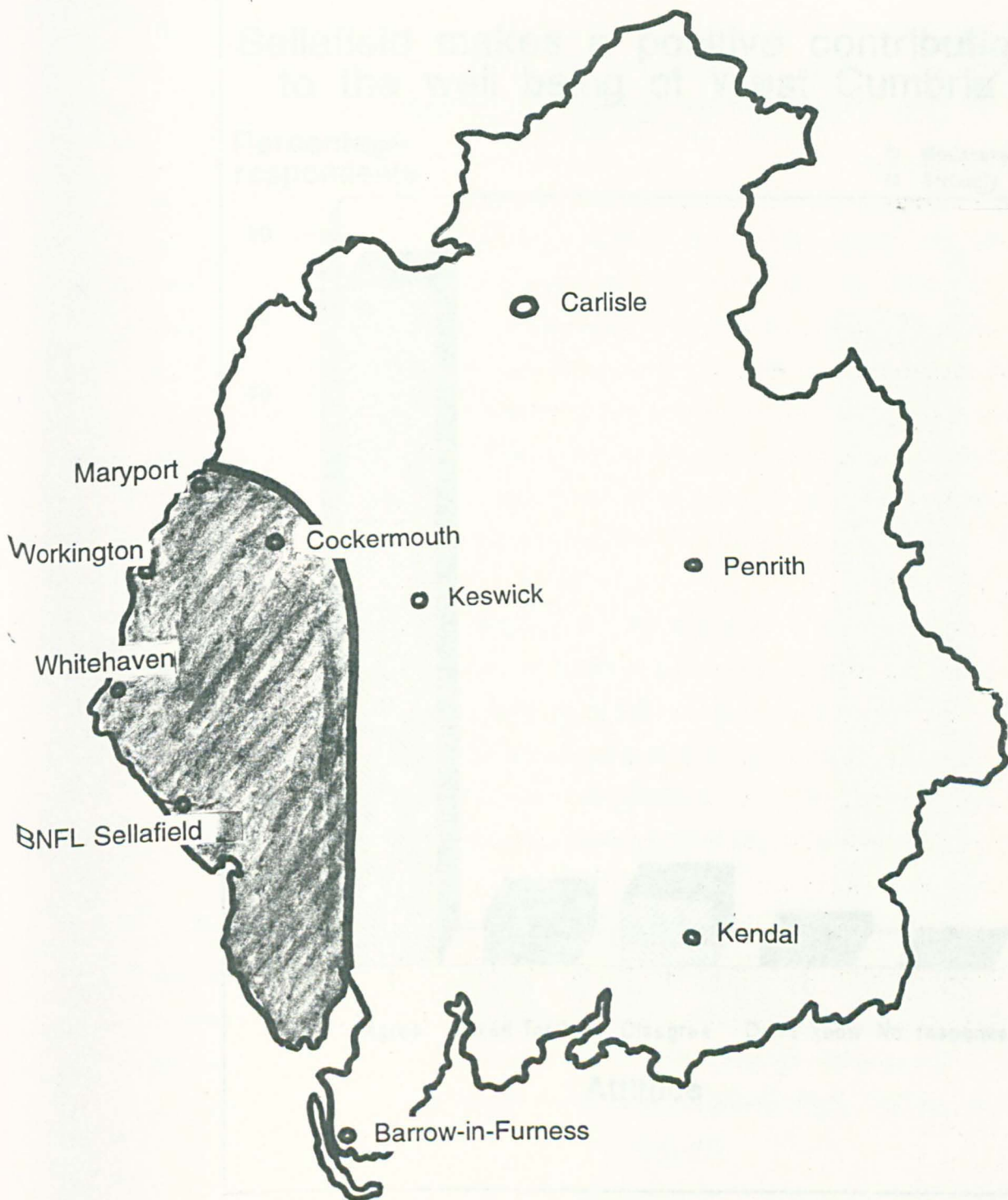
They were then asked to describe their reaction to the statements by choosing from the responses 'agree strongly'; 'agree'; 'neither agree nor disagree'; 'disagree', 'disagree strongly' and 'don't know'.

As Figure 4.9 shows, over 84% of respondents agreed or strongly agreed that Sellafield made a positive contribution to West Cumbria. Only 8% disagreed or disagreed strongly, whilst, as Figure 4.10 shows, 80% agreed or strongly agreed that the nuclear industry was important to the future of West Cumbria. Only 10% disagreed or disagreed strongly with this statement (Priority Search 1993, 49).

These levels of agreement are higher than levels of awareness of the economic benefit in either of the previous two studies. This result may be because the recession of the 1990s has accentuated the perceived economic contribution of the nuclear industry. It could also reflect the change in the phraseology employed in the questions. Both these questions ask respondents about the industry's contribution to the community in general, whereas the first study by Macgill and Phipps asked about BNFL's effect on the respondent's own livelihood. This difference could have the effect of increasing apparent levels of perception of economic benefit simply because even if a person did not feel that they benefitted personally from BNFL's presence, they might think that the community as a whole did so. Another possible factor in the increased perception of the industry's contribution is that the phrase 'mixed feelings' used in Macgill's work, is replaced in this study by 'neither agree nor disagree', which

Map 4.3

Area covered by fieldwork, Priority Search, January-March 1993



(Lamplugh, Little Clifton, Great Clifton Maryport, Seaton, Workington, Tallentire, Cockermouth, Dearham, Great Broughton, Harrington, Sandwith, Silecroft, St.Bees, Whitehaven, Cleator Moor, Lowca, Millom, Moorsby Park, Arlecdon, Rowrah, Bootle, Cleator, Corney, Distington, Egremont.)

Figure 4.9 Perceived economic importance of Sellafield, January - March 1993

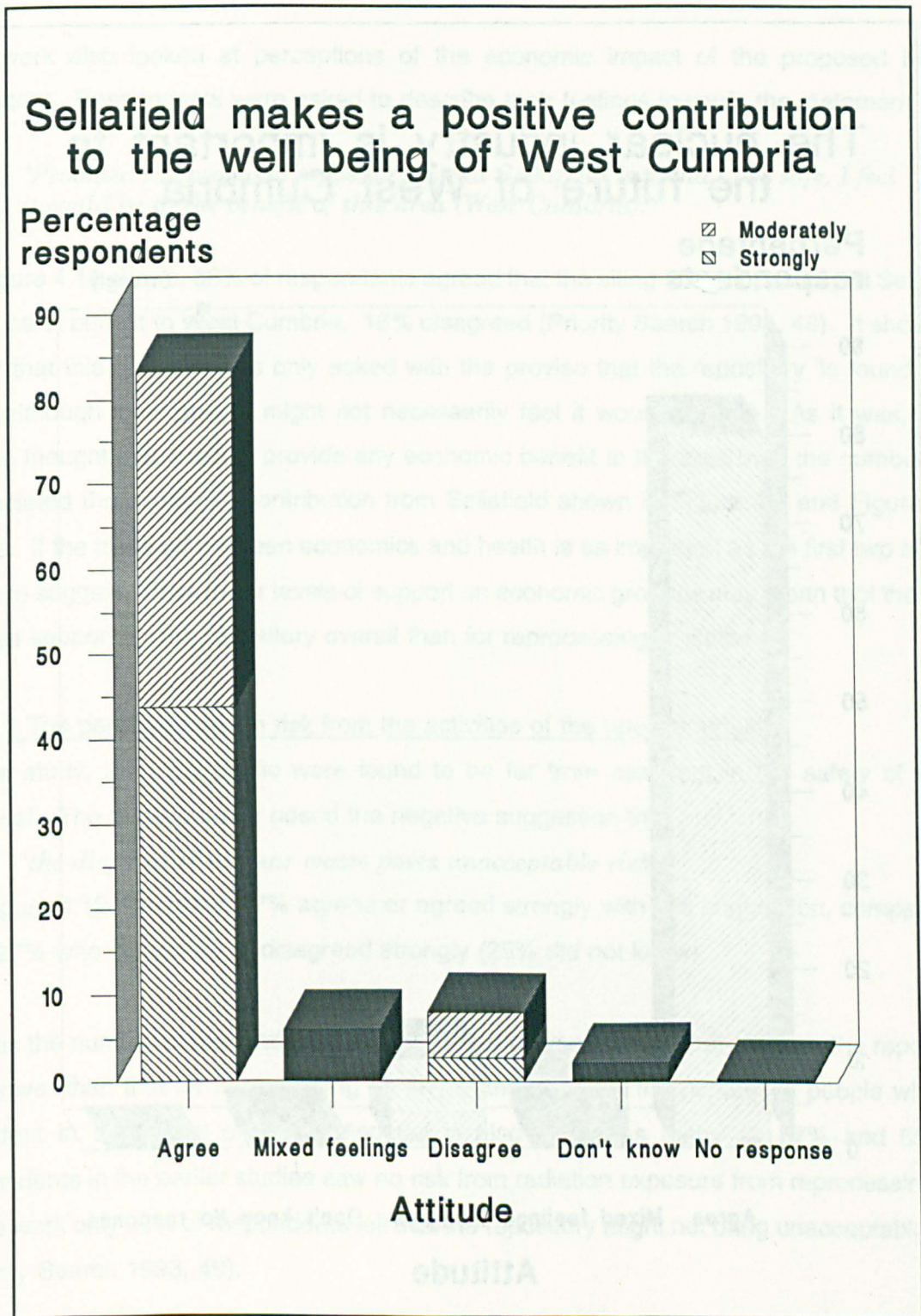
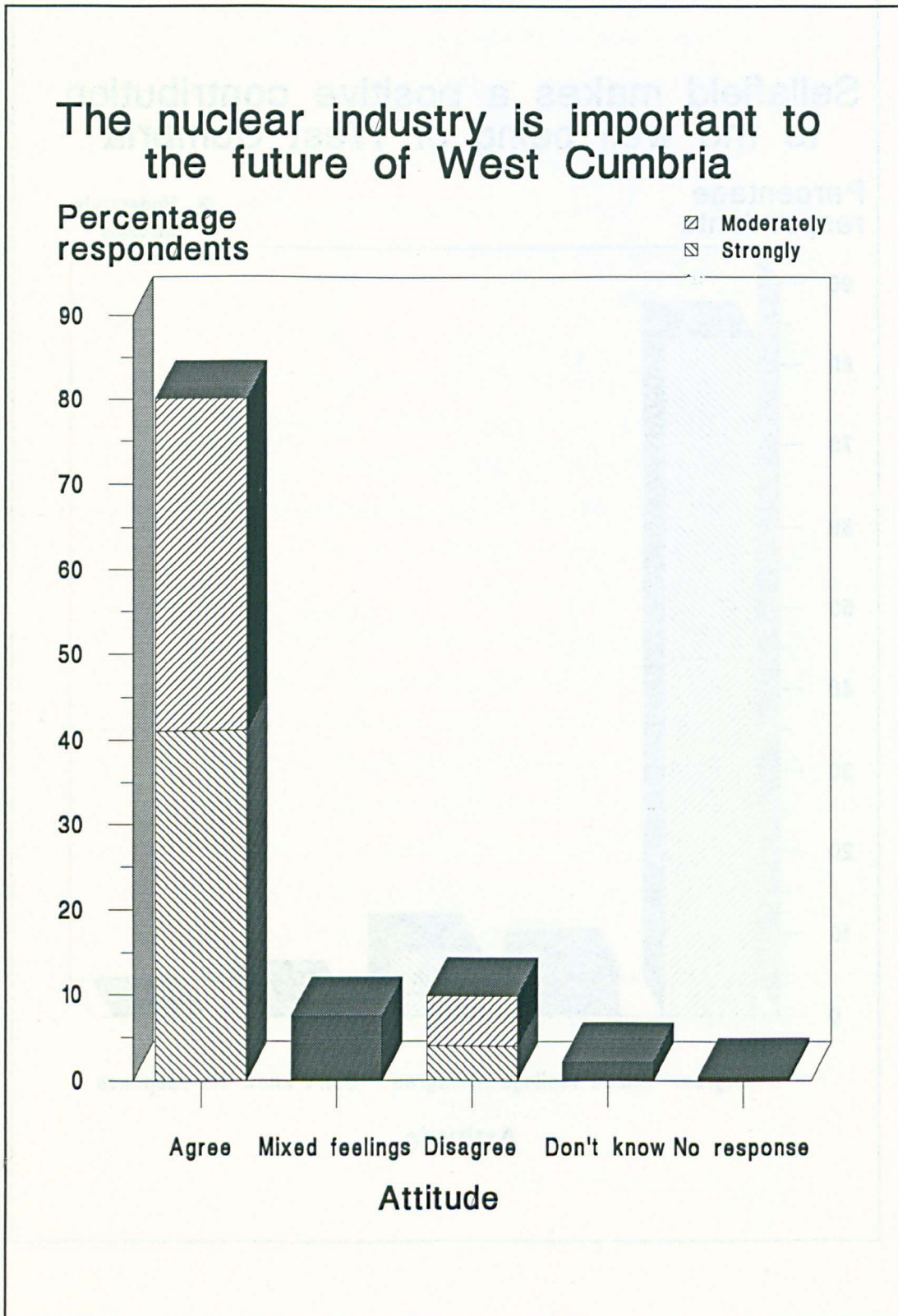


Figure 4.10 Perceived importance of the nuclear industry to West Cumbria, January-March

1993



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perhaps not as enticing a response option for respondents, leading to more people choosing "agree".

This work also looked at perceptions of the economic impact of the proposed NIREX repository. Respondents were asked to describe their feelings towards the statement

"Provided the proposed repository site at Sellafield is found to be safe, I feel it could be to the benefit of this area (West Cumbria)."

As Figure 4.11 shows, 68% of respondents agreed that the siting of the repository at Sellafield could be of benefit to West Cumbria. 18% disagreed (Priority Search 1993, 48). It should be noted that this question was only asked with the proviso that the repository 'is found to be safe' although local people might not necessarily feel it would be safe. As it was, fewer people thought that it would provide any economic benefit to the area than the number who appreciated the economic contribution from Sellafield shown in Figure 4.9 and Figure 4.10 above. If the trade-off between economics and health is as important as the first two studies seem to suggest, these lower levels of support on economic grounds may mean that there will be less support for the repository overall than for reprocessing at Sellafield.

4.4.3.2 The perceived health risk from the activities of the nuclear industry

In this study, the local public were found to be far from confident in the safety of waste disposal. The questionnaire posed the negative suggestion that

'the disposal of nuclear waste poses unacceptable risks'.

As Figure 4.12 illustrates, 47% agreed or agreed strongly with this suggestion, compared to only 27% who disagreed or disagreed strongly (25% did not know).

Just as the number of respondents who perceived a net economic benefit from the repository was lower than that for reprocessing (in any of the studies), the number of people who are confident in the safety of waste disposal is also lower. As many as 67% and 55% of respondents in the earlier studies saw no risk from radiation exposure from reprocessing, but in this work only 27% of respondents felt that the repository might not bring unacceptable risks (Priority Search 1993, 49).

Figure 4.11 Perceived benefits of a safe repository, January - March 1993

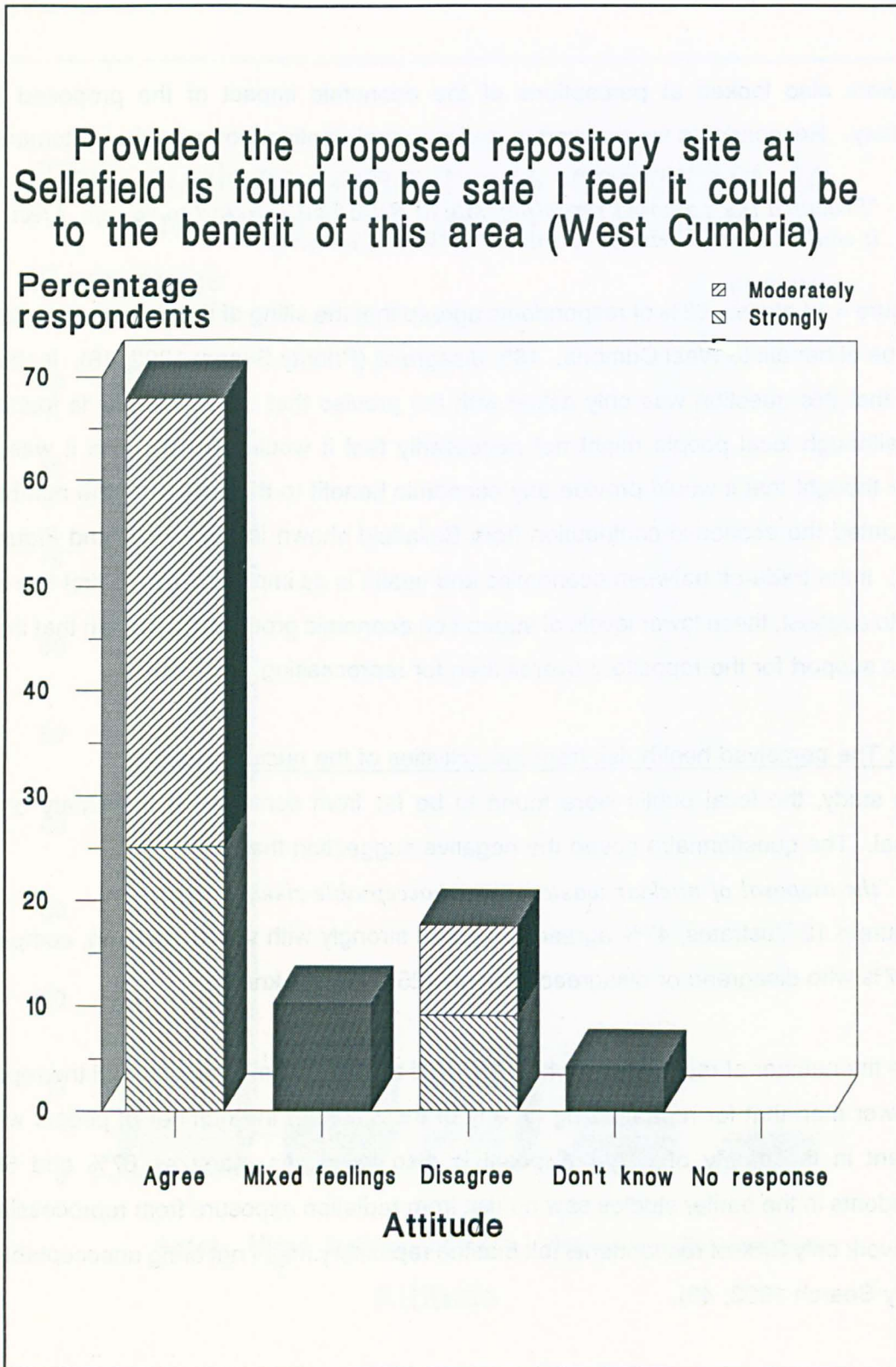
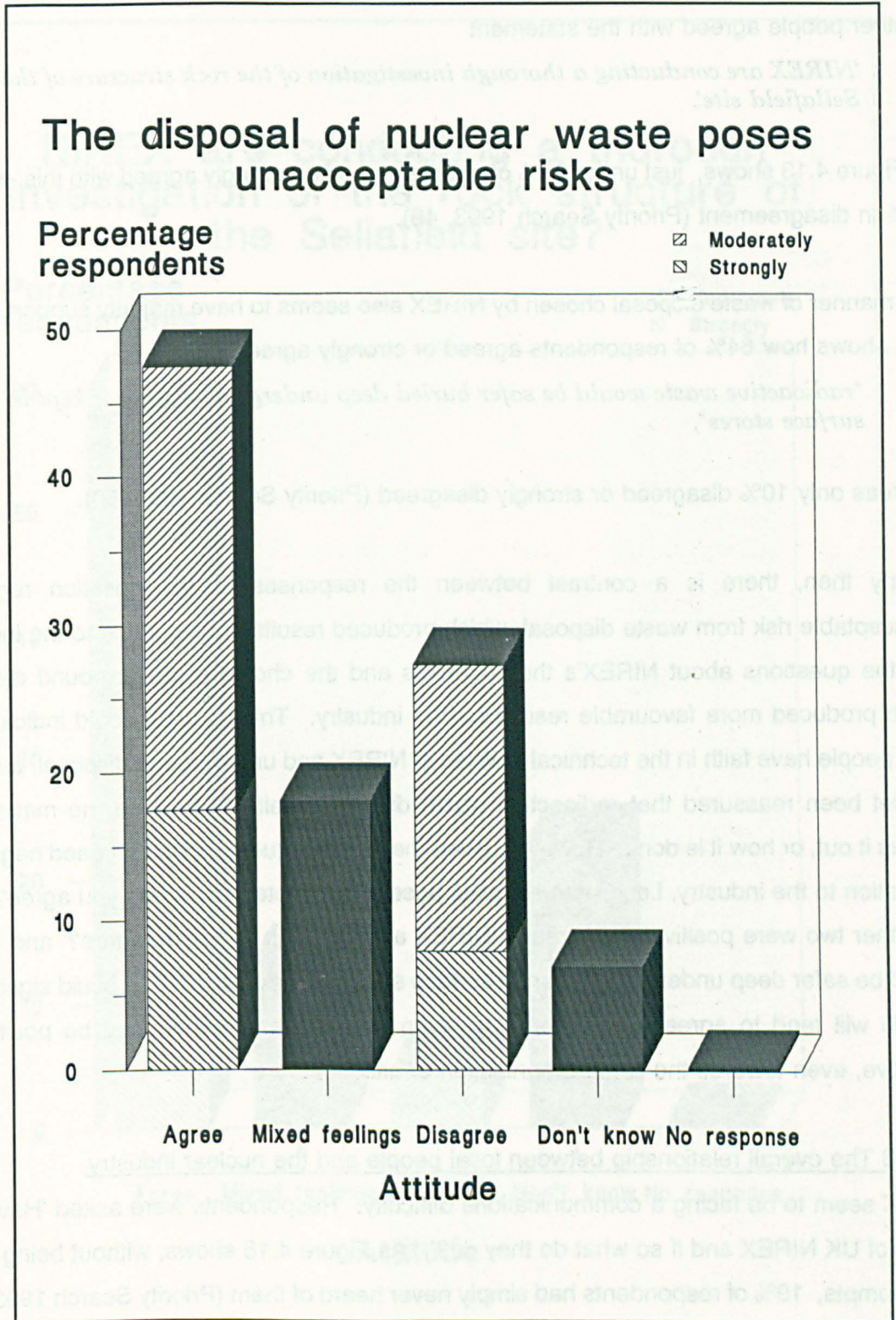


Figure 4.12 Perceived risks of waste disposal, January - March 1993



There is an extent to which the Priority Search findings show that people lack confidence in the technology of waste disposal rather than in the abilities of those responsible for waste disposal. Confidence in the quality of NIREX's work was quite high. A question asked whether people agreed with the statement

'NIREX are conducting a thorough investigation of the rock structure of the Sellafield site'.

As Figure 4.13 shows, just under 58% of people agreed or strongly agreed with this, with just 4.9% in disagreement (Priority Search 1993, 48).

The manner of waste disposal chosen by NIREX also seems to have majority support. Figure 4.14 shows how 64% of respondents agreed or strongly agreed that

"radioactive waste would be safer buried deep underground than if kept in surface stores",

whereas only 10% disagreed or strongly disagreed (Priority Search 1993, 50).

Clearly then, there is a contrast between the responses to the question regarding unacceptable risk from waste disposal, which produced results unfavourable to the industry, and the questions about NIREX's thoroughness and the choice of underground disposal, which produced more favourable results for the industry. This contrast could indicate that local people have faith in the technical abilities of NIREX and underground disposal, but have not yet been reassured that radioactive waste disposal itself will be safe, no matter who carries it out, or how it is done. However, given that the first question was phrased negatively in relation to the industry, i.e. 'waste disposal poses unacceptable risks do you agree?', and the other two were positively phrased - 'NIREX are thorough - do you agree?' and 'waste would be safer deep underground than in surface stores - do you agree?', it could signify that people will tend to agree with statements given in surveys, whether they be positive or negative, even towards the same organization or situation.

4.4.3.3 The overall relationship between local people and the nuclear industry

NIREX seem to be facing a communications difficulty. Respondents were asked 'Have you heard of UK NIREX and if so what do they do?'. As Figure 4.15 shows, without being given any prompts, 19% of respondents had simply never heard of them (Priority Search 1993, 44).

Figure 4.13 Perceived quality of NIREX's investigations, January - March 1993

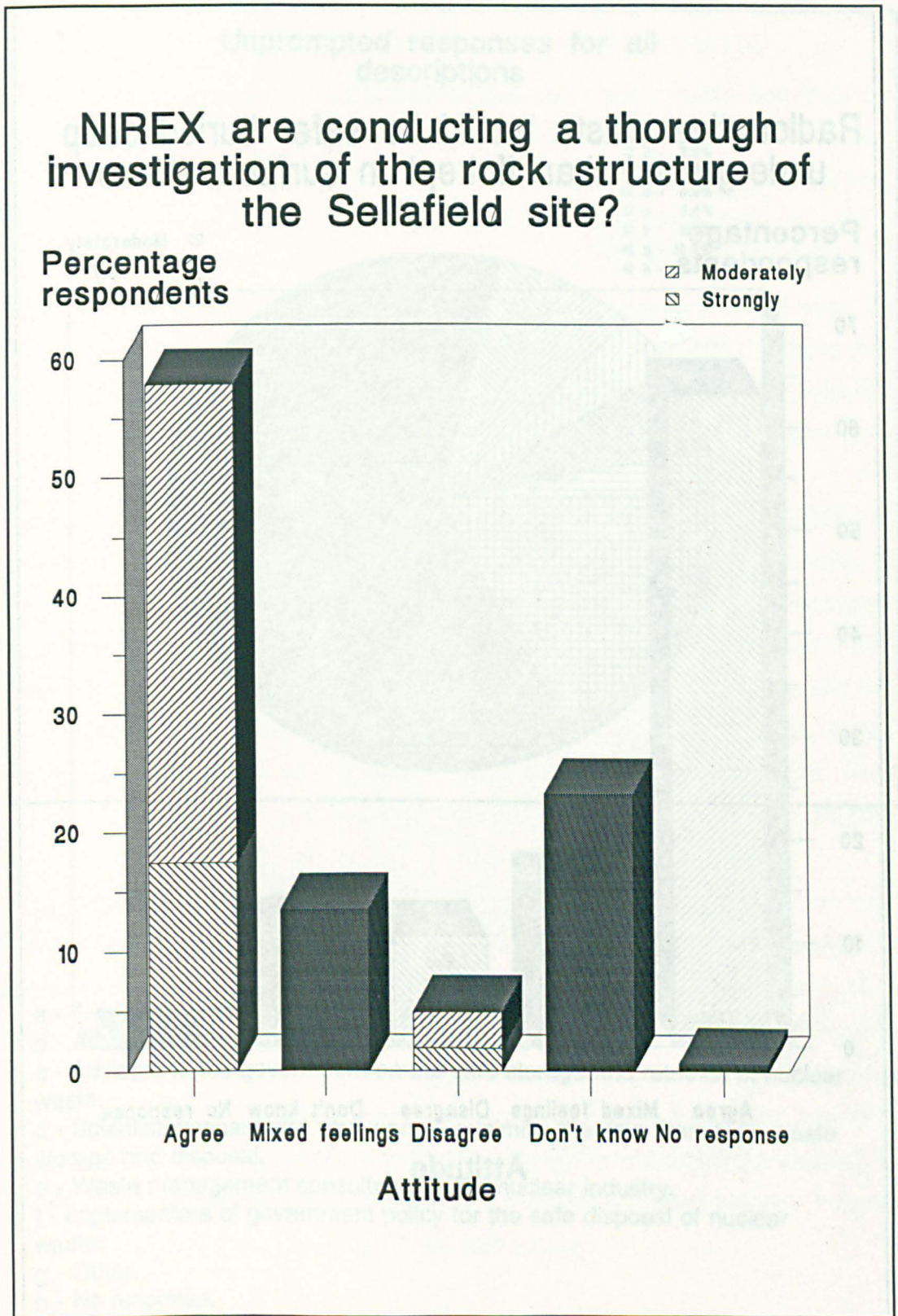


Figure 4.14 Local support for underground disposal of radioactive waste, January - March

1993

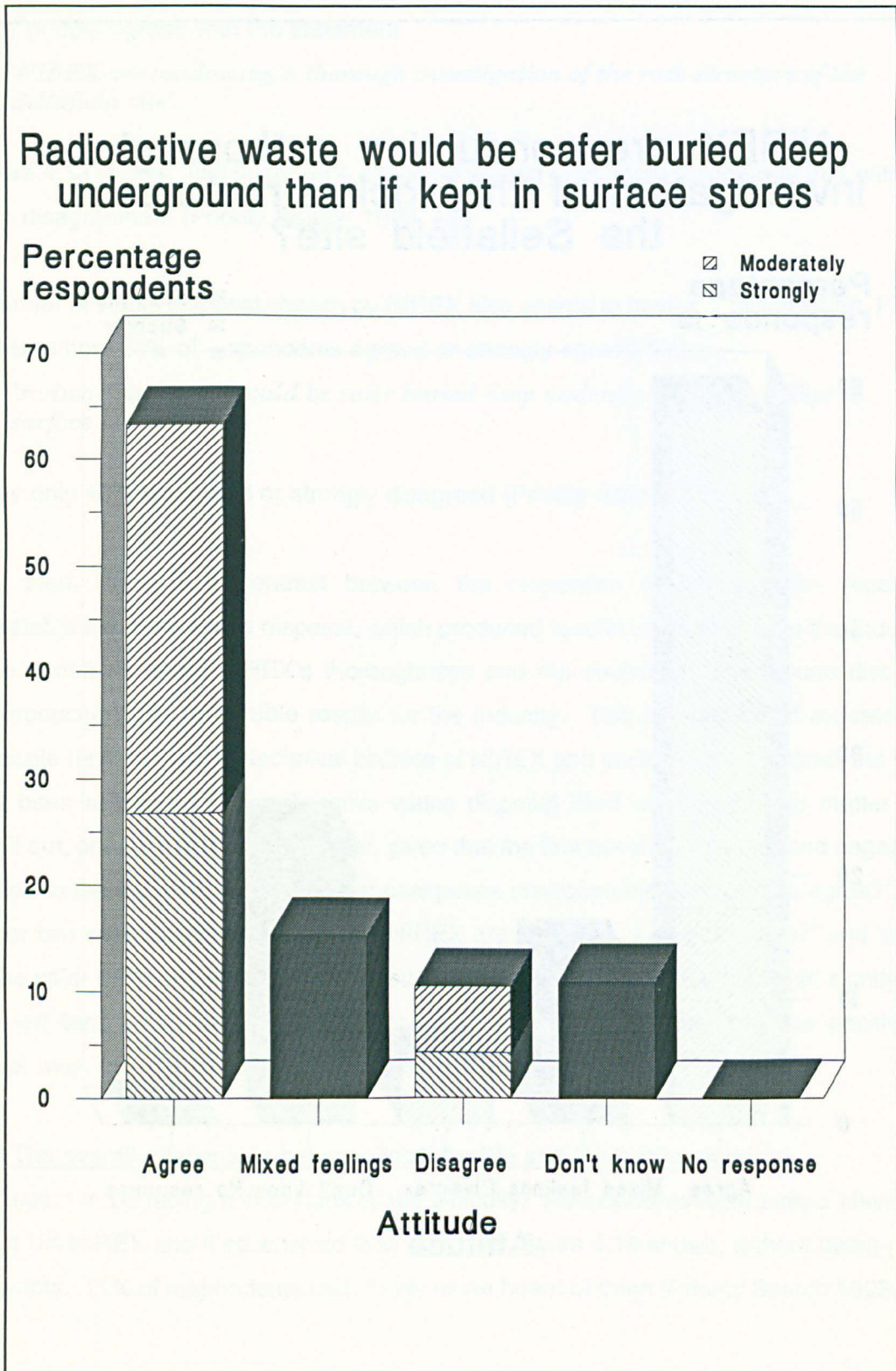
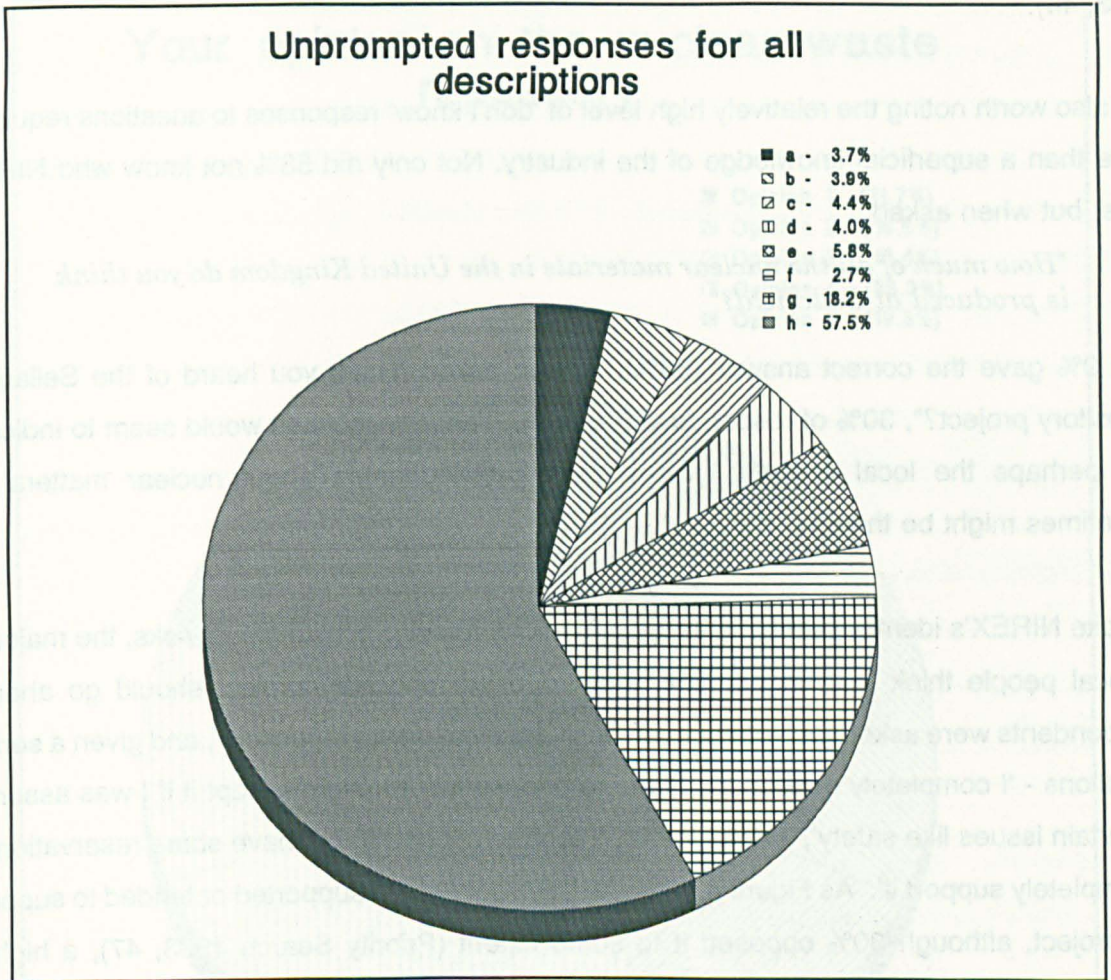


Figure 4.15 Popular knowledge of NIREX, January - March 1993



KEY

- a - A mining company connected with the nuclear fuels industry.
- b - Advisors to British Nuclear Fuels on waste recycling.
- c - Advisors to the government on the safe storage and retrieval of nuclear waste.
- d - Scientists/researchers who work to minimize the risks from toxic waste storage and disposal.
- e - Waste management consultants to the nuclear industry.
- f - Implementors of government policy for the safe disposal of nuclear waste.
- g - Other.
- h - No response.

58% said they did not know what NIREX did and a further 18% made incorrect guesses as to the nature of their work. Priority Search concluded that 'it would appear that without prompting there is very little knowledge of the role of UK NIREX Limited' (Priority Search Ltd. 1993, 44).

It is also worth noting the relatively high level of 'don't know' responses to questions requiring more than a superficial knowledge of the industry. Not only did 58% not know who NIREX were, but when asked

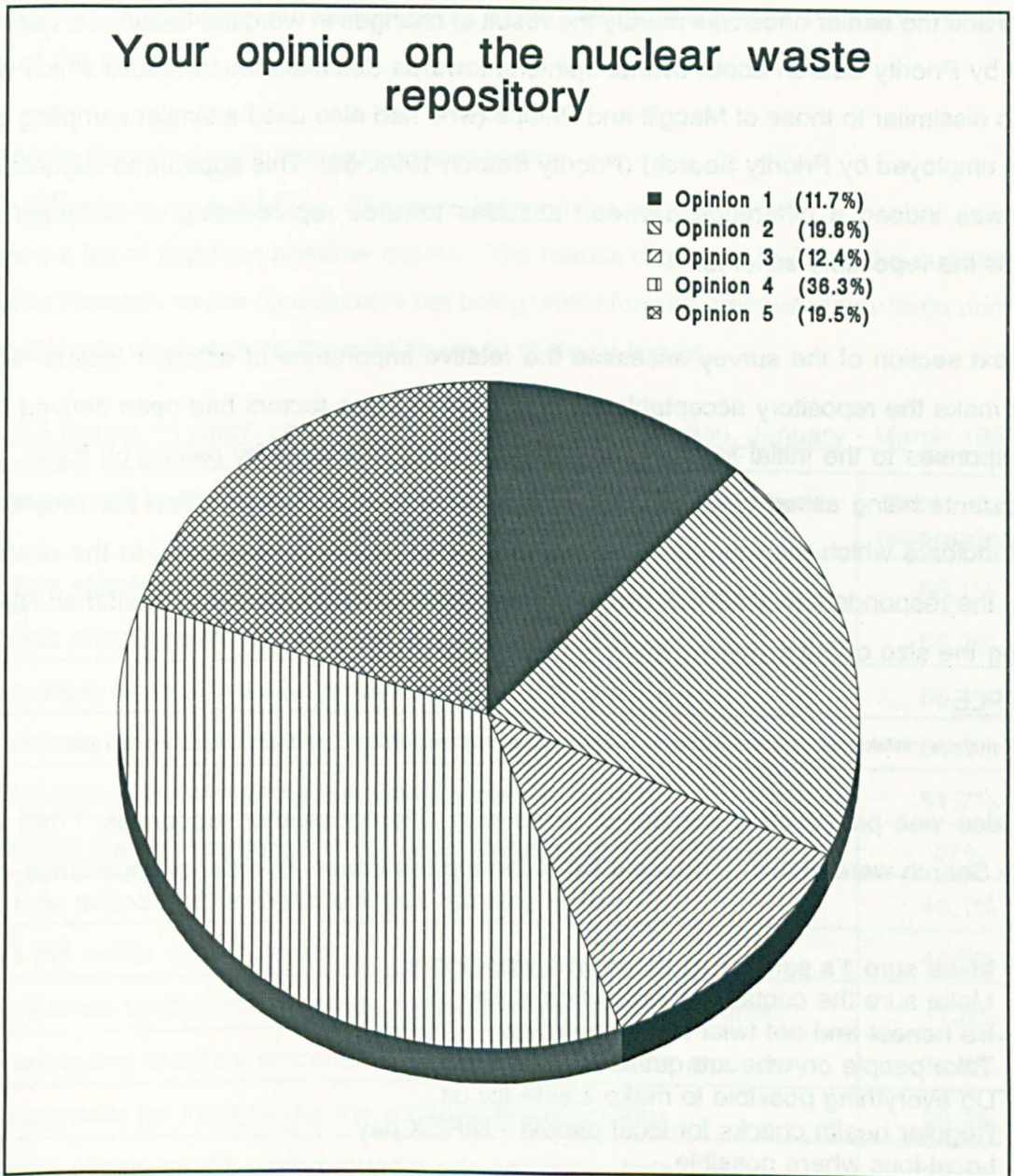
"How much of all the nuclear materials in the United Kingdom do you think is produced at Sellafield?"

only 9% gave the correct answer (60%). When asked "Have you heard of the Sellafield repository project?", 30% of respondents had not. These responses would seem to indicate that perhaps the local community is not as knowledgeable about nuclear matters as sometimes might be thought.

Despite NIREX's identity problems and reservations about potential safety risks, the majority of local people think that, in practice, the proposed repository project should go ahead. Respondents were asked for 'your opinion on the nuclear waste repository', and given a series of options - 'I completely oppose it', 'I tend to oppose it but I might accept it if I was assured of certain issues like safety', 'I don't know', 'I tend to support it, but have some reservations', 'I completely support it'. As Figure 4.16 shows, 57% of people supported or tended to support the project, although 30% opposed it to some extent (Priority Search 1993, 47), a higher proportion than had opposed Sellafield in either of the previous two studies.

The larger figures for both support and opposition to the repository plan in this study may be attributable to a genuinely more clear-cut division of opinion on the project, but it might also be due to the integration of the equivocal 'mixed feeling' and 'neither agree nor disagree' categories which were present in the earlier studies into the more judgemental responses in this study such as 'I tend to oppose it but I might accept it if I was assured of certain issues like safety' and 'I tend to support it, but have some reservations'. Compared to attitudes to BNFL in the 1980s, the division between the two extremes of opinion about NIREX is, overall, not particularly marked in Priority Search's findings. 11.7% of respondents completely

Figure 4.16 Local support for the NIREX repository project, January - March 1993



KEY

- 1 - I completely oppose it.
- 2 - I tend to oppose it but might accept it if I was assured of certain issues, like safety.
- 3 - I don't know.
- 4 - I tend to support it, but have some reservations.
- 5 - I completely support it.
- 6 - No response.

opposed the NIREX project, which is only 7.8% less than the 19.5% who completely supported it. (In Macgill & Phipps' work, 30% had been strongly in favour of BNFL and only 9% strongly against, a 21% difference). One cannot claim that the difference between these results and the earlier ones was merely the result of changes in wording, because a question asked by Priority Search about overall opinions towards Sellafield found results which were not too dissimilar to those of Macgill and Phipps (who had also used a similar sampling area to that employed by Priority Search) (Priority Search 1993, 50). This appears to suggest that there was indeed a difference between attitudes towards reprocessing at Sellafield and towards the repository scheme.

The next section of the survey assessed the relative importance of different factors 'which would make the repository acceptable to you' (a list of these factors had been derived from the responses to the initial focus group research) This was done by pairing off ideas, with respondents being asked to place a cross at a point along a line between the two, which would indicate which they thought was the more important. For instance, in the example below, the respondent saw NIREX owning up to mistakes as far more important than NIREX defining the size of the proposed site.

EXAMPLE

If NIREX make a mistake, tell us about it at once Own up to mistakes Define the size of the site

Each idea was paired off a number of times with different partner responses. From this, Priority Search were able to produce a list of the top ten issues. In order of importance, they were:

- 1 Make sure it's safe for all those who work there
- 2 Make sure the containment of waste is sound
- 3 Be honest and not twist things their way
- 4 Take people on who are qualified to do the job
- 5 Do everything possible to make it safe for us
- 6 Regular health checks for local people - NIREX pay
- 7 Local jobs where possible
- 8 Make sure it's well monitored
- 9 Less secrecy
- 10 Tell us the chances of waste harming anybody
- 11 Unannounced spot checks by Nuclear inspectorate
- 12 Don't put money before people

(Priority Search 1993, 18)

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It is interesting to note that amongst predictable issues like health and safety, 'Be honest and not twist things their way' was the third most important issue, whilst 'less secrecy' was also in the top ten, suggesting that, as with BNFL in the 1980s, there were still problems with the image of the industry.

The Priority Search survey also asked the question

'Which issues would you like more information on?'

and gave a list of eighteen possible issues. The results displayed in Table 4.3 suggest that the public themselves are conscious of not being well informed, because fairly large numbers of respondents wanted more information on all of these issues.

Table 4.3 Issues on which people wish receive more information, January - March 1993

Responses to the question 'which issues would you like more information on?'	Percentage respondents
Possible effects on health if there was a leak	66.1%
Possible effects on the environment if there was a leak	58.3%
The number of local jobs the repository is likely to create	55.1%
To discover how to protect oneself if there was a leak	54.5%
Arrangements for monitoring the waste once it is buried	51.7%
Likelihood that the environment will be contaminated in the future	47%
The time period that radioactive waste remains active	46.1%
Ways the waste will be stored	44.5%
The distance underground that the radioactive waste will be buried	41.3%
The adequacy of safety procedures in the operation of the repository	39.8%
Arrangements for transporting the waste to the repository	39.5%
Possible effects on the underground water and rock strata	39.4%
The potential for recovering the waste at some time in the future	38.3%
Advantages/disadvantages of underground storage on land compared to other methods of storing nuclear waste	38.2%
The reasons why Sellafield was chosen for the repository project	37.2%
Responsibility/ownership/who pays for the repository	36.8%

Responses to the question 'which issues would you like more information on?'	Percentage respondents
Current storage arrangements for radioactive waste in the U.K.	31.4%
Length of time it is going to take to build the repository	31.3%

Source: (Priority Search 1993, 51)

4.4.3.4 Social composition of response

Priority Search presented several tables displaying the different issues which different social groups prioritised as important to make the repository acceptable to them. Male and female priorities were broadly similar. Males placed more importance on monitoring and safety of workers than women, possibly due to the greater likelihood that they themselves would work there. Women placed a higher priority on honesty than men (Priority Search 1993 , 18).

4.4.4 Comments and conclusions

The sampling universe employed by Priority Search was more representative of West Cumbria than that used in previous studies, because it involved a wider spread of towns and villages. The sampling methods also appear to be the most likely to arrive at a representative set of respondents, because of the use of quotas of sub-populations according to the most recent census figures.

There are criticisms to be made of the methodology. Non-response is not mentioned in the report. The 939 interviews were only the 'successful' ones (Priority Search 1993, 16). The number of people who were unwilling to express an opinion on the subject, for whatever reason, for example because they were too frightened to talk, or too bored with the whole 'Sellafield controversy', is therefore unknown. Self-selection may have entered the process through this, with only people with stronger views wanting to take part. Without this unknown quantity of non-respondents, the sample is also relatively small compared to the sampling universe. 939 people out of the 168,500 strong population for Allerdale and Copeland is a sample which constitutes less than 0.6% of the population. Another potential difficulty could have arisen from the use of several interviewers, whose individual characteristics could have provoked different results from respondents, although one might perhaps expect that the professionalism of the full-time staff of RAS would minimise this effect.

Another criticism of the study is that once more, the scope of possible responses to questions was limited to the responses offered by the researchers. In addition, because the research

was actually sponsored by NIREX, it might also be expected that there might be a pressure to arrive at results favourable to NIREX. Certainly the questions are phrased in a manner which might produce such an outcome. An example of this is the use of more general, non-personal terms, with provisos which people might not actually believe are really true, such as the question asking respondents whether they agreed with the statement "*Provided that the proposed repository at Sellafield is found to be safe I feel it could be to the benefit of this area (West Cumbria)*". This question may allow the conclusion to be drawn that 68% of respondents think that the scheme would be good for the region, when in reality those 68% may not think that the scheme will even be safe at all. This finding, amongst others, suggested that great care had to be taken in phrasing the questions to be employed in the 1994 study.

This research confirmed earlier reported levels of awareness of the nuclear industry's contribution to the local economy. but made a new distinction by showing how fewer people saw economic benefit from NIREX's presence than had seen benefit from BNFL in the two earlier studies. The number of people who felt that NIREX's presence would be a disadvantage was also higher than that for BNFL. As the first study to investigate attitudes towards NIREX, Priority Search's work revealed an interesting dichotomy between faith in NIREX's intentions, and the existence of doubt over the safety of waste disposal. This differed from attitudes towards BNFL, and thus it appeared that West Cumbrian attitudes cannot be regarded as uniform towards the whole industry, but differ towards different aspects of it. Overall, levels of support for NIREX are less than that for BNFL, although there is more support than opposition for the NIREX proposals.

Another important finding was that there is less knowledge about NIREX than about BNFL. Widespread demands for more information on every topic offered to respondents also support the notion of a hitherto inadequate public information service from NIREX, just as earlier studies had found existed from BNFL. It may be that there is an extent to which NIREX has deliberately kept a low profile, and this notion shall be discussed further in Chapter Six.

4.5 Interim Technical Appraisal Report to Cumbria County Council, Public Perception and the Nuclear Industry in West Cumbria

RESEARCHERS: Centre for the study of Environmental Change /
Environmental Resources Management

DATE OF RESEARCH: March 1993

PUBLICATION: Environmental Resources Management, Oxford, (September
1993)

4.5.1 Overview

Cumbria County Council commissioned the Centre for the Study of Environmental Change (CSEC) from Lancaster University and Environmental Resources Management (ERM) to produce a report to 'provide information on local perceptions of risk as a contribution to the debate in relation to the proposed Sellafield Waste Repository' (ERM 1993, 1). The research was carried out at the same time as the work conducted by Priority Search, and the report given to the council investigated the feelings of West Cumbrians towards the proposed NIREX repository and other possible future developments of the nuclear industry in the locality. The researchers were also able to relate the study to current national and international debates on risk assessment (ERM 1993, 2).

The original aim of the report was different from that of the previous studies in that it sought not to represent either public opinion in West Cumbria or particular sections of West Cumbrian society *per se*, but to show the 'range of variability of meanings' in that population, by use of respondents selected as typical of certain relevant social categories (ERM 1993, 28). ERM's report stressed the complexity of local attitudes, and how different issues were tightly interwoven. The ERM report was presented in a manner which interlinked the separate categories under which the previous studies have been discussed in this report. In order that the analysis of ERM's work should be consistent with that of the previous studies, the findings of ERM have had to be separated into the different sub-headings.

4.5.2 Methodology

The research centred upon focus group discussions, using twelve groups, each containing up to ten local people and either one or two researchers. Focus group research was chosen as a qualitative research method which would allow the investigation of an individual's attitudes

in more depth, and which would allow a more free expression of personal opinions (ERM 1993, 27). The participants were selected for different groups according to the following criteria: occupation; gender; geographical location; and family involvement with the nuclear industry. The groups represented were BNFL apprentices (four groups); farmers and fishermen (two groups); working professionals (two groups) and women and mothers (four groups). The groups came from the areas around Sellafield, Keswick, Cockermouth, Workington, Whitehaven and Seascale (See Map 4.4). Participants were screened to ensure that no-one included had been actively involved in either any pro-nuclear or anti-nuclear campaigns, and to ensure that a broad range of different ages, education, social class and length of time spent living in West Cumbria were also represented. The discussions lasted one and a half to two hours, with the detail of discussion being the prerogative of the local people, but with subjects suggested by the researcher. The facilitators acted 'to ensure that the overall research agenda had been covered' (ERM 1993, 31).

Before the meetings took place, research was carried out into the socio-economic development of West Cumbria, and contemporary and possible future developments of the nuclear industry were examined, in order to understand the socio-economic context in which the debate took place. At each meeting, discussions were tape-recorded and transcribed for later analysis. The research was carried out between October 1992 and March 1993 at Lancaster and in West Cumbria (ERM 1993, 28-31).

4.5.3 Findings³²

4.5.3.1 The perceived economic importance of the nuclear industry

ERM's group work found

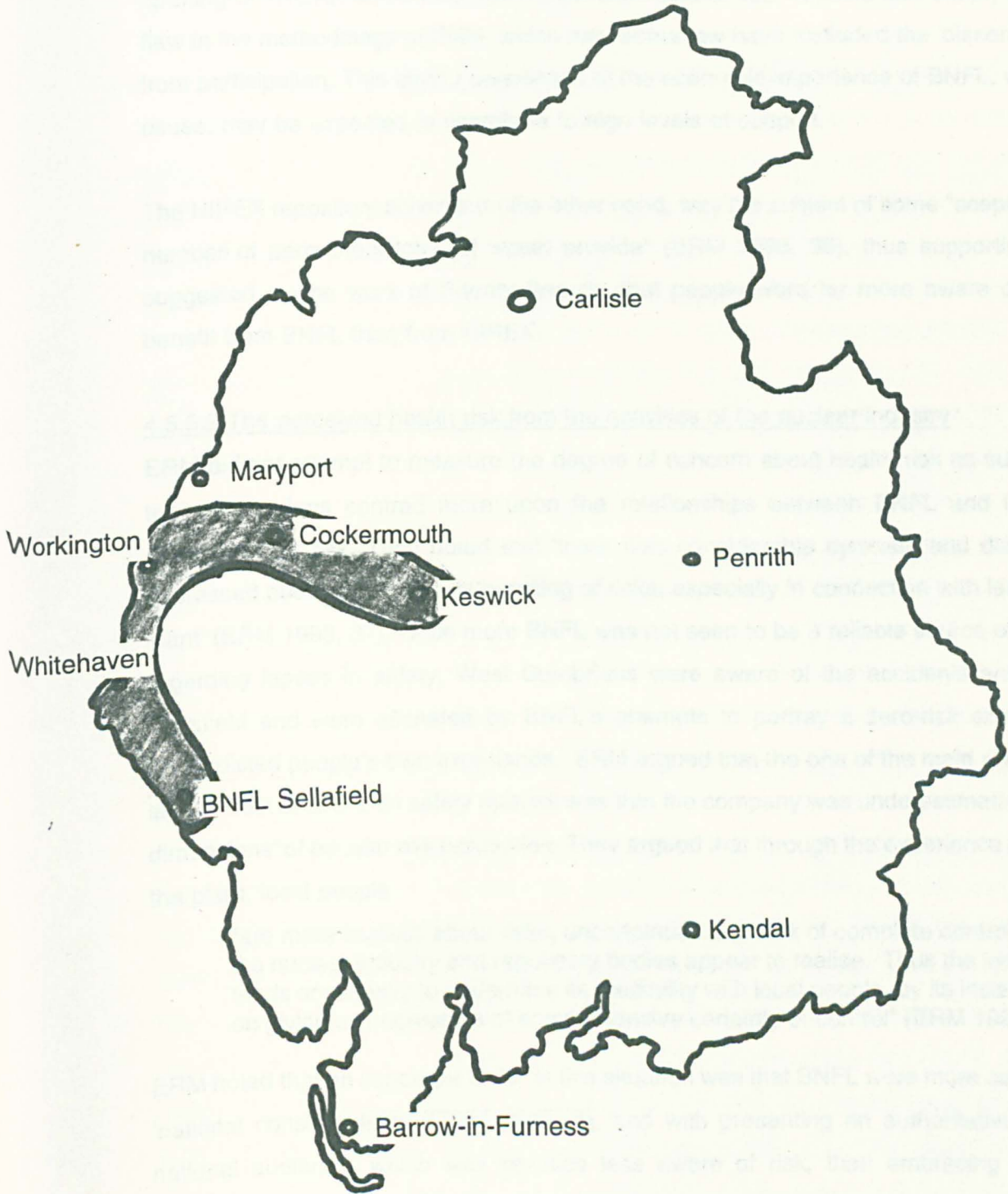
"universal recognition of the crucial role of Sellafield in the local economy. Without the jobs provided there, and the multiplier effect locally, the perception was that there would be nothing" (ERM 1993, 34).

BNFL's role in supplying not only employment but also social events and sponsorship were widely recognised. The opening of THORP, for example, was seen as 'an essential ... source of work in the area, at a time when work was hard to come by' (ERM 1993, 39). This 'universal recognition' of the industry's economic assistance would seem to suggest even higher levels of awareness of economic benefit than that found in earlier research. ERM even

³² As focus group research produces results which are qualitative rather than quantitative in nature, there is little statistical evidence given in the ERM report.

Map 4.4

Area covered by fieldwork, ERM, October 1992-March 1993



(Whitehaven, Workington, Cockermouth, Keswick, Seascale)

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claimed that such awareness was 'universal', whereas the previous studies had all registered some dissenting voices. This difference could be the result of an increased awareness of BNFL's economic contribution due to the recession. The contemporary debate around the opening of THORP could also have heightened awareness. It could also simply be due to a flaw in the methodology of ERM, which may somehow have excluded the 'dissenting voices' from participation. This strong awareness of the economic importance of BNFL, whatever its cause, may be expected to contribute to high levels of support.

The NIREX repository scheme on the other hand, was the subject of some "scepticism at the number of permanent jobs [it] would provide" (ERM 1993, 39), thus supporting the idea suggested by the work of Priority Search, that people were far more aware of economic benefit from BNFL than from NIREX.

4.5.3.2 The perceived health risk from the activities of the nuclear industry

ERM did not attempt to measure the degree of concern about health risk as such. Instead their discussions centred more upon the relationships between BNFL and local people regarding that risk. They noted that 'there was considerable cynicism and disillusionment expressed about BNFL and its handling of risks, especially in connection with leaks from the plant' (ERM 1993, 37). Once more BNFL was not seen to be a reliable source of information regarding lapses in safety. West Cumbrians were aware of the accidents and risks from Sellafield and were alienated by BNFL's attempts to portray a zero-risk situation, which contradicted people's own experience. ERM argued that the one of the main reasons for the lack of trust of BNFL on safety matters was that the company was underestimating the 'social dimensions' of popular risk perception. They argued that through the experience of living near the plant, local people

"are more realistic about risks, uncertainties and lack of complete control than the nuclear industry and regulatory bodies appear to realise. Thus the industry tends continually to undermine its credibility with local people, by its insistence on giving an impression of comprehensive certainty or control" (ERM 1993, 3).

ERM noted that an important factor in this situation was that BNFL were more concerned with 'national considerations' (ERM 1993, 3), and with presenting an authoritative image to a national audience, which was perhaps less aware of risk, than embracing the complex uncertainties with which local people were concerned. As a result, most of the information which West Cumbrians receive will be presented in a manner which alienates them by

ignoring local concerns. People felt 'deceived' when days lapsed before they were informed of events, as they were robbed of the chance to take actions such as keeping their children indoors (ERM 1993, 3). There was also resentment that people were forced to trust BNFL. Nevertheless, there was a 'widespread acceptance that BNFL were genuinely trying to get it right' (ERM 1993, 36).

4.5.3.3 The overall relationship between local people and the nuclear industry

ERM stated that West Cumbrian support and opposition towards the industry was the result of a complex mixture of several factors such as risk, resilience, trust, belief systems, information, and dependency (ERM 1993, 33). They noted that there was an 'apparent general support for the industry' (ERM 1993, 33), but also said that this support was found to be based more upon 'a fatalistic acceptance of the dominant local economic and employment role of Sellafield, with the accompanying risks, in the absence of any realistic alternatives for the area' (ERM 1993, 3). They said that the economic importance of BNFL in the area had created a 'dependency syndrome' whereby the economic importance of BNFL had led many locals to employ the 'burying of a range of personal ambivalences and anxieties about Sellafield, its operations and its implications' (ERM 1993, 3). Support for THORP, for instance, was based more upon the provision of jobs than the acceptance of any other arguments (ERM 1993, 45). ERM also found that for some people, BNFL's economic contribution to the area was not necessarily a good thing, and that the company's public relations money had not succeeded in pacifying their concerns. Instead, BNFL's generosity had 'brought the contrary feeling of encroachment, that it risked leaving few areas of personal and social experience not coloured by the intervention of the company' (ERM 1993, 42).

ERM also found that, amongst some people, there was support for the belief that local knowledge about the nuclear industry was in some way superior to levels of knowledge elsewhere (ERM 1993, 45), perhaps representing a good reason why the industry should be located in West Cumbria. However, like Priority Search before them, ERM suggested that local acceptance of nuclear power is not based upon a particularly deep understanding of nuclear power. 'There was ample evidence of confusion ignorance ... about the industry, its organization, plans and practices'. This confusion extended to the relationships between BNFL, NIREX, THORP and the repository, even amongst BNFL apprentices (ERM 1993, 45).

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ERM found that, as the findings of Priority Search seemed to indicate, locally, the nuclear industry was identified with BNFL, whereas NIREX were viewed as outsiders who had arrived in West Cumbria because it was the only place in the country so subservient to the nuclear industry as to accept their proposals.

"Whereas BNFL was recognised as a long-established local company, NIREX was seen as an outside company that had only finished up in West Cumbria because it had failed to find acceptance elsewhere" (ERM 1993, 39)

Similarly, ERM, like Priority Search, found that the NIREX plans had 'little distinct identity in local people's minds'. Few positive remarks were made about it. Instead, some people were concerned about becoming the world's 'dustbin' (ERM 1993, 4). Several people doubted that the scheme would ever be realised (ERM 1993, 39).

4.5.3.4 The relationship between local people and national bodies

Supporting the findings of Macgill and Phipps in the early 1980s, this report found that Greenpeace was seen to be an effective watchdog body which could guard the nuclear industry better than any government agency. Once more, Greenpeace's actions were also often seen to be 'extreme' (ERM 1993, 37), and ERM concluded that support for Greenpeace thus 'appears to be more a reflection of the fragility of trust in 'official' regulatory institutions than of any assumption of 'reliability' or 'objectivity' by Greenpeace, as a watchdog' (ERM 1993, 3).

West Cumbria's relationship with the rest of the country was felt to be one in which Cumbria was

"stigmatised in the eyes of the rest of the country by its perceived servile dependent relationship with the nuclear industry come what may. This is exacerbated by the perception that West Cumbria has become the only place in the country compliant and dependent enough to accept it" (ERM 1993, 4)

This was especially true of the acceptance of the radioactive waste repository.

Local people were also aware of the isolated and depressed nature of West Cumbria, seeing its transport links with the rest of the nation as poor, and the area's appearance as 'run-down and decrepit' (ERM 1993, 34). ERM found that there was 'a brooding and recurrently observable resentment' at the poor physical and social infrastructure in the area, and at the

lack of government action to rectify the situation and compensate for the presence of the nuclear industry (ERM 1993, 4). This combination had facilitated the development of 'a sense of injustice and even humiliation' (ERM 1993, 34). ERM noted the stoicism of West Cumbrians in reaction to this situation, and the presence of 'a sense of toughness and down to earth pragmatism borne of a local history of hazardous work such as coal-mining and seafaring' (ERM 1993, 34). The industry's controversial presence was found to have facilitated the evolution of a local identity of united resistance to the rest of the nation, 'expressed sometimes as a feeling of pride in carrying a burden of risk for the rest of society' (ERM 1993, 34). However ERM commented that with the nuclear industry possibly about to expand in the area through THORP and the RCF, investment in communications, higher education, and retraining might be needed to alleviate any increase in feelings of neglect and stigma (ERM 1993, 61)

4.5.3.5 Levels of political activity

As people who had taken part in campaigns on the issue of nuclear power had deliberately been precluded from participation, a low level of political activity was perhaps to be expected in ERM's study. Amongst those who had been allowed to take part, a feeling of impotence was again noticeable. ERM noted an extent to which this disempowerment was partly self-inflicted - people seemed to employ a psychological mechanism which was used to

'shut out threatening forces and issues ... almost any development, however large and uncertain, could be fenced off psychologically by the determined assertion that it would 'not affect me' (ERM 1993, 60).

The NIREX scheme, for example, was 'perceived as distant and barely relevant in personal terms, even by those who live close to the potential site' (ERM 1993, 4). This boundary construction would remove the threat which could otherwise be the catalyst to political action - if people do not perceive issues as being anything to do with them, there is little incentive for them to become politically involved. ERM also found a 'striking inability to articulate long term perspectives, in all the groups' (ERM 1993, 41), which they felt to be consistent with the 'defensive retrenchment of people's horizons' (ERM 1993, 41). If people did not look at the long term then they would not get concerned about the future of a radioactive dump in the area. It was also noted that there was a 'frequently expressed view' that the implications of the nuclear industry's presence 'was never far from people's minds , but that it was not much talked about' (ERM 1993, 35). This would seem to support this notion of a suppression of concern.

4.5.3.6 Social composition of responses

ERM found that people in social classes A/B/C1 ('middle class') felt less dependent upon BNFL than those in C2/D ('working class'), reflecting feelings of 'greater freedom and flexibility' in the choice of their place of residence. However, this freedom had led to an unwillingness to criticise the industry, as they had chosen to live here, or at least could leave if they objected that strongly. C2/D responses tended to be more forthright in voicing concern about the risk which the industry brings. All groups shared the same feelings of powerlessness to actually influence anything (ERM 1993, 43-44). ERM did not observe any difference in levels of concern between genders.

It was noted that the geographical location of respondents was important in terms of psychological boundary construction. They found 'a sharp division' between the West Coast and areas further inland, with people in Keswick seeing themselves as distinct and separate.

"The respondents in Keswick, in the Lake District National Park but not much more than twenty miles from Sellafield, spoke of the West Coast as if it were completely separate from them"(ERM 1993, 41).

Similarly, farmers at St. Bees felt safer than those people even closer to Sellafield than themselves.

4.5.4 Comments and conclusions

There are several strengths to this work. It was not sponsored by any of the major protagonists in the debate, and the use of focus groups provided qualitative insights unavailable in the previous studies. Tape recording of meetings and subsequent use of transcriptions for study should also have facilitated more precise analysis of responses (ERM 1993, 28). The use of free discussions by focus groups avoids many of the methodological problems of the more quantitative studies, such as the tendency to use directional questions, but there is a possible problem in this research, because although the detail of discussion was at the discretion of participants, 'core subjects [were] introduced by the facilitator' (ERM 1993, 28) in each meeting. This procedure could be seen to incur another variant of the directional question problem, because the discussions were led to topics of interest to the facilitator, topics which might not necessarily be at the forefront of local people's minds when the subject of nuclear power is mentioned.

Other problems with ERM's study include the fact that, as with many qualitative studies, the sampling ratio is very small. 120 people from the total population of the chosen towns (68,750) is a ratio of only 0.17%. The use of different facilitators, each with different personalities might have produced different responses in different groups. Another problem is that the groups chosen seem to limit somewhat unnecessarily the 'broad cross-section of social experience' which the researchers had sought to investigate. For example, it is hardly conducive to the creation of a 'broad range' to have a third of participants come from one social group, as ERM did, using four groups of BNFL apprentices out of the total of twelve groups³³. Representation of sub-populations within the groups was attempted, but no reference was given as to how closely these actually mirrored the constitution of the local populace. The preclusion of people with strong views from participation also meant that even the groups which were selected did not contain the people who would have been at the polarities of the 'range' of local attitudes. The resulting apparent 'universal' appreciation of the industry's economic contribution, when compared to the dissenting voices heard earlier, warns once more of the importance of methodology in determining the outcome of research findings. Another problem, which applies to all qualitative surveys, is that analysis of the substantial amount of data generated relies upon the researcher's own objectivity. ERM appear to have used no check, other than the researcher's own morality, to ensure that bias and preconceptions did not distort the analysis. This may have caused problems, for sub-conscious prejudices may not be eliminated by deliberate self-censorship.

ERM's research reaffirmed the notion of a public highly aware of the industry's economic contribution to the area, but, like Priority Search's work, it also found lower levels of recognition of economic benefit from the repository proposals than for reprocessing. Once more, general support for the industry was found. Like Macgill and Phipps, ERM stressed the importance of economics in determining support. They felt that the socio-economic situation in West Cumbria was very important, and that the apparent 'nuclear friendliness' of West Cumbria

³³ The 'range and variability of meanings in the population at large' which the research aimed to explore (ERM 1993, 28) might have been better accomplished by introducing more variability into the groups - perhaps a group of more experienced BNFL employees, or a group containing only people working in the tourism industry (rather than these people being a small proportion of the 'catch all' category of 'working professionals') or even a group of local 'A' level students and young workers, who represent the future for West Cumbria but who might (and do) leave the area if the region's prospects are seen to be poor.

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"needs to be interpreted with real caution; it may reflect recognition of dependency rather than more positive endorsement" (ERM 1993, 33).

A new contribution to the analysis of risk was the suggestion that dependency on the industry had led to the sub-conscious burying of fears.

ERM provided more evidence of poor communications from the industry, and added a new and important dimension, namely that the industry was making the situation worse by ignoring both local concerns and the local acceptance of risk, and that at the same time, BNFL risked over-publicizing, and invading too many aspects of West Cumbrian life. The theory that environmental groups were valued for the 'watchdog' service they provided over an untrustworthy industry, rather than for their own objectivity was also significant.

The fact that people in social classes C2/D were more critical of the industry was another useful observation, while the fact that people living further from Sellafield were apparently able to construct psychological barriers from the industry was very important, both in terms of understanding risk perception, and in organizing the sampling of future studies.

Other key findings were the feelings of pride in bearing the nuclear burden for the nation, and that local people believed that the area had an above average knowledge of the nuclear industry, despite the simultaneous lack of knowledge shown by participants. Both these factors could help account for the 'nuclear friendly' appearance of West Cumbria.

4.6 Other research

4.6.1 BNFL-sponsored research

Other, national, surveys have also investigated public attitudes towards nuclear power. It was decided that the more recent of these studies could provide a view of national opinion with which to contrast the attitudes of people in West Cumbria.³⁴

Amongst these studies, BNFL themselves have commissioned a regular poll, carried out every three months, which has found the continued existence of a bare majority in favour of nuclear power (except for the immediate post-Chernobyl period). This support does not appear to have a guaranteed long term future though, because between 1984 and 1989, the same research found that the proportion of respondents in favour of maintaining or expanding current levels of nuclear power had fallen from just over 50% to 40%, whilst those seeking to eradicate or reduce nuclear power had climbed from 30% to 45%. These national figures were different to the higher levels of support and lower levels of opposition found in the West Cumbrian studies.

The same BNFL-sponsored research also contrasted strong opinions towards nuclear power and other power sources (Table 4.4). It found that 'only nuclear power arouses strong antagonism, and it also has the lowest number of enthusiastic supporters' (Harding 1990, 32).

Table 4.4 Public attitudes to fuel sources, 1986-89

	1986	1986	1989	1989
Fuel	In favour	Against	In favour	Against
Nuclear	7%	33%	7%	29%
Hydro	61%	1%	66%	1%
Coal	62%	1%	28%	3%
Oil	47%	3%	22%	4%

Source: (Harding 1990, 32)

³⁴ Obviously there are limitations to the extent to which responses to these surveys could legitimately be contrasted with responses to the existing academic studies and to the new survey conducted in 1994. The phrasing of questions was not identical, and there would be differences in the methodology employed in conducting the pieces of research, but nevertheless, they addressed the same basic issues, and so the results are worth noting.

4.6.2 Gallup polls

The opinion pollsters Gallup have also conducted research into attitudes to nuclear power. The relevant questions and response rates from recent Gallup polls are displayed in Tables 4.5 to 4.11 below.

One set of results (Table 4.5) appears at first glance to contradict the first findings of the BNFL-sponsored poll. Where BNFL found a bare majority in favour of nuclear power, Gallup found that far more people opposed any growth in the number of nuclear power stations than supported such a development.

Table 4.5 Public support for new nuclear power stations, October 1992

"Do you have the impression that most people in Britain support or oppose the growth of nuclear power stations? Would you say that you support or oppose the growth of nuclear power stations?"

Opinion	Most people	Self
Support	9%	18%
Oppose	64%	62%
Don't know	27%	20%

Source:Gallup report #387

As the Gallup figures are more recent than those of BNFL, this change could confirm the decline in support for nuclear power found in BNFL's study, but it could merely be that the phrasing of the questions might have led to different results. BNFL's question asked for people's opinions on *maintaining* or expanding nuclear power. Gallup's asked only about *expanding* it. It could be that many people, who do not wish to expand the number of power stations, are happy with the status quo, and do not want to see the number of power stations reduced from its present level either. Another interesting point to be note was that perceived levels of support for expanding nuclear power amongst other people were lower than actual levels of support.

Gallup asked questions about renewable energy sources, which confirmed the high levels of support for such energy sources found by BNFL.

Table 4.6 Public support for renewable sources of energy, August 1991

"Would you prefer to see a greater proportion of your power coming from these 'renewable' sources, even if some are slightly more expensive than traditional fuel sources?"

Response	Percentage respondents
Would prefer	77%
Would not prefer	9%
Don't know	14%

Source: Gallup report # 373

When asked which renewable source was the most favoured, wind and solar power received most support.

Table 4.7 Public support for particular renewable sources of energy, August 1991

"Which of the following types of 'renewable' energy do you think the U.K. ought to develop?"

Resource	Percentage respondents
Wind	53%
Wave	36%
Solar	52%
Something else	2%
None of these	11%

Source: Gallup Report #373

Gallup also examined the advantages and disadvantages of nuclear power, a subject which had not been looked at in the West Cumbrian studies, but which could prove to be useful in understanding overall dispositions towards nuclear power. As Table 4.8 shows below, the main advantages perceived by the national public were economic ones - longevity of supply, cost and employment, but there were also a number of environmental advantages. Safety was not seen to be an advantage by many people. As Table 4.9 shows, poor safety and

environmental concerns were named as disadvantages by more people than named them as advantages. A minority of people also criticised the cost of nuclear power.

Table 4.8 Public awareness of the advantages of nuclear power, June 1991

"From what you may know, or have seen or read, which of these do you believe are the main advantages of using nuclear power stations to generate electricity?"

Advantage	Percentage respondents
Limitless source of energy	36%
Produces cheap electricity	35%
Brings local employment	33%
Quiet	23%
Produces no pollution	14%
Safe	7%
Needs little land area	6%
Can be built quickly	5%
Easily sited in the landscape	3%
Little local disruption during building	3%
Other	0%
None	11%
Don't know	12%

Source: Gallup Report #371

Table 4.9 Public awareness of disadvantages of nuclear power, June 1991

"And which do you believe are the main disadvantages of using nuclear power stations to generate electricity?"

Disadvantage	Percentage respondents
Risk of catastrophic failure	58%
Dangerous to health	56%
Pollutes the environment	41%
Looks ugly, spoils the landscape	31%
Cannot be near towns or villages	27%

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Disadvantage	Percentage respondents
Much local disruption during building	13%
Takes up a lot of land	13%
Produces expensive electricity	10%
Unreliable, not always working	8%
Noisy	6%
Other	1%
None	2%
Don't know	8%

Source: Gallup report #371

Another question examined attitudes to environmentalists. Most people thought they were reasonable, but nearly a fifth thought that they were extremists (Table 4.10)

Table 4.10 Public attitudes to environmentalists, August 1991

"Think about the people who are actually involved in groups that are concerned about environmental issues. Do you think most of these people are reasonable people, or are most of them extremists?"

Response	Percentage Respondents
Reasonable	68%
Extremists	18%
Depends	9%
Don't know	5%

Source: Gallup report #373

Another interesting question from Gallup asked about some environmental acts which respondents might have carried out. As Table 4.11 shows, most people had taken part in environmentalism at the basic level of green consumerism, but, like the passive levels of interest in the nuclear industry found in the early West Cumbrian studies, this was not matched by a high level of more political environmentalism.

Table 4.11 Levels of public environmental action, March 1992

"Have you, yourself, done any of the following things in the past year?"

Action	Have done	Have not done	Can't remember / refused	Don't know
Avoided using certain products that harm the environment	75%	21%	4%	0%
Been active in a group or organization that works to protect the environment	10%	88%	2%	1%
Voted/worked for candidates because of their position on environmental issues	10%	87%	2%	1%

Source: Gallup Report # 382

4.6.3 Conclusions

As non-academic studies, there was little theory given with these results. Nevertheless, the results are worth remembering because they provide valuable data on national opinion which could be contrasted with West Cumbrian opinion in the 1994 study. This could be done in order to find out whether West Cumbria really is an atypical area of the UK. By contrasting these results with the existing West Cumbrian studies there is already evidence of a difference. National levels of general support for nuclear power are lower than the levels of support for BNFL found amongst West Cumbrians. National environmental concern however, like West Cumbrian interest in nuclear power, seems to manifest itself at a passive level, rather than an active political one.

4.7 Overall conclusions about existing research

Several points emerge from the various pieces of research:

- Overall, the local populace expressed a wide range of attitudes towards the nuclear industry, which cannot be pigeonholed easily. People's attitudes to risk and the economic value of BNFL must be understood within the social and economic context of West Cumbria.

- The local populace appears to be keenly aware of the economic contribution which the nuclear industry brings to West Cumbria. Many local people feel that they themselves benefit directly from the industry's presence, and many more are aware of the contribution made to the community as a whole. BNFL are seen to bring economic benefit by more people than think NIREX bring economic advantages. There is a minority who think that the industry brings economic harm to the area.

- There is a lack of knowledge about who exactly NIREX are, and what they do. Indeed, there is a lack of knowledge about the nuclear industry in general which does not match up with a local perception that West Cumbrians are particularly knowledgeable about nuclear power.

- There is widespread concern about the health and safety implications of the industry's presence. Levels of concern over health risks vary, and tend to be less intense than perceptions of economic benefit. Perceptions of risk may be affected by a local culture which includes a considerable element of stoicism, and also by the construction of psychological boundaries between respondents and the potential risk. Women appear to be more concerned than men. Official reassurances appear to be failing to convey the message of safety to those in most need of reassurance. No source of information is perceived as completely reliable by the majority of West Cumbrian people.

- On the whole, most people seem to support the presence of BNFL, and more people support NIREX than oppose them, perhaps trading off potential harm against present economic benefit.

- Environmental groups are valued as watchdog bodies, but there is concern about the 'extreme' nature of some of their activities and the reliability of their information.

- Despite a high level of passive interest, the number of respondents participating in political activity is low, perhaps due in part to people seeing the nuclear debate as something which does not concern them, and in part to feelings of political impotence. There are a minority of people who do feel very strongly about the industry's presence.

- There are minor faults with the methodology of each of the studies, amongst the most notable being the distortion which slight changes in the phrasing of questions can cause and the effects that changes in the sampling area and sampling quotas may bring. There is also a problem which arises from the fact that each piece of research is designed with its own agenda for study. Whether it be risk from reprocessing or risk from the proposed repository, each study is directed to a topic which is not necessarily the primary concern of local people. True enough, local people may be concerned about the risk from Sellafield, for example, but it may not be something about which they are so concerned that it intrudes into their everyday lives. The concerns of researchers may thus lead to results which reflect artificially aroused levels of support or opposition to the nuclear industry. The next chapter outlines how the analysis of methodology of existing research was used to improve the methodology of the 1994 fieldwork.

- There are differences between national and Cumbrian attitudes to nuclear power, with support higher amongst West Cumbrians and opposition higher amongst the national public. As later chapters shall discuss in more detail, this may have an important impact upon the nature of the nuclear industry's public relations campaigns.

Between them, the above studies outline a wide range of trends which are present within West Cumbrian attitudes, giving some statistical insights into levels of feelings, and also some qualitative reasons behind the formation of those opinions. The cumulative effect of this research has been to change the popular image of West Cumbrians from one of an anxious and unsympathetic population, very concerned about the health risk from BNFL (as portrayed in the media before this research began), to one of a public which is supportive of the presence of the industry, being very aware of its economic contribution rather than overly conscious of potential health concern (although genuine concern does exist). There is a chance however, that the methodological flaws in these studies may mean that even this is still a distorted picture of local attitudes. The following chapters shall seek to clarify the picture yet further.

Chapter Five

Methodology of the 1994 Fieldwork

5.1 The choice of area to be studied

Having analysed the methodology of existing research, the next step was to decide upon the techniques to be used to discover how West Cumbrians regarded the nuclear power industry in 1994, and how to examine the potential impact of different campaigning groups. This chapter examines the techniques chosen, in the light of academic literature on research methodology. A series of questions about the nuclear power industry were to be put to a representative sample of the population of a West Cumbrian town, with responses analyzed for any observable trends, and for any similarities or differences from existing research. A study of a single town was decided upon because limitations of time, finance and personnel meant that any larger scale study of the whole of West Cumbria could not be accomplished with adequate rigour regarding the representation of all sub-populations. In order for a single town to be of use in assessing broader Cumbrian attitudes, the choice of the location to be surveyed required considerable thought. As noted in Chapter Four, much of the previous research into public opinion in Cumbria has tended to focus upon the attitudes of people living closest to Sellafield. This tendency may have had the effect of producing results which are atypical of the whole of Cumbria, because it may be that the population of the area immediately around Sellafield receive more economic benefit from the industry's presence, and are consequently more dependent upon the nuclear fuel cycle, and more supportive of it, than elsewhere in the county. Close proximity to the site may also have had the accompanying effect of driving away people who were really worried about the risks from nuclear power. It is important to understand the attitudes of people living outside BNFL's immediate sphere of influence. Although they might not share any possible risks or benefits to the same extent as those living immediately around Sellafield, they will surely share enough of the costs should there ever be a major accident. Map 5.1 illustrates how, if, for any reason, an evacuation identical to that at Chernobyl were required around Sellafield (however technically improbable that event may be) the evacuation of a similar 20 miles radius would include areas such as Cockermouth and Keswick, which were relatively neglected by earlier research compared with places such as Seascale. It could also be argued that people's opinions from areas outside of the west coast also have a right to be heard on economic grounds, for the whole county may share a 'nuclear stigma' which could deter investment and tourism. Finally, the views of the county beyond the immediate vicinity of Sellafield are also important at a political level, because decisions such as whether to allow the NIREX repository to go ahead will be decided at a county council level by representatives from both east and west of the county, and so it is important to understand the nature of public opinion in areas

Map 5.1

20 miles radius around BNFL Sellafield



other than Copeland, because Copeland is but a minority within the county council. Bearing in mind that ERM had noted how respondents in Keswick saw themselves as very different from the west coast, it was decided to choose a location further away from the site, where people may be more able to create mental barriers to 'forget' about any risks, and to externalise the site as being 'a long way away from them', and yet which was still near enough to Sellafield to feel the immediate presence of the nuclear industry. The town chosen for the study was Cockermouth (see montage overleaf). It had been included in previous works such as Macgill and Phipps (1987) but it was rarely central to the research. It was felt that there was good cause to focus upon Cockermouth. Sited only twenty miles from BNFL's Sellafield site, and less than two miles from the Lake District National Park, within easy reach of Bassenthwaite Lake, Ennerdale, Crummock Water, and Loweswater, Cockermouth can be seen to embrace the dichotomy of Cumbrian culture - on the one hand, the attitudes of the industrialised west coast, and on the other the rural traditions and attitudes of the Lake District. Because it is not immediately adjacent to Sellafield, Cockermouth is not as dependent upon the nuclear industry as those towns in Copeland which surround the site, such as Whitehaven or Seascale, might be. Yet, on the other hand, there are still a sizable number of people who do work at the Sellafield nuclear reprocessing plant, and in other parts of the West Cumbrian nuclear power industry, and so the town is far from detached from the industry.

Taken in a direct one-on-one comparison, the opinions of the population of Cockermouth might not mirror precisely those of any of the more industrial towns such as Workington and Whitehaven. Nor would they imitate exactly those of towns more geared to the tourist industry such as Keswick. However, it was felt that, as a 'half-way house' which contained aspects of both cultures, Cockermouth might represent the aggregate of West Cumbrian opinions better than any other urban centre could do, and that this study would therefore be more representative of the whole of West Cumbria than previous studies such as Macgill and Phipps and Macgill, which were over-representative of the 'company towns' in the area around Sellafield.

To provide further context for this study, there now follows a brief outline of the town at the centre of this study.

5.2 Cockermouth

Like the county in which it sits, Cockermouth has declined in the last hundred years from a previously grand status. Once the second most important conurbation in Cumberland (the only borough to Carlisle city), the town had regular parliamentary representation from 1640 but this ended in 1880 (Bradbury 1981, 123-25). Cockermouth's political status grew from its commercial heart. Henry III had granted a charter for a market in 1221, great Whitsun and Martinmas hiring fairs brought more trade to the town from 1349, and by the seventeenth century, Cockermouth's markets were the centre of commerce for the whole county (including the trade of the west coast ports), (Bradbury 1981, ix). As industrialisation changed the nature of shopping in the twentieth century, this trade declined. The hiring fairs also ceased in 1950 (Cockermouth Urban District Council 1971, 7). With a great supply of water power from the rivers Derwent and Cocker, which converge at its heart (see Map 5.2), Cockermouth was once also a great centre of industry. In the nineteenth century many mills lay not only along the two rivers, but also along their tributaries, Tom Rudd Beck and Bitter Beck (Bradbury 1981, 167). However, as time progressed, and the spending power of local people fell and other regions offered more attractive sites for investment, most of the mills closed too. Even in the last decade, Cockermouth has lost Millers footwear factory, and Costain Petrochemical Limited, leaving only James Walker & Co Ltd (manufacturers of industrial packing and jointing) and Jennings Brewery as major employers in the town. The creation of the Derwent Mills Industrial Park (on the site of Millers Shoe Factory), the Lakeland Business Park, and Strawberry Howe Business Centre on the outskirts of the town have been of some assistance in recent years (Economic issues in Allerdale 1993 3:6), but these new enterprises are primarily small businesses, which will not create great numbers of jobs (Business and Industry Review 1993, 2-8).

With the decline of the town's industrial base, residential patterns have also changed. For much of its history, the lives of Cockermouth's inhabitants centred upon the banks of the two rivers, and upon the agricultural markets which took place in the town centre. In the last half century, increased car ownership has allowed people working in the coastal towns to commute from less industrialised places such as Cockermouth to their workplace, and the town has developed a new role, as 'a dormitory serving the industrial belt to the west' (Bradbury 1981, ix), an industrial belt which includes Sellafield. Accordingly, the town has expanded substantially in the last half century, with the development of the Castlegate, Towers Lane,

COCKERMOUTH

Gem Town of Cumbria

The ancient town of Cockermouth is set in attractive countryside on the fringe of the Lake District National Park at a point where the River Cocker joins the River Derwent.

The historic town of Cockermouth has long held an attraction for writers, poets and artists, which makes the town a natural setting for the annual Cockermouth Festival held in July.

It is one of the 51 towns in Great Britain listed as 'gem' towns, recommended for preservation by the state as part of the national heritage.

Tree-lined Station Street, Market Place and the broad attractive Main Street, complemented by Old Kings Arms Lane and Lowther Went are the principal shopping areas, where all tastes and needs are well catered for.

The new Cockermouth Guide is available from Cockermouth T.I.C., The Printing House and the New Bookshop.



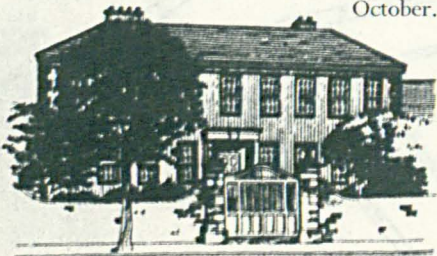
Cockermouth
Information
Centre,
Town Hall
0900 822634

WORDSWORTH HOUSE

Wordsworth House is a fine Georgian town house, built in 1745 for the Sheriff of Cumberland.

It later passed into the Ownership of Sir James Lowther (1st Earl of Lonsdale) who let it to his Estate and Law-Agent, John Wordsworth. Here all five Wordsworth children were born, including the Poet Laureate, William, on 7th April, 1770, and his sister Dorothy, on Christmas Day 1771.

The house is open to the public from April to October.

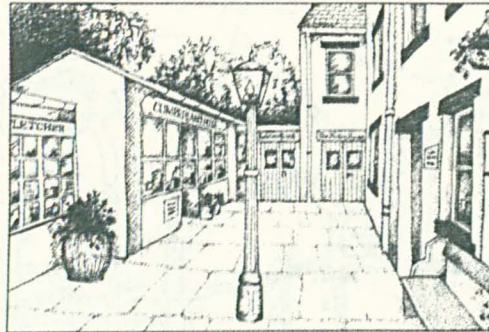


COVER PICTURE - LEN ROOPE

THE PRINTING HOUSE

The Working Museum of Printing is set in a building which dates back to the 16th Century. On display is a varied and interesting range of historical presses and equipment, the earliest, a Cogger press, dated 1820.

The range of presses includes an Imperial press, two Columbians, two Albions, a Jones press, Cropper Minerva, an Arab and a Wharfedale, and a hot metal section with Monotype and Linotype. Visitors are offered the opportunity to gain 'hands on' experience by using the presses displayed, to produce cards or keepsakes. The Museum aims to cater for many tastes, the large varied and ever-changing displays will appeal to both young and old alike.

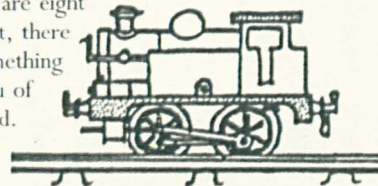


THE TOY MUSEUM

The Museum exhibits mainly British toys from c1900 to the present. There are many visitor operated displays including 0 and 00 vintage trolley trains, Scalextric cars, Lego models and even a helicopter to fly. Famous names include: Hornby trains, Meccano, Triang, Sutcliffe boats, Lego, JEP, Bayco, Minic, Airfix, Pedigree, etc. There are prams, dolls houses, a railway in both a 'loft' and a garden shed.

There is a family quiz to do and small children can find the little teddy bears or play with the wooden bricks.

Whether you are eight or eighty-eight, there should be something to remind you of your childhood.



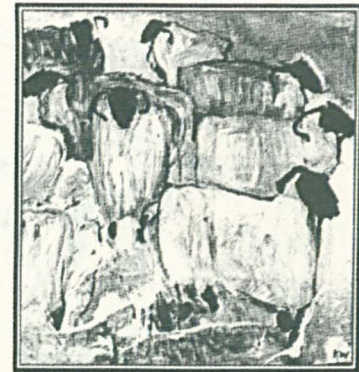
OPEN:
Mon.-Sat.
10am to 4pm.
Wheelchair
access - help
available.
0900 824984

OPEN:
1st Feb. to
30th Nov.
every day
1000 to 1700.
Dec. & Jan. by
appointment.
Parties
welcome at
any time,
including
evening visits,
please phone
first.
Admission
charge.
0900 827606

CASTLEGATE HOUSE

This listed Georgian house and garden, built in 1739 and situated opposite the entrance to Cockermouth Castle, contains original paintings, ceramics, sculpture and glass. Being also the home of the owners, the atmosphere is one of friendliness and warmth.

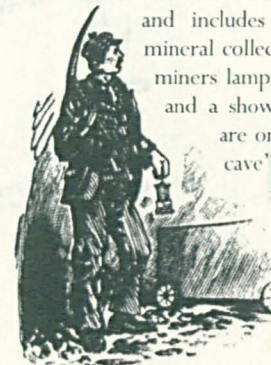
Exhibitions change monthly and the future programme is available on request (telephone 0900 822149). The annual 'Secret Garden' show in June when the garden is open, weather permitting, is especially popular. You are invited to browse among the works of art and to consult the many art books and magazines. Advice on purchases is freely given without obligation, and interest-free credit is normally available through the Northern Arts Art Purchase Plan.



MINING MUSEUM

Mining for minerals in Lakeland and Northern England dates back to Roman times. These minerals and rocks which include Andesite, Shap Granite, Garnet and Cumberland Green Slate come in many beautiful shapes and colours.

The Creighton Mineral Museum comprises a collection of Northern England minerals and includes the late Wm. Shaw's mineral collection. Also on display are miners lamps, tools, old photographs and a show of fluorescent minerals are on display in the 'Aladdins cave'. The Museum shop stocks minerals and fossils for sale, also jewellery, original paintings, photographs and crafts.

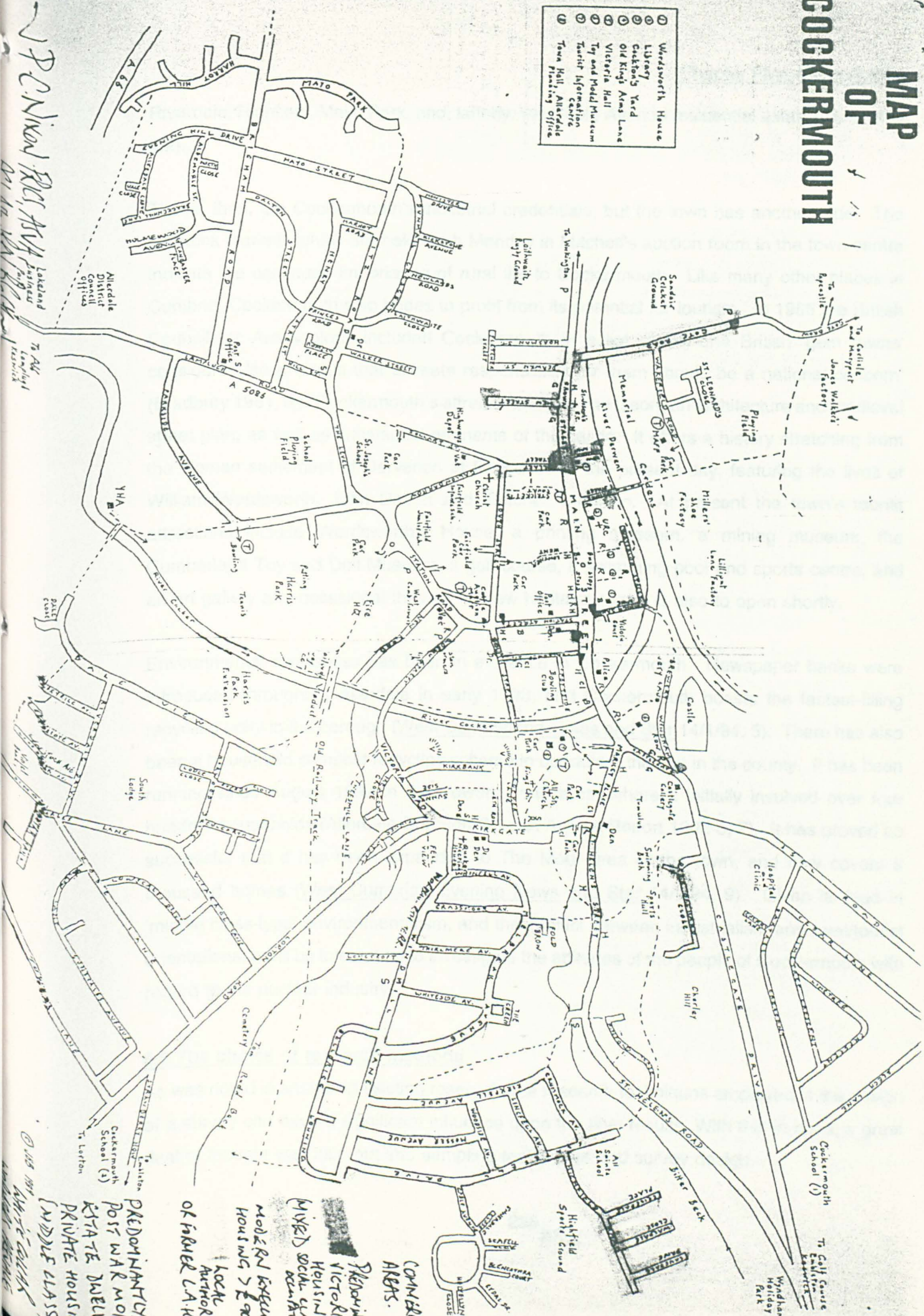


OPEN:
1 March-24
December
each day
except
Sundays and
Thursdays.
10.30am until
5pm (Wed.
7pm).
Admission free
0900 822145

OPEN:
10am-1.00pm
2pm-5pm.
Closed Sunday
and Monday.
0900 828301

MAP OF COCKERMOUTH

- ① Waterside House
- ② Library
- ③ Cocker's Yard
- ④ Old Kings Arms Lane
- ⑤ Victoria Hall
- ⑥ Top and Model Museum
- ⑦ Tourist Information Centre
- ⑧ Town Hall, Alameda Planning Office



J.P. C. Nixon, R.I.C., A.S.A. Assistant

PREDOMINANTLY POST WAR MOD ESTATE DWELL PRIVATE HOUSIN [MIDDLE CLASS]

MODERN EXTEN HOUSING > 2 or 3 LOCKS AUTHOR OF IRMER L.A.H.

COMBIC AREAS. Predomin Victoria Housing. MIXED SOCIAL CLAS

Cockermouth School (1) To Call Gause Caldbeck Wyndham Holiday Park

© 1988 1989 A.S.A. Cocker

Riverdale, Highfield, Mayo Park, and, latterly, the Gable Avenue residential estates (See Map 5.2).

These, then, are Cockermouth's industrial credentials, but the town has another side. The livestock markets which are held each Monday in Mitchell's auction room in the town centre indicate the continued importance of rural life to Cockermouth. Like many other places in Cumbria, Cockermouth also hopes to profit from its potential for tourism. In 1965 the British Council for Archaeology included Cockermouth in a list of fifty-one British 'gem towns' considered 'so precious that ultimate responsibility for them should be a national concern' (Bradbury 1981, ix). Cockermouth's attraction was its fine Georgian architecture and medieval street plan, as well as substantial remnants of the castle. It offers a history stretching from the Roman settlement of Derwentio at Papcastle to the present day, featuring the lives of William Wordsworth, John Dalton and Fletcher Christian. At present the town's tourist attractions include Wordsworth's House, a printing museum, a mining museum, the Cumberland Toy and Doll Museum, a golf course, a swimming pool and sports centre, and an art gallery and occasional theatre. A new heritage centre is also to open shortly.

Environmental awareness has been in evidence in Cockermouth. Newspaper banks were introduced throughout Allerdale in early 1993, and Cockermouth boasts the fastest-filling recycling point in the borough (West Cumberland Times and Star 14/1/94, 5). There has also been a household compost recycling scheme in operation, the first in the county. It has been running since August 1992 in the Towers Lane area, where it initially involved over four hundred households (Allerdale Borough Council Annual Report 1992-3, 7). It has proved so successful that it has been expanded to The Moor area of the town, and now covers a thousand homes (West Cumbrian Evening News and Star 14/1/94, 9). Given its lead in 'middle class-type' environmentalism, and the conflict between industrialism and rural/tourist orientations, it will be interesting to investigate the attitudes of the people of Cockermouth with regard to the nuclear industry.

5.3 The choice of research methods

As was noted in analysing existing research, the research techniques employed in the design of a survey can have a significant influence upon the final results. With this in mind, a great deal of thought was also put into sampling techniques and survey design.

5.3.1 The sampling universe

"The principal object of any sampling procedure is to secure a sample which, subject to limitations of size, will reproduce the characteristics of the population, especially those of immediate interest, as closely as possible."
(Yates 1981, 9)

There are several ways in which a sample may fail to represent accurately the wider population from which it is drawn. All are based upon the simple fact that if any group present in the wider population is excluded from the sample, or has a diminished chance of inclusion within a sample which is otherwise randomly selected, the sample may produce results which fail to represent the whole population accurately (Clegg 1990, 115; Slonim 1968, 37; Huff 1973, 25).

There are several examples of sampling techniques which have led to people being excluded from surveys due to a discrepancy between the 'sampling universe' (those individuals who are available for selection), and the actual population which is intended to be surveyed. For example, a telephone survey would have a sampling universe containing only those people with the money and inclination to own a telephone, and would also exclude ex-directory numbers. A significant number of people, although resident in the location to be studied, would thus effectively be barred from the sampling universe. Other sampling techniques with similar problems include postal surveys (which contain in their results only those who feel strongly enough about the issue to be bothered to reply); systematic samples of the electoral roll (which would not feature those who have 'disappeared' from the electoral register in recent years in order to avoid paying the community charge); and town-centre surveys (which tend to exclude the elderly or housebound who might not venture into the town centre very often, and which might perhaps also over-represent some people who particularly want to answer questionnaires, and actually make a concerted effort to walk nearer the researcher in order to do so). A more salient example was the study by ERM which specifically precluded those who had participated in political action over nuclear power, as well as those from social categories outside the chosen focus groups. All these methods in one way or another run a very high risk of producing distorted conclusions. It was decided therefore, not to use any of these methods, but instead to have a sampling universe which included everyone in

Cockermouth. This was to be achieved by randomly visiting a sample amount of addresses in Cockermouth from a list from which no household would be excluded³⁵.

5.3.2 Sampling methods

Once the sampling universe has been established, there are two main paths which may be followed in an attempt to create a representative sample - regulating selection in some way, or trying to leave it to random methods. Taken to their extremes, both of these methods have problems. Deliberate selection of respondents in 'focus groups' (according to various criteria, such as places of employment), would diminish the chance of the sample accurately representing the whole population, through both the over-representation of those focus groups and also the implicit under-representation of those sections of society not chosen to be included (as in ERM's work). To draw conclusions from only the attitudes of the focus groups selected and then to apply them to the attitudes of the whole population, could be misleading.³⁶ If no attempt was made to regulate the content of the sample, 'random sampling error' might have occurred, whereby mere happenstance led to 'the chance inclusion of an undue proportion of units of a particular type' (Yates 1981, 1), which may distort the results just as much as a deliberate selection of respondents would do.

Although there is a chance that random sampling error may not occur, and that a random sample would therefore be more accurate than an artificially distorted sample, it was decided that the best option is perhaps to take a middle course, and to use a 'stratified sample'. In this, a quota system can be used to regulate the sample, in which certain types of people are represented in the sample by a given number of respondents. In this particular case study, for example, age might be an important factor, since younger people have not only received more education about nuclear power, but have also grown up in the post-Chernobyl era, and

³⁵ An important variable in this particular case study, which ensured that the sampling universe matched up with the real population, was that the researcher had worked for the Royal Mail over the preceding four years in the front line of the town's communications industry, and so knew of the location of the more obscure streets and houses which might have been unknowingly omitted had anyone else conducted the survey.

³⁶ Another problem of focus group studies is that the nature of social interaction may distort the true balance of opinion, ie. some people may be reluctant to voice their opinions in a group situation, simply through bashfulness, or due to being browbeaten by other group members. A system of one-on-one interviews with an impartial interviewer would be less likely to suffer from these possible flaws.

may therefore have different attitudes regarding nuclear power compared to older citizens whose formative years coincided with nuclear power's utopian beginnings. The strata chosen to subdivide the factors of interest must be comprehensive and encompass the whole population, so that no-one can fall between two strata and not qualify for inclusion within the sample (eg the age groups 0-19, 20-29, 30-49 etc should be used). Quotas for each of the strata within the sample should also be proportional to their size in the population as a whole. If these conditions are met, this method introduces more structure, making a random selection less haphazard, less conducive to error (Yates 1981, 24), yet without distorting the sample through the kind of over-regulation which inevitably excludes sections of the population from participation.

The best way to make this system work, and thus to secure a representative sample of the population, would be to obtain as much relevant information as possible relating to the populace of Cockermonth, and to create quotas proportional to that information. An example would be to find out the total number of people of different age groups, and then to give proportional numbers of people of each age who should be interviewed, in order to produce a sample which best represented the distribution of age groups within the town. This system would thus avoid the gender mis-representation which had occurred in the study by Macgill and Phipps, and the age group misrepresentation which had proved to be a failing of Macgill's study. However, an immediate problem encountered in creating a stratified sample was a lack of helpful information upon which to base such strata. With the aim being to assess public opinion, it would be helpful to discover not only demographic information, but also as much information as possible about the different interests and attitudes of groups of people in the population which might possibly influence their views on nuclear power, so that these could be taken into account when plotting the sample. For instance, how many people had ever studied physics? How many people made an active contribution to environmental organizations? How many people in Cockermonth worked at Sellafield? Unfortunately, no details were available on such matters. The only reliable information available came from the 1991 census breakdowns for the town's two electoral wards, Castle and All Saints³⁷, and from the current electoral register. The census breakdowns were used to provide information on the numbers of people of different age groups, genders, and employment status, as well as the number of people living in the two electoral wards of the town. As in the work conducted

³⁷ Census material was kindly provided by the Technical Services Department at Allerdale District Council.

by Priority Search, the census was used as the main source of demographic data because, although it has its faults (such as the fact that it is completely accurate in representing a 'snapshot' of the demographic situation only once every decade), it was the most reliable source available, and was also least likely to be inaccurate, because of the legal requirement for its completion.

Some surveys also create further sub-strata according to economic criteria such as income. In this study, the geographical location of the respondent's residence in Cockerthorpe was used instead. It was felt that not only was the amount of a person's income a delicate question to ask respondents, and a variable likely to encounter some distortion for pride's sake, but it might be a misleading indicator of the type of person concerned anyway, especially in recessionary times, when, for example, more educated people might well be found in lower paid work than might be expected in other times. Housing locations, it was hoped, would not only give a guide to standard of living through the price of houses, but also some insight into the personality of the respondent through the type of location they would like to live in, the type of neighbours they would wish to have etc. Social grouping was felt to be important in that people may well discuss matters such as nuclear power with their friends and neighbours.

An analysis of the different housing types in Cockerthorpe was kindly provided by Jon Nixon of Cockerthorpe surveyors Nixon Associates, and the town was subsequently divided into geographical areas according to housing type, with a number of streets randomly selected from each area. Both the number of streets and the number of people to interview in each area were selected in proportion to the number of people in each area according to the electoral roll³⁸. All interest groups or social groupings present in the town would, as far as existing research can show, have an equal random chance of inclusion within these main strata of age, gender, basic economic status, and housing location. Although this is perhaps not the most perfect scenario, it was the best available. As Yates said:

"The most suitable sampling method will ... depend very much upon the type of information that is already available on the population to be sampled" (Yates 1981, 19).

³⁸ Information from the electoral roll was supplemented by the knowledge gained from working for the Royal Mail.

and this system utilises the information at hand to the optimum.

Admittedly, these sub-populations will be far from internally homogeneous. (Cochran, 1977, 89-90). The idea, for example, that all people between the ages of 30 and 44 would have identical attitudes towards nuclear power seems ridiculous. Nevertheless, the stratification of the sampling universe into such sub-populations seems more likely to advance towards a representative sample than either a completely random non-quota system or a focus group system with its built-in bias.

There was a further problem with multiple stratification in planning the sample. The number of units for the main strata were known, such as age group totals for the whole of Cockermouth, and population numbers for given areas, but not the numbers for combined strata, such as the ages of the population in any one area. This phenomenon is known as 'multiple strata sampling without control of sub-strata' (Yates 1981, 25). This meant that an exact list of houses to be visited could not be prepared in advance. It was not feasible, for example, to nominate Mr X of 18 High Street as someone to be interviewed as a working male aged 30-44, because no accessible detailed combined information existed for age and employment, either for individuals, or, indeed, for areas smaller than electoral wards. All that could be done was to visit houses at random, keeping a tally of certain characteristics of those questioned, until the available quotas were filled, at which point any more respondents eligible for the completed strata were rejected. In other words, a system of random sampling with subsequent adjustment was employed (Yates 1981, 25).

Overall, the sample was designed to give everyone an equal chance of inclusion, stratified to reduce random sampling error, but retaining a fundamental element of random selection to minimise any constructed bias. Certainly this fundamental random selection of both streets and houses to be selected meant that selection could not be made merely to support any hypotheses of the researcher.

5.3.3 Determination of sample size

Each sub-population within the above strata was represented in the sample by a 2.5% quota of the 1991 census figures for each of the two town wards, Castle and All Saints. This created a sample of 192 people out of the total population of 7,702. When the 1383 people aged under 16 years were discounted (because of the high level of diversity within that age

group which would make creating a meaningful representative sample too complicated, given the resources of time and personnel available), a sample was left of 158 of the 6319 people aged 16 years and above. The sample was expanded by one to take into account a conservative estimate of population increases since the previous census (given the extension of the Gable Avenue housing estate and the creation of the new Marvejols Park houses).

There were several reasons for the size of the sample - firstly, it was necessary to reconcile the need for a fair amount of precision with the practical constraints of time. Random sampling error tends to decrease as the size of the sample increases (Yates 1981, 9), thus the larger the sample in proportion to the sampling universe, the greater the likely accuracy. In this case, for example, with nearly one hundred and sixty responses, any eccentric respondents would be unlikely to distort the overall figures to any significant degree (as would be the case with a smaller sample). A second reason was simple practicality. Due to the complexity of the questionnaire, with each interview averaging around thirty minutes in duration, this amount of interviews took nearly two months to carry out, and was really the greatest number practicable. A greater number of respondents than this would have necessitated an undesirable trade-off reduction in the range of questions asked. Even so, the size of the sample in proportion to the area of study was still far greater than that used in the earlier published studies (2.5% in this study compared to 0.23% for Macgill and Phipps; 2.1% for Macgill; 0.6% for Priority Search and 0.17% for ERM, see Chapter Four), and so this study can be defended against one of the most common criticisms of qualitative surveys, namely that the sample size is too small. There was also no pressing need for a larger sample, since detailed results were sought only for the Cockermonth population as a whole, not for each of the sub-populations.

Because the difference in scale between the census totals and the 2.5% quota produced a vulgar fraction, the quotas had to be rounded off to the nearest whole number for a *working sampling fraction*. According to Yates (1981, 25)

"the use of the working sampling fraction in the analysis of the results leads to minor inaccuracies, but these will seldom give rise to errors of a practical importance."

5.3.4 Procedure

The survey was conducted between April 1 and May 24 1994 on a house-to-house basis by a single interviewer. The use of one sole interviewer eliminated the possibility of distorted answers to different researchers which may have beset the earlier studies. The surveys were carried out on a single visit basis, with each housing area visited at morning, afternoon, evening and weekends. This rotation of interviews was an innovation designed to avoid the problems encountered by Macgill and Phipps, and Macgill, who had interviewed during the day only, and had encountered too many homemakers and retired people. In this study, any person living at any location in the town, working on any shift system had an equal chance of being present for surveying unless, of course their activities prevented them from being at home every single morning, afternoon, evening and weekend. A possible problem with the chosen sampling system was that it might be weighted in favour of those who would be at home all day every day, and who were therefore more likely to be present at all of the times mentioned above. The system of quotas for economic activity was intended to counter this event by preventing an over-representation of pensioners, homemakers, home-workers or the unemployed. The day-time visits were felt to be important, because the pilot survey found a tendency in the evenings for people to prefer the economic 'breadwinner' to respond to the questionnaire. A survey conducted at evenings and weekends alone therefore, would have suffered from under-representation of the economic dependents of the household.

The survey was completed on Tuesday May 24 1994, by which time every part of the original quotas had been filled. This was vital because failure to complete the chosen sample would have obviously resulted in the under-representation of any sub-populations containing large numbers of non-respondents.

5.3.5 Non-response

Non-response is an important factor in all surveys. In this study it was felt to be an especially important variable, which has not been highlighted as a major response option in some of the other studies of local opinion of the nuclear industry, such as those by Macgill and Priority Search. This tendency has perhaps given the impression that the West Cumbrian population feels more strongly about the nuclear industry, either clinging onto it as the county's economic lifeblood, or opposing it in fear of possible health risks, than is the actual case.

The survey method employed in this study, that of visiting houses, meant that it was relatively easy to record instances of non-response. A survey in the street for instance, would be more easily side-stepped by those who wished to avoid the subject under discussion. Non-respondents could also be classified according to their reasons for non-response, a feat impossible in postal surveys. To differentiate between different kinds of non-response, people were asked first if they would answer a questionnaire, and then told that it was about nuclear power. Those who had originally agreed to a questionnaire but then decided that they did not want to talk about nuclear power (thus refusing to answer a questionnaire on nuclear energy purely because it was a questionnaire about nuclear energy as opposed to any other subject), were counted as 'significant non-respondents'. These latter responses were included as full answers, as important as any given by people who answered the full questionnaire, and are discussed more fully in Chapter Seven. In order that these 'significant non-respondents' should be eligible as a full part of the sample, they were nevertheless asked to identify themselves in terms of their sex, age, occupation and length of time in the county. The location of their house was already known.

People who said that they were too 'busy' to answer questionnaires were taken at face value and discounted as 'not at homes', because to determine which were genuine cases of distraction, and which were people disguising antipathy towards surveys, would require either most unscientific guesswork or most unethical intrusion into the home in the cause of lie-detection. Call-backs for unoccupied houses were only made if the initial visit to the street(s) had failed to bring the quota of respondents for the housing zone.

5.3.6 Impartiality

In order to minimize the 'interviewer effect' of respondents attempting to give the answers which they believe interviewer might wish to hear (as might have happened in the Priority Search study), it was important to display the impartiality of the research. Respondents might have reacted differently had they felt they were supplying information to a representative of BNFL or CORE rather than to an impartial academic. For this reason, a verbal self-introduction, including a declaration of impartiality, was given, and a statement of neutrality displayed on the question pad (See Appendix B). Furthermore, a policy of 'friendly but restrained' interviewing was maintained, so as to neither encourage nor discourage any

particular answers. Obviously any effects of the interviewer's sex, age, race and accent upon the respondent's behaviour could not be avoided.

If the research had been commissioned by one of the main protagonists in the nuclear debate, even though carried out by an independent firm, it would no doubt suffer from a constant pressure, subconsciously if not explicit, to produce results favourable to that sponsoring organization. This pressure could lead to a distortion of questions or conclusions in order to satisfy that pressure. This research was not sponsored by any of the groups concerned.

5.3.7 Question type

The questions included in the survey were open-ended rather than directional. The decision to do this was made in the knowledge that it would hinder quantitative statistical analysis, but that this disadvantage would be offset by the fact that it would avoid problems highlighted in the multiple-choice questionnaires employed by Macgill and Phipps, Macgill and Priority Search, which restricted the possible answers to those chosen by the question-setters, thus preventing the full expression of respondents' true feelings in the matter. Open questions were preferred as they were more likely to display those feelings and opinions which pressed strongly upon a person's mind than the mere selection of a response from a proffered list. Such a list may force words into respondents' mouths, or merely revives dormant feelings and opinions. As was noted in the analysis of ERM's work, there is a risk that even open questions may also employ subtle direction. To avoid this, the key questions in the survey asked people to freely express their opinion relating to the nuclear industry without deliberately focusing upon particular aspects such as risk or economic dependency.

When viewing the analysis of the results of the open-ended, qualitative questions employed in this research (Chapter Seven), it is important to bear in mind that respondents had a completely unrestricted choice of answers, and that consequently the frequencies of any particular response would be far lower than in 'prompted' questions where the respondent has a finite number of responses from which to choose. It should also be remembered that because of this free choice of answers, any responses given are perhaps more significant than those selected from a 'prompt list', and that any response with a very high response rate from these open questions would be expected to be very important indeed.

One of the most common criticisms made of qualitative surveys is that reports based upon qualitative data may easily be distorted by bias in the researchers interpretation of that information. In an attempt to ensure that this did not occur in this study, some questions asked alongside the main body of qualitative questions were of a more quantitative nature. This was intended to be a 'belt and braces' approach, as the quantitative questions would present illustrations of broader aggregates of feeling on certain topics, and conclusions drawn from the qualitative analysis could be compared with these.

The subject-matter of the questions was based upon questions posed by contemporary events in the West Cumbrian nuclear power industry and by the conclusions of other research, both local and national. The survey was to examine several themes: the popularity of nuclear power in relation to other power sources, the relative advantages and disadvantages for Britain as a whole of using nuclear power; the advantages and disadvantages of locating many elements of the industry in West Cumbria; the relationship of the West Cumbrian nuclear industry with the media, with other campaigning groups, and with the population of the UK as a whole; attitudes to waste disposal; the important concepts with which CORE, FoE, BNFL and NIREX were associated; support for the industry as a whole; general associations with nuclear power, the political implications of attitudes to nuclear power; social composition of response.

Before they were selected for the survey, the questions were put through a twenty person pilot survey, containing a microcosm of those sections of the population specified by the stratification quotas. Through this, the questions were checked to ensure ease of comprehension, and to eliminate either any possible bias, or the covert direction of the respondent. Finally they were presented to two academics experienced in the field of politics (Harvey Cox and Geoff Woodcock of the University of Liverpool), who checked their objectivity further. This task accomplished, they were set out into two copies, with one question per page in order that the sight of the next question should not distract or direct the respondent from the question at hand. One copy was held by the researcher, the other was given to the respondents so that they could see each question in front of them, so as to avoid any communication difficulties encountered through oral questioning alone. The questions were printed in a large typeface for the benefit of those respondents with poor eye-sight. A replica

of the full questionnaire put to respondents is included in Appendix B to illustrate how this methodology operated in practice.

5.4 Other aspects of the research

5.4.1 Local Groups

Local opinion is not derived purely from awareness of history and experience of the local social and economic environment. It is also influenced by the interplay of a wide range of political influences. This was felt to be very important to their strength of local opinion, and so measures were taken to ascertain the actions and views of a wide range of bodies which are politically active within the nuclear debate. The following section describes the methodology employed in this task.

The most important of these groups were felt to be those who regularly featured in local debates on nuclear issues. The experiences of living in West Cumbria for the previous twenty-one years, and monitoring the local press over the previous twelve months, had suggested that there were no less than four locally based groups which featured prominently in West Cumbrian debates over the nuclear industry. These organizations were; NIREX, Cumbrians Opposed to a Radioactive Environment (CORE), Friends of the Earth - Cockermouth, and BNFL. In order to understand their contribution to the shape of local opinion, interviews were arranged with those responsible for public relations at each of the four organizations. Through this series of meetings, an insight was gained into the aims and tactics of these organizations in terms of gaining the support of the West Cumbrian populace, and also of the organizations' perceptions of West Cumbrian opinion.

An interview with the representatives responsible for public information in Cumbria was felt to be the fairest way of conducting this research, not only because that individual would be the person most knowledgeable about the message which the organization hoped to convey to the public, but, by asking them the questions directly, the research would be carried out upon a 'level playing field', as each interviewee would have equal chance to answer exactly the same questions. Were the research to consist of merely inferring the answers from available published material, in which different organizations might not focus on the same aspects of the issues in question to the same extent (as they were not targeting a given question) this would not have been the case. It would also prevent distortions caused by the superior financial resources of any group relative to the others, meaning that they could

publish their views more effectively. In order to ensure accuracy in these interviews, each meeting was recorded on an audio-tape, and the tapes transcribed for analyses.

An unexpected problem was encountered in this stage of the research, in that it was rather difficult to discover BNFL's positions on certain subjects. The company showed considerable confusion in deciding who was responsible for public information campaigns in Cumbria, and who should therefore speak to the researcher. Eventually it was decided that the manager of the Sellafield Visitors Centre (SVC), Ms Penelope Cater was the person to be interviewed. Ms Cater was particularly hard to track down for some time, and as a result she was not interviewed until some weeks after the representatives of the other groups. Even then she declined to answer many questions and referred the researcher to a Mr Alan Irving, head of media relations at Sellafield.

Mr Irving proved even more elusive than Ms Cater, and no meeting with the gentleman ever took place. The researcher was left wondering whether the company did not like to have any of its activities scrutinized, even its public information work, or whether the company was simply too large to be efficiently organized. It was to be hoped that the company did not believe that the combination of visitors centre, publicity material and money spent on the community should be enough to replace public relations work carried out at a more personal level, especially when West Cumbrian people were involved, or even that BNFL were so concerned with creating the right public image that they were afraid to say anything for fear of tarnishing that image.

Ms Cater's comments seemed to typify the company's attitude:

"I can't give you the company view on that. I can't quote you chapter and verse, but there are brochures and bits and pieces which I can give you - the company profile, things like that ... I'm not trying to cop out ... I just don't want to give you any wrong facts or whatever, at the end of the day, my job is running a facility and there are people with much greater depth of knowledge than I on the industry [sic]."

Unfortunately, finding such 'more knowledgeable' people who were actually willing to talk about their knowledge was nearly impossible, and one wondered if the industry was really any less secretive than in the 1950s. It was not until nearly six months had passed that a letter

arrived from a Dr Adrian Tognarelli, Special Projects Coordinator at Sellafield, containing the elusive missing responses.

5.4.2 National groups

Although they are maybe less important in shaping West Cumbrian opinion, there are many other groups which might have an interest in the nuclear debate besides the major players such as BNFL and FoE.

The activities of any of these groups may have had an effect on public opinion, an effect which should be monitored, because unaccounted for it might distort other analysis. For instance it is possible that one person's opinions might coincide with the points BNFL try to make, but that this could be not so much because BNFL themselves have convinced them, as because the person's professional association may have done so. The number of such groups who may have an interest in the sphere of nuclear power is however, possibly unlimited. In order to create a fair sample of such groups, it was decided to study those listed in The Environment Council's 1992 Directory Who's Who in the Environment - England, under the headings *energy, fossil fuel energy, nuclear energy, renewable energy, and pollution from nuclear waste/radiation*. These groups were sent questionnaires through the post. Questionnaires were also sent to a number of environmental bodies based within West Cumbria, and to the Conservative, Labour, Liberal Democrat and Green Parties, both in the Workington constituency and at national level.

In order to establish some sort of framework for comparison, an identical questionnaire was sent to each of the groups. It was hoped that this would produce a fairer comparison of group objectives and activities than merely hoping to infer the information from published materials of differing levels of availability.

In order to ensure the fairness of the analysis (as with the local groups), all information about group activities regarding the nuclear industry from sources other than the replies to the interviews had to be excluded. A FREEPOST envelope was enclosed with each questionnaire so that lack of finance would not prevent groups from returning questionnaires. Whilst questionnaires do possibly restrict the scope of the respondent in their replies, it was hoped that the questions would be sufficiently open to allow free expression of opinions, although in a more concise fashion.

A second purpose to these questionnaires was that the national groups could also be used to form a population whose views could be contrasted with those of the West Cumbrians, representing a 'control group' of more informed non-Cumbrians. Unfortunately the response rate from these postal questionnaires was poor, and it was felt that the data given provided an inadequate base for results of statistical significance. This matter is discussed in more detail in Chapter Seven. Nevertheless, those questionnaires which were returned were analyzed to show some of the range of views held by different groups.

Chapter Six

The public information campaigns of four local groups

6.1 Introduction

This chapter analyses the data obtained from the interviews with representatives of local campaigning groups. The interviewees were: Bruce Alderman, public relations manager for NIREX at Sellafield; Janine Allis-Smith and Martin Forwood, campaigner and campaign co-ordinator of Cumbrians Opposed to a Radioactive Environment (CORE) in Barrow-in-Furness; Jill Perry and Dave Harris, co-ordinator and treasurer of Friends of the Earth, Cockermouth; and Penelope Cater and Dr Adrian Tognarelli manager of the Sellafield Visitors Centre and Special projects coordinator at Sellafield. The interviews took place on April 12, April 21, April 27 and May 25³⁹ 1994 respectively. The text below assesses the strengths and weaknesses of the various campaigns in relation to public relations theory. The first half of the section analyses the different campaigns in relation to the following topics: target publics; finance; staffing resources; technological resources. The second half of the section examines their campaigning work in more detail. Quotes attributed to the four groups in the text came from the interviews.

6.2 Resources and audiences

6.2.1 Target publics

The wide range of literature on the subject of public relations has suggested that there are a number of different 'publics' which might be the focus of public relations (PR) campaigns (Nolte 1974, 125; Price 1992, 25). One kind of campaign seeks out 'opinion formers', or more politicized citizens from any walk of life (Lin 1973, 150-52), whose opinions are thought to sway other people into following them. A second sort of campaign may target only small specific groups whose opinion is seen to 'matter' - it may be that in a political field this means that the campaign only targets those who hold the keys to power, such as ministers or civil servants, or key MPs, with general public opinion of secondary importance. A third kind of PR campaign appeals directly to the public as a whole.

NIREX said that they worked on two levels. On a national level they focused upon

"politicians, trades unions, opinion formers, regulatory bodies ... because a large proportion of the population aren't really concerned about what we're doing."

At a local level however, they not only targeted opinion formers such as 'trades unions, county and district councils, parish councils', but were also concerned to obtain the support of local

³⁹ See Chapter Five.

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people in general, 'because they are the ones most directly affected by our plans.'

BNFL placed a priority upon 'decision makers' because

"at the end of the day the site has a licence to operate which is awarded by governmental bodies",

but they too also saw the need for 'general acceptance of nuclear power.'

CORE shared the concern that those with access to the levers of power should be aware of the organization's message. They targeted 'politicians' and 'the media' at different times, as well as local people.

Friends of the Earth (FoE) Cocker mouth, as a local branch of a far larger national organization, did not concern themselves with particular groups of decision makers or opinion formers. In general their target was 'just people'.

NIREX, BNFL and CORE all claimed that although they had split their attentions between 'decision makers' and the general public, these two 'publics' were of equal importance. It is important that this is actually true in practice, because if 'decision makers' were to be given a higher priority than the general public, this might lead to the campaigning groups spending less of their resources on the general public. Even if, as the groups claim, the two publics are of equal importance, there is a danger that resources may be overstretched in trying to reach both 'publics' and that any group who only target one 'public' are able to allocate their resources more efficiently. Consequently, the division between FoE and the other groups could have several implications in terms of public relations with the West Cumbrian populace. For one thing, there is an advantage for FoE in that, by leaving lobbying at a national level to FoE in London, FoE Cocker mouth are more able to focus upon the needs and interests of local people than the other groups who must, at best, divide their attentions. On the other hand, the decision not to lobby at a national level may mean that national decision makers are less aware of anti-nuclear opposition from within Cumbria itself, and consequently, they may be more likely to believe that Cumbria is a good place for the industry.

6.2.2 Finance

A most fundamental factor which will influence the level of success of a public information

campaign is the amount of money available to finance it. As might have been expected, the nuclear industry has a great advantage over voluntary groups in this respect. NIREX would not disclose their exact public relations budget, but said that (including staff costs), it was in the region of 'the lower end of seven figures'. The budget for the BNFL's Sellafield Visitors Centre (including wages) is two million pounds per annum. In contrast to this, CORE have only around three to four thousand pounds a year (including staff costs) to cover all eventualities and FoE Cockeremouth's main anti-nuclear campaign has a total financial resource of two and a half thousand pounds, not all of which is spent in any one year. The bulk of that money came from a contribution from national FoE to establish an anti-NIREX campaign. FoE Cockeremouth's income in 1993 was a mere £840. This difference in financial resources should give the industry bodies a distinct advantage in the battle for Cumbrian hearts and minds. Certainly, neither of the industry's representatives felt anywhere near as frustrated by financial constraints as CORE did. According to Janine Allis-Smith

"Funding is a real problem. If we only had half the money that the nuclear industry have to spend on this publicity material, it would be great, I mean we just don't get financed at all. We desperately need to be able to make information packs. You know, the nuclear industry is now really actively pointing at junior schools, and we would like to be able to do a pack to do the same, to give them the other side ... we just haven't got the money. It's ... an uphill struggle, so many people have never even heard of us and I don't think whatever we do will change that unless we had a lot of money to spend."

Strangely, whilst CORE felt finance to be a restrictive factor, FoE felt that 'financial resources are fine'. This comment perhaps reflects a less realistic assessment of their situation in relation to the resources of the nuclear industry, or simply that the immediate objectives of FoE Cockeremouth are on a far smaller scale than those of CORE. It could also mean that FoE Cockeremouth believe that the backing they receive from their national organization will always be available in sufficient amounts to allow them to achieve their goals.

6.2.3 Staffing resources

One of the clearest ways in which the difference in relative financial resources manifests itself was in the staffing levels of the four organizations. The wealthier an organization is, the more staff it can employ, and the better they can be trained. FoE Cockeremouth, the poorest group, were in the worst position regarding numbers of full-time workers. They had no-one who worked full-time for the cause and their active volunteer core consisted of only 12 people, supported by a local membership of 43. This was one aspect of their organization which they felt to be a weakness - 'we could do more with more people', their coordinator admitted.

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CORE were in a slightly better position, having two full time staff, and 'a couple' of volunteers (with a supporters list of between 800 and 1000 supporters).

BNFL, by comparison, had a team of 34 full and part-time staff in the Sellafield Visitors Centre, as well as additional staff for functions, such as catering. Crucially, the far greater financial resources of BNFL meant that they had the luxury of determining staff levels according to what they wanted to achieve, rather than according to what they could afford.

In Ms Cater's words:

"If you want to provide a service you need the correct level of staffing to provide that service. So you have to determine your level of service first."

It seems that this is a luxury which is simply beyond the reach of FoE Cockermouth and CORE.

The staff resources at NIREX's disposal were quite surprising. They had been working with only 3 full time staff in West Cumbria, only one more person than CORE. This situation might change, because NIREX did say that they were coming to see that

"West Cumbria is a very important area where we need to direct our information"

and would be increasing staff levels accordingly. Again, this is a strategic option which is simply not open to FoE or CORE. In the meantime, NIREX did actually have considerable other resources at their disposal - various staff from head office in Oxfordshire often came to Cumbria to 'do various roles from time to time'. There was also a public information office in Whitehaven, and they could always 'call upon the resources of BNFL staff'. Overall, the industry thus had an advantage over its opponents in terms of staff numbers.

The knowledge and experience of the staff members may also have an important role in determining the success of different groups. The groups were asked to evaluate their staff in terms of their experience of the nuclear industry. Both NIREX and BNFL were confident in their members' 'knowledge and dedication'.

NIREX - "Around 60% of our staff have been in the industry for some years, and have a very good knowledge and experience of the industry, and a belief and dedication to the industry, and I think that is important in getting our

message across."

BNFL - "All our staff have to have a complete training programme so that they know and understand all the aspects of the company's operations. The basic training takes about six weeks. I don't think you could stay in a job like this if you weren't dedicated to the company ... they're a very dedicated team here."

The anti-nuclear bodies could not boast such professionalism and experience. The Cumbrian anti-nuclear movement does not seem to contain any defecting nuclear scientists or the suchlike, and the active members of neither FoE Cockermouth nor CORE had any direct experience of work in the nuclear industry. CORE's campaigner was therefore concerned by the fact that

"neither of us are scientists, so I think our experience is purely through working here and doing it and having to learn, having to read, having to talk to scientists."

The staff of the nuclear industry may be more efficient at public relations than the anti-nuclear activists because of their better training. There is also the chance that the less-trained anti-nuclear groups might suffer in the public eye through being perceived as amateurs interfering in a highly technical issue. On the other hand, as volunteers, the anti-nuclear campaigners might be more committed to their cause, and make up for their lack of experience with their enthusiasm. It could even be that the public will view them as more sincere, and perhaps as more likely to tell the truth, than those who are being paid to defend the industry (Nightingale 1982, 170-71). Certainly FoE's coordinator, when asked about staffing resources, felt that it was 'fine, we have no problems with that', although this comment might just be reflective of her generally upbeat interpretation of the situation.

Given the physical and cultural isolation of West Cumbria in relation to the rest of the UK, the ability of the staff to empathise with Cumbrian attitudes and ways of thinking might be important. The four spokespeople were therefore asked to analyze how 'Cumbrian' their public information staff were. Not only were all four groups based in West Cumbria, but all the groups claimed a high proportion of Cumbrians in their workforce. NIREX said that around two-thirds of their staff were West Cumbrian, and BNFL had a company policy of only employing local labour. All the active members of both CORE and of FoE Cockermouth had lived in West Cumbria for some time before becoming involved in the organization's work.

This set of results meant that all four groups should be equally able to empathise with the concerns of local people. The non-Cumbrian 'third' of NIREX's three person staff only

represents one person after all! However, NIREX may be different in that the staff who visit from head office are non-Cumbrian and this may make them appear to other people, to be 'outsiders'⁴⁰, and may harm their relationship with the public.

BNFL, CORE and NIREX all established their public information campaign policy from a Cumbrian base, but perhaps surprisingly, FoE Cockermouth said that their campaign 'is very much led from London'. It was only for non-nuclear issues that 'at the local group meeting we would decide' which strategies were to be used. This would seem to imply that national FoE, or perhaps even FoE Cockermouth themselves, do not feel that the Cumbrian group is capable of co-ordinating this important issue. Should the local populace become aware of the dominance of national FoE, it might cause FoE Cockermouth problems in terms of public relations, as they might incur resentment at the perceived interference of a centralized organization based in London whose primary concern is Whitehall, Westminster and the national media, not the interests of West Cumbrians (Davies 1985, 32).

Relationships within the organization were also analyzed, and the four representatives were asked to evaluate their relationships with other parts of their own organization outside their immediate department or branch. Apart from BNFL, all reported internal harmony. FoE described a smooth relationship with the national office in London, as London valued the presence of a FoE branch within West Cumbria. CORE, too, reported no problems, pointing out that they worked very closely with Greenpeace who give them a grant each year. NIREX claimed to have good communications and relations with their shareholder companies. The Sellafield Visitors Centre manager however, admitted that

"There are people within the company, within the factories who say 'Well why are they building the visitor's centre?'. You have to explain to them that this isn't just chucking money about, this is work which will ultimately support the site licence which is ultimately going to keep them in work."

⁴⁰ It is also important to note that on the whole, NIREX's employees on site are not Cumbrian -

'a lot of the people who are working for us here have come into the community - consultants and contractors ... although we have some local employees at this stage'.

This, more than the county of origin of the PR department may foster the notion of NIREX as an 'outside' organization.

This revelation would seem to add weight to the idea of BNFL as an organization which is perhaps not as well organised and united as it might be. The internal discord might also lead to problems for BNFL's public relations work if they must divert time and resources to educating their own workforce before they can deal with the rest of the public. In traditional commercial PR, one would expect that superior technological resources would aid the industry immeasurably in their battle with their opponents. The nuclear policy arena however, may prove to be different.

6.2.4 Technological resources

Technological resources, like staffing resources, depend heavily upon available finance, and the nuclear industry bodies had far greater resources at their disposal than the anti-nuclear groups. For example, if one looks at the standard of telephone information services that the different groups could provide, the standard of service offered to the general public increased with the financial resources available. FoE's part-time workers ran no such service. CORE could only claim to have organised a telephone service because they have two full time staff who will be in their office and able to answer telephone queries in the midst of performing their other duties.⁴¹ The nuclear bodies offer a better service still, having specialists to deal with telephone enquiries. BNFL offered a service similar to that run by CORE, only on a larger scale. NIREX seemed to be the best organised of the four in this respect, and had gone out of their way to make themselves readily accessible to all members of the public through a freephone information service, which they had run 'almost since the start of our operations here'. None of the groups seemed unhappy with their overall technological resources, even though for FoE this meant that their technological resources consisted of paying to use the fax, photocopier, and computers of the coordinator's place of work.

6.3 Methods used in the public information campaigns

6.3.1 Overview

The four groups were offered a list of possible methods which they might have employed to

⁴¹ CORE's anecdotal comment about the telephone information service illustrates the multifarious faces which the nuclear debate can present. "We get some really weird questions. Somebody was going to be employed as a designer on the BNFL site. He wanted to know whether he should do it - whether he'd be safe. Someone else wanted to know about contamination of the coast because they were going to use it in a divorce case, whereby this fellow wanted his daughter who was living with her mother on the coast, and he was going to use it against her".

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convey their message to the local public, and were asked to say which of them they had used, and any others they could think of which might not appear on the list. A condensed version of their replies is presented in Table 6.1, and the text below analyses the differences between the four groups' campaigns in more detail.

Table 6.1 Public information methods used by organizations based in Cumbria, 1994

Method	BNFL	NIREX	FoE	CORE
Adverts	YES	YES	NO	YES
Publications	YES	YES	YES	YES
Videos	YES	YES	NO	NO
Telephone 'hotline'	YES	YES	NO	YES
Leaflets	YES	YES	YES	YES
Posters	YES	NO	NO	NO
Petitions	YES	YES	YES	YES
Research	YES	YES	YES	YES
Criticize opponents	NO	YES	YES	YES
Help potential allies	NO	NO	NO	YES
Get impartial expert support	YES	YES	YES	YES
Get celebrity support	NO	NO	YES	YES
Campaign in the street	NO	NO	YES	YES
Demonstrations	NO	NO	YES	YES
Work with schools	YES	YES	YES	YES
Political lobbying	YES	YES	YES	YES
Media releases	YES	YES	YES	YES

6.3.2 Advertisements

Advertising is a method used commonly in public relations to convey an image to the general public. It is used to increase the organization's legitimacy by making it seem a part of everyday life. Both sides in the nuclear debate encountered problems in their use of advertisements. It was simply beyond the financial resources of FoE Cockermouth - 'We don't use advertisements because we have to pay for those'.

Similarly, although CORE did find it possible to advertise, their financial limitations meant that it could only be carried out on a very small scale. Although BNFL and NIREX did not suffer the same financial problem, they were hampered by the fact that the Independent Television Commission (ITC) consider nuclear power to be a political item, about which they will not allow advertising.

BNFL - "We are not allowed to promote the nuclear industry. We are allowed to advertise the services that we offer, so we can advertise in certain publications the fact that we will reprocess fuel because that's a job ... but we can't promote it as the best."

Despite this stumbling block, the nuclear industry had ingeniously found other ways of gaining advertising publicity.

BNFL - "Within the community we do support various activities, we take advertising space as a method of supporting those activities [on a recent Advert] I think our ad read 'BNFL - giving energetic support to the community', so there are ways of supporting people and at the same time raising their awareness."

BNFL had also been able to advertise the visitors centre, notably on the television, and this advert had been instrumental in the success of that centre. In 1993 over half of visitors to the centre had been attracted by the television advertising campaign (BNFL Visitor Centre Survey Analysis 28/5/93 to 26/9/93, 1993)

6.3.3 Publications

All four groups released their own newsletters, which, while avoiding the unpredictability of relying upon outside media coverage, also have the disadvantages of being seen as a biased source of information, and also requires time and money to run (Heitpas 1988, 183). All four groups also produced leaflets, technical reports and information booklets. There was a marked difference in the quality of presentation of these documents. Each of the groups were asked to supply the researcher with documents which they would be able to give any member of the public who came to them asking for information on the nuclear industry. BNFL supplied no less than sixteen glossy brochures, full of colour photographs and diagrams. It should not be forgotten of course that BNFL also provide all the information on display inside the Sellafield Visitors Centre itself free of charge. NIREX had a well-presented set of documents - seven glossy coloured brochures and two videos, which they also gave away free of charge. There was a great contrast with what the anti-nuclear groups could present. FoE Cockerham could offer only two colour pamphlets from national FoE, a poorly photocopied

version of a briefing from national FoE on nuclear power, and a Cumbrians Against Radioactive Dumping (CARD) booklet. Other than the two pamphlets from national FoE, all the rest of this material was black and white. CORE actually had to charge £2.50 for the material which they could give out. This would surely hamper their ability to reach a wide range of people, indeed their documents would only reach people who were already concerned enough about the issue to pay for CORE's material. The documents themselves consisted of a couple of articles from Greenpeace, one glossy CORE pamphlet, and four poorly photo-copied articles.

The quality of argument in all the documents was very impressive, but the marked difference in quality of presentation could have implications for public perceptions of the groups in that the anti-nuclear groups may be seen once more to be amateurs in comparison to the professional output of the nuclear industry.⁴²

6.3.4 Posters

Both CORE and FoE Cockerthorpe use posters to advertise meetings but they do not use them to convey their messages to the public. According to Dave Harris of FoE Cockerthorpe, they could only afford to use a small 'hand-made' style of poster and these were not used:

"I don't think they're very effective. I don't think people look at them. Large scale billboards probably are effective, but obviously we haven't got the resources to use them."

NIREX had also used small posters as a form of newsletter in and around Gosforth, but did not use them to convey their message of safety in any way.

BNFL have taken a completely different stance. They prefer to use the larger, glossy style of poster used on billboards and bus stops. However, they do not use them in Cumbria. Instead BNFL's poster campaigns were organized in Liverpool and Manchester. BNFL's use of posters in the cities of the North West but not in West Cumbria was interesting. It could

⁴² An ironical twist was given to the situation by the fact that in 1993 NIREX paid Royal Mail in West Cumbria to deliver NIREX leaflets to every letter box in the area. One of FoE Cockerthorpe's volunteers, a man who was in fact responsible for FoE's publicity material, works for Royal Mail and was therefore responsible for the dissemination of NIREX information. It seems unlikely that either FoE or CORE would ever be able to pay BNFL or NIREX to do their campaigning for them in such a way.

be interpreted as indicating that BNFL are perhaps concentrating on national rather than local opinion, either because they believe that the local populace are supportive anyway or that the support of the public outside Cumbria is more important at present.

6.3.5 Research, petitions and exhibitions

The publication of a well-presented set of research results can gain considerable media attention, but research is expensive to commission, and time-consuming for the organization themselves to carry out (Wilson 1984, 102). These restrictions perhaps limit the availability of any large scale research projects to the nuclear industry alone, such as the NIREX-commissioned public opinion research carried out by Priority Search (see Chapter Four). The Cumbrian environmental groups had not conducted any such research, and would therefore be less able to justify their PR work with 'the latest research findings'.

All groups had used petitions, but the prevalent use of petitions in protests over the years perhaps means that they are exhausted in terms of political impact. (Wilson 1984, 102). NIREX certainly viewed them cynically: 'Yes we have petitions but we don't put a lot of weight on petitions. A lot of people will sign anything.'

Exhibitions and displays are another obvious way of publicizing a group's point of view, and one which all four groups had used, attending commercial exhibitions, local agricultural shows, and so on. With larger public relations budgets, NIREX and BNFL had also been able to organize mobile exhibitions which they had taken around the county and the country, which FoE and CORE had not.

6.3.6 Educational links

Every group had tried to form links with educational establishments. This is an important sphere of campaigning because today's schoolchildren are tomorrow's voters and consumers. Even whilst they are still young, children can also exert tremendous pressure upon their parents in many fields, especially where the environment is concerned. In addition, teachers themselves are often considered opinion leaders (Wood 1992 77-78, 89-91). Once again, financial resources made a marked difference to the means available for such educational links.

NIREX run

"a sort of national education programme, produced by third parties. It's researched with schools and with teachers and ... we will provide free copies for schools."

BNFL - have speakers who visit schools, as well as

"educational visits to all the [BNFL] sites, work placements and teacher placements, where teachers come in from schools to work within the industry."

CORE and FoE Cockerthorpe, on the other hand, could not offer such schemes. They could give talks when individual teachers invited them into the classroom, but they could not organize any form of pre-planned educational programme to be distributed to every school. This limitation was felt to be a source of frustration (see the quote from CORE above regarding finance).

6.3.7 Political lobbying

All four groups took part in lobbying political bodies (informing them of their view of developments and hoping to persuade them of the merits of their cause), both locally and at a national level. At a national level those groups with better financial resources were able to run a more concerted, higher profile effort. For instance, while NIREX had the resources to attend most of the party political conferences, where they held exhibitions, CORE could only say that 'we write rude letters to John Major.'

In their relationship with national policy makers, the distinction between the 'insider' nuclear industry and 'outsider' anti-nuclear groups was apparent. NIREX were in

"very close contact with the various government departments which affect our business, the regulators of the nuclear industry, the environmental planning people the safety people and so on."

BNFL, through their company head office in London and corporate office in Risley, had similar access to key policy makers. By comparison, FOE Cockerthorpe said that their national representatives 'have quite a lot of input, but I wouldn't say that they had good relations' whilst the Cockerthorpe branch simply was not involved at a national level.

CORE, as a purely Cumbrian organization, seemed to have the least access to national policy makers, and also received little co-operation from their MPs.

"Jack Cunningham loves us of course! ... No, he hates us. Michael Jopling, I think he dislikes us as well, he just takes the official Sellafield line on everything we say. When we write to him, objecting to something or asking his opinion he writes to Sellafield, gets a letter back, reads what they say and that's his answer, so Jopling is out really as well ... I never feel that we have the clout that Greenpeace have ... It's a strange kind of relationship really, they know we're here, they know who we are, they know what we do, [but] they prefer to speak to others ... but the fact that we do work very closely with Greenpeace means that what we say does rub off eventually through Greenpeace to some people."

The difficulties experienced by the voluntary groups in gaining this access will obviously have implications at a national policy level, but it may also be that it has implications for local public perceptions, as the groups may be seen to be irrelevant or impotent if they are ignored by the real holders of power.

Locally, both sides had problems. NIREX found that, despite making great efforts

"to ensure that councillors and so on are aware of what we're doing ... [to make sure] that we have taken their concerns on board, and that we consult with them fully before we go ahead and make decisions and make applications",

their relationship had been far from smooth. NIREX had

"had to fight our side on every borehole application we've done. None have gone through a normal planning application, and two of the boreholes went to public inquiry as well, and this has meant delays ... which has given some slippage to our programme."

BNFL had also found that local policy makers 'are their own masters', although overall they did not seem to be too obstructive because 'they know the industry well ... they are a bit more enlightened.'

The spokesperson for CORE said bluntly that -

"I have to say that we're not unduly impressed with local authorities as far as their decision making is concerned, because their decisions are based on a complete lack of knowledge - a sort of blind support of the industry ... they have always been supportive of BNFL, because they have seen BNFL as being the major benefactor, economically, job-wise and they would say yes to anything that BNFL asked ... I think they see now that BNFL is just too dominant and they need to get away from that, but just don't know how to do it ... I think the THORP issue is a good point. They actually asked groups, such as ours, to go and give them a presentation because, as they said, 'Look we don't know much about THORP.' So we did ... but when it came to the crunch ... we could see clearly that councillors had not undertaken a word of what we had said, they just missed the point completely, quite amazing. And

so from that point of view its always been very disappointing. Of course there are members of the council who are extremely good, so the statement I've just said about our council doesn't apply to everybody across the board, it's a general thing."

FoE seemed to have a mixed relationship with their local government bodies.

"They are relatively helpful. Councillors less so than council officers I suppose."

It is important to bear in mind that local policy makers must try and balance both the economic benefits which the industry brings, with the health risks and economic harm it may entail. It is perhaps not surprising that as a consequence they are very cautious when dealing with both sides in the debate in order to arrive at what they consider to be the best decision. The fact that all four groups at times had difficult relations with local policymakers could affect local opinion in that if local elected representatives object to a group or its activities, this could turn local voters against that group too.

6.3.8 Reacting in public

The groups were asked whether they ever spoke out against either the activities or statements of opposing organizations. Both FoE and CORE said that they did this regularly. NIREX said that they only did when an

"environmental group has selectively quoted from various sources out of context, and we wish to redress that and the conclusions they come to."

BNFL were even more passive than NIREX -

"We tend not to do that, not really, we tend to stay on the back foot, we're more interested in promoting the company's activities and the way they're carried out than slagging off other people."

This was another interesting difference between the two sides. The anti-nuclear groups were clearly more pro-active than the industry. The difference between the more reactive nuclear industry bodies and their opponents could have further implications for public perceptions of the different groups, for it allows the anti-nuclear lobby to attack the industry and gradually wear down its credibility, whilst the industry is passing up an opportunity to harm the anti-nuclear groups' legitimacy. Perhaps they are also missing a chance to gain public support for a local industry which is being 'victimised'. On the other hand, the anti-nuclear

groups may develop a reputation as interfering 'kill-joys' if their protestations become too frequent and extreme.

In order to shed some more light on this matter, the groups were asked to evaluate the problems which their opponents caused them. NIREX had faced no major problems from their opponents (At the time of the interview at least, see Appendix A) -

"There will always be opposition, we haven't had protest marches and this kind of thing, people chaining themselves to railings. Obviously we have had hecklers at public meetings, and so on quite rightly expressing their views, [but] ... we have always sought to debate fully with them and have been quite happy to do so."

BNFL seemed less happy with the situation - implying that perhaps they found their opponents' 'non-scientific' version of events to be a problem because it was leading the public astray from BNFL's message -

"I think the problem with opposition is that they don't stop you putting your message across, but it's up to the public who they believe isn't it? We put out factual, up to date information, some people don't."

The way in which this comment was phrased, and BNFL's somewhat malicious handling of Lancashire County Council's decision to contest the opening of THORP, would seem to indicate that it is sometimes hard for the company to remain calm against the criticism it receives.

Given the nuclear industry's reticence to become officially involved in speaking out against environmental groups, FoE's main problem with opposition came from the general public.

'Occasionally we get a bit of hassle if we're out on the streets, not a lot but occasionally we get people who give us a bit of abuse.'

CORE found that

'there is a bit of slanging matches with the unions which is strange because I'd have thought the unions and us would have had a lot in common but they seem to be more on the management side than on the Cumbrian side.'

This point is discussed in more detail below.

6.3.9 Statements of support

Gaining and publicizing statements of support from impartial bodies, preferably experts in a field, is a way of not only creating a newsworthy item for release to the media, but by gaining

Chapter Six: The public information campaigns of four local groups

third party backing, it can add to the legitimacy of the campaign. Glowing words spoken about an organization by its own public relations department tend to be received somewhat sceptically (Palin 1992, 6). Scientists are of particular value, as they can provide the expertise to challenge the opposition's technical arguments.

"When a seriously dressed Dr Engineer with a black attache case comes to the podium in a debate, the ordinary citizen is already more impressed than he would be by someone with a beard or dirty parka ... Scientists in the nuclear debate have been a decisive political resource, and no party could hope to gain public attention without scientific support" (Nelkin and Pollack 1981, 89).

As was mentioned earlier, neither of the two anti-nuclear groups had any sort of scientific credentials, and this may be another source of legitimacy which the nuclear industry has been able to capitalise upon.

Third party endorsement can also ensure that the message is actually heeded by people, since information which arrives from a number of channels is more likely to be acted upon than that which arrives from one source alone (Palin 1992, 6). All four groups had sought out and used impartial third party experts, although as CORE pointed out

"as soon as one of those impartial experts has come on your side a few times, he's not called impartial any more by the other side."

A crucial difference in the third parties which the groups had been able to recruit was that BNFL were aided by the Sellafield unions, whose economic interests depend upon the long term success of the plant (hence the arguments with CORE), and who helped to lobby political bodies, organised petitions and so on (see montage overleaf). The participation of trades unions may have strengthened BNFL's credibility because their assistance was a third party endorsement from local people themselves -

"Employees are the most important tools of public relations. Properly motivated and properly utilized, they can accomplish more than all other tools combined" (Nolte 1974, 355).

Groups with similar interests provide another source of potential third party support (Wilson 1984, 37). However, FoE Cockermonth, NIREX and BNFL had not chosen to pursue links with like-minded organizations. The NIREX representative summed up the industry stance -

"We endorse any safe activity within the industry but we don't make a public show of it."

It appears that there is no actual conflict between these groups and their potential allies, merely that chances for co-operation and a more sustained publicity campaign have been missed. Only CORE said that they actively worked with other groups, citing work with CND against the use of Barrow docks for both civil and military nuclear projects as a prime example of such work.

'Celebrities' provide another form of third party endorsement for a campaign which may gain extra media coverage of events. This avenue was something which the nuclear industry had not explored to the same extent as their opponents. In fact, the industry's representatives seemed rather surprised at the very idea of involving celebrities. NIREX's representative said,

"We don't go out of our way to solicit celebrities, although Lord Cavendish is on our board, I suppose you could call him a Cumbrian celebrity."

BNFL's notions of what constituted a celebrity also extended only as far as local politics - 'councillors or your MP'. On the other hand, CORE had certainly been successful in gaining celebrity endorsements, with music celebrities U2, The Farm, Bob Geldolf and Mike Harding, sporting celebrities such as Ian Botham and the England Football team, as well as others such as Jeremy Irons and David Bellamy all backing their campaign. FoE Cockermonth had also tried to gain celebrity endorsements, but as yet they have not been successful. Like 'impartial experts', celebrities can be seen to be 'housetrained', and so it is important to have a variety of celebrities at hand (Wilson 1984, 31). The long list of CORE's famous supporters would seem to provide such a variety. One must also be careful of unfortunate alliances which may prove embarrassing, such as David Icke's links with the Green Party (Davies 1985, 37). The celebrity endorsements attained by CORE could also have drawbacks because all these celebrities may be seen as 'outsiders' interfering in local affairs. FoE Cockermonth's failure to attract celebrity support may indicate their lack of stature on a national stage.

6.3.10 Use of the media

All four groups issued regular press releases, did interviews and often wrote letters to the editors of newspapers. There is an extent to which all sides might expect their press releases to be printed without much distortion due to the technical complexity of the nuclear debate, which may deter some journalists, faced with deadlines and similar pressures, from investigating statements in depth before printing them. As the nuclear debate is an important economic issue in West Cumbria, it might also be expected that, at a local level at least, press

LOCAL NEWS

9,600 job axings 'if Sellafield goes'

By MARTIN MORGAN

A STAGGERING total of 9,600 jobs would eventually be lost if Sellafield goes under.

The grim calculation comes in a hard-hitting GMB union study which warns that Copeland's jobless rate would hit 48.9 per cent, or one in two of the working population.

And if Thorp fails to go ahead, warns trades union boss Nick Anderson, regional secretary of the GMB, then the future of the nuclear plant could be in serious jeopardy.

Warning of the danger of axing Thorp, Mr Anderson said: "Some time in the near future we could be looking at a disaster for West Cumbria.

"We have spoken to BNFL management and they tell us that without Thorp their operation becomes unviable."

However, Mr Anderson said he was extremely confident that the £2.85 billion plant would get the

'In the near future we could be looking at a disaster for West Cumbria'

green light, possibly before the end of this week.

The GMB has sent its report for consideration to the departments of the Environment, Trade and Industry and Employment.

Even if Sellafield stayed open with the abandonment of Thorp, unemployment in Copeland would rise by 2,400, to 28.4 per cent, says the report.

The figure currently is 12.95 per cent.

Julian Kenyon, assistant regional director of employers' group, the CBI, joined the call for an end to government indecision.

"It is clear the economy in Cumbria is being held back because of the uncertainty surrounding Thorp."

But Martin Forwood, of local anti-nuclear group, CORE, said the GMB claims were "utter nonsense."

He said: "This is just scaremongering at its worst. It's nonsense to say there would be a dearth of jobs.

"If people see Thorp is not opening, it would attract inward investment creating more jobs."

Sellafield goes'



Parish's past goes 'int in Commons lobby

SELLAFIELD trades unions are to lobby MPs at the House of Commons today as the culmination of their 3,000 mile "Trust Us" tour.

The tour has targeted councils and politicians in 13 cities, in Britain and Ireland, who are sceptical about the nuclear industry.

And has called vigorously for the start-up of the THORP plant, at Sellafield.

"We'll be telling MPs enough is enough," said Nick Johnston, Clerk to the Trust Us campaign.

"It has gone particularly well. We got a good reception in all the cities we went to. I think we changed a few peoples' minds. We will now have to see our response when we get to London.

He added: "Everywhere we have gone we've told how much BNFL spends in that city. Over £100m is spent in

Manchester by the nuclear industry, but it's the headquarters of the Nuclear Free Local Authorities."

Mr Johnston claimed that 10,000 to 12,000 jobs in Manchester alone were supported by BNFL, mainly through suppliers to the industry.

The unions, led by John Kane, GMB Sellafield Shop Stewards' Convener and Alan Westnedge, AEEU Convener, will spend three hours with MPs at Whitehall.

They will be joined by John Edmonds, GMB General Secretary, Bill Brett, IPMS General Secretary, and Copeland MP Jack Cunningham.

The group will later meet Martin O'Neill, Labour's Shadow Energy Secretary.

Cities visited on the Trust Us tour have included Dublin, Belfast, Glasgow, Cardiff and Manchester.

Environment Secretary John Gummer is expected to announce the government's decision on THORP within the next few days.

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occasion. chairman David is a very special gh Parish and for cil, now in its path is a magnificent

Chapter Six: The public information campaigns of four local groups

statements from any of the four groups will be seen as newsworthy items, and stand a better chance of receiving coverage. The groups reported, however, that their attempts to talk with the media had met with varying degrees of success. NIREX and FoE both reported that overall, their relationship with both the local and national television and newspapers was good. FoE Cockermonth's coordinator though, admitted that in terms of national press, this 'good' relationship meant that 'We try letters to the editors of national newspapers but they don't print them.' She also pointed out that

"I have had constant fights with the editor of the West Cumberland Times and Star, because they don't cover the issues at all."

CORE reported less difficulty in getting national coverage because

'we've learnt to see what is just purely a local issue that the nationals just won't be interested in. So we avoid that mainly. So by the time we think it is a national issue, we usually get some sort of coverage.'

They seemed to feel they received a fair press: 'There's nobody who's against us.' Like FoE, they did also report a reluctance amongst some Cumbrian newspapers to carry stories on the nuclear industry.

"Some papers don't give it any coverage at all because they are a bit frightened ... for example, The Westmorland Gazette, which is a weekly paper based in Kendal. They will cover Heysham power station because that 'comes within their district' but they won't cover Sellafield because it doesn't 'come within their district'. Sellafield is actually far closer than Heysham and far more of a risk to them, but that's nasty, it doesn't fit in with the 'cucumber sandwich, afternoon vicar', that kind of image, so it doesn't get the coverage, which is a disservice to the people over there who hardly know what's going on over here."

BNFL also seemed to have had some bad experiences when dealing with the press. Ms Cater's response when asked whether they attempted to release information bearing BNFL's point of view to the media, was a curt 'Yes regularly, whether they choose to use them or not is their business.' Although Dr Tognarelli described the local media coverage as generally 'reasonable to good in most cases ... it is frank, open and honest on both sides', with Border Television 'better factually because they have taken the time to bother to come and have a look.' However, he insinuated that certain problems occurred with some sections of the press.

"The local press can be a little mixed at times. Remember they are there to sell newspapers. National coverage tends to concentrate on the sensational side, sometimes even knocking

the industry. Some indeed tend to follow the anti-nuclear party line. Not surprising if one stays in London and can get press releases from the anti-nuclear industry."

Dr Tognarelli's choice of words, using the phrase 'anti-nuclear industry' was a little surprising, but he clearly feels an amount of resentment at what he perceives to be journalists who do not bother to visit the site itself and to hear BNFL's side of the story.

The possibility that BNFL's relationship with the media might not have been as trouble-free as with the other groups is an interesting finding. It could be that the chequered history of the nuclear industry has provided journalists with their own prejudices which may affect coverage of stories about BNFL (Cutlip 1988, 51). The possibility that media coverage might be adverse to the industry could be an important influence upon public opinion by reinforcing popular myths about the industry, and this might explain the industry's irritation at certain journalists. Whether or not the press are anti-nuclear is examined in more detail in Chapter Seven.

6.3.11 Actions

Despite all the resources the nuclear industry may have at its disposal, they have one major handicap, in the shape of the history of the nuclear industry itself (James 1982, xxii). As the Voltairean cliché has it, action speaks louder than words, and the actions of the nuclear industry worldwide have certainly provided enough instances for public concern (Block 1988, 90). It could be that a single, all too tangible mistake, such as the Windscale fire or Chernobyl, may well have a more long lasting effect on public opinion than the work that public relations officers could ever do.

In West Cumbria, the nuclear industry may be able to off-set this difficulty. One of the most influential tactics a group can use is to integrate events into its public relations campaign which demonstrate a sense of social responsibility (Harlow 1988, 9-11). The nuclear industry, however, had much to be positive about. BNFL could boast that their contribution was quite simply 'the establishment of ongoing employment.' NIREX could not claim to have brought employment to the same extent but still laid claim to a positive economic impact -

"We have put a lot of money into the community ... we're not great employers, but we are putting a lot of money into the community by services necessary to our operations, whether that's industrial, commercial services or whether that's hotels, guest houses, pubs, clubs, shops, whatever, there is an economic spin-off to what we're doing. The work we've done here to date is probably

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over £130,000,000 worth of work which must have some economic spin-off, and that's apart from any direct sponsorship of various organizations and events."

Sponsorship is a good example of how groups can be seen to contribute to their community (Wood 1992, 86), and BNFI certainly donate much to West Cumbria through this route. It should be remembered, of course, that actions for the good of the community may only prove a useful public relations tool while they are perceived as being genuine rather than a contrived piece of public relations work. The more BNFL and NIREX are seen to sponsor local events and to provide free equipment for local societies and clubs, the more they may be seen to have something to hide which requires such public relations efforts, and this suspicion may actually frighten people, rather than reassure them. It may even lead to a belief that the nuclear industry is trying to enter some Faustian pact with the West Cumbrian community. Consequently, the nuclear industry's sponsorship schemes have to find the elusive middle ground between efficiency and obtrusion.

When asked whether their organization had in any way made a contribution to the West Cumbrian community (not necessarily directly connected to the nuclear industry), the spokesperson of CORE could only say that 'I think that for some people we have shown them the down-side of Sellafield', and FoE said

"Certainly in raising awareness of environmental issues generally and certainly by putting pressure on planning and things, even if a lot of the time it doesn't actually affect the final decision I think a lot of the time it has an effect in varying the decision."

Both these groups could thus only see their contribution in negative terms, merely criticising other people's proposals, rather than putting forward anything constructive themselves. As mentioned above, the anti-nuclear groups run the risk of being seen to be too negative.

6.3.12 Work in the street

It is often argued that direct human contact is the most effective way of getting someone to heed a message. However, whilst both CORE and FoE Cockermouth used this 'principal weapon of advocacy' (Wood 1992, 15) by talking to people in the streets of Cumbria, NIREX merely 'talk to the public through exhibitions'; and BNFL

"tend not to go in for this collaring people in the street stuff ... we're not into this grabbing hold of someone and shoving a leaflet into their hand about nuclear power."

Similarly, whilst Friends of the Earth and CORE had organised demonstrations in support of their campaign, NIREX and BNFL had not. This reticence on the part of the nuclear industry to employ direct action, like their reluctance to spend their considerable PR budgets on obvious methods such as posters, is perhaps indicative of a tendency for the nuclear industry to avoid being as proactive as perhaps they might have been. Despite the fact that they possess the financial, staffing and technological resources which make it possible to produce copious amounts of publicity information, both BNFL and NIREX do not seem to be employing any sort of 'hard-sell' on the local populace. Instead, it appears that there may be even be a perception on their part of a need to avoid being too overt in their publicity. Their reluctance may be because they seek to avoid attracting fresh controversy, and thus have to find a fine balance between creating a positive image on the one hand, and keeping a low profile and thus reducing possible opposition on the other. It may simply be that being pro-active does not fit in with their notion of the proper behaviour of a professional organization. There may also be an extent to which BNFL and NIREX, as publicly owned companies, are wary of any chance of the public perceiving the organization to be wastefully spending public money on public relations (Nolte 1974, 436-37).

6.3.13 Communications

The groups were asked about the types of research which they employed to examine local attitudes and opinions, and how they evaluated the success of their various public campaigns. The methods employed to assess the nature of local opinion are important, for if they do not provide an accurate picture of local opinion, the organization might not know the true level of support or opposition that exists for their arguments, and might consequently be unaware of the true nature and scale of their public information task.

NIREX said

"We have sought to measure and analyze perceptions and views by direct 'man in the street' type surveys, by surveying groups ... by national and local polls."

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They had used the feedback from these studies to refine the message which they attempted to convey and the method and the geographical areas in which they conveyed it, and they had also used this research to examine the cost-effectiveness of their advertising campaigns.

BNFL's methods of measuring public opinion centred upon measuring the numbers of visitors to the visitors centre, the amount of people on programmed visits, and the results of an attitude survey completed by some visitors to the centre asking them about their views on nuclear power before and after visiting the centre. This method of research seemed to involve more than a little self-selection on the part of the public - BNFL would only receive information on those people who actually made the effort to come to Sellafield. They also referred to work on public attitudes to nuclear power carried out by companies such as MORI.

CORE assessed public opinion by organizing a variety of questionnaires targeted at different parts of the population, and assessed their success in terms of the amount of donations made to CORE, and responses to postal campaigns, which also seemed to be a rather self-selecting method of assessing public attitudes.

FoE Cocker-mouth referred to work on public opinion carried out by national Friends of the Earth and also felt that it was important that

"when we are out on the streets we get a lot of input from people because people stop and talk whatever their views."

Assessing the *true* nature of public opinion on any subject is always problematic, but the self-selecting nature of the samples used by both CORE and BNFL, and the problems of methodology in NIREX's research (see Chapter Four) means that distortions could well have arisen in all this research, which might prove to be an additional handicap to the groups in assessing the public information tasks which lie before them. It should also be noted that talking to the public face-to-face may also offer the best way of interpreting the state of popular feelings, and that because they are the only groups to do so, FoE and CORE might have an advantage over the nuclear industry.

6.4 Conclusions

The greater financial resources of the nuclear industry gave them certain advantages, but they were also hampered in some ways. With more money, the nuclear industry has greater

resources both in terms of personnel and technology, and can afford a more polished image for their public information campaign. They can also utilise a wider variety of PR tools. Where both sides use the same techniques, the industry can afford to use them far more often and to a greater extent, such as was the case with posters, school links, and information hotlines. One would expect this advantage to give the industry the upper hand in influencing public opinion. However, for all their money, the industry are reticent to use their resources to their full potential, shying away from debates in the forefront of the public eye. Their reluctance to do this, perhaps caused in part by apparent problems of internal organization, leaves a space at grass roots level which the anti-nuclear lobby could capitalise upon through their direct action.

The anti-nuclear groups face an uphill task in persuading the local populace that the potential disadvantages of the nuclear industry's presence in West Cumbria outweigh the more easily perceptible advantages. CORE and FoE might also suffer through being seen to be 'whingers' because they do not offer alternatives to the industry, and also because of the way in which the industry tries to remain aloof from argument with the groups.

There are areas such as the use of celebrities and combined fronts which could be used more by both sides with little risk of negative side-effects, whilst the industry needs to improve its relationship with the media.

Chapter Seven

The Surveys

7.1 Introduction and important factors

Earlier chapters have already examined the historical and socio-economic factors which might affect public opinion about the nuclear industry, as well as the efforts made by campaigning groups to mould that opinion. The purpose of this chapter is to analyse the opinions voiced by the three targeted publics of the research (the representative sample of the population of Cocker mouth; local campaigning groups themselves⁴³; and national organizations concerned with energy and the environment) in response to the surveys detailed in Chapter Five. Of these responses, those of the population of Cocker mouth were of primary concern.

7.1.1 Problems of analysis

Analysis of the more qualitative, 'open' questions used in these surveys presented a problem. Although the responses often shared a basic point of argument, they were presented in a range of superficially disparate comments. This was because the shape of the final response was entirely dependent upon the individual respondent, and each expressed their views in differing styles, reflecting their own experiences, cultural upbringing, knowledge, prejudices and capacities for self-expression. In an attempt to rectify this situation and to draw some form of condensed picture from these responses, a quantitative element was introduced. Responses were coded into several categories, with each category containing responses sharing the same basic point of argument, following the method used by Macgill in analysing open questions on nuclear issues in West Cumbria (Macgill 1987 92-105). If an individual's response contained several basic points of argument, the response was registered in several categories. This method provided the quantitative framework necessary to display the frequency of basic opinions amongst the respondents, whilst still allowing them the freedom of expression allowed in purely qualitative research.

In this coding technique, the idiosyncrasies of phrasing and use of emotional language present in the original responses were sacrificed to create aggregates of basic points of view. In order that the fuller and more colourful original responses were not lost, the text of this section also contains a selection of some of the original statements given by individual respondents to the various questions. These verbatim quotations should give the reader a more accurate 'feel' of the respondents' personal reactions to the subject. Information regarding the gender, age, occupational status and the style of the housing area of each respondent quoted is given, in

⁴³ Quotes from these groups which are included in the text below come from the interviews outlined in Chapter Five and Chapter Six.

order to give each some form of biographical context.

It should be noted that such quotations as are included in this section do not necessarily represent the view of the majority of respondents on each subject. They are primarily intended to indicate some examples from the wide range of types of response offered by the sample of the population of Cockermouth.

Before analysing the actual questions, it is helpful to understand some factors which could influence understanding of attitudes to nuclear power. Amongst the local respondents these factors included significant non-response; connections with the nuclear industry; and levels of environmentalism. Their relevance is outlined below. An attempt is also made to place the responses of the local and national institutions into some form of context.

7.1.2 Significant non-response

Of the 159 members of the public who agreed to take part in an unspecified survey, 48 proved to be 'significant non-respondents'⁴⁴ when it was revealed that the questions were to be about nuclear power. As Figure 7.1 shows, this is a substantial proportion of all possible respondents.

Much of the earlier research into West Cumbrian opinion neglected this significant non-response (see Chapter Four), and consequently, implied that local people feel more strongly about the issue of nuclear power than is actually the case. For example, Priority Search implied that 47% of the West Cumbrian population felt that 'the disposal of nuclear waste poses unacceptable risks'. They failed to point out that it was really only 47% of their respondents who felt that way, not 47% of the whole population.

This study found that the majority of significant non-respondents seemed to feel the debate to be completely alien to them, a contrast to the previously implied notions of great concern about health risks or economic dependency,.

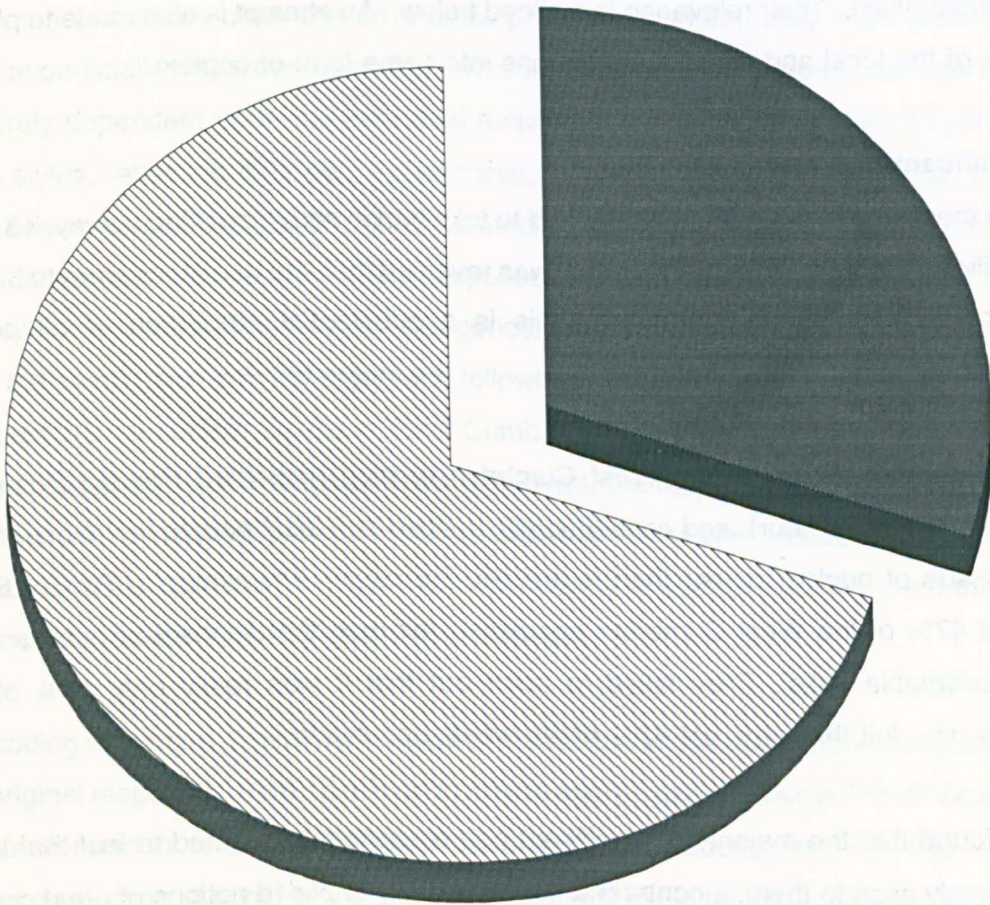
"I'm not that interested. Maybe if I had someone working there..." (F, 30-44, working, post-war estate housing area)

⁴⁴ See Chapter Five

Figure 7.1 Non-response in Cockermouth, 1994

Ratio of significant non-respondents to respondents

- Significant non-respondents
- ▨ Respondents



"A's nut awa bothered about it marra. Waste o' time."
(Male 30-44, not seeking employment, local authority housing area)

There were other reasons for significant non-response. Some people seemed reticent to express opinions because they felt ill-qualified to pass comment on such a complex subject as nuclear power.

"Things are far beyond my knowledge."
(Female, 45-59, working, post-war estate housing area)

Many of the more senior members of the sample chose not to answer the questionnaire because they felt that their views were not important or that they could not influence anyone.

"I'm beyond bothering, at my age."
(Female, 75+, retired, post-war estate housing area.)

"At my age it doesn't make much odds."
(Male ,75+, retired, mixed housing area)

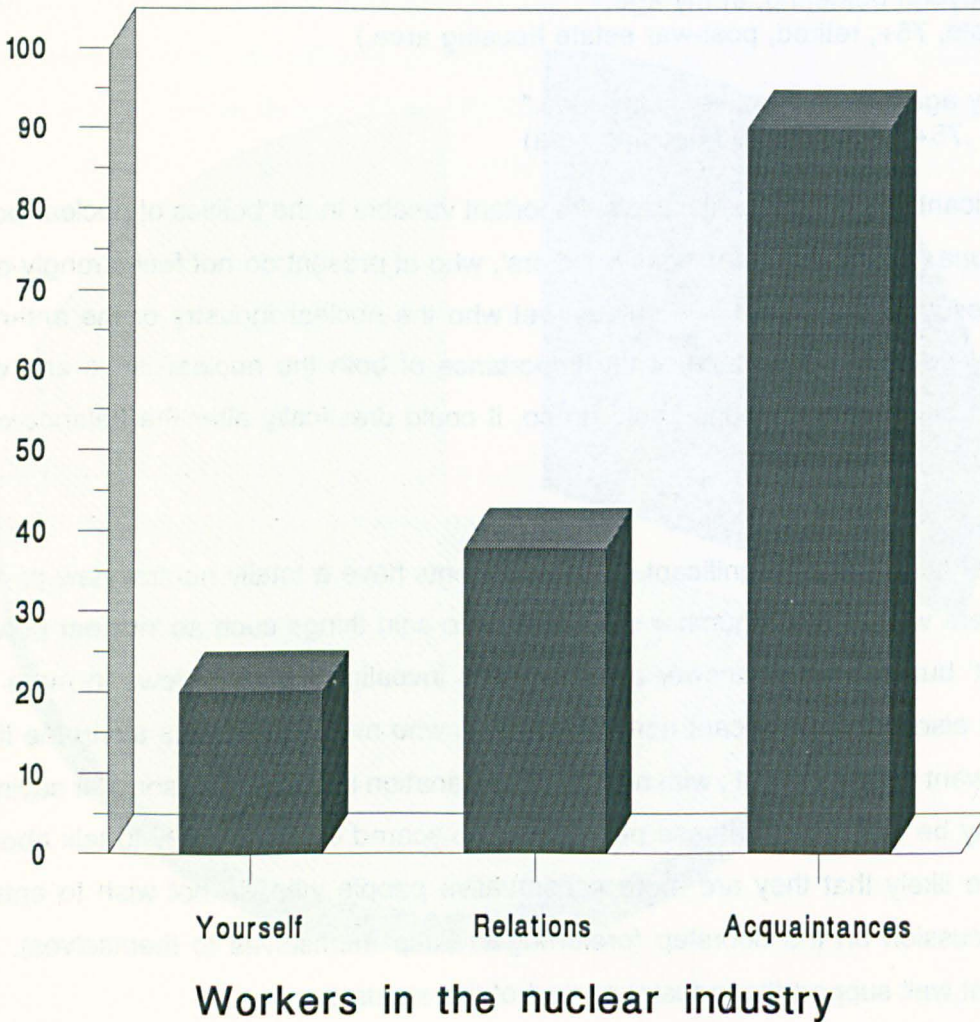
Such significant non-respondents are an important variable in the politics of nuclear power in West Cumbria. They represent 'floating voters', who at present do not feel strongly enough about the issue to participate in a survey, yet who the nuclear industry or the anti-nuclear groups may be able to convince of the importance of both the nuclear issue and of their opinions. If either set of groups could do so, it could drastically alter the balance of local public opinion.

On the other hand, not all significant non-respondents have a totally neutral view of nuclear power. There were a small number of people who said things such as 'nuclear power, oh I'm all for it' but refused to answer any questions investigating their views in more detail. There were also some significant non-respondents who made comments along the lines of 'no, I don't want to talk about it', with no further explanation as to their reasons for saying this. Whilst it may be that some of these people are too scared of the industry to talk about it, it seems more likely that they are more conservative people who do not wish to enter into political discussion on the doorstep (preferring to keep themselves to themselves). Such people might well support the industry as part of the status quo.

Figure 7.2 Connections between respondents and the nuclear industry, 1994

Do you/your family and/or anyone you know, work or have you/they ever worked for the nuclear industry or for any company involved in the nuclear industry.

Percentage respondents



Sadly, the true opinion of non-respondents can never be scientifically proven, and must remain a matter of conjecture. Only a couple of things can be known for certain. There is a significant portion of people in the town of Cockermouth, and perhaps in a wider area of Cumbria, who, for whatever reason, do not wish to take the political action of discussing nuclear power with a stranger. These people might become involved in the debate, should any of the campaigning groups become able to motivate them.

7.1.3 Connections between the nuclear industry and the people of Cockermouth

Before this survey was conducted, there was no available information on precise numbers of nuclear industry workers residing in Cockermouth, and so no quotas were set for employment in the industry. Instead questions were added to the survey to examine such connections retrospectively.

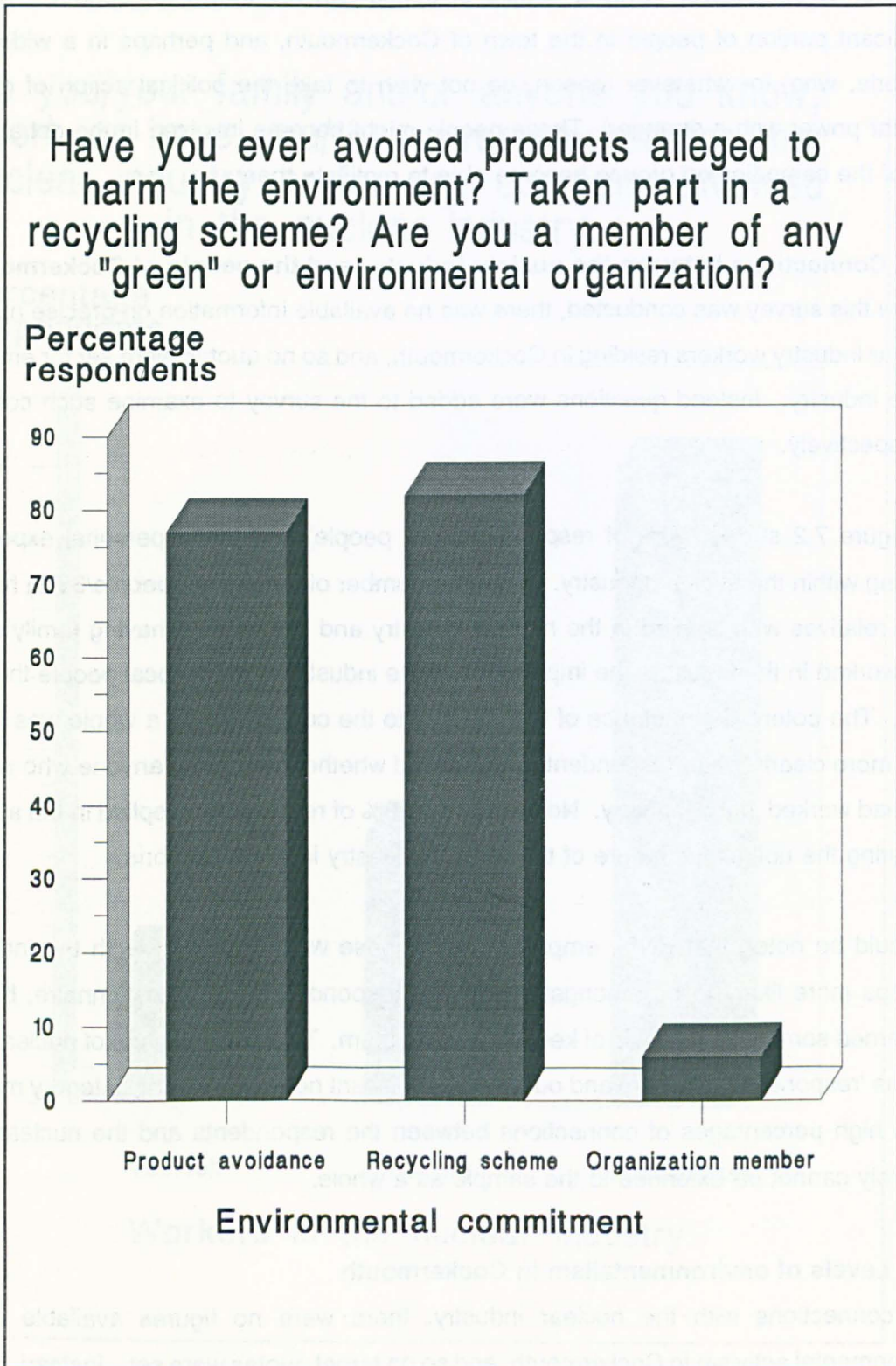
As Figure 7.2 shows, 20% of respondents (22 people) had direct personal experience of working within the nuclear industry. A greater number of people (42 people/38%) had one or more relatives who worked in the nuclear industry and over a third having family members who worked in the industry, the importance of the industry to many local people thus can be seen. The potential importance of the industry to the community as a whole was illustrated even more clearly when respondents were asked whether they knew anyone who worked, or who had worked in the industry. No fewer than 90% of respondents replied in the affirmative, indicating the ubiquitous nature of the nuclear industry in West Cumbria.

It should be noted that BNFL employees, and those with close links with the industry are perhaps more likely to be amongst those who responded to the questionnaire, because it concerned something which is of keen interest to them. This self-selection of nuclear workers into the 'respondent' category and out of the 'significant non-respondent' category means that these high percentages of connections between the respondents and the nuclear industry probably cannot be extended to the sample as a whole.

7.1.4 Levels of environmentalism in Cockermouth

Like connections with the nuclear industry, there were no figures available regarding environmental activism in Cockermouth, and so no target quotas were set. Instead, questions were added to discover such levels of environmentalism retrospectively. At a relatively

Figure 7.3 Levels of public environmental action, 1994



passive level there appeared to be quite a high level of environmental concern amongst the respondents. As Figure 7.3 shows, 77% (85 people) had avoided using certain products alleged to harm the environment, and 82% (91 people) had taken part in recycling schemes for paper, glass, cans etc. These figures were even higher than the national levels of product avoidance found by Gallup (75%). As in Gallup's poll, environmental action was far less common at a more political level. 94% of respondents were not member of any environmental organization, with just 3 contributors to Friends of the Earth, 3 contributors to Greenpeace and one contributor to the British Union for the Abolition of Vivisection (BUAV) amongst the respondents. This was a lower level of direct environmentalism than the 10% found by Gallup at a national level.

The contrast between the low levels of political environmentalism and the far higher numbers of people with direct connections to the nuclear industry is important. In the 20% of respondents who work for them, and to a lesser extent in the 38% of people whose family work there, BNFL and NIREX have a captive audience, to whom it is relatively easy to convey their arguments. FoE and CORE meanwhile, have to catch virtually all their support from a 'cold start'.

7.1.5 The contest in which the main campaigning organizations responded

In order to provide a context within which the views of the four main campaigning organizations could be understood, they were each asked to crystallise three things: their aims; the message about nuclear power which they would most like to convey to the local public; and the timescale upon which they operated. They answered as follows:

NIREX

Aim - 'To develop a single national facility for the disposal of low and intermediate level radioactive waste'.

Message about nuclear power - 'Safe, clean, vital for the country'.

Timescale - 'to be in operation by about 2010 (given planning permission for a rock laboratory in 1994 and permission for the repository itself in 1998/9)'.

BNFL

Aim - 'The reprocessing of spent nuclear fuel is the company's core activity ... My role within the company is to manage the facility that is the Visitors Centre and the purpose of the Visitors Centre is to demonstrate that BNFL is a company dedicated safety, and to gain further public acceptance of the nuclear power industry'.

Message about - 'Safety'
nuclear power

Timescale - 'ongoing'

FoE Cockermonth

Aim - 'To promote renewable and energy efficiency, to reduce dependence on ~~nuclear~~ power, to promote clean technologies, to reduce car use'.

Message about - 'That it is unnecessary'.
nuclear power

Timescale - 'Just a continuing thing'.

CORE

Aim - 'We want to stop reprocessing. We want to stop the import of spent fuel'.

Message about - 'No expansion, but diversification'.
nuclear power

Timescale - 'Sooner rather than later'.

It was rather interesting that most of the groups did not see the general public as an important focus of their work. Only BNFL's representative specifically mentioned 'public acceptance' as an objective.

7.1.6 The postal questionnaire, and the organizations which replied

Another fact which needs highlighting is that the response rate to the postal questionnaire was rather disappointing. On May 20 1994, questionnaires were sent to groups which might be expected to have an interest in Cumbrian issues. 93 were sent to national groups concerned with energy matters, a further 8 to local and national party political bodies, and 6 to West

Cumbrian environmental groups. Only 21 completed questionnaires were returned to the Freepost address by September 1 1994. Surprisingly, some of the more prominent participants in the debate over the future of nuclear power were amongst the non-respondents. National Friends of the Earth failed to complete the questionnaire, saying that they did not have the resources to do so. Greenpeace and the Council for the Protection of Rural England gave a similar answer, returning information packs instead. Unfortunately, the decision to include no other information than responses to the questionnaires (see Chapter Five) meant that the information in these packs had to be omitted from analysis. Some of the completed questionnaires, such as those from the UKAEA and the Martin Centre for Architectural and Urban Studies contained only personal viewpoints from employees which stated that they were not the views of their organizations. As it was the views of the organizations themselves which were sought, it was decided that whilst these responses were very interesting and informative, they could not be used in this research either. Of the other national organizations concerned with energy, one organization had moved from the address listed in the Environment Council's handbook, and their questionnaire was consequently returned unopened. 21 organizations wrote back to say that they could not answer the questionnaire as it was outside their field of expertise. Of the local environmental and conservation groups, and the local and national political parties, only the national Liberal Democrats completed the questionnaire. This perhaps signifies an unwillingness to enter into any controversial discussion on the subject on the part of most political organizations, and a desire to stay apolitical on the part of the local environmental bodies.

With only 21 sets of responses, and some of those ineligible on methodological grounds, it was decided that the postal sample was not large enough to be statistically representative of those groups targeted, and so the returned questionnaires would only be used to show the range of opinions held by such groups. For reasons of space, the respondent organizations are referred to under the abbreviations given in Table 7.1. Quotes from these groups which are included in the text below come from the completed questionnaires which they returned.

Most of the respondent organizations were not primarily concerned with the nuclear industry. When asked to give a rough estimate of the percentage of the organization's work which was concerned with the civil nuclear energy industry in Britain, most said that less than 2% of their

Table 7.1 Abbreviations employed to refer to respondents to the postal questionnaire

Abbreviation	Name of organization
ACE	Association for the Conservation of Energy
AECB	Association of Environmentally Conscious Buildings
BGS	British Geological Survey
BNIF	British Nuclear Industry Forum
BSRIA	The Building Services Research and Information Association - Environmental Section
CEE	Centre for Energy and the Environment
CEI	Centre for Environmental Initiatives
CHPA	Combined Heat and Power Association
EN	English Nature
GER	United Kingdom Global Environmental Research Office
IME	Institute Of Mechanical Engineers
LD	Liberal Democrats
NEF	National Energy Foundation
NPVAC	Newcastle Photovoltaics Applications Centre
STA	Solar Trade Associations Limited
TACE	The Association of Consulting Engineers
TLI	The Landscape Institute
UI	Uranium Institute

work was so concerned. The exceptions were BGS and CHPA who said that 5% of their work was occupied with the British nuclear industry, LD and UI who said 10%, and BNIF who said

100%. When asked about the percentage of their work which was concerned with the civil nuclear energy industry in West Cumbria in particular, the figures were even lower. Most said that only a mere fraction, or non of their work focused upon West Cumbria. Only the Liberal Democrats, BGS and CHPA said 5% and the BNIF 30%. Given the lack of direct concern with West Cumbria in particular, it would be interesting to discover whether this national public in any way stereotyped the West Cumbrian situation.

The organizations were also asked to say whether they broadly supported or opposed the civil nuclear power industry. Nearly all the organizations claimed to be impartial. The UI, TACE and BNIF declared support, AECB and the Liberal Democrats declared themselves to be in opposition. GER, IME and STA all gave guarded answers which would indicate a tendency to support certain aspects of the industry for the time-being at least.

7.1.7 Conclusions

Up to as much as 30% of the West Cumbrian public may be described as significant non-respondents who do not hold particularly strong views on nuclear power and therefore represent a pool of 'floating voters' whom campaigning groups might be able to motivate. Repeated omission of this factor in earlier studies has led researchers to imply that the West Cumbrian public is more concerned about certain issues than is actually the case. By highlighting this factor of non-response, this study will reflect overall attitudes more accurately.

The nuclear industry has strong connections with the respondents to the survey. A fifth worked, or had worked, for the industry, over a third had relatives who worked, or had worked, for the industry, and 90% of respondents had acquaintances who worked for the industry. While environmental action requiring little commitment was also very high amongst respondents, membership of environmental organizations was very low, and the industry therefore has a head start in the battle for West Cumbrian hearts and minds because of its larger captive audience.

Of the four local campaigning groups, BNFL are the only ones who see public acceptance as an end in itself. The other groups see it more as just one way to achieve goals which might be attainable without mass public support. Most of the organizations who were sent a copy of the postal questionnaire failed to complete it. With the exception of BNIF, the respondents

· organizations were not preoccupied with the nuclear industry, and certainly not with the West Cumbrian nuclear industry. The majority of postal respondents claimed to have a neutral stance towards the nuclear industry. Of the others, slightly more declared support for the industry than said they opposed it.

All of these factors should be borne in mind when reviewing the findings below.

7.2 General Energy Policy

7.2.1 West Cumbrian public opinion

The section of the questionnaire related to general energy policy involved five questions, which were designed to evaluate local attitudes towards nuclear power in relation to attitudes towards other power sources. One question asked which energy sources respondents felt should and should not be used to supply Britain's energy supply:

"I would like you to think about the energy supply which we need to operate the mechanical and electronic equipment which we use everyday of our lives. At the moment most of these things are powered by electricity, which is generated in power stations run on coal, gas and nuclear power."

"What resources do you think we should use to generate our energy supply, both now, and in the future?"

Unlike the questions in previous studies, respondents were offered no set list of possible answers. The choice of responses were entirely at their own discretion. The frequencies of different responses to this question is shown in Figure 7.4

The results from this survey shed new light upon the levels of support for nuclear power found amongst West Cumbrians in the previous studies. 42% of respondents spontaneously named nuclear power as a power source which Britain should use. This is certainly a substantial figure in absolute terms, but it is slightly lower than levels of support found in the earlier studies. Perhaps this is because public opinion is gradually turning against nuclear power, but it is perhaps as much due to the fact that this question asked about general energy policy rather than focusing specifically upon nuclear power as earlier questions had done. It may also be a disappointing figure for the nuclear industry in a town so close to the largest nuclear site in Britain. If one takes into account the 48 'significant non-respondents' who, after all, were not particularly keen to express support for the industry, only 26% of possible respondents named nuclear power as an energy source they would like to see Britain using.

One must not overstate this argument. Nuclear power was the most frequently named energy source and the nuclear industry should be rightfully pleased with that result.

Figure 7.4 Energy resources favoured by West Cumbrian respondents, 1994

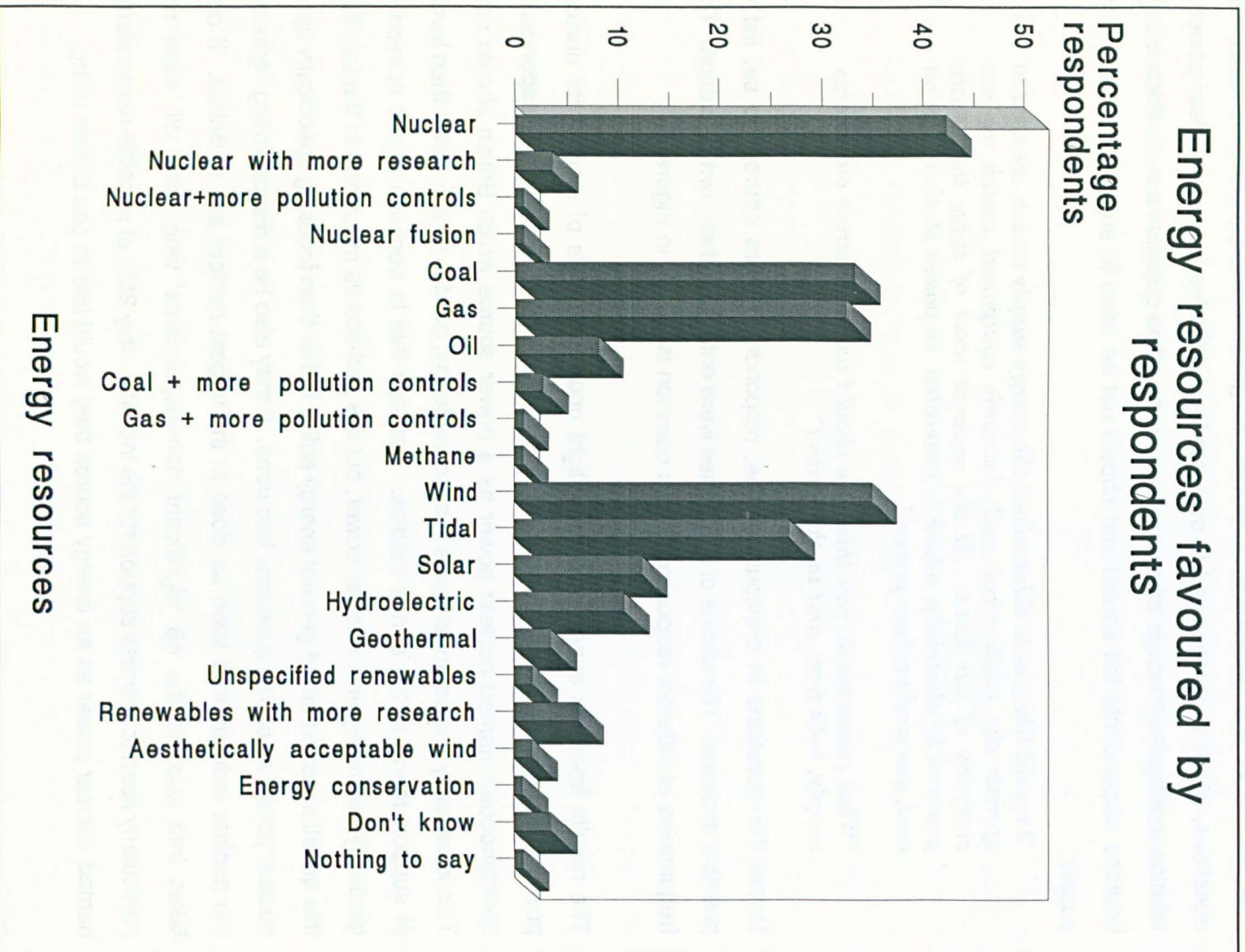
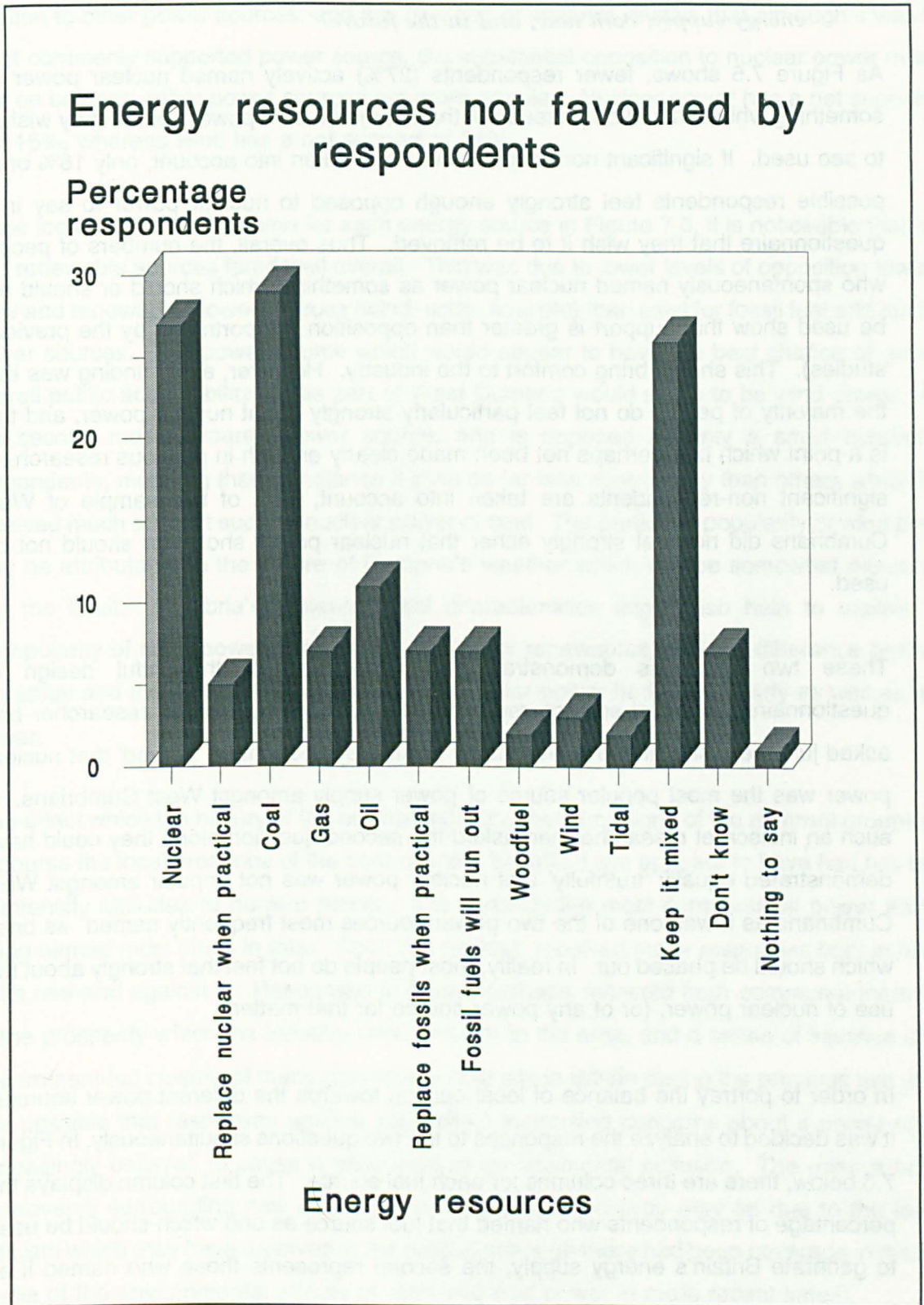


Figure 7.5 Energy resources not favoured by West Cumbrian respondents, 1994



The next question in the survey enquired

"What resources do you think we should not use to generate our energy supply, both now, and in the future?"

As Figure 7.5 shows, fewer respondents (27%) actively named nuclear power as something which should be phased out than named it as a power source they wished to see used. If significant non-respondents were taken into account, only 18% of all possible respondents feel strongly enough opposed to nuclear power to say in a questionnaire that they wish it to be removed. Thus overall, the numbers of people who spontaneously named nuclear power as something which should or should not be used show that support is greater than opposition (as portrayed by the previous studies). This should bring comfort to the industry. However, a key finding was that the majority of people do not feel particularly strongly about nuclear power, and this is a point which has perhaps not been made clearly enough in previous research. If significant non-respondents are taken into account, 54% of this sample of West Cumbrians did not feel strongly either that nuclear power should or should not be used.

These two questions demonstrate the importance of thoughtful design of questionnaires in social science research. If a careless or biased researcher had asked just the first of these questions by itself, they could have 'proved' that nuclear power was the most popular source of power supply amongst West Cumbrians. If such an indiscreet researcher had asked the second question alone they could have demonstrated equally 'truthfully' that nuclear power was not popular amongst West Cumbrians as it was one of the two power sources most frequently named as ones which should be phased out. In reality, most people do not feel that strongly about the use of nuclear power, (or of any power source for that matter).

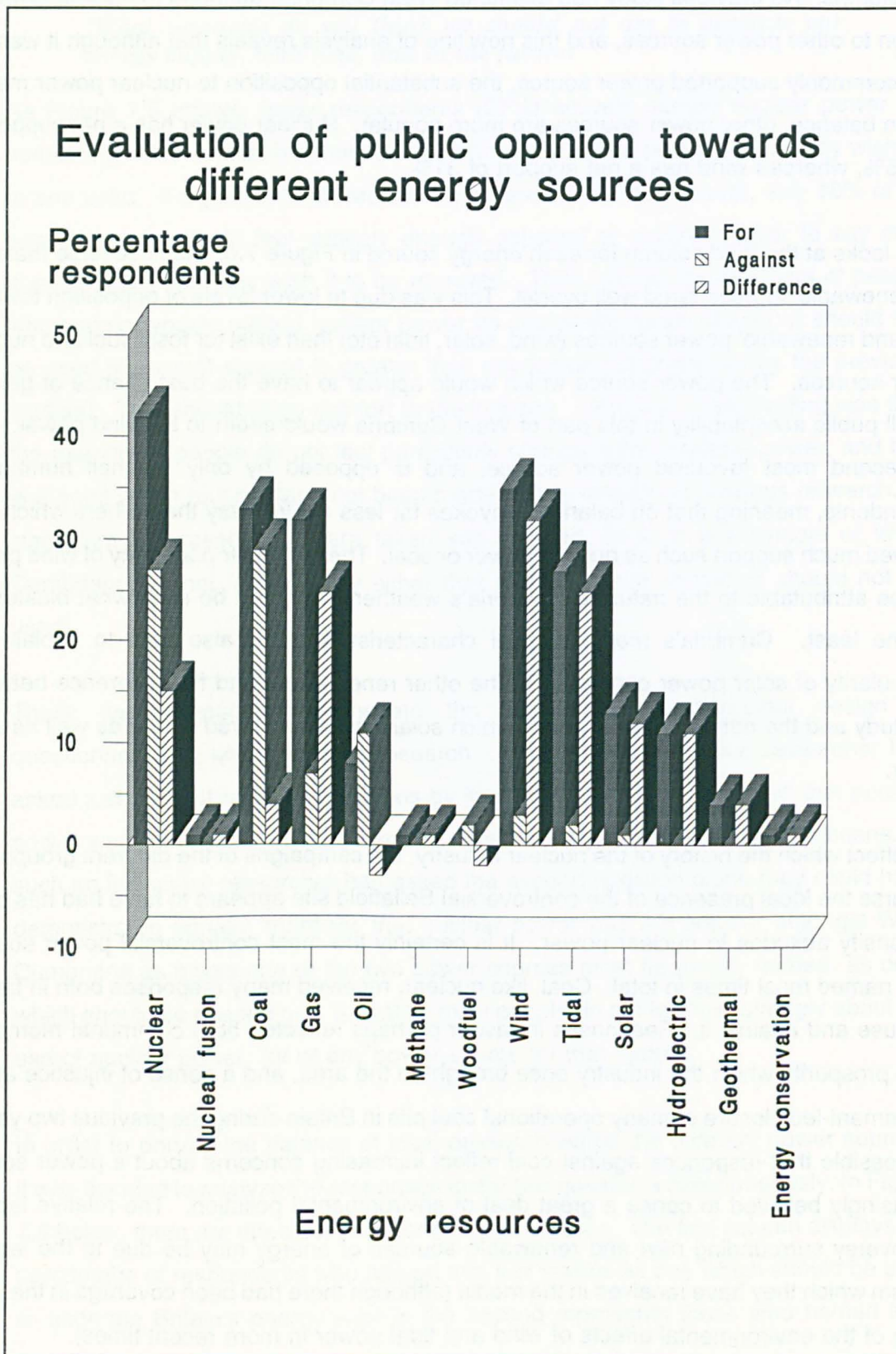
In order to portray the balance of local opinion towards the different power sources, it was decided to analyze the responses to the two questions simultaneously. In Figure 7.6 below, there are three columns for each fuel source. The first column displays the percentage of respondents who named that fuel source as one which should be used to generate Britain's energy supply, the second represents those who named it as

something which should not be used, and the third represents the difference between the first two columns. No previous study had examined West Cumbrian attitudes to nuclear power in relation to other power sources, and this new line of analysis reveals that although it was the most commonly supported power source, the substantial opposition to nuclear power means that on balance, other power sources are more popular. Nuclear power has a net support of just 15%, whereas wind has a net support of 31%.

If one looks at the third column for each energy source in Figure 7.6, it is noticeable that new and renewable sources fared well overall. This was due to lower levels of opposition towards 'new and renewable' power sources (wind, solar, tidal etc) than exist for fossil fuel and nuclear power sources. The power source which would appear to have the best chance of gaining overall public acceptability in this part of West Cumbria would seem to be wind power. It is the second most favoured power source, and is opposed by only a small number of respondents, meaning that on balance it invokes far less controversy than others which had received much support such as nuclear power or coal. The particular popularity of wind power may be attributable to the nature of Cumbria's weather which can be somewhat blustery to say the least. Cumbria's meteorological characteristics might also help to explain the unpopularity of solar power compared to the other renewables, and the difference between this study and the national Gallup poll in which solar power had fared nearly as well as wind power.

One effect which the history of the nuclear industry, the campaigns of the different groups and of course the local presence of the controversial Sellafield site appears to have had has been to intensify attitudes to nuclear power. It is certainly the most controversial power source, being named most times in total. Coal, like nuclear, received many responses both in favour of its use and against it. Responses in favour perhaps reflected both communal memories of the prosperity which the industry once brought to the area, and a sense of injustice at the government-led closure of many operational coal pits in Britain during the previous two years. It is possible that responses against coal reflect increasing concerns about a power source increasingly believed to cause a great deal of environmental pollution. The relative lack of controversy surrounding new and renewable sources of energy may be due to the lack of criticism which they have received in the media (although there had been coverage in the local media of the environmental effects of wind and tidal power in more recent times).

Figure 7.6 Evaluation of public opinion towards different energy sources, 1994



A degree of pragmatism was also visible in the results. As shown in Figure 7.4, 5% of respondents wished to see fossil fuels eradicated only as soon as was practical. 4% expressed a similar view about nuclear power. Similarly, as Figure 7.3 showed, 6% only wanted increases in renewable fuel sources if research into those fuel supplies was increased, and other people supported increases in nuclear power or fossil fuels only on condition of technological developments. Previous questions, which had restricted the respondents choice of answer, would not have allowed the expression of this pragmatism.

7.2.2. The views of the four local groups

The comments made by the four main campaigning groups on the subject were as follows -

FoE Cocker mouth found no place for nuclear power in their ideal energy programme, and were also opposed to an expansion of gas fired power stations, which they considered to be 'a waste of a primary source of energy'. They only wanted to continue to use coal if environmental precautions were introduced -

"if we put clean technology into the chimneys, the sort of scrubbers that remove the sulphur and things that cause the acid rain."

They also wanted 'investment in renewable technologies' such as 'wind; wave-power; small scale hydroelectricity; geothermal'.

CORE sought to make more use of renewable energy sources and coal, as well as other options like methane and wood plantations

The spokesperson for NIREX chose a more conciliatory tone, saying 'I don't think I'd criticise other energy resources'. However, he did add that

"We should ... not encourage the profligate use of any of them. You shouldn't be unnecessarily burning valuable fossil fuels which have far greater uses."

BNFL were very conscious of practicalities, and perhaps more than a little resentful of the less stringent safety standards which other fuel sources had to conform to.

"Coal, gas, nuclear, wind, solar, [and] geothermal may all be used if the case is made for safety, cost, reliability etc. (It could be argued that if these had to come up to nuclear standards, things might be different, in some cases). As fossil fuels become scarcer, nuclear and alternative sources of energy become more important, but it will never be possible to get solar power when the sun

is not shining for example. Solar power is fine, but do we have the climate for it or not? Does it supply energy during the evening?"

The division between the pro-nuclear and anti-nuclear group finds constituencies for both arguments in the local populace, as does the pro and anti-coal division. Those groups who advocated the use of renewable resources, either explicitly such as CORE and FoE or implicitly such as NIREX, found much support amongst the respondents. It is perhaps unlikely that much of this correlation arises from the campaigning of these particular groups on the subject, given the 'greening' of British society over recent years, which has come from many sources. Similarly, although BNFL's point about the unreliability of solar power may also be accepted by most local people, it seems unlikely that this is the result of any campaigning from BNFL, who are, after all, reticent to speak out against any rivals (see Chapter Five). It seems more likely that this comes about because people can see the lack of sunshine in Cumbria. There is another insight into the lack of influence which these groups may have had though, in that CORE's support of methane and wood as fuel sources found few friends in the Cockermouth community. Just one person advocated the use of methane, and no-one said wood should be used, with two people actually opposing its use. Similarly FoE do not seem to have conveyed a message of opposition to gas power stations very successfully, since gas is the most popular of the fossil fuels on balance. This evidence would seem to correspond with the idea that the local public are influenced more by national events than local campaigns. Of course this situation may only exist because one side of the local debate is addressing itself to a national audience, whilst the other is too poor to mount an effective high profile local campaign.

7.2.3 Respondents to the postal questionnaire

In response to the question about which fuel sources should be used, most postal responses refrained from naming any energy sources in particular. CHPA alone named 'Coal; wastes; renewable; gas'. Otherwise, there was a fairly even division between those advocating a continual mix of all sources of energy (including the nuclear industry representatives), and those who advocated use of such a mix in the short term only, with renewable sources to eventually take up the main burden of production. There was also the occasional eccentric response - 'Human energy needs promoting so much more!' (Centre for Environmental Initiatives).

When asked

"What resources do you think we should not use to generate our energy supply, either now, or in the future?"

fossil fuels were the fuel source most commonly named as those which should be phased out, slightly ahead of nuclear power. It was interesting that groups such as the Centre for Environmental Initiatives which had declared themselves neutral regarding nuclear power, named that power source as one which should be phased out. It should be noted however, that both of these fuel sources were mentioned by only three or four organizations. Just as many said that no power source should be overlooked, once again many of the organizations 'hedged their bets' and declined to mention any fuel sources in particular, opting for bland responses such as,

"Any that can be clearly shown to have more 'disbenefits' than benefits to society." (BGS)

"Least cost-effective." (ACE)

"Those which cause severe environmental damage. Those which divert more economic resource into energy supply than is necessary." (NPAC)

There seemed to be a predictable trend amongst responses. The groups concerned with energy conservation mentioned looking at reducing demand. Similarly, the pro-nuclear groups proposed that fossil fuels and certain renewable fuel sources be rejected on environmental grounds.

"Where possible, we should reduce dependence on more environmentally damaging sources, such as coal and oil." (UI)

"Environmentally unacceptable eg. tidal." (BNIF)

The main difference between the attitudes of the groups and of local people seems to be that local people are more outspoken. Postal responses seemed to favour a broader range of energy supply rather than focusing on one or two individual sources.

7.2.4 Conclusions about views on general energy policy

In terms of choosing between energy sources to be used in the future, nuclear power was the most frequent response. This was different to Gallup's findings at a national level, and to that extent the 1994 findings support the notion of a pro-nuclear West Cumbrian community. However, nuclear power was not something which was specifically nominated by the majority

of respondents. Wind and coal power were also popular, and far fewer people opposed the use of wind power than nuclear power. This discovery adds a new context within which to view local support for the nuclear industry. Perhaps most importantly, if significant non-respondents are taken into account, the majority of local people do not actually feel very strongly about whether we should or should not use nuclear power. This represents a significant finding not highlighted in earlier studies which had made it seem that nuclear power was a more important issue amongst local people.

The answers given by the four local groups reflect popular feeling in the main, although with one or two other suggestions which the respondents do not appear to have taken on board which suggests that the local groups are not having too great an influence upon local opinion on this issue.

7.3 Positive and negative aspects of nuclear power

7.3.1 West Cumbrian opinion

This section of the survey consisted of three questions which examined respondents' perceptions of the particular advantages and disadvantages of nuclear power. One question was intended to be a control question. Respondents were asked to name what they felt to be the most important factors to bear in mind when choosing between different energy sources. The frequency of the different responses is displayed in Table 7.2 below⁴⁵.

Table 7.2 Public perceptions of important considerations in energy policy, 1994

"Please can you tell me what you think are the most important things to consider when deciding which resources should supply our energy needs?"

Factors to consider	Frequency
Effect on the environment	64 (58%)
Cost	44 (40%)
Availability of supply	27 (24%)
Safety	23 (21%)
Renewability	15 (14%)
Jobs	11 (10%)
Efficiency	6 (5%)
Appearance of sites	4 (4%)
Location of sites relevant to markets	3 (3%)
Keeping a mix of different energy sources	3 (3%)
I don't know	3 (3%)
Energy self sufficiency	2 (2%)
Public opinion	2 (2%)
Tradition	1 (1%)

⁴⁵ In this table, as in all the tables of response in this chapter, percentages relate to the percentage of the 111 actual respondents (i.e. not including significant non-respondents) who mentioned each factor. Factors were not exclusive alternatives to each other, and so, as each respondent could mention more than one factor, the total numbers of responses given often add up to more than 100.

Factors to consider	Frequency
Demand	1 (1%)
Well researched	1 (1%)
Total responses	210

With 58% of respondents mentioning effects on the environment as an important factor, 14% mentioning renewability, and 21% safety in general, the responses seemed to reflect the greening of popular consciousness which has occurred in Britain over the last twenty years.

Economic considerations also featured heavily amongst the major responses, with 40% of respondents concerned with cost, 24% concerned that the supply should be long-lasting, and 10% concerned that jobs should be created. Given the economic context in which the respondents found themselves (see Chapter Three), the fact that employment opportunities was an important factor for 10% of respondents was perhaps to be expected.

The next question examined the advantages which people saw in the use of nuclear power in Britain, and sought to compare these perceived advantages with the control question. The frequencies of different responses are displayed in Table 7.3 below.

Table 7.3 Public awareness of advantages of nuclear power, 1994

"Please tell me what you think are the advantages for Britain of using nuclear energy compared to other options for energy supply.

Advantage	Frequency
I don't know	28 (25%)
Is environmentally friendly	24 (22%)
None	17 (15%)
Long term supply	16 (14%)
Renewable	9 (8%)
More efficient	7 (6%)
We have experience of using it	7 (6%)

Advantage	Frequency
Jobs for Britain from reprocessing foreign fuel	6 (5%)
Income for Britain from reprocessing foreign fuel	5 (5%)
Safer	5 (5%)
Cheaper	5 (5%)
Gives us independent energy supply	4 (4%)
<i>Might be</i> cheaper in long run	3 (3%)
Will not deplete limited resources of fossils	3 (3%)
<i>Will be</i> cheaper in long run	2 (2%)
FBRs offer self-perpetuation	1 (1%)
One day everyone will use it anyway	1 (1%)
Less waste	1 (1%)
Is scientifically advanced	1 (1%)
There are no alternatives	1 (1%)
We can lead the world	1 (1%)
Total responses	147

This list of perceived advantages of nuclear power might, at first, seem to be a pleasing set of responses for the nuclear industry. According to the previous question, the characteristic which most respondents sought in a power source was environmental friendliness, and this is indeed seen to be the biggest advantage of nuclear power. This was a change from the Gallup survey of 1991, in which more respondents named longevity of supply and cheap electricity as advantages. This change was perhaps a result of the nuclear industry's attempts to promote its reputation for not contributing to the greenhouse effect as part of its new 'eco-nuclear' public relations strategy (Tilson 1993, 419). The provision of a supply of great longevity, renewability and employment prospects, were also commonly held to be advantages of nuclear power and are also high amongst the list of priorities.

Less pleasing for the industry is that it was noticeable that in response to this question, the proportion of respondents who made 'don't know' comments increased dramatically to 25%,

the most frequent response, from single figure levels in the earlier, more general questions. This is possibly because to name advantages and disadvantages of the industry requires more specific knowledge, which many respondents did not possess. To educate these people of the advantages of nuclear power is the task of the public information departments of BNFL and NIREX, a task at which they do not seem to be having comprehensive success. When those people saying they did not know of any advantages were added to the 48 non-respondents (whom the industry has not convinced of their arguments enough for them to want to speak out in favour of the subject) and the 17 people who said that there were no advantages whatsoever to be gained from using nuclear power, it can be seen that 93 of the possible 159 respondents (58%) did not name any advantages of using nuclear power.

To examine perceptions of the disadvantages of nuclear power in relation to the 'control' considerations, respondents were asked

"Please tell me what you think are the disadvantages for Britain of using nuclear energy compared to other options for energy supply."

The results are shown in Table 7.4

Table 7.4 Public awareness of disadvantages of nuclear power, 1994

Disadvantages	Frequency
Waste	27 (24%)
Damage to the environment	26 (23%)
None	14 (13%)
Risks to health	13 (12%)
I don't know	11 (10%)
We don't know enough about it	10 (9%)
Cost too much	9 (8%)
Import of foreign waste	5 (5%)
Doesn't supply much energy	4 (4%)
Plutonium could reach wrong hands	3 (3%)
Public image is poor	2 (2%)
Once started is hard to shut down	2 (2%)
Encourages green groups	1 (1%)

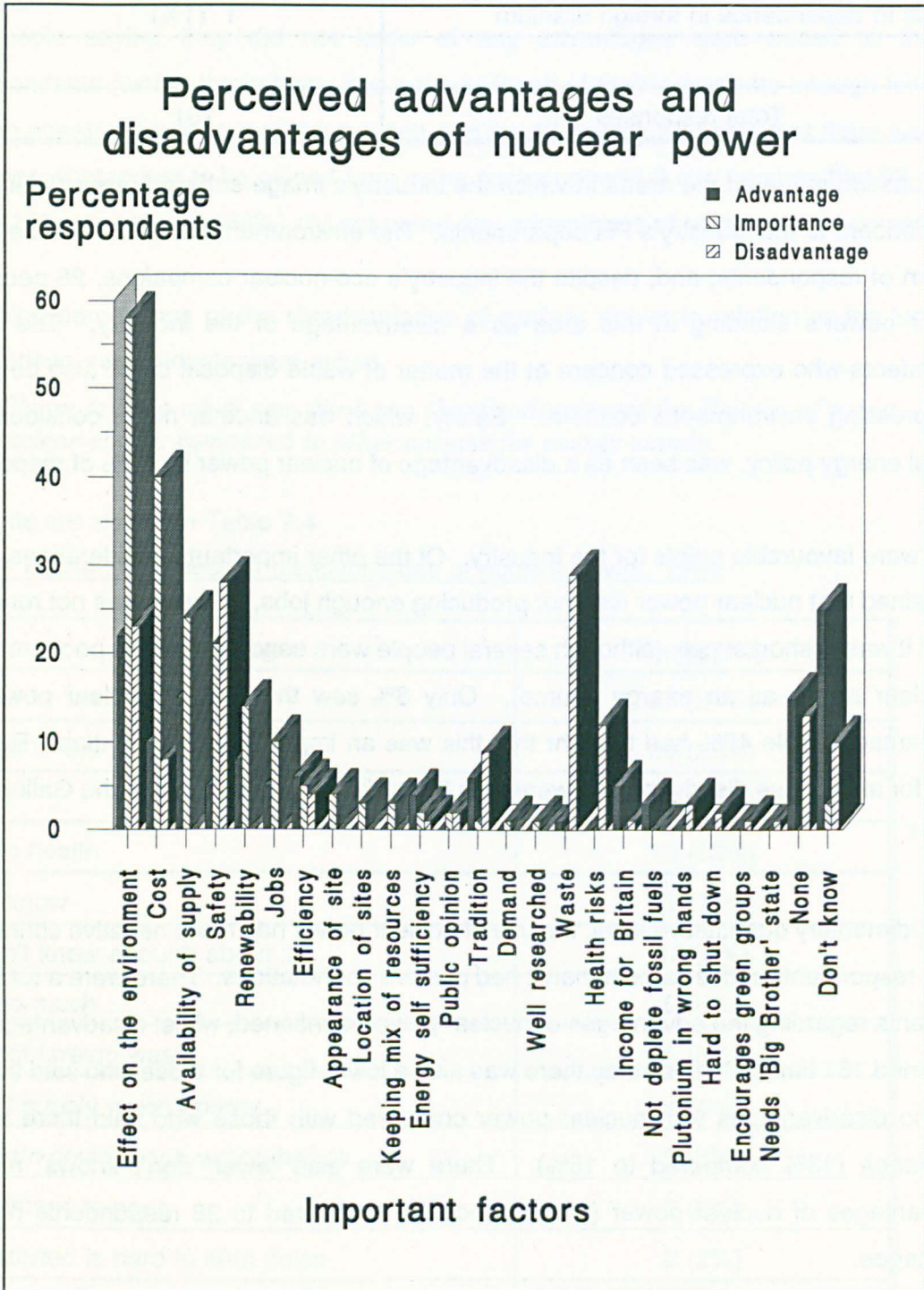
Disadvantages	Frequency
Needs a "Big Brother" state	1 (1%)
Deters investment in Britain	1 (1%)
Leads to dependence in foreign uranium	1 (1%)
Total responses	161

This question revealed the areas in which the industry's image suffered, areas which must be of concern to the industry's PR departments. The environment had proven to be a major concern of respondents, and, despite the industry's eco-nuclear campaigns, 26 people saw nuclear power's standing in this area as a disadvantage of the industry. The 24% of respondents who expressed concern at the matter of waste disposal could also be seen to be expressing environmental concern. Safety, which was another major consideration in general energy policy, was seen as a disadvantage of nuclear power by 28% of respondents.

There were favourable points for the industry. Of the other important considerations, no-one complained that nuclear power was not producing enough jobs, or that it was not renewable, or said it was in short supply (although several people were concerned at the poor productivity of nuclear power as an energy source). Only 8% saw the cost of nuclear power as a disadvantage, while 40% had thought that this was an important consideration. Response levels for all of these disadvantages were also lower than they had been in the Gallup survey of 1991.

On a rudimentary quantitative level, the use of nuclear power had more negative connotations for the respondents in this sample than it had positive connotations. There were a total of 147 comments regarding the advantages of nuclear power mentioned, whilst disadvantages were mentioned 161 times. In this study there was also a lower figure for those who said that there were no disadvantages with nuclear power compared with those who said there were no advantages (13% compared to 15%). There were also fewer 'don't knows' regarding disadvantages of nuclear power (11 respondents) compared to 28 respondents regarding advantages.

Figure 7.7 Relationship between advantages and disadvantages of nuclear power as perceived by the public, and public views on general energy policy



In order to clarify the relationship between the balance of perceived advantages and disadvantages of nuclear power in relation to the control question, Figure 7.7 examines the relationship between nuclear power and the factors which respondents had said were important in general energy policy. The different factors are presented along the horizontal axis. The first and third column for each factor shows the number of people who mentioned that factor as an advantage or disadvantage of nuclear power. In order to put these perceived advantages and disadvantages into context, the middle column shows the proportion of respondents who had named each factor as an important consideration.

When put into context, the overall picture is not too pleasing for the industry. When the proportions of respondents seeking various characteristics in potential power sources are compared with the proportion of respondents seeing those same characteristics as advantages of nuclear power, there is a clear shortfall. For example, the 22% of respondents who thought that nuclear power was an environmentally friendly source of fuel is far smaller than the 58% of respondents who were looking for energy sources which minimized pollution. Other shortfalls include the fact that 24% saw longevity of supply as important, yet only 14% of the same sample thought nuclear power offered this. Renewability was demanded by 14% and seen in nuclear power by only 8%. More importantly, 21% of respondents sought safe sources of energy, yet only 5% named nuclear power's safety record as one of its advantages. Perhaps the largest drawback for nuclear power was in relation to cost, which was the second most important consideration for general energy considerations, (with 40% of all respondents, mentioning it as an important factor), yet no-one at all mentioned it as a particular advantage of nuclear power.

The situation is slightly more pleasing for the industry's opponents. More people see the industry's safety record as a disadvantage than were concerned to find a good safety record in different fuel sources. Other than that though, there is considerable scope for improvement from the PR sections of the anti-nuclear groups, because perceptions of factors as disadvantages of the industry are far below the number of people who see different factors as important considerations. This is especially true of economic factors. The low level of response to this question is also worth noting. No advantages of nuclear power were named by more than 22% of respondents, and no disadvantages by more than 28%. It is not as

though people do not think that there are important factors in energy supply - 58% thought environmental effects were important, it is just that far fewer are aware of them in relation to nuclear power.

7.3.2 The opinion of the four local groups

When asked about the most important considerations regarding different energy sources, the representatives of the four groups replied as follows. FoE Cockermonth's coordinator said that 'The short-term and long-term environmental effects' of any possible power source was the most important factor to bear in mind. CORE were also primarily concerned with environmental issues, looking in a power source for

"Conservation ... Whether it's renewable and pollution free, and how long it takes to clear up afterwards .

The main concern of the NIREX spokesman was to achieve

"A balance of energy types, with due concern for the environmental impact and the safety of those various energy types."

BNFL said that

"availability of the resource is essential, security of the source too, environmental impact and considerations such as cost, user expertise etc. We should use the ones which are available to use in a safe manner. We should use those ones which are cost effective. We should use the ones which provide energy when it is required"

In their lists of important factors to consider, the four groups seem to be 'in tune' with the concerns of local people. All four mentioned environmental considerations, which had been named by most respondents, and the nuclear industry showed that it was also conscious of factors such as safety, cost and availability of supply, which were the other most frequent responses. One distinct difference between the factors named by local people and those named by the representatives of the four local groups was that none of the groups named employment prospects as an important factor.

The advantages and disadvantages of nuclear power named by the four groups also provided interesting reading. CORE refused to see any advantages in nuclear power, seeing only major disadvantages.

"the risks associated with nuclear power are unacceptable ... the mountains of waste it leaves that we don't know what to do with."

FOE Cockermouth too, would admit to no advantages of nuclear power, insisting that

"the whole of the nuclear industry was promoted ... purely to do with producing the plutonium which were needed for bombs ... the energy was therefore just a by-product."

They saw that in national terms, nuclear power intrinsically entailed

"danger to the health ... of people plants and animals from ... regular and licensed discharges of radioactivity to the sea, to the air, accidental discharges, either through the regular routes or leaks ... the risk of a large scale accident such as the Windscale fire ... the problem of what to do with a nuclear power station when it is no longer producing energy, which they still have not solved, and the problem of what to do with the radioactive waste, which is produced on a regular basis."

To a certain extent, CORE were in tune with local opinion, having named the two most commonly perceived disadvantages of nuclear power, the risk and the question of waste. FoE had mentioned these two, and also the risks to health from routine discharges, which was also a popular concern. Nevertheless, there was still considerable scope for improving the number of people who agree with the 'anti-nuclear groups' criticisms of the power source. For example, only 28% of respondents saw the risk of a major accident as a disadvantage.

The fact that the environmental groups had not conceded that there could be any advantages in nuclear power might be more important, for it makes them seem a little extremist, and unable to take a balanced view. They appear unwilling to entertain any positive aspects, which are plainly seen by many of the people whom they must seek to convert.

Ironically, just as the anti-nuclear groups were blinkered in their refusal to admit that any advantages existed from nuclear power, the nuclear industry were loathe to concede that there might be any disadvantages to the use of nuclear power. The NIREX spokesman said

"we should not have all our eggs in one basket. I can't see any other disadvantages."

Instead he pressed the environmental credentials of nuclear power, which made it 'a key part' of a balanced energy programme - 'you're not pumping carbon dioxide and nitrous oxide into

the atmosphere'. He also claimed that 'as the new power stations come on stream' it would be, 'as economical as other energy forms'.

NIREX's success in conveying these messages to the public had been mixed - while comments about environmental benefits were positively accepted by 22% of respondents, and was the most popular advantage named, cost benefits were only mentioned by a small amount of people.

Like NIREX, BNFL did not admit to any disadvantages of nuclear power, and said

"Nuclear energy is a safe method of generation of electricity. If it were on the same level playing field, it would be even more cost effective, even allowing for the disposal of wastes ... Nuclear energy is less dependent on inflation ... it gives a security of supply in the event of industrial action, and is independent of influences outside the country. Having built the nuclear power stations, the electricity is much cheaper to produce. The overall cost of the electricity for the older power stations is much the same as for the best coal stations, and the cost of electricity from the newer power stations is much cheaper. Nuclear does not contribute to the greenhouse effect, nor to the acid rain effect. Uranium has only one other use, and that is to make coloured glass, so it is leaving the fossil fuels for the things they are best used for. At the moment the full environmental costs of nuclear power included in the prices charged by nuclear generators (including BNFL). The same is not true of the full environmental costs of greenhouse gases and acid rain of electricity generated by coal, oil and gas. One day they will be. There will then be a genuine level playing field."

The point about the 'greenness' of nuclear power was the one which found most support amongst local people. The long term nature of a nuclear energy supply was also one of the most popular, and most of the other points BNFL made were mentioned by at least some respondents. As noted above, there is a major shortfall between the amount of people who want to be convinced of the relevance of certain factors to nuclear power and those who actually believe in them, and so the industry can improve upon its current position. The failure to admit the existence of disadvantages may also damage the industry's credibility amongst local people.

7.3.3 Responses to the postal questionnaire

When asked about general energy policy, the respondents to the postal questionnaire named a wide range of factors to bear in mind. The ones most commonly mentioned were

environmental impact (mentioned by nearly half the groups), and cost, long term security of supply, and the amount of demand (each mentioned by a quarter of the groups). The idea of taking steps to reduce demand was mentioned by three organizations. These responses almost all mirror local attitudes. Only the idea of taking steps to reduce demand had found no support amongst local people. Other responses included safety, practicality, reliability, diversity of energy sources, and creating a 'level playing field' on which different fuel options could compete fairly.

The responding organizations were almost unanimous in mentioning nuclear power's advantages in terms of environmental impact, especially the negligible amount of carbon dioxide released in electricity production. This near unanimity suggested that eco-nuclear campaigns may have had greater success at a national level amongst non-governmental organizations than amongst the general public. Several groups also mentioned the long term energy supply which nuclear power offered. Other responses included its 'value in diversifying our energy supplies', and the 'long-term stability of fuel supplies at stable prices' (UI) as well as the hopes which nuclear fusion offered as a utopian energy supply of the future (STA). Postal responses mirrored those of local people, even to the extent that there were some cynical voices amongst the postal respondents. AECB said that an advantage of the nuclear industry for some sectors was that it 'keeps research budgets high', and that, as a centralised system, it required less administrative work for the government than smaller scale renewable sources. Some of the postal respondents also mirrored the substantial proportion of local respondents who either did not think that there were any advantages in nuclear power or did not know of any.

"none whatsoever" (CEI)

"none" (LD)

Regarding disadvantages, nearly half the groups mentioned the question of nuclear waste. Other problems seen by many of the groups included the risk to the environment and to human health, and the overall cost of the nuclear cycle. Other complaints included excessive use of technology (CEI), the risk of creating a 'Police State' (AECB), and the proliferation of nuclear materials (LD). The threat of a major accident, which was the most common concern amongst local people, did not feature in the postal responses.

Like BNFL and NIREX, the representatives of the nuclear industry seemed to find little wrong with nuclear power. The Uranium Institute saw no disadvantages, and the BNIF said that there was only a question over economics given the current set up of the electricity market.

7.3.4 Conclusions about perceptions of advantages and disadvantages of nuclear power

This section of the survey added to previous work by putting [perceived advantages and disadvantages of nuclear power into context of general energy considerations. Environmental and economic considerations were the factors which the most respondents would consider when choosing energy sources. The nuclear industry is seen as a 'green' industry by many people, with its reputation for low pollution spontaneously pointed out by far more people than had said so in Gallup's prompted survey. This finding represents a success for recent 'eco-nuclear' campaigns, and may also support the notion of a local population which is better informed of nuclear issues. However, it should be noted that as many as 58% of all possible respondents could not name any advantages of nuclear power, and that 15% said outright that there were no advantages, a *higher* proportion than said so at a national level. contradicting the notion of Cumbria as being more nuclear friendly than the rest of the UK. When put in the context of the general energy considerations, the perceptions of advantages did not match up to public demands for what an ideal⁴⁶ energy source should be, especially regarding cost and safety. At a rudimentary quantitative level, more people are conscious of the disadvantages of nuclear power rather than of the advantages. Like the large number of people who did not advocate the use of nuclear power (see above), these are all important discoveries regarding the intensity and nature of West Cumbrian support for the industry.

Perhaps worryingly for advocates of the 'eco-nuclear' concept, environmental considerations were also seen to be a disadvantage by many people. There is considerable scope for the campaigning groups to increase public awareness of both 'advantages' and 'disadvantages' of nuclear power. The most frequently named disadvantage was mentioned by only 28% of actual respondents (19% of all possible respondents), and the most commonly cited advantage was only mentioned by 22% of actual respondents (15% of possible respondents). Although they are aware of most of the general policy concerns which are also the most important to local people (with the notable exception of employment prospects), the four local

⁴⁶ The key word here may be 'ideal', as people may be content for settle for less in practice

groups seem to be rather extreme in the perceptions of the advantages and disadvantages of nuclear power. The industry admits no defects, and the industry's opponents see no advantages. These standpoints may alienate local people from the four groups. After all, less than 15% of respondents said that there were either no advantages or no disadvantages to the two questions. Most respondents therefore would seem to appreciate that there are faults and advantages. If the organizations do not reflect this too, they might be viewed as blinkered, unbalanced, and untrustworthy. The failure of BNFL and NIREX to admit to any disadvantages of nuclear power supports the observations made by earlier researchers that the industry was attempting to portray a zero risk scenario. Interestingly, the anti-nuclear groups' attempted to portray a zero-benefit scenario which may be expected to be as contradictory to commonsense as the zero-risk scenario propounded by industry. The extremism of both sides may help to explain the low levels of trustworthiness found in previous studies.

With the exception of BNIF and UI, the views of the respondents to the postal questionnaire were close to those of the local public (i.e. acknowledging both advantages and disadvantages of the industry). There might therefore be a chance that the four local groups' extremism over these factors may also alienate this national public. Awareness of the industry's green credentials was higher amongst the non-governmental organizations than amongst local people, suggesting that the nature of the eco-nuclear campaigns, i.e. aiming at an influential national audience, is working only too well.

7.4 Advantages and disadvantages of the presence of many elements of the nuclear industry in West Cumbria

7.4.1 West Cumbrian public opinion

The next two questions were intended to examine the advantages and disadvantages which respondents saw in the location of many elements of the nuclear power industry in West Cumbria. The first question asked about the advantages, and the results are shown in Table 7.5 below.

Table 7.5 Public perceptions of the presence of the nuclear industry in West Cumbria, 1994

"Please tell me what you think are the advantages of having many elements of the nuclear power industry energy sited in West Cumbria."

Advantages	Frequency
Jobs at Sellafield	84 (76%)
Less danger for the rest of the U.K., as we have a low population	15 (14%)
Keeps all of West Cumbria alive	13 (12%)
Existing nuclear industry is here, thus aiding communications	7 (6%)
None	7 (6%)
Brings investment to the region	7 (6%)
I don't know	5 (5%)
Indirectly boosts the economy	3 (3%)
Gives West Cumbrian population better training	3 (3%)
Good geographical site	3 (3%)
West Cumbrian population are skilled and knowledgeable	1 (1%)
BNFL enhance reputation of West Cumbria	1(1%)
West Cumbrians are pro-nuclear	1(1%)
Nothing to say	1(1%)
Total responses	151

The beneficial impact of employment provided by the industry was clearly seen to be the most important advantage of the location of the industry in West Cumbria, and correlates with the

high level of awareness of BNFL's economic contribution to the area found by Macgill in 1984. 76% of respondents spontaneously mentioned it as an advantage. It is noticeable that this is a level far higher than the number of respondents in this study who saw jobs as an advantage of nuclear power for the UK as a whole (5%). Even without prompting, this is a level two times higher than the number of people who said that the creation of employment was an advantage in the national Gallup poll of 1991. The remarkably high level of this response to a non-quantitative question illustrates how important the perception of BNFL's economic role remains to West Cumbrians. 12% of respondents went so far as to say it was vital for the economic future of West Cumbria:

"If it wasn't here, Cumbria might as well be dead, 'cos there's nowt else here."
(M, 15-29, working, Local Authority housing area)

"Amazing ... without it there wouldn't have been Wyndham School, there wouldn't have been Seascale. Every village has been built up. Other places like Gosforth and Beckermeth, if it weren't [sic] there, those places would stand empty."
(F, 60-74, retired, post-war estate housing area)

The second most frequent response concerned the lower population density of the area, which, for some people, made West Cumbria a sensible place to locate a hazardous industry. Some people saw this as a legitimate reason and accepted that it made sense for the country as a whole to choose a less densely populated area.

"It's in the middle of nowhere up here."
(M, 15-29, working, local authority housing area)

The people who could accept that there were good reasons for choosing Cumbria because of its lower population represented a type of response which has not been commented upon in previous studies. There appears to have been a tendency amongst some respondents to actually identify with the nuclear industry rather than with the local population, and the first of the three comments above may be a prime example of this. Some people certainly appear to have interpreted the good of the industry as being synonymous with the good of local people, rather than seeing West Cumbria and the industry as completely separate entities. At the very least it indicates an ability to empathise with the industry's needs. Other examples of this attitude include those respondents who mentioned ease of communications between the industry's sites, favourable geological conditions and the existence of a population with relevant skills and an already pro-nuclear attitude. None of these things can be considered advantageous for West Cumbrians in themselves but they can be considered as advantages

for the nuclear industry. As the most frequent of these responses (the advantage of having better communications between nuclear sites), was mentioned by 6% of respondents, perhaps it can be said that up to 6% of the local populace find it possible to empathise with the industry and its needs. Perhaps surprisingly (and contrary to the findings of ERM), only 2% of respondents said that the skills or the pro-nuclear disposition of local people was an advantage of the siting of the industry in West Cumbria.

Some people resented the choice of Cumbria, seeing it as an exploitative choice by central government.

"It seems they looked at Cumbria and thought, 'Oh there's not many people up there'. It's an easy option for politicians."

(M, 15-29, working, predominantly Victorian housing area).

"If there is a big disaster, they can just dig a big ditch and cast us adrift in the Atlantic Ocean."

(M, 30-44, working, predominately Victorian housing area)

This last quote exemplifies the self-denigration and gallows humour which had been noted earlier by ERM. In the light of previous findings about the sense of being 'put upon' by the rest of the country, it was interesting that the decision to site much of the nuclear industry in West Cumbria was often mentioned as an exploitative decision, but that no-one said that the siting of the industry was a philanthropic move to ease the unemployment situation of the area.

It is very important to note that, other than the jobs provided and the geographical advantage of using remote West Cumbria, no other advantages were mentioned by more than 6% of respondents. This would suggest that other than the jobs which it brings, there is little perception of any other advantages for local people of having the nuclear industry in West Cumbria, and thus the main reason to support the industry's presence would appear to be economic.

There were also people who denied that there were any advantages from the presence of the nuclear industry

"You can't say it creates work, because anyone who works at Sellafield is [sic] out of towners."

(M, 45-59, unemployed, mixed housing area)

but it is worth noting that the number of respondents seeing no advantage in the nuclear industry fell to just 6% in a West Cumbrian context, compared to 14% who saw no advantage in the use of nuclear power at a national level.

Given the findings in the previous section about the doubtful qualities of the 'nuclear friendly' image of West Cumbria, and the lower than expected level of knowledge about the advantages of the industry, perhaps interpretations of West Cumbrian attitudes might include the notion that West Cumbrians do not support the nuclear industry *per se*, but the particular West Cumbrian nuclear industry, and in particular the jobs it provides.

The next question enquired about the disadvantages of the location of many elements of the nuclear power industry in West Cumbria. The results are displayed in Table 7.6 below.

Table 7.6 Public perceptions of the disadvantages of the presence of the nuclear industry in West Cumbria, 1994

"Please tell me what you think are the disadvantages of having so many elements of the nuclear power industry sited in West Cumbria. "

Disadvantages	Frequency
Risk of accident	36 (32%)
Health risk	26 (23%)
None	15 (14%)
Over-reliance on one industry	15 (14%)
Being left with waste	12 (11%)
Discharges/pollution	10 (9%)
Deters tourists	9 (8%)
Harms reputation of West Cumbria	8 (7%)
Deters investment	5 (5%)
Threat to beauty of lakes	5 (5%)
Don't know	5 (5%)
Risk of Sellafield being a target in war	4 (4%)
Getting foreign waste - dustbin of the world	3 (3%)
Poor infrastructure	3 (3%)
Brings non-Cumbrians here	2 (2%)

Disadvantages	Frequency
Is a political option	2 (2%)
Unknown problems will be here	2 (2%)
Appearance is poor	2 (2%)
Causes fear	2 (2%)
Risk to Scotland / Scandinavia	2 (2%)
BNFL can be blackmailed by West Cumbrian population for sponsorship etc	1 (1%)
Not much room to expand	1 (1%)
Threat of seepage from repository	1 (1%)
Makes West Cumbrians biased in favour less objective	1 (1%)
Being stranded with nuclear waste when nuclear energy is superseded	1 (1%)
Nothing to say	1 (1%)
House prices fall	1 (1%)
Increased traffic in West Cumbria	1 (1%)
Increases local wage demands	1 (1%)
Everything	1 (1%)
Total responses	179

The most commonly perceived disadvantage (named by 36% of respondents) of the location of the industry in West Cumbria was the threat that one day a major accident might occur.

"If anything goes wrong we're only 26 miles away ... if there is a disaster you're right in the firing line"
(M, 30-44, working, mixed housing area).

It was noticeable that as people thought more about their own nuclear environment, concern about the risk of an accident increased. Only 28% had named a major accident as a disadvantage of nuclear power in a non-Cumbrian context. It is worth noting though, that even these levels of concern were still lower than those amongst the national Gallup respondents, and so the area still appears to be *relatively* nuclear friendly.

The second most frequent concern was the health risk from the normal day to day activities of the nuclear industry.

"I've a suspicion that Chernobyl, which caused so many unfortunate sheep, really dates back to '57, when they got their figures wrong. That's also one of the reasons why the thyroid problem is so widespread through the county."
(M, 60-74, working, predominately Victorian housing area)

"There's the risk of accident if its flown from Carlisle airport, or on lorries through Cumbria. The Sellafield newsletter says there's about one leak a week."
(F, 30-44, self-employed, post-war estate housing area)

This second quote illustrates the notion of local acknowledgement of risks and that the industry is not as totally safe as its PR campaigns make out. Nevertheless, this level of concern over health was lower than those levels found in Macgill and Phipps' study in the 1980s, perhaps because concern had genuinely decreased with the passage of time, but perhaps because the style of questioning employed by Macgill and Phipps had artificially heightened levels of anxiety by focusing upon risk in particular. Similarly, without the directional questions employed by Macgill and Phipps and Macgill, no distinction was made between risk to adults and risk to children.

Another problem mentioned spontaneously by over 10% of respondents was that of being left with nuclear waste

"We get all the shit that comes out of it"
(F, 15-29, working, mixed housing area)

"Dustbin of the nation, dustbin of the bloody world, we are. Everyone puts it in our county"
(M, 60-74, retired, local authority housing)

Interestingly enough, the notion of waste being a disadvantage of nuclear power was mentioned by only half as many respondents in this local context as had mentioned it at a national level. Perhaps this reflects the sub-conscious barriers which ERM referred to, with this lower level of concern indicative of people who do not believe or do not want to believe that the problem of radioactive waste is anything to do with them.

9% of respondents saw pollution as a disadvantage of the industry's presence.

"Look at St. Bees beach, it's a bloody waste. Now you can't go there because of all the crap. It ruins the Irish Sea, it's disgraceful using it as a dumping ground."

(M, 15-29, not currently seeking employment, modern executive housing area).

"There's a proven increase in radioactivity on the beaches around Sellafield. They're gonna keep polluting until eventually the Cumbrian coastline is off limits."

(M, 15-29, working, predominantly Victorian housing area).

This figure of 9% was lower than the 23% who viewed pollution as a disadvantage at a national level, but perhaps this was offset by the rise in fears of health effects and of major accidents.

Another common perception was that the industry might damage the reputation of West Cumbria, affecting tourism and investment:

"Everyone points daggers in this direction."

(M, 15-29, working, post-war estate housing area)

"If you had to choose between the North-East and here to invest, all things being equal, I'd choose the North-East."

(F, 30-44, self-employed, post-war estate housing area)

These responses confirm ERM's observation that West Cumbria was seen to be an area which was 'put upon' and undeveloped compared to other regions.

The tendency of some people to identify with the industry was also present when looking at disadvantages, with some respondents mentioning restrictions on expansion, excessive demands made on the industry by the local people and the poor infrastructure of the area, all of which might hamper the industry's interests.

There were also several people who perceived no particular disadvantages in the presence of the industry locally, and who instead made what might be termed 'positive denials', whereby respondents merely showed how disadvantages weren't true disadvantages -

"An accident would affect the whole country, so it might as well hit us first ... we're immune to it anyway ... if you're gonna get hit, you're gonna get hit" (F, 45-59, working, predominately Victorian housing area).

"I don't see that they could ever have any other industry in West Cumbria. The roads aren't good enough" (F, 60-74, retired, post-war estate housing area).

The first of these quotes might also be seen to illustrate the stoical element of Cumbrian culture (as discussed in Chapters Three and Four) with the inclusion of the phrase 'if you're gonna get hit you're gonna get hit', and the black humour of the comment 'we're immune to it anyway'.

The insular element of Cumbrian culture was also on view in the two respondents who said that Sellafield was a bad thing because it brought non-Cumbrians in the area.

In naming disadvantages, nothing was mentioned with anything like the same frequency with which employment opportunities has been mentioned as an advantage. Yet overall, 179 comments named disadvantages, compared to only 151 advantages. Other than jobs, the industry has failed to establish much in the way of good reasons for their presence. Local people are thus more aware of the economic dependence as a reason in favour of the industry's presence, which may, ironically, make them more hostile to it. The possible over-reliance of the area upon the industry was another important area of concern.

"Traditionally, West Cumbria has always relied upon one industry - coal, steel or shipping, and when they've collapsed, there's been nothing to back it up" (F, 30-44, self-employed, post-war estate housing area).

This concern was also present in the way many respondents combined responses in ways which would not be detected by mere frequency counts alone. Some summed up the feeling of living on the horns of a dilemma, consistent with the complexities and contradictions of life in West Cumbria noted by ERM.

"If it ever does go wrong, Boom Boom! If they phase it out you lose your jobs" (M, 15-29, working local authority housing).

Another trend which was noted was that many people made comments which implied that they thought that they were the only ones who held doubts about the industry, that they were alone in a community very much in favour of nuclear power. As one respondent put it,

" It's so difficult because everybody loves it around here."

(M, 15-29, not currently seeking employment, modern executive housing area).

Other respondents were concerned to ensure that their responses would be anonymous, to ensure that the researcher wouldn't 'leave a mark on their door' for apocryphal pro-nuclear bully boys to visit. It seems that perhaps there is a misunderstanding about the levels of local support for the industry, even amongst local people.

It was noticeable that the responses to the questions about advantages and disadvantages of nuclear power, and in particular the pros and cons of the local industry, excited far more comment than the questions about general energy issues, the answers to which had mostly consisted of one or two words. This perhaps indicates a greater intensity of feeling about nuclear power (on the part of those who do have something to say), than in the more general questions.

7.4.2 The opinion of the four local groups

The same questions about the advantages and disadvantages of the local presence of many elements of the nuclear power industry were put to the campaigning groups. FoE said that the disadvantages of the industry's presence were

"The detrimental effect that it has on other sources of income for the area, fishing, tourism, farming. The effect on the environment, like the sea being polluted, which may link in with the other things, such as the disadvantage to the health of the local people."

They also complained of the seemingly interminable and ever-expanding nature of the nuclear presence.

"The original power station of Windscale is now coming to the end of its life and is now ready for decommissioning, but immediately they are replacing that with something else, so we'll never, ever actually come to the end of it, and linked in with that is the fact that once you've got something, you are classed as a sort of nuclear friendly area and they try and put a lot of other things on to you as well - like nuclear waste for example."

FoE could see advantages for the nuclear industry in locating in West Cumbria, although they viewed them somewhat cynically.

"It is an advantage to Britain to have it clustered together where ... most of the damage to the environment will be situated in a particular area, West Cumbria

... because it is well away from major centres of population. It is also an advantage to Britain to have it sited here where there is poverty ... and unemployment therefore we are dependent on something big like that so therefore we'll put up with it".

It was interesting that in a local context, FoE did admit that there were also good points to the nuclear industry's presence. They noted the help which the industry gave in terms of sponsorship and investment in local infrastructure. This made them seem less blinkered than they had seemed when looking at nuclear power in a national context. In terms of relating to public attitudes, FoE's cynicism as to the reasons for the industry's presence and their concern over its environmental, economic, and political effects were all shared by a substantial minority of local people. However, they had still underplayed the advantages compared to local people, most notably by not mentioning jobs.

CORE said that the presence of many elements of the nuclear power industry in West Cumbria

"might be advantageous for the nuclear power industry, but it certainly isn't for the other industries in Cumbria i.e. tourism, farming ... I think it deters investment ... I think any big industry that dominates one particular area is bad. And in the case of Sellafield, well, although everybody tries to ignore that it is there, like tourists, and farmers, who tend to keep quiet about it, it would be absolutely devastating if an accident were to happen because it should affect these two main industries so much ... It just makes Cumbria the nuclear dustbin of the world."

CORE's response confirms the suspicions of their 'blinkered' outlook. Although deterring investment and making the area a 'nuclear dustbin' had each been mentioned by a number of respondents, it was perhaps more important that CORE had failed to acknowledge that the industry might bring advantages to the area, appearing instead to have nothing but outright hostility towards an industry which is perceived by many to be the area's lifeblood.

The remarkable lack of awareness of the importance of nuclear industry jobs to local people may be part of the reason why the anti-nuclear groups have only called for the industry to be halted and have failed to propose anything to replace the industry and support the West Cumbrian population. It appears from both this new set of findings and the previous studies, that the jobs provided by the industry are more important to local people than possible health risks, yet, in their campaigns, anti-nuclear organizations are concentrating upon highlighting the health risk rather than suggesting other ways in which jobs might be created. If they saw

creation of jobs as the priority they might gain more support. Very few people mentioned the factors which CORE and FoE named as disadvantages, and so it can be seen that there is much education work which can be done by the anti-nuclear bodies.

For their part, NIREX appeared to underrate local health concerns, seeing only technical and industrial disadvantages rather than social ones.

"Well, there's the economic eggs in one basket, and I suppose it's geographically rather isolated, communications links are not that good and I think that's it really."

Just as the environmental groups failed to acknowledge positive aspects of the industry's presence, NIREX once again appeared to be blinkered to the possible negative aspects of the industry's presence, such as the risk of a accident.

NIREX's spokesperson was able to list many advantages of the industry's presence in West Cumbria. The geology of the area, he said, 'seems to show good promise for what we want to do'. He commented that having all parts of the fuel cycle concentrated in the same area was an important advantage in terms of waste disposal. The Cumbrian populace itself provided another advantage through the presence of 'knowledge, the expertise, the skilled workforce, the understanding'. This research and aspects of previous studies have shown this to be not particularly true, and that knowledge and support might be lower than thought. Only one respondent in the sample agreed with Mr Alderman's view on this factor. Importantly, in terms of relating to public feeling, he added that

"there is also an economic advantage ... for West Cumbria, providing direct jobs, and indirect jobs."

Although most of the other factors NIREX named as advantages of the industry had been mentioned by some of the respondents, only the jobs which it brought was mentioned by any significant proportion, and so it can be seen that the industry, too, has a substantial education task remaining.

For some reason, BNFL neatly sidestepped this question of advantages and disadvantages of the industry's presence in West Cumbria altogether. Dr Tognarelli's response was that -

"Although there is the Calder Hall nuclear power station at Sellafield, there is also the reprocessing plant here, and therefore the waste management is here too. We are also developing a decommissioning expertise. The other parts of the industry are elsewhere. For example, fuel is manufactured at Springfields near Preston, enrichment is done at Capenhurst near Chester. The generation of nuclear electricity is done at many other sites around the country. So although a lot is carried out at Sellafield, by no means all of it is."

It seemed as if BNFL were automatically on the defensive, denying that the *entire* industry was in West Cumbria, when no-one had suggested that it was.

Overall, the failure of the local campaigning groups to accept that there may be advantages and disadvantages to the situation may well have a bearing upon the ability of local people to trust them.

7.4.3 Responses to the postal questionnaire

The national organizations seemed more able to present a balanced view of the advantages and disadvantages of the presence of many aspects of the nuclear industry in West Cumbria. Nearly half the organizations cited the creation of jobs in an isolated area as a major advantage whilst other common responses focused upon the advantages of having many parts of the industry in close proximity, thus reducing the chances of accidents in transport, and the tradition of the nuclear industry in the area, which had led to a good 'local knowledge base and local acceptance' (GER) making it a 'Centre of excellence' (CHPA) As mentioned above, this latter idea is not a view which local people share, although the other two are.

There were also some answers which echoed the cynicism of local respondents about the reasons for the choice of Cumbria.

"It's a long way from London (Government) if there is an accident." (AECB)

"Accidental or routine releases of radioactive pollutants will not affect the families of decision-makers who live in the south-east of England." (NPAC)

Popular responses about disadvantages focused upon the dangers of overreliance upon one industry (including the comment by the BNIF that 'Cumbria is especially vulnerable to cuts in industry activity'), and the harm that could be done to the population and environment of West Cumbria. CEE, BFEA, and UI, saw no disadvantages.

Respondents to the postal questionnaire were also asked about local attitudes to the industry. Some simply didn't know what local opinion would be, but the general consensus, from those groups which had been critical of the industry as well as those who had been supportive, appeared to be that the local population supported the nuclear industry.

"Local support for the nuclear facilities has generally been high (often higher than in the general population)." (UI)

"Locally probably welcome the nuclear industry - without it there would have been even greater economic problems, even more unemployment etc." (GER)

"I suspect that they must have a higher level of support since a significant amount of work will come from the Nuclear Industry." (AECB)

"They must support it since they work in it. Apart from self-interest there is a need for a positive self-image, so it is quite understandable" (NPVAC)

"Most are very comfortable with nuclear industry." (BNIF)

"More would support BUT only because of job potential and ignorance/disinformation on alternatives." (LD)

The CEE were the only group to give a different answer

"Not sure. The answer could be a function of how far from the site you asked people and where those that have jobs on the site live"

It may well be that these national interpretations of West Cumbrian attitudes are heavily coloured by the fact that the Sellafield trade unions have been very active in campaigning at a national level through schemes such as the 'Trust Us' roadshow in support of THORP, whilst the main West Cumbrian opponents of the nuclear industry have, either by choice (FoE Cockerthorpe), or lack of opportunity (CORE), been unable to attain such national publicity. As the only West Cumbrians the national bodies encounter are consequently those in favour of the industry, the national respondents may believe that all West Cumbrians support the industry. Methodological flaws in existing research discussed in Chapter Four which portrayed the local population as being more supportive of the industry than is actually the case, will not have helped this situation.

7.4.4 Conclusions about the perceptions of the advantages and disadvantages of the presence of the nuclear industry in West Cumbria

The main disadvantage perceived by local people was the threat that one day there would be a major accident. This was seen as a disadvantage by more people than saw it as such in a non-West Cumbrian context, although concern was still lower than the national Gallup poll. Although many people were also aware of the day to day risk from Sellafield's operations, this concern was not as high as earlier studies implied, perhaps because their style of questioning distorted the portrayal of public attitudes. The number of people seeing no advantages in the industry's presence is smaller than the number of people seeing no advantages in the use of nuclear power in general. These findings all confirmed to an extent that West Cumbria is relatively friendly towards its nuclear industry. Up to six percent of the respondents find it possible to empathise with the nuclear industry's needs and problems, and may even see the industry's good as synonymous with that of the rest of West Cumbria. Some people see the location of a 'risky' industry in a less densely populated area such as Cumbria as a sensible option for the UK as a whole, although several respondents resented being put upon in this way.

Concerns about waste generated too, were not perceived to be as much of a problem for Cumbria as it was seen to be a disadvantage in a national context, perhaps reflecting the sub-conscious disassociation of the waste question from Cumbria. With regard to waste, one must be careful not to mistake simple ignorance for the construction of psychological boundaries, for many people may not actually be aware of the proposals to dispose of radioactive waste underground in West Cumbria. More shall be said of this later.

It should not be thought that people either see only advantages or only disadvantages in nuclear power. Many people simultaneously acknowledged both the benefits and disadvantages which the industry brings.

No previous study had investigated whether there was any difference between West Cumbrian attitudes towards the national industry and towards the local industry. The most striking finding was the astoundingly high level of awareness of the benefit of nuclear jobs, mentioned spontaneously by 76% of respondents. However, there was relatively little sign of much

awareness of any other advantages of having the industry in West Cumbria. Jobs aside, fewer advantages were named than in a national context. Indeed, on a quantitative level, more local disadvantages were named than advantages (including jobs), suggesting that support for the actual local industry is heavily dependent upon the appreciation of employment opportunities to outweigh perceived disadvantages, and this was an important finding regarding the nature of support. Another interesting and important finding was that some people may be scared to speak out against the industry because there is a perception that the vast majority of local people are strongly in favour of nuclear power. There was also a lack of knowledge about the industry which suggested that support on the grounds of the technical merits of the industry was not particularly common.

When contrasted with the range of responses from local people, the four local campaigning groups still appeared to be unbalanced in their pronouncements on the advantages and disadvantages of the industry's presence in West Cumbria. FoE underplayed the economic factors seen as advantages by the general public, CORE did not see any advantages for local people in the industry's presence at all. If, as seems likely, local people value economic prospects more highly than possible health concerns, the environmental groups may thus be appearing to be hopelessly impractical. NIREX seemed to be similarly blinkered by their refusal to admit to any possible disadvantages. This might explain the low levels of trust in the various organizations found in the earlier research, as none of the main protagonists are seen to be capable of presenting a balanced argument. BNFL were perhaps too defensive to be able to comprehend the question. Overall, there was considerable room to improve the awareness of other advantages and disadvantages which the campaigning groups see as important but which as yet have little support amongst the local populace.

Respondents to the postal questionnaire seemed more able to take in both advantages and disadvantages of the industry's presence, and were more aware than the local groups of the importance of employment which the nuclear industry brings, possibly due to the recent media portrayals of the local populace as being heavily dependent economically upon the industry. They were also more aware than local people of the technical advantages of the siting of many aspects of the industry in close proximity, perhaps as a result of the industry campaigning more at a national level than at a local one. Interestingly, the national groups'

perceptions of local attitudes almost all conform to the stereotype of a supportive population, albeit one which is supportive due to economic dependency. This may be due to the success of the industry's national campaigns, and the failure of the West Cumbrian anti-nuclear groups to attain publicity at a national level, as well as the strength of trades union campaigns which gives the impression that local opinion is supportive, and the possible inaccuracy of existing social research which has been weighted in favour of the industry.

7.5 Waste Disposal

7.5.1 West Cumbrian public opinion

The next part of the survey investigated local attitudes towards waste disposal. The question asked was a very open one:

"Please tell me what you think about the options for the safe disposal of radioactive materials."

The varied responses given are set out in Table 7.7 below.

Table 7.7 Public attitudes to radioactive waste disposal, 1994

Answer	Frequency
Dump it underground	25 (22%)
I don't know	23 (21%)
It will never be safe no matter what	14 (13%)
Don't dump it underground	14 (13%)
Don't dump it in the sea	9 (8%)
They must know what they're doing	5 (5%)
Vitrification is a good idea	5 (5%)
Don't want any foreign waste	5 (5%)
Nothing to say	4 (4%)
So long as it's safe it doesn't matter	4 (4%)
Not sure it will be safe for millennia	4 (4%)
Have it above ground	4 (4%)
Don't have it above ground	4 (4%)
Reprocessing is a good idea	3 (3%)
Must be safe for millennia	3 (3%)
Need to know more about long term effects	2 (2%)
Require more research into disposal options	2 (2%)
Dump it in the Sahara	2 (2%)
Don't dump it in space	1 (1%)
Dump it in the sea	1 (1%)
Dump it under the seabed	1 (1%)

Answer	Frequency
Should be easily retrievable	1 (1%)
Shouldn't have any connection in West Cumbria	1 (1%)
Cheapest option	1 (1%)
Decision should be based on safety not money	1 (1%)
None	1 (1%)
Total responses	140

The most common kind of response involved people either naming disposal methods which they thought should be used, or naming those which should not be used. Of these, underground disposal was the option which received by far the most support.

"Creates jobs. It's not an eyesore because it's below ground. Pretty good."
(M, 15-29, not currently seeking employment, modern executive housing area).

There appear to be two major factors in the high level of support for underground disposal. Firstly, as in the Priority Search study, a lack of knowledge on the subject was quite common. 23 people (21% of respondents) did not know enough about the subject to express an opinion. Even some of those who did express an opinion did so on shaky knowledge of the subject.

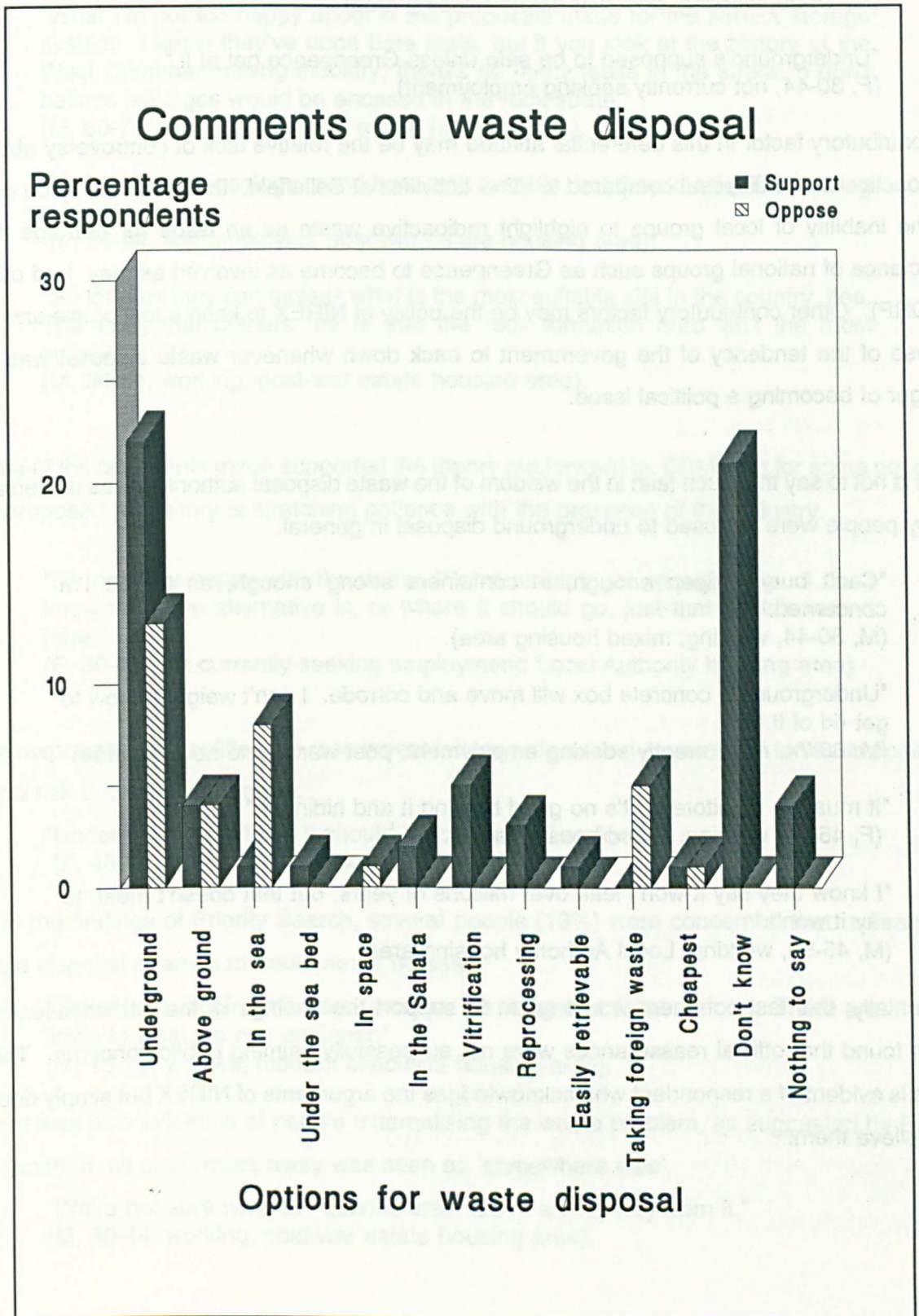
"I don't know much about it but what I've heard doesn't sound very good."
(F, 30-44, not currently seeking employment, predominately Victorian housing area).

Many opinions were expressed in terms of whether underground disposal itself was inherently 'good' or 'bad', rather than whether it was better or worse than any alternatives. As in the analysis of earlier questions, it is possible to draw up a graph which illustrates both support and opposition simultaneously (Figure 7.8). As it shows, most respondents did not appear to be aware of any alternative options.

The second factor which may have helped boost support for underground disposal was that many respondents appeared to have a high level of faith in the knowledge of experts. A number of people displayed this attitude quite explicitly.

"Whatever chemists and scientists come up with, they'll make it safe. Ordinary

Figure 7.8 Public attitudes to radioactive waste disposal options, 1994



people are just scared of the name, you see."
(F, 60-74, retired, post-war estate housing area)

"If it wasn't proved (sic) to be safe, they wouldn't be using them."
(M, 15-29, working, post-war estate housing area)

"Underground's supposed to be safe unless Greenpeace get at it."
(F, 30-44, not currently seeking employment)

A contributory factor in this deferential attitude may be the relative lack of controversy about radioactive waste disposal compared to other activities at Sellafield. In turn, this may be due to the inability of local groups to highlight radioactive waste as an issue (or perhaps the reluctance of national groups such as Greenpeace to become as involved as they had over THORP). Other contributory factors may be the policy of NIREX to keep a low profile and of course of the tendency of the government to back down whenever waste disposal was in danger of becoming a political issue.

That is not to say that such faith in the wisdom of the waste disposal authorities was universal. Many people were opposed to underground disposal in general.

"Can't bury it deep enough, in containers strong enough, as far as I'm concerned."
(M, 30-44, working, mixed housing area).

"Underground a concrete box will move and corrode. I can't weigh up how to get rid of it."
(M, 60-74, not currently seeking employment, post-war estate housing area)

"It must be monitored. It's no good burying it and hiding it."
(F, 45-59, working, mixed housing area).

"I know they say it won't leak over millions of years, but that doesn't mean to say it won't."
(M, 45-59, working, Local Authority housing area)

Incidentally, this last comment would seem to support the findings of the earlier research which found that official reassurances were not successfully calming public concerns. This quote is evident of a respondent who acknowledges the arguments of NIREX but simply does not believe them.

Some respondents were unhappy about the particular area in which the dump was proposed for technical reasons.

"What I'm not too happy about is the proposals made for the NIREX storage system. I know they've done bore tests, but if you look at the history of the West Cumbrian mining industry, there's so many faults in the strata. I don't believe leakages would be encased in the rock strata."
(M, 60-74, working, post-war estate housing area).

"They know the geology round here isn't suitable, but they keep whitewashing over it."
(F, 30-44, self-employed, post-war estate housing area).

"So long as they can assess what is the most suitable site in the country, fine. The thing that bothers me is that the rock formation here isn't the most suitable."
(M, 30-44, working, post-war estate housing area).

Some of the comments made supported the theory put forward by ERM, that for some people, the proposed repository is stretching patience with the presence of the industry.

"I'm not very happy with the dump. We've already got enough here. I don't know what the alternative is, or where it should go, just that I don't want it here."
(F, 30-44, not currently seeking employment, Local Authority housing area)

One respondent exemplified the resentment felt towards central government for the imposition of the risk upon West Cumbria.

"Underground ... I think it should be put under London."
(F, 45-59, working, mixed housing area).

As in the findings of Priority Search, several people (13%) were concerned that radioactive waste disposal of any sort could never be safe.

"There is no single safe way, because the danger remains so long. There are limits to what we can engineer."
(M, 15-29, working modern executive housing area).

There was also evidence of people externalising the waste problem, as suggested by ERM, as Gosforth, all of 20 miles away was seen as 'somewhere else'.

"We're not sure what the options are. We're a long way from it."
(M, 30-44, working, post-war estate housing area).

From looking at Figure 7.8, it can be seen that the number of people who simply did not know what they thought about waste disposal should not be overlooked. Taking don't knows and significant non-response into account puts the apparent support for underground disposal into a better context. Less than a quarter of respondents actually expressed positive support for underground disposal. The vast majority of respondents, therefore, remain to be convinced. If significant non-respondents are taken into account, up to as many as 85% of all possible respondents did not express positive support of underground disposal.

7.5.2 The opinion of the four local groups

BNFL said that

"More is known about this thing than lots of other things that society disposes. High level vitrified waste will be stored on site for a period of 50 years as per government instruction. Near the time a decision will be made about it. Intermediate level waste is to be disposed of by NIREX. The site for this is now being looked into, in order to see if the rocks are suitable, and if so, then the planning permission will need to be obtained. Low level solid radioactive waste is already being disposed of at Drigg. Drigg is the national disposal centre for LLW from industry and hospitals as well as from the nuclear industry. Drigg is expected to last until the middle of the next century now that compaction is being used. All these methods have to have the necessary notice of no objection from the Nuclear Installations Inspectorate."

Once more BNFL's comment was a rather narrative response to a question which had hoped to evoke evaluative comment. Because BNFL did not give any evaluatory comment about waste disposal, one cannot comment upon how many people agreed with their 'point of view'. They do claim that more is known about this subject than many other waste disposal issues. If this is the case, the amount of knowledge displayed by the respondents must leave one very worried indeed about these 'other subjects'. In the results above, the public did not seem to be particularly aware about the waste disposal programme as outlined by BNFL. For instance no-one differentiated between LLW, ILW and HLW, and so there is room to improve BNFL's message about the back end of the nuclear fuel cycle.

NIREX decried surface storage because it meant having to take

"responsibility of manning those stores and repackaging that waste, and giving maybe very small but avoidable radiation doses to your staff over the many thousands of years you would need to maintain those facilities. [It would be] far more liable to damage at the surface, either from natural effects or from terrorist attack ... How do we know we will still be capable of maintaining a

storeroom in x thousands of years, I mean look at a thousand years, look what civilisation has done in a thousand years"

NIREX said that underground disposal meant 'removing the burden from future generations to care for this waste'.

As mentioned above, underground disposal was indeed the most favoured disposal route and to that extent, NIREX are successful in gaining support. However, very few of those respondents advocating underground disposal justified their choice by the arguments NIREX offered. Most did so because they just thought it was the 'right' way to do it, that is, because the experts said so, and they were not aware of any alternatives. Were their opponents to argue convincingly for surface storage or any other disposal methods, the picture might be different.

FoE Cockermonth's coordinator said,

"There is no safe disposal of radioactive materials, therefore I think they should stop producing radioactive materials. Nothing could possibly ever be guaranteed safe for the length of time that we are talking about, but probably the least 'unsafe' is to have it dry-stored on the surface where it can be monitored for leaks, and can be re-packaged if the package is found to be leaking. If some answer to the problem of radioactive waste comes along, it's well placed to take advantage of it, it could still be treated. And it isn't forgotten and lost, it is always there. Underground dumping means you have no control over it any more, you've relinquished all control over it and it might get into the water supply, will certainly contaminate the land, might go critical, if plutonium builds up. And it might get lost, or might get tampered with."

While many members of the local populace seem to share Jill Perry's doubts about the long term safety of waste, they do not follow her argument to the conclusion that no more radioactive waste should be created, or that it should be stored on the surface, perhaps a result of the perceived economic importance of the local industry.

CORE's views were quite similar to FoE Cockermonth. They said that

"they should stop reprocessing for a start, spent fuel should be stored at the site of origin ... at the power stations. Reprocessing's just a nonsense."

Like FoE's comments, this point of view appears to have failed to carry through to local people in any significant numbers. Perhaps the biggest failure of both FoE and CORE has been to

establish any notion of viable alternatives for waste disposal, given that storage was supported by only 4% of respondents.

7.5.3 Responses to the postal questionnaire

Of those who expressed an opinion, feelings seemed evenly divided. About half seemed convinced that a deep underground repository was the only way forward.

"The current proposals seem sensible." (BFEA)

"An underground rock repository appears to be the only feasible option." (BGS)

Others felt that there simply was no way of dealing with waste safely.

"Is there such a thing as truly safe disposal - I think not. It is a question of risk assessment which implies an evaluation and comparison with other energy sources. Even then direct comparisons are limited given the half lives of nuclear fuels." (GER)

"It is not possible to make statements about safe disposal over periods of 1000 years or more. We do not understand either geology of science and technology of materials well enough." (NPAC)

As with the local responses, there seemed to be little awareness of methods of waste disposal other than underground disposal.

7.5.4 Conclusions about attitudes to radioactive waste disposal

A finding not highlighted by previous studies was that attitudes towards radioactive waste disposal were affected by the (low) level of knowledge about the subject. Underground disposal was the most favoured option, but this must be understood in the context of a widespread lack of awareness of any alternatives, faith in the ability of experts (possibly due to the lack of public 'controversy' over waste disposal), and the existence of large numbers of people who did not have any opinion on waste disposal at all.

There was an amount of uncertainty of public hesitancy and concern towards NIREX's current proposals, based on doubt over the technology required. It was also noticeable that once more there was an amount of scepticism among some respondents about the reasons why the nuclear industry was located in Cumbria.

Opinion amongst national groups was similar to that of the local public, in that it was divided between those who favoured underground disposal and those who doubted the long term safety of such a scheme, with little comment made about other disposal options.

All four local groups therefore needed to inform both the local public and national groups more about the different options for dealing with radioactive waste. The industry had not conveyed the differences between different levels of waste, or the reasons why waste should be disposed underground rather than on the surface. FoE and CORE needed to convey their message of the advantages of surface storage and of the need to stop creating more waste.

7.6 Media coverage of the nuclear industry in West Cumbria

7.6.1 Introduction

The next major section of the surveys investigated attitudes to the different actors involved in the debate over nuclear power. The first actor which was investigated was the media. In such a technical area as the issue of nuclear power, the role of the media in translating between the scientific and the public realms is an important one (Corner *et al* 1990, 11). Previous research had found that certain elements of the media tended to sensationalise reports of the Cumbrian nuclear industry, and had also found that local people did not regard the media as a particularly trustworthy source of information. This section intended to examine attitudes to the media in 1994.

In order to provide the reader with a rudimentary insight into the standpoint of the media at the time of this study, Table 7.8 displays the coverage of the initial government decision that THORP would be allowed to open. This incident was arguably the most important news item relating to the nuclear industry in 1993-4. Unfortunately, there was neither time nor space in this study to analyze these reports in depth. Instead Table 7.8 outlines the general tone⁴⁷ of each report, quoting the headline and first line of each article to give the reader a taste of the actual text. An 'importance' column is also introduced in this table in order to show how coverage of the decision on THORP was minimized because of the timing of the announcement to coincide with the Downing Street Declaration, which usurped most newspaper column inches on December 16. In Table 7.8 the newspaper articles for each of the days December 15 and December 16 are arranged to show the incremental spectrum of opinion from articles which support the industry through to the most hostile articles.

Obviously an analysis of two days coverage cannot be looked upon as statistically reliable, but it does appear that the majority of the national media display at least a degree of slight antipathy towards the nuclear industry. This may be because of the increasing categorization of nuclear power a 'bad news event', especially after Three Mile Island and Chernobyl, events which increased the scepticism of journalists towards the industry (Corner *et al*, 1990, 11) and the fact that 'bad news sells'.

⁴⁷ The author has tried to be as objective as possible, but an analysis of other people's writings and emotions cannot help but be subjective.

One factor which appears to have influenced the media depictions of the industry is the nature of the media's audience. The West Cumbrian press has a readership which contains a large number of people employed in or dependent upon the nuclear industry, and so the local press will not want to alienate this readership. The national media, meanwhile, has an audience which is not as closely linked to the nuclear industry, and it can publish anti-nuclear stories without fear of alienating many readers. At the opposite end of the spectrum from the Cumbrian press, The Daily Star for example, has a strong readership in Ireland, one of the nations which publicly opposed THORP, and the paper has taken a quite virulent anti-nuclear stance (see montage opposite). It has run a series of leading articles against the nuclear industry, leading BNFL to make no less than 26 complaints to the Press Complaints commission, all of which were rejected (The Daily Star 25/2/94, 1-2).

Apart from The Daily Star, the more right-wing tabloids were more favourable in their reports of the decision, perhaps out of loyalty to the Conservative government as much as anything else. Even then it was noticeable that The Sun, The Daily Express and The Daily Mail all either devoted the story little column space, or buried it deep within the paper. There was no lead-story triumphalism over the plant's opening to counter the strong criticism which was coming from some quarters.

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WORLD EXCLUSIVE: Inside Britain's nuclear dustbin



DEADLY DUMP: Daily Star reporter Sue Crawford sits on a massive store of nuclear waste — and it's just a tenth of the 35,000 tons at Sellafield Picture: TONY FISHER

DOOMWATCH GRAVEYARD

- THIS is the first picture taken right in the heart of Sellafield, the Cumbrian plant set to become the world's nuclear dustbin.
- THE 35,000 tons of nuclear waste already stored here are enough to create TEN disasters like Chernobyl. And the waste is so powerful that it will still be radioactive in a quarter of a million years.
- NEXT month the Government will decide whether to give the green light to the new Thorp complex here — opening the floodgates to even more nuclear waste from all round the world.

Full story — See Page 16

Table 7.8 Press coverage of the government decision to confirm the commissioning of THORP 15-16/12/93

Date	Newspaper	Main Headline	First Line	Importance	General Tone
15/12/93	West Cumbrian Evening News and Star	THORP: ALL SYSTEMS GO	Union leaders at Sellafield were today claiming victory as Thorp seemed set to get the government green light.	p.1 21.5 cm x 22 cm (lead article) p.2 11 cm x 20 cm	Positive - highlighted economic benefits
15/12/93	The Times	Thorp begins reprocessing nuclear waste within weeks	John Gummer will today give the go-ahead for the £2.8 billion Thorp nuclear reprocessing plant at Sellafield in Cumbria,	p.2 8.5 cm x 28 cm	Neutral - outlined what THORP will do and arguments from those against it.
15/12/93	Financial Times	Japan divided as Thorp waits	Tokyo's green lobby claims Britain will become a dump for nuclear waste	p.14 27 cm x 27 cm	Very slightly negative - showed arguments for and against nuclear power in Japan, beginning and ending with anti-nuclear statements

Date	Newspaper	Main Headline	First Line	Importance	General Tone
15/12/93	The Independent	Ministers ready to back £2.8bn Thorp plant	Ministers are expected to announce the go-ahead of the controversial Thorp project today, allowing the recycling of imported nuclear waste at the plant in Sellafield, Cumbria.	p.2 30 cm x 8 cm	Slightly negative - expected ministers to give go-ahead, but highlighted opposition to the plant
15/12/93	The Guardian	Gummer braced for Thorp backlash	The government was bracing itself last night for criticism in Britain and abroad when it makes its announcement on the future of the Thorp nuclear reprocessing plant at Sellafield.	p.6 4.5 cm x 19 cm	Mildly negative - implied UK would give go-ahead because it is already built. Listed many possible opponents
16/12/93	The Times			No coverage (Coverage of Downing St. Declaration 4 of first 7 pages)	

Date	Newspaper	Main Headline	First Line	Importance	General Tone
16/12/93	The Sun	Go-ahead for nuclear plant	A controversial £2.billion nuclear reprocessing plant got the go-ahead from the government yesterday.	p.2 5 cm x 9 cm (Coverage of Downing St. Declaration rest of p.2 and editorial)	Positive - did not mention any possible problems
16/12/93	Daily Express	Go-ahead for new A-plant at Sellafield	The controversial £2.8 billion Thorp nuclear reprocessing plant a Sellafield was yesterday given the go-ahead by the government	p.15 11 cm x 24.5 cm (Coverage of Downing St. Declaration 7 of first 13 pages)	Slightly positive - stressed economic benefits for Cumbria and UK, highlighted green extremist protests
16/12/93	West Cumbrian Evening News and Star	Greenpeace vows to fight on over Thorp	Greenpeace lawyers were today battling to stop Thorp going into operation	p.12 full page	Neutral - showed arguments for and against
16/12/93	Daily Mail	Gummer's go-ahead to nuclear waste plant	LONG legal battles were heralded yesterday after the government gave the go-ahead for reprocessing work to begin at the controversial THORP nuclear plant	p.33 11.5 cm x 27 cm (Coverage of Downing St. Declaration 7 of first 9 pages)	Neutral - listed arguments for and against with little comment

Date	Newspaper	Main Headline	First Line	Importance	General Tone
16/12/93	The Journal	Thorp go-ahead saves 4,500 jobs in the North	The jobs of 4,500 N-plant workers were safeguarded yesterday when Sellafield's £2,800m Thorp reprocessing plant was given the go-ahead	p.4 21.5 cm x 15 cm (Coverage of Downing St. Declaration 4 of first 9 pages)	Positive for jobs but negative otherwise - highlighted criticisms
16/12/93	The Scotsman	Controversial nuclear plant gets go-ahead for start-up	THE GO-AHEAD was given yesterday for the commissioning of the £2.8 billion THORP nuclear reprocessing plant at Sellafield, Cumbria, in spite of fervent opposition from environmentalists	p.2 9 cm x 23.5 cm (Coverage of Downing St. Declaration 3 of first 5 pages) p.12 secondary editorial	Article slightly positive - highlighted advantages of a decision removing stagnation from industry. Editorial very negative - "The go-ahead ... is consistent, expected, and utterly wrong-headed".
16/12/93	Financial Times	Ministers accept economic case for waste plant	British Nuclear Fuels has gained the decision it wanted, although a year later than it had hoped.	p.12 over half page (Coverage of Downing St. Declaration Street declaration p.1)	Slightly negative - described how plant works, how greeted in Germany & Japan 'with relief', but outlined several possible problems

Date	Newspaper	Main Headline	First Line	Importance	General Tone
16/12/93	The Independent	Thorp approved with tighter discharge limit	The government yesterday gave its blessing to British Nuclear Fuel's new £2.8bn thermal oxide reprocessing plant (Thorp) at Sellafield in West Cumbria.	p.9 over half page (Coverage of Downing St. Declaration dominated first four pages)	Mildly negative - highlighted government secrecy, opponents of THORP, and possible problems. Also showed Cumbrian communities overjoyed at plant opening
16/12/93	Daily Telegraph	'Greens' prepare legal case against Thorp	Environmental groups are to take legal action to try to overturn the Government's go-ahead for the Thorp nuclear reprocessing plant at Sellafield,, Cumbria.	p.2 18 cm x 19 cm (Coverage of Downing St Declaration of first 5 pages)	Mildly negative - highlighted possible problems
16/12/93	The Herald	Greens see red at green light for Thorp plant	Ministers yesterday gave their backing to the controversial £2800m Thorp reprocessing plant at Sellafield in Cumbria, confirming that it is to be commissioned	p.3 37 cm x 8 cm (Coverage of Downing St. Declaration 5 of first 16 pages)	Negative - highlighted all opponents

Date	Newspaper	Main Headline	First Line	Importance	General Tone
16/12/93	Daily Mirror	Nuclear waste plant gets OK	The controversial Thorp nuclear reprocessing plant was given the go-ahead yesterday by the government	p.5 4 cm x 25 cm (Coverage of Downing St. Declaration 5 of first 9 pages)	Negative - highlighted protests and possible problems from THORP
16/12/93	The Guardian	Gummer gives go-ahead for Thorp	The government gave the go-ahead last night for the controversial £2.85 billion thermal oxide reprocessing plant (Thorp) at Sellafield in West Cumbria in the face of fierce opposition from environmentalists	Back page 22 cm x 25 cm p.6 35 cm x 22 cm p.7 full page editorial Section 2 pp.12-3 2 full pages (Coverage of Downing St. Declaration pp 1-3 25-6)	Showed many aspects - international , economic, Cumbrian situation, but editorial was negative 'THE THORP nuclear waste reprocessing plant is an epitaph to lost age.'
16/12/93	Daily Star	Nuclear Dustbin gets the go-ahead	Britain was on course to become the nuclear dustbin of the world last night, following the recommissioning of the Thorp reprocessing plant	p.1 5 cm x 28 cm (Before Coverage of Downing St. Declaration)	Very negative - Editorial comment 'The decision to open the Thorp nuclear reprocessing plant in Cumbria is a gutless piece of government'

7.6.2 West Cumbrian public opinion

The questions in the questionnaire about media coverage differentiated between local and national coverage. The results are shown in Tables 7.9 and 7.10 below.

"Please tell me what you think about the coverage of the West Cumbrian nuclear power industry by newspapers and by television and radio news programmes at both a local and national level."

Table 7.9 West Cumbrian perceptions of local media coverage, 1994

Comments	Frequency
Fair	37 (33%)
Support the West Cumbrian nuclear industry	28 (25%)
Lots of coverage	11 (10%)
Oppose the West Cumbrian nuclear industry	10 (9%)
Not much coverage	7 (6%)
Don't show full truth as to what goes on	6 (5%)
Need to investigate what will happen in an accident	4 (4%)
Sensationalize	4 (4%)
Scaremonger	4 (4%)
I don't know	3 (3%)
Nothing to say	3 (3%)
Mixed	3 (3%)
Show negative aspects only	2 (2%)
Ill-informed	1 (1%)
Total responses	123

Table 7.10 - Perceptions of national media coverage, 1994

Comments	Frequency
Oppose the West Cumbrian nuclear industry	36 (32%)
Fair	21 (19%)

Sensationalize	14 (13%)
Only show the negative, eg accidents	9 (8%)
Nothing to say	6 (5%)
Don't show the full story	6 (5%)
Give lots of coverage	5 (5%)
Need to investigate what will happen in an accident	4 (4%)
Scaremonger	4 (4%)
Don't give much coverage	4 (4%)
I don't know	2 (2%)
They are ill-informed	2 (2%)
Support the West Cumbrian nuclear industry	2 (2%)
Mixed	1 (1%)
Total responses	116

The above tables show that although there are a small minority who perceive elements of the local media as hostile to the local nuclear industry, the majority see them as fair to both sides, or supportive of the industry. The national media on the other hand was seen as far more hostile.

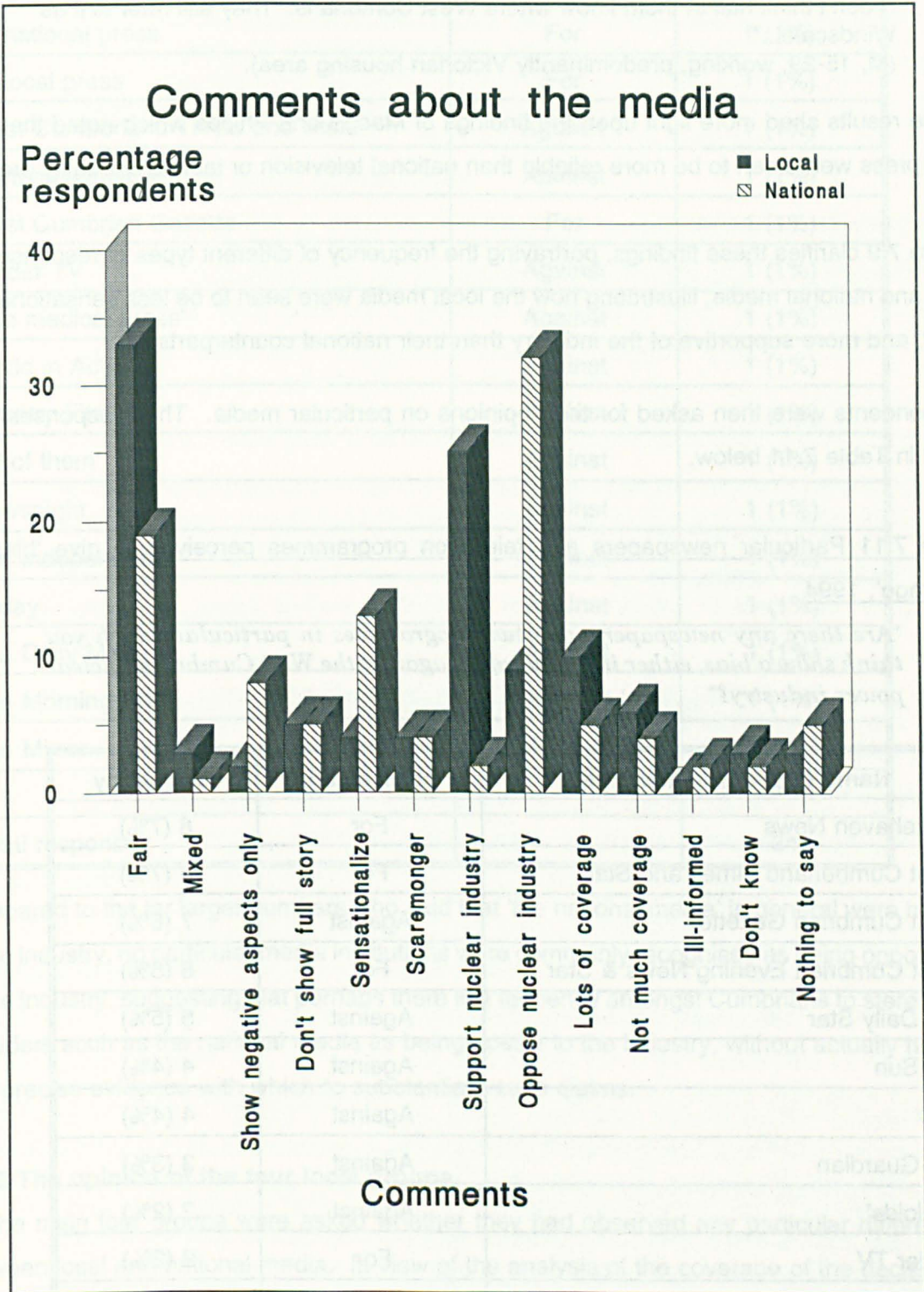
"They give a false view of it. Always dark and dingy, and it's not." (M, 15-29, unemployed, local authority housing area)

"I think the national ones are shocking personally. They should think about people who live here. They should gag them and their photos."
(M, 60-74, retired, post-war estate housing area)

Only two people thought the national press supported the local nuclear industry. although a number of respondents said they presented a fair case, often under difficult circumstances

"The national press used to be frightened - they didn't want to get involved in anti-nuclear campaigning. Given the lack of information and the complexity of the issues, they do a good job. Isotopes and half-lives are well beyond the average reader and they are dealing with experts who can destroy the gut feeling arguments of ordinary people."
(M, 30-44, working, predominately Victorian housing area).

Figure 7.9 Comparison of public perceptions of local and national media coverage, 1994



For some people the sense of resentment at the national media's handling of the nuclear industry was closely bound up with the notion of West Cumbria's isolation from the rest of the country

"I don't think half of them know where West Cumbria is. They still refer to it as Windscale..."

(M, 15-29, working, predominantly Victorian housing area).

These results shed more light upon the findings of Macgill and Phipps which noted that the local press were seen to be more reliable than national television or tabloid or quality press.

Figure 7.9 clarifies these findings, portraying the frequency of different types of response for local and national media, illustrating how the local media were seen to be less sensationalist, fairer, and more supportive of the industry than their national counterparts.

Respondents were then asked for their opinions on particular media. Their responses are listed in Table 7.11 below.

Table 7.11 Particular newspapers and television programmes perceived to give 'biased coverage', 1994

"Are there any newspapers, or news programmes in particular which you think show a bias, either in favour of, or against the West Cumbrian nuclear power industry?"

Name of programme/paper	For or against	Frequency
Whitehaven News	For	8 (7%)
West Cumberland Times and Star	For	8 (7%)
West Cumbrian Gazette	Against	7 (6%)
West Cumbrian Evening News & Star	For	6 (5%)
The Daily Star	Against	5 (5%)
The Sun	Against	4 (4%)
BBC	Against	4 (4%)
The Guardian	Against	3 (3%)
'Tabloids'	Against	2 (2%)
Border TV	For	2 (2%)
Daily Mirror	Against	2 (2%)
BBC	For	1 (1%)

Name of programme/paper	For or against	Frequency
Daily Mail	For	1 (1%)
All national press	For	1 (1%)
All local press	For	1 (1%)
West Cumberland Times and Star	Against	1 (1%)
Whitehaven News	Against	1 (1%)
West Cumbrian Gazette	For	1 (1%)
Border TV	Against	1 (1%)
'The medical press'	Against	1 (1%)
World in Action	Against	1 (1%)
Country File	Against	1 (1%)
'All of them'	Against	1 (1%)
Newsnight	Against	1 (1%)
The Independent	Against	1 (1%)
Today	Against	1 (1%)
The Daily Mail	Against	1 (1%)
The Morning Star	Against	1 (1%)
The Mirror	Against	1 (1%)
Total responses		34

Compared to the far larger numbers who said that 'the national media' in general were hostile to the industry, no particular media institutions were commonly recognised as being opponents of the industry, suggesting that perhaps there is a tendency amongst Cumbrians to stereotype outsiders such as the national media as being hostile to the industry, without actually having any precise evidence with which to substantiate such claims.

7.6.3 The opinion of the four local groups

All the main four groups were asked whether they had observed any particular differences between local and national media. In view of the analysis of the coverage of the decision to commission THORP, NIREX's representative seemed to be quite accurate when he said that nationally

"There's an anti-nuclear bias to the news media in general. I don't think you ever see a really pro-nuclear article in the national media. You might see the occasional balanced one, but mostly they are really sensationalist ... Nationally I think you'll find The Star, Today, The Guardian, to some extent The Independent have quite a notable anti-nuclear content, the tabloids are always looking for the sensational or they treat it in a sensational manner. Locally there can still be bias, and perhaps some of the media are more biased than others, but also, there's a balanced view. They are naturally wary of claims made by the industry, but they are prepared to give both sides of the argument and I think that goes for all the local media."

BNFL gave a similar answer -

"National coverage tends to concentrate on the sensational side ... The local TV, Border TV tends to be better factually ... the local press can be a little mixed at times"

CORE too noted how the industry had few supporters in the media.

"On the whole I'm surprised really how anti-THORP and Sellafield most of the national media seem to have become, which is good for our cause. Sellafield doesn't seem to have many friends left. You don't see many papers who are supporting the operation of THORP. The press have become very suspicious over the years of anything nuclear whether its nuclear power or Sellafield because they don't believe what they're told by the industry and they're quite right in that respect. I certainly feel The Star would always publish a good story on our side, I feel, I mean that's why Sellafield hate them. Locally, well I think they try and do their best. On the West Coast I think there's a fair coverage. I don't think there have been any real news programmes which support BNFL. The only thing I think sometimes is on the health front. I think there seem to be biased towards the nuclear industry, think scientists have become a bit paranoid about speaking out against radiation. I think papers are at the moment more likely to accept the industry's explanation that radiation is nothing to do with cancer and does not kill anybody".

FoE Cocker mouth gave a different point of view, thinking that most of the media was fair and that the BBC actually supported the industry.

"I think BBC Radio Cumbria and the BBC North West programme on the television have always given very biased coverage in favour of BNFL or the nuclear industry. The Border TV coverage has been much more balanced. I think the Whitehaven News and the Evening News and Star give not bad coverage. I think national coverage on TV, radio, and in national newspapers has been fair and unbiased. I tend to read the Guardian, but I think that the Independent and the Telegraph have also given quite good coverage, but I don't read the papers regularly so I can't comment on the broad spectrum of

national newspapers."

The first three groups quoted here give responses very similar to local feeling, with an important difference being that they could actually name particular media sources which they believed to be biased. FoE's response was unexpected, and perhaps reflects unfavourably upon their awareness of the media climate.

7.6.4 Responses to the postal questionnaire

Many of the groups had little to say about media coverage. Comments that were made ranged across a spectrum of opinion, from some who believed that there was slight support for the industry:

"There is a reasonably balanced coverage, probably somewhat more favourable to nuclear industry than is justified" (NPVAC),

through belief that the media gave a fair and balanced coverage (LD, CHPA) to complaints about sensationalism (UI) and anti-nuclear bias (TACE). Only the nuclear industry groups could name any particular newspapers or news programmes with a distinct bias. BNIF said that the Daily Mirror and The Daily Star were 'pathetic', that The Guardian and BBC television were 'rather biased against'.

7.6.5 Conclusions about media coverage of the nuclear industry

To judge from the one news story studied, there was little evidence of positive support for the nuclear industry amongst the press, although the local evening newspaper showed support in terms of employment opportunities. There were papers who took a very anti-nuclear stance, notably those with strong Irish readerships. The right-wing press were not as overtly supportive of the industry as the left-wing press were overtly critical. The manner in which local people perceived the national media to be more hostile to the industry and more sensationalist than the local press, even though they had difficulty in naming examples of hostile media suggests that there may be a tendency for West Cumbrians to stereotype 'outsiders' as hostile to the industry and the area, even though they have little direct evidence to justify such belief. This represents a significant addition to Macgill and Phipps' original work on attitudes towards the media. With the exception of FoE Cockermonth, the local groups all see elements of the national media as being hostile to the industry, and note a lack of any particularly supportive media. The groups are different from many local people in that they

can name particular newspapers which they believe are biased. Most respondents to the postal questionnaire did not feel as strongly about media coverage, although the nuclear industry bodies were particularly scathing of certain tabloid newspapers.

7.7 Public awareness of organizations which support or oppose the nuclear industry

The next set of questions in the survey examined local perceptions of groups of people who might be involved in the debate over the future of the West Cumbrian nuclear industry. Respondents were first asked the following question

"Can you name any groups of people or organizations, either local or national, which oppose the West Cumbrian nuclear power industry?"

With only 6 people registering as 'don't knows', public awareness of the opponents of nuclear power was quite high. As Figure 7.10 shows, Greenpeace's profile was very high indeed, with 85% of respondents recognising their role in opposition to the nuclear industry. This response level was far higher than those for either of the two main Cumbrian anti-nuclear groups⁴⁸, suggesting once more that Cumbrian opinions about the nuclear industry are affected more by events and actions on a national level than on a local level. This is probably because with greater resources at their disposal, Greenpeace's activities can be more eye-catching and controversial, such as blocking the discharge pipe and taking BNFL to court, whereas the limitations upon CORE and FoE Cockerthorpe has led them to undertake operations on a smaller scale.

CORE suffered a public awareness problem in that not everyone was sure exactly who they were. Fourteen respondents had heard of them but were unsure of their name. When these unsure responses were added to those which named CORE correctly, CORE's profile amongst the respondents of this survey was greater than that for FoE, despite the fact that FoE are actually based in Cockerthorpe, where the respondents lived, whilst CORE are based at the other end of the county, in Barrow. This greater level of recognition for the more aggressive CORE would suggest that at a local level too, a more confrontational approach receives greater publicity. Beyond Greenpeace, FoE and CORE, there are no bodies which receive any substantial amounts of recognition.

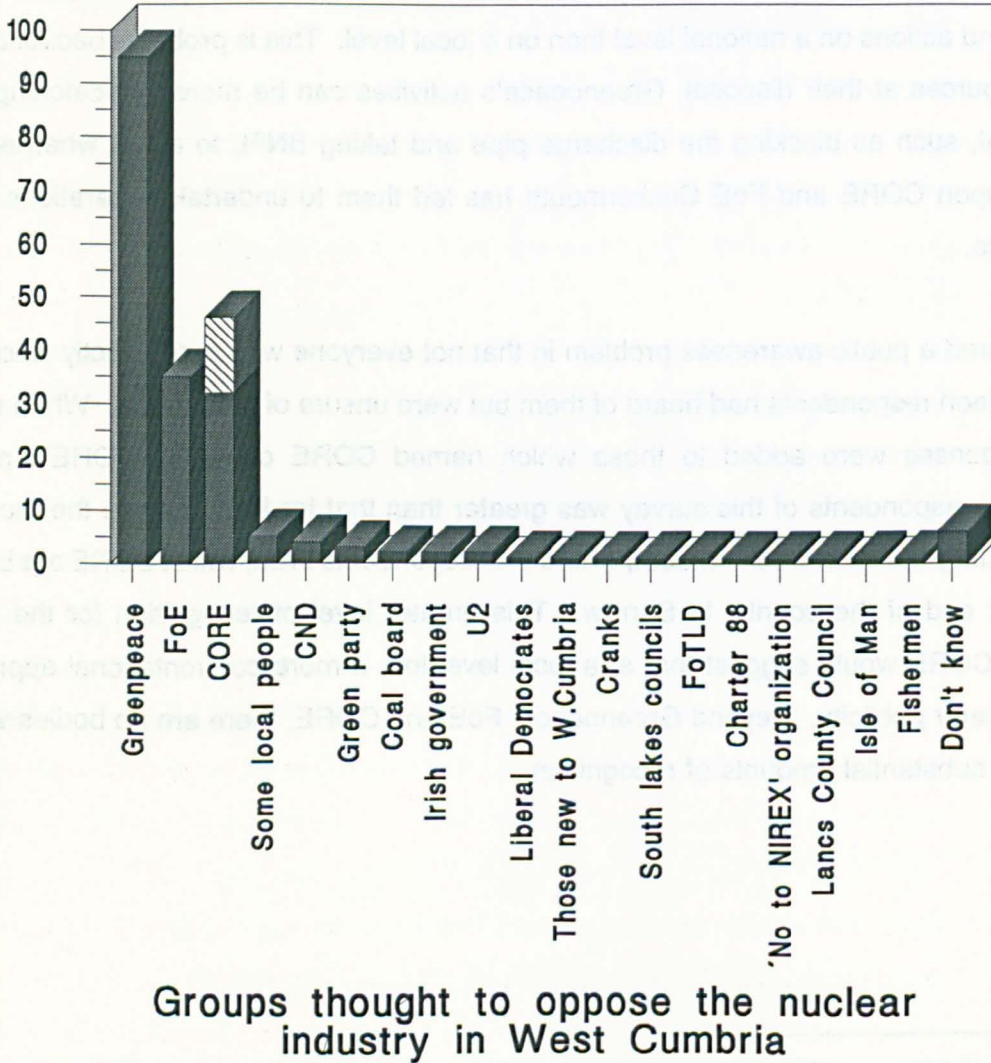
⁴⁸ It should be noted that many people who named FoE might have named them in terms of the national organization rather than the local group, and so it would be advisable for future researchers to devise some method of assessing public awareness of the activities of FoE Cockerthorpe in particular.

Figure 7.10 Public awareness of organizations which oppose the West Cumbrian nuclear industry. 1994

Can you name any groups of people or organizations which oppose the West Cumbrian nuclear power industry?

Percentage respondent

▨ Unsure of name
 ■ Named group



Only 5% of respondents mentioned 'some local people' as opponents of nuclear power, supporting the point made earlier about the common local perception that very few local people were critical of the industry.

Respondents were also asked

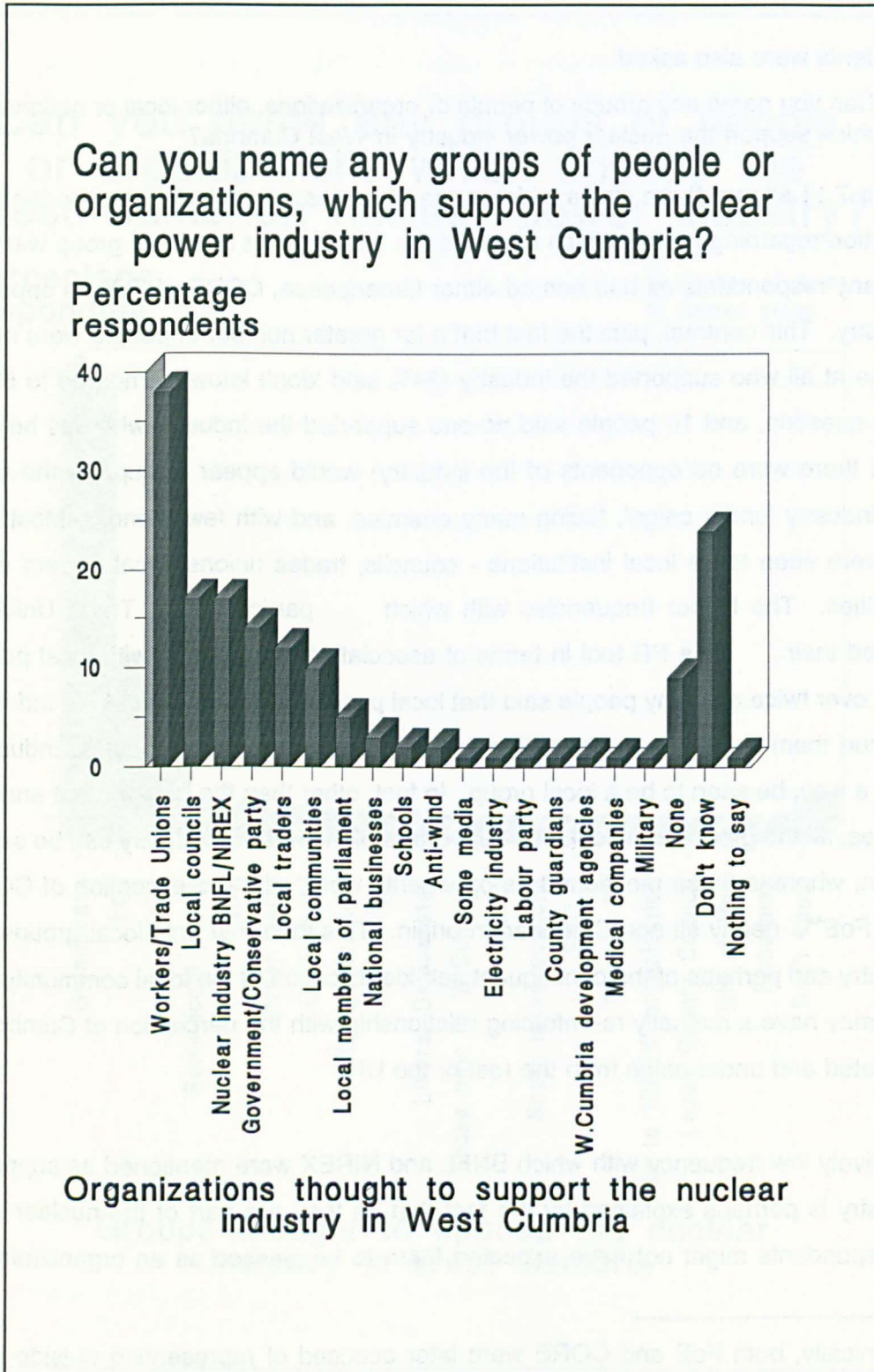
"Can you name any groups of people or organizations, either local or national, which support the nuclear power industry in West Cumbria?"

As Figure 7.11 shows, there was a wider range of names presented by respondents than to the question regarding groups which opposed the industry, but no single group were named by as many respondents as had named either Greenpeace, CORE or FoE as opponents of the industry. This contrast, plus the fact that a far greater number of people were not aware of anyone at all who supported the industry (24% said 'don't know' compared to 5% in the previous question, and 10 people said no-one supported the industry whereas no-one had said that there were no opponents of the industry) would appear to support the idea of a nuclear industry 'under seige', facing many enemies, and with few friends. Most of these friends were seen to be local institutions - councils, trades unions, local traders and local communities. The higher frequencies with which particular Trade Unions highlighted their as a PR tool in terms of associating the industry with local people. In addition, over twice as many people said that local people were in favour of the industry than had named them as being in opposition to the industry. Even the nuclear industry itself could, in a way, be seen to be a local group. In fact, other than the government and medical companies, all the groups mentioned as supporters of the nuclear industry can be seen to be Cumbrian, whereas those mentioned as opponents were, with the exception of CORE and possibly FoE⁴⁹, nearly all non-Cumbrian in origin. This idea that only local groups support the industry and perhaps of the consequent self-identification of the local community with the industry may have a mutually re-enforcing relationship with the perception of Cumbria as an area isolated and under seige from the rest of the UK.

The relatively low frequency with which BNFL and NIREX were mentioned as supporters of the industry is perhaps explained by the fact that as they are part of the nuclear industry, many respondents might not have expected them to be classed as an organization which

⁴⁹ Ironically, both FoE and CORE were later accused of representing outside interests anyway.

Figure 7.11 Public awareness of organizations which support the West Cumbrian nuclear industry, 1994



could support the industry. The success of the industry's campaign to foster links with local educational institutions can be seen in the fact that some respondents actually named schools as organizations which positively supported the industry.

It was noticeable that of the groups which had responded to the postal questionnaire, only the Liberal Democrats were specifically mentioned, and even then there was only one respondent who named them as an organization opposed to nuclear power (although BNIF and UI could conceivably be included in 'the nuclear industry').

In order to understand their low profile in the area, the postal questionnaires asked these national groups the question

"Do you wish to increase the proportion of West Cumbrians who agree with your views on the nuclear power industry? If so, do you have any particular goals in mind? eg reaching a particular target audience or a particular timescale you work to?"

With one exception, the groups were not concerned with making any particular attempts to involve themselves in the nuclear debate in West Cumbria. Even the UI and BNIF thought it was a job best left to BNFL and NIREX. It was in fact only the Liberal Democrats who were interested in increasing their profile in the area. Their spokesperson said "I would like to see more research work on the alternative employment strategies and investment potential for the area and disseminate the findings." This set of responses illustrates yet further the de-politicization of the nuclear debate outside of site specific nuclear areas in that even these, the twenty most concerned potential pressure groups were simply not interested in being involved.

7.8 Public awareness of group activities

Local respondents were also asked a series of questions designed to examine how far the activities of various pro-nuclear and anti-nuclear groups had pervaded into the lives of West Cumbrians. The first question asked

"Have you ever seen any adverts advertising the nuclear industry in newspapers, on TV, in posters etc? Can you name them?"

As Figure 7.12 shows, the adverts for the SVC which had been shown on national television were the most frequently named adverts. This level of success, compared to the far less frequently named local adverts again supports the notion that use of the national media is having more impact upon awareness within West Cumbria than the use of local media.

The next question asked

"Have you ever seen any adverts opposing the nuclear industry in newspapers, on TV, in posters, etc?"

As Figure 7.13 shows, a similar conclusion can be drawn regarding anti-nuclear adverts. There were no comparable national television adverts against the industry, and so there is no commonly well recognised advert.

The most frequently mentioned adverts came from Greenpeace who campaign at a national level. FoE Cocker-mouth's local campaigns in the street had resulted in five respondents mentioning their handouts, but no-one remembered seeing any evidence of CORE's work. The limitations upon the anti-nuclear groups appears to have had an impact upon the effectiveness of their adverts, for 47 people had not seen any adverts against the industry, over three times more than had not seen any in favour of the industry.

The next question was designed to test the effectiveness of the use of celebrity endorsements.

As Table 7.12 shows, only the rock band U2 had made any significant impact, probably due to their controversial proposals for a concert on the Cumbrian shoreline and subsequent photo-opportunity. This may not, of course, be entirely beneficial to groups such as CORE who were associated with U2's presence, because a number of respondents mentioned U2 in derisory fashion. Overall, far more people could name celebrities in opposition to the industry than in support. Therefore it appears that the anti-nuclear lobby has both the benefits of publicity and the disadvantages of association with celebrities.

Figure 7.12 Public awareness of pro-nuclear advertisements, 1994

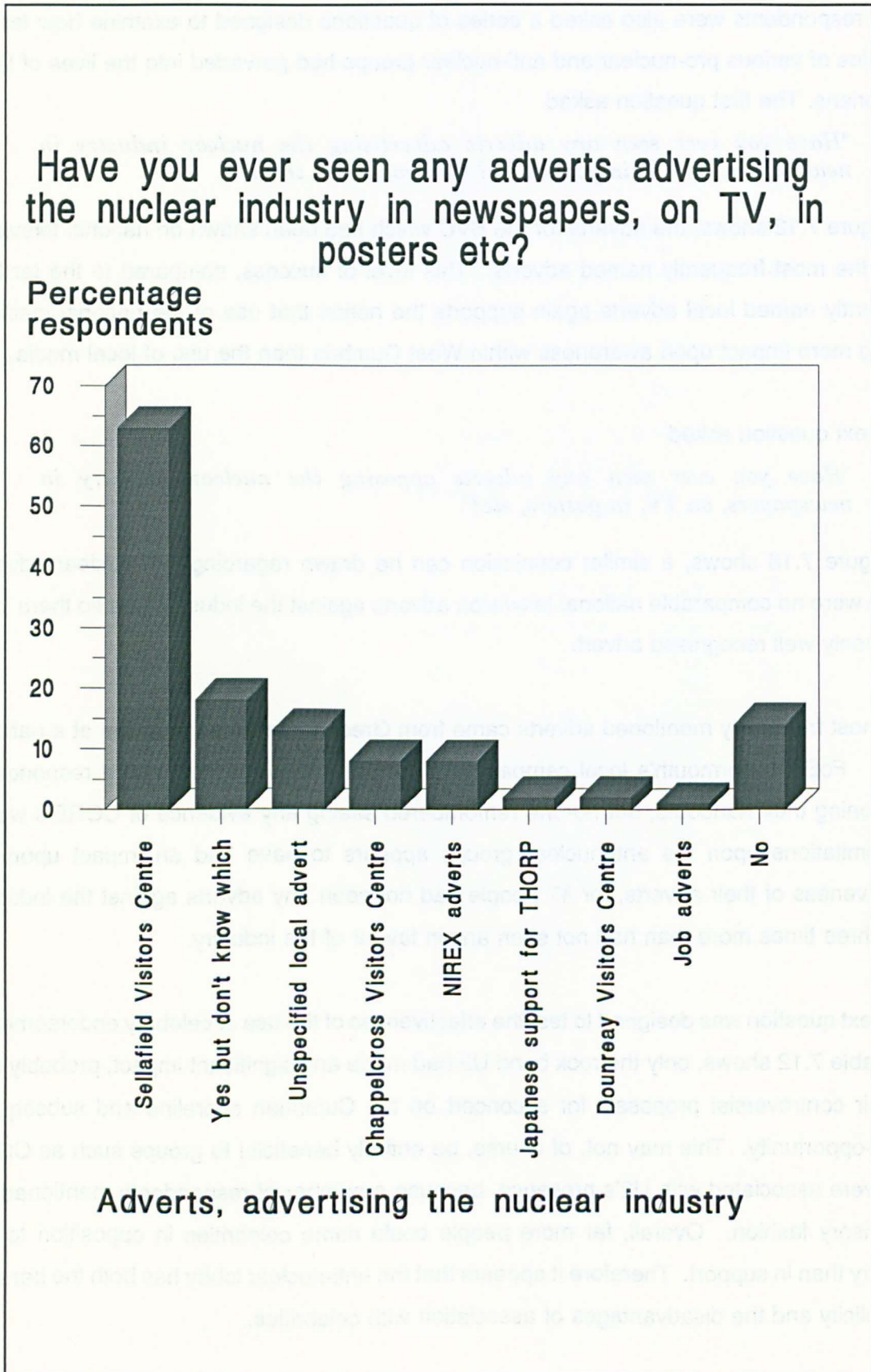


Figure 7.13 Public awareness of anti-nuclear advertisements, 1994

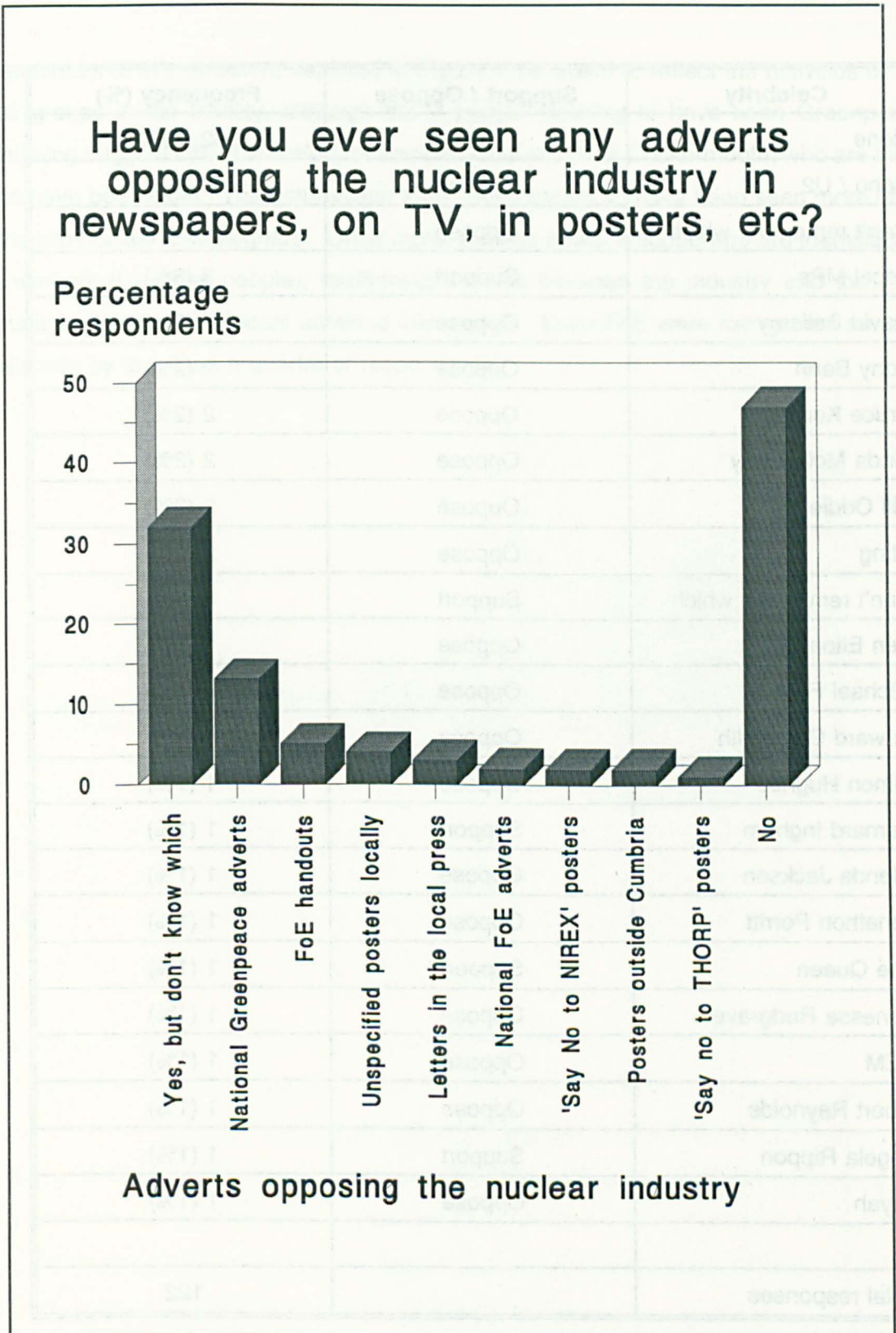


Table 7.12 Public awareness of pro-nuclear or anti-nuclear celebrities, 1994

"Have you ever heard of any celebrities who support or oppose the nuclear power industry?"

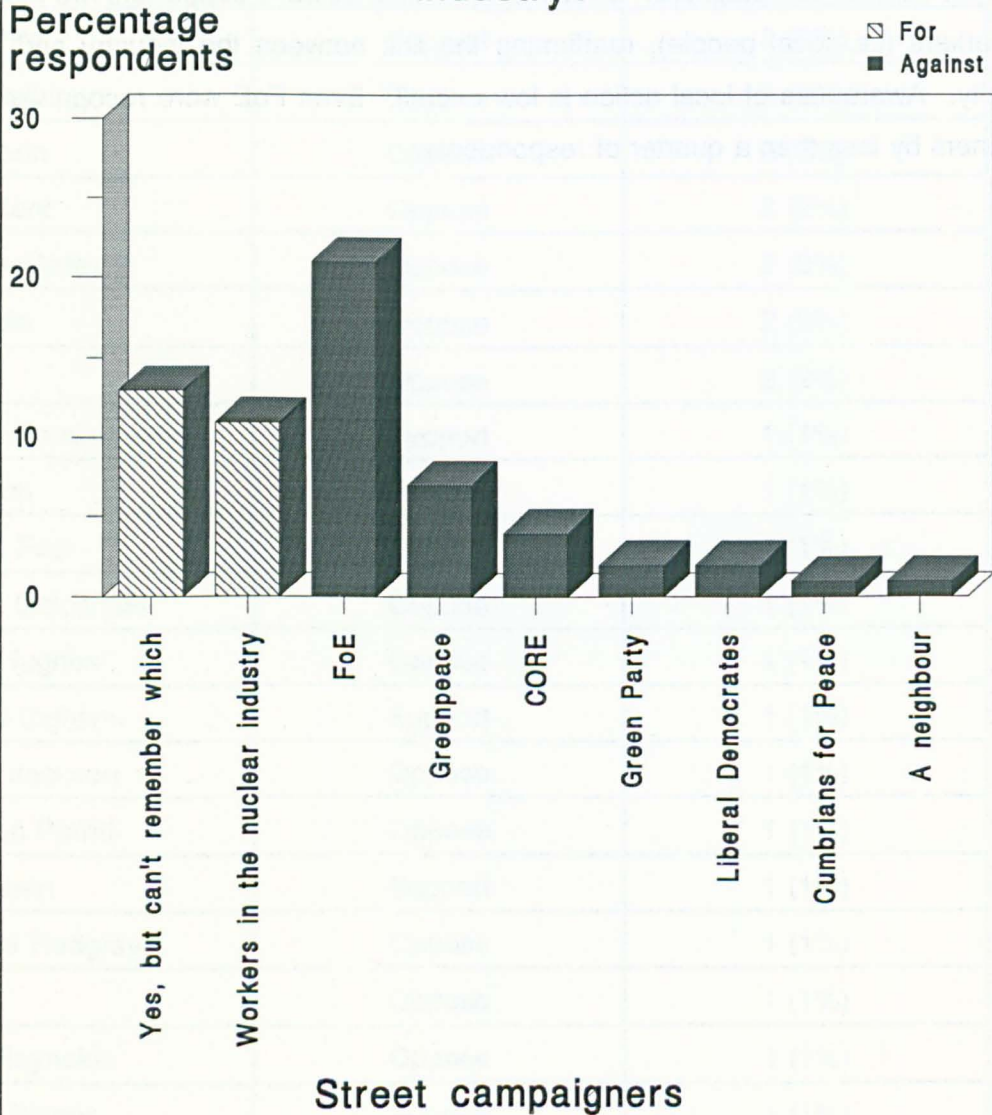
Celebrity	Support / Oppose	Frequency (%)
None	N/A	62 (57%)
Bono / U2	Oppose	16 (14%)
Can't remember which	Oppose	15 (14%)
Local MPs	Support	3 (3%)
David Bellamy	Oppose	2 (2%)
Tony Benn	Oppose	2 (2%)
Bruce Kent	Oppose	2 (2%)
Linda McCartney	Oppose	2 (2%)
Bill Oddie	Oppose	2 (2%)
Sting	Oppose	2 (2%)
Can't remember which	Support	1 (1%)
Ben Elton	Oppose	1 (1%)
Michael Foot	Oppose	1 (1%)
Edward Goldsmith	Oppose	1 (1%)
Simon Hughes	Oppose	1 (1%)
Bernard Ingham	Support	1 (1%)
Glenda Jackson	Oppose	1 (1%)
Jonathon Porritt	Oppose	1 (1%)
The Queen	Support	1 (1%)
Vanessa Redgrave	Oppose	1 (1%)
REM	Oppose	1 (1%)
Albert Reynolds	Oppose	1 (1%)
Angela Rippon	Support	1 (1%)
Toyah	Oppose	1 (1%)
Total responses		122

The next question assessed personal encounters with supporters and opponents of the industry.

The responses to this question, depicted in Figure 7.14, seem to reflect the activities of the various groups in the locality, although the 7 people claiming to have seen Greenpeace campaigning suggests that there may be some overlap with FoE Cockerthorpe, who are more likely to have been seen. The anti-nuclear lobby does appear to have been seen more often than the pro-nuclear campaigners. Once more, nuclear power's supporters are identified as being workers (i.e. local people), reaffirming the link between the industry and the local community. Awareness of local action is low overall. Even FoE were recognised as local campaigners by less than a quarter of respondents.

Figure 7.14 Public awareness of campaigns in the street, 1994

Have you ever met or seen people in the street who were actively campaigning in favour of or in opposition to the nuclear power industry?



7.9 Conclusions about the effectiveness of different campaigns in gaining public awareness of different groups

Public awareness of opposition to the industry was high, with Greenpeace (who, ironically, had no bases in West Cumbria) being mentioned by far more respondents than named either FoE or CORE. This suggests that West Cumbrian opinion is affected by national campaigns to a larger degree than it is affected by the current small-scale local activities.

Overall, people in Cockermouth were more aware of the more distant CORE than they were of FoE, suggesting that CORE's campaigns had been the more effective of the two, although CORE's identity was not precisely known by all those who had heard of them.

Very few people said that local people opposed the industry. In contrast, most of the groups which were thought to be opposed to the industry were non-Cumbrian, and those which were named as supporters of the industry were West Cumbrian institutions. There was a lower awareness of support for the industry than of opposition, perhaps facilitating the image of the industry as being under seige. With the industry's friends identified as West Cumbrian groups, and its opponents seen as mainly outsiders, this perception of the industry as being besieged may have a mutually reinforcing relationship with the notion of West Cumbria as being put-upon by the rest of the country.

Of the concerned national groups, only the Liberal Democrats were mentioned by local people, and even they were only mentioned by one respondent. The reason why they alone were mentioned seems to be because they were the only group who wished to be involved in West Cumbria, a finding which supports the idea that the nuclear industry is, on the whole, a local matter, rather than a focus of national political debate.

In terms of the effectiveness of publicity campaigns, BNFL's Visitors Centre campaign was by far the most effective of all adverts, again reflecting the importance of national exposure (especially on television), in reaching the minds of West Cumbrians and the advantage which the industry holds courtesy of its greater financial resources. FoE Cockermouth's campaigning in the street has been rewarded by higher levels of awareness of in the street campaigning, although such levels were still relatively low and lagged behind the SVC's national advantage in terms of making an impression upon people's minds.

7.10 Attitudes towards NIREX

7.10.1 Introduction

The next set of questions examined local attitudes towards the four main campaigning groups within Cumbria. These were the most open ended of all the questions. In many ways, they were perhaps the most important, precisely because they were not at all directional. Because they were so open, these questions could reveal overall attitudes towards nuclear power by allowing respondents to talk about what they saw as important rather than focusing upon particular subjects such as risk and economic dependency. The questions were phrased thus (using NIREX as an example):

*"Have you heard of NIREX?
Have you anything you would like to say about them, anything at all?"*

From these questions it was possible for the respondents to make any comments at all about each of the organizations without any form of direction from the researcher. This was possible because unlike the previous studies there was no particular agenda for research other than the question of what was at the forefront of West Cumbrian minds.

Developing the initial image which the public holds of an organization is perhaps the most important part of any public information or public relations campaign. Should something ever go wrong, the existing good reputation of a trusted organization may in itself deflect damage to public confidence (Nolte 1974, 437; James 1992, xix). These questions would assess what these initial image of the four local groups were, because the responses given would indicate the concepts with which respondents most associated each organization.

7.10.2 The attitude of the West Cumbrian public towards NIREX

Responses to the question

*"Have you heard of NIREX?
Have you anything you would like to say about them? Anything at all?"*

are displayed in Table 7.13 below.

Table 7.13 West Cumbrian comments about NIREX, 1994

Response	Attitude	Frequency
I don't know much about them	Don't know	26 (23%)
I have nothing to say	No Comment	14 (13%)
They are drilling for repository	Descriptive	10 (9%)
They are connected with waste	Descriptive	7 (6%)
I've never heard of them	Don't know	6 (5%)
They are secretive as to what they do, I only know what they do through their adverts	Don't know	5 (5%)
No matter what we say they will continue their plans	Negative	5 (5%)
We should get rid of them	Negative	5 (5%)
I can't see why they are here	Negative	4 (4%)
They are doing a good job	Positive	4 (4%)
They are here for political reasons	Negative	4 (4%)
Not very good	Negative	3 (3%)
After money	Negative	3 (3%)
Need to do more research	Negative	3 (3%)
I appreciate that they have a hard job	Positive	3 (3%)
Improving image	Positive	2 (2%)
Help Sellafield	Descriptive	2 (2%)
Nothing against them	Neutral	2 (2%)
Offer good jobs	Positive	2 (2%)
Too big	Negative	2 (2%)
Jobs are only short term	Negative	2 (2%)
Not trustworthy	Negative	2 (2%)
Want to know more	Don't know	1 (1%)
They put money before safety	Negative	1 (1%)
I wish they'd stop drilling	Negative	1 (1%)
They're trying hard to win people	Descriptive	1 (1%)
They have lots of money to spend on adverts	Descriptive	1 (1%)

Response	Attitude	Frequency
They're an environmental watchdog	Descriptive	1 (1%)
We're stuck with them	Negative	1 (1%)
They're here because of the low population	Negative	1 (1%)
They're using us	Negative	1 (1%)
They've got a poor PR image	Descriptive	1 (1%)
They're better than BNFL	Positive	1 (1%)
They 'piggy-back' BNFL	Negative	1 (1%)
They're just BNFL in disguise	Descriptive	1 (1%)
Want to store above ground	Descriptive	1 (1%)
Deters investment	Negative	1 (1%)
Deters tourists	Negative	1 (1%)
Total responses		130

There was no particularly common comment made about NIREX. Echoing the lack of knowledge about waste disposal illustrated earlier in the survey, most respondents did not seem to know enough to make any evaluatory comment. This was despite substantial coverage of the company in the local press (see montage overleaf). 26 people had heard of NIREX but did not feel that they knew enough about them to make a comment of any sort, and 6 people had never even heard of them. A further five people commented that apart from their newspaper adverts for the repository, little was heard about them. Given their reticence to use posters etc in West Cumbria and their reluctance to talk to the public outside of prearranged meetings, it seemed that NIREX were hardly rushing to rectify this situation. Many people who did venture a statement were only taking guesses as to the nature of NIREX's work rather than making any sort of evaluatory comment. Thus 7 people merely commented that NIREX were something to do with nuclear waste, and 10 people knew that they were drilling for a repository. In putting forward a guess as to who NIREX were, one person even thought they were an environmental watchdog similar to CORE, and one thought they were advocating surface storage of waste. Such is the state of knowledge about NIREX that one person even confessed

"I was working for them once, but didn't really know much about it"
(M, 30-44, working, post-war estate housing area).

Overall, this level of knowledge about NIREX would seem to support Priority Search's findings that NIREX have little identity amongst local people. Paradoxically, this might also be a contributory factor in explaining the low levels of opposition to underground disposal found earlier in this study because if people do not know about NIREX and their plans, they cannot oppose them. In the light of this theory, one might perhaps wonder whether NIREX are deliberately keeping a low profile, and whether this is the reason that NIREX only had 3 full time PR staff, compared to the 30 of BNFL.

The second most common response type showed how 14 people had heard of NIREX but simply had nothing to say. Interpreting these responses is problematic. Some people appeared to have been scared to speak out in public.

"Yes [I have something I'd like to say about them], but I'd better keep me mouth shut"
(M, 60-74, not currently seeking employment, post-war estate housing area).

Other respondents could have been attempting to disguise ignorance about the company. Many of these respondents however, seemed to represent the view found in many of the significant non-respondents - that the industry is simply there and is not a particularly emotive subject. This was a response type which was not taken into account or discussed in previous studies. The failure to represent this viewpoint is a serious flaw in previous work. For example, in their study which focused upon risk, ERM had implicitly suggested that such 'no comment' attitudes might be the result of a psychological reaction to cope with risk or a reluctance to question the industry upon which they were so dependent. It could be argued instead, that whilst this may be true for some people, it seems more likely that the persistent controversy over Sellafield has led many people to become de-sensitised to the issue of nuclear power, and that for many people in West Cumbria, there is no real Sellafield controversy.

Of the strong reactions, supportive comments were few and far between. Without the prompt which provoked 58% of people to say that NIREX were 'conducting a thorough investigation of the Sellafield site' in the Priority Search study, just four people said that they thought NIREX did a good job.

WEST CUMBRIA: More waste kept on surface

NIREX SLASHES N-DUMP PLANS

Accident...
...pledge from...
...waste lab chief...
...Battle over
...N-dump

LAKELAND: Atom waste drill warning
...Nirex hit
...hotting

...new snag in
...plan in
...SELLAFIELD: Council calls for inquiry

...‘Back door’
...A-dump fear

...RADIOACTIVE
...‘NIREX
...out of their
...depth...
...Dr. Dave Siddall

...inadequate
...leakage from
...fore of th
...It is interesting to note that an event which directly affects West Cumbria and was deemed of national importance was given little coverage in the local press.
...Three weeks ago, Friends of the Earth published a report ‘Out of their Depth’, about the inadequacy of NIREX research. Using NIREX own computer models to show accurately how activity will leak from the dump, NIREX own have accurate data to feed into the model.
...port shows that NIREX have still failed to basic contradiction of keeping radioactive gas out. Year quantities of gas and pressure will build up, creeps and cracks will build up, escape. NIREX have simplified ability of radionuclides, data and its environment. It accurately predicted if we contaminated water from simplifications there-fore in the safety
...inadequacies of building to the much data is localised - and and because ground prop-erty with activity.
...also
...Environment Sec-ary in the application to agency Nirex so a pu-lic should n-

"Their idea of storing waste is excellent, and definitely the way forward."
(M, 30-44, working, predominately Victorian housing area).

One person thought they were better than BNFL, and three people sympathised with them as they thought they had been set a hard task.

"They're portrayed as the baddie when in fact, they're dealing with other people's waste problem. They have a serious PR problem."
(M, 30-44, self-employed, post-war estate housing area).

Two people said that they had nothing against NIREX.

There was little appreciation of any economic benefit to be had from NIREX's presence. Only two people remarked about the jobs which NIREX provided but this was in the context of such work being well paid sinecures, rather than appreciating them as a boon to the local community. One person made a point of differentiating between NIREX and BNFL, in that NIREX employment would be for the short term only.

The rest of the comments tended to be negative. Three people castigated NIREX for being concerned with financial gain.

"They're like a piggyback organization, they're in it for the money more than BNFL."
(M, 15-29, working, predominantly Victorian housing area).

One person said that they feared NIREX's preoccupation with finance would lead to cut-backs in safety. Two people said that the organization was too large and powerful. Two said they were not trustworthy, and five said they were too secretive, supporting the demands for more honesty found by Priority Search.

"It's a bloody big cover up job."
(F, 45-59, working, mixed housing area).

"Like BNFL they bend the truth to suit their own ends. Like BNFL they're a faceless company you don't know who's in charge. If they're so caring for the environment and West Cumbria they should make it known, apart from through propaganda - get their managers out and about and let people meet them."
(M, 15-29, working, predominantly Victorian housing area).

This last comment illustrates how existing public relations campaigns from the industry appear to some people to be too contrived, possibly because they are not addressing issues which West Cumbrians want to see tackled in the manner which they wish to see them presented.

Other comments included the idea that NIREX deterred tourists and investment.

The responses to the question also provide more information on some of ERM's discoveries. Contrary to their findings, many people did not particularly see NIREX as an outsiders. This was particularly unexpected given the fact that most of NIREX's workforce did come from outside of Cumbria. Admittedly, several people did feel that way, but it was not the sentiment of the majority as ERM claimed it was. Four respondents wanted to know why NIREX had come to the area. Four felt that they were here for political reasons, and one mentioned the lower population and the fact that nobody else in the country would take them.

"The trouble with NIREX is that they've hawked their methods all over the country, and surprise surprise the only place they can find to do it is Cumbria, because nobody else wants it in their back yard."
(M, 75+, retired, predominately Victorian housing area).

"I don't think their investments are based on science. They're basically looking for somewhere politically expedient to dump it. There are so many other suitable or more suitable areas. But if most waste comes from THORP, it's better that it only travels a short distance."
(M, 15-29, working, modern executive housing area).

"They say you've already got the problem here so you may as well have this instead of exploring somewhere else where they'll fight like hell against it."
(M, 60-74, working, predominately Victorian housing area).

As with the responses to the question about waste disposal in general, some people's patience appears to be running out with the increasing presence of the industry,

"We shouldn't be lumbered with everything."
(M, 15-29, not currently seeking employment, predominately Victorian housing area).

"I don't want them here, why the hell should we be the refuse tip of the world? We've got enough up here, that we don't know enough about without them starting on something else that we know nothing about."
(F, 30-44, not currently seeking employment, Local Authority housing area).

"They should definitely consult people better - why always bloody Cumbria?"
(M, 30-44, working, post-war estate housing area).

These comments support ERM's concerns that unless West Cumbrians received adequate compensation for increases in the industry's presence, that they would become increasingly resentful of its imposition. The questionable site-selection process was even alienating

NIREX's potential supporters.

"We have the waste here already, and I would have them here if not for the fact that I think they're picking us for political reasons."
(M, 30-44, working, post-war estate housing area).

The sense of fatalism observed in previous studies was evident once again, with one person saying West Cumbria was stuck with NIREX and 5 people saying that no matter what opposition there may be, the repository would go ahead. There was little sign of optimistic defiance. The fact that only five people explicitly said that Cumbria should get rid of NIREX suggests that whilst making many criticisms, most people are resigned to their presence.

"If they want to put a dump in, they'll get a dump. They'll find a way somehow."
(M, 15-29, working, local authority housing).

Although one must be careful with attempts to categorise people's comments, the coded responses were further grouped together according to whether they were broadly positive in their attitude towards NIREX; negative; descriptive; represented respondents who did not make a comment; or were 'don't knows'. The totals for these different groupings were: 14 positive comments; 39 negative comments; 25 descriptive comments; 14 'no comments'; and 38 'don't knows', a less than perfect outcome for the company. In order to provide a more quantitative analysis of respondents' attitudes to NIREX, respondents were asked a more directed question.

"Do you think their presence in West Cumbria is a good thing or a bad thing?"

As Figure 7.15 shows, nearly twice as many people thought that NIREX's presence in the area was a bad thing as thought it was a good thing. This was an important change from the findings of Priority Search, who found 57% of their respondents supported or tended to support the repository, and just 30% opposed or tended to oppose it. It also suggested that when it comes to public relation battles, superior financial and technological resources do not necessarily guarantee success.

7.10.3 The opinion of the local groups

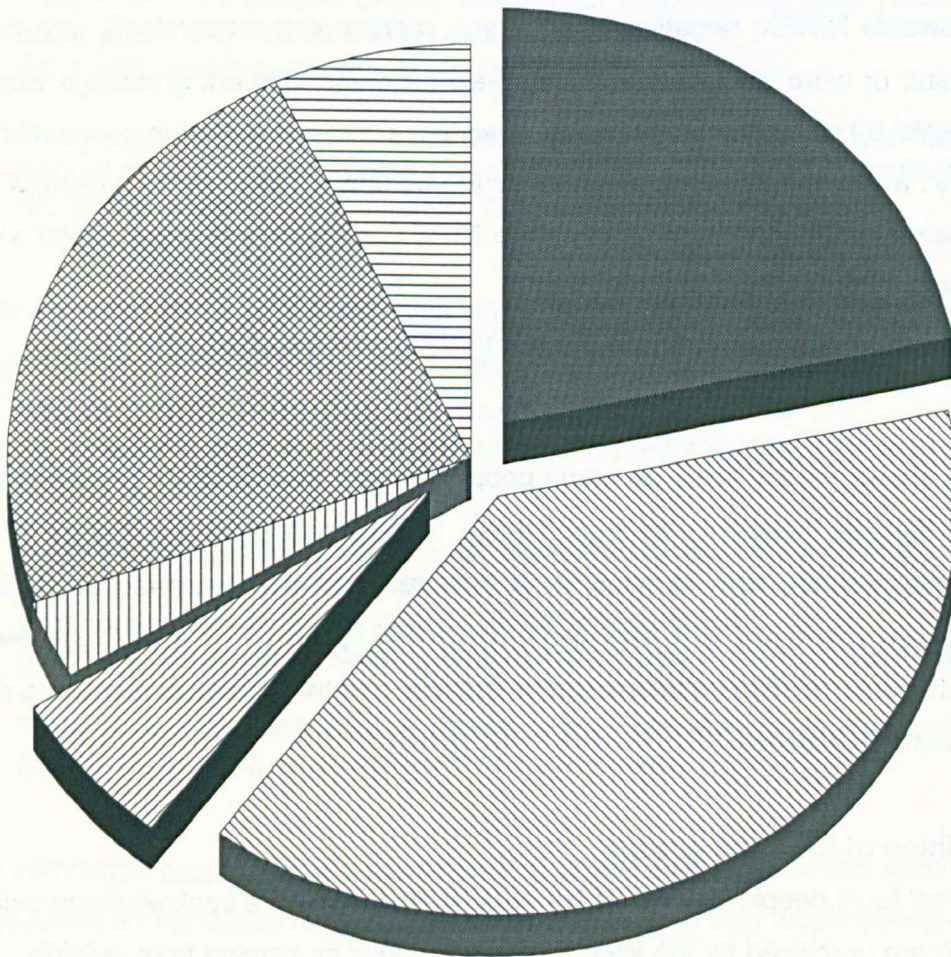
When asked what local people thought of his organization, NIREX's spokesperson said,

"I think we are perceived by the West Cumbrian public as coming from outside.

Figure 7.15 West Cumbrian evaluation of NIREX's presence in West Cumbria, 1994

Do you think the presence of NIREX in West Cumbria is a good thing or a bad thing?

- Good
- ▨ Bad
- ▧ Bad except for jobs
- ▩ Neutral
- ⊠ Don't know enough about NIREX
- ▤ Other Can't say



Coming from outside Cumbria in particular, we're those people from the South. I think there are misconceptions as to why we're here and why we have of the task we have chosen Sellafield but I think a lot of people in Cumbria realise the importance, and they realise the economic importance of the repository to the continued economic well being of both BNFL, and of West Cumbria."

In many respects, NIREX's perception of local opinions seems to be grievously out of line with reality. There were not 'a lot of people' in the sample who realised the importance of NIREX's task. Although two respondents had said that NIREX were important to BNFL, no-one had realised the economic importance of the repository to West Cumbria either. In fact no-one mentioned any way, economic or otherwise, in which NIREX helped the West Cumbrian people at all. Perhaps most importantly, NIREX did not appear to be aware of the problems of identity they had amongst the local populace (or at least, if they were aware, they did not admit it).

The areas which NIREX felt was a problem did evoke some comment, as some people had questioned the company's motives for being in Cumbria, but no-one directly castigated them as outsiders. Overall, this misunderstanding of local opinion could be due to the fact that NIREX's research, as exemplified by Priority Search's study, may have been somewhat 'loaded' in its methodology, producing results which NIREX expected to hear rather than the true picture which they needed to hear.

BNFL said

"They've had a mixed reception. Waste management is one of the big worries of people about the industry. It is the major concern, where people are getting slightly more comfortable with nuclear power as a source of energy, people are not comfortable with waste management. They too are a company that are dedicated to safety, they're not going to do anything without safety cases and looking into it, and I think anybody involved in the nuclear industry behaves in the same way.

Their job is to find a long term solution to the disposal of intermediate level radioactive waste. This is only one area that they've looked at, you know they didn't just say 'Oh well the nuclear industry's in West Cumbria let's go there', they've been looking at various sites up and down the country."

BNFL seemed to appreciate the problems of public image confronting NIREX more than NIREX themselves would admit. However, the comments BNFL made about NIREX's safety

and the research around the country before choosing Sellafield were not actually mentioned favourably by respondents. Instead there were several people questioning the motives for NIREX's presence.

FoE's remarks concentrated entirely on NIREX's public image. Like BNFL, they appreciated the difficulties NIREX faced, but they also added criticisms of the way in which NIREX was addressing its image problems.

"I think they have a poor public relations programme, they so often appear to miss the mark completely with their promotional literature etc."

To judge from the poor level of knowledge about NIREX amongst local people, and the lack of supportive comments, there would certainly appear to be an argument that this is indeed the case.

CORE were more militant in their attitude towards NIREX.

"They should go away. They are in the wrong place researching the wrong policy on the wrong time scale and they shouldn't be here, its as simple as that. We believe that underground dumping is wrong. In terms of where they're doing it, the Sellafield site has been chosen for all the wrong reasons. Research has not backed up their claims about the site. There are no research projects being undertaken any where else in the country, so we can make comparisons. They're rushing it through far too quickly. In a way it lends weight to this feeling that the decision has already been made, whether we like it or not, its going to be here and they're going to make it fit. But there is so much opposition, they've made such a mess of it. I think out of principle people don't want it here after no-one else would have it."

The nature of the local responses means that whilst most people do not know enough to agree or disagree with these comments, for once most of those who did make a remark would probably agree with CORE. There is no strong body of people who are strongly pro-NIREX, and as yet there are no organisations ready to initiate a supportive movement as the GMB did for THORP. This suggests that there is a chance that the NIREX repository is an issue around which the anti-nuclear groups could mobilise support, if only they can convey their arguments successfully and put forward alternatives.

7.10.4 Responses to the postal questionnaire

Many groups had nothing to say about NIREX. A few groups made comments just describing the work which they did

"They are doing a necessary job - someone has to do this!" (BFEA)

"NIREX was set up by the UK nuclear industry to provide facilities for disposal of some types of radioactive waste. In this it is now making considerable progress, with site investigations in West Cumbria proceeding well." (UI)

Others expressed sympathy. AECB referred to the difficult situation NIREX were placed in,

"Their name has become a dirty word. They are faced with an unpopular choice, cheapen nuclear waste storage and make a profit or do it properly and make nuclear power look even more expensive."

Overall, NIREX escaped many critical comments although NPVAC did say

"They have very competent scientists, but their work is presented with a powerful political gloss, so decisions seem to be made first and then evidence marshalled to justify them." (NPVAC)

and the Centre for Environmental Initiatives said their opinion on NIREX was 'not printable'.

Perhaps surprisingly, BNIF made a double edged comment, reflecting an awareness of the difficult task NIREX had, but perhaps also implying that in some of their publicity NIREX were making life difficult for BNIF themselves.

"Difficult brief, tendency to over-exaggerate dangers of radioactive waste, scientifically impressive."

When asked the more quantitative question,

"How would you evaluate their presence in West Cumbria? - eg., is it beneficial or harmful?"

The postal questionnaire revealed a different trend to local responses. Only the Centre for Environmental Initiatives and AECB were critical -

"They are a commercial operation. I wouldn't trust them an inch. I don't believe they would have a view that encompassed environmental concerns - hence harmful." (AECB)

All the other groups said that NIREX's presence in West Cumbria was a good thing. The Liberal Democrats in particular were rather unsympathetic to West Cumbrians:

"Now we have all this waste it has to be dumped somewhere!" (LD)

a viewpoint which will surely do little to reconcile West Cumbrians to the Liberal Democrats

cause.

Others supported their presence in West Cumbria as economically beneficial to the area, although West Cumbrians themselves seemed less aware of the prospect of this.

"Their presence is essential." (BSRIA)

"Beneficial to local employment." (BGS)

"Creates some jobs. Could help to reduce the radioactive pollution." (NPVAC)

This widespread support for NIREX, contrasted to their relative unpopularity amongst Cumbrians who gave an opinion, suggests that perhaps it is easier to be supportive for NIREX when the repository isn't actually going to be near one's home and family.

7.10.5 Conclusions about NIREX's image

For all their financial and technical resources NIREX still had not achieved a fixed identity in the minds of West Cumbrians, just as Priority Search had found. Certainly such an identity did not seem to be well enough developed to evoke as many forthright comments as might have been expected. Very few people had anything positive to say about NIREX. This might raise questions about the effectiveness of NIREX's advertising, but then again, perhaps it was in their interest to minimise publicity - if local people weren't aware of what they planned to do there could be little opposition.

There were two very important discoveries from this question. Firstly a substantial number of people did not appear to find NIREX a subject of particular interest or controversy, an important response type which had been overlooked in previous studies and one which has great significance in understanding the nature of the apparent support for the industry in West Cumbria. Secondly, more negative comments were made about NIREX than positive ones, and nearly twice as many people think NIREX's presence in West Cumbria is a bad thing as think it is a good thing. This represents a change from the results of earlier studies, possibly because this question did not attempt to direct respondents in any way. There was little appreciation of any economic contribution made by NIREX. Complaints included excessive secrecy and the notion that NIREX were taking advantage of West Cumbria (although fewer people were hostile towards NIREX as outsiders than ERM claimed). Many people were resentful of the imposition of yet another aspect of the nuclear industry in West Cumbria.

Despite these complaints, the fatalistic attitude noted in previous studies was observable once more. The views of the respondents to the postal questionnaire mirrored local responses to the extent that many of them merely described what NIREX did rather than making any form of judgemental comment, thus suggesting that there is a relatively low level of knowledge about NIREX at a national level as well as at a local one (perhaps indicating another success of the industry's 'softly softly' approach).

All the local groups were aware of the existence of public relations problems for NIREX, but NIREX themselves perhaps overestimated the levels of understanding and support which existed amongst local people, perhaps due to inadequacies in their own research. BNFL's defence of the site selection process was not actively espoused by local people either. The comments of the anti-nuclear groups appeared to find more support amongst the respondents than those remarks made by the industry, suggesting that the repository is perhaps an issue around which FoE Cocker mouth and CORE could mobilise support (although they need to present a stronger case for alternatives to underground disposal).

7.11 Attitudes towards BNFL

7.11.1 The attitude of the West Cumbrian public towards BNFL

Table 7.14 displays the comments made when respondents were asked the question

"Have you heard of British Nuclear Fuels (BNFL)? Have you anything you would like to say about them? Anything at all?"

Table 7.14 West Cumbrian comments about BNFL, 1994

Comments	Attitude	Frequency
I've nothing to say	No Comment	22 (20%)
BNFL means jobs	Positive	14 (13%)
Without BNFL, West Cumbria would die	Positive	12(11%)
BNFL spend lots of money to help the community through sponsorships etc	Positive	11(10%)
BNFL are too large and have too much money, and they use it to buy support, which is unhealthy	Negative	10 (9%)
BNFL are still too secretive	Negative	9 (8%)
Get rid of them!	Negative	7 (6%)
BNFL are good employers	Positive	7 (6%)
BNFL are not concerned enough about the health implications of their presence for local people	Negative	7 (6%)
BNFL go out of their way to reassure people	Positive	6 (5%)
BNFL are very good	Positive	4 (4%)
Don't trust them	Negative	4 (4%)
Do very good PR job	Positive	4 (4%)
BNFL are now safer than they used to be	Positive	4 (4%)
BNFL are concerned for the environment	Positive	3 (3%)
I'd like a job at BNFL	Positive	3 (3%)
BNFL harm the environment	Negative	3 (3%)
BNFL have to operate somewhere, it may as well be here	Positive	2 (2%)
BNFL try to be as safe as possible	Positive	2 (2%)
There are too many unknowns involved in their activities	Negative	2 (2%)

Comments	Attitude	Frequency
The presence of BNFL deters tourism	Negative	2 (2%)
BNFL have a poor image	Descriptive	2 (2%)
We are too dependent on them	Negative	2 (2%)
Working at Sellafield is a sinecure	Negative	2 (2%)
BNFL don't consult the public enough	Negative	2 (2%)
BNFL will get it right in the end	Positive	2 (2%)
BNFL just means Sellafield to me	No Comment	2 (2%)
BNFL are very professional	Positive	2 (2%)
BNFL overpay their workers and therefore disrupt the local economy	Negative	2 (2%)
I've nothing against them	No Comment	2 (2%)
BNFL used to be too secretive in past	Negative	2 (2%)
BNFL don't just operate Sellafield, which is a common misconception	Descriptive	1 (1%)
They haven't had any real disasters so far	Positive	1 (1%)
BNFL are a waste of money	Negative	1 (1%)
BNFL's raison d'être is the manufacture of nuclear weapons	Negative	1 (1%)
BNFL bring stability to the area	Positive	1 (1%)
The presence of BNFL deters investment	Negative	1 (1%)
I don't know enough about them	Don't Know	1 (1%)
BNFL are very disorganised	Negative	1(1%)
We're stuck with them	Descriptive	1(1%)
BNFL's adverts are unrealistic and daft	Negative	1(1%)
Total responses		164

Respondents were far more aware of BNFL than they had proven to be of NIREX. Compared to the large number of people who said that either they didn't know enough about NIREX to pass a comment (26 people), or had simply never heard of them (6 people), only one person felt they did not know enough about BNFL to make some sort of comment, and no-one had failed to hear of them. Consequently, there was also a far wider range of comments made -

the respondents made a total of 164 remarks about BNFL, compared to 130 about NIREX. The increased familiarity with BNFL also meant that the comments made were more evaluative than the simplistic attempts at description regarding NIREX. In response to this question, only 5 comments were made which could be deemed to be descriptive rather than evaluatory, compared to 25 descriptive comments made about NIREX.

The most frequent response type was 'nothing to say' (made by 20% of respondents). Another four respondents said either 'BNFL just means Sellafield to me' or 'I've nothing against them'. As with NIREX, these responses may simply mean that for many people, the presence of BNFL was just another permanent fixture in their lives, which had been present for a long time, and which would always be there. The reaction of many people to this question was as if they had been asked to pass comment upon the moon, or the earth beneath their feet.

"They're just there. I don't disagree, I don't particularly agree, it's just there."
(M, 15-29, unemployed, modern executive housing area)

This response type was even more important than it had been regarding NIREX. It represented over a fifth of respondents to this question, and, if significant non-respondents are counted as also representing this attitude, it may be seen to represent as much as 46% of all possible respondents.

The second most frequently expressed remarks made about BNFL related to their economic impact, with 14 people seeing BNFL as synonymous with jobs, and 12 people making the even stronger assertion that without BNFL's presence West Cumbria would die.

"Without them we'd just be completely jiggered. There'd be a hell of a lot more unemployed folk than there are."
(M, 60-74 working, post-war estate housing area)

Another eleven people appreciated BNFL's contribution to the community in ways other than the creation of jobs.

"Anything I have heard about them has all been good ... They've done a lot of economic good - investing cash in specific town projects, Whitehaven in particular."
(M, 45-59, self-employed, commercial area)

These results confirmed the findings of all the earlier studies which said that local people had

a high awareness of the economic influence of BNFL. In this study, this awareness was far higher than it had been for NIREX, and this constituted a difference from Priority Search's findings.

It seems however, that no matter how highly trained BNFL's staff may be and how much they spend on PR, that there is a very fine line between social conscience and over-intrusive paternalism (as ERM hinted). Several people were disconcerted at the scale of BNFL's contribution to the area. 10 people were concerned by the company's ubiquitous intrusion into all spheres of local life.

"They do spend a lot of money in the community in an attempt to buy friendship, although that's not necessarily for the community but for their own benefit, they involve themselves in voluntary groups to gain local influence."
(M, 60-74 working, post-war estate housing area).

These respondents were worried that such effort would only be necessary if BNFL had something to hide, and two more respondents expressed concern at the reliance of the community upon one organization's direct and indirect assistance.

"I think they're taking over. Why should it all be here? I suppose it has its advantages but it has more disadvantages. It wants away out in the wilds where there's nobody at [sic]."
(F, 45-59, working, mixed housing area)

Others condemned BNFL's wages for disrupting the local economy. Some were simply concerned that BNFL were too wealthy and powerful for regulations to be effective,

"I'm a bit worried that they have so much money, money talks. It helps you win cases in court - those who dare to stand up to them lose not because their arguments are weak, but because they haven't got as much money."
(M, 30-44, working, post-war estate housing area)

An awareness of this concern might perhaps be the reason for BNFL's attempts to keep a check on their PR efforts, as discussed in Chapter Six.

Despite the organizational difficulties which had hampered BNFL's own cooperation in this research, and which Ms Cater had revealed sometimes also hampered her work, only one person thought that BNFL were disorganised.

As mentioned in the introductory section of this chapter, the main message which BNFL wish

to convey to the public is one of reassurance over safety. To an extent BNFL were proving successful in conveying this message. 10 people made spontaneous positive responses about BNFL's safety record. Two people said that they try to be as safe as possible,

"They're very safety conscious, they had a brand new £30,000 JCB on site for three weeks recently. They wouldn't sell it when they'd finished with it, they buried it instead."

(M, 15-29, working, Local Authority housing area)

"Compared to other sites I've worked on, in Britain, and especially abroad, they are streets ahead in terms of safety."

(M, 30-44, working, predominately Victorian housing area)

3 people said BNFL showed concern for the environment. Another 4 people said that BNFL were safer than they used to be. One person also said that at least there hadn't been any major disasters so far.

On the other hand, there were also a number of comments to the contrary - 3 people thought BNFL harmed the environment and 7 people thought they did not show enough concern for the health of local residents. This latter result contrasts with earlier perceptions of a greater number of local people being concerned at health risk. A further two respondents expressed doubt over BNFL's actions in that there were too many unknowns involved.

"There's always been a question mark about them because there's so many unknowns, I reckon all the hills were full of caesium before Chernobyl."

(M, 45-59, working, predominantly Victorian housing area)

As noted by ERM, BNFL's reluctance to acknowledge the full scale of accidents such as the nitric acid leak when THORP first opened (which BNFL said spilled onto a floor and CORE later said had actually affected instruments), has aroused suspicion amongst the public. (Press coverage of BNFL's secrecy is featured in the montage overleaf). Nine people said that BNFL were too secretive, seven said that the company was not concerned enough about the health of local people, and four people simply said they did not trust BNFL. Some felt that the secrecy of the industry meant that the presence of investigative journalists was vital.

"If they weren't there, there's lots of things we wouldn't know"

(F, 45-59, working, post war estate housing area).

"I don't think BNFL help themselves by often not coming out with the full facts about incidents. If they were more up front with people ..."
(M, 30-44, working, post-war estate housing area)

"They're running the place like a police state, they need to be more open. In some ways it would help them, people would be less suspicious."
(F, 30-44, self-employed post-war estate housing area)

"They do deliberately mislead the public, they take too long to acknowledge incidents which happened"
(M, 60-74 working, post-war estate housing area).

"They don't exactly reek of honesty when there are leaks. The truth only comes out when there's pressure on them. I find it hard to believe that Chernobyl radiation settled on West Cumbria when it could have been a leak from Sellafield and Chernobyl was a convenient excuse."
(M, 30-44, working, mixed housing area)

"I don't like it. It frightens me because we're only told half truths. I know because my husband works there. There are certain things they never acknowledge to the outside world, they just carry on regardless of human life."
(F, 30-44, not currently seeking employment, Local Authority housing area)

"We should be as fully informed as possible and I don't think we are."
(F, 45-59, working, mixed housing area)

"They could be more honest about those cases of leukaemia."
(F, 15-29, not currently seeking employment, mixed housing area)

This failure of BNFL to establish a trustworthy reputation amongst local people does not appear to have changed significantly since Macgill and Phipps first found that only 16% of respondents found BNFL to be 'completely reliable'. The perception of being told the truth is vital, for once a credibility gap appears in any part of the organization's activities, it will be far harder to sway the public to one's side, for they will be less likely to believe anything they say (Nolte 1974, 163).

This problem over secrecy may be rooted in the prioritizing of drives such as the poster campaigns in Liverpool and Manchester rather than focusing upon West Cumbrian acceptance

Hush hush Sellafield

A-plant 'silence' worries local people

By NICK TURNER

MANY West Cumbrian people resent the lack of information about leaks at Sellafield and see Greenpeace as the most effective regulator of the British Nuclear Fuels.

A survey commissioned by Cumbria County Council has revealed that British Nuclear Fuels is undermining its credibility with the local population.

The attitude survey - the kind in West Cumbria - of group discussions. Many of those who they were being taken Sellafield and though was stigmatised in th of the country for its nuclear industry.

One typical re stuck with the pl the best of it." A Seascale m tion at the are field: "We're enough. Just "

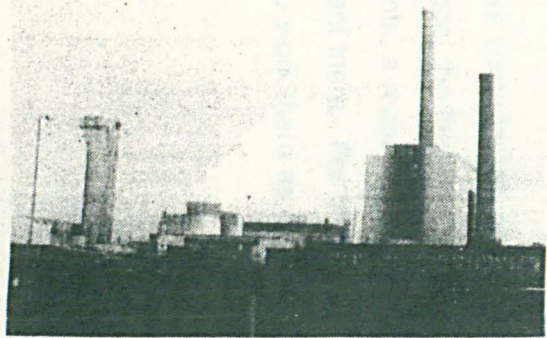
SELLAFIELD: N-fuel shearing halted

BNFL deny Thorp leak cover-up

AN acid leak inside the Thorp nuclear plant caused more damage than the company has made public, according to anti-nuclear pressure group Core. The anti-nuclear group claims the leak in March of nitric acid inside Thorp has caused all nuclear fuel shearing to be halted. But nuclear bosses have denied there has been any cover-up.

'Contrary to Core's allegations there has been no cover-up

not likely to resume until next month. Core said its findings were confirmed by the Nuclear Installations Inspectorate. Responding to the claims, Alan Irving, media relations manager at Sellafield said: "Contrary to Core's allegations there has been no cover-up concerning the Thorp nitric acid spillage. In fact details of the spillage were made public to the media. It happened on March 29. "The spillage of the nitric acid occurred on the 29th of March." Core



SELLAFIELD... "we're stuck with it" was a typical reaction to the survey

CARL...
E'

Thorp secrecy

revealed in the BBC Panorama documentary A Very British Folly, that details of the report have always been kept secret. Confirmation that even the Government was not allowed to see the figures came in response to a question from MP Llew Smith. He asked when BNFL made a copy of the Touche Ross report available to either the Department of the Environment or the Ministry of Agriculture. Mr Atkins replied on behalf of the government: "No such report is, or has been, in our possession."

THE Government was never allowed to see the financial report which claimed Thorp would be economically viable, a minister has admitted. Environment Minister Robert Ross said in a Commons reply that the report had never been in the Government's possession. The report, prepared by leading accountants Touche Ross, was used by BNFL to justify the viability of the plant. However, critics have pointed out, as by the Crown Court. Wallace tackled his drug problem and committed no further offences. The court heard that Wallace, now registered disabled and unable to carry out his community service order, had been out of trouble for six months. Judge Robert Brown, who said

of risk. Information should be presented in a manner with which the public can identify. It should certainly address the issues which are perceived as central by the target audience (James 1992, xxiii). BNFL's information, targeted at a national audience, is not seen to do this. Like the Black Report, which Macgill found to have missed its target audience, it appears that BNFL are still not gaining access to all West Cumbrian hearts and minds. One respondent commented that BNFL's adverts were 'daft'. One person thought their advertising campaign to be so overt as to be 'ridiculous'.

"They need a better PR manager, they're not getting their message across at all."

(M, 30-44, working, mixed housing area)

"They're a good international company, but they have to improve their public image, and I don't know how they'll do it."

(M, 30-44, working, post-war estate housing area)

Another criticism was that BNFL did not consult local people enough,

"They've steamrollered their way into West Cumbria."

(M, 15-29, working, predominantly Victorian housing area).

"They could consult local people better than ploughing ahead with we're gonna do this, we're gonna do that."

(M, 30-44, working, post-war estate housing area)

On the other hand, to other people it seemed that BNFL were going out of their way to reassure people. Four respondents said that BNFL did a very good PR job.

"They're highly professional, both in what they do and in the publicity they try to give out."

(M, 30-44, self-employed, post-war estate housing area)

"They do care about the environment and are trying hard to put the record straight. They're more aware of it now because of questionnaires."

(M, 45-59, working, post-war estate housing area)

There were some instances in which the same facts were interpreted in different ways. For instance, the fact that BNFL pay well and offer long holidays was, for some respondents, a reason to praise them as good employers, and even gave cause to desire employment there. For others, the same fact was a reason to condemn Sellafield and those who work there as wasters and layabouts.

BNFL certainly evoked some strong reactions amongst some sections of the community. Some were very supportive.

"I wish them all the luck in the world."
(M, 30-44, working, mixed housing area)

"They're doing a damn good job, a damn good job."
(M, 60-74, retired, post-war estate housing area)

"My late husband paid into the provision fund, they always remember you do the nuclear works. It has to be some where, the site was going to be taken over by Courtaulds and they were always moving, going abroad. They've had more stability from nuclear fuels."
(F, 60-74, retired, post-war estate housing area)

On the other hand, 7 people spontaneously called for their removal (a higher figure than for NIREX). Some of these were very vehement.

"They're just a bloody horrible organization. I don't see the need for it to be in Britain. The amount of investment, if they'd put that in other resources like wind then it'd be a 'goer'. The amount of money the government has put into nuclear is obscene."
(M, 15-29, working, predominantly Victorian housing area)

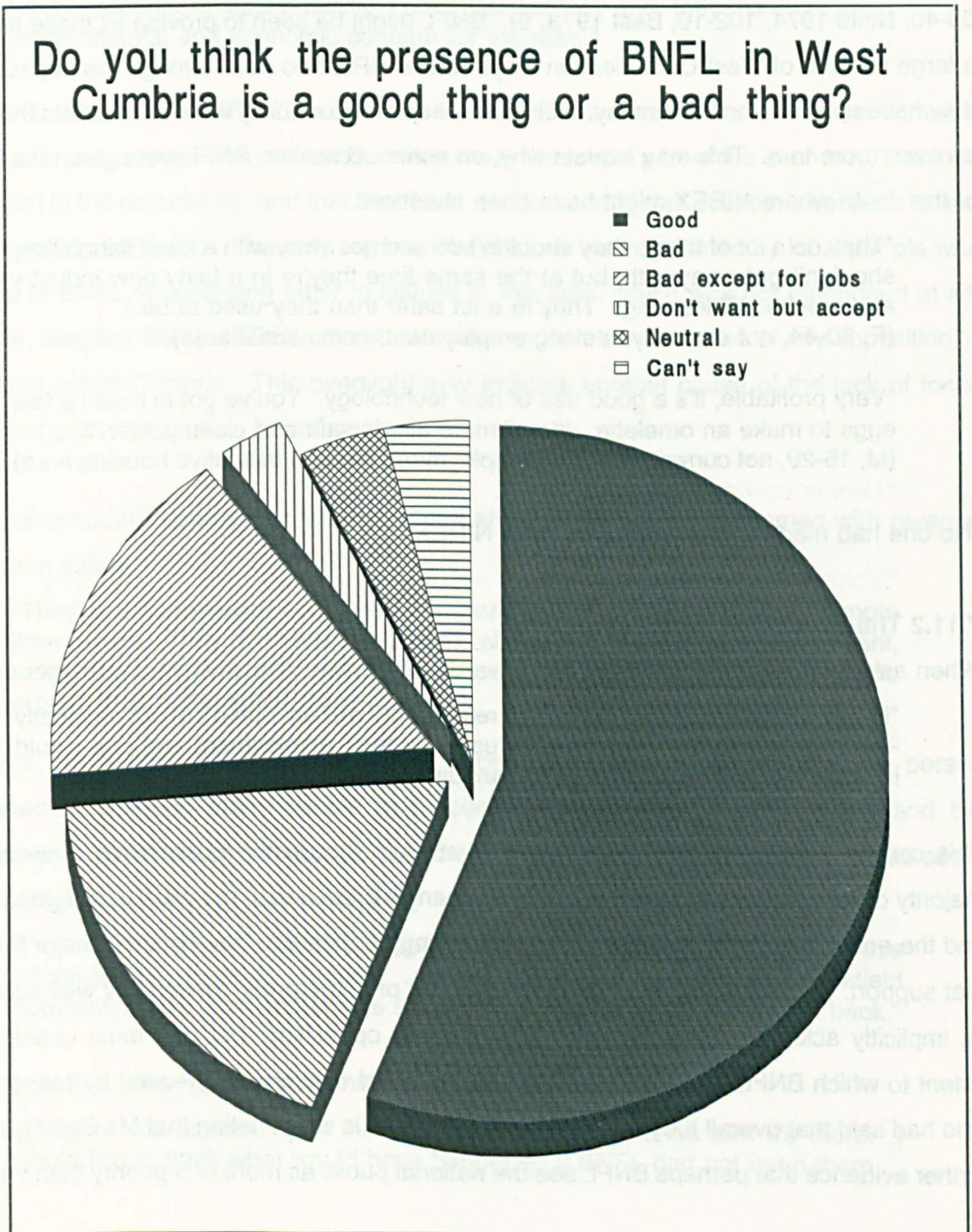
"They're very dangerous, the people at the top, their attitude frightens me."
(M, 30-44, working, post-war estate housing area)

"A scandalous waste of taxpayers' money, and electricity consumers' money. It's only there for weapons manufacture, otherwise the government would have pulled the plug long ago."
(M, 30-44, working, post-war estate housing area)

Overall, though 78 supportive comments were made, compared to 57 negative remarks, with 25 'no comments' and just five descriptive statements and one 'don't know', a very different set of results to those for NIREX, and a more pleasing one for the industry. Similarly, in response to the purely quantitative question, support for the company was high, as shown in Figure 7.16 below. With 62 people (56% of respondents) offering straightforward support, and 80 people (72% of respondents) supporting it in some capacity, the majority of respondents clearly felt that, on balance, the company was worth supporting. There were still 20 respondents who felt that BNFL's presence was a bad thing, a level slightly higher than was found by Macgill and Phipps in 1984, and three times higher than that found by Macgill in the near vicinity of Sellafield.

Figure 7.16 West Cumbrian evaluation of BNFL's presence in West Cumbria, 1994

"Do you think their presence in West Cumbria is a good thing or a bad thing?"



The extent to which institutions relate to certain basic needs of individuals might explain the difference between the attitudes to the two industry organizations. First amongst these needs may be seen to be the need for safety and sustenance, for preservation of both self and family. Other basic social needs might include the desire to feel an accepted part of a group, to be held in esteem, and to find a sense of self-fulfilment (Maslow cited in Ravenscroft 1993, 39-40; Nolte 1974, 102-10, Best 1973, 6). BNFL might be seen to provide all these things to a large number of West Cumbrians in ways which NIREX do not - through the impact which they have upon the local economy. For those people who actually work at Sellafield this might be even more true. This may explain why, on some occasions, BNFL were given the benefit of the doubt where NIREX might have been chastised.

"They do a lot of things they shouldn't do and get away with a lot of things they shouldn't get away with, but at the same time they're in a fairly new industry and they're still learning. They're a lot safer than they used to be."
(F, 30-44, not currently seeking employment, commercial area).

"Very profitable, it's a good use of new technology. You've got to break a few eggs to make an omelette. It's ultimate aim is safe and clean power."
(M, 15-29, not currently seeking employment, modern executive housing area)

No-one had made such comments about NIREX.

7.11.2 The opinion of the local groups

When asked to evaluate public opinion towards BNFL, the Visitors Centre manager said,

"In the immediate area I think we're reasonably well accepted but not nationally - a lot of people do rely on the industry for their employment and one would imagine that they would be quite well disposed to the industry."

This can be seen to be an accurate observation in that in the quantitative question, the majority of respondents did think that the company's presence in the area was a good thing, and the economic benefits which the industry brings appears to have been a major factor in that support. It can also be seen to be accurate if one interprets 'reasonably well accepted' as implicitly acknowledging the existence of some opposition, but one must question the extent to which BNFL really acknowledge the range of concerns expressed by respondents who had said that overall they favoured the industry. It is worth noting that Ms Cater gave yet further evidence that perhaps BNFL see the national public as more of a priority than the local

public.

When asked for his views on BNFL, the NIREX spokesperson said,

"BNFL have a very good relationship with the West Cumbrian public. They are an essential part of the economy. They are anxious to fulfil their role in the community and they are anxious to attract other industries to the area, and they play their part in doing that. They are equally anxious that the area is not totally dependent economically upon themselves, and they have a great environmental and economic concern for the area."

Like BNFL themselves, NIREX's comments about BNFL seemed to have much in common with popular comments. The notions that they are an essential part of the economy, that they play a part in the community, and that they have environmental and economic concern for the area, were all mentioned. The only comment which was not mentioned by local people was the idea of BNFL encouraging other industries in the area, which was not mentioned at all. However, also like BNFL, NIREX did not explicitly mention the existence of any opposition to them from within Cumbria. This oversight may indicate another cause of the lack of focus upon local public relations - complacency.

FoE Cocker-mouth's coordinator felt that above all else BNFL were concerned with revenue rather than safety.

"They're a commercial body, and therefore it is in their interests to promote themselves. They don't have regard for all the things we think are important, safety to personnel, the environment, and all the rest of it. They're there to protect their commercial interests."

This was not a point which pressed hard upon the popular mind, as only one person mentioned it, although many people had been concerned about health, safety and the environment. However, with regard to public opinion, the findings of this study would seem to give weight to Jill Perry's comment that

"I don't think there is all this support that BNFL make out, you know, this unconditional support. I think ... West Cumbrians will support Sellafield outwardly, but I think sometimes they get a raw deal on what they get back."

CORE said that although at a personal level,

"They're nice people, I just think it's very sad for Cumbria that it's there. I would like to think what would have happened if BNFL had not been there ...

We'd have a much more thriving tourist industry which will never happen now ... I think the majority of local people in the area who were deprived before Sellafield arrived are still deprived, and people like that might have benefitted more from much more non-skilled things which might have come with the tourist industry. I think a lot of the skilled people are being brought in ... a lot of local people are really sort of uneducated and need jobs, they don't get the jobs. They would have benefitted from something else in West Cumbria."

The point about the effect upon the tourist industry was mentioned by two respondents, but CORE's opinion that BNFL had not really helped the local population was not picked up on by anyone. Much to the contrary, the most numerous opinions were that BNFL stimulated the very heart of the local economy and provided many jobs.

7.11.3 Responses to the postal questionnaire

The postal questionnaire too included the question,

"Have you heard of the organization British Nuclear Fuels (BNFL.)? Have you anything you would like to say about them, anything at all?"

Not surprisingly, BNIF and UI were very supportive,

"BNFL is one of the leading companies in its field internationally, making an important contribution to the whole nuclear industry. It is a very well-run and highly-competent company." (UI)

"Professional, high technology company. Vast foreign earnings for UK, Excellent environmental performance. Becoming much more open." (BNIF)

English Nature said that in their dealings with them,

"BNFL have shown willingness to cooperate and a wish to be seen to be environmentally aware",

which would appear to be another useful endorsement for BNFL.

A couple of responses were hostile

"I'm very glad I don't work for them! I am cynical about the amount of money they have been throwing at advertising and promotion many times what environmental organisations receive." (AECB)

"not printable"(CEI).

Some were flippant

"Part of endless number of entities with the word 'nuclear' in the title." (ACE)

NPVAC drew a more equivocal sketch of the company.

"Powerful lobby; technically competent; view nuclear technology through rose-tinted glasses, suffer from past history of secrecy in nuclear industry so still not trusted "

Most groups however, declined to make any comment. The fact that most groups had no comment to make was once again indicative of the way nuclear power is not a major political issue affecting many environmental organizations, and was also very similar to many responses made by the local public.

The postal questionnaire also asked

"How would you evaluate their presence in West Cumbria? - eg., is it beneficial or harmful?"

The responses revealed a more even split in opinion than amongst local people. Some, notably the nuclear industry groups, saw it as a positive influence.

"Beneficial to the local economy, and also nationally in view of the contribution to the overall nuclear power programme. It is also a major export earner, notably in Japan." (UI)

"Very beneficial to local employment" (BGS)

"Beneficial - employment more support for shops and other services etc." (BFEA)

"Beneficial - much better for health and the environment than coal mining, steel etc, that came before, good employer, high wages." (BNIF)

Others saw it as anything but a positive presence.

"Isn't it one of the most catastrophic things that ever happened?" (CEI).

"Nuclear Power in any area must be harmful eventually." (BSRIA)

"On a basic level, I can't see that their natural tendency to try and expand can cause anything but harm." (AECB)

Some groups saw two sides -

"To people in W.Cumbria it has brought jobs and prosperity. To those outside W.Cumbria it has despoiled a beautiful area and polluted the Irish Sea."

(NPVAC)

"Swings and roundabouts." (CHPA)

"Beneficial in the short run to the employment and prosperity of local population. Harmful due to shortsightedness of the energy strategy they are pursuing for the local populace and Britain as a whole." (LD)

"In terms of impacts on wildlife it has not been possible to show any dangerous effects on the growth patterns of plants and animals that can be directly attributed - however there are site related impacts as would be with any major development in the area." (EN)

7.11.4 Conclusions about BNFL's image

BNFL had a more distinct identity than NIREX and evoked more emotive comments of both support and opposition. These forthright comments about BNFL must be understood with acknowledgement of the fact that the single most frequently expressed attitude towards BNFL was that the company was not a subject of particular controversy. Overall, the respondents seemed far more supportive of BNFL than they were of NIREX. This was despite the fact that opposition to BNFL was higher than that found in the research conducted in the 1980s, suggesting that BNFL's PR campaign is not having any great degree of success amongst local people. The difference in attitudes towards the two organizations was quite striking, and may be affected by the greater economic contribution which BNFL are seen to make.

Many people were aware of BNFL's economic contribution to the area, although for some people, the scale of this is itself a cause for concern, and this may be a reason behind BNFL's restraint in some areas of PR work. BNFL's message of safety was successfully reaching a substantial number of people (although a smaller number also criticized their safety record), but their concern with national opinion is perhaps having an adverse effect upon local opinion. Although some people praised BNFL's PR work, a substantial number of people implied that they did not trust BNFL. Therefore the situation had not improved since Macgill and Phipps study in 1984.

The comments of BNFL and NIREX seems to reflect local opinion quite well although they underplay the level of local concern (perhaps because of their preoccupation with national opinion). The environmental groups made criticisms about the effect of BNFL which are not reflected in local attitudes, indicating a failure of FoE Cocker mouth and CORE to convey their

messages successfully. They do, however, appear to have a better understanding of the real, less than unconditionally pro-nuclear nature of local opinion.

Responses from the national groups to the qualitative question were similar to popular local responses. There were a number of very supportive and very hostile remarks, and many groups did not find BNFL a particularly emotive subject. In response to the quantitative question, there was a different division of opinion. Where local opinion had been largely in support of BNFL, the opinion of the national groups was more evenly divided between support and opposition; supporting the notion that the general public of West Cumbria is relatively nuclear-friendly.

7.12 Attitudes towards CORE

7.12.1 Introduction

A new avenue of research introduced in this study was the in-depth investigation of attitudes towards the opponents of the nuclear industry. Previous research had sometimes referred to them in passing, but no detailed questions had been specifically directed at West Cumbrian attitudes towards environmental groups. This study enquired about attitudes towards both FoE and CORE.

7.12.2 The attitude of the West Cumbrian public towards CORE

The responses to the open question

"Have you heard of the organization Cumbrians Opposed to a Radioactive Environment (CORE)?

Have you anything you would like to say about them? Anything at all?"

are displayed in Table 7.15 below.

Table 7.15 West Cumbrian comments about CORE, 1994

Comment	Attitude	Frequency
Never heard of them	Don't Know	29 (28%)
Perform a useful watchdog role	Positive	13 (12%)
Don't know enough about them	Don't Know	12 (11%)
Sincere	Positive	9 (8%)
Represent an opposing viewpoint	Descriptive	8(7%)
Incorrect facts	Negative	8 (7%)
Nothing to say	No Comment	7 (6%)
Raise issues and awareness	Positive	6 (5%)
I agree with them	Positive	4 (4%)
Question over how Cumbrian they are	Negative	4 (4%)
Vital watchdog	Positive	3 (3%)
Won't change anything	Negative	3 (3%)
Do a good job	Positive	3 (3%)
Limited resources	Descriptive	3 (3%)

Comment	Attitude	Frequency
I disagree with them	Negative	2 (2%)
Get poor media coverage	Descriptive	2 (2%)
Biased	Negative	2 (2%)
They've got no stake in it - if they had it'd be different	Negative	2 (2%)
Allow people to show not all West Cumbrians are pro-Sellafield	Positive	2 (2%)
Naive	Negative	2 (2%)
Good that someone is doing something	Positive	2 (2%)
Don't publicize well	Negative	2 (2%)
Entitled to their own opinion	No Comment	2 (2%)
I should join them	Positive	1 (1%)
Do little positive	Negative	1 (1%)
Pedantic	Negative	1 (1%)
They have expertise	Positive	1 (1%)
Costs us to keep an eye on them	Negative	1 (1%)
Very open	Positive	1 (1%)
Get too much media attention	Negative	1 (1%)
Hinder the industry	Negative	1 (1%)
Loonies	Negative	1 (1%)
Same as FoE (+ve)	Positive	1 (1%)
Same as FoE (-ve)	Negative	1 (1%)
Go over the top	Negative	1 (1%)
Dodgy actions	Negative	1 (1%)
Trying to force their views on us	Negative	1 (1%)
Are just jumping on the bandwagon	Negative	1 (1%)
Total responses		127

Like NIREX, CORE have had difficulty in establishing an identity with local people (although this may well be more attributable to financial constraints than to the tactical options related to NIREX's campaigns). 29 people had never heard of CORE, and a further 12 had heard of

them but did not know enough about them to make any sort of comment.

Of those who had heard of CORE, only 7 people stated that they had nothing to say, a far lower number than for BNFL and NIREX, suggesting that in some ways CORE may actually have a more controversial relationship with local people than the nuclear industry, and that CORE are not accepted merely as 'something which is there'.

Of the evaluatory comments, local opinion was again stretched between two extremes. On the one hand some people offered great support for CORE.

"These people should be listened to."

(F, 60-74, not currently seeking employment, post-war estate housing area).

"More power to their elbow. I've nothing but admiration for them for having the determination to stand up to such a powerful organization."

(F, 30-44, working, post-war estate housing area).

On the other hand, some people had nothing but contempt for them.

"A complete waste of time, they're all mouth"

(F, 45-59, working, predominately Victorian housing area).

"A pain in the arse."

(M, 15-29, not currently seeking employment, predominately Victorian housing area)

"A dead loss ... they should be banned ... curtailed ... they twist the truth."

(M, 60-74, retired, post-war estate housing area).

"Bunch of fuckin' idiots."

(M, 45-59, unemployed, mixed housing area).

This outright contempt for environmentalists was something which had not been picked up on by the previous studies, although ERM had noted that some people supported Greenpeace because of a lack of faith in the industry rather than through any intrinsic support for environmentalism. Bearing this in mind, it was noticeable that the most frequent type of evaluative comment showed how CORE were valued for their presence as a watchdog over the industry, which many people could not trust to regulate itself effectively. In this context, it was interesting to note that one respondent said,

"If BNFL got their act together their [CORE's] support might fall."
(M, 60-74, retired, post-war estate housing area).

In the responses to this question there were further examples of people sympathising with the industry, the clearest being the individual who spoke out against CORE for hindering the industry.

CORE also invoked hostility both for having their facts wrong. The group's financial weakness may have had an influence in this perception, because CORE could not afford to commission as much of their own research to justify their actions as the industry could. Nevertheless, CORE's reputation for trustworthiness appeared to have improved in relation to BNFL since 1984 when Macgill and Phipps' sample held the nuclear company to be more 'trustworthy' than 'environmental groups'. In this survey, only 7% spontaneously said that CORE were not reliable in their ability to tell the truth, whereas 12% had spontaneously said that BNFL were untrustworthy or too secretive.

BNFL and NIREX's decision to refrain from public confrontation with the anti-nuclear lobby had meant that no-one accused them of going 'over the top'. The decision of CORE to adopt an amount of direct action led to several people criticizing excessive aspects of their campaigns.

As suspected in Chapter Six, CORE also suffered because of their failure to propose constructive alternatives to replace the industry.

"They wouldn't say the things they do if their jobs, their livelihood depended on it."

(F, 45-59, working predominately, local authority housing area)

"With their energy and their money they could do something more to help the communities."

(F, 60-74, retired, post-war estate housing area).

The perceived social composition of the groups seeking to gain public confidence may be an important factor in explaining attitudes towards them. For example, it is important that no issue is seen to be the exclusive concern of any particular social class or grouping, as this may deter others who feel alienated from this clique (Nolte 1974, 216-17). This does not appear to be the case with CORE to any great extent, as no-one castigated them as elitist.

"You tend to think they're all sort of vegetarian extremists, but really they're just ordinary people."

(M, 30-44, working, post-war estate housing area).

Instead, CORE's support may have been increased purely because they were Cumbrian. Several respondents praised them for showing that there were a number of Cumbrians who opposed the nuclear industry.

"They are Cumbrians so they have local knowledge."
(M, 30-44, working, mixed housing area).

On the other hand though, someone also said that,

"They're too close to the problem to be able to view it objectively."
(M, 60-74, working post-war estate housing area).

The issue of Cumbrian identity also surfaced in the question of exactly how Cumbrian CORE actually were. Four people cast aspersions over their Cumbrian credentials.

"They're all people who've just moved here. They seem like a lot of hippies from Kent and Sussex and Essex. They don't sound West Cumbrian, and people round here don't trust non-West Cumbrians."
(M, 15-29, working, local authority housing).

"They're incomers - you should accept the mores of the county you move to."
(M, 60-74, retired, post-war estate housing area).

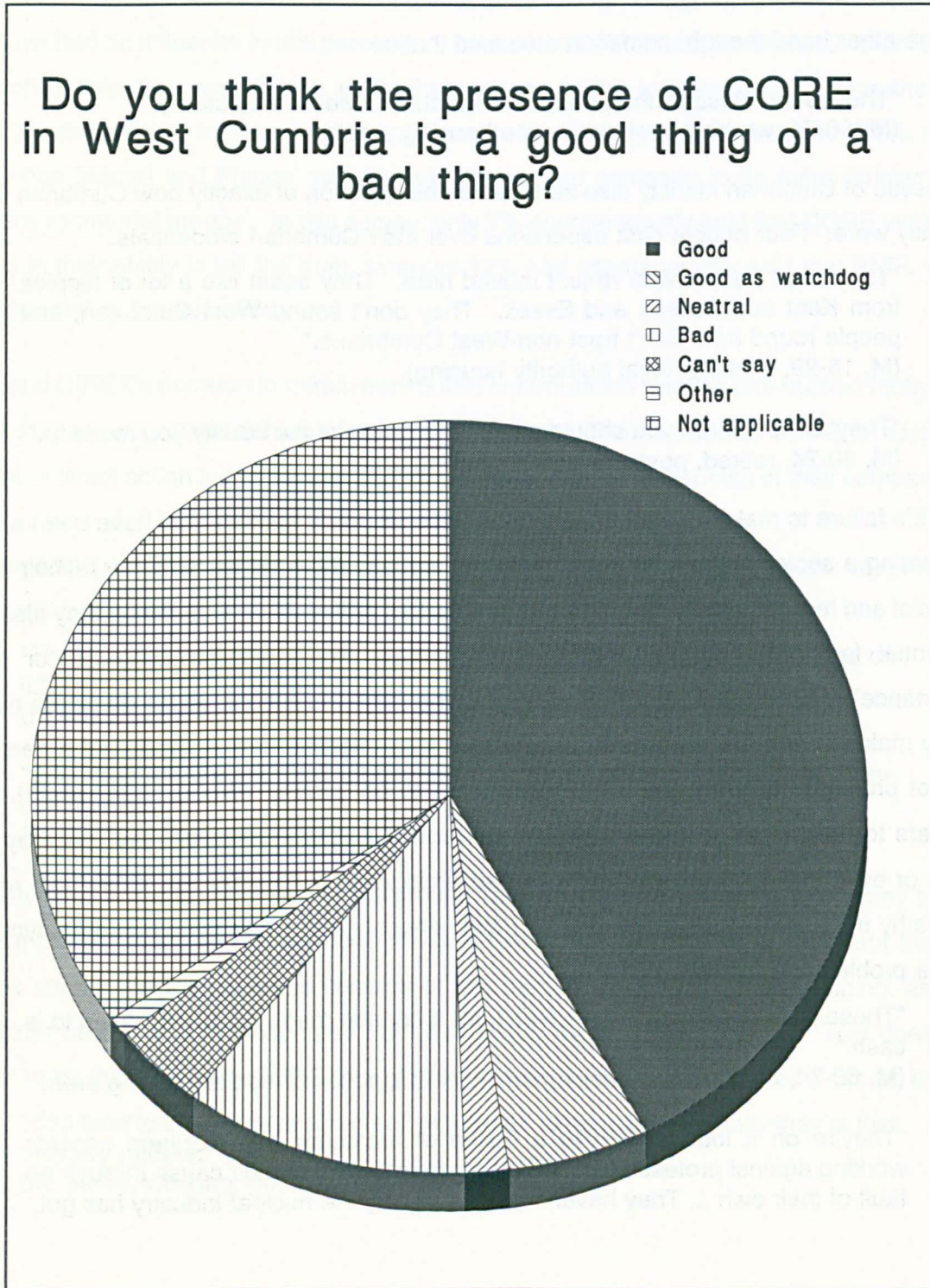
CORE's failure to make a direct impact upon national policy makers may have been a factor in creating a sector of the local public who did not take them seriously either. Their limited financial and technological resources and their lack of professional experience may also have influential factors. As mentioned in Chapter Six, professionalism may be 'of critical importance' (Wilson 1984, 30), in dealing with the large institutions which dominate nuclear policy making. Not only might campaigners be less effective in their work, but a perceived lack of professionalism might make them seem to be 'cranks' (Wood 1992, 18-23). This appears to be a small problem CORE have, for some respondents did say that they were naive or even insane. However, as was also anticipated in Chapter Six, CORE did receive sympathy from some quarters because of their sincerity and some people offered sympathy for the problems which faced CORE.

"Those poor buggers. They haven't got a chance man. All it boils down to is cash."
(M, 60-74, not currently seeking employment, post-war estate housing area).

"They're on a loser. They're a bunch of amateurs with Northern accents working against professionals. They do a disservice to their cause through no fault of their own ... They haven't got the money the nuclear industry has got,

Figure 7.17 West Cumbrian evaluation of CORE's presence in West Cumbria, 1994

"Do you think their presence in West Cumbria is a good thing or a bad thing?"



or the time or resources to present a glossy case."
(M, 30-44, working predominately Victorian housing area).

It was interesting to observe that no-one spontaneously castigated CORE for their links with Bono and U2, suggesting that any negative publicity of their celebrity associations had been minimal. A total of 127 remarks had been made about CORE, a lower total than for BNFL or NIREX, and this signified the lower level of local awareness of the organization. Of these, there had been 47 positive comments, 36 negative comments, 9 'no-comments', 13 'descriptive' statements, and a total of 41 don't knows. The quantitative question depicted in Figure 7.17 slightly clarified the general picture.

Overall, support for CORE was high, although the fact that the majority of people had simultaneously expressed support for the nuclear industry suggests that perhaps CORE were supported only as watchdogs, rather than to the extent that people agreed with their campaigns to cease reprocessing at Sellafield completely.

7.12.3 The opinion of the local groups

CORE assessed West Cumbrian opinion of themselves as follows

"I don't think we're flavour of the month exactly, I think the main thing is they accuse us of wanting to close the place down which would mean loss of jobs ... When something has happened, for instance, like Chernobyl, we asked people how they felt the whole thing had been handled, did they trust the information from the nuclear industry, the authorities or whatever, that sort of thing, and I think the nuclear industry came out pretty bad. I think most people either trusted the police or us more than the nuclear industry to give them the sort of truth about it all."

CORE seem to be aware of the fact that they are valued as a watchdog, but perhaps strangely they overestimate the opposition and hostility which exists towards them. Whilst it certainly does exist amongst a minority of the local population, many people had simply not heard of them, and most of those who had heard of them supported them in general (although not to the extent to which CORE would like). CORE appeared unaware of this broad base of sympathy upon which they could perhaps build. This misunderstanding may have harmed CORE's relationship with West Cumbrians. An explanation of this misunderstanding may lie in the discovery that although CORE work with the general public in the south of the county, they are somewhat distanced from, and perhaps even antipathetic towards, the north-west of

the county. In one comment, CORE's representative said,

"In some ways I feel rather sorry for NIREX, I mean they have been told to go and find this hole somewhere and its a rotten job to do when they've already been kicked out of other places. I think West Cumbria should have it, though, in a way, I think they deserve it. How can they support the industry for so long, take what advantages there are, which are none for others that live in Cumbria, and then turn round and say, 'Well we don't want that bit. We don't want what you produce at Sellafield', which is nuclear waste. So I think most of those people who supported THORP deserve NIREX."

This lack of sympathy for West Cumbrians, and the manner in which CORE could view the repository from the standpoint of an outsider, could not only lead CORE to misunderstand West Cumbrians, but could also alienate them from West Cumbrians.

FoE were supportive of CORE, although, like many local people, they had reservations about some of their methods.

"Very professional ... That they tend to be a little bit confrontational is a criticism I would make, but apart from that I think they're very aware of the issues, their factual basis is good and they get good coverage in the media."

NIREX said

"Well, they question what we are doing, our plans. It's a free country, they're free to express their opinions, thank goodness. The way they choose to do that may not really be to our liking and in common with other "environmental" [his quotation marks] organizations, they tend to use methods which we wouldn't ... I don't think anybody should be able to do anything unquestioned, and they play an important role in West Cumbria in doing that, as a local group, as opposed to the national environmental organizations."

Most of the comments NIREX's spokesperson made seemed to be in line with local feeling, but one may wonder whether he was able to be so magnanimous towards CORE because he felt that they posed very little real threat to his organization's objectives.

Similarly, BNFL said

"They are one of many organizations who don't much care for the industry. I think every industry has those people who are opposed to it. Those people have a right to their opinion, to their own thoughts, and one should have a dialogue with them, but all that we ask of anybody whether they're pro or anti the industry is that they get their facts right."

7.12.4 Responses from the postal questionnaire

CORE's difficulties in gaining publicity was highlighted by the fact that BSRIA, BFEA, GER, AECB, NPVAC, CEE, STA, TACE and EN had not heard of them. Not surprisingly BSRIA commented that 'They should seek wider publicity'. Of those that could pass comment, some merely described who CORE were without passing any judgement.

"Small local pressure group" (UI)

Some were critical.

"Need to put positive alternatives as well as saying what they don't like." (ACE)

"Well meaning but fall into temptation of exaggerating science for political ends." (BNIF)

"They should consider practicalities." (TACE)

And some were supportive:

"Good pressure group." (CHPA)

"Very good, liaise with them regularly." (LD)

TACE's comment was revealing in terms of the prejudices which people might hold toward environmental groups, in that they saw fit to tell CORE to be more practical, yet had confessed above that they had not even heard of them, let alone the practicality of their campaigning.

The failure of most of these groups to have heard of CORE is important, for it should be remembered that of the 90 or so most important groups concerned with energy policy, these were the 20 who found the nuclear power important enough to contribute a completed questionnaire, and are perhaps amongst the most informed organizations as regards the issue of nuclear power, and yet CORE had failed to establish an identity with many of them.

The question

"How would you evaluate their presence in West Cumbria? - is it beneficial or harmful?"

was also asked. Obviously the groups who had not heard of CORE should not have been

able to say whether they were beneficial or detrimental to West Cumbria, but this did not prevent TACE from commenting that they were 'Adverse to the whole of the UK'. TACE apart, even the groups who had heard of CORE found it difficult to make some evaluative comment. There were only two other comments made, one positive, one negative.

"Harmful - creating atmosphere of concern, to the detriment of people's proper peace of mind, and driving other investment away." (BNIF)

"Beneficial - present an alternative voice." (LD)

7.12.5 Conclusions about CORE's Image

The detailed investigation of attitudes towards anti-nuclear groups was a major innovation in this study. Its findings added an important new element to understanding the nuclear debate of West Cumbria, because no previous study had focused so directly upon attitudes towards environmental groups. One interesting difference was that there were fewer 'no comment' responses than had been made about BNFL or NIREX, suggesting that in some ways, CORE may be more controversial than the industry itself and not a focus of passive acceptance. As had been noted in passing in earlier studies, many respondents supported CORE in its watchdog function, regulating an industry which could not be trusted. The quantitative evidence from this study found that support for CORE was far higher than opposition, but the fact that high levels of support for BNFL also existed suggests that CORE are supported more as a watchdog body than as an institution which seeks to destroy the nuclear industry. However, people held reservations about them for the accuracy of their arguments (although more people were worried about BNFL in this respect, an important change since 1984). As ERM noted, there was therefore a chance that if the industry was seen to become more trustworthy, support for environmental groups such as CORE might fall. Further evidence that this might occur was given in the way that CORE's policy of direct action had led them to be seen to go 'over the top' by a small number of people, whilst the failure to propose constructive alternatives to the nuclear industry was also criticised. Some people also criticised them for their naivety. Significantly there existed an amount of outright hostility towards CORE which was not noted in earlier studies, quite probably including those who were most vociferously in favour of the nuclear industry and providing further evidence of the area as being relatively nuclear friendly.

There was however little evidence that CORE received opposition for being a middle class

elitist concern. Instead, some people expressed sympathy for them for their lack of resources. Another important finding was that it could be that the fact that CORE are Cumbrians endears them to the insular element of Cumbrian culture, even more than BNFL who are more concerned with addressing national considerations, although some people doubt that CORE are 'true' Cumbrians. CORE also escaped criticism for their links with U2, suggesting that their tactic of involving celebrities had so far been a PR success. Nevertheless the fact that CORE have had difficulty in establishing an identity with many local people, a large proportion of whom are unsure who they are suggests that their PR work could still be improved.

The responses of the local groups were very interesting, with CORE display the stereotypical belief in a West Cumbrian populace which was very supportive of the nuclear industry and hostile to environmental groups. Some of CORE's comments showed that they are alienated from West Cumbrian in a way, to an extent which almost borders on contempt for supporters of the industry. The way in which the nuclear industry viewed CORE with magnanimity, was perhaps because they saw little threat from them.

The responses from the postal questionnaire highlighted the difficulty CORE have had in obtaining publicity, as many groups had not even heard of them.

7.13 Attitudes towards Friends of the Earth**7.13.1 The attitude of the West Cumbrian public towards FoE**

Respondents were asked

*"Have you heard of Friends of the Earth?
Have you anything you would like to say about them? Anything at all?"*

The responses are shown in Table 7.16 below

Table 7.16 West Cumbrian comments about FoE, 1994

Comment	Attitude	Frequency
Go over the top	Negative	21 (19%)
Are useful watchdogs	Positive	20 (18%)
Sincere	Positive	11 (10%)
Nothing	No Comment	9 (8%)
Represent an opposing viewpoint	Descriptive	9 (8%)
Vital watchdog	Positive	6 (6%)
Trying to force their views on us	Negative	6 (6%)
Question over how Cumbrian they are	Negative	5 (5%)
Don't know enough about them	Don't Know	5 (5%)
Just causing trouble	Negative	4 (4%)
Incorrect facts	Negative	4 (4%)
I agree with them	Positive	4 (4%)
Good in non-nuclear matters	Positive	4 (4%)
Hippies	Negative	4 (4%)
Run as business	Negative	4 (4%)
Biased	Negative	3 (3%)
They've got no stake in it - if they had it'd be different	Negative	3 (3%)
Raise issues and awareness	Positive	3 (3%)
Nothing against them	No Comment	3 (3%)
Entitled to own point of view	No Comment	3 (3%)

Comment	Attitude	Frequency
Good that someone is doing something	Positive	2 (2%)
Naive	Negative	2 (2%)
Bring down West Cumbrian reputation	Negative	2 (2%)
Never heard of them	Don't Know	1 (1%)
They're just jumping on a bandwagon	Negative	1 (1%)
Scaremonger	Negative	1 (1%)
Do-gooders	Negative	1 (1%)
Dodgy actions	Negative	1 (1%)
Won't change anything	Negative	1 (1%)
Are a branch of Greenpeace	Descriptive	1 (1%)
Trying to increase renewables	Descriptive	1 (1%)
Get too much media coverage	Negative	1 (1%)
Not as good as Greenpeace	Negative	1 (1%)
Do nothing positive	Negative	1 (1%)
Do a good job	Positive	1 (1%)
Aim for hype	Negative	1 (1%)
Have expertise	Positive	1 (1%)
Get rid of them	Negative	1 (1%)
Disagree with them	Negative	1 (1%)
Are useful in calming things down	Positive	1 (1%)
I wish I could help them more	Positive	1 (1%)
Total responses		156

Friends of the Earth were far more well known than CORE. Only one person had not heard of them, and only 5 people did not know enough about them to pass comment. Overall, 156 comments were made about FoE, compared to 127 about CORE⁵⁰.

⁵⁰ It is important to note that the question only asked about FoE as a whole and not about FoE Cockermouth specifically. Given that FoE Cockermouth suffered even tighter financial and staffing constraints than CORE, levels of awareness of the local branch could well have been even lower than those for CORE.

Chapter Seven: The surveys

Far more so than CORE, FoE had a major problem in that although many people saw them as a watchdog, even a vital watchdog body, many people thought that they went over the top with their actions. In this respect, FoE Cockerthorpe could suffer through the association with the national body of FoE, who through actions such as the Die-In at Whitehall over THORP, have unapologetically sought national publicity for the issue. From a Cumbrian viewpoint, such actions may be perceived as 'a self-indulgent expression of the impatience of protestors' (Wilson 1984, 33) and may antagonise people in Cumbria.

"They go a bit far some times, going round with coffins, stopping you in Workington, emphasising disaster all the time, it's not nice for the kids."
(F, 30-44, not currently seeking employment, commercial area).

"Stuffing up the pipelines is no good. They're playing with fire. I'm for them but they could do with being taken down a peg or two. Half the time you get the impression it's for publicity rather than any necessary reason."
(M, 60-74, working, predominately Victorian housing area).

The second of these responses also indicates an extent to which FoE sometimes suffer from association with Greenpeace (who attempted to block the Sellafield discharge pipes), under an assumption that all environmental groups are one and the same. The first quote however, clearly refers to the actions of the local branch.

There were also some respondents who doubted FoE's factual accuracy

"I must say sometimes their arguments are irrational, and they don't recognize the need for an extensive energy supply and technological improvement."
(M, 30-44, working, post-war estate housing area).

As with CORE, there was outright opposition to FoE's presence.

"Put 'em all in a boat and drop 'em in the sea, French first!"
(M, 60-74, retired, post-war estate housing area).

"A load of idiots." (M, 45-59, self-employed, local authority housing).

Considering the fact that their policies originated from FoE in London, respondents viewed FoE as a non-Cumbrian organization, who could be criticized for interfering.

"A bloody menace, they should get back to where they came from."
(M, 60-74, retired, post-war estate housing area).

"The top men are all in London. They should be up here living up here and seeing what it is."
(M, 60-74, retired, local authority housing area).

"They've a lot of tin-pot ideas, all out of books, and dreams. They don't belong to the area anyway."
(F, 60-74, retired, post-war estate housing area).

"I wish they'd go and be friends with somebody else" (M, 75+, retired, predominately Victorian housing area).

"Leave West Cumbria alone. We can make our own decisions, we're big enough. They give Cumbria a bad name, publicising BNFL as a bad thing, radioactive, glowing, and everything."
(M, 15-29, working, Local Authority housing area).

"They should keep their noses out. They want to get something to do. Why have they so much time? If they're trying to stop people getting work, I'm against them."
(F, 75+, retired, post-war estate housing area).

The fact that FoE Cockerthorpe were the group based most closely to the respondents, and were also the group who only focused upon work with the general public, may have facilitated the perception of FoE as locals.

Unlike CORE, there was little sympathy for FoE as sincere amateurs. Instead, some people criticised them for becoming too commercial, and losing sight of their *raison d'être*.

"They're run as a business now. If it wasn't for the likes of the British nuclear industry, they'd be out of business. I feel they've changed their ideas, they look around to see where they can generate more money. They've left the whales behind now."
(M, 30-44, working, predominately Victorian housing area).

"They hit places according to how much money they can get out of it and I think that's wrong."
(F, 45-59, working mixed housing area).

Some people were specifically critical of FoE Cockerthorpe because, as appeared from some of their replies in the interviews, they appeared almost complacent at times.

"Extremely blinkered. I'm not happy with them. Nationally they do a good job. Locally they tend to be amateurish and idealistic. My main criticism of them is that they don't get involved in solutions to problems. They pose the problems but they don't get involved in finding solutions."
(M, 60-74, working, post-war estate housing area).

"The local branch rarely seem to do anything about the nuclear industry, it's more important than the Third World round here."
(F, 30-44, self-employed, post-war estate housing area).

"Nuclear power is just a little bit of what they're concerned about. You only know their presence in West Cumbria though through items in the news. You don't see them on a day to day basis - their presence isn't felt as much as it could be. Friends of the Earth in [another northern town] were out for people to see every day."
(M, 15-29, working, predominantly Victorian housing area).

Overall, more negative comments (70) were made about FoE than positive remarks (54). However, despite these criticisms, and the occasional hostile article in the local press (see montage overleaf), FoE's presence was clearly valued overall. As Figure 7.18 shows, in response to the question

"Do you think their presence in West Cumbria is a good thing or a bad thing?"

the vast majority supported FoE's presence.

7.13.2 The opinion of the local groups

FoE Cockermouth's coordinator said

"I think generally people respect what we're trying to do even if they don't agree with us, well they think we are well meaning anyway, might be a bit misguided maybe, but at least we're sort of fairly well meaning. I have had two poison pen letters from pro nuclear people"

To a large extent this can be seen to be an accurate assessment. Both the quantitative and the qualitative questions supported the idea that people respect FoE's work. FoE are also aware that opposition does exist and that some people see them as misguided. Perhaps the fact that FoE were the only group actually talking to people in the streets of north-west Cumbria may have been an important factor in making them have the most accurate assessment of West Cumbrian opinion in relation to a group themselves.

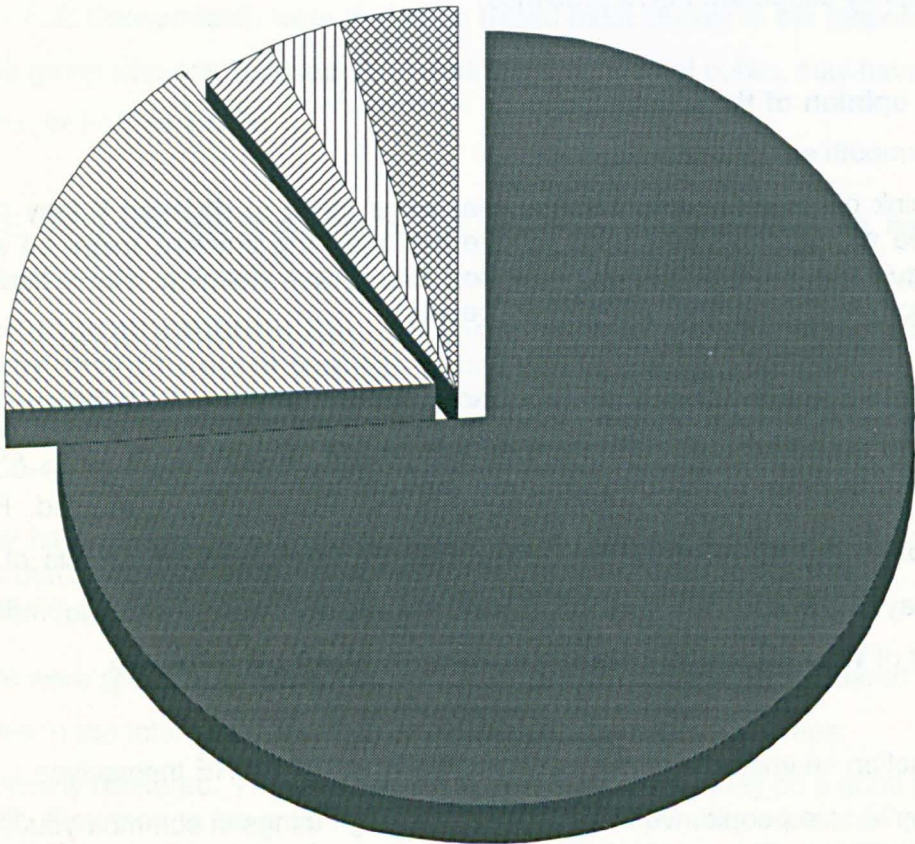
CORE's reaction seemed to match FoE's comments about CORE themselves

"They're nice people, we have a lot of campaign things in common you know we don't agree on everything we do, but you know certainly nuclear-wise we are all sort of cycling the same way."

Figure 7.18 West Cumbrian evaluation of FoE's presence in West Cumbria, 1994

Do you think the presence of FoE in West Cumbria is a good thing or a bad thing?

- Good
- ▨ Bad
- ▧ Neutral
- ▩ Don't know enough about FoE
- ⊠ Can't say



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Battling Bill: Profile page 7

Maggie's man storms at the anti-Thorp environmentalists

GREENS ARE CRACKPOTS!

By **NICK TURNER**
Political correspondent

FORMER Downing Street press officer Sir Bernard Ingham has launched a blistering attack on environmental groups opposed to the Sellafield Thorp plant.

He described them as "Luddites" and "crackpots."

In a robust speech to a North-west region of the Guild of Newspaper Editors meeting in Cockermouth, the former chief press secretary to ex-Prime Minister Margaret Thatcher accused Greenpeace and Friends



Sir Bernard Ingham... blistering

QUOTE:

'Environmentalists want to turn the clock back'

Turn to page 3

Anti-Thorp Greens 'trade on ignorance'

Simon Lee Business Reporter

Environmentalists opposed to Thorp have launched a broad battle to prevent the plant's opening. The propaganda of the Greens said: "The broad battle to prevent the plant's opening will show how the Greens are trading on the public's ignorance." In a speech to a North-west region of the Guild of Newspaper Editors meeting in Cockermouth, the former chief press secretary to ex-Prime Minister Margaret Thatcher accused Greenpeace and Friends of "trading on ignorance".

Bridget Woodman, Greenpeace nuclear campaigner said the jobs claims were exaggerated and claimed many of the facts about the plant were inaccurate. "They are the ones trading on ignorance by putting this sort of propaganda in front of the public," she said. "These are the ones who are trading on ignorance."

And Martin Forwood, of lead firm Cumbrians Opposed to Thorp, said: "These are the ones who are trading on ignorance by putting this sort of propaganda in front of the public."

Mr Guinness' claims were "tired, and discredited" and "don't stand up." Environment group press release said: "Mr Guinness' claims were tired, and discredited" and "don't stand up."

Mr Guinness' claims were "tired, and discredited" and "don't stand up." Environment group press release said: "Mr Guinness' claims were tired, and discredited" and "don't stand up."

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The industry comments about FoE mirrored those about CORE.

NIREX - "Much the same answer [as for CORE] but on a national and international scale, although they do have local branches."

BNFL - "Again, they're involved in all sorts of activities, and they've highlighted many issues. All that we ask is that they get their facts right. That's all."

7.13.3 Responses to the postal questionnaire

In contrast to CORE, all of the groups had heard of FoE, although possibly not of FOE Cockerthorpe. FoE also received more critical comments than CORE from some quarters. BNIF in particular were scathing in their comment

"Largely a spent force; scientifically corrupt. Credibility fatally compromised by opposition to VAT on fuel. Now seen to be more interested in personal popularity than in improving the environment." (BNIF)

Centre for Environmental Initiatives were critical too.

"They have done good work in the past but really do need to catch up with what is possible now, eg. steering people towards a sustainable future."

All the other groups however, were supportive of FoE for their environmental campaigning, with TACE, almost inevitably, adding a comment that they should consider practicalities.

When asked

"How would you evaluate their presence in West Cumbria? - is it beneficial or harmful?"

several groups made no comment. This suggested a lack of national knowledge about FoE Cockerthorpe akin to the low level of knowledge about CORE. This lack of awareness may be less worrying for FoE Cockerthorpe than for CORE, because FoE Cockerthorpe did not attempt to campaign at a national level, where CORE do. BNIF, UI and the Liberal Democrats felt FoE were more or less 'irrelevant' in West Cumbria. The Centre for Environmental Initiatives said that they were,

"probably useful in the past, now need to be coming up with alternative employment options and ways of managing over the future generally and sitting around the table with decision makers."

AECB saw their presence as beneficial, NPAC saw them as a useful watchdog.

"It can only be beneficial to keep a close and critical watch on any organisation with the power and capacity for damage of BNFL."

7.13.4 Conclusions about FoE's image

FoE had a higher profile than CORE, possibly due to the actions of the national body from this factor it was surprising that there were relatively few criticisms for being outsiders. As with CORE, a new finding was that FoE had aroused some hostility from both local people and some respondents to the postal questionnaire. Their factual accuracy and their Cumbrian credentials were criticized. More importantly, they were very often seen to go over the top in their direct actions. Some people also criticized their business-like attitude. Some local people were also concerned that FoE Cockermouth did not seem to be doing very much.

On the whole, the majority of respondents valued FoE's presence as a watchdog body. At a quantitative level, support for FoE was greater than for any of the other groups, but more negative comments than positive comments were made about them in the qualitative section, a less favourable finding than for CORE or BNFL and an important one in terms of understanding the nature of attitudes to environmental groups. It seems that people recognized that both CORE and FoE have faults but still value them to watch over an industry which also has many faults.

Like CORE, FoE Cockermouth (but not FoE in general) seem to have had difficulty in establishing their identity at a national level. Many respondents to the postal questionnaire seemed unaware of their existence. This low level of awareness of the existence of organized opposition in West Cumbria may have fostered the development of the national view that West Cumbrian people support the nuclear industry in general. It also highlights the impact of being able to publicize at a national level, and the advantage which the industry has over its far poorer opponents in this respect.

7.14 General support for the nuclear industry

7.14.1 West Cumbrian perceptions of national attitudes towards the nuclear industry, 1994

Respondents were asked to describe national opinion towards nuclear power. As Figure 7.19 shows, barely a quarter of respondents felt that most people in Britain supported the industry. The most frequent response was that most people opposed the industry, although there was also a sizeable number of respondents who gave responses indicative of apathy and lack of interest amongst the British population as a whole. This set of results might strengthen the notion of West Cumbria as a pro-nuclear island struggling valiantly against a sea of anti-nuclear feeling from outside the county.

7.14.2 The views of the four local groups regarding national opinion

The local groups were divided as to the state of national opinion. BNFL said that

"According to surveys carried out by MORI, people have a better understanding of nuclear electricity, and most think that in 50 years time nuclear will be the major source of electricity."

This is a response which, despite saying that people believe nuclear power will be an important fuel of the future, cleverly avoids actually exactly saying what BNFL believe the current state of opinion to be at present.

NIREX's spokesperson highlighted national apathy, but believed that many people were in favour overall, saying

"I think most people are probably pretty apathetic about it unprimed. A lot of people are probably sceptical, because of this misunderstanding, but realise it's worth it in the long term"

CORE and FoE Cockerhmouth both noted a lot of apathy but felt that most people in Britain opposed the industry, with CORE's representative saying that

"I have the impression that most people don't think about it an awful lot, but I think that of those who think, I think that most people oppose it."

The fact that both sides of the debate believed that the majority of opinion was on their side may have implications for their campaigning by perhaps by perhaps inducing a degree of complacency.

Figure 7.19 West Cumbrian perceptions of national attitudes towards the nuclear industry,

1994

Do you have the impression that most people in Britain support or oppose the nuclear power industry?

- Oppose
- ▨ Support
- ▧ Support if not near them
- Further away the more opposed
- ⊠ More facts, more support
- Many don't know much about it
- ▩ Most people don't care
- 50:50
- ▨ Most people are confused
- ▧ Don't know

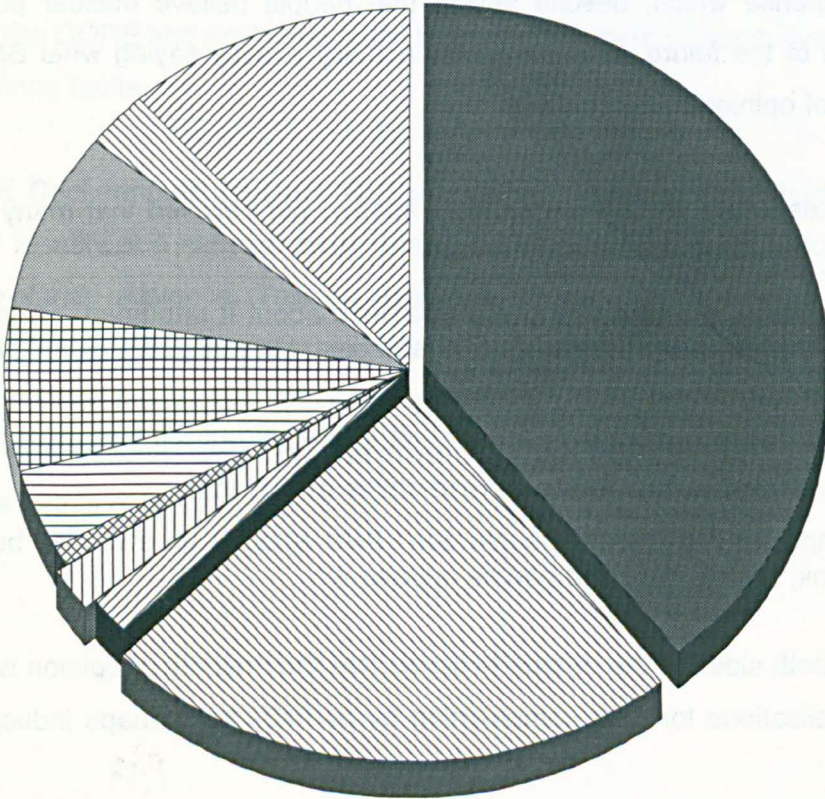


Figure 7.20 General levels of West Cumbrian support for the nuclear industry, 1994

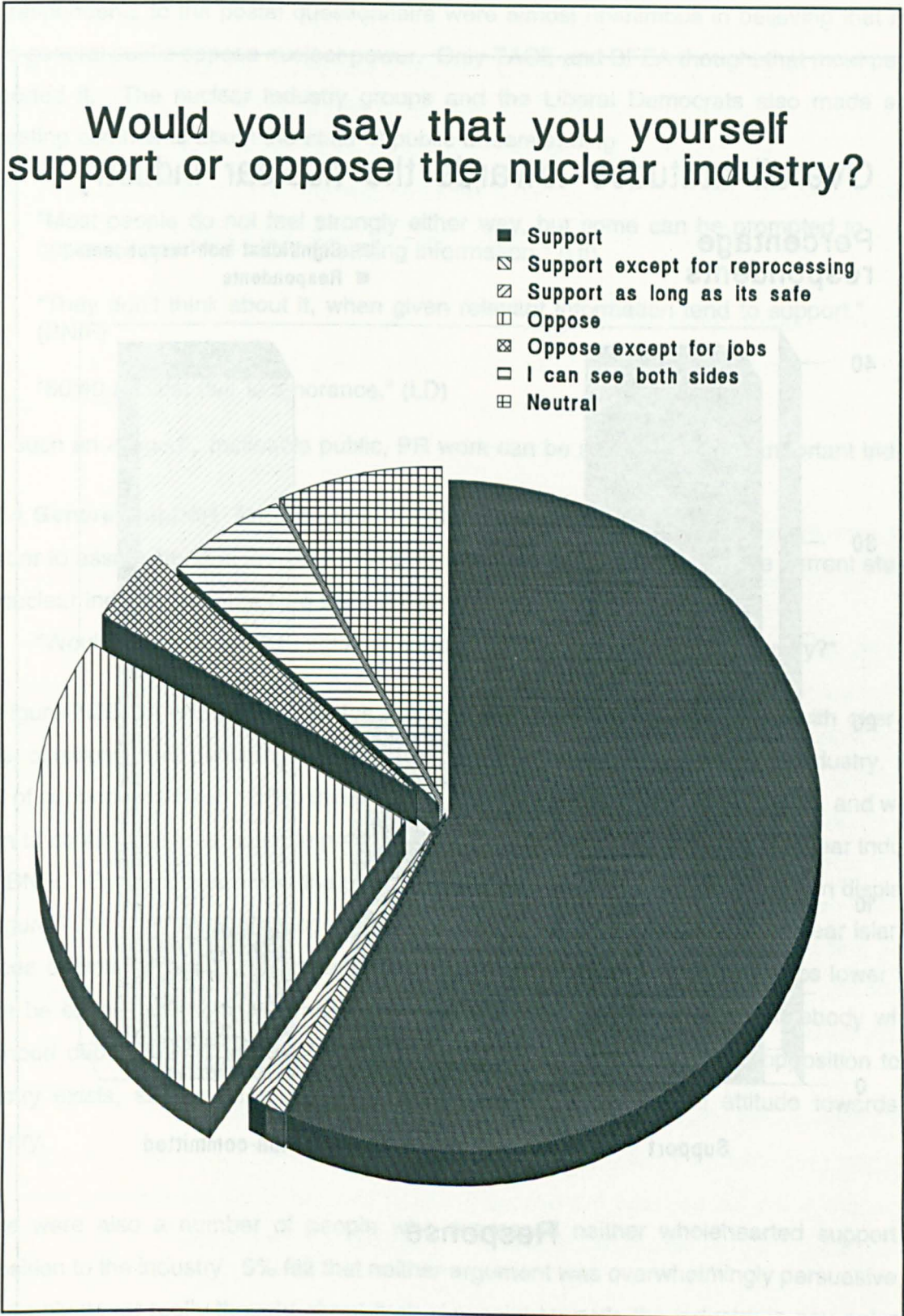
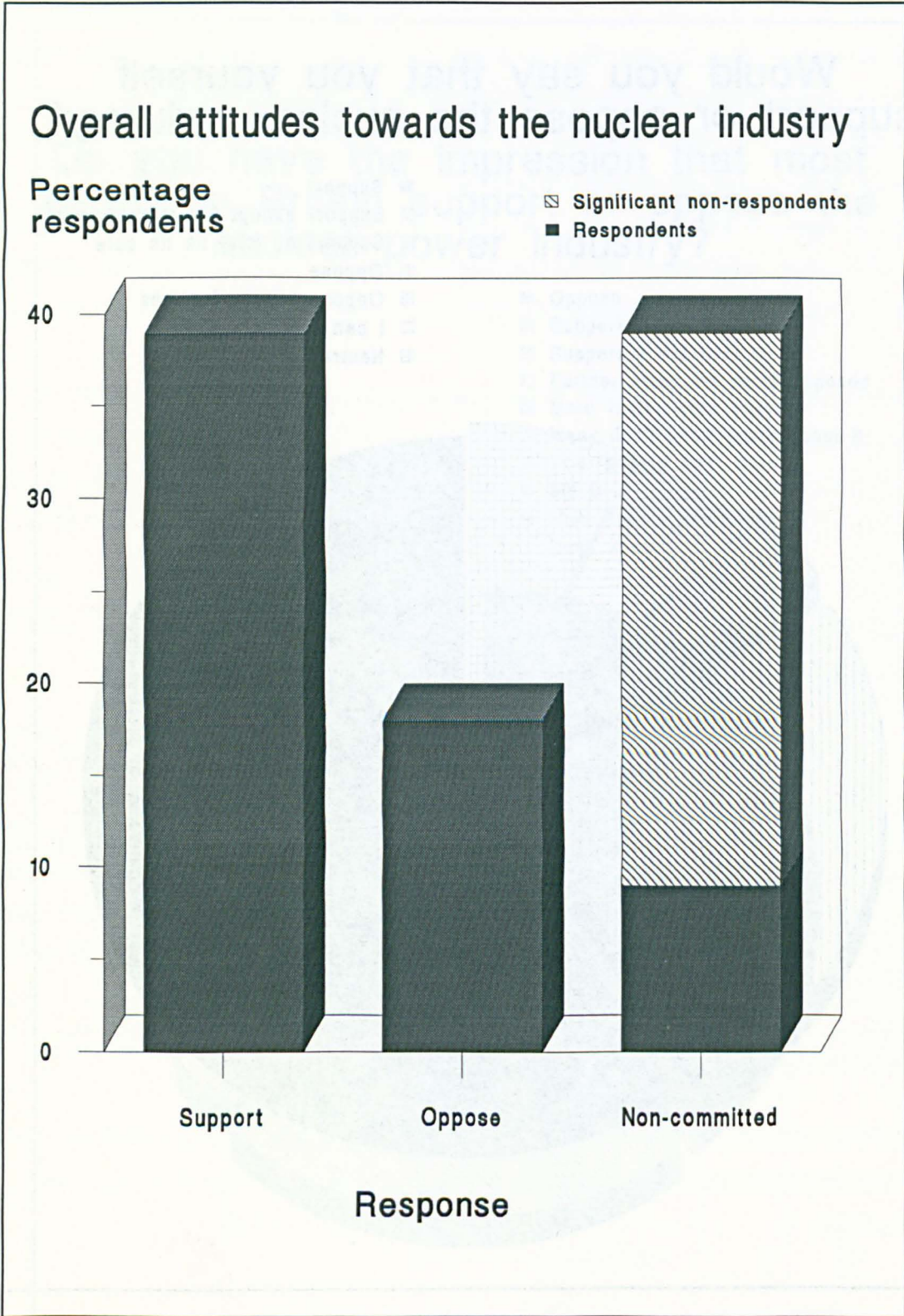


Figure 7.21 General levels of West Cumbrian support for the nuclear industry, taking into account 'significant non-response'



7.14.3 Responses to the postal questionnaire regarding national opinion

The respondents to the postal questionnaire were almost unanimous in believing that most of the general public oppose nuclear power. Only TACE and BFEA thought that most people supported it. The nuclear industry groups and the Liberal Democrats also made some interesting comments about the state of public understanding

"Most people do not feel strongly either way, but some can be prompted to oppose if provided with misleading information." (UI)

"They don't think about it, when given relevant information tend to support." (BNIF)

"60:40 against due to ignorance." (LD)

With such an allegedly malleable public, PR work can be seen to be very important indeed.

7.14.4 General support for the nuclear industry in West Cumbria

In order to assess general levels of their own approval or disapproval for the current state of the nuclear industry, local people were asked the question,

"Would you say that you yourself support or oppose the nuclear industry?"

As Figure 7.20 shows, support for the industry was high in absolute terms, with over half (57%) of respondents declaring themselves to be unequivocally in favour of the industry. This level of support was closer to the levels of support for BNFL than those for NIREX, and would seem to confirm the idea noted in previous studies of an identification of the nuclear industry with BNFL. By comparison with the perceptions of national support and opposition displayed in Figure 7.19, this evidence supports the idea that West Cumbria is a pro-nuclear island in the sea of British opinion. However, this substantial level of support is perhaps lower than might be expected from a community in which virtually everyone knows somebody whose livelihood depends upon the nuclear industry. It is clear that substantial opposition to the industry exists, as a quarter of people expressed an unfavourable attitude towards the industry.

There were also a number of people who expressed neither wholehearted support nor opposition to the industry. 5% felt that neither argument was overwhelmingly persuasive, 7% had simply never really thought about their viewpoint towards the industry in any polemical manner, and a number of people gave equivocal responses. 4% of respondents supported

the industry only because it brought jobs to the area, the support of one respondent was conditional upon safety. The 48 significant non-respondents may also represent people who do not have particularly strong views on nuclear power, as they did not want to answer a questionnaire on the subject. As Figure 7.21 shows, if significant non-respondents are added to those unsure of which camp to follow, the section of people who do not have a particularly strong view on the nuclear industry represents as large a proportion of local people as those in support of the industry, and reinforces the point that care should be taken not to exaggerate the existence of 'controversy' over the nuclear industry within West Cumbria.

7.14.5 Dependence upon the industry

From the comments made about BNFL, there was clearly a perception that the nuclear industry was important to the local economy. It had also been suggested by earlier researchers that this was a very important influence on opinion.

To examine this subject more directly, respondents were asked

"Do you think your livelihood depends upon the nuclear power industry?"

Only 25% (28 people) answered in the affirmative. 75% (83 people) said 'no'. Although a situation where a quarter of the population claim that they are directly dependent upon the industry is still a large proportion, this would seem to run contrary to both local and national perceptions of the industry's economic importance to the area. It is certainly very different to the results of Macgill & Phipps (1987), who found nearly 50% of respondents said BNFL made a positive contribution to their livelihood. In Cockermouth, twenty miles away from Sellafield, direct dependency upon the nuclear industry represents only a minority of local people, and so the (greater) level of overall support cannot be explained as simple direct dependency. Instead the economic importance of the industry in attracting support may lie in perceptions of how many other local people are dependent upon the industry.

7.14.6 Conclusions about general support for the nuclear industry

The largest proportion of West Cumbrian respondents and posted respondents thought that most people in the UK opposed the nuclear industry, conform to the stereotypical view that West Cumbria is a pro-nuclear region, which is almost unique in the UK.

On the other hand, the finding that although the majority of respondents supported the industry, the total of significant non-respondents and those unsure of their opinion is just as

high as the level of support was significant. It shows that it is important not to exaggerate levels of controversy about the nuclear industry within West Cumbria.

Another important finding, which contradicted the model of support being based upon economic dependency, was that only a quarter of respondents felt that they were directly dependent upon the nuclear industry for their livelihood. This was a far lower number than the level of overall support, and suggested that perhaps perceptions of economic dependency are more important than direct personal dependency in explaining support.

7.15 General associations with nuclear power

7.15.1 Associations made by the West Cumbrian public

The next section of the research was perhaps the least directed of all, as it did not even ask for comments about any particular aspect of the nuclear industry. Respondents were asked

"What are the first few things that come into your mind when you hear the phrase 'nuclear power'?"

Their responses are displayed in Table 7.17 below

Table 7.17 Spontaneous associations with the term 'nuclear power' made by the West Cumbrian public, 1994

Associations	Frequency
Sellafield	28 (25%)
Generates electricity	17 (15%)
Pollution	16 (14%)
Radiation	15 (14%)
Danger	12 (11%)
A-bomb	11 (10%)
Waste	10 (9%)
Chernobyl	10 (9%)
Jobs	8 (7%)
Clean energy	7 (6%)
BNFL	5 (5%)
Public misunderstanding	4 (4%)
Cancer	4 (4%)
Progress/the way forward	4 (4%)
Wanting to get rid of it	4 (4%)
CORE	3 (3%)
Controversy	3 (3%)
Disaster	3 (3%)
SVC	3 (3%)
Big silver globes	3 (3%)

Associations	Frequency
Nervousness	3 (3%)
My work	3 (3%)
THORP	3 (3%)
AGRs	3 (3%)
Windscale fire	2 (2%)
Evil	2 (2%)
MAGNOX	2 (2%)
Technology	2 (2%)
Safety	2 (2%)
Sizewell	2 (2%)
Target in war	2 (2%)
Unsightly plant	2 (2%)
Irate farmers	1 (1%)
Unfulfilled promises of cheap electricity	1 (1%)
Not drinking rain water	1 (1%)
Genetic defects	1 (1%)
Unknowns	1 (1%)
Beaches	1 (1%)
Violence	1 (1%)
Propaganda	1 (1%)
Deceit by the Conservative Party	1 (1%)
Saving fossil resources	1 (1%)
Boring subject	1 (1%)
Drigg	1 (1%)
Renewable resource	1 (1%)
Nothing	1 (1%)
Explosions	1 (1%)
Dirty industry	1 (1%)
Total responses	214

In the light of previous research, which had focused upon 'risk', 'controversy' and 'economic dependence', it was revealing to discover that none of these things was the single most frequent association with nuclear power. Instead the most frequent responses were more mundane associations with Sellafield itself, and the generation of electricity. Yet again this supports the idea of a common local attitude towards Sellafield as merely being 'something that is there', and warns of the need for caution when reporting the extent to which controversy exists in West Cumbria. That is not to say that concern does not exist amongst local people - pollution, radiation and danger were all mentioned by a substantial number of people.

7.15.2 The extent to which the four local groups understood the public's priorities

The four local groups were also asked to say what they thought were the events and concepts which the West Cumbrian general public most commonly associated with the term 'nuclear power'. NIREX's representative said that there was

"a great misconception as to what it is and how it works ... Subconsciously and even consciously there's a link with nuclear weapons ... There's a fear of radioactivity because it's not a tactile thing ... you can't hear it, touch it, see it, taste it."

To a certain extent his perception of local thoughts was accurate. 11 people spontaneously associated nuclear power with atomic weapons, 15 people associated nuclear power with radiation, and a number of people also gave negative responses such as 'nervousness' and 'cancer'. It was interesting to note that 4 people shared Mr Alderman's assessment of public understanding.

"A lot of people think there's a lot of problems with it, but I don't think there are."
(F,45-59, working, mixed housing area)

"People are frightened of it because they don't know enough about it - they just hear the bad things like leukaemia clusters." (M, 45-59, working, post-war estate housing area)

However, while all the factors named by NIREX's representative were certainly amongst the things most commonly mentioned by local people, he did not mention the most frequent response - the simple association with Sellafield, nor did he anticipate the amount of people who viewed nuclear energy as a purely productive phenomenon.

BNFL made similar mistakes to NIREX in their anticipation of local feeling. They too expected

the public to associate nuclear power with negative concepts!

"Waste management has to be the most common concern, there are concerns about non-peaceful use, and the economical aspects of nuclear power - the cost of decommissioning, the cost of waste management."

Certainly the problem of military use for nuclear material (11 people) and that of waste management were mentioned, (10 people) but cost was only mentioned by one respondent who felt that early promises of cheap electricity had not been fulfilled. Like NIREX, BNFL had not anticipated the popularity of mundane and favourable responses.

CORE expected only an association with health problems.

"I think its the health damage that people initially think about in living near Sellafield"⁵¹

Although 12 people mentioned the question of safety in general, only four people mentioned cancer, and one person genetic defects, as a direct association with the industry. Like BNFL and NIREX, CORE appeared unaware of the mundane and favourable associations which the public hold towards nuclear energy. With only 5 people specifically mentioning health problems, it may be that CORE's perception of public concerns are becoming anachronistic as increasing doubts are cast over the Gardener report by the failed attempts of the Hope and Reay families to sue BNFL.

FoE Cockerthorpe seemed to be the group most in tune with the opinions of local people.

Their representative thought people associated nuclear energy with

"Chernobyl, the closure of the beaches, Sellafield itself, advertising campaigns, the visitors centre, work, risk, THORP, they might even think of NIREX."

FoE Cockerthorpe were thus the only group to mention the mundane associations with Sellafield itself, with THORP, work and the visitors centre, although even they did not mention the production of electricity. As well as mentioning risk, they were the only group to mention Chernobyl, and thus the only major response they omitted was the association with nuclear

⁵¹ It was interesting that although the question asked about nuclear power in general, CORE's representative redefined her answer to talk about Sellafield in particular. Perhaps the nature of CORE's work is so all consuming that they cannot think of nuclear power in any other terms.

weapons. Of all the things FoE Cockermouth mentioned, only the association with NIREX did not correspond to any public responses.

7.15.3 Respondents to the postal questionnaire

Chernobyl was by far the most common concept which the respondents to the postal questionnaire believed the public thought of when they heard the phrase nuclear power, with nearly three quarters of all postal respondents mentioning it. Other common responses were Three Mile Island; a clean source of electricity; nuclear weapons; radiation leaks; nuclear waste. Other responses mentioned by one or two groups were: Hiroshima; aesthetically unpleasing plants; Windscale; THORP; failed privatisation attempts; demonstrations; and peace since 1945. Like BNFL, NIREX and CORE, most respondents to the postal questionnaire omitted mundane associations, suggesting that they too are a public too caught up with the notion of 'controversy'.

7.15.4 Issues of central importance

By comparing the issues of most importance to the four campaigning groups, mentioned in section 7.1.5 above (NIREX - "Safe, clean, vital for the country"; BNFL - "Safety"; FoE - "That it is unnecessary"; CORE - "No expansion, but diversification.") with what the public spontaneously associated with the term 'nuclear energy', the groups could be assessed in terms of their relative success in driving home their most important message to the public. All could be seen to be successful to a certain extent. Safety, the clean nature of nuclear power, and the call to get rid of it were all mentioned by some sections of the sample. However, these were not overwhelmingly popular responses. Indeed, twice as many respondents said that nuclear energy meant jobs as they said they wanted rid of it, and more than twice as many associated nuclear power with pollution as named it as a clean and safe energy source.

7.15.5 Conclusions about spontaneous associations with the term 'nuclear power'

The most common associations with 'nuclear power' were mundane ones - Sellafield itself and the generation of electricity. Although risk, waste and pollution were mentioned by a considerable number of people, the prevalence of mundane associations casts doubt upon the wisdom of previous studies in focusing upon controversial issues when attempting to portray the state of local attitudes.

FoE Cockerthorpe clearly had a more accurate understanding of the minds of local people than any of the other three groups. Perhaps this is because they are based closest to the people involved in the survey, but surely it is also important that they were the group which talked to the general public in the street the most, and were also the only group who dealt exclusively with the West Cumbrian public whereas the other three had the distraction of national 'campaigning' to contend with.

The other organizations could be seen to have become locked in 'ivory towers', where, without meeting the public, the public information staff of BNFL and NIREX have been forced to defend the industry so often that they perceive all the public as critical, and CORE similarly, have tried to make the point about health so often they forget that there may be other associations with the industry. One must certainly begin to question the methods which these three groups use to measure the nature of local attitudes.

The mundane associations with 'nuclear power' were also underestimated by the respondents to the postal questionnaire. Given that these groups have conducted little original research into local opinion themselves, this may be a result of the tendency of both the media and academic research (upon which the beliefs of these groups may be based) to focus upon the more sensational or controversial aspects of the nuclear industry in West Cumbria.

7.16 Social Influences upon attitudes

It was important to discover whether factors such as gender and age affected the way people reacted to the nuclear industry. In order to do this, specific sub-groups were examined to see if there was any difference between their answers to the quantitative questions about the four local groups. The social composition of the significant non-respondents was also scrutinised.

7.16.1 Gender and attitudes (Figure 7.22)

Interest in the subject of the study appeared to vary between genders. Of the 48 significant non-respondents, 33 (69%) were women. That meant that of the original 85 women in the sample, 39% were significant non-respondents, compared to 20% of the original 74 men in the sample. This apparently higher level of interest amongst males may reflect stronger connections between male respondents and the predominantly male workforce at Sellafield, or it could reflect the less politicised status of females in the town. For whatever reason, of the 111 full respondents, 59 were male and 52 were female.

As in the findings of Macgill and Phipps, and Macgill, there was a large difference between the genders in terms of support for BNFL. Of the actual respondents 38 men (64%) said that their presence was a 'good thing', but only 23 women (44%) felt the same way. Correspondingly, 13 women (25%) said BNFL's presence was a bad thing, compared to only 7 men (12%) who said BNFL's presence was a bad thing.

Understanding of gender differences was increased by examining different attitudes to the other groups. Although overall support for NIREX was lower, the same gender division was apparent. 15 men (25%) said the presence of NIREX was a good thing, compared to 8 women (15%). It was interesting that a larger proportion of men (39%) said that NIREX's presence was a bad thing, compared to 16 women (31%). Given the large amount of 'don't knows' on this question, these apparently contradictory findings are perhaps explained by the idea that men may be more informed about the organization.

There was very little difference between genders in terms of support for FoE. Women seemed to be slightly more in favour. 43 men (73%) declared their presence in West Cumbria to be a 'good thing', as did 39 women (75%). There was a similar division in opposition to FoE, with 10 men (17%) and 8 women (15%) saying that their presence was a 'bad thing'.

Support for CORE was higher amongst men. 30 men (51%) said their presence was a good thing, compared to only 22 women (42%). 8 men (14%) opposed CORE's presence, but only 4 women (7%) did so. Again the theory of a tendency for women to say 'don't know' about a lesser known organization, rather than take a polemical stance, may explain this contradiction.

7.16.2 Age and attitudes (Figure 7.23)

In accordance with the census figures, the overall sample consisted of 36 people aged 15-29 years, 44 people aged 30-44, 34 people aged 45-59, 30 people aged 60-74 and 15 people aged over 75. As Figure 7.23 shows, the proportion of significant non-respondents in each age group was far highest amongst the most senior respondents. The lowest was amongst the 30-44 age group. With significant non-respondents discounted, the age groupings of respondents were as displayed in Table 7.18 below. The number of respondents aged over

Table 7.18 Age groups of actual respondents, 1994

Age	Number of Respondents
15-29	30
30-44	38
45-59	27
60-74	12
75+	4
Total	111

Figure 7.22 Gender and West Cumbrian attitudes, 1994

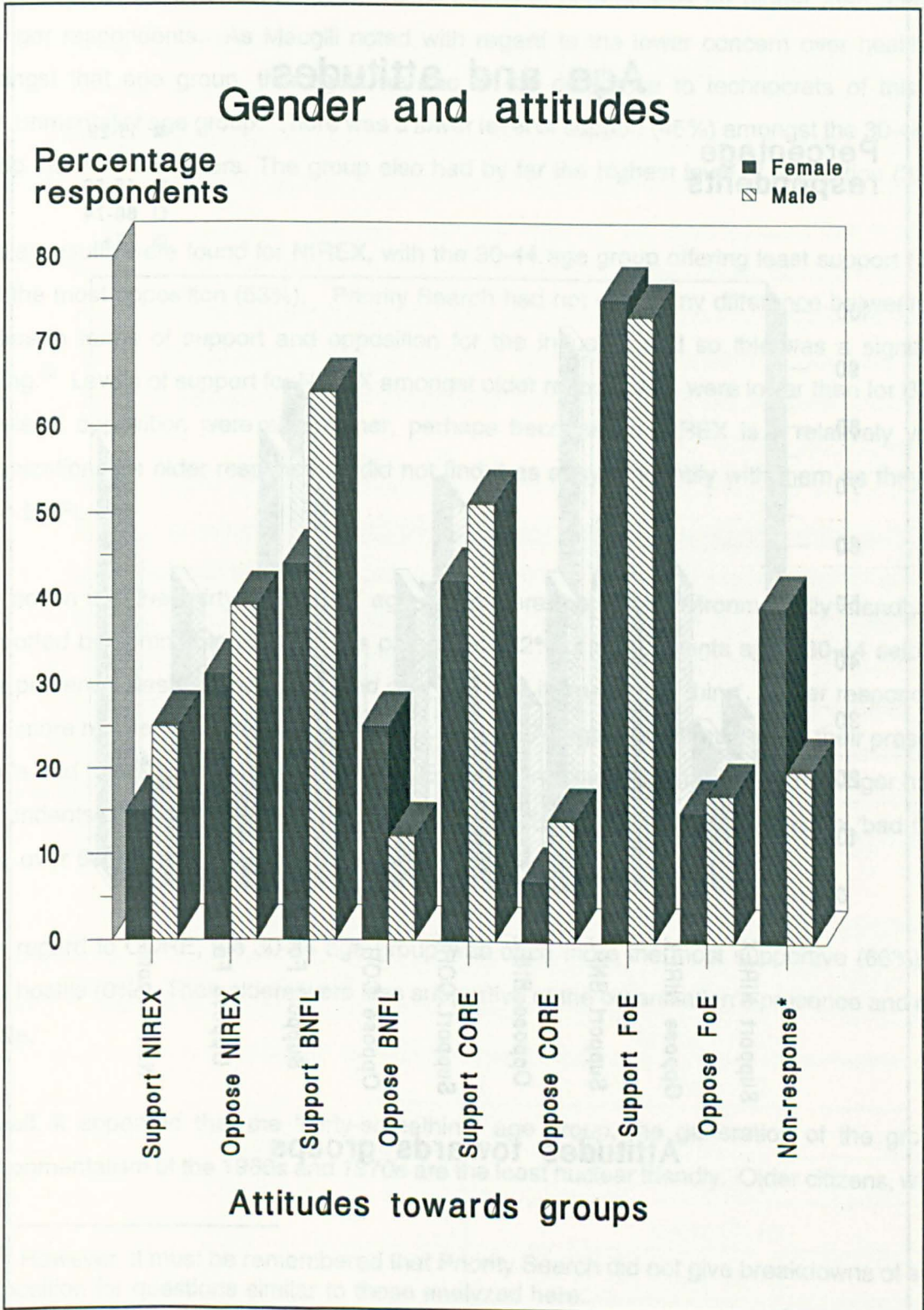
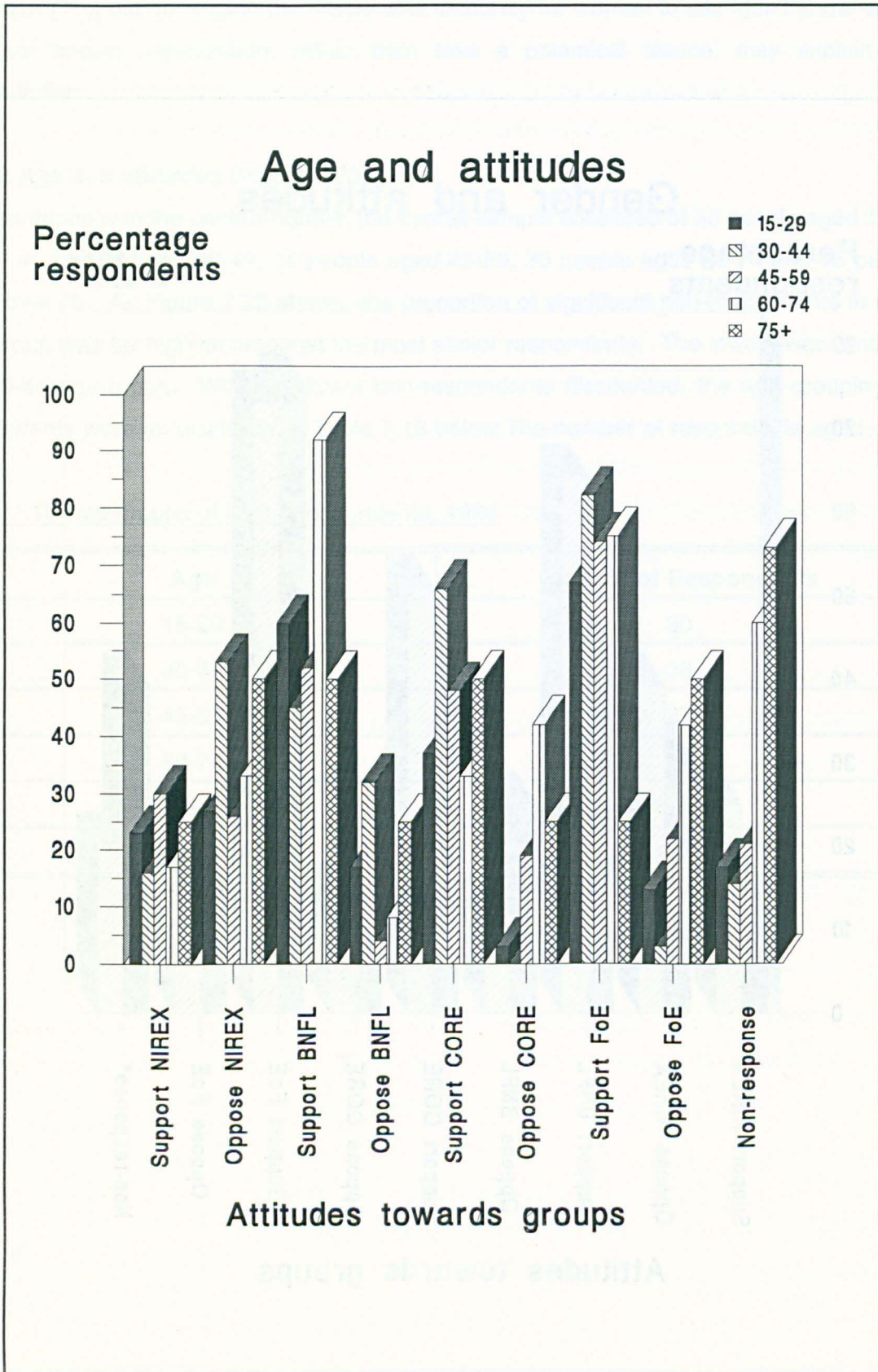


Figure 7.23 Age and West Cumbrian attitudes, 1994



75 is too small to be statistically significant, but the proportion of each sub-population making unequivocal comments about the presence of each of the four groups is still displayed.

Support for BNFL amongst the older respondents in general was far higher than amongst younger respondents. As Macgill noted with regard to the lower concern over health risk amongst that age group, this could be due to the deference to technocrats of this pre-environmentalist age group. There was a lower level of support (45%) amongst the 30-44 age group than for any others. The group also had by far the highest level of opposition (32%).

Similar results were found for NIREX, with the 30-44 age group offering least support (16%) and the most opposition (53%). Priority Search had not noted any difference between age groups in terms of support and opposition for the industry, and so this was a significant finding.⁵² Levels of support for NIREX amongst older respondents were lower than for BNFL. Levels of opposition were also higher, perhaps because as NIREX is a relatively young organization, the older respondents did not find it as easy to identify with them as they had done BNFL.

The notion that the 'thirty something' age group were the most environmentally friendly was supported by comments about FoE's presence. 82% of respondents aged 30-44 said that their presence was 'a good thing', and only 2% said it was 'a bad thing'. Older respondents were more hostile to FoE's presence (42% of the 60-74 age group thought that their presence was 'a bad thing'). Overall, support for FoE was more common amongst the younger half of respondents. Nearly half the respondents who said that FoE's presence was a 'bad thing' were over 59 years old.

With regard to CORE, the 30-44 age group was once more the most supportive (66%) and least hostile (0%). Their elders were less supportive of the organization's presence and more hostile.

Overall, it appeared that the 'thirty-something' age group, the generation of the growing environmentalism of the 1960s and 1970s are the least nuclear friendly. Older citizens, whose

⁵² However, it must be remembered that Priority Search did not give breakdowns of social composition for questions similar to those analyzed here.

attitudes may have been formed in the post-war decades of optimism for the industry, are the most intensely nuclear-friendly, and the most hostile to anti-nuclear groups.

The NIREX representative had commented that, possibly as a result of the emphasis on youth, education and participation in the industry's public relations work since the 1980s

"I think perhaps as our education has progressed you'll find the younger generation are better informed than the older generation."

To an extent this may be seen to be true, for the very youngest age group, who have been those most exposed to the industry's educational campaigns of the last decade, were less hostile to the industry than the 'thirtysomethings'. However, although the industry finds it easier than its opponents to campaign in schools, young people were evidently receiving anti-nuclear messages from other sources. The youngest age group were not as supportive of the industry as the more senior respondents. Perhaps as time progresses, the local population will become less and less supportive of the industry, for demographic reasons as much as any sudden political cause.

7.16.3 Length of residency in West Cumbria and attitudes (Figure 7.24)

Overall, 5 members of the sample had resided in West Cumbria for less than two years; 12 for between 2 and 5 years; 10 between 6 and 10 years; 30 between 11 and 20 years; 29 between 21 and 30 years; 23 between 31 and 40 years; and 50 respondents had lived in the area for more than 40 years. Tying in with the fact that over half of significant non-respondents were over 60, over half of the significant non-respondents had resided in West Cumbria for over 40 years. The numbers of actual respondents having lived in the area for different periods of time was as set out in Table 7.19 below.

Table 7.19 Length of residency in West Cumbria of actual respondents, 1994

Length of time in W. Cumbria	Number of respondents
Under 2 years	4
2-5 years	7
6-10 years	8
11-20 years	24
21-30 years	24
31-40 years	19

Length of time in W. Cumbria	Number of respondents
Over 40 years	25
Total	111

Although the numbers in this analysis cannot be looked upon as large enough to be statistically significant, support for BNFL was highest amongst two groups: those who had only recently moved to the area, and amongst those who had lived there the longest. Levels of opposition were lowest amongst the more recent arrivals.

A different pattern of support was found for NIREX. Support was highest amongst the more recent arrivals in the county, and lowest amongst those who had lived in the area for longer periods. Similarly, opposition was lowest amongst those who had lived in the area less than two years, and highest amongst those who had lived in the area over 40 years.

Lowest levels of support for FoE were found amongst those who had lived in West Cumbria for more than 20 years. Opposition to CORE was highest amongst people who had lived in the area longest. There was a relative absence of support for CORE amongst newer arrivals. This perhaps reflects a lack of knowledge about the group.

Overall, people who have very recently arrived in West Cumbria were more supportive of both BNFL and NIREX than people who had lived in the area for a longer period. High levels of support for BNFL (but significantly, not for NIREX) were also found amongst people who had resided in West Cumbria for over 40 years.

Explanations for these discoveries might be found in the idea that newer arrivals had had less time to become politicized in the nuclear debate and therefore opposed different groups less than other respondents. The patterns of response for those inhabitants of over 40 years standing may be more attributable to their age than because of their pattern of residence.

Figure 7.24 Length of residency in West Cumbria and West Cumbrian attitudes, 1994

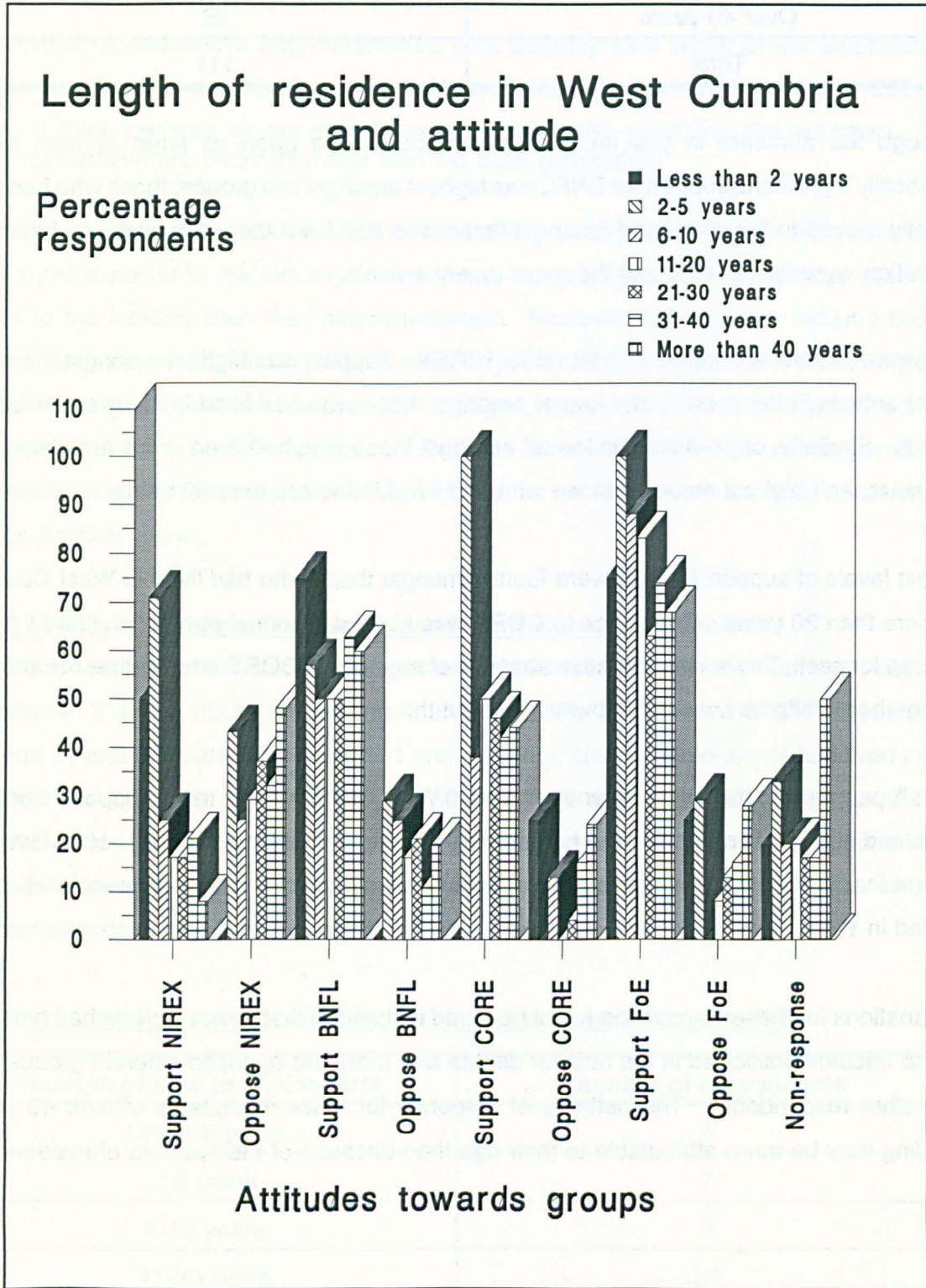
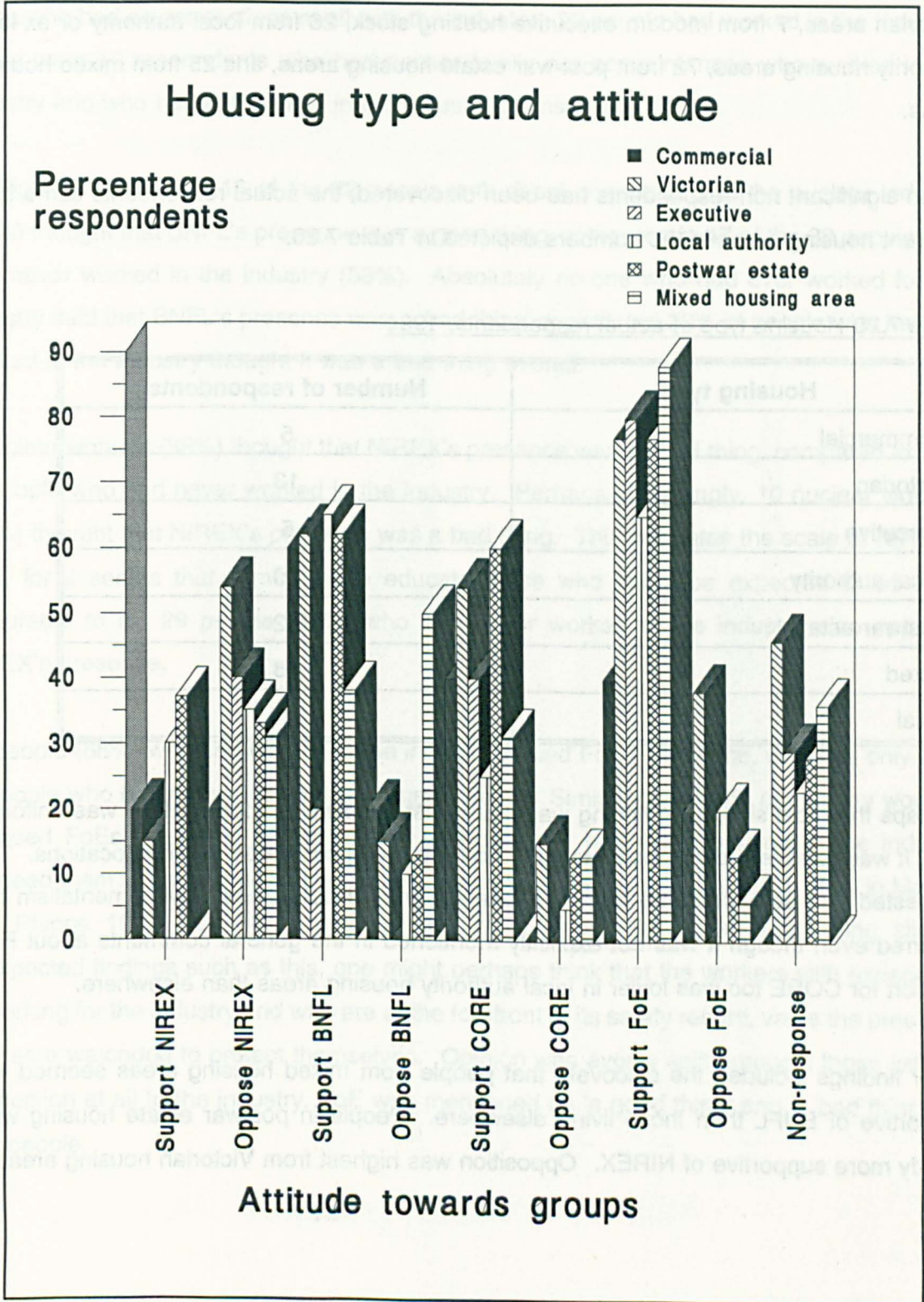


Figure 7.25 Housing type and West Cumbrian attitudes, 1994



7.16.4 Housing type and attitude (Figure 7.25)

In order to give a fair representation of the different housing types in Cockermouth, 5 members of the sample came from commercial areas of town, 24 from predominantly Victorian areas, 7 from modern executive housing stock, 26 from local authority or ex-local authority housing areas, 72 from post-war estate housing areas, and 25 from mixed housing areas.

When significant non-respondents had been discovered, the actual respondents came from different housing areas in the numbers depicted in Table 7.20.

Table 7.20 Housing type of actual respondents, 1994

Housing type	Number of respondents
Commercial	5
Victorian	13
Executive	5
Local authority	20
Postwar estate	52
Mixed	16
Total	111

Perhaps the most significant finding was that whilst absolute support for FoE was uniformly high, it was relatively low in local authority housing areas compared to other locations. This suggested that perhaps some form of alienation from 'middle class' environmentalism had occurred even though it was not explicitly mentioned in the general comments about FoE. Support for CORE too was lower in local authority housing areas than elsewhere.

Other findings included the discovery that people from mixed housing areas seemed less supportive of BNFL than those living elsewhere. People in postwar estate housing were slightly more supportive of NIREX. Opposition was highest from Victorian housing areas.

7.16.5 Links with BNFL and attitudes (Figure 7.26)

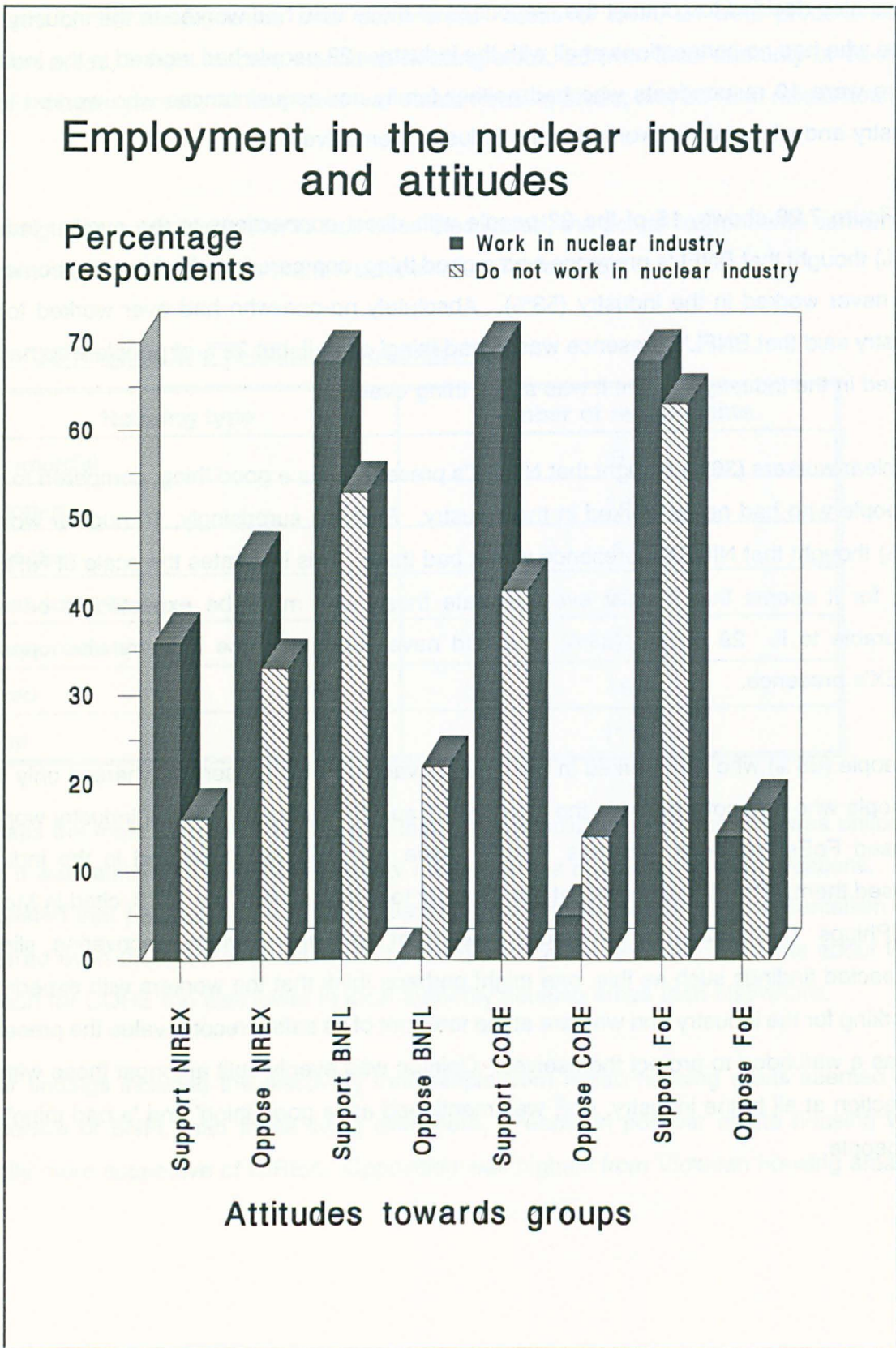
It was also decided to contrast the responses of those who had worked in the industry, and those who had no connections at all with the industry. 22 people had worked in the industry. There were 10 respondents who had neither family nor acquaintances who worked in the industry and who had not worked in the industry themselves.

As Figure 7.26 shows, 15 of the 22 people with direct connections to the nuclear industry (68%) thought that BNFL's presence was a good thing, compared to 47 of the 89 people who had never worked in the industry (53%). Absolutely no-one who had ever worked for the industry said that BNFL's presence was 'a bad thing' overall, but 22% of people who had not worked in the industry thought it was a bad thing overall.

8 nuclear workers (36%) thought that NIREX's presence was a good thing, compared to 16% of people who had never worked in the industry. Perhaps surprisingly, 10 nuclear workers (45%) thought that NIREX's presence was a bad thing. This illustrates the scale of NIREX's task, for it seems that it must even educate those who might be expected to be most favourable to it. 29 people (33%) who had never worked in the industry also opposed NIREX's presence.

15 people (68%) who had worked in the industry valued FoE's presence, whereas only 63% of people who had not worked in the industry did so. Similarly only 14% of industry workers opposed FoE's presence, whereas 17% of those who had never worked in the industry opposed them. These findings might run contrary to expectations (Lee 1983, cited in Macgill and Phipps 1987, 222-24). Although one must be careful when discovering slightly unexpected findings such as this, one might perhaps think that the workers with experience of working for the industry and who are at the forefront of its safety record, value the presence of FoE as a watchdog to protect themselves. Opinion was evenly split amongst those with no connection at all to the industry. FoE was mentioned as 'a good thing' and 'a bad thing' by four people.

Figure 7.26 Employment in the nuclear industry and West Cumbrian attitudes, 1994



15 nuclear workers (69%) thought that CORE's presence was a good thing. 37 (42%) of those who did not work in the industry thought likewise. The difference in these levels may be a result of nuclear workers grater familiarity with CORE, and of their importance as a watchdog to protect them from their employers.

7.16.6 Conclusions about the social composition of response

There appear to be four areas in which social factors have a close correlation to quantitative response types. Males, with a closer relationship to the Sellafield workforce, are more supportive of the industry than women. Overall, they are also more politicized than women. Older respondents are more pro-nuclear, and pro-BNFL in particular, than their juniors, with the generation that grew up in the 1960s and 1970s the 'greenest' of all. Newcomers to the county are least politicized, whilst some people from local authority housing areas appear alienated from the green cause.

7.17 The political implications

7.17.1 Introduction

From the point of view of a student of politics, perhaps the most important issue in the survey was how respondents' attitudes translated into political action. It was possible to measure political activity at several different levels, beginning with participation in the survey itself, and moving on to examine passive interest in nuclear power, the actions which people had taken in support of their views on nuclear power, the reasons why some people did not take any such action, and finally, the effect of the issue on voting intentions.

7.17.2 Non-Response

Voicing one's opinions to a stranger on one's doorstep may be seen to be a political action, as people will almost certainly be aware that those responses will later be analyzed and any conclusions may become evidence upon which later public policy is formed. To take part in a survey is to make sure that one's voice is represented in the political debate. As was outlined at the outset of this chapter, only 111 out of the 158 people in the sample had the motivation to participate in a survey on nuclear power, and it seemed that most of the 48 non-respondents were apathetic to the issue.

7.17.3 Passive interest

At a passive level of participation, a level of observing rather than contributing to the debate, participation levels were high, just as had been found in earlier studies.

Respondents were asked a number of questions. They were

"Have you ever watched any TV programmes or films on nuclear issues?"

"Have you ever heard any radio programmes on nuclear issues? If so, can you name them?"

"Have you ever been to Sellafield?"

"Have you ever talked to family and friends about issues related to nuclear power?"

Figure 7.27 shows how 84 respondents said they had been to Sellafield and only 27 had not. These figures represent substantial interest in the activities of BNFL, if only at a level of observing their activities rather than trying to affect them.

As Figure 7.28 shows, 81 respondents had talked to family and friends about issues related to nuclear power. 30 had not. Again this can be seen to be evidence that at a non-

Figure 7.27 Proportion of respondents in the 1994 survey who had visited Sellafield

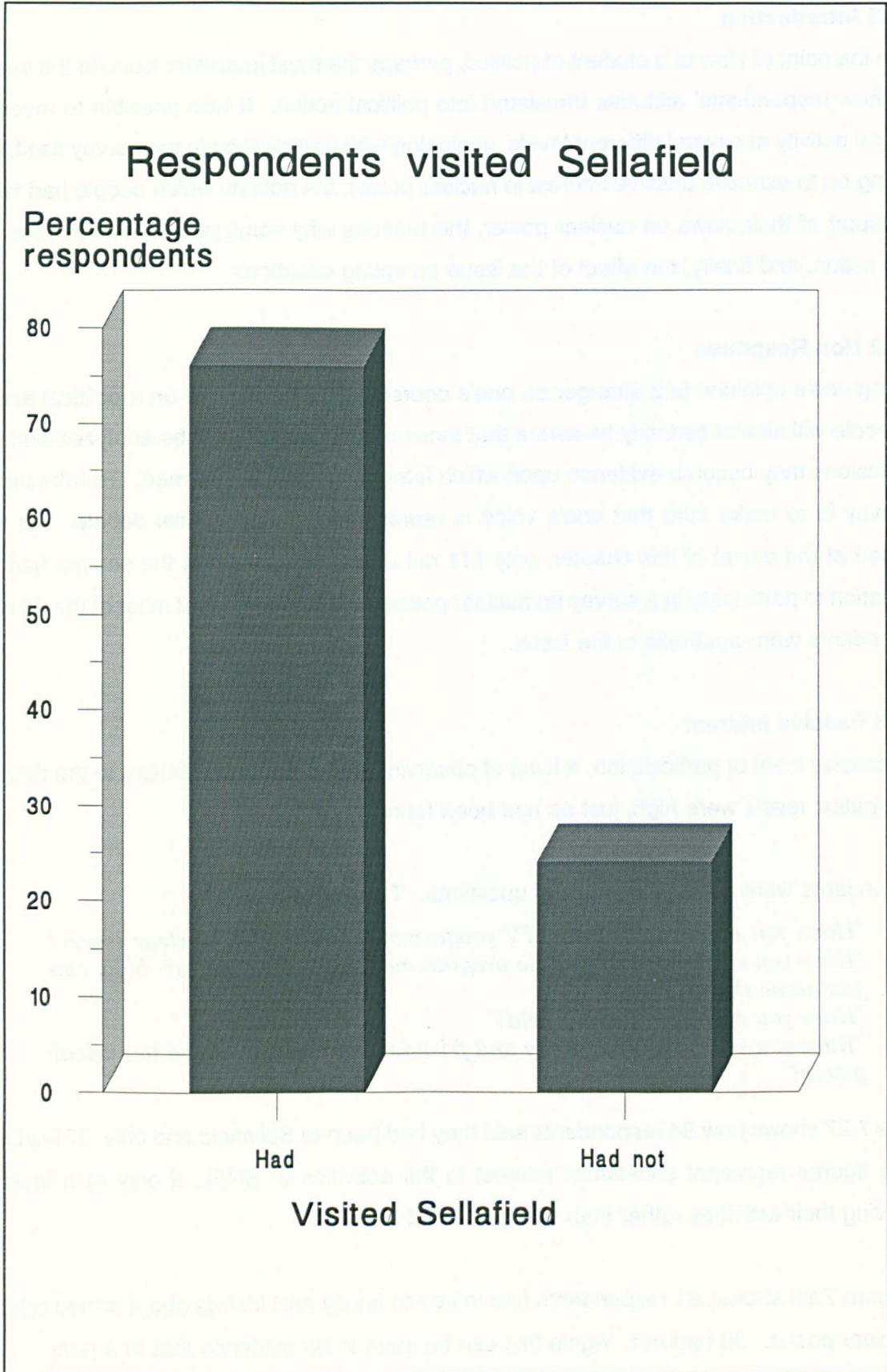
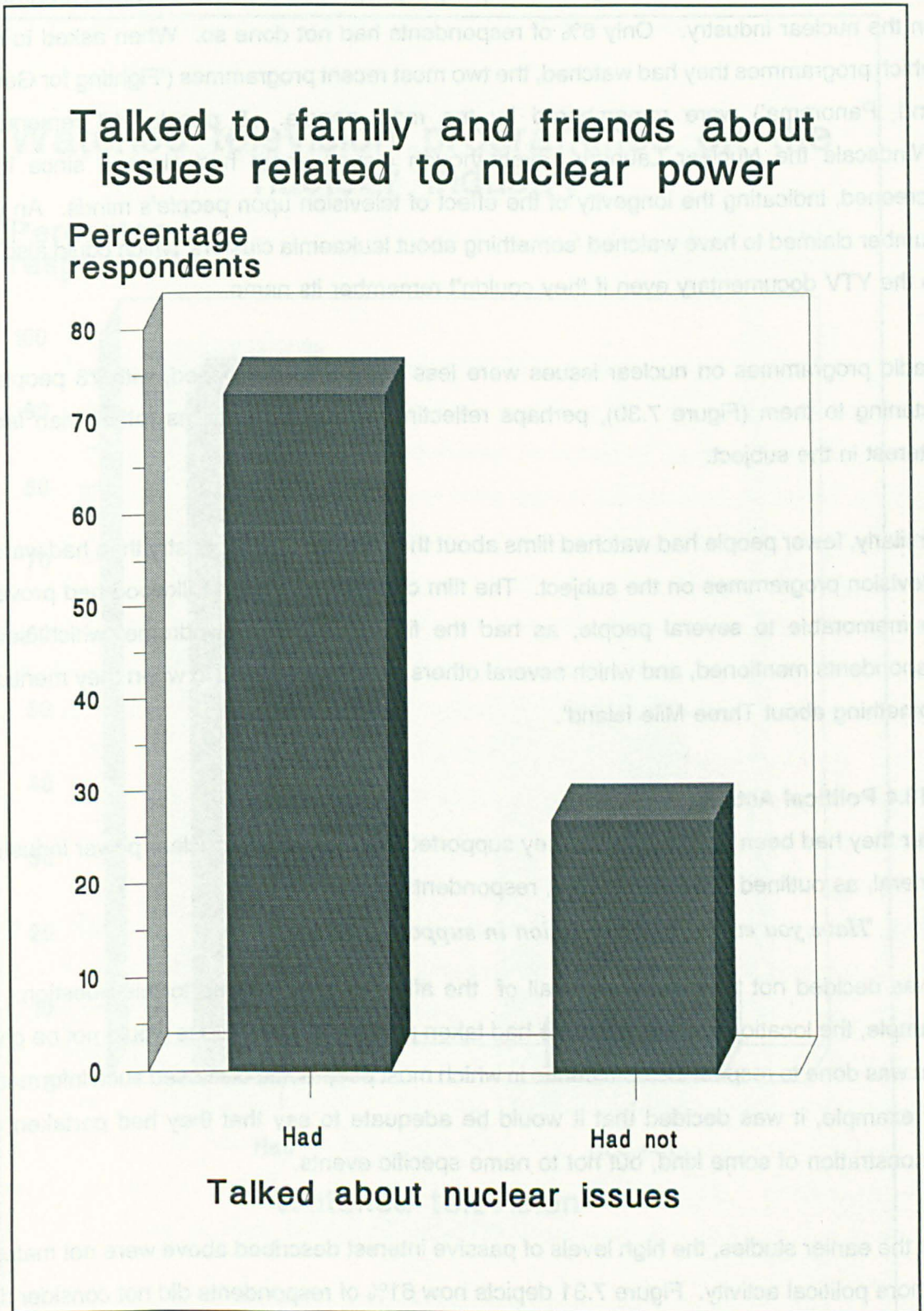


Figure 7.28 Proportion of respondents in the 1994 survey who had spoken to relatives and friends about nuclear power



campaigning level, interest in nuclear power is high amongst local people. It also contradicts the idea that nuclear power was 'not much talked about' which ERM had suggested.

As Figure 7.29 shows, an even greater majority of people had watched television programmes on the nuclear industry. Only 8% of respondents had not done so. When asked to name which programmes they had watched, the two most recent programmes ('Fighting for Gemma' and 'Panorama') were remembered by the most people. 5 people still remembered 'Windscale the Nuclear Laundry', even though eleven years had elapsed since it was screened, indicating the longevity of the effect of television upon people's minds. An equal number claimed to have watched 'something about leukaemia clusters' which could also refer to the YTV documentary even if they couldn't remember its name.

Radio programmes on nuclear issues were less commonly mentioned, with 73 people not listening to them (Figure 7.30), perhaps reflecting media use patterns rather than lack of interest in the subject.

Similarly, fewer people had watched films about the nuclear power industry than had watched television programmes on the subject. The film of the life of Karen Silkwood had proven to be memorable to several people, as had the film 'The China Syndrome' which several respondents mentioned, and which several others probably referred to when they mentioned 'something about Three Mile Island'.

7.18.4 Political Activity

After they had been asked whether they supported or opposed the nuclear power industry in general, as outlined in section 7.15.4, respondents were asked,

"Have you ever taken any action in support of that opinion?"

It was decided not to go into full detail of the affirmative responses to this question. For example, the locations at which people had taken part in demonstrations would not be given. This was done to respect the confidence in which most people had disclosed such information. For example, it was decided that it would be adequate to say that they had partaken in a demonstration of some kind, but not to name specific events.

Like the earlier studies, the high levels of passive interest described above were not matched by more political activity. Figure 7.31 depicts how 61% of respondents did not consider that

Figure 7.29 Proportion of respondents in the 1994 survey who had watched television programmes on the nuclear industry

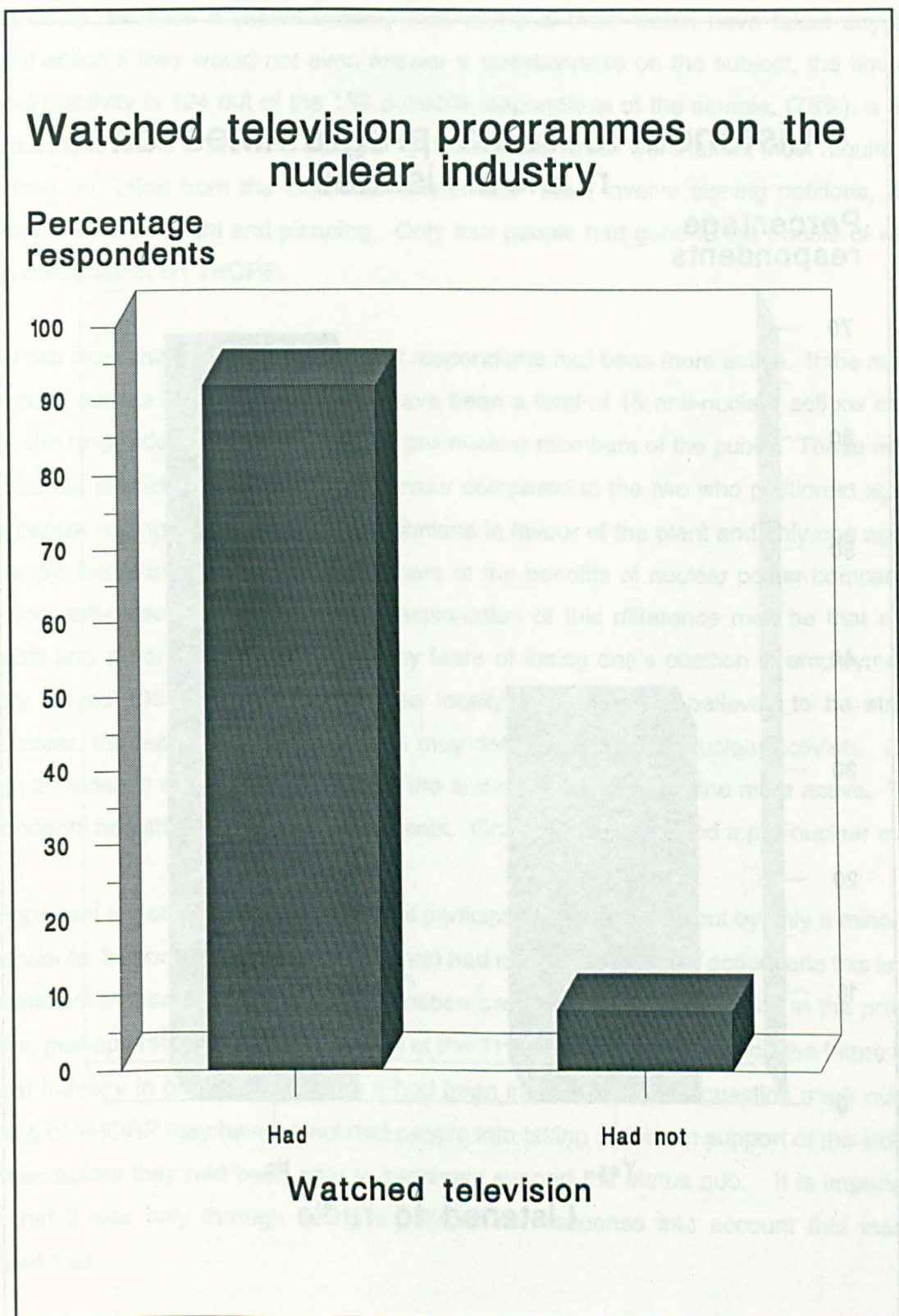
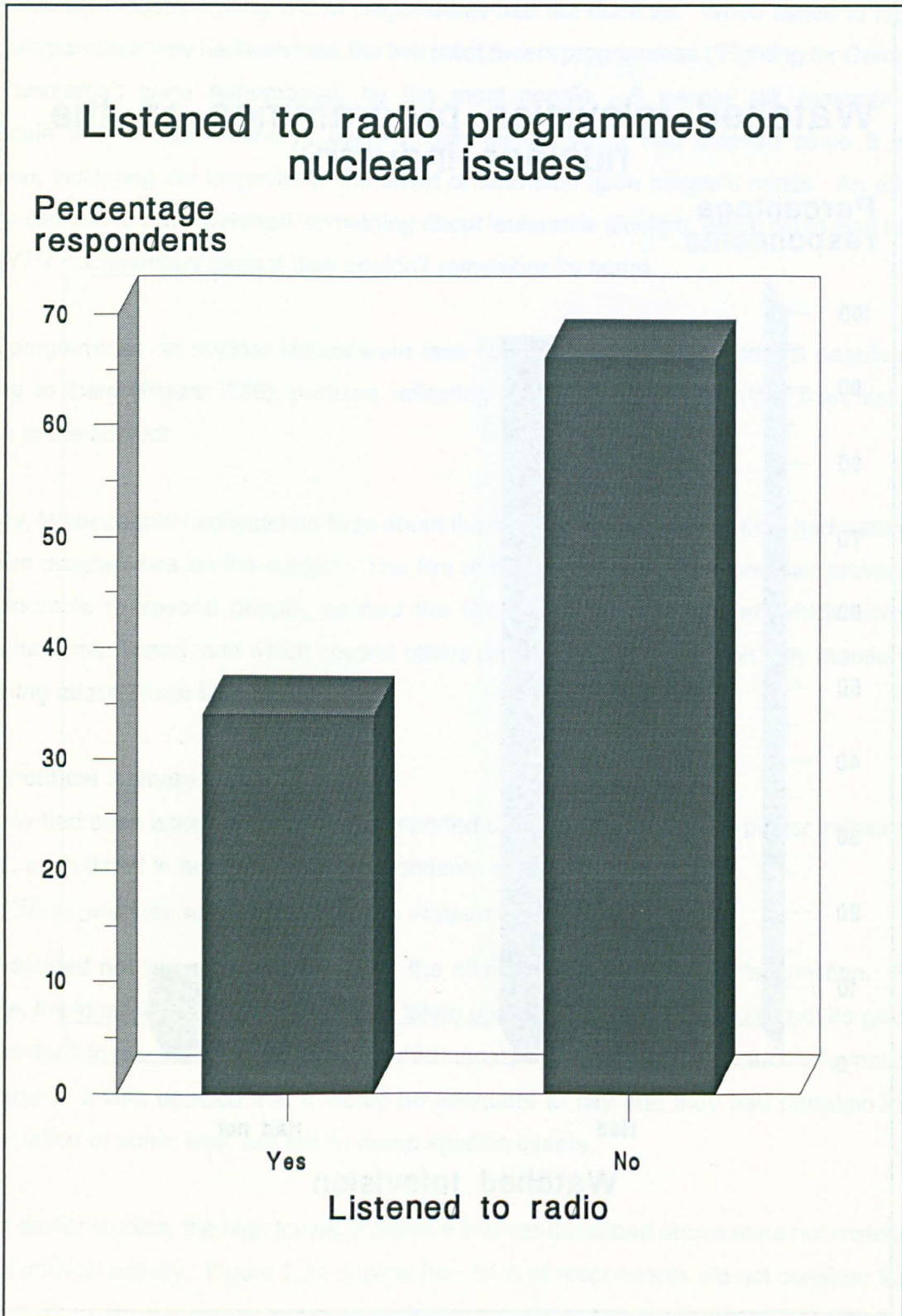


Figure 7.30 Proportion of respondents in the 1994 survey who listened to radio programmes in the nuclear industry

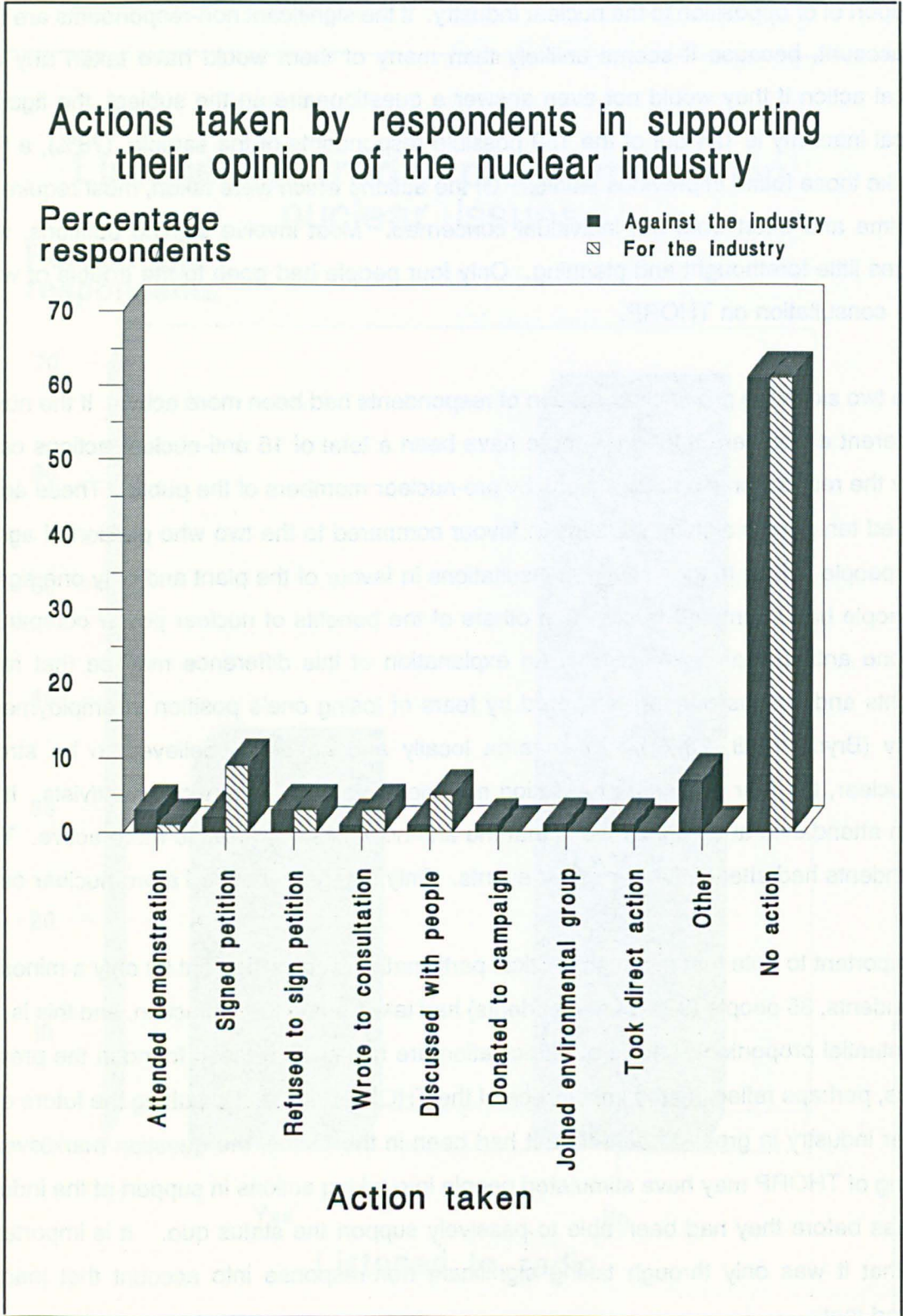


they had made any contribution to the debate in response to their views on the subject. A further eight respondents did not take any action because they did not have an opinion either in support of or opposition to the nuclear industry. If the significant non-respondents are taken into account, because it seems unlikely than many of them would have taken any other political action if they would not even answer a questionnaire on the subject, the figure for political inactivity is 124 out of the 159 possible respondents of the sample, (78%), a figure very like those found in previous studies. Of the actions which were taken, most require very little time and effort from the individual concerned. Most involve signing petitions, which requires little forethought and planning. Only four people had gone to the trouble of writing to the consultation on THORP.

Of the two sides the pro-nuclear section of respondents had been more active. If the number of different actions are added up, there have been a total of 15 anti-nuclear actions carried out by the respondents and 25 actions by pro-nuclear members of the public. These actions included ten people signing petitions in favour compared to the two who petitioned against, three people writing to the THORP consultations in favour of the plant and only one against. Six people had attempted to convince others of the benefits of nuclear power compared to only one anti-nuclear polemicist. An explanation of this difference may be that radical thoughts and actions may be tempered by fears of losing one's position in employment or society (Bryce 1988, 73-74). In an area locally and nationally believed to be strongly pro-nuclear, the fear of popular retaliation may deter potential anti-nuclear activists. It was only in attendance at demonstrations that the anti-nuclear side were the more active. Three respondents had attended anti-nuclear events. Only one had attended a pro-nuclear event.

It is important to note that although political participation was carried out by only a minority of respondents, 35 people (32% of respondents) had taken some form of action, and this is quite a substantial proportion. Levels of participation are higher than those found in the previous studies, perhaps reflecting the importance of the THORP debate. By putting the future of the nuclear industry in greater doubt than it had been in the 1980s, the question mark over the opening of THORP may have stimulated people into taking actions in support of the industry, whereas before they had been able to passively support the status quo. It is important to note that it was only through taking significant non-response into account that inactivity mirrored that

Figure 7.31 Action taken by West Cumbrians because of their views on nuclear power, 1994



found in earlier research. Without that factor (which was not included in earlier studies), the 1994 levels of political activity do seem to be slightly higher.

In order to understand what was, nevertheless, widespread apathy, respondents who had not taken any action were asked

"If not, why not?"

The responses are shown in Table 7.21 below

Table 7.21 Reasons for political inactivity, 1994

Reason	Frequency (%)
Not applicable (did take action)	35 (32%)
Don't feel strongly enough	19 (17%)
Never been asked to	11 (10%)
My actions aren't needed - it will survive	7 (6%)
Lazy	6 (5%)
No reason	6 (5%)
Never get involved in that sort of thing	6 (5%)
Too old	6 (5%)
I don't want confrontation	6 (5%)
No time	5 (4%)
I couldn't change anything	5 (4%)
You have to travel	4 (3%)
My (non nuclear) job says I can't	2 (2%)
Family/friends work there	2 (2%)
Didn't know there was anything I could do	2 (2%)
Not confident enough of own knowledge	2 (2%)
I used to work there	1 (1%)
I work there	1 (1%)
Total responses	126

It has been argued that taking practical political action on an issue requires sacrifice of time and effort, and that for most people an issue must reach a critical point of 'cognitive dissonance' before opinions and attitudes become translated into physical actions (Best 1973, 18-19). The above comments show that for most of the population of the sample, the issue of nuclear power is not felt to have a large enough bearing upon their everyday lives. 19 people said outright that the subject was not something about which they felt strongly enough to galvanise them into action.

"I live with it, as a fact of everyday life in West Cumbria."
(M, 15-29, working, modern executive housing area).

There were also a further 12 who either confessed laziness or said that there was no particular reason for their inactivity.

Perhaps many local people would only reach the stage of repeated action if there was a major disaster there, or if the threat of closure became real. Perhaps for towns nearer to Sellafield and Gosforth the industry is more important and levels of political activity will correspondingly be higher, but, likewise, the further to the East one moves in the county, one might expect levels of political activity to fall even from the levels of the sample of the population of Cockermouth.

As in Macgill and Phipps' and ERM's findings, feelings of impotence are another factor in people's justification for inactivity. Several respondents said that personal sacrifice of time and effort would be for nought.

"I don't believe pressure groups either against it or in favour of it have any say, its all a government political decision."
(M, 15-29, working, modern executive housing area).

"What's the use? Look at all the action they took against THORP and it's still going ahead."
(M, 30-44, working, local authority housing area).

"It's a big organization, the government's behind it - what are people going to say or do ... There's been billions spent on the place and if for example they want to open THORP, they will open THORP. Nothing you can do will change that, and at the end of the day we're not taking on BNFL, you're taking on the government, and they won't listen, not when exorbitant sums have been spent there."
(M, 30-44, working, mixed housing area).

"There's nothing you can do about it, just hope they make it as safe as possible"

(F, 45-59, working, post-war estate housing area).

Perhaps most dramatic reason given for inactivity came from a person who used to be a member of Friends of The Earth who said that they took no further action because,

"I'm scared, I want to live" after "dealing with the big boys."
(M, 30-44, working, predominately Victorian housing area)

Employment and personal reasons also played a part in justifying inactivity, but only for a couple of respondents. A woman whose husband worked there said

"I wouldn't dare [take any action] for the sake of a happy marriage!"
(F, 30-44, not currently seeking employment, Local Authority housing area).

Another factor may be the political culture of Britain, which has no strong tradition of popular political protest. Britain's political culture appears to be one of leaving the business of politics to professional politicians instead (Davies 1985, 22). The delays to the nuclear programme in the 1970s and 1980s which helped asphyxiate anti-nuclear protest from growing in Britain as it had in mainland Europe, meant that there is no popular 'anti-nuclear culture' here either.

There seems to be little popular conception of the debate as something too technical for local people to be involved in. Only 2 respondents said that their own level of knowledge discouraged them from participation.

It is perhaps unwise to read too much into the responses to this question. Respondents may have distorted the truth by offering exaggerated excuses rather than the true reasons for their inactivity, especially if they feel that they ought to have done something, but have just never got around to it. They might also have given distorted responses if the very act of talking about the subject of nuclear power had made them think that perhaps they ought to do something. Those 11 people saying they hadn't been asked to be involved are perhaps classic examples of this, blaming someone else for their inactivity. Perhaps more respondents, if they were truly honest would admit that they simply did not feel nuclear power to be an important enough issue in their everyday lives to cause them to take action.

7.18.5 The party-political implications of local opinion

Respondents were asked about the importance of nuclear power as a possible factor in deciding which way they would vote. The question put to them was

"Would nuclear power be an important issue in deciding which way you vote?"

As Figure 7.32 shows, 24% said it would, but 76% said it would not. These results once more support the notion of a relative lack of importance of the nuclear issue to local respondents. The 24% who said yes is not only a minority, but must also be viewed with reference to the fact that some of these respondents might, by the very act of answering the questionnaire itself, have been stimulated into thinking that nuclear power was perhaps an issue about which they ought to care more strongly.

It must also be remembered that there is no indication of how important the issue is compared to other issues. The respondents who said that nuclear power was an important voting issue might not have seen it as an important issue if they were given a list which included subjects, such as unemployment, inflation, the health service, and social security as well as nuclear power, and were asked to name the more important ones which determined their voting allegiances. Some indication is given though, that to West Cumbrians, nuclear power is more important than it is to the national public, because the 24% who declared that it was an important factor in their voting intentions is over twice as many as the proportion of people who claimed to have voted on environmental issues in Gallup's national survey.

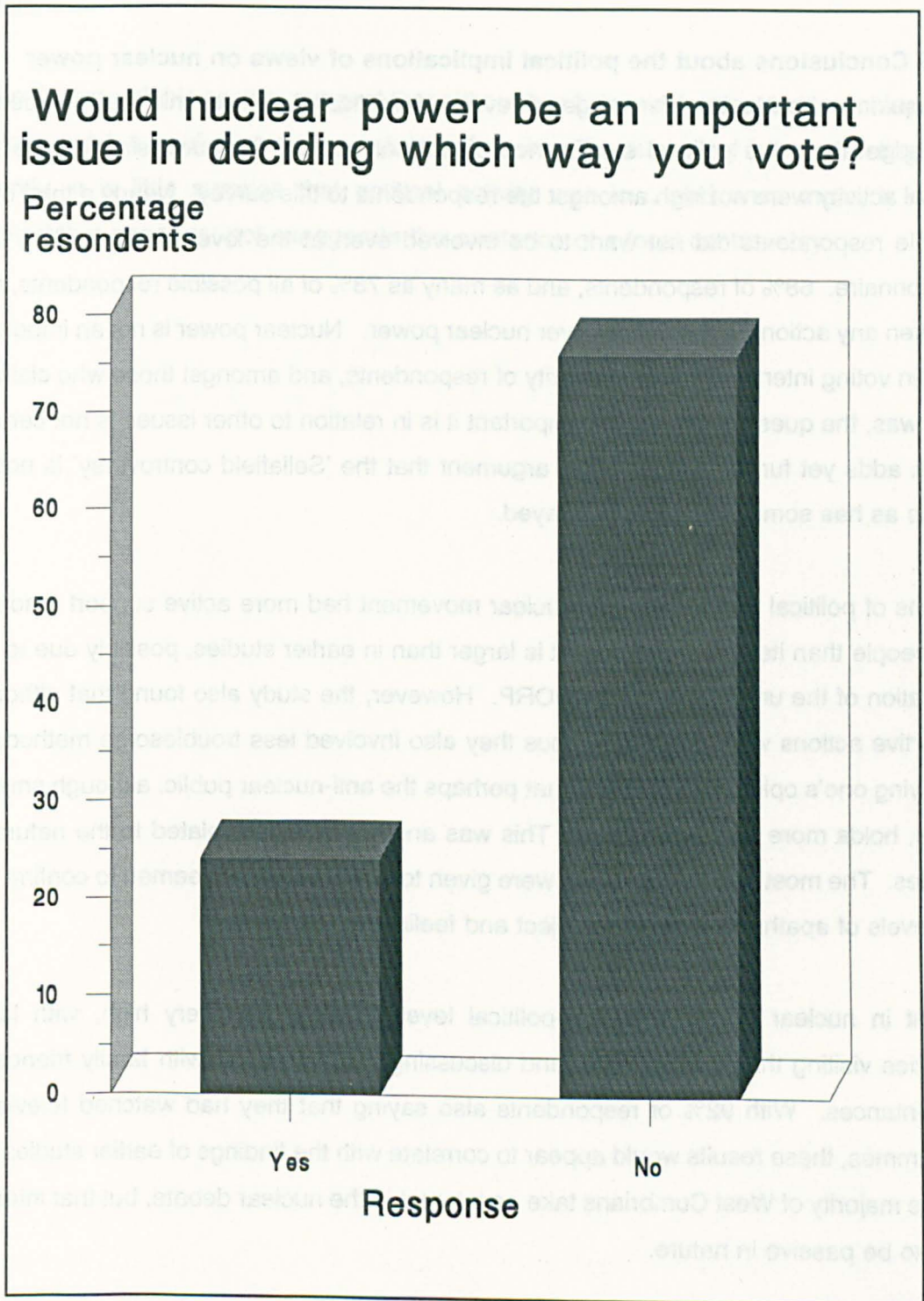
The four local groups were asked for their perceptions of the political importance of nuclear power. NIREX and BNFL appear to have been correct when they said that it wasn't a matter of great political importance.

NIREX - "It is to the nuclear industry but I don't think it is in general. Nationally I don't think it's a great political issue at all."

BNFL - "in general political terms it's important... but it's not high on the political agenda."

CORE seem to be mistaken in their belief that "locally, because of the economic benefits and disbenefits then yes it is important." This response, like some of CORE's earlier comments, shows them to be slightly out of touch with what local opinion actually is.

Figure 7.32 Voting implications of views on nuclear power, 1994



FoE supported the notion that it was important for some local people, and were probably more accurate than CORE in mentioning that - "I think it is an issue, not for most people but for a significant number."

7.17.6 Conclusions about the political implications of views on nuclear power

By enquiring about a broader range of levels of political activities, this study added to knowledge about the political significance of nuclear power. To put it simply, levels of political activity were not high amongst the respondents to this survey. Nearly a third of all possible respondents did not want to be involved even at the level of responding to a questionnaire. 68% of respondents, and as many as 78% of all possible respondents, had not taken any actions in the debate over nuclear power. Nuclear power is not an important factor in voting intentions for the majority of respondents, and amongst those who claimed that it was, the question of just how important it is in relation to other issues is not certain. All this adds yet further height to the argument that the 'Sellafield controversy' is not as intense as has sometimes been portrayed.

In terms of political activity, the pro-nuclear movement had more active support amongst local people than its opponents, and it is larger than in earlier studies, possibly due to the stimulation of the uncertainty over THORP. However, the study also found that although supportive actions were more numerous they also involved less troublesome methods of conveying one's opinion, suggesting that perhaps the anti-nuclear public, although smaller in size, holds more intense feelings. This was another new find related to the nature of attitudes. The most common reasons were given to justify inactivity seemed to confirm the high levels of apathy towards the subject and feelings of impotence.

Interest in nuclear power at a non-political level however was very high, with large majorities visiting the Sellafield site, and discussing nuclear power with family friends or acquaintances. With 92% of respondents also saying that they had watched television programmes, these results would appear to correlate with the findings of earlier studies i.e. that the majority of West Cumbrians take an interest in the nuclear debate, but that interest tends to be passive in nature.

Once more it was FoE who understood local feeling best of the four local groups, reaffirming the importance of direct contact and local campaigning in understanding one's target public.

Overall, the findings of this section suggest that although substantial interest in the nuclear industry does exist, it is of a mundane nature rather than the subject of intense feeling. Consequently, it is little surprise that political activity was low, and once more, it is demonstrated that one must not exaggerate the existence of a local controversy.

Chapter Eight

Conclusions

8.1 Introduction

In some ways, the true nature of public opinion towards nuclear power has been an enigma. For many years the attitude of the general public was relatively neglected. When, in recent years, public attitudes have been examined, both the nuclear industry and its opponents have been able to claim that popular feeling is on their side. This research aimed to investigate the true nature of West Cumbrian opinion in 1994 and the different factors which might have shaped that opinion. Many important findings were made regarding the historical and socio-economic context within which views were formed, and after attempting to improve the methodology of fieldwork, many additions were made to the body of knowledge regarding the nature of West Cumbrian support and opposition towards the nuclear industry.

8.2 Important contextual factors

To understand the nature of public attitudes towards nuclear power, one must have an insight into the chequered history of that industry. Such an insight should ideally be based upon a comprehensive understanding of all aspects of the industry's development, and not be based upon a polemical or one-dimensional account of the industry's development. This study sought to include such an objective account, and it revealed the importance of the following factors. One must understand how in Britain the nuclear power industry began as one of the world's leaders in developing a utopian energy source for the future, a fuel which would not only serve to provide energy for the for the nation, but which would also provide revenue through construction, energy generation, development and reprocessing, and would also provide a nuclear deterrent for national defence purposes. One must remember the environmental advantages which nuclear power can be seen to offer in relation to fossil fuels. One must also comprehend how, over the years, several factors have combined to cast doubts upon the industry. These factors include: schisms within the British industry; accidents both in the UK and around the world; doubts over the economics of nuclear power; the cost of waste disposal; the question of how best to deal with radioactive waste; the growth of an environmental movement opposed to nuclear power; the ending of the nuclear arms race, and the emergence of concern over post cold-war nuclear proliferation. One should also bear in mind the tendency of the British authorities to avoid controversy where possible by choosing the path of least resistance when choosing sites for nuclear developments, and by backtracking and postponing such schemes when opposition begins to organise, courtesy of natural supplies of other British energy resources which can 'buy time' for the authorities. It

is hoped that the presentation of these factors in a straightforward chronological account of the industrial development succeeded in outlining the historical influences of public opinion.

West Cumbrian attitudes towards the nuclear power industry are an interesting focus of study. The examination of the social-economic situation in West Cumbria revealed that one must be aware of the physical and cultural isolation of the region from the rest of the UK, of the history of dependence upon large scale industry in the area, and the subsequent difficulties when such industries falter. One must also be aware of the less than healthy state of the local economy today, and the difficulties the area faces in attracting new investment. Existing studies have intimated that the large presence of the nuclear industry in the area, and the relatively low level of local protest, suggest that the area is in some way 'nuclear-friendly', especially as the industry provides large amounts of employment as well as sponsorship and other forms of indirect investment. Having reviewed the situation in 1994, one must be aware of the scale of connections between the local population and the nuclear industry in the area. Of respondents in this study, a fifth had worked for the industry, over a third had relatives who had worked for the industry, and 90% had acquaintances who had worked for the industry. On the other hand, one must also be aware of the numerous disadvantages of the industry's presence for the area, including the potential harm to the region's image, and the adverse affect the industry's presence may have upon other businesses, and of the cultural conflict between industrialisation and environmentalism within the area. Although it should be remembered that although there was a high level of small scale environmentalism, very few people were members of environmental groups, and this situation could give the industry a head start in attaining support. One should consider cultural factors such as the self-identity of an isolated area, possible de-sensitization to controversy over pollution, and the stoicism of many people.

8.3 Methodological advances

The third stage of this study aimed to examine previous research into West Cumbrian opinion. Through doing so, it was discovered that there was considerable scope to improve upon the methodology employed in previous works. Macgill and Phipps, Macgill, and ERM all had an inadequate system of regulating the sample, and Macgill and Phipps had not even completed their target quotas. This study used a carefully thought out stratified random sample with quotas based upon both the latest census information and data on different housing types

from a local surveyor to improve upon this situation. The rotation of interviews in each area between morning, afternoon, evening and weekends eliminated some problems of timing encountered in the first two studies. The samples employed by Macgill and Phipps, and by Macgill were biased in favour of an area close to Sellafield, rather than using West Cumbria as a whole, and the focus groups used by ERM were deliberately weighted in a manner which over-represented BNFL employees. By choosing a 'half-way house' which represented both the industrialised and rural aspects of West Cumbrian life, this study attempted to avoid these flaws in methodology. The stratified sample quotas also eliminated the problem of over-representing women and young people encountered in the study by Macgill, and by Macgill and Phipps. This study also offered a larger ratio of sample size to area studied than had been employed in earlier studies.

Other methodological improvements included the declarations of impartiality which sought to prevent any 'interviewer effect' which might have blighted Priority Search's study, and the recording of significant non-response, a factor overlooked by some earlier studies. This was important, because such studies had consequently given the misleading impression that levels of controversy amongst West Cumbrians were higher than they really were. Similarly, the manner of questioning was different to that of earlier studies. The fact that this was the only piece of research which did not come with any sponsorship or particular theoretical research agenda meant that it could use completely open-ended questions. The open style of questioning subsequently employed meant that there was far more chance of the final results displaying what local people really felt on the subject, rather than what the researcher allowed them to say, as occurred in the first three studies. It even meant that it was even an improvement upon ERM's study which, despite being otherwise admirably non-directional, had focused upon risk in particular. Such a focus could only distort the true picture of public opinion, by highlighting topics of importance to the researcher rather than those of importance to the general public.

The presence of an amount of quantitative questions provided a procedural counterbalance to prevent any subjective misinterpretation of purely qualitative data. Even the inclusion of montages of newspaper cuttings was an innovative idea intended to make the contemporary atmosphere of West Cumbrian nuclear debate more alive to the reader.

8.4 West Cumbrian public opinion

The next major aim of this work was to add to the body of knowledge regarding West Cumbrian public opinion. Its most significant overall contribution was to confirm that in many ways West Cumbria was indeed a relatively nuclear friendly area, but that the area was far from offering unconditional support for the industry. This study began to add to existing understanding of West Cumbrian attitudes towards nuclear power by contrasting attitudes towards that power source with attitudes towards other fuel sources. This line of questioning had not been undertaken in the four West Cumbrian studies which had been analysed, although Gallup had investigated it at a national level. Gallup had found that other fuel sources had been far more popular than nuclear power, but in this study, nuclear power was the most popular power source, suggesting that West Cumbria was indeed relatively nuclear friendly. The area was not solely nuclear-friendly though. Wind and coal power were also popular. Nuclear was not advocated by the majority of respondents and was, in fact, the most controversial, as many people also opposed its use. On balance, wind power was more popular than nuclear power amongst local people, a new finding. It was also found that it was important not to overstate the strength of local feeling about nuclear power. Without prompting, the majority of local people neither advocated nor opposed the use of nuclear energy, something which was not highlighted by earlier studies.

When enquiring about perceptions of the advantages and disadvantages of nuclear power, Gallup's survey had also found perceptions of nuclear power's environmental advantages to be relatively high, but outweighed by perceptions of nuclear power's environmental and safety disadvantages. This study found similar results in West Cumbria, where the industry's environmental benefits were the single most commonly mentioned advantage. The industry's eco-nuclear credentials received higher prominence at a West Cumbrian level, but overall, many people found it hard to name advantages for Britain of using nuclear power, and perceptions of the advantages of nuclear power in no way matched up with the factors people were seeking in an ideal fuel source. In this study, safety and waste were particularly commonly named as disadvantages, as they had been in Gallup's surveys. At a rudimentary quantitative level in a national context, more disadvantages were named than advantages.

This study also investigated the perceived advantages and disadvantages of the presence of the nuclear industry in West Cumbria in particular. As ERM suggested, the problems of the

local economy, both in terms of unemployment, and of the difficulties which it faces in attracting new investment to the area, may have made local people value the industry through a sense of economic dependency. The quite staggering importance which respondents placed upon the jobs brought by the nuclear industry suggests that this may be true. However, the fact that other than the jobs it provides, people had difficulty in naming advantages for West Cumbria of the nuclear industry's presence, and the fact that in total more disadvantages of the industry's presence in the area were named than advantages, suggest that the nuclear industry is only valued by many local people in relation to a more important issue for West Cumbrians - unemployment. The fact that more people could see advantages in the local nuclear industry than could see advantages for Britain as a whole in the use of nuclear power also suggests that perhaps West Cumbrians were in favour of the local nuclear industry rather than the nuclear industry in general.

A related finding was that far smaller numbers of respondents felt that they personally were dependent upon the nuclear industry than thought the industry's presence in the area was a good thing. This finding suggests that if, as it seems, economic benefits are the main reason for supporting the industry's presence, it is perceptions of economic benefit for the community, rather than direct economic benefits for individuals themselves, which influence levels of support and opposition. This represents an important addition to ERM's notion of dependency as an important variable in creating the appearance of positive endorsements of the industry.

Another notable discovery was that some people were reluctant to criticise the industry for fear of retaliation, and that there seemed to be a general perception of higher levels of support and lower levels of criticism amongst local people than this study has found to exist in actuality.

Another interesting finding was that there is a section of the population who could identify with the needs of the industry, or perhaps see the interests of the industry as synonymous with the interests of West Cumbria.

Where Macgill found local criticism of the YTV programme Windscale the Nuclear Laundry, this study found much criticism of the national press for being biased against the West Cumbrian nuclear industry and for being sensationalist. The local media received less criticism. The analysis of the press coverage of the decision to open THORP suggested that

bias was indeed present in much of the press. Even the right wing press did not greet the decision with triumphalism comparable to the criticisms coming from the left wing press and those with a strong Irish readership.

Another useful discovery from the question about the presence of the nuclear industry in West Cumbria was that the majority of people accept the presence of the nuclear industry in Cumbria rather apathetically. This stands in contrast to the media depictions of local attitudes both in the early 1980s, which portrayed concern and unease at health risk posed by the industry, and in the early 1990s, which portrayed a local population strongly in favour of the nuclear industry. When asked to comment on BNFL, the most frequent type of response suggested that the company was not a particular source of controversy. Similarly, when asked which concept they associated with nuclear power, the most frequent responses were not controversial topics, but more mundane associations with electricity generation and Sellafield. Although there were many emotive comments made about BNFL, levels of concern about health risk appeared to be lower than in the earlier studies. This suggested that previous researchers' preoccupation with 'risk' (and their subsequent direction of their research to focus upon that subject) had exaggerated its importance amongst local people. Without the directional questioning employed by earlier researchers, there was no particular concern for the health of children rather than for adults which both the studies of the 1980s had found. Similarly, the strong support depicted in contemporary media reports was absent. This failure to observe the lack of controversial attitudes amongst many people, like the factor of significant non-response, had been overlooked in previous studies, probably with detrimental effects upon their accuracy.

Questions asking specifically about opinions towards BNFL and NIREX uncovered one aspect in which the new findings agreed with all four previous studies. This was that overall, most people were supportive of the industry in general, with relatively few opposed to BNFL's presence. According to the new findings, the majority supported BNFL's presence (albeit relatively passively), and supported the industry in general, although opposition to BNFL was greater than it had been in the 1980s. Awareness of the economic contribution of BNFL was high, as it had been in the earlier studies. However, the new study did find the existence of widespread reservations about the industry. Some people were concerned at the scale of

BNFL's economic contribution to the area, others at the secrecy of the company.

NIREX drew less favourable comments than BNFL. Contrary to the results of the rather directed questions asked by Priority Search, this study found relatively little awareness of economic benefits offered by NIREX, and awareness of employment prospects offered by NIREX were far lower than were perceived to be offered by BNFL. Very few people had positive comments to make about NIREX, and at a quantitative level, nearly twice as many people thought NIREX's presence was a bad thing as thought it was a good thing, a radical difference from Priority Search's findings which had found a majority of support for NIREX. The low levels of knowledge about NIREX found by Priority Search were confirmed. Many people who had heard of the company merely attempted to describe what NIREX did rather than judge them as 'good' or 'bad' as such. An additional discovery was that levels of awareness of different disposal options was also very low. It is important to note that one must be careful not to mistake such ignorance for the construction of psychological boundaries as proposed by ERM.

NIREX's chosen method of dealing with radioactive waste via underground disposal was the most popular amongst respondents, but this fact must be understood in the context of a lack of knowledge of any alternatives. This ignorance amongst local people, and, to a slightly lesser extent, amongst national respondents reflects badly upon the environmental groups PR efforts. Perhaps as a result of this lack of knowledge, there also appears to be a greater level of faith in the 'experts' (as opposed to acceptance of technical arguments) regarding nuclear waste than there does regarding other elements of the nuclear industry. Many people simply did not have an opinion on waste disposal. Some respondents were unhappy about the technicalities of waste disposal, and some at the imposition of waste on West Cumbria.

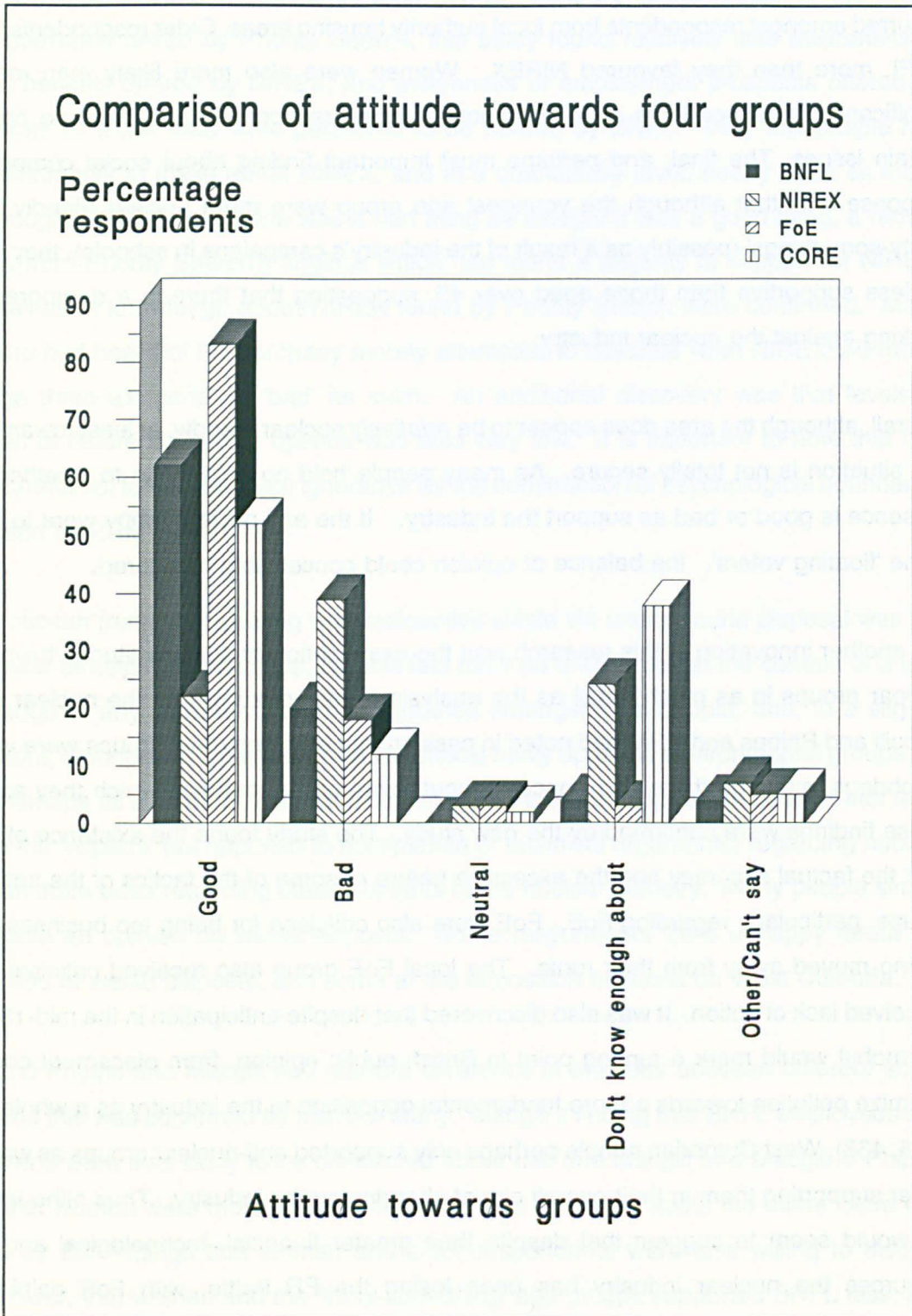
Macgill and Phipps and Macgill had noted a difference in attitudes between different social groups, and this was confirmed by the new study. Macgill's finding that BNFL employees and older citizens were less likely to be concerned about risk and Macgill and Macgill & Phipps' findings that women were more likely to be concerned than men about the same issue was added to by the findings that women and older respondents were less willing to discuss nuclear power, that women and the 'thirty-something' age groups supported BNFL less, and opposed them more, than other sub-groups, that some industry workers were hostile towards

NIREX but none were hostile to BNFL, and that proportionally, more industry workers valued environmental groups than did the general public, perhaps because their need for a watchdog over their employers was greater. An amount of alienation from the 'green' perspective had occurred amongst respondents from local authority housing areas. Older respondents favoured BNFL more than they favoured NIREX. Women were also more likely than men to be significant non-respondents or to be amongst those respondents who had no opinion on certain issues. The final, and perhaps most important finding about social composition of response was that although the youngest age group were more nuclear friendly than the 'thirty-somethings' (possibly as a result of the industry's campaigns in schools), they were still far less supportive than those aged over 45, suggesting that there is a demographic tide working against the nuclear industry.

Overall, although the area does appear to be *relatively* nuclear friendly, at least towards BNFL, this situation is not totally secure. As many people hold no opinion as to whether BNFL's presence is good or bad as support the industry. If the anti-nuclear lobby were to motivate these 'floating voters', the balance of opinion could conceivably be altered.

Yet another innovation in this research was the examination of public attitudes towards anti-nuclear groups in as much detail as the analysis of attitudes towards the nuclear industry. Macgill and Phipps and ERM had noted in passing that environmental groups were valued as watchdogs, although there was concern about some of the methods which they employed. These findings were confirmed by the new study. The study found the existence of concern over the factual accuracy and the excessive nature of some of the tactics of the anti-nuclear groups, particularly regarding FoE. FoE were also criticised for being too business-like and having moved away from their roots. The local FoE group also received criticism for their perceived lack of action. It was also discovered that despite anticipation in the mid-1980s that Chernobyl would mark a turning point in British public opinion, from piecemeal concern to minimize pollution towards a more fundamental opposition to the industry as a whole (Turner 1986, 438), West Cumbrian people perhaps only supported anti-nuclear groups as watchdogs rather supporting them in their overall aim of abandoning the industry. Thus although Figure 8.1 would seem to suggest that despite their greater financial, technological and staffing resources the nuclear industry has been losing the PR battle, with FoE gaining more quantitative support than any other group. However, this support was offered by people who

Figure 8.1 Comparison of support and opposition for the four local groups, 1994



also supported BNFL's presence. There is a chance that if the industry were to become more trustworthy, support for CORE and FoE might fall. One can surmise that perhaps the government anticipated that the West Cumbrian population would not want to cut off the nuclear hand that fed them when choosing West Cumbria for the latest incarnation of the NIREX scheme and for BNFL's presence in general.

Respondents were more aware of the activities of Greenpeace in opposing the industry than they were of either of the two local anti-nuclear groups, indicating both the importance of awareness of national events in shaping local opinion, and the relative failure of local groups to increase public awareness of their activities. As in Gallup's national polls, a minority of respondents saw environmentalists as extremists.

The element of stoicism which ERM had noted, and which was inferred from the data of Macgill, and Macgill & Phipps, which might have arisen through a traditionally harsh way of life was observed once more in this study. Many respondents seemed more than willing to bear the nuclear industry for the rest of the country. The stoical element of Cumbrian culture has also perhaps reduced the likelihood of protest against the industry's presence.

The insular aspect of Cumbrian culture should not be overlooked either. Many respondents were aware of the remoteness of their region as being a reason for the siting of the nuclear industry there. Just as resentment at the imposition of the Spanish central government had angered Basques in Lemoniz, many respondents felt that their area was neglected and put upon by the rest of the country, and resented being left with the nuclear industry. This was especially true of the waste repository scheme. However, an important finding was that many people combine an irritation against the outside influences which site the nuclear industry in the county with an irritation against the outside environmentalists which oppose the industry and try to close it down (again suggesting to an extent that the area may appear to be relatively pro-nuclear). For example, although there appeared to be a relative amount of alienation from environmentalism amongst people from local authority housing areas, this was not actively expressed in terms of class, as might be expected. Instead, alienation was expressed in terms of environmentalists being outsiders, specifically over them being non-Cumbrians. Connected with this, one of the reasons why CORE performed slightly better than FoE at a qualitative level was that CORE received an amount of support purely for being

Cumbrian (although some people questioned whether they were really locals). Groups named as supporters of the industry were mainly local groups, including local people. Those in opposition to the industry were commonly thought to be outsiders (with the exception of CORE and perhaps FoE). Most people think that most people in Britain oppose the industry, and this may re-enforce the notion of West Cumbria and its nuclear industry as being under seige. The reason why many West Cumbrians saw the national press rather than the local press as being sensationalist and biased against the West Cumbrian nuclear industry, often with little evidence to justify such belief might be connected to this insularity.

Levels of political activity were low, as had been discovered in the earlier studies. However, it was discovered that activity was more common than had been found in earlier studies, possibly because the question mark over THORP had galvanised supporters of the industry to take political action. It was also discovered that whilst pro-nuclear action was more frequent, anti-nuclear action involved more commitment. Nuclear power was not a very important factor in voting intentions for most people, but interest in the subject was high in terms of visiting Sellafield, watching television programmes, and talking about it to family and friends, suggesting that high levels of passive interest does exist in the area, which may one day be galvanised into more committed actions.

The study added to the understanding of political inactivity by observing the same type of feelings of impotence and fatalism as mentioned by Macgill & Phipps. This study found that this feeling of disempowerment, even extended to the less popular aspects of the industry such as the repository scheme. Another important factor in the relatively low levels of political action was that many people had no reason to get involved.

In response to many questions, large numbers of respondents said that they did not know enough about the subject to express an opinion. This runs contrary to the notion espoused by the nuclear industry and by many national groups of a highly knowledgeable local population. The high level of significant non-response (30%) and the many respondents who held ambivalent stances towards BNFL, waste disposal and nuclear power in general also showed that the nuclear issue is not as controversial as is sometimes implied by other portrayals of local attitudes. Obviously, if people do not see an issue as being of controversial importance to them, they will not become actively involved in that issue. One should not

forget the influence that factors such as the lack of a tradition of popular participation may have had upon political activity in nuclear issues.

8.3 National groups

A new avenue explored in this research was to attempt to directly contrast the views of the West Cumbrian public with those of a section of the public outside the county. Although it was hampered by the fact that levels of co-operation, and perhaps levels of interest in the subject amongst national and local environmental groups and political party organizations were very low, some interesting findings were made. In terms of general energy policy, national groups were less ready to commit themselves to advocating or opposing particular power sources than local people. National groups were less concerned by the risk of a nuclear accident than those who lived in Cumbria, but overall, the national groups were aware of both advantages and disadvantages of nuclear power in both a national and West Cumbrian context. In a West Cumbrian context, the national groups named more technical advantages than local people had been aware of, which once more highlighted a possible lack of technical knowledge amongst West Cumbrians. Like the local respondents, the national groups seemed relatively unaware of alternatives to underground disposal of radioactive waste, and merely attempted to describe NIREX, rather than judging them, an action which suggested a relative lack of knowledge on their part also, whilst highlighting NIREX's low profile once more. The national groups' greater appreciation of the industry's green credentials and their belief that West Cumbria was a good location for NIREX to choose however, suggested that certain aspects of the industry's national campaigns have been successful.

Most national groups had not heard of CORE, and were unaware of FoE's presence in West Cumbria, demonstrating the difficulties which the West Cumbrian anti-nuclear groups have had at a national level. Like many local people, the national groups believed local support for the industry to be greater than this study has found. This is perhaps because of the flaws in previous studies upon which national groups may base their views, and because of the failure of local anti-nuclear groups to attain much national publicity. They also believed people associate nuclear power with more controversial topics than local people named, which could also be caused by flaws in existing research which focuses upon 'controversy'.

National groups were less supportive of BNFL than West Cumbrian people, but were more

supportive of NIREX's presence in West Cumbria than West Cumbrians themselves, suggesting that perhaps an element of NIMBY attitudes existed amongst these national groups. Unlike local respondents, the national groups did not have particularly strong views on press coverage of the nuclear industry. They also displayed a remarkable lack of interest in becoming involved in the West Cumbrian situation, signifying how successful the 'softly softly' approach has been in depoliticizing the nuclear arena.

8.4 The activities of Cumbrian campaigning groups

This research also aimed to be the first to examine the resources and techniques of local groups who might seek to alter public opinion, to assess their public relations campaigns, and also to examine how closely their points of view matched up to local opinion.

Of the four groups, it was only BNFL who saw gaining public acceptance as an aim in itself, and they devoted the most resources to public relations. The difficulty encountered in actually managing to find someone from BNFL who would participate freely in this research did cast some question marks over their true attitude to openness and the general public, although this could be attributable to more innocent disorganisation within the company. BNFL's flawed methods of assessing public opinion left them open to misunderstanding local feeling. For example, they understated the level of local opposition to themselves.

NIREX have a harder task than BNFL, because BNFL have been present in the area for some time, whereas NIREX must persuade local people that their schemes should be allowed into the area from a 'cold start'. At present, NIREX still have a considerable task ahead of them if they wish to establish an identity with local people before the application for the repository in 1998/9, and they might also benefit from convincing more locals of the reasons why radioactive waste should be buried underground. At present what image the public do hold of NIREX is negative rather than positive.

As the flawed Priority Search study typified NIREX's attempts to assess public opinion, it was little surprise that their understanding of local feeling was sometimes erroneous. Perhaps most worryingly for them, they overestimated the level of local support for themselves and misunderstood the nature of opposition, both to themselves and to BNFL.

More local people were aware of CORE's anti-nuclear activities than were aware of those of FoE, suggesting that the Barrow based organization runs the better campaign of the two, but still there was considerable confusion over CORE's identity, which CORE could improve. CORE's refusal to admit that there may be advantages to the industry's presence will only mark them out as extremists, and will not gain them support. Like the nuclear industry, CORE's attempts to understand public opinion were somewhat unsound, and their estimation of local feeling was similarly out of touch. The situation was exacerbated by their self-alienation from West Cumbrians. They made the opposite mistake to the industry bodies, and under-estimated the support which existed for them amongst local people. They also believed that more people were concerned with health risk than appeared to actually be the case.

CORE's tactic of attracting publicity through the use of celebrity endorsements had been relatively successful, with Bono and U2 named as anti-nuclear celebrities by many respondents, and no-one castigating them for associating with 'outsiders' interfering in the West Cumbrian situation. Overall their greater liking for direct action had led CORE to be identified with 'going over the top' and with naivety

FoE Cockerthorpe appeared to be the most aware of the less than unconditional nature of support for the nuclear industry amongst local people, and of what local people really associated with the term 'nuclear power', as well as what local people thought of FoE themselves. This was probably attributable to the fact that FoE Cockerthorpe were the group who talked directly to the local population most often and the fact that they did not have the distraction of national campaigns to waylay them. Even so, FoE did have some problems in interpreting public opinion. At a local level they underestimated the importance people placed upon employment prospects. At a national level, the difficulty which they have had with the national press may have affected their understanding of press attitudes to the nuclear industry. In terms of missed opportunities to collaborate with sympathetic journalists, this may be a costly misunderstanding. The criticisms which FoE received for 'going over the top' highlighted the adverse effect of opting for the tactics of direct action.

Both industry companies appeared unnecessarily defensive or worried about public opinion at times. The best example being when they thought that people commonly associated nuclear power with negative images, when in fact the most frequently named associations had

been mundane or even positive. In terms of resources, the industry has far greater supplies of money and personnel available, and could afford to present a more polished image. Often, however, they shied away from too much publicity. Both BNFL and NIREX appear to use tactics of minimizing local intrusion, whilst campaigning at a national level through the mass media. NIREX in particular have only a slightly larger local PR presence than CORE. In their interviews, BNFL's responses were often narrative rather than evaluative, suggesting that perhaps they were scared to needlessly invoke controversy and jeopardise their situation. It is perhaps in a similar attempt to avoid becoming overbearing that the industry shies away from talking to people in the street. One might question the long term success of the defensive aspect of these local tactics. As BNFL's own chairman once said,

"We are engaged in a war of words about our industry ... wars are not won by defensive strategies, however soundly based. The best you can achieve by defence is avoidance of defeat. To gain victory requires more positive and more active measures." (Harding 1990, 31)

However, there are perhaps justifiable reasons for this passivity. In reality BNFL do not so much need an actively supportive public so much as a public which is not actively in opposition, and this situation they do appear to have. Although only a minority of people could name advantages of nuclear power, and some are concerned at their secrecy and the scale of the economic contribution the industry makes to the area, the company have a fatalistic attitude amongst local people on their side, and the keen awareness that BNFL means jobs. For their part, NIREX may be happy with a lower profile which entails less controversy around a currently unpopular scheme.

While the nuclear industry's reluctance to campaign too overtly in West Cumbria, and the importance of sitting back and letting curious members of the public come to the visitors centre has spared the industry from the criticisms of being 'over the top', it has perhaps blinded them from the concerns of people who do not come within the industry's passive reach. This may have allowed anti-nuclear groups a certain amount of breathing space. There may be room at grass roots level for environmental groups to increase their support amongst local people. However, for various reasons, a lack of funding, and perhaps complacency on FoE's part, the local environmental groups have failed to do this, and this has allowed NIREX and BNFL to take advantage of a politically silent local population. The industry has been able to claim that the absence of protest means that the industry has local

support. This in turn has made local people increasingly reluctant to speak out against the industry because they feel they are alone in their opposition. This may not always be the case.

The effective tendency of campaigning groups to concentrate upon large scale national opinion rather than smaller scale local considerations may yet prove a costly error. Other authors have observed how the technical debate between 'experts' has alienated the public from both sets of protagonists (Cottrell, 1981, 3) Many aspects of this research suggested that the local populace is very aware of the media campaigns organized by the protagonists which are targeted at the nation as a whole, and that these have an adverse effect upon local attitudes.

Communication studies conducted in the USA earlier this century (Lazarsfeld, Berelson & Gaudet (1948), Merton (1949), Katz and Lazarsfeld (1955)) found that mass media is not as persuasive as might be imagined, that

'personal influence rather than the mass media accounted for most ... changes in opinion' (Lin 1973, 153).

Just as Macgill and Phipps had found a lack of trust in the various sources of information in 1983, and Macgill had found the Black Report had failed to reassure people in the 1980s, because of the way they were targeted at a wide national audience rather than at the specific concerns of local people, this study found people objecting to national PR efforts which failed to take into account local knowledge and experience (as ERM had found). This study found this to be true not only of the nuclear industry's campaigns, but also of those of its opponents.

For many people the mass media tactic does not work, because while the industry offers blanket reassurances of safety, they are adversely affected by the personal influence of the local community which informs them of risk and disadvantages of the industry. Because of this, the industry's reluctance to admit that there are any disadvantages to the industry, either in a national or local context, might be a rather pointless standpoint to take, as both the general local public and the more informed national groups accept the existence of both positive and negative sides to the industry. The anti-nuclear groups' refusal to admit the existence of any advantages to the industry will have similar effect while people can clearly see their friends and neighbours in employment at Sellafield, or benefitting from the indirect

stimulus to the local economy. Clearly national campaigns are very important in terms of reaching local people - people were more aware of Greenpeace's activities than the local FoE and CORE organizations for example, just as the SVC was recognised far more than FoE's local campaigning. However, It is important to note that although West Cumbrians appear to be made aware of issues by 'blanket' national campaigns, such as the Sellafield Visitors Centre adverts (and arguably the SVC itself) or Greenpeace's activities, they are not necessarily persuaded by them. This is an important distinction to make. There is a difference between on the one hand awareness of national orientated events such as the Greenpeace 'die-in' and *reaction* to the event, based upon one's own opinion (eg irritation at anti-nuclear demonstrators being 'over the top'), and on the other hand, being persuaded by these events and having one's opinion *shaped* by the event (eg being inspired by the demonstrators and becoming a supporter of anti-nuclear campaigns).

There is considerable scope for the industry to convince local people of the advantages of using nuclear power, both in a national context, and in a local setting (apart from the jobs it offers). In a national context, the industry need to reassure local people of such 'disadvantages' as the safety of the industry, the question of waste, and the ability of science to fully control nuclear physics. Regarding the question of waste, the industry may benefit from increasing awareness of the reasons why underground disposal is the best option, rather than relying upon public trust in experts to 'do what's best'. They should also pay more attention to genuine local opinion, rather than national concerns. In one way, the industry's current attitude to West Cumbrian opinion was summed up by the difficulty encountered in arranging an interview with 'the person in charge of public relations in West Cumbria'.

The environmentalists' main task, a somewhat monumental one, is to convince the public that they are not merely a watchdog to enforce piecemeal reforms, but that they have a viable non-nuclear vision. To convince the public of this case is perhaps more difficult than in other environmental issues. The safety, health and economic arguments against the industry are by no means clear cut. For example, there is no guarantee that the presence of Sellafield will *inevitably* lead to a Chernobyl-type disaster in the same way that unrestricted and excessive slaughter of white rhinos will certainly lead to the extinction of the species. FoE and CORE's task is further complicated by the fact that they must convince the public that the *potential* threat from the industry outweighs its easily perceptible advantages such as local jobs and

investment from the industry. They need to propose viable alternatives to support local people if the nuclear employment were to cease.

"Community/cause pressure groups should be determined, single-minded, highly efficient, and professional, but also caring and reasonable. It is a revolution we seek, but a revolution with the support of the people as a whole."
(Wilson 1984, 38)

FoE and CORE will not be seen to be caring if they do not offer some alternative lifeline for West Cumbrians. At present, defenders of the industry can point to tangible economic benefits with possible down-sides, environmentalists cannot point to anything constructive which they have done for local people.

From an environmental view-point there is considerable need for anti-nuclear groups to improve awareness of any disadvantages of the industry, and of BNFL in particular, both in a national and a local context, particularly of any economic arguments against the industry. given the doubts which exist over NIREX, perhaps FoE and CORE should concentrate on heightening awareness of any links between Sellafield's presence and the presence of the repository scheme. They could also benefit by increasing local awareness of alternatives to underground disposal and by chipping away at the current level of faith in waste disposal experts. They might also bolster their credibility by appearing more reasonable and admitting to the existence of at least some advantages from nuclear power.

8.5 Thoughts for future research

As a case study of one town, albeit one chosen as a 'halfway house' between the west coast and inland Cumbria this research can make no claims to be fully representative of the whole population of Cumbria or even West Cumbria. It would be worth investigating which of the trends which it has uncovered do indeed exist throughout the county.

Research conducted in areas outside Cumbria, asking the same questions, in a similarly open manner, would also be very productive. Such a project would provide a more useful control group with which to contrast this set of results, and to discover how different West Cumbrian attitudes are to those of the rest of the country. Perhaps the best form for this work to take would be to study another area of similar economic situation with different dominant industry. This would facilitate the examination of the extent to which people's attitudes are altered by

the local socio-economic situation, irrespective of the particular industry.

Another useful task would be to devise a comparable set of questions for other energy options, such as wind and coal, to see how attitudes to nuclear power compared other energy sources over a broader range of questions.

New research could also investigate any differences in public attitudes to West Cumbrian and national branches of FoE, and attitudes towards Greenpeace, and investigate social differences in attitudes in more depth.

Another line of questioning worth examining would be to investigate actual levels of local knowledge of technical aspects of the industry more directly than occurred in this study.

8.6 Concluding remarks

In all, this study has succeeded in exploring the aspects of public opinion which it set out to investigate. In doing so it has improved upon the methodology of previous work, and has updated research into what attitudes towards the nuclear power industry in West Cumbria really are. The inadequacies of previous research, and the differences which this study had found suggest two things. One is that more attention should be genuinely paid to the true thoughts of local people, rather than putting words into their mouths by directional questioning. Researchers coming to examine West Cumbria within the context of their own preconceived agenda for investigation based upon a notion of controversy appear to have mis-represented certain aspects of West Cumbrian opinion. They have found only what they sought to find, rather than describing the whole picture. This is a shortcoming which should be borne in mind in all areas of social science research when investigating 'sexy' or controversial issues. One should investigate the whole story, not just the headline. The second point is that it is borne in mind that 'local people' can live further than ten miles from Sellafield, and that the views of such people are important and should not be taken for granted.

Compared to other areas of the UK, West Cumbria may well be relatively nuclear friendly, more so towards BNFL and reprocessing than for NIREX and waste disposal. However, important things need to be understood about the nature of the area's support. It is friendly to its own particular nuclear industry, and the economic benefits it is seen to bring to the

community rather than to nuclear power in general. It is also very important not to overstate levels of controversy about nuclear power which exist amongst local people. For many West Cumbrians, nuclear power is not a 'big deal'. The area could even be deemed to be 'wind-friendly' more than it should be said to be 'nuclear-friendly'. Campaigning groups have much to improve upon, both in terms of understanding local opinion, and in their aims of shaping that opinion. They should be aware that local opinion is affected by local reactions to national-orientated PR campaigns as well as by specifically Cumbrian work, and should attempt to ensure that the former does not adversely effect the latter.

Appendix A

Events since the fieldwork was conducted

A.1 Introduction

In order to bring the reader as up to date as possible with the development of the West Cumbrian nuclear debate, this section sets out the main course of events since the surveys were conducted. It was not included in the main body of the text because events which have occurred since May 1994 had no bearing upon public opinion before that date.

A.2 West Cumbria and the UK

On May 25 1994, 2,200 redundancies were announced from the 7,200 strong Sellafield workforce, as part of a 1.85 billion pound cost-cutting exercise by BNFL. The jobs were to be phased out on a voluntary basis over 5 years (Business Gazette, June 1994, 1). Demoralisation was reported amongst those workers who had campaigned on behalf of the 'Trust Us' campaign in favour of THORP and who now faced dubious job prospects. The job cuts would also mean the loss of up to forty million pounds per annum from the local economy by 1999. The harmonious relationship between the company and the unions which had been so helpful to BNFL during the THORP campaign was thus put in jeopardy (see montage opposite). The Sellafield Shop Stewards Committee would not rule out the possibility of industrial action (West Cumbrian News and Star 6/6/94, 5).

The nuclear industry as a whole seemed to offer less secure job prospects in June, when Nuclear Electric announced that similar rationalisation plans entailed the loss of 2,000 jobs from their plants. Nuclear Electric had already cut its workforce from 14,200 to 9,000 since the government decision in 1989 not to privatise the nuclear sector (Daily Telegraph, 24/6/94, 24).

Disbelief and outrage were amongst the initial reactions by many West Cumbrians later in June 1994 when BNFL announced that they would build a new plant in Cheshire to manufacture 10,000 stainless steel containers each year, beginning in September 1994. County councillors voted for an all-party protest to the company that jobs were being taken out of Cumbria, when the necessary expertise existed within the county, for instance at British Steel, Workington, and that this work could perhaps have off-set the damage caused by BNFL's job cuts at Sellafield. In a further ironical twist, the containers to be made in Cheshire would be used to contain the radioactive waste which NIREX planned to bury in West Cumbria. Conservative councillor Bryan Metz said simply "The company has ratted on us" (West Cumberland Times and Star, 10/6/94, 3).

SELLAFIELD TO CUT 2,000 JOBS

MORE than 2,000 jobs are to be cut

400 ATOM JOBS AXED

Sellafield: Kiss of death for jobs for life

For some, it may be a kiss of death. Sellafield's job losses are cutting costs were 100 days after it was announced. The back on the political axe is much deeper than that.

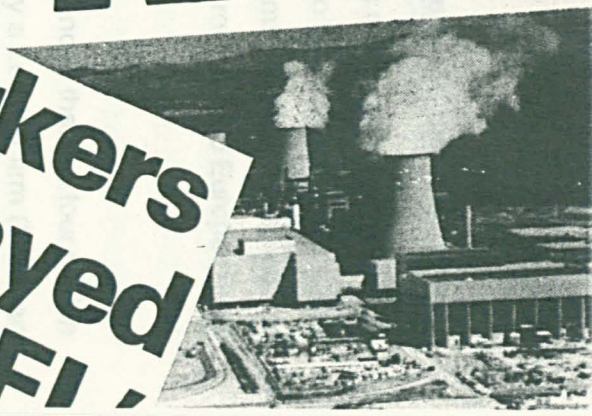
In all areas of business across a shrinking world, fiercer and more extensive before. On all sides there drive down costs, to exploit technologies and remain in order to stay in business.

industry which for years has been above the poverty line, it is assumed that worst fears have exceeded by a considerable margin. Here was the strongest industry, perhaps that, like mass employment, steel and shipbuilding, clear business nothing last but, when all is said and done, it is the world in which we live — not just in Cumbria but everywhere else.

Anger as £4m deal goes south

Workers 'betrayed' by BNFL

SELLAFIELD workers face management losses. Despite face



UNION leaders have

Appendix A: Events since the fieldwork was conducted

On June 20 1994, thirty-eight people were arrested at Sellafield as demonstrators in a "Stop Sellafield For Solstice Campaign", attempting to block three gates to the plant. However, this protest was not a local initiative. Protestors, including Janet Bloomfield, the chairperson of CND, mostly came from outside the county, from peace camps and from around Europe (West Cumbrian News and Star 20/6/94, 1).

In July 1994 there was yet more local indignation when it was announced that the four million pound refit of the Sellafield Visitors Centre was to be carried out by a London firm (Brennan and Whalley of Wimbledon), because BNFL felt that no local firm was capable of performing the task. August's unemployment figures showed that despite a nationally improving trend, unemployment in Cumbria was still rising. Unemployment had now reached 10.4% in the Whitehaven TTWA. Unemployment in the Workington TTWA, including Cokermouth, remained static but remained the county's worst area, with 11.8% unemployment (West Cumbrian News and Star 17/8/94, 3).

On July 29 1994, NIREX finally submitted a planning application for the 125 million pound rock laboratory at Longlands Farm, with hopes to have an underground repository in operation by 2010, to be sealed in 2050, assuming the safety of the scheme is acceptable by 1999 (West Cumbrian News and Star, 29/7/94, 2). Following this submission, around a dozen protestors from the peace camp now established at Sellafield broke into a NIREX borehole compound in Wasdale. Five women were arrested (West Cumbrian News and Star, 1/8/94, 1).

On August 12 1994, several Labour county councillors called for a public inquiry into the rock laboratory, rather than waiting for one for the full repository, because by the time a full repository was at stake, NIREX would have already invested over 125 million pounds on the project in the area, and the councillors felt that this might prejudice the outcome of any later inquiry (West Cumbrian News and Star 12/8/94, 4). NIREX began to show signs of bringing economic benefits to the county, by placing contracts worth 66,000 pounds with local firms, including C.G. Ford of Workington, and Bethwaites of Cleator Moor (West Cumbrian News & Star, 27/8/94).

The debate over BNFL's safety record continued apace throughout the summer of 1994. On

August 17, BNFL received an enforcement notice from HMIP ordering them to take action within a week over emissions of nitrogen oxides from a new gas and oil fired power plant. Emissions from the plant had exceeded limits twenty times during July and the first half of August 1994. BNFL accepted responsibility and said the matter was in hand (West Cumbrian News and Star, 17/8/94, 3). In the same month, CORE claimed that the pumping of silt from Maryport harbour as part of the redevelopment scheme could be releasing plutonium previously emitted from Sellafield and hitherto trapped in the silt, into the air and onto beaches when pumping occurred at low tide. Maryport Developments Ltd. and MAFF insisted that there was no danger to the public but nevertheless MAFF requested that pumping halt for an hour and a half either side of low tide "for aesthetic and environmental reasons" (West Cumbrian Gazette, 18/8/94, 1-2). During routine testing at Calder Hall in August, instruments were found to have excessive radioactive contamination, and an inspector received minor contamination, while a safety device being tripped caused the shut down of a reactor (West Cumbrian News & Star, 25/8/94).

BNFL's safety record nevertheless received valediction on August 18 when a new Health and Safety Executive report released findings which "tend to weaken the support for the Gardner theory". After reviewing the original findings, the HSE found that the association between children born in Seascale with leukaemia and their father's exposure to radiation in the twelve weeks previous to conception was "no longer statistically significant" (West Cumbrian News and Star, 18/8/94). For children born outside Seascale, the HSE claimed that there was no evidence of any association between father's exposure before conception and incidence of leukaemia. The original finding of "a strong statistical association" between Seascale born children and leukaemia in relation to the father's cumulative dose still stood, although no further additional safety measures were said to be necessary (West Cumbrian News & Star 18/8/94, 1).

The debate over the future of the nuclear industry in West Cumbria took another twist in August 1994 when BNFL proposed to take radioactive materials from dismantled Soviet nuclear weapons and reprocess them, forming more fuel. They proposed that if necessary a second MOX plant would be constructed to deal with the extra workload (West Cumbrian Gazette 25/8/94, 12).

Appendix A: Events since the fieldwork was conducted

By December 1994, BNFL's aims of broadening their operations began to appear more than a little prudent, when the Krummel nuclear power station near Hamburg in Germany announced that they were pulling out of their contract for THORP to reprocess 125 tonnes of their spent fuel between 2004 and 2014. In some ways the decision was not too harmful for BNFL, in the sense that Krummel would still honour their agreement for the first ten years up to 2004, and even if all the other German companies followed suit, it would represent a loss of only six percent of THORP's total order book. The danger was though, that it would set a precedent for others (West Cumbrian News and Star 27/12/94). Sure enough, within days, a Bavarian plant cancelled a deal to reprocess 420 tonnes of spent fuel after 2004. Between the two orders, BNFL had lost some 17% of work for the second decade of THORP's operation. The German companies would have to pay BNFL cancellation fees, but not as much as they would have had to have paid had they waited until 1995 to announce their decision (West Cumbrian Gazette 5/1/95, 1-2).

Whether Japan will still demand BNFL and NIREX's waste management services is also an interesting question. In April 1995, the governor of Aomori Prefecture in Japan refused to let a ship carrying radioactive waste back from reprocessing in France (the *Pacific Pintail*) dock, until he received assurances that the HLW on board the ship would not be buried in his province (The Economist 29/4/95). If such incidents of obstruction were to continue, perhaps one day the Japanese authorities may decide that it is simpler to dry-store radioactive waste and thus avoid generating HLW by trading with THORP in the first place.

Nevertheless, at the time of writing, BNFL is still an important company in the British economy. In 1994/95, turnover rose to over 15% to £1,304m and thue doubled to £425m. They claim that they are one of the top thirty British exporters, earning £1 of every £750 earned by the UK, supporting 1 in every 375 British jobs, and representing £1 in every £155 generated by the whole of Britain's manufacturing industry (BNFL advert in New Statesman and Society 2/12/94) and paying a dividend £45m to the government. The Calder Hall and Chapel cross reactors broke the records for power generation in 1994, supplying power for BNFLs' other plants and enough electricity to power a city the size of Leeds (Sellafield newsletter 422 30/8/95).

Perhaps a little unexpectedly, given Cumbria's nuclear history, Cumbria County Council voted by 40 votes to 33 to reject NIREX's application for planning permission for the RCF in December 1994. The council received 499 letters of objection to the scheme, including Workington MP Dale Campbell-Savours, and only 143 in favour. Their decision was helped by the fact that two hours before the meeting, a fax arrived from Environment Secretary John Gummer, in reply to the council's appeal to him in August that he should call in the proposal for a public inquiry. Mr Gummer's fax said that the county should not rush into giving planning approval. Instead, after an appeal from NIREX, the RCF was to be made the subject of a public inquiry. NIREX's managing director Michael Folger described the decision as a setback that could be overcome, and said that he believed that the repository could still be ready by 2010. Councillor Bill Minto said "I think we have sent a very strong message to the people who think we are a soft touch and that everything is going to come here" (West Cumbrian News and Star 3/1/95, 10; West Cumberland Times and Star 23/12/94, 6).

Greenpeace maintained the record of publicity grabbing protests at Easter 1995 when activists invaded Sellafield dressed as drums of radioactive waste whilst others blocked a road to the site. In August, Greenpeace were £25,000 for these actions (West Cumbrian Gazette 3/8/95). When the long-awaited outcome of the nuclear review was announced on May 9 1995, it brought mixed blessings for the industry. On the positive side, the AGRs of Scottish Nuclear and Nuclear Electric, who had cut operating costs by 45% and increased AGR output by 65% since 1990, and the PWR at Sizewell (along with six billion pounds worth of liabilities) would be granted the commercial freedom offered by privatisation. Scottish Nuclear and Nuclear Electric would be replaced by two new companies, co-ordinated by a new holding company which was to be called GB Co. GB Co. would then have some 22 percent of the electricity generation market. The reason that the two Scottish AGRs were to be placed in a separate company from the six English and Welsh reactors was to allay Scottish fears of being merged into a southern company. GB Co. would also be based in Edinburgh. The revenue from the sale would be used to cover decommissioning liabilities. On the negative side, it appeared unlikely that any new atomic power stations would be funded by either public or private sector, a potentially devastating blow for the long term future of the industry. The industry would also lose the 'nuclear levy' on electricity distributors in 1996, some eighteen months early.

Critics were unhappy at the decision to keep the nine MAGNOX stations and 8.2 billion pounds worth of liabilities in the public sector, eventually to be taken on board by BNFL

Appendix A: Events since the fieldwork was conducted

(although this would make it in BNFL's interest to minimize costs for MAGNOX reprocessing), while the other stations would be sold to private investors at a cost far less than the state had invested in them up to that date. The critics questioned the true use of the nuclear levy, which had been set up in 1989 to cover decommissioning costs of MAGNOX reactors, but which had been used for other purposes as the life of MAGNOX stations had been extended, with the cost of decommissioning still to be found. Another criticism was that the merger of Scottish nuclear and Nuclear Electric, whose mutual competition had been a driving force in the recent improvement in the British nuclear industry's performance, would result in the creation of a monopolistic situation for GB Co. who, with 22 percent of the electricity market, would be made very powerful at a time when the electricity regulator was forcing National Power and Powergen to reduce capacity. Some commentators pointed to the coincidence that the end of the nuclear levy would mean cheaper electricity bills (down by eight percent) in a pre-election year. The traditional deferment of tricky decisions by the British authorities was once more in evidence. The future of the MAGNOX stations would be reviewed every five years, and it appeared that decisions on waste disposal policy were likely to be deferred by at least the same amount of time, after the Review of Radioactive Waste Management said the inquiry into the NIREX RCF should start in September at Cleator Moor, and that if the RCF was given the go-ahead, there would be a further public inquiry at whatever date it was proven that a full scale repository was both safe and feasible. Mr Gummer said that this meant that the plans for an operational repository by 2015 had been abandoned. Cumbrian environmentalists however, were concerned that the need for the industry to put forward a confident, competent image for privatisation would cause extra pressure for a final solution to waste disposal to be found as soon as possible, with the favourite site being Gosforth (The Guardian 10/5/95; Business Gazette June 1995). FoE planned to tour the UK with a 12 foot Trojan horse in the run up to the RCF enquiry. In June 1995, Copeland County Council decided to be objectors at the inquiry, on the grounds that more analysis of the local geology was needed, and that the A595 trunk road was not adequate to cope with the site (Whitehaven News 22/6/95, 3). In July the government abandoned the proposal to put LLW in domestic landfill sites following protests from local authorities all over the county (West Cumbrian Gazette 13/7/95). In September Copeland council joined Cumbria county council in opposing the scheme (West Cumbrian Gazette 14/9/95)

The uncertain future of the nuclear industry in West Cumbria was starting to have an effect by the summer of 1995. Following the announcement of job losses from Sellafield, and more importantly, the end of contracting work at the site, a Copeland council report revealed that Copeland's unemployment levels had risen since April 1994, despite the trend which saw unemployment falling in the other regions of Cumbria, and in the UK as a whole. Copeland's unemployment figures were expected to rise to over twenty percent by 2010. Already by 1995, seventy-two percent of the unemployed in Copeland were long-term unemployed aged between 20 and 40. There were 31 unemployed people for every job vacancy, and seventy-five percent of those job vacancies were only part time. Copeland Borough Council were left hoping for a return to Special Development Area status to help cope as the nuclear industry's contribution to the economy fell (West Cumbrian News and Star 23/6/95, 8).

Questions were asked over privatisation in September 1995 when it was revealed that Nuclear electric would be given a huge six figure fine because a meltdown could have occurred at Wylfa power station because the plant was not shut down when part of a metal crane went missing in the reactor for 9 hours to save money (Guardian 3/9/95 and Today 28/7/95). Although not directly connected to the nuclear industry, the area's social and economic problems were highlighted in July 1995 when riots broke out in the Salterbeck area of Workington (West Cumberland Times and Star 28/7/95).

Plans to counter the county's 'brain drain' also received a set-back in 1995 when the Millenium Commission rejected plans for a University of Cumbria for the Twenty first Century (West Cumbrian News and Star 16/6/95, 7). The prospects for enticing new investment into West Cumbria were not helped much either, when in June 1995, the Lake District Traffic Management Initiative announced plans to curb traffic through the Lakes. Through traffic would be barred from the National Park, and speed limits within the park would be reduced to a maximum of 40 miles per hour (mph). On some roads, including Whinlatter, Honister, Hardknott and Wrynott Passes, only local traffic would be allowed access. On others, lorries, coaches and caravans would be banned, with a 30 mph speed limit for cars. On others, all vehicles other than bicycles and horses would be banned. Whilst the A66 would not be directly affected, traffic which once went through the Lakes roads would have to use it, adding to the tailbacks during the long stretches of single carriageway. Whilst the scheme was proposed to ease noise pollution, and ease traffic congestion in the Lakes, there was considerable concern that it might put off tourists and businesses from coming to the region.

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A three month public consultation was to follow the announcement before any final decision was made (West Cumbrian News and Star 23/6/95, 15; West Cumbrian News and Star 19/6/95,3)

On a positive note, by July 1995, the first of the European Union's Objective Two money for West Cumbria and Furness was coming in. Nineteen million pounds would be available by the end of 1996. A new scheme, entitled Linkstart was also launched in 1995 to help set up small businesses (Allerdale Outlook Summer 1995), whilst plans were announced for a three million pound heritage centre in Maryport. Ironically, given by August 1995, the support for wind power found in this research project, action groups had been established in Pica and Siddick against proposals for nearby wind farms (West Cumberland Times and Star 25/8/95).

A.2 The international situation

International concerns about nuclear proliferation continued to escalate throughout the summer of 1994. In June, Russia announced that it had expelled five North Koreans who had attempted to obtain components for nuclear weapons from the Russian mafia (Daily Telegraph 16/6/94, 1). In mid-August, a 34 year old man was arrested in Bremen in Germany for attempting to trade 0.05 milligrams of (weapons grade) plutonium 239, allegedly obtained from the old Soviet Union (Daily Mail 17/8/94, 12).

The international tension also continued to mount over the possibility of 'rogue' nations, in particular North Korea, developing a nuclear capability. At the beginning of June the IAEA voted 28 to 1 Libyan vote against, to suspend technical aid to the North because of its refusal to permit thorough inspections of its nuclear facilities (Daily Telegraph, 11/6/94, 1). On June 13 North Korea announced its withdrawal from the IAEA, and 43 million South Koreans practised air raid drills as the tension mounted (Daily Telegraph, 15/6/94, 13). Japan proposed that as part of a programme of sanctions, it would ban the transfer of monies from its sizable community of Korean emigres to North Korea, a move which could deny North Korea as much as 1.3 billion pounds a year (Daily Telegraph, 16/6/94, 11). North Korea responded by making threats of violence towards Japan as well as South Korea (Daily Telegraph, 10/6/94, 1). In early August the tension eased when, after talks with America, the North agreed not to develop a bomb capacity and to abide by the NPT in return for being given a civil-use light water reactor to replace their existing graphite reactor, to be supplied

by and financed by South Korea. North Korea was also to receive more official recognition by the USA. By the end of August, North Korea was demanding that the reactor should come from Japan or Russia, rather than South Korea. This jeopardised the whole détente process because the South were reluctant to pay for a reactor which would not be built by their workers (Daily Telegraph 30/8/94, 9). By June 1995, compromise was faltering forwards once more. In return for abandoning their indigenous nuclear programme, North Korea would accept a South Korean built reactor from an American, South Korean and Japanese consortium, but it would be based on an advanced American design. Conveniently for the South, their reactors were actually based on an advanced American design anyway, but there was to be no evidence that the reactor was 'made in South Korea'. Even if this task could be accomplished there was no guarantee that that would be the end of it all, because the North was demanding an extra billion dollars' worth of equipment on top of the four billion the reactor would cost. It would be another five years before the North's nuclear facilities were to be inspected once more (The Economist 17/6/95).

The status of other countries was still causing concern. On August 24 1994, the former Pakistani prime minister, Nawaz Sharif, claimed that his country actually possessed a nuclear bomb. India called upon the international community to persuade Pakistan to halt its nuclear programme, and tension in the subcontinent increased once more (Daily Telegraph, 25/8/94, 10). The effects of the national poverty of other countries was equally disquieting. Ukraine for instance, with little oil or gas resources, and perennially strike-bound coal mines, still operated two of its reactors at Chernobyl in 1994, and planned to re-open a third which had been closed since a fire there in 1991, even though the safety standards of the plant 'scared the daylight' out of the IAEA inspectors who visited that year (The Economist 2/7/94). In order that a second disaster should not jeopardise the status of nuclear power in the West, the EU agreed in June 1994 to give Ukraine money to finish three half-built reactors on the pledge that it shut down Chernobyl immediately, although 'immediately' can mean quite a long time in nuclear terms (The Economist 2/7/94). To maintain Western concerns, reports from Bielarus told how numbers of thyroid cancers in under-fourteen year olds from Bielarus had risen from 2 a year in 1986, to 66 in 1992, and 87 in 1994, with little other explanation apart from the effects of Chernobyl (The Guardian 4/7/95, 11).

The threat of nuclear proliferation was taken so seriously that plans were announced in May 1994 for a UN intelligence body, formed from Britain's MI6, the American CIA and the Russian

Appendix A: Events since the fieldwork was conducted

Foreign Intelligence Service, all working in conjunction with the IAEA to monitor weapons programmes around the world (Sunday Telegraph 29/5/94, 1). By April 1995, a global nuclear summit was organised to extend the NPT. If the treaty was not extended, what fragile control there was of nuclear materials would be lost. Proliferation concerns were already causing disputes between the major nuclear powers, as the USA grumbled about Russia completing the German reactors abandoned in Iran in the 1970s (eventually the Russians promised not to sell militarily useful technology, only that for civil use), and China supplying Iran with two PWRs, and selling the Iranians the technological know-how to manufacture fuel (and thus possibly weapon) manufacturing plants (The Economist 22/4/95). The major powers pressed for, and gained, an indefinite extension of the NPT.

In reciprocation of the agreement, the major nuclear powers had to do more on their part of the treaty, after pressure not merely from the smaller countries but from countries such as Japan and Germany (The Economist 13/5/95). In terms of disarmament, this was progressing well. Russia and the USA were on course to have less than 3000 weapons each by the year 2003. The major five powers also promised to assist any country threatened with or attacked by nuclear weapons, and promised that they themselves would not use their nuclear missiles to attack non-nuclear countries (The Economist 22/4/95). The major countries also pledged themselves (although they were not legally bound) to a comprehensive weapons test ban by 1996, so as to prevent them from developing any new weapons (The Economist 13/5/95).

Problems arose however, when newly elected French President Jacques Chirac's first major policy decision was to resume nuclear testing at Mururoa Atoll in the South Pacific. Since 1992, only China had been conducting weapons tests. The French proposed eight tests in four months in advance of a permanent cessation of tests for 1996. This upset French South Pacific colonies, who demanded independence and trade sanctions, and also signatories to the NPT. The French Socialist, Green and Communist parties condemned Chirac's decision, as did the prime ministers of Australia and New Zealand. The European Union considered taking legal action to restrain France while the British government said nothing (Telegraph 9/8/95). Polls showed that up to eighty percent of New Zealand's consumers were boycotting French goods. The Greenpeace ship the Rainbow Warrior II prepared to sail into the test zone to obstruct the bomb tests (The Guardian 4/7/95, 11; The Economist 24/6/95). Ten years to the day after the first Rainbow Warrior was attacked, French marines rammed the

vessel, and removed it from the test zone, using tear gas to subdue its crew (The Guardian 11/7/95). The test was carried out anyway, leading to riots in the Tahitian capital Papeete (West Cumbrian News and Star 7/9/95, 4).

Appendix B

Sample Copy of the 1994 Questionnaire

THIS IS A SURVEY CONDUCTED FOR THE
UNIVERSITY OF LIVERPOOL

DEPARTMENT OF POLITICS &
COMMUNICATIONS STUDIES

ON THE SUBJECT OF
PUBLIC OPINION - ENERGY AND THE
ENVIRONMENT

IT IS
AN INDEPENDENT SURVEY OF THE
POPULATION OF COCKERMOUTH

IT IS NOT SPONSERED BY ANY
ORGANISATION

IT IS ACADEMIC WORK WITH NO DIRECT
CONNECTION TO EITHER THE NUCLEAR
INDUSTRY OR ANY ANTI-NUCLEAR GROUP

1) Please can you tell me what you think are the most important things to consider when deciding which resources should supply our energy needs.

2) I would like you to think about the energy supply which we need to operate the mechanical and electronic equipment which we use everyday of our lives.

At the moment most of these things are powered by electricity, which is generated in power stations run on coal, gas and nuclear power.

What resources do **you** think we should use to generate our energy supply, both now, and in the future?

3) What resources do you think we should not use to generate our energy supply, both now, and in the future?

4) Please tell me what you think are the advantages for Britain of using nuclear energy compared to other options for energy supply.

5) Please tell me what you think are the disadvantages for Britain of using nuclear energy compared to other options for energy supply.

6) Please tell me what you think are the advantages of having many elements of the nuclear power industry energy sited in West Cumbria.

7) Please tell me what you think are the disadvantages of having so many elements of the nuclear power industry sited in West Cumbria.

8) Please tell me what you think about the options for the safe disposal of radioactive materials.

9) Please tell me what you think about the coverage of the West Cumbrian nuclear power industry by newspapers and by television and radio news programmes at both a local and national level.

10) Are there any newspapers, or news programmes in particular which you think show a bias, either in favour of, or against, the West Cumbrian nuclear power industry?

11) Can you name any groups of people or organizations, either local or national, which oppose the nuclear power industry in West Cumbria?

12) Can you name any groups of people or organizations, either local or national, which support the West Cumbrian nuclear power industry?

13) Have you heard of NIREX?

Have you anything you would like to say about them? Anything at all?

Do you think their presence in West Cumbria is a good thing or a bad thing?

14) Have you heard of British Nuclear Fuels (BNFL)?

Have you anything you would like to say about them? Anything at all?

Do you think their presence in West Cumbria is a good thing or a bad thing?

15) Have you heard of the organization Cumbrians opposed to a radioactive environment (CORE) ?

Have you anything you would like to say about them? Anything at all?

Do you think their presence in West Cumbria is a good thing or a bad thing?

16) Have you heard of Friends of the earth?

Have you anything you would like to say about them? Anything at all?

Do you think their presence in West Cumbria is a good thing or a bad thing?

17) Do you have the impression that most people in Britain support or oppose the nuclear power industry?

18) Would you say that you yourself support or oppose the nuclear industry?

19) Have you ever taken any action in support of that opinion?

If not, why not?

20) Would nuclear power be an important issue in deciding which way you vote?

21) Have you ever :

- a) - avoided using certain products that harm the environment?
- b) - taken part in any recycling schemes for paper, glass, cans etc?
- c) - watched any TV programmes on nuclear issues? (If so, can you name them?)
- d) - heard any radio programmes on nuclear issues? (If so, can you name them?)
- e) - seen any films about the nuclear power industry?(If so, can you name them?)
- f) - seen any adverts advertising the nuclear industry in newspapers, on TV, in posters, etc?
- g) - seen any adverts opposing the nuclear industry in newspapers, on TV, in posters, etc?
- h) - heard of any celebrities who support or oppose the nuclear power industry?
- i) - met or seen people in the street who were actively campaigning in favour the nuclear power industry?

j) - met or seen people in the street who were actively campaigning in opposition to the nuclear industry?

k) - been to Sellafield?

l) - talked to family and friends about issues related to nuclear power?

(Please circle the appropriate answer)

1) Are you MALE / FEMALE ?

2) To which of the following age groups do you belong?

15-29	30-44	45-59
60-74	75+	

3) How long have you lived in W.Cumbria?

Less than 2 years	2-5yrs	
6-10yrs	11-20yrs	21-30yrs
31-40yrs	over 40yrs	

4) Which of the following best describes your employment status?

a) working b) self-employed
c) unemployed/on government schemed
not currently seeking employment

5) Do you now, or have you ever, worked in the nuclear industry or for any company involved in the nuclear industry?

YES NO

6) Do/Have any of your family?

YES NO

7) Do/Has anyone you know?

YES NO

8) Are you a member of any "green" or environmental organization?

YES NO

If YES, which ?

9) Do you think your livelihood depends upon the nuclear power industry?

YES NO

22) What are the first few things that come into your mind when you hear the phrase "nuclear power"?

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British Nuclear Industry Forum

Building Services Research and Information Association (Environmental Section)

Centre for Environmental Initiatives

Centre for Energy and the Environment, Exeter University

English Nature

UK Global Environmental Research Office

Institute of Mechanical Engineers

Liberal Democrats

National Energy Foundation

Newcastle Photovoltaics Applications Centre

Solar Trade Association

The Association of Consulting Engineers

The Landscape Institute

Uranium Institute