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THE PUBLIC AND THE POLLUTER : A LOCAL PERSPECTIVE OF RE-CHEM'S PLANT AT PONTYPOOL

SIÂN PHIPPS

School of Geography
University of Leeds
Leeds LS2 9JT

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Introduction

Society is faced with something of a dilemma over the location of facilities that are either potentially or perceived to be an environmental risk. On the one hand, facilities which produce, process or dispose of hazardous or toxic substances are indispensible to the workings of a developed, industrial economy, and if they manage these services safely, such installations benefit the welfare of society as a whole. On the other hand, the same facilities are becoming increasingly unacceptable to the people who live in their vicinities. The costs and benefits to these local people are, naturally, unique for each technology and for every geographical location, but growing hostility to sites or installations of perceived or potential risk (a condition often referred to as Not In My Back Yard or NIMBY) is an increasingly common - and problematic - phenomenon.

The NIMBY syndrome is, however, too simplistic an explanation of local opposition to be applied to all instances where public concern for some local technology has been expressed. The response from those in authority often appears to be unsympathetic, considering local fears to be 'irrational', 'emotional', the result of ignorance or 'misperception', but to ordinary people, their own perceptions may be perfectly 'rational' in light of their very different beliefs, values, experiences and social backgrounds. It is this all too apparent clash of interests and ideologies that has become the focus of a growing body of literature, both theoretical and empirical, on the ways in which different people perceive environmental risks.

This Working Paper provides the basis for one chapter of a proposed thesis on public attitudes towards environmental risks. The aim of the thesis is to build upon existing literature and gain greater insight and understanding of ordinary people's attitudes and concerns for themselves and their environment by studying local perceptions in two contemporary environmental controversies - the nuclear reprocessing plant operated by British Nuclear Fuels Limited (BNFL) at Sellafield in Cumbria, and the case presented here - the chemical incineration plant owned by Re-Chem International Limited at Pontypool in Gwent.

1 Re-Chem International at Pontypool

Re-Chem International Limited, a waste processing firm, currently operates two regional plants in the United Kingdom - Pontypool (Gwent) and Fawley, near Southampton. The company shut down its third plant at Roughmute in Stirlingshire in October 1984 for economic reasons, and in December 1985, Re-Chem's management bought out the company from the British Electric Traction (B.E.T.) Group for £1.6 million.

Re-Chem's plant in Panteg, Pontypool, has been processing waste since 1974. Organic wastes are incinerated at high temperatures (up to 1200°C), while other wastes are chemically treated and converted into innocuous liquids or solids (Re-Chem, 1984). Treated waste is disposed of either by land fill, or in the case of liquids, through the sewers. More than 90% of the processed waste is composed of materials such as bleaches, detergents, battery acids, paint wastes and so on; the remainder is made up of more toxic - and controversial - substances such as cyanides, pesticides, drugs and polychlorinated biphenyls (PCBs). Most of the work handled at Panteg comes from Welsh industry, although waste is also imported from abroad.

2 Context of the controversy

Re-Chem's history has been fraught with controversy ever since it came to Pontypool. Welcomed, by some, as a source of much needed employment in the area, and the prospective pioneer of a series of industries to be attracted to the region, local residents were nevertheless critical of the planning process which approved the siting of a waste processing plant in a densely populated area and on a valley floor (micro-climatic conditions are not always conducive to the dispersion of chimney emissions).

In 1978, Re-Chem was the centre of a controversy concerning its contract (later terminated as a result of 'public concern') with a US company to destroy American stocks of kepone - a pesticide widely used in the States until it was discovered to have caused toxic symptoms in workers producing and handling the material (Western Mail, April 1978).

Five years later, in May 1983, Re-Chem was implicated in an argument concerning the possible import of 41 barrels of dioxin from the continent for disposal at its Panteg plant (Western Mail, May 1983). The dioxin was allegedly the same material which had caused the Seveso disaster in Northern Italy in 1976. Then (the Western Mail reported) an explosion at a chemical factory had sent a cloud of dioxin across the surrounding countryside, killing thousands of animals, destroying crops and vegetation

and leading to the evacuation of hundreds of local people. The possibility of importing the waste into this country was quashed, however, amid fervent local opposition.

The most recent controversy concerning Re-Chem emerged later on in 1983 when deaths and deformities in cattle, and eye defects in human babies were blamed (in Scotland at first, and later in South Wales) on the company's practice of incinerating PCBs. (Glasgow Herald, October, 1983).

The issue has remained very much 'live' ever since - the closure of the Roughmute (Bonnybridge) plant, local lobbying by residents, MPs and councillors for a full, independent inquiry into the environmental impact of the plant at Pontypool, frequent letters and articles in local (and occasionally national) press, and television coverage in the form of documentary reports.

In addition to these more significant episodes in Re-Chem's history, other incidents have included a spillage of inflammable wastes during transportation to the Pontypool plant in 1978 when nearby residents were evacuated; local opponents of Re-Chem taking the company to court in the same year (although charges were eventually dropped); and in September 1984, workers were affected when a solvent containing Bromine leaked from Re-Chem's Southampton plant - an incident for which the company were fined £1000 in the following March.

This chequered past should be considered when discussing the present debate on Re-Chem's operations. An historical perspective reveals that current controversy is merely the latest stage in the gradually worsening relations between company and public - the product of years of intermittent publicity 'scares' and local rumour which have both alerted and enhanced local alienation, suspicion and fear. Re-Chem's present image in the public eye is overshadowed, therefore, by local experiences and perceptions of the past.

Historical legacy, however, is not the only reason why Re-Chem has become, in local minds, such a contentious issue - emotionally and politically. The rôles of science and government have been significant for increasing the heat and intensity of local debate. On the part of science, there is firstly a lack of scientific knowledge on the chemistry of PCB incineration. A conference on the incineration of toxic waste held in Cwmbrân in April 1985, revealed that although the 'safe' incineration temperature for PCBs, and the minimum length of time for which this temperature must be maintained in order to completely destroy the material are generally agreed upon, the cumulative toxicity of dioxin compounds, their long-term effect on people and

on the environment, what constitutes a 'safe' or 'lethal' level of exposure and so on, are subjects about which very little is known (Hay). Further research into these subjects is hampered by financial costs and the availability of analytical techniques. Secondly, scientific inquiries which have been carried out in both Scotland and Wales (Lenihan, 1985; Eggleton, 1985; Welsh Office, 1985) have been unable to either prove or disprove an alleged link between the operations of Re-Chem plants and the occurrence of highly publicised deaths and deformities in livestock and eye defects in human babies in the vicinity of those plants. Science, therefore, can give no credibility nor assurance for the continued incineration of PCBs; neither does it provide any substantiation for the allegations of deformities made against the Re-Chem company.

In much the same way, the government, too, has lacked the authority and the conviction to mollify local concerns. Its attitude towards the Re-Chem controversy has, up till now, been one of disinterestedness and a reluctance to commit itself to a full, independent, 'public' inquiry into either the Pontypool or Bonnybridge plants - an attitude that seems unlikely to change. There is very little sign, therefore, that serious consideration has been given to the nature of local feelings, nor indeed, to a constructive policy of resolving local unrest.

The facts remain, therefore, that Re-Chem operates under the formidable legacy of a controversial past; that the company's arguments for the continuation of its present operations are based on its faith in science and technology - a science already known to be incomplete and inconclusive, a technology that may be advancing but which, as employed at Pontypool has been criticised for its inefficiency (Kleppinger); that the government continues to adopt a laissez-faire approach towards local pleas for a public inquiry; and that such an attitude seems unlikely to change - one that can only lose the government both face and faith as far as the local public is concerned.

3 The case for research

The topicality of the Re-Chem controversy has been outlined in the previous section. There are a number of other reasons, however, which justify the study of public opinion in this particular context.

Firstly, information on local attitudes and perceptions towards Re-Chem is relevant in an academic context. Risk perception literature has, in the past, relied on empirical examples to serve as media through which to conceptualise various aspects of the discipline - public attitudes towards different kinds

of risk (nuclear, industrial, household), perceptions of authority or specific institutions, the impact of actual events or certain sources of information, the influence of individual attributes such as age, sex and occupation on belief formation, and so on. A social survey into the attitudes and concerns of people living around Re-Chem's Panteg plant is designed to add to empirical literature in this field.

Secondly, information on how people feel and express themselves on certain issues may be of importance in a policy-related context. The Re-Chem debate has received 'official' attention in the form of several studies: the Eggleton (Harwell) report on dioxin, furan and PCB levels measured in the vicinity of Re-Chem's Scottish plant (Eggleton, 1985); a Welsh Office review of congenital malformations in Wales with particular reference to the Gwent and Torfaen areas (Welsh Office, 1985); and the Scottish Office report (Lenihan, 1985), on morbidity levels in the Bonnybridge and Denny districts of Stirlingshire. All three of these studies concerned the physical implications of Re-Chem plants and found no significant evidence to suggest that either posed a threat to human and animal health or to the environment. As is so often the case in these debates, however, no official inquiry attempted to assess the socio-psychological effects of recent publicity on the local residents of the Panteg plant. These are the people who have to live and cope with the potential 'risks' - real or imagined - that have been associated with their local environment, and it seems appropriate that medical, chemical and environmental angles of inquiry should be complemented by a consideration of the human aspects of the debate.

A third reason to justify choosing Re-Chem as a case study concerns the orientation of previous research in the pursuit of a thesis on public attitudes towards environmental risks. A social survey has already been carried out in Cumbria regarding local attitudes towards British Nuclear Fuels Limited (BNFL) and its nuclear reprocessing plant at Sellafield. Naturally, nuclear and chemical installations are characterised by their own very special set of issues and considerations, but the Sellafield and Re-Chem cases also display some obvious similarities - both a focus for controversy where research in the form of a social survey would not unduly arouse local anxiety; cases where scientific knowledge is far from complete on the potential or perceived risks involved; controversies which have received considerable 'official' attention in the form of scientific inquiries; and in neither case had these official studies been complemented by research into the feelings and perceptions of the people who are living in the immediate vicinity of the two installations. There is scope, therefore, for some deep,

comparative analyses to be made. Searching for more general trends in different contemporary environmental debates appears to be an attractive proposition considering their increased moral, social and political significance. The study of such debates is relevant when they can be seen not only to reflect the intricate workings of power, planning and politics and the changing face of public awareness and influence, but when the process and outcome of such debates affect future relationships between man and between man and his environment.

4 Risk perception : the state of the art

Research into public attitudes towards risk has concentrated, in the main, on the nuclear power industry; there exists a rich, substantial body of empirical and theoretical literature in this field. Research on risks associated with the chemical industry, however, does not share the same breadth and depth of analysis. Studies have tended to concentrate on technical estimates of risk - predicting the effects of accidents or emergency planning for example - rather than examining lay attitudes of risk. Other research has considered public perceptions of chemical risks, but either consists of mainly raw opinion polls as opposed to in-depth analyses, or has included the chemical industry within studies with broader terms of reference - the Social and Community Planning Research (SCPR) Report for example, which addressed public perceptions of nuclear, industrial, household, chemical and other risks (Prescott-Clarke, 1982). Socio-psychological research in a chemical context is meagre, therefore, when compared to developments in the nuclear field. In seeking to account for this, it could be argued that much research on public perceptions of nuclear power has been sponsored by organisations with a vested interest in the results - the C.E.G.B., for example, keen to know how it is regarded by people living close to its nuclear power stations (University of Surrey, 198), or the Department of the Environment, intrested in public attitudes towards radio-active waste management (University of Surrey, 1983) - a phenomenon not so characteristic of companies in the chemical industry. There are other reasons, of course, why research has concentrated on the nuclear industry - reasons ad infinitum owing to the colossal significance of nuclear power in technological, political and environmental walks of life.

There seems little reason, however, why concepts and methods developed in the nuclear field of public perception cannot be applied in a chemical context. There exists a large body of literature on the 'fundamentals' of risk perception - Fischhoff et al (1981) for instance on the 'qualities'

discerned between different kinds of risk. People may vary in their attitude towards a risk according to its perceived effects - chronic or catastrophic; whether that risk is controllable or out of their control; whether the risk occurs naturally or is man-made; whether they face a risk voluntarily or involuntarily and so on. Concepts such as these, however, tend to focus on the individual nature of the risks themselves as opposed to offering insight into the formation of people's perceptions and attitudes. More lucid commentary on the variations between different people's perception of risk is offered by the Royal Society (Lee, 1983) with its identification of key factors believed to influence individual perceptions eg. a person's level of knowledge about the risk in question; the perceived benefits or costs represented by that risk; 'culpability' - the degree to which a person is voluntarily exposed to a risk, and the recognition of authorities responsible for the management of a risk; familiarity with a risk source; the mental capacity to conceptualise and evaluate the elements of a risk; and the social context and behavioural 'norms' of individuals. Such factors have been widely addressed in a nuclear context, but the idea of adapting them to a case such as Re-Chem is equally attractive both to complement and contrast the findings that have emerged.

More recently, risk perception has become a focus for cultural theorists, Thompson (after Douglas) especially in his analysis of the energy debate (Thompson, 1982). The main argument of the cultural approach is that cultural filters shape people's perception of objects and events in accordance with their own social and moral contexts - confirming existing beliefs, blocking out information that contradicts or invalidates those beliefs. In this way, people may belong to one of a (limited) number of cultural 'biases' (styles), each bias preserving its own basic moral principles from outside competition. An individual, therefore may adopt a certain attitude towards, for example, a potential or perceived risk and feel justified in doing so, given his background, experience and knowledge. The advantage of such an approach, although little tested in reality, is that it enables us to use terms such as 'risk' in a differentiated way, attempting to understand people's perceptions of control and responsibility to it, and not dismissing those perceptions which depart from the 'dominant' or institutional 'norm' as being 'irrelevant' or 'unjustified' within the debate on risk as a whole (Wynne, 1983).

Not so much related to the 'state of the art' of risk perception analysis, but nevertheless a significant element of the setting for research into public attitudes towards chemical installations, is the spate of accidents

and disasters which have recently occurred within the industry. Leaks and explosions have been brought to public attention on a national and international scale - the dioxin leak at Seveso in 1976 (cf page 3), the Flixborough disaster of June 1984 when an explosion at the works of Nypro (UK) Ltd killed 28 people and injured 36 others (HSE, 1975), and more recently, 1984 saw two catastrophic events - one at Mexico City in the November when a gas explosion at an installation owned by the Mexican state oil monopoly, Pemex Limited, killed an estimated 1000 people (New Scientist, 29 November 1984), and the other in the following December at Bhopal, India, when a gas leak from a pesticide plant owned by the American chemical firm, Union Carbide, killed more than 1000 and injured more than 20,000 people (New Scientist, 6 December 1984).

Not only has public awareness been awakened to such incidents, but in recent years, the effects of continuous chemical discharge and the use of certain chemicals have also come under increased public scrutiny from health and safety points of view - kepone, asbestos, agent orange (245 T) are just a few examples.

Against such a background - one that touches upon environmental, political, technological and social walks of life, research into the perceived risks of the chemical industry appears even more relevant and worthwhile.

5 Valley Setting : the local community and area

While it is obviously crude and naïve to think in terms of regional 'prototypes' when describing various parts of the country, it is, nevertheless, important to recognise and appreciate nuances in local colour and character. Differences in local 'cultures', although difficult to quantify or explain can be 'sensed' in terms of an area's political history and awareness, its social networks, behavioural 'norms', its attitudes towards government and authority, its dialect, humour, language and self-expression. An appreciation of environmental context does have a contribution to make when considering the particular qualities and significance of certain local debates - throwing light on individual comments and opinions perhaps and thereby gaining a better understanding of local perceptions, or helping to account for the peculiar setting and course of developments associated with one particular issue of contention. General risks, after all, are an inherent part of the environment in which they exist, and it is with these thoughts in mind that the following section aims to provide some broad indicators of the human and physical backcloth to Re-Chem's local surroundings.

Re-Chem's plant is situated about two miles south-east of Pontypool in the village of New Inn, Gwent (see Figure 1). Well accessed by road and eight miles north of Newport, this area is the gateway to the Eastern valley of South Wales, the eastern edge of the coalfield. A region of contrasts, landscape, settlement and economic tradition vary from the industrial valleys of the north and west, to the valuable farming and pasture lands of the Usk valley to the east, to the New Town of Cwmbrân and the coastal plain to the south. Once important for its heavy industries of coal, iron and steel, the present day picture consists more of lighter industries on modern estates. Major local employers remain at ICI Mamhilad, the Royal Ordnance factory at Glascoed and Lucas Girling Pontypool, but unemployment levels (from the 1981 Census) within the borough of Torfaen are consistently above the national average - 15.9% as a whole, ranging from over 22% in one ward to the lowest figure of 7.1% in New Inn itself. Re-Chem's own contribution to local employment is about 54 jobs (among a potential workforce of 54,673 men and women), although several of these are skilled, managerial posts 'imported' from outside the area. Of those people in employment, industrial manufacturing occupies the greatest number, while the female economic activity rate for Torfaen is marginally above the national average at 57%.

Further contrasts within Torfaen are borne out by housing tenure characteristics. New Inn, until recently, was a well sought after place to live, with considerable new building on private estates being undertaken over the last ten years or so. Within the village, 71.2% of homes are owner occupied, 25.3% rented from the council or new town - Borough figures average 40.8% and 54.8% respectively. Further evidence of greater affluence among New Inn residents is the fact that 76% of households own a car - 15% more than the average for Torfaen.

The social and industrial traditions of Torfaen are reflected in the political bias of the local people. Torfaen itself is strongly Labour-controlled, Leo Abse being its representative in the House of Commons. The neighbouring boroughs of Islwyn and Blaenau-Gwent are also Labour strongholds, the seats of Neil Kinnock and Michael Foot respectively. To the east the Monmouth and Newport-East constituencies favour Conservative politics, but the European Parliamentary representative for South East Wales remains Labour. It is Llewelyn Smith, Euro-MP, and Leo Abse who have been the main parliamentary campaigners in the Re-Chem debate.

Agitation by local politicians against Re-Chem International has been paralleled by local protest which is both active and vociferous. Greater

consideration is paid to local involvement in later sections, but is is enough to state here that opposition to Re-Chem is widespread, organised through three main action groups and has been given considerable (and generally favourable) publicity by the local media.

It is hoped that the background information supplied so far has been of value in placing Re-Chem International into some sort of local perspective. The people who originally welcomed the arrival of a chemical waste processing plant over ten years ago to boost local employment, and who are still in very great need of new job opportunities, have become the company's greatest opponents. In an area with a traditionally socialist outlook, attitudes have never been favourably disposed to Welsh Office bureaucracy, even less to a Conservative Government. Suspicion and doubt concerning authority and politicians alike, therefore, are almost an inherent part of local philosophy - an observation which has significant repercussions for many of the issues discussed in the following sections.

6 Research design

It was apparent from background knowledge and media reports that there was much local hostility towards Re-Chem, and that local concern for the risks perceived to be associated with the plant were high. The objectives in carrying out a social survey in the New Inn area were directed at two levels of inquiry. In a thesis-related context, the objective was to use empirical information of the way in which ordinary people perceive a potential environmental risk such as Re-Chem as a basis for more theoretical and insightful commentary on public attitudes towards risk. In a case study context, the objective was primarily to examine local attitudes and the way in which concern was both engendered and expressed. Of secondary interest was the comparison of this impression with the image the media had portrayed.

A questionnaire was compiled which allowed not only for the tabulation of answers in a format readily suitable for computer analysis ('graded' questions), but it also included questions which permitted respondents to answer freely in their own words ('open' questions). Together with a letter outlining the aims of the survey (see Appendix) and a 'Freepost' envelope for replies, the questionnaires were hand-delivered to 782 people living in the immediate vicinity of the plant. This 'immediate' vicinity included New Inn itself, Griffithstown and Sebastopol, the three residential areas within a $1\frac{1}{2}$ to 2 mile radius of the plant (see Figure 2). Names and addresses were systematically sampled from electoral registers, making up an

8% sample of those people eligible to vote. In addition, 20 names were randomly sampled from the New Inn area (taking care not to overlap with the postal sample) as people to be interviewed. These interviews were carried out at the same time as the rest of the questionnaires were being delivered: if a prospective interviewee was not at home, then neighbours were called upon (again, avoiding an overlap with the postal sample).

The response rate to the survey varied between the three areas, but overall 240 (31%) of the questionnaires were returned - a rate not unusual for surveys of this kind. The age and gender characteristics of the respondents are given in the following table:

Table 1 Age and gender characteristics of respondents

Age

	16-25	26-35	36-45	46-55	56-65	Over 65
%	14.2	18.2	23.3	15.0	17.9	9.6

[Missing cases : 1.7%]

Gender

	Female	Male
%	42.1	57.9

Before discussing the findings of the survey, it is appropriate to relate a series of incidents which may, or may not, have influenced both the rates of response and the nature of the results that emerged.

At the same time as the first questionnaires were being distributed, Re-Chem - notified in advance of the content and aims of the survey - released a press statement which condemned the project for a number of reasons: it questioned the legitimacy of the survey's motives, the credibility of its organisers, the integrity and objectivity of the funding bodies and criticised the wording of the questionnaire as 'extremely biased'. Despite further exchanges through the media, the company retained its initial interpretation of the survey's objectives and continued to discredit its validity - comments which were picked up by the local (and later, Yorkshire) press and Welsh television and radio.

It is pure speculation as to the impact of this publicity on people who received questionnaires and failed to return them. However, from the comments of people who did reply, it appeared that some opposers of Re-Chem

saw the survey as a means of helping them achieve a public inquiry, others as a way of 'getting at the real facts'. Three respondents iterated the comment made by Re-Chem in its press release that the survey was 'biased' or a 'complete waste of taxpayers' money'.

The experience from this at least served to emphasise that risk perception studies can never be cocooned from the wider political implications of the discipline, and to demonstrate that if it is so easy for people to construe such different interpretations of a single letter, it is hardly surprising that on more complex issues such as risk, attitudes and perceptions become so diverse.

7 Attitudes towards Re-Chem

The first question of the survey which asked people how they currently felt towards Re-Chem (a choice of 'in favour', 'mixed feelings', 'against', 'indifferent', or 'cannot say') produced the following result:

Table 2 Attitudes towards Re-Chem

	In Favour	Mixed Feelings	Against	Indifferent	Cannot Say
%	6.3	18.3	72.5	2.5	0.4

(Graded answers)

Such a degree of expressed opposition to the plant confirmed the impressions already gained from media reports and echoed the company's own admission that,

> 'We are under no illusions about our rating in the popularity stakes .....'
>
> (Malcolm Lee, Managing Director of Re-Chem, 3.4.85)

However, one of the aims of the survey was to consider and explain the whole spectrum of local attitudes towards Re-Chem, so the considerable number of people (nearly 25%) who expressed either mixed feelings on the subject or who were in favour of the company, should not be dismissed as an insignificant minority. A second question, asking peoply why they felt in the way they did served to throw some light on the very different attitudes revealed by the table above.

For those people who said they were against the plant, the main cause of discontent was the smell and smoke emitted from the stack. Another major

reason for hostile attitudes was that people believed the plant had been wrongly sited - in a valley and in a residential area. Other comments people made were that the plant was a health risk (both real and potential risks were perceived); there was the risk of an explosion or leak; and that the plant was polluting the environment. The list below provides a fuller summary of the comments most frequently mentioned:

Table 3 Reasons why people are against Re-Chem

(Open answers)	Frequency
Nuisance from smell and smoke emissions	66
Wrongly sited	54
Health risk	39
Pollutes the environment	20
Risk of an accident	17
Because of the nature of materials handled	13
Risk of congenital defects	7
Company guilty of hiding facts	5
Uncertainty of it all	5
Because waste is imported	4
Risk of dioxin poisoning	3
Other reasons	26
	259*

[No reason given: 8]

[* The 'frequency' column in all tables refers to the number of times a particular comment (or sentiment) was made. Totals do not add up to the 240 people who responded to the survey because some people made more than one comment; others made no comment at all.]

People who expressed mixed feelings towards Re-Chem seemed to be tied between some of the feelings listed above (chiefly that the plant was wrongly sited or posed a health risk) and factors such as the need for installations like Re-Chem which carefully dispose of toxic wastes. The employment it provides in the local area also seemed a major consideration. Other people seemed either confused by conflicting information concerning the safety aspects of the plant, or believed that no conclusive evidence had been produced by either side to confirm their argument in the debate.

People who were in favour of the Re-Chem plant iterated these remarks and added a few of their own:

Table 4 Reasons why people are in favour of Re-Chem

(Open answers)	Frequency
Provides employment	8
Fulfils a necessary rôle by safely disposing of waste	7
Expert opinion says it's safe	4
The company are being hounded	1
They are a scapegoat for other industries in the area	1
There are other more worrying risks to think about	1
	22

[No reason given: 5]

It should be made clear here that other respondents - who were not in favour of the company - did acknowledge the important service to industry provided by Re-Chem in disposing of waste properly and on one site. Other factors - such as have been mentioned - tended to outweigh the advantages the plant represented, however.

Reasons for 'indifference' towards Re-Chem (only six people fell into this category) were chiefly because people felt they were not affected in any way by the plant at Panteg - a significant minority.

The next question asked people whether their attitude towards Re-Chem had ever changed over time, and if so, how feelings had altered and what had been the cause of that change. It is recognised that retrospective questions, especially in situations where respondents are asked to recall distant events or perceptions, do not always produce reliable results. However, the aim of this particular question was to examine whether local people have always been antagonistic towards Re-Chem as section 2 would suggest. This supposition was, in fact, largely found to be the case. The vast majority of people (81.3%) answered that their attitude towards Re-Chem had always been the same; only 16.7% said that their opinion had changed. Of this minority (of 40), only two people remarked that their attitude had become more favourably disposed towards the company: this had been the result of experts declaring the plant to be 'safe'. Of the others, most had experienced a worsening of

opinion - as a result of recent publicity (the closure of the Bonnybridge plant, the allegations of congenital defects for example); previous ignorance of the nature of operations carried out at the plant; a recent move to the area; while about four people stated that the emissions from Re-Chem's stack had worsened of late.

In order to gain greater insight into local hostility towards Re-Chem, people were asked how the plant's existence affected the financial livelihood of their households. It is an accepted concept in risk studies (Royal Society, 1983) that compensation or benefits may have an important influence on people's perception of a risk - the advantages of employment opportunities, indirect benefits and consumer products, for instance, may outweigh the perceived disadvantages of living close to a risk source. While economic factors are obviously not the overriding criteria in helping to explain variations in risk perception, they are, nevertheless highly significant - at Sellafield, for example, where the plant's economic impact is an inherent part of the local social and political fabric (Macgill and Phipps, in press). In cases such as Re-Chem, however, where workforces are smaller, the local benefits of living close to a plant may be insignificant when compared to gains made at a national level. The following table for the perceived financial effects of Re-Chem's existence not only reflects this but requires even further explanation.

Table 5 Re-Chem's financial effect on household livelihoods

	No effect	An Advantage	A Disadvantage	A Combination of both
%	70.4	1.2	27.5	0.8

(Graded answers)

While most people consider themselves to be unaffected by Re-Chem's existence, and few to be directly advantaged by it, the table shows that a considerable percentage of respondents believe themselves to be at a financial disadvantage. The reasons for this were revealed in a second question which asked people to explain the answer they had given.

Those people who considered Re-Chem to be to their financial disadvantage gave the following main reasons:

Table 6 Why Re-Chem is a disadvantage to household livelihoods

(Open answers)	Frequency
Devaluation of property	33
Property difficult to sell	22
Reduces attractiveness of area	6
Deters firms from coming to area	5
Affects sale of garden/farm produce	3
	69

[No reason given: 2]

Other comments of interest included one made by two individuals who said they now had to spend more money on maintenance costs to their homes as a result of the stack emissions from the plant, while another spent more money on medicines because of illness which he said was caused by these emissions. All of these complaints, however, were mostly confined to the New Inn area - the area nearest the plant. A crosstabulation between answers given to Re-Chem's effect on household livelihoods and the residential area of the respondent revealed that 40% of New Inn respondents believed they stood at a financial disadvantage, an opinion shared by fewer than one in 10 people from the other two areas.

It is a phenomenon which has attracted some attention, although, obviously estate agents are reluctant to broadcast an opinion on the subject. An article in the Western Mail (Wales's largest circulating newspaper) on 23 May 1985 commented on the fall in house prices in New Inn and the reduction in interest as regards property in the village, as did the South Wales Argus that month, while PEPA (Panteg Environmental Protection Association, one of the leading protest groups against Re-Chem has undertaken a study of the property market in the area (South Wales Argus, May 1985).

The financial advantages experienced by (only 3) respondents from Re-Chem consisted in indirect, spin-off effects such as increased custom from workers at the plant or business relations with the firm. None of the respondents actually worked for Re-Chem itself.

8 Perceived risks and local concern

People were asked to indicate the degree of concern they felt for different aspects of the environment potentially at risk - for oneself, other adults, children, the unborn, livestock and the environment itself. Table 7 reveals the priorities for concern that emerged:

Table 7 Levels of concern %

(Graded answers)

	Not at all Concerned	Concerned	Very Concerned	Cannot Say	Missing Cases
Unborn children	5	16	67	4	8
Children	8	20	66	2	5
The environment	7	23	63	1	5
Livestock	9	26	50	5	10
Oneself	14	33	50	2	2
Other adults	11	34	48	3	4

Such depth of local feeling and concern tended to confirm the impressions gained before the survey had been carried out - from the media and personal experience for example. Greater insight into this picture was obtained by crosstabulating levels of concern with other variables such as age, sex and areas of residence; significant* relationships are recorded below.

Residential area was found to have a bearing on the extent to which people were concerned for their children and the unborn - respondents from New Inn appearing to be more concerned than those from Griffithstown or Sebastopol. The relationship is not merely a question of distance from the plant, however; some parts of New Inn are further away than other parts of Griffithstown or Sebastopol. It is more a case of New Inn being most affected by the emissions from the plant. As regards the influence of other variables, the youngest age group (16-25 year olds) and the two eldest age groups (people over 56) tended to be the least concerned for their own personal risk - nearly a third of people over 65 were 'not at all concerned' for themselves. As for gender,

* 'Significant' in the statistical sense where the chi-square significance level for all the crosstabulations was below 0.05. This is the level at which two variables are considered not to be independent and where the distribution of cases over the cells is significantly different from expected cell sizes.

women tended, on the whole, to express slightly more concern, but on only two counts was the difference between the sexes statistically significant: for the potential risk to oneself, 19% of men as opposed to 8% of women were 'not at all concerned', and as regards risk to the unborn, 9% of men compared to 1% of women were similarly unconcerned.

People who had expressed a concern for potential risks they associated with the Re-Chem plant, were asked to write, in their own words, what they believed those risks to be. A variety of perceived risks were mentioned : the main ones are listed in the table below. It can be seen that certain of these perceived risks may overlap ('accidents' and 'the risk of human error' for example), but the aim was to stick as closely as possible to people's original wording.

Table 8 Perceived risks as a result of Re-Chem's activities

(Open answers)	Frequency
Pollution of the environment	109
Risk to general health	74
Risk of congenital deformities	50
Unknown, long-term effects	33
Accidents (explosion/fire/leaks)	31
Risk of cancer/leukaemia	20
Inefficient incineration	15
Fear of the unknown	13
Risk of human error	12
PCB/dioxin contamination	12
Repetition of other disasters	10
Others	23
	402

[No answer given : 25]

Some of the risks listed above require further comment. Firstly, as regards 'pollution of the environment', some people went into specific detail eg. pollution of the air (35), soil (6) or river and water supplies (6). Others referred to contamination of the food chain - locally grown crops and vegetables (13), pasture land (8) and milk supplies (5) - while 4 people expressed concern that Llandegfedd Reservoir nearby (which supplies water to Cardiff) could also be affected.

Secondly, 'general health' is a term used to embrace a variety of ailments that people either attributed, or thought might be attributed to Re-Chem's emissions - lung and throat infections, coughs, catarrh, eye irritations, skin disease, headaches and nausea. Respondents who stated that they actually suffered from such complaints tended, on the whole, to live in the New Inn area. It is noticeable that the perceived risks from Re-Chem were mostly of these two kinds - risks to the environment and to general health - and not so much concerned with the question of human and livestock deformities which had been given so much publicity (although these were mentioned by about 20% of people).

As regards the perceived risk of an accident at the plant, all but three of the people who expressed concern lived in New Inn - again indicating the significance of proximity in accounting for differences in local perceptions.

Concern for the risk of 'inefficient incineration' stemmed from news reports and rumour circulating in the area regarding the 'safe' incineration temperatures of PCBs. Leading scientific experts (eg. Professor Christopher Rappe of Sweden) had specified that PCBs had to be burned at a minimum temperature of 1100^{o}C for at least two seconds in order to be properly destroyed. Incineration at any temperature below this would result in the formation of deadly polychlorinated dibenzo dioxins (PCDDs) and polychlorinated dibenzo furans (PCDFs). There had been much criticism from local activist groups that Re-Chem's furnaces were unable to achieve these 'safe' temperatures once their doors had been opened for loading. Another rumour, also circulating among the local community had caused some alarm by suggesting that black smoke was often an indication that sufficient incineration temperatures were not being met, and as the emissions from Re-Chem vary in colour and are not infrequently black, local concerns were naturally aroused.

The term 'other disasters' was separated from the risk termed 'accident' because specific incidents were named - Flixborough, Seveso, Sellafield, Bhopal and Southampton - implying that people had been affected by accidents in other places and perceived similarities between these and the Re-Chem case.

The next question attempted to put concern for Re-Chem into some sort of local perspective - assessing the relative importance of concern for Re-Chem against a series of other more general risks and problems - unemployment, road accidents, smoking, nuclear war, disposal of radio-active waste, vandalism and violence, family health, chemical pesticides and other cases of

environmental pollution. Respondents were asked to tick those of the above which concerned them more than the risks associated with Re-Chem, a method of questioning that was perhaps not very successful in retrospect (since an unticked box could indicate either 'no concern' or an unanswered question) but the results produced were as follows:

Table 9 Other risks

	% more concerned about this than about Re-Chem
Disposal of radio-active waste	49.2
Family health	39.6
Risk of a nuclear war	36.7
Chemical pesticides	27.1
Other environmental pollution	25.8
Vandalism and violence	23.7
Unemployment	21.2
Smoking	17.9
Road accidents	10.0

A number of people (7) wrote on their questionnaire that several of the 'risks' listed above concerned them 'as much as' those associated with Re-Chem. Some others (9) stated that although all of these subjects were worthy of concern, Re-Chem was a very different case - an immediate, localised threat with which they were confronted on a day-to-day basis.

A further question attempted to find out if there were any other installations in the local area that also gave cause for concern. The following were mentioned; several people commenting that some of these were as guilty as Re-Chem of polluting the local environment.

Table 10 Other installations of concern

(Open answers)	Frequency
Pilkington's Fibre Glass Factory(Croesyceiliog)	62
Crematorium (Croesyceiliog)	21
Panteg Steel works	15
Propane containers at Panteg Steel Works	4
ICI Fibres (Mamhilad)	3
ROF (Glascoed)	2
Others	9
'None'	44
	160

[No answer given : 93]

For the Pilkington works - a fibre glass factory located about a mile further down the valley from Re-Chem - people were concerned about the amount (and content) of smoke it emitted. They did not know what the emissions contained, some believing that minute fibres could be deposited on the surrounding area. As regards the crematorium in Croesyceiliog, an unusual story was publicised by local papers in the February of 1985. It concerned the discovery of dioxin deposits in the flues at the crematorium, believed to have resulted from incinerating certain materials within the coffins - linings and shrouds for example. The effect of this, apart from alerting local residents, was to create more widespread concern for crematoria and hospital incinerators on a national scale. Panteg Steel Works was also a source of complaint for the smoke it emitted - leaving a residue on washing and gardens in adjoining areas of Griffithstown. However, it was the inconvenience of this (and heavy plant traffic) that concerned respondents, not any fear as to the content of its emissions. The Royal Ordnance Factory at Glascoed was a source of concern because it acted as a potential target in the event of war or sabotage. 'Other' installations of concern included B.S.C. Llanwern because of its 'toxic gas emissions' and its effect on people and the environment; Lucas Girling (Pontypool) 'because of the noise'; a local hospital incinerator for reasons similar to those of the crematorium; and the two nuclear reactors along the Severn estuary. Many people, however, indicated that no other local installation concerned them. As one person explained, no other local industry had suffered from as much publicity as Re-Chem.

9 The effect of ad hoc events on local concerns and attitudes

At the time of the survey, in April 1985, a number of incidents had occurred which may have had an effect on local people's attitudes. A number of questions were therefore included in the questionnaire to determine the extent and nature of any such influence at that time.

On 17th January 1985, a BBC Wales documentary about Re-Chem was shown on 'Week In, Week Out', a regular topical affairs programme on Welsh television. The half-hour documentary briefly summarised the main developments in the growing Re-Chem controversy and interviewed local residents of Re-Chem plants in Scotland and South Wales and the Secretary of State for Wales, Nicholas Edwards. In the studio, a short discussion was held between Malcolm Lee (Managing Director of Re-Chem International), Alec Karseras (a leading eye specialist employed by Re-Chem), Leo Abse (MP) and Chairman, John Humphreys. Dr Alistair Hay, a leading expert on the chemistry of PCBs, joined the discussion from a studio in Leeds.

Shortly after this programme, at the beginning of February, the Welsh Office published its report on congenital malformations in Wales with particular reference to the Gwent and Torfaen areas (Welsh Office, 1985). Although the report found that levels of two particular malformations - anencephalus (a malformation of the bony skull and brain) and polydactyly (a condition where babies are born with too many fingers or toes) - were 'significantly raised' for the Torfaen area, these symptoms were already known to have a higher than average incidence in the South Wales valleys. The report therefore concluded that,

> 'over the ten year period 1974-83 the incidence of all babies with congenital malformations for Torfaen was lower than would have been expected if it were typical of Wales as a whole.'

No cases of anophthalmos (the absence or rudimentary development of the eye(s)) nor microphthalmos (a condition where the eyeball(s) is abnormally small) - about which there had been so much publicity - were recorded for the Torfaen area. The Welsh Office retained its original verdict, therefore, that it saw,

> 'no grounds for believing that the plant poses a threat to human or animal health.'
>
> (Wyn Roberts, Parliamentary Under-Secretary of State for Wales in a letter to Leo Abse, MP, 4 October 1984).

A third incident which may have affected local perceptions was the closure of Re-Chem's Scottish plant in the previous October. Allegedly shut for 'economic reasons', the event was still a subject of concern in the following April: there had been rumours that the plant had simply been closed because of surrounding controversy and public pressure; that the untreated waste stockpiled at the Bonnybridge plant would be transferred for disposal to Panteg; and local opponents of Re-Chem were still campaigning for a similar shut-down in South Wales.

The impact of these three events on local perceptions and attitudes appeared to be as follows:

Firstly, the documentary was discovered to have had little effect - on local opinions at least. (This may not have been the case for the wider public in South Wales who may previously have been unaware of Re-Chem's existence or the details of the controversy surrounding it). People were asked three questions : whether they had seen the programme (box answers 'yes', 'no' or 'cannot say'); if 'yes', what they had thought of it (open answers): and whether the programme had influenced their attitude in any way.

96 respondents (40% of the total) had actually seen the documentary, a significant 67 (70%) of whom came from the New Inn area. Opinions of the programme, however, were diverse. Favourable comments (there were 36 in all) included descriptions such as 'fair', 'good', 'informative', 'considered both sides of the argument' or 'represented local views'. Criticisms (35 in all) described the documentary as 'inconclusive', 'inaccurate', 'not long enough', 'low-key', 'misleading', 'biased against Re-Chem', alternatively, 'biased towards Re-Chem', or 'didn't tell us anything we didn't already know'.

When it came to assessing the impact of the programme, one third stated that the documentary had not influenced their attitude towards Re-Chem in any way - their minds had been made up before the programme had been broadcast. Another eight people commented that the documentary had merely confirmed their original opinion or concerns. Only three people believed that the programme had improved their attitude towards Re-Chem: they considered that it had sensationalised the issue, for example, or had succeeded in representing opposers of Re-Chem as 'purely politically motivated or hysterical'. The rest of the respondents who had seen the documentary made a variety of comments: some expressed greater concern (4); others that they were more suspicious of Re-Chem and its activities (8); 5 people considered they were now more fully informed of the details of the debate; while 9 others were increasingly opposed to the continued operations of the plant.

It appears, then, that while the BBC Wales documentary may have been seen by the minority of respondents (although the majority of those living in New Inn), it did serve to either confirm existing beliefs or to add to anti-Re-Chem feeling in the area.

As regards the impact of the Bonnybridge closure, it appeared that more people had been affected: 58% stated that the incident had had a bearing on their views towards the plant at Panteg; 40% had experienced no marked effect. When asked to explain the nature of this influence/non-influence, the answers were as follows:

TABLE 11 How people's attitudes were affected by the Bonnybridge closure

(Open answers)	Frequency
Concern that more waste would be burned at Panteg	28
Why isn't the plant at Panteg closed?	28
Panteg must therefore be unsafe too	18
More concerned/scared/frightened/suspicious	12
Confirmed previous fears	10
The plant must have been closed because of risks	10
What were the real reasons for the closure?	8
The symptoms can't be a coincidence	4
Panteg must be closed as a matter of course	4
Other comments	17
	139

[No answer given: 4]

Those people who said that events at the Scottish plant had not influenced their attitude towards the Panteg plant gave the following reasons:

TABLE 12 Reasons why people were not affected by the closure

(Open answers)

	Frequency
Opinion already formed before plant closed	18
Don't know enough about it	6
Media not a reliable source of information	2
I accept the company's explanation	2
They should be treated as separate cases	1
Why should I be? Factories close all the time	1
My only concern is for this plant	1
Other comments	2
	33

[No reason given: 48]

It appears, then, that most respondents tended to equate the two cases in Scotland and Wales, regarding the closure of the Bonnybridge plant as a sinister turn of events. Despite assurances as to the plant's safety by company and government alike, and Re-Chem's explanation of the closure as a necessary economic measure, local people in Pontypool remain unconvinced. The extent of local scepticism towards this official explanation is revealed in the following table where people were asked why they thought the Scottish plant had been shut down.

TABLE 13 Perceived reasons for the Bonnybridge closure

(Open answers)

	Frequency
Health and safety reasons	87
Public pressure	68
Don't know	32
Economic/financial reasons	30
Not for the company's alleged reasons	13
For fear of what an inquiry might find	9
Because of bad publicity	9
Incineration methods were inefficient	8
Workers refused to handle certain materials	3
Poor management	2
'I wish I knew'	2
Other reasons	8
	271

[No reason given: 19]

It was interesting to note that although the largest number of people attributed the closure to 'health and safety' reasons, their underlying assumptions for believing this were very different. Some people were firmly convinced that congenital deformities, for example, were 'living proof' that the plant was dangerous, and that it had been shut down as a consequence; others 'suspected' that the closure was the result of the possibility of these risks. As one person commented, he knew there was no evidence to prove Re-Chem was a hazard, but he simply couldn't help feeling suspicious and ill at ease. Whatever the real reasons for closing down the Scottish plant, the fact remains that local doubts and suspicions as to Re-Chem's safety and credibility do exist, and no amount of public 'reassurance' seems likely to change those beliefs.

In light of this, it comes as no great surprise to learn that the Welsh Office report on congenital malformations in the area, rather than reassuring local people and dispelling local concern, produced the opposite effect (or non-effect, even). When asked to describe the impact of the Welsh Office Report, people either remained immune or expressed anger, bitterness or extreme cynicism about the whole thing:

TABLE 14 Effect of the Welsh Office report on local attitudes

(Open answers)

	Frequency
No effect	89
I don't believe it	22
They should live here/they don't live here	22
I'm more reassured	15
I'm not reassured	12
It's money talking	12
It's a cover-up	12
More research is needed	11
The Welsh Office is ignoring the issue	11
I believe them	10
It has hardened my attitude	9
There should be a public investigation	8
Typical of the W.O./only to be expected	7
No confidence in W.O./Government	6
It's a load of rubbish	6
'Angry'/'bitter'	6
	258

[No answer given: 9]

Many other individual remarks were made - 7 favourably disposed towards the Welsh Office, 34 decidedly critical of its rôle in the debate. On the whole, the Welsh Office is distrusted in the area : several comments referred to its associations with Re-Chem - 'vested interests', Re-Chem's contributions 'to Tory Party funds'. Most other comments were blunt accusations concerning bureaucratic inefficiencies, disinterestedness or incompetence.

Such deep-rooted mistrust in the Welsh Office is a significant aspect of the continued hostilities between the Re-Chem company and its local population. The Welsh Office's refusal to hold a public inquiry into the environmental effects of the plant has engendered local resentment and impatience - an issue that has bearing on the following section which discusses local attitudes towards different institutions of information and authority.

10 Information and authority

Public faith in the various institutions which both manage and regulate industries of risk is a growing area of research - Wynne (1982), Otway and Ravetz (1984). Industries themselves recognise the significance of their credibility and legitimacy in the public eye and accordingly spend considerable sums of money on maintaining and seeking to improve their public image. An examination of local perceptions of the various 'protagonists' of the Re-Chem debate should contribute, therefore, not only to a better understanding of local attitudes and opinions about perceived risks, but also to the protagonists' own knowledge of how local people regard them.

Respondents were asked to indicate how reliable they considered each of nine institutions to be on the Re-Chem issue - 'completely reliable', 'adequately reliable', 'of variable reliability', 'unreliable' or 'cannot say'. Re-Chem itself was listed because it makes frequent statements to the media about its activities and has distributed copies of its public information document, 'Re-Chem - trying hard to be a good neighbour' to households in the area. The Welsh Office was included because of its rôle in refusing a public inquiry and for carrying out its own investigations into the plant. MPs were not individually named but simply listed as one group (Leo Abse and Llew Smith being the most prominent political agitators). Greenpeace and Friends of the Earth were listed because of their rôle - albeit low-key - in carrying out their own soil tests in the area. PEPA was included because it is the longest-established of the local action groups and the most well known, holding regular meetings and publicising its activities in the local press. The South Wales Argus is the regional paper for Gwent and the one which covers the Re-Chem controversy in the greatest detail. The Western Mail is the national newspaper of Wales, but it follows the main developments in the debate. And finally, monitoring bodies such as H.M. Industrial Air Pollution Inspectorate, Harwell, and so on were included under the term 'Government monitoring bodies' for convenience and to achieve wider recognition. The perceived reliability of these various organisations (beginning with those least trusted) is revealed in the following table:

TABLE 15 Perceived reliability on the Re-Chem issue %

(Graded answers)

	Completely reliable	Adequately reliable	Of Variable reliability	Un-reliable	Cannot Say	Missing Cases
Re-Chem	4	7	21	52	9	8
Welsh Office	3	11	28	39	10	9
Government Monitoring Bodies	1	11	26	34	15	12
MPs	5	17	35	25	7	10
Western Mail	3	23	33	6	21	13
South Wales Argus	5	30	34	8	11	11
FoE	19	23	19	7	20	12
Greenpeace	20	24	18	8	18	13
PEPA	34	27	20	5	6	8

On the subject of Re-Chem, therefore, it is the environmental groups - PEPA most especially - which have secured the greatest public faith and confidence. The Argus is perceived as being marginally more reliable than the Western Mail - probably because it is a local paper and more widely read (a fifth of respondents could not comment on the latter), while the local MPs have a mixed audience.

It is the Welsh Office, government bodies and Re-Chem itself, however, which face the greatest problems of securing local trust and confidence. They are suffering from what Habermas would call a 'legitimation crisis' (Kemp, 1980) - the erosion of their capacity to make convincing claims about the legitimacy and credibility of their actions in the public eye. Reasons for such a crisis lie not only in a local context but are part of a much wider movement in Western, industrialised societies. In the Re-Chem case, Welsh Office policy to avoid conflict may be interpreted by local people as an abandonment of their feelings and welfare. The Welsh Office also has a responsibility to protect Welsh industry and jobs, however, so it could be said that this apparent contradiction of rôles may severely hamper its claims to legitimacy. In a much wider context, O'Riordan has suggested that public acceptance of authority and public attitudes towards technological and governmental institutions have experienced a marked rearrangement over the last couple of decades - the result of a number of factors including increasing public awareness to some of the dangers associated with major industrial developments, pressure group activity which has aroused individual consciences to take a greater interest and participate,

and the changing complexion of societal goals and values as a whole. Public mistrust in Re-Chem and government bodies, therefore, may not only be perceived as a localised phenomenon, but also as part of a much wider social movement among Western publics.

Still, it was interesting to note that variations of local mistrust in Re-Chem were again spatially significant - considerably more New Inn respondents believing Re-Chem to be 'unreliable' (63%) compared to those in Griffithstown (50%) and Sebastopol (46%). Concurrent with the lack of faith placed in Re-Chem, more illuminating comments were obtained when people were asked what they thought of the company's public relations:

TABLE 16 Opinions of Re-Chem's public relations

(Open answers)

	Frequency
Poor/very poor	22
Good/very good	22
Terrible/Lousy/Appalling/Rubbish/Pathetic etc.	20
'Not a lot'/'Not much'	20
Non-existent/Nil/What public relations?	19
Fair/Mostly acceptable	17
Cover-up/Whitewash/Lies	17
Don't know/No experience to speak of	16
They try hard	15
False/Insincere/Evasive/Misleading	10
Not to be believed/No confidence	9
Other comments (- in favour	21
(- against	57
	265

[No answer given: 14]

Comments seemed to be polarised, therefore. At one end of the scale, people praised the recent efforts Re-Chem had made to improve their local image, although about three of the verdicts of 'very good' - in the context of other remarks made in the questionnaire - were tongue in cheek, followed by 'they must be good, otherwise the plant would have been shut down long ago,' and so on. In contrast, others were, 'impressed at the attempts to communicate and reassure', to quote one individual, while

someone else made the point that, 'they're doing their best against people who've decided they're wrong no matter what'. At the other (more weighty) end of the spectrum, people made various remarks - 'I wouldn't buy a used car from them', 'they treat us like mindless, neurotic idiots', and comments in a similar vein. Despite the differences of opinion on Re-Chem's public relations, one thing is clear : people are polarised, feeling either strongly in favour of the company or strongly against it. There seems to be little middle (or moderate) ground.

Still in the context of attitudes towards authority, there were two issues, however, on which the majority of people were agreed : 86.7% of respondents wanted the 'authorities' (the government, planners, industry) to take more account of local feelings; 87.1% thought there should be a public inquiry on Re-Chem's effect on the local environment.

People were asked to give, in their own words, reasons why the authorities should or should not take more account of local feelings. Answers were varied : a few people simply iterated the question and stated that the authorities should take more account - as a matter of course perhaps, or maybe they could not think of a reason. Highly individualised comments were made, such as 'to disregard local opinions creates distrust', 'more democracy is needed at all levels', 'why should we be oppressed by mult-nationals, then ignored by the authorities too', or 'but if I lived 200 miles away, my attitude might, perhaps, be different'. The more common remarks, however, are listed in Table 17:

TABLE 17 Reasons why the authorities should take more account of local feelings

(Open answers)

	Frequency
Because we are the ones who have to live with Re-Chem	47
If more account had been taken in the first place the plant would never have been sited here	38
These people are accountable to/represent the public	22
It's our democratic right	15
Because the government takes no account at present	15
They don't live here/they should live here	11
We pay the rates : we should have some say	9
People should come first, not money	8
We have a right to breathe fresh air	5
Other reasons	38
	208

[No reason given : 20]

The nine people (3.7%) who believed that authorities should not take more account of local feelings stated that enough notice was already taken (3); that it was not the government's responsibility; that it was unnecessary; that enough opportunity already existed to appeal against a planning decision; that 'people who object always have the loudest voices; those who don't, don't care enough to speak out'; or that 'this question is too loaded to answer either way'. Perhaps the most lucid comment made in reply to this question, however, came from a gentleman living in New Inn. He wrote:

> 'local feelings can be grossly un-informed and often inaccurate - they can be emotional and maybe irrational. But, until it can be established as being of this nature, feelings must be taken account of.'

As regards local support for a public inquiry into the plant's effect on the environment and community, ample evidence for this was provided by a petition of over 10,000 signatures which was presented by local residents to the London headquarters of the Welsh Office in August 1985. Even in the April of that year, the number of people in favour of an inquiry was significant - only 5% of the respondents being opposed to a public investigation. People who were in favour of a public inquiry were asked what they thought such an inquiry (if held) would achieve. The most common replies are listed below:

TABLE 18 What would a public inquiry into Re-Chem achieve?

(Open answers)

	Frequency
(Evidence to cause) Closure of the plant	43
Peace of mind either way/once and for all	41
Very little/nothing	27
'The truth'/'the facts' about the risks involved	23
'Bring everything into the open'/'clear the air'	14
Show the extent of local opposition	11
Publicity of the plant's operations	10
Proof that the plant is a nuisance/hazard	9
Resiting	7
Other comments	69
	254

[No answer given : 6]

As can be seen from the 69 'other comments', this question produced a particularly wide range of views and opinions. The vast majority of people were optimistic that a public inquiry would lead to a 'fair' and 'independent' result - in other words (in their view), a shut-down. Obviously people's view of an 'unbiased' decision is one that corresponds with their own perception of things, and it is a sobering thought that if a public inquiry were to absolve Re-Chem of all the allegations made against it, local people would perhaps not accept such a pronouncement. Nevertheless, the majority of people still believe that an inquiry would 'clear the air', 'bring facts out into the open', 'set the record straight' and 'put people's mind at rest either way' - perhaps in very great contrast to the cynical attitudes shown towards the government's present role in the debate revealed elsewhere in the survey. Many people, however, did punctuate their comments with words like 'hopefully', 'maybe', 'perhaps' - betraying the impression that not everyone is convinced that an inquiry would achieve much, even if one will be held at all. Others stated their firm doubts as to an inquiry's impact : 27 respondents believed a public inquiry would achieve 'nothing' or 'very little'; some remarked (in the words of one individual) that 'it depends on how an inquiry is conducted and by whom'; another stated that 'there will always be doubt as to the impartiality of an inquiry..... and the competence of experts'; some considered it would be 'a waste of time/money' or a 'whitewash'; another that it would produce 'just a load of excuses'.

Despite the very mixed expectations or aspirations of a (possible) public inquiry, however, respondents were more agreed when it came to offering their own opinion as to why an inquiry had not been held so far (see below):

TABLE 19 People's views as to why no public inquiry has been held so far

(Open answers)	Frequency
Welsh Office refusal/complacency/indifference	49
Don't know	36
For fear of the results/something to hide	34
Insufficient public/political pressure	17
Insufficient evidence/grounds	16
Cost of holding one too high	13
'Vested interests'	11
Because of money/business/profits	9
Can see no good reason why not	6
Other reasons	63
	254
[No answer given : 22]	

Although 63 'other reasons' were given in answer to this question, indicating that a whole range of points were made, they were all, with the exception of 7, highly critical of the authorities (or, to quote one lady, 'the powers that be'.) Of the seven who supported the decision not to hold a public inquiry, their reasons were as follows: it was a means of protecting jobs at a time when unemployment was a problem (3); the plant was an industrial necessity; people are 'more concerned about other things'; 'the government are more aware of the dangers and better informed'; and finally, 'we don't need one... all that is needed is for Torfaen Borough Council to withdraw Re-Chem's licence to operate'. Of the remaining 56 comments, their essence was that political interests - between companies and between industry and government - were of overriding significance in the debate, and that local people lacked the 'political clout' to overcome such institutional barriers.

Public inquiries aside, however, and in reply to a question on Re-Chem's future at Panteg, respondents' preferences were as follows:-

TABLE 20 Views on Re-Chem's future

(Graded answers)	%
Total shut down	64
Ban on PCB incineration	12
Continuation of present operations	9
Other*	8
Cannot say	4
Reduction in amount of PCBs burned	2
	99

[Missing cases: 2%]

There seems little doubt in local minds, therefore, as to their hopes for Re-Chem's future. As for 'other' ideas,* most people wanted the plant to be resited in a non-residential area (10), (or, in the case of one person 'to the town of the blokes who built it'!); some awaited a full investigation (15) but in the meantime differed on current strategy - two suggesting that the plant should remain operational, two that PCB incineration should be suspended; four that the plant should be shut down. Other suggestions included the upgrading of equipment, a ban on the import of PCBs for burning, the incineration only of those chemicals known to be safe, tighter monitoring and even demolition (2).

11 The impact of current publicity and debate

In order to assess the impact of current publicity and debate concerning Re-Chem on the local area, people were first asked to describe - in their own words - how their own lives had been affected. Just over half (57%) of the 205 people who answered this question stated that the recent controversy had had no effect on their own lives; 20% said they were more concerned about their safety (and that of their family); 9% considered themselves more aware and involved with the debate; while in New Inn, 7 (3.4%) people complained of health deterioration (although they could not blame Re-Chem for this, they said, the suspicion was there), 7 had experienced difficulties in selling their house, 2 (1%) had suffered a devaluation of property, 6 (3%) complained of the inconvenience of living with the fumes emitted from the plant (not being able to sit outside, for example), while 3 (1.4% of) people expressed a wish to move away from the area. The general impression was that people were sick of the plant and of all the publicity it had attracted. Indeed, when answering this particular question, people tended to equate the controversy surrounding the plant with the effects of the plant itself, eg. people were actually asked how they had been affected by... 'the recent controversy about Re-Chem...' Many people replied by referring to the nuisance of the plant's emissions, their health and so on. Again this illustrates the difficulties involved in formulating questionnaires - the meaning implied by analysts is not necessarily the same as that of respondents.

As regards the effect on the local community and area, the perceived impacts were much greater (see Table 21):

TABLE 21 Perceived effects of recent controversy on the local community and area

(Open answers)	Frequency
'Concern'/'unrest'/'anxiety'/'worry'	73
Drawing community closer together	35
Hardening of attitudes towards Re-Chem	22
Difficulty in selling houses (in New Inn)	18
Greater awareness	15
People detracted from moving to area	14
No effect	13
Devaluation of (New Inn) property	10
Lack of trust/suspicion	9
Increase in houses for sale/people leaving area	9
'Bitterness'/'anger'	8
Health deterioration	8
'Disillusionment'/'depression'	7
Other effects/comments	38
	279

[No answer given: 23]

Whereas most people viewed the impact on the local community as being of a serious and detrimental nature, a few expressed annoyance that the affair had been 'blown out of all proportion'. Four people considered there had been 'unnecessary concern and hysteria' as one of them put it; others criticised the emergence of local protest groups - 'an opportunity for a minority to carry banners' said one, making 'certain people feel very self-important', wrote another, resulting in 'a lot of people commenting on things they do not understand', said a third. These respondents, however, were in a very small minority.

A further question designed to assess the impact of the Re-Chem controversy on local lives asked people what involvement they had taken in the debate so far and the reasons why they had, or had not, become involved.

TABLE 22 Participation in the Re-Chem Debate

(Open answers)	Frequency
None	115
Attended meetings	60
Support for PEPA	36
Attended protests/demonstrations	11
Signed petitions	9
Reading/informing others	9
Lodged complaints to the company	6
Correspondence	2
Media contribution	2
	250

[No answer given: 16]

It is obvious from the above figures that the majority of people take no direct action in the Re-Chem debate - a pattern of behaviour which can be considered typical of British society as a whole. Nevertheless, a significant number of the respondents have taken an active interest in the debate, a feature not typical of some other environmental controversies in this country (Sellafield and Sizewell, for example, where opposition has come from environmental organisations from outside the local area). In the present case, 25% of the respondents had attended meetings on the subject of Re-Chem - either regular PEPA meetings, or more likely, a public meeting arranged by PEPA in November 1984. Over 500 local residents were present at this meeting - chaired by Leo Abse MP, staging representatives from Re-Chem, local councils and environmental groups - and amid the bright glare of publicity, passed a motion demanding that the plant should be closed. A considerable number of respondents also pledged support for PEPA itself - they were either members, had given financial support or had been involved in fund-raising activities for the organisation. Only a few respondents had signed a petition against Re-Chem, the survey having been undertaken before the highly publicised 10,000 signatures petition by local mothers had been organised. Two respondents had written to the authorities complaining about Re-Chem, while two others had spoken to reporters.

When people were asked why they had decided not to take an active interest in the debate, a variety of reasons were given. On the whole, respondents were either apologetic about their inaction - excuses like disability, lack of time, work commitments, family commitments, away at college and so on (41) - or were extremely defensive about their position : they did not agree with the opposition groups (3); the cause was a futile one (11); they were not affected nor bothered by the plant (19); it was someone else's problem (6); public meetings 'give off as much hot air as Re-Chem', or 'usually repeat themselves and get nowhere'. Very few people admitted to 'apathy' (6), 'laziness' (1), while some said they didn't know <u>how</u> to get involved or 'I'm just one of the silent majority'. Fifteen people did not answer this question.

People who had become involved in the debate gave roughly similar reasons to each other (see below):

<u>TABLE 23</u> <u>Reasons for participating in the debate</u>

(Open answers)

	<u>Frequency</u>
Concern for future/health/environment/children	38
Want it shut-down	12
Disagree with the siting	8
Want more information as to what's going on	5
Other reasons	15
	78

[No reason given: 13]

'Other reasons' were usually of two kinds : one, that respondents felt very strongly about certain aspects of the debate - wanting a public inquiry, for example, or disagreeing with the <u>import</u> of waste; or two, that individual consciences willed people to take some action eg. 'It will be no good our looking back in 10 to 20 years time and saying to deformed babies "we didn't know".' In many cases, however, it was the proximity factor and the nuisance aspect of the plant ie. direct experience of the plant's effects - that had caused respondents to take some form of active involvement. And again, these people came mostly from the New Inn area.

The third question to assess the local impact of Re-Chem's activities asked people whether they would ever consider moving away from the area because of the potential risks associated with the plant, and if they had already contemplated a move. The pattern of responses varied between the three residential areas: $\frac{2}{3}$ of the respondents from New Inn would consider a move - just under $\frac{1}{2}$ had actually thought of it; in Griffithstown, almost $\frac{1}{2}$ of the respondents would consider a move with under $\frac{1}{3}$ already contemplating it; while in Sebastopol, $\frac{1}{3}$ of respondents were willing to consider a move - 1/5 had already thought about moving.

The decision to move, however, was not just dependent on proximity to the plant. Age and the length of time a respondent had been living in the area were also an important influence on people's attitude towards moving.

Generally speaking, a person was more likely to move if:

a) he or she was in the 26-35 year old bracket (the people most likely to have young children perhaps, or the age group more likely to move house anyway)

or b) he or she had been living in the area less than five years.

Conversely, the longer a person had lived in the area, the less likely he or she was to move (see below):

TABLE 24 Length of residence in area

	% willing to consider a move
0 - 5 years	75
6 - 10 years	63
11 - 20 years	54
21 - 40 years	40
over 40 years	25

while it was the youngest age group (the 16 - 25s) and the older age groups (people over 56) who were most against moving from the area. People gave various reasons to explain their decision to move or stay.

TABLE 25 Reasons why people would consider moving because of Re-Chem

(Open answers)	Frequency
Concern for family health	65
Nuisance of smell/smoke	10
Fear of an accident (eg. explosion)	6
If the risks were proven	6
In order to start a family	5
Because of unknown, long-term effects	5
To protect investment in house	4
Other reasons	11
	112

[No reason given : 13]

There were, however, very many 'ifs' and 'buts' about a move from the area - money, jobs and schools being the major obstacles. For those who would not consider moving, there were these and other reasons to remain where they were.

TABLE 26 Reasons why people would not move away from the area

(Open answers)	Frequency
I see no risk/I think it is safe here	12
Too old/disabled to move	10
I have roots here/brought up here	9
Family and friends are here	8
'I like it here'	8
Not affected	8
'It's our home'	7
My job is here	7
It is Re-Chem who should move, not us	6
Financial reasons	5
'We were here first'	5
Other reasons	18
	103

[No reason given: 7]

People were divided, therefore, over the decision to move or stay in the area - given the choice. Some were very concerned for their families' health and safety, but realised the very great obstacles to moving. Others were adamantly against leaving their homes, believing there was either no evidence to warrant a move or arguing that it was Re-Chem itself which should be moving - 'why <u>should</u> they have to leave the area?'

As one lady wrote,

> 'We live in hope of Re-Chem closing down. We were here first and 12,000 people cannot move. But Re-Chem <u>can</u> be resited.'

Or as another person commented,

> '....moving would not solve the Re-Chem problem'.

12 Conclusions

The task remaining is to discuss the main implications of the survey findings in the context of arguments from background literature, and to offer some suggestions as to the potential contribution of social survey research to local environmental debates.

Firstly, then, empirical findings of the survey will be addressed within the seven-point framework of Lee's 'key' factors that are believed to influence risk perception.

1 Knowledge/Information. From interview and questionnaire answers it was apparent that respondents had different levels of knowledge about the details and developments of the Re-Chem controversy. On the whole, local knowledge was impressive - people knew the parties involved in the debate and were aware of the various forms of official attention it had attracted. What local people do not have is full knowledge of the possible risks that have been associated with the plant. But then, scientists likewise are also in the dark. Re-Chem is not simply a case where public ignorance has led to alarmist perceptions and hysteria. Rather, local awareness and concern is acute partly as a result of the lack of scientific knowledge of the full implications of Re-Chem's operations. While background theory would imply that by increasing people's knowledge about a risk, their attitudes towards it would become more positive, it is dubious as to whether such a simplistic remedy could resolve the Re-Chem debate. The deep-rooted concern that exists needs to be satisfied by something more penetrating than this. Besides, information in the form of media reports can be said to have sensationalised certain issues of the controversy, so leading to the spread of local concern.

2 Compensation or benefit. The survey revealed that respondents perceived few benefits and considerable costs from having Re-Chem on their doorstep. The relative lack of 'compensation' to the local area (in terms of job opportunities, direct income or economic spin-off) may be a significant factor in helping to account for local hostility - an effect compounded by local property devaluation and house sale difficulties, perceived by some to be the result of Re-Chem's deterring people and firms from moving into the area. The inconvenience and discomfort of living with the plant's foul smells and smoke is another very real contributor to local opposition. In saying this, however, it would appear

that ideas to negotiate financial compensation to communities affected by waste disposal sites and treatment plants displays insensitivity and a poor understanding of the nature of local concerns - in the Re-Chem case at least. It is highly doubtful that residents in the New Inn area could be placated by financial incentives at this late stage in the debate.

3 Voluntariness/Culpability. Local people have no choice (other than a move which most can ill afford) about their 'exposure' to the Re-Chem plant. They live with it 'involuntarily', having little say about its location or the way in which it operates. People's lack of control over what happens at the plant, then, may contribute not only to local concern, but to the apportionment of blame. For example, Re-Chem has been accused by some of having caused deaths and deformities in cattle and deformities in babies in areas surrounding its plants. Although these accusations are not proven, they have done nothing to improve the deteriorating relations between Re-Chem and its local public. The degree of local mistrust that the survey revealed - not only in Re-Chem but in the Welsh Office and the institutions responsible for the monitoring of the plant - cannot merely be seen as a symptom of local hostility and concern; it may be said to act as a catalyst for increased cynicism towards the rôle and status of authority and even greater levels of local concern and insecurity.

4 Familiarity. Previous research has produced conflicting ideas on how familiarity with (or proximity to) a potential risk affects local attitudes. In the case of Re-Chem, the findings show that despite being highly familiar with Re-Chem's presence, local people are far from favourably disposed towards the plant. Although respondents' answers to the question on attitudes towards Re-Chem did not appear to vary between the three residential areas, answers to the question on concern for the environment did yield higher levels of concern from respondents in New Inn than from those in either Griffithstown or Sebastopol. Although the geographical area covered by the survey is small in comparison to those covered by other research projects, it could be suggested that because some parts of New Inn are further away from Re-Chem than either Griffithstown or Sebastopol, 'familiarity' with a potential risk source is not necessarily a function of proximity to it. As a result of prevailing winds, New Inn is more affected by Re-Chem's

stack emissions - its residents are therefore more aware of the plant than people who cannot see or smell it. In this sense, Re-Chem is very different from other controversial installations - nuclear plants for example, where low-level radiation discharges cannot be seen, smelt or tasted by local people. Sensory perception, therefore, seems to be an important additional dimension to the 'familiarity' effect.

5 Other risks. The survey attempted to place concern for Re-Chem into a local perspective by finding out people's concern for other 'named' risks (disposal of radioactive waste, road accidents, chemical pesticides and so on) together with other installations in the area. It was found that although many respondents did express concern about these things, the majority still felt that Re-Chem was of greater concern to them. Some people commented that Re-Chem was a different sort of concern - an immediate problem, on their doorstep, and one that they faced on a day-to-day basis. Other remarks referred back to concepts already covered in this final section - that people felt they exercised a certain degree of control when crossing the road, choosing to smoke and so on. The survey revealed, therefore, that Re-Chem is the main cause for concern for the majority of respondents.

6 Mental capability. It was not the aim of the survey to pursue this particular concept - the questionnaire was not designed for deducing an individual's ability to conceptualise different aspects of a risk context, nor for assessing personal values, feelings or interests in life. In saying this, however, it was possible from reading people's answers to appreciate their ability to express and quantify individual feelings and perceptions, as well as permitting a 'guess' as to their political or moral stance on a broader range of issues.

7 Social contexts. It is extremely difficult to unravel an individual's social network and the influence of friends, neighbours, experts and other social relationships on a person's attitude. The survey revealed the significant rôle played by local rumour - reports of mishaps at the plant, tales of bad housekeeping and the inefficiency of plant technology, word-of-mouth accounts of potential risks and 'inside' information. It is, however, very hard to assess the effects of local rumour and gossip. Another feature to emerge from the questionnaire and interview replies was respondents' personal reactions to prominent

members of different groups and organisations. People tend to identify the Welsh Office, Re-Chem, MPs, environmental groups, local councils and so on with particular figures or personalities. An individual's like or dislike, trust or mistrust, or personal experience of these people, then, often flavours his or her perception of the debate as a whole.

In applying these seven key factors of risk perception to the Re-Chem case, it is apparent that certain of these factors are more relevant than others. It could be argued, of course, that the survey's methodology was geared to addressing specific issues (factors 2, 3 and 4 for example) and not others. The seven-point framework falls short, however, of explaining the totality of influences which shape local attitudes and beliefs on Re-Chem. It has already been suggested in sections 2 and 7 of this Paper that the historical legacy of local experiences and perceptions of Re-Chem in the past are conditioning present attitudes and opinions towards the company. This implies that it is important to adopt an historical perspective when looking at contemporary environmental controversies. Another important influence on local perceptions has been the related events at Re-Chem's previous plant in Scotland, and more recently, the publicity aroused from television documentaries which have focused on the company's operations. 'New' allegations, therefore, are constantly being directed at Re-Chem, and the continued agitation by local protesters and MPs ensures that Re-Chem remains a topical issue.

So what contribution can survey findings of this kind make? It appears that there is a real gulf between the social science communities - with their knowledge (albeit incomplete) on public risk perception - and the institutions who manage and control the installations of potential risk. It is a generalisation, but nevertheless a valid one, to say that academics are reluctant to enter the 'arena' of environmental debates. The information social scientists collect from their research projects may be of interest to - indeed, it may even be commissioned by - the institutions involved in environmental controversies, but this knowledge is not always turned to the task of producing practical measures to help resolve (or referee) local conflicts. There seems, therefore, to be an area of no-man's land, that social survey researchers could well occupy.

From undertaking this particular research project on local perceptions of Re-Chem, it appeared that most people - from industry, government and the public alike - are all too often convinced of the infallibility of their own point of view. Anyone or anything that contradicts or undermines their own perspective is almost immediately dismissed as 'wrong', 'biased', 'ignorant' and so on. Cultural theory aims to reconcile opposing viewpoints by making people aware of their different (often conflicting) value, moral, political and cultural biases. By doing so, it is intended that people will appreciate that issues such as risk do mean different things to different people, and that there is never a 'right' answer to risk-related problems. In this sense, social survey research does have an important rôle to fulfil in providing the material for mediating between opposing individuals and interest groups.

The political machinery for achieving greater discussion and communication between these parties (in the form of liaison bodies, boards, advisory councils and so on) can only be achieved, however, if there is the political and institutional will and commitment to accommodate alternative ideologies on environmental issues. It is hoped that research on public attitudes and perceptions can enlighten those in authority by revealing the needs and the wishes of local people who rarely have the political power to influence present environmental decisions.

There seems to be a real divide, then, between what the academic world can offer in terms of knowledge and empirical evidence and the present system whereby little opportunity (or willingness) exists for various factions of society to sit down and discuss their mutual interests and disagreements. This Paper, therefore, ends by arguing that the gap between what the public perceives and wants and what the authorities believe those perceptions and wants to be needs to be bridged - and soon - otherwise environmental controversies are doomed to continue on their present course. While social survey research is considered to be an important part of the healing process, the problem remains that resolutions can only be attempted if those in authority will permit the opposing parties to communicate on a more official, more equal and more tolerant basis.

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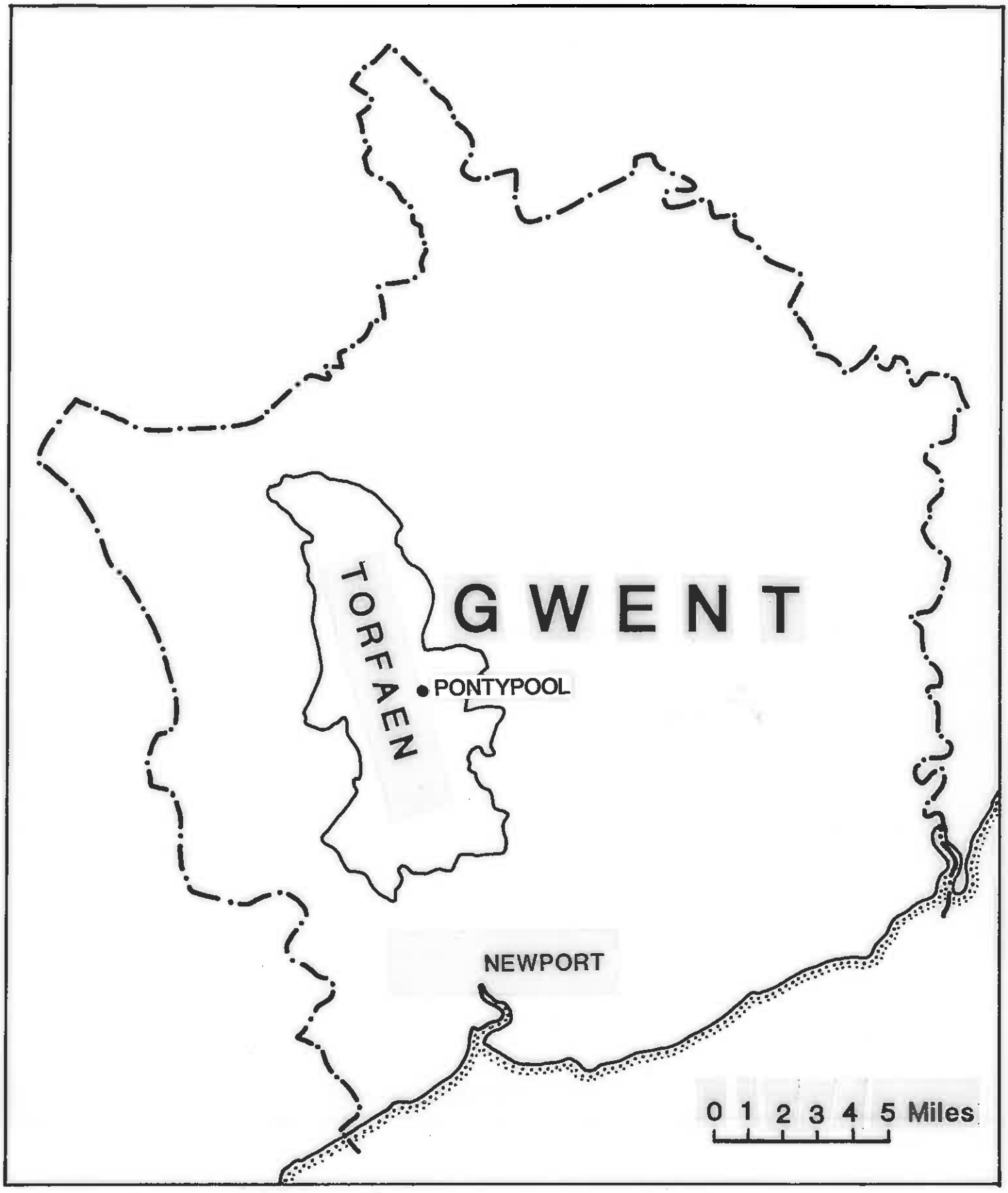

Figure 1. Map to show Torfaen, Pontypool in Gwent

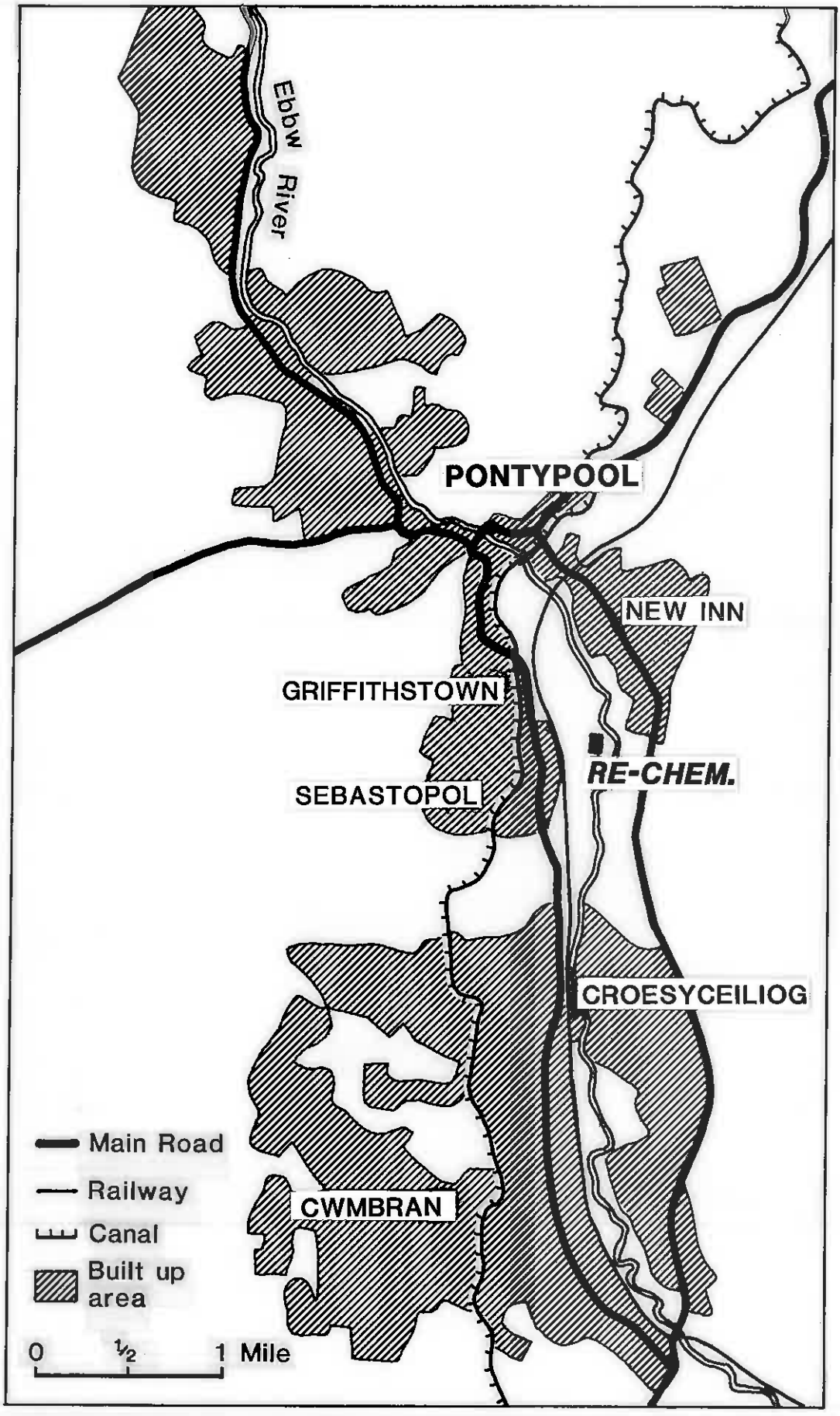

Figure 2. Map to show New Inn, Griffithstown and Sebastopol