

**Health Impact Assessment of the Proposed Extension to
Margam Opencast Mine**
**Welsh Health Impact Assessment Support Unit and National
Public Health Service for Wales on behalf of the Margam
Opencast and Health Steering Group**



The authors:

Dr Alison Golby
Research Associate
Welsh Health Impact Assessment Support Unit
Cardiff Institute of Society Health and Ethics
School of Social Sciences, Cardiff University
53 Park Place
Cardiff CF10 3AT

Carolyn Lester
Lead for Inequalities and Equity
National Public Health Service
Temple of Peace and Health
Cathays Park
Cardiff CF10 3NW

Telephone : 029 20879609
Fax: 029 20879054
E-mail: golbya@cardiff.ac.uk

Telephone: 029 20402463
Fax: 029 20402503/4
E-mail: carolyn.lester@nphs.wales.nhs.uk

Website: www.whiasu.wales.nhs.uk

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FRONT COVER PHOTOGRAPHS

Top

This photograph illustrates the current view over open land looking across from Kenfig Hill to Margam Mountains. Hafod Heulog wood is located to the right of the picture. The area in this photograph would be likely to become similar to that in the lower photograph if the proposed extension to Margam Opencast Mine were to go ahead.

Bottom

This photograph shows the present opencast site as seen from Cefn Cribwr.

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Contents page

Content	Page number
Acknowledgements	iii
Introduction	1
Focus Group Study	4
Background	5
Scope of the Health Impact Assessment	7
Planning issues	7
Communication with the public	9
Government policies and programmes	9
Profile of Bridgend County Borough	12
Health Inequalities	12
Assessment of impacts	13
Health impacts identified by residents	13
Nuisance Dust	13
Particulates	18
Studies carried out by residents	24
Transportation, plant on site and diesel fuel	25
Stress, anxiety and depression	26
Physical Activity	29
Social Capital	31

Severance	37
Local Economy	38
Noise	41
Vibration	43
Waterways, pollution and risk of flooding	44
Safety Issues	44
Light pollution	45
Loss of amenity	45
Visual Impact	50
Effect on property and character of the neighbourhood	52
Heritage	54
Human Rights Act	55
Complaints liaison and consultation	56
Climate change	58
Conclusion	60
References	63
Tables	
Table 1	
Proposed development in relation to WAG policies and programmes	10
Table 2	
Annual dust deposition rate at two sites in Kenfig Hill	14
Table 3	
Schools by distance from opencast and presence of asthma medication in school (Spring 2005)	24

Table 4	
Pollutants associated with road transport and their health effect	26

Table 5	
Complaints received by Bridgend's CBC's Public Protection Department	57

Photographs

View over existing open land	Front cover
Present opencast workings	Front cover
Deposit on garden wall	16
Inside Hafod Heulog woods	47
Looking down into the void	51
Aerial view of land restoration	Back cover

Appendices

Content	Appendix
Membership of the Health Impact Assessment Steering Group	1
Health Impact Assessment Timetable	2
Middle Super Output Areas maps, tables and graphs	3
Maps and Plans	4
Planning Applications – Margam Opencast Mine	5
PM ₁₀ concentrations measured at Kenfig Hill	6
Comparison of local area with Swansea PM ₁₀	6

Introduction

This health impact assessment examines the impact of the proposed extension to Margam Opencast Mine, located between the high land at Cefn Cribwr and Kenfig Hill and the Pennant Escarpment of the Margam Mountains, upon the local communities most affected by the proposal. The current and proposed opencast site straddles the Neath Port Talbot and Bridgend County Borough Council (CBC) boundary and will continue to have sections in each authority.

Residents of villages bordering the existing opencast operations and the proposed extension believe that opencast mining in the area has already had a negative impact on their health. If the proposed extension is given planning permission, this will allow at least ten more years of working, adding cumulatively to exposure to particulate matter and noise. Land treatment and rehabilitation will take at least a further five years extending the period of industrial degradation of the landscape, which some residents have lived with for almost 60 years. Residents are also exposed to pollutants from other industries in the vicinity, including the Corus Steelworks at Port Talbot. Arguments put forward in support of the extension include the sale of coal to cement works in England and to Aberthaw Power Station, local employment and the mining company's assertion that the site is well managed with emissions kept to a minimum.

This health impact assessment originated from an approach made to the Welsh Health Impact Assessment Support Unit (WHIASU)¹ on 4th May 2005 by a community member representing local residents². Local residents are concerned about the health affects of proposed extensions to the opencast mine and believe that the health of the population was not being adequately considered as part of the planning process. A Research Associate from the WHIASU met with the residents group on two occasions prior to the first steering group meeting held on 20th July. The steering group was formed with the agreement of residents.

The planning application is currently being considered by two local authorities, Neath Port Talbot and Bridgend CBCs. The larger area of the current and proposed opencast site is within the Neath-Port Talbot CBC boundary but the majority of affected housing is situated within the Bridgend local authority area. There have been a number of approaches made to Neath Port Talbot planning department inviting them to take part in the health impact assessment but the invitations have been declined. However, in a letter dated 24th June 2005 the Principal Officer, Development Control (Neath Port Talbot CBC) requested a copy of the completed HIA report, as it will be a "*material consideration in assessing the (planning) application*".

Whereas the planning process covers regulatory, environmental and public health aspects of a proposal, the HIA process is more responsive to community concerns and considers health and wellbeing in the wider context, examining issues which would be outside the remit of other processes. Nevertheless, all of the issues addressed by the Local Authority's Public Protection Department as a consultee, i.e. dust, noise and vibration are directly concerned with the possible health consequences of a planning application. The

¹ The WHIASU is funded by the Welsh Assembly Government through Wales Centre for Health and based at Cardiff University

² The community member has become a point of contact for local residents, especially those concerned about their health and that of their families and some of whom are also members of a local residents' group PACT (Protecting and Conserving Together).

criteria used in assessing impact within the planning process are based on targets and objectives set to ensure that, based on current knowledge, human health is protected. Indeed, many of the criteria are based on lower thresholds to prevent nuisance.

The health impact assessment approach is different from approaches taken within the regulatory framework and can be defined as:

“... a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population (WHO, 1999)”

In other words, it provides a systematic yet flexible framework that can be used to consider the wider effects of local and national policies or initiatives and how they, in turn, may affect people's health. Some of the effects may be positive, whilst others could be more harmful. The aim is to remove or mitigate any possible negative impacts on health and well-being and to maximise opportunities to improve the health of the population. This definition is also useful in that it suggests that there is no single way of conducting an assessment. The combination of procedures, methods and tools used will depend on both the decision-making structures of the organisation undertaking the assessment and on the nature of the proposal in question. It also highlights the inequalities dimension as policies, programmes or other developments can affect groups within a given population in different ways. Health impact assessment can help to ensure that the people who are most vulnerable to the causes of ill-health stand to gain as much as possible.

Wherever possible, assessments should be conducted in partnership with representatives of stakeholder groups (those affected by, and/or those who have an interest in, the proposal in question) which may include local communities, as in this particular health impact assessment. Health impact assessments make use of any relevant evidence and expertise that would help to make judgements about the potential impacts and is therefore a mechanism to support evidence and knowledge based decision making (WHIASU, 2004).

The World Health Organisation (WHO) defines health as: *“a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”*.

This definition suggests that health is a positive concept to which governments, statutory agencies, voluntary organisations, businesses, communities and individuals can all contribute, and that people's sense of well-being can be poor even where there is no identifiable disease. The environment, income, employment, the organisation of transport, the design and condition of houses, crime and the social and physical condition of local neighbourhoods all contribute to good and poor health. Health impact assessment identifies how a particular proposal, project or plan will alter these determinants and assesses the likely impact on the health of different groups in a population (WHIASU, 2004, pp.3-4 and p.20).

This collaborative Health Impact Assessment (HIA) of the proposed extension to opencast mining on the Bridgend/Neath Port Talbot border took place during the second half of 2005. The likely impacts of the development on the physical and mental health and wellbeing of the community were examined in terms of the relevant scientific and medical

literature, the history of opencast in the area and the evidence of local people. The HIA was conducted by a Steering Group comprising personnel from the Welsh Health Impact Assessment Support Unit (WHIASU), National Public Health Service (NPHS) and community members representing relevant interest groups. Technical advice regarding pollution control and environmental monitoring was provided by a principal environmental health officer from Bridgend CBC and public health medicine advice was provided by the Public Health Director of Bridgend Local Health Board (LHB). The principal environmental health officer took part with agreement of Bridgend CBC's Chief Executive and the Public Health Director's participation took place with the full agreement of Bridgend LHB's Chief Executive. A full list of Steering Group members appears as appendix 1 and the HIA timetable as appendix 2.

The HIA was led by the WHIASU in partnership with the NPHS. WHIASU organised meetings with the relevant stakeholders and conducted a focus group study³ with local residents. NPHS was mainly responsible for summarising evidence from the literature on the likely impacts on health and wellbeing of living in close proximity to an opencast mining operation. The HIA followed guidance produced by WHIASU (2004) in partnership with the Welsh Assembly Government and followed the three meeting process used by NPHS in previous work (Lester 2002, 2003, 2004). In addition, six focus groups facilitated by WHIASU examined the concerns of local residents in depth. There was some discussion at the first steering group meeting about the most appropriate method of data collection. Residents were keen to undertake a survey of self reported health complaints in the locality. Following advice from three members of the steering group that a survey of this nature would not be statistically significant and that the short time scale of this HIA would be prohibitive, residents agreed not to proceed with the survey.

The majority of published research was collected and collated by the Lead for Health Inequalities and Equity, NPHS who completed a systematic search of the literature using the following key words: opencast mining, coal mining, particulates, environmental pollution, place and health, view and health. Steering group members and professional advisors also made suggestions on essential documents including reports by the Committee on the Medical Effects of Air Pollution (2005) and Department of the Environment Food and Rural Affairs (2005). In some cases lay members provided information and data which prompted individual literature searches for verification. Residents were active in providing a substantial amount of published and other information which has been discussed and appraised by the Research Associate and Lead for Health Inequalities as well as at steering group meetings as part of the HIA process. Draft reports have been considered at two steering group meetings, the first on 22nd September and the second on 14th November 2005. Suggestions, comments and further information were incorporated where appropriate to form a final document to be sent initially to the decision-makers, Neath Port Talbot and Bridgend planning departments, before being disseminated more widely.

³ Focus groups can be defined as "a research technique that collects data through group interaction on a topic determined by the researcher" (Morgan, 1996, p.130).

Focus Group Study

As the HIA would be drawing upon published research and monitoring data collected by Bridgend Council, it was decided to carry out a focus group study as a means of collecting qualitative data from local residents to complement and add depth to quantitative information (Morgan, 1988). Focus groups can be used for a number of different purposes and as a 'self-contained' method or in combination with other methods (Morgan and Krueger, 1993, Morgan, 1996). Although the health impact assessment includes statistical information and published research, apart from residents' statements during HIA Steering Group meetings, focus groups are the sole source of primary qualitative data.

As Morgan and Krueger (1993) pointed out, focus groups can be very useful when there is a power differential between participants and decision makers and where historically groups have had limited power and influence. Focus groups were therefore appropriate in this case, as local residents feel impotent in relation to the planning application process and have past experience of feeling that their views and opinions have not been 'listened to'. Focus groups allow data to be collected in participants' own words (Morgan, 1988), thus allowing the voices of local residents to be heard. Participants may also feel more able to express their feelings and experiences, and interact with others, if surrounded by people who share similar experiences, especially when in a non-threatening environment (Morgan and Krueger, 1993). People who took part in the study all shared concerns about the health effects of the proposed extension to Margam opencast mine. Five focus groups took place in a well-known local community centre and one at a resident's home.

Participants were recruited by residents from an advertisement placed in a local paper (the Gazette), PACT Newsletter, flyers asking for volunteers endorsed by WHIASU delivered directly by residents and by word of mouth. Participants were selected therefore through a combination of a 'purposive' sampling (DeVaus, 1990), to ensure they reflected a range of local interests, 'snowballing' and 'opportunistic' sampling, which are recognised qualitative sampling methods, since participation is largely dependent upon availability and goodwill (Bell, 1991). The aim was to recruit six to eight people for each interest group but final numbers for each group ranged between four and ten. Interest categories for the individual groups were as follows: mix of community members (Group 1) residents living near the present opencast site at Cefn Cribwr (Group 2), older people (Group 3), those involved with outdoor pursuits (Group 4), local business representatives (Group 5) and younger parents (Group 6). Groups also included PACT members, some of whom had originally contacted the WHIASU. A profile of participants compiled from information provided by the thirty eight people who agreed to take part in the study shows that the sample comprised twenty three women and fifteen men with ages ranging from 18 to over 75 years. The majority of those who took part were between the ages of 30 and 59 years (25) with eleven people over 60 years of age. There were fewer younger people, and parents with young children overall in the study but younger people were represented in Groups 1, 4 and 6 and a number of parents with children and older people with grandchildren participated in other interest groups and were therefore able to express their concerns about the health and wellbeing of children. Twenty two people lived in Kenfig Hill, seven in Cefn Cribwr, three in Pyle and six in neighbouring villages, including Sarn, Coytrahan, North Cornelly, Pen y Bryn and Margam Village/Coed Hirwaun.

Six focus groups were completed, starting at the end of July and running throughout August. They were facilitated by the Research Associate using topics and questions (available on request) as a framework to guide discussions. Topics were originally identified by community members at meetings and formulated into questions by the researcher. Residents were asked to reflect upon how the proposed opencast would be likely to affect their quality of life, lifestyles, health (including existing complaints), and psychological wellbeing. All focus groups comprised entirely voluntary participants and were tape recorded with notes taken by the Research Associate. This was done with the informed consent of participants, who were assured of anonymity and confidentiality regarding the storage, analysis and reporting of the findings (further details are available on request).

Focus group data were analysed by the researcher thematically under the wider determinants of health headings and using 'grounded theory' (Glaser and Strauss, 1967), whereby topics generated from the data are grounded in the concepts and theories of the persons under study. Further analysis involved using Glaser and Strauss's 'constant comparative method', making inferences by looking for contradictions, relationships, differences and similarities from the same individual, in the same focus group and in other focus groups. Thus the majority of statements and comments presented in the report reflect topics, concerns and views which were repeated by other individuals and/or in other focus groups. Verbatim quotations are used for illustrative purposes. A small number of statements reflect particular perspectives and this is indicated throughout the report where applicable. An independent observer (Dental Student, Cardiff University) listened to the tapes to further assess 'consensus', similarities and differences in comments, and hence to confirm the key health impacts from the community's perspective.

Background

In the opinion of the site operator, Celtic Energy Ltd., the Margam site is best suited to opencast rather than underground mining due to the geology of the area, where steep and fairly narrow diagonal coal seams ranging from 0.4 to 4 metres in width predominate. This information was provided during a visit to the site on 1st September 2005 by the two professional members of the HIA Steering Group, accompanied by the group's environmental advisor. However, this assessment is disputed by the residents and various conflicting statements have been made over the years concerning the viability of drift or deep mines. (See Social Capital section).

The village nearest to and overlooking the current open-cast mining operation in the past has been Cefn Cribwr and, until recently residents living there were those most affected by noise, dust and the visual impact of the present workings. However, most complaints currently received by Bridgend CBC's Public Protection Department, are from Kenfig Hill as the work advances towards this area. Indeed, at present the opencast is 250 metres away from the closest housing at Kenfig Hill, closer than it has been to housing at Cefn Cribwr. Kenfig Hill will continue to be the area most affected, should the new extension go ahead, although the workings will still be visible to Cefn Cribwr residents. On the Neath Port Talbot side of the border the areas most affected are Aberbaiden, Bryndu and Pen y Bryn.

Open casting has taken place in the area since 1947/8, work on the last phase of the ongoing operation beginning in spring 2000. Further planning consent has been given, taking the period for the completion of coaling in the present phase to January 2007, followed by a two year restoration programme, extending the original time period by 18 months. By this time 1.95 million tonnes of coal will have been extracted from a 45 hectare excavation, extending up to 120 metres below ground level. Markets for the coal include cement works at Westbury and Rugby, Corus Steel at Port Talbot and power stations at Didcot and Aberthaw. All coal is transported by rail from a siding with a loading platform and adjoining coal screens, which are located and will continue to be located in Bridgend CBC. Sixty-five people are employed including contractors who are permanently on site. (Source: Site Manager, Celtic Energy Ltd., personal communication).

If the proposed extension takes place, operations would continue westward from the existing site with the first cut of the new site being developed in 2007. The greatest impact would be at Kenfig Hill in the Pyle ward of Bridgend and the Aberbaiden and Pen y Bryn areas in the Margam ward of Neath Port Talbot (see maps, appendices 3 and 4). Celtic Energy Ltd. states that the extension is “*required to continue supplies of coal to existing markets and also to satisfy regional and UK demand...*”. This proposal is on a larger scale than the last phase of the current operation, with a proposed excavation area of 51 hectares, compared with 45 hectares in the present phase. The aim is to extract 2,400,000 tonnes from the new site at a rate of 8,000 tonnes per week compared with 7,000 tonnes per week at present. Markets and transport arrangements will be similar to those at present. Work on the site is expected to last for approximately ten years, including backfilling, followed by a five year period of land treatment and rehabilitation (Celtic Energy Ltd. 2004).

Despite the population having been assured on more than one occasion that open casting on this site would cease within a specified period and that land remediation would take place, excavation continues and the currently proposed extension will bring the site border to within 130 metres of the nearest area of housing. However, Celtic Energy Ltd.’s management state that there would be no operational work within 200 metres of the nearest house, as it is proposed that the area nearest to housing would be used as a water treatment area. Scottish planning regulations differ from those in Wales and the Scottish Executive Development Department Guidance (revised July 2005) states the following:

“In considering whether impacts on local communities are acceptable, particular attention needs to be given to separation distances between proposed sites and adjacent communities. As a general rule, site boundaries within 500 metres from the edge of a community are likely to be unacceptable although this should not prevent non-engineering works, such as the planting of trees, from taking place to reduce the visual impact of development on communities and the environment. Exceptionally the topography, the nature of the landscape, the respective location of the site and the nearest community in relation to the prevailing wind direction and visibility may be such that they can justify the 500 metres distance being tailored to local circumstances and a greater or lesser distance may be applied.”

The above must be taken within the context of the whole document which is not a set of regulations but planning guidance and therefore open to interpretation. Celtic Energy Ltd.’s position is that the distance between the operational area of the site and the

community should be determined using a science based approach to predict likely impact and they believe that 200 metres is a safe distance.

Local communities have been exposed to opencast mining for almost 60 years. Assurances which have been given by Celtic Energy Ltd. on more than one occasion had provided hope for a pollution free future and restoration of the natural landscape, which has now been undermined by the present proposal. A history of planning applications from 1979 to the present, provided by Bridgend CBC, appears as appendix 5.

Several avenues of communication were explored by the two local authorities following the application for extension submitted by Celtic Energy Ltd. in December 2004. Two public meetings were held, one attended by approximately 200 people and one by around 300. Some residents believe that numbers were closer to 400 and 600 but this is difficult to verify as minutes were not taken at either meeting (see Social Capital and Complaints, Liaison and Consultation sections). Representatives of Celtic Energy Ltd. were invited to these meetings but declined to attend. Public meetings are often not the most effective means of communication, as a combative atmosphere can develop where people with opposing interests fail to listen to each other.

The Margam Mine Liaison Committee was formed as a result of a planning condition in the current consent. It comprises members of Bridgend and Neath Port Talbot CBCs, community council members, residents (now including at least one member of PACT), officers of both local authorities and Celtic Energy Ltd. management. Meetings are held every three months and items for discussion include site progress, site operation, environmental reports about dust, noise, blasting and water, as well as progress reports on any applications for planning permission (see residents' comments in Complaints, Liaison and Consultation section).

Local community members were not satisfied that their concerns had been adequately considered via the public meetings or the liaison committee and wished to explore the potential of HIA. At the first HIA meeting, the process was introduced, including the focus on reducing health inequalities, which is integral to WAG policies and. it was made clear to residents that WHIASU and NPHS would take a non-partisan approach, helping the group to consider both positive and negative impacts and the likelihood of each occurring, supported by relevant evidence. It was explained that HIA should be based on the determinants of health and a multi-disciplinary understanding of the proposal and of the local situation.

Scope of the Health Impact Assessment

As this development involves large scale fuel supply, there could be some impact on the whole of Wales and on established markets in England, but it was agreed that it was not feasible to examine these aspects in sufficient detail in the time available (see appendix 2). It was therefore agreed to examine only impacts on the local community including Kenfig Hill, Cefn Cribwr, Aberbaiden, Pen y Bryn and Margam Village/Coed Hirwaun.

Planning issues

Planning guidance in Wales for opencast sites is given in Mineral Planning Policy Wales (MPPW 2000) and the annexes of Mineral Planning Guidance 3 (MPG3) 1994. An updated Technical Guidance Note (TAN) was due at the end of 2006, but this may now be

brought forward and a consultation draft should be available January 2006. Paragraph 40 of MPPW states, in relation to buffer zones, that *“Further guidance on the factors that should be taken into account when setting buffer zones for particular minerals will be provided in Technical Advice Notes.”*

The annexes of MPG3 1994 still apply in Wales. These contain sections which address planning and pollution control, visual impact, noise, blasting, dust, water, transportation, land use, nature conservation, subsidence, tips and restoration. As with Scottish SPP16 the document provides guidance and is not a set of regulations.

The Scottish Planning Policy (SPP) 16 states that, as a general principle, opencast sites should not be approved if they are within 500 metres of a community, would result in disturbance for more than ten years, are close to existing mining sites or would adversely affect any built or natural heritage site. The policy further states that applications should only be approved if they are environmentally acceptable or provide local benefits. Similar policies have been introduced in England (Body 2005a) and, on all these grounds, the current proposal would probably be rejected if sited in Scotland or England. This is further discussed in the section dealing with the Human Rights Act.

The Scottish Executive has called in the first applications since stricter planning controls over the sector were introduced (Body 2005b). These applications had previously been passed by the local authority but will now be subject to a public enquiry on the grounds of significant negative effects on local communities. The development in question is at Douglas Valley which has some similarities to Kenfig Hill in that opencast mining has taken place on an adjoining site for several years and residents fear that it will become a polluted industrial landscape.

Individual local authorities also produce Minerals Local Plans, which clarify or expand on national guidelines. Nottinghamshire County Council’s Minerals Local Plan, for example, in advising on how to deal with a succession of applications for extraction states:

“The impact, both real and perceived, of a concentration of workings close to or even surrounding a community can be especially damaging to the general quality of life. It may also irrevocably and adversely alter the existing landscape character.”

“The stage may therefore be reached when it is the cumulative rather than the individual impact of a proposal that renders it environmentally unacceptable.” (Nottinghamshire County Council, Revised Minerals Local Plan, 2005)

The above philosophy informs Nottinghamshire’s policy within the Minerals Local Plan: *“Planning permission will not be granted for minerals development which would result cumulatively in a significant adverse impact on the environment and for the amenity of local communities.”* (Policy M3.28 Cumulative Impact)

In a recent development, a letter to the press regarding the proposed Ffos-y-Fran opencast site at Merthyr Tydfil from Carwyn Jones, Assembly Member for Bridgend, stated that:

“...the Labour Party made a commitment to introduce the presumption of a buffer zone during the Assembly term in 2003... In keeping with that commitment, the draft guidance is due to be produced ... before Christmas.” (Western Mail 2005b)

This would indicate that during 2006, Wales is likely to have similar planning guidance to that of Scotland and England and that local residents should be protected by the

“presumption of a buffer zone”. It should be noted, however, that though the letter refers to 500 metres in an earlier paragraph, it does not state categorically that the buffer zone in Wales will be 500 metres and does mention *“exceptional circumstances surrounding some developments”*. (Western Mail 2005b)

Communication with the public

Community members thought that some of the planning issues had not been adequately explained to them, so it was suggested that they should put these in writing for reply by the local authority’s case officer dealing with the application.

Since the HIA commenced the principal environmental health officer from Bridgend has met with local residents to discuss their ongoing concerns about the present site. It should be noted, however, that an offer to respond to queries or questions from those attending had been made at both public meetings held in March 2005.

In general, residents were dissatisfied with the modes of communication, whereby residents were made aware of the planning application to extend the opencast mine by means of press notices and information posted on telegraph poles, and on the gate posts of local footpaths. They compared this with the practice of the Local Authority sending a personal letter if a neighbour was planning to build a garage. The point they were making was that communication was less good regarding a development which they felt could have a profound affect on their health and wellbeing, compared with that for a fairly minor building which had no such implications (see Complaints, Liaison and Consultation section). The Town and Country Planning (General Development Procedure) Order 1995 determines methods of public notification and this was followed. This procedure is considered to be adequate by the councils involved, as it would not be a practical proposition to notify individually every household that might possibly be affected by such a development.

Government policies and programmes

In the words of the Prime Minister, the Rt. Hon. Tony Blair:

“Real progress cannot be measured by money alone. We must ensure that economic growth contributes to our quality of life, rather than degrading it”. (HM Government, 1999)

Residents believe that going ahead with the proposed opencast mining extension would destroy large areas of countryside, exposing the community to pollutants in order to extract fossil fuel. This would tend to undermine many Welsh Assembly Government (WAG) and UK wide policies relating to health and wellbeing, especially in its likely impact on physical activity through the consequent loss of a natural outdoor amenity for at least another ten years, if the proposal goes ahead. The likely effects of an extension to Margam Opencast Mine on major policies and programmes related to health and wellbeing are summarised in table 1.

Table 1**Proposed development in relation to WAG policies and programmes**

Policy/Programme	Relevant aims	Potential effect of open-cast	Section reference
Government of Wales Act 1998	Contains commitment to sustainable development	Continued reliance on coal from opencast sites incompatible	Climate change
Health Challenge Wales: National focus for improving health in Wales	Help create the conditions necessary for people to lead healthy lives and to improve their health	Countryside will be replaced by a polluting industry, which will make leading a healthy life more difficult	Nuisance dust, particulates, transport, physical activity
Climbing Higher: Sport and Active Recreation, Mentro Allan (funding)	Using “our great outdoors” as a “wonderful resource for sport and active recreation”	The local environment will not be conducive to recreational physical activity if the development proceeds.	Physical activity, loss of amenity
Nutrition Strategy for Wales	Increase fruit and vegetable intake	Pollutants likely to adversely effect local garden produce	Nuisance dust
Welsh Network of Healthy Schools	Actively promote and protect physical, mental and social health	Local work undermined by the impact of pollutants, especially on children with asthma.	Particulates, physical activity, social capital
Safe routes to school	Encouraging walking and cycling to school	Children less likely to walk or cycle if pollution increases	Physical activity
Play Policy	Children use “play in the natural environment to learn of the world they inhabit with others”	Play in the outdoor environment may be restricted in order to protect children from ambient air pollution.	Physical activity
Wales Spatial Plan	Building sustainable communities	People who have a choice are likely to	Loss of amenity, social

		move away	capital
Wales: A Vibrant Economy	Encourage clean energy generation. Joining up policy agendas	Encouraging 'dirty' coal dependent power generating	Particulates Local economy
Smoke-free public places and workplaces	Protecting people against the adverse health effects of second hand tobacco smoke	Local outdoor and indoor environment will continue to be polluted by health damaging particulates.	Particulates
Physical health gain targets	Reduction in coronary heart disease (CHD) and cancer	Pollutants produced by the proposed site increase the risk of CHD and lung cancer	Particulates, physical activity
Mental health gain target	Increase the SF36 mental component summary score	Worries about the proposal are already a cause of anxiety and depression.	Stress
Developing Health Impact Assessment in Wales	Ensure that health and wellbeing issues outside the scope of the planning process are considered	This collaborative HIA aims to help local people explore likely impacts of the development and present these to decision-makers	Introduction, discussion, conclusions

Profile of Bridgend County Borough

The 2001 census shows that Bridgend County Borough has a population of 128,645 which is forecast to increase by about 7000 by 2006. The largest increase is expected to be equally shared between the older population and the 15-29 age group. Older people are five times more likely to use health services, so the increase in this age group has implications for the sustainability of existing provision (Bridgend Local Health Board and Bridgend CBC, 2005). Older people are also known to be more vulnerable to some of the health impacts identified in this report and this will require vigilance to ensure that adverse health effects are avoided wherever possible.

Local area statistics have traditionally been presented at ward level but there are several drawbacks to this approach, including small populations that may result in unreliable data. Also, in matters relating to environmental pollution, the geographical shape of a ward may mean that some parts are quite far from the likely source. In order to overcome such problems, this report will use new statistical geographies called Super Output Areas (SOAs) developed by the Office of National Statistics, based on the 2001 Census. The data has been derived for Middle SOAs that border the existing opencast site and the proposed extension. Appendix 3 gives an explanation of SOAs and contains maps, tables and graphs for the relevant area.

The two Middle SOAs described are Bridgend 008 (Pyle, Kenfig Hill and Cefn Cribwr areas) and Bridgend 006 (sparsely populated in the area immediately adjoining the opencast site but including Tondy about one and a half miles to the east). Bridgend 006 has a significantly higher all cause mortality rate than Wales as a whole for all ages and for those aged under 75 years. The area also has a significantly higher overall death rate from respiratory disease than Wales as a whole. For respiratory deaths in those aged under 75 years, Bridgend 006 has a higher rate than Wales as a whole, but this does not reach statistical significance. Bridgend 008 has higher overall and under 75 years mortality rates for all causes and for respiratory disease but none of these differences reaches statistical significance.

It is not possible to say whether or not these higher mortality rates are caused by emissions from the opencast site, as there are other possible causes, including exposure at work, other sources of pollution in the area and active or passive smoking. It could, however, be said that those with existing respiratory disease are more susceptible to ambient particulate pollution. Evidence of these effects is discussed in following sections.

Data from a survey of GP records was requested from Bridgend Local Health Board in an attempt to assess whether the workload of GPs with practices near the site was heavier than elsewhere in Bridgend. This was supplied with a warning that the figures were based on very early data from a new system and were therefore not sufficiently robust to draw any conclusions. This data is therefore not presented in the report.

Health Inequalities

Bridgend County Borough is considered to be one of the most deprived regions in Europe and has been designated as an Objective 1 area. The fact that Bridgend is relatively deprived means that many of the wider determinants of health need to be improved. These wider determinants include the outdoor and indoor environment together with social and community conditions, which will be examined in this HIA.

Assessment of impacts

An Environmental Statement has been prepared by Celtic Energy Ltd. (2004) and data on the impact of the site on the local environment and ecology contained in that report will be referred to when relevant to human health and wellbeing.

As previously stated, the new Technical Advice Note (TAN) on Coal is being consulted upon and is therefore not currently available. A consultation draft should be available January 2006.

Health impacts identified by residents

Many different health concerns were raised during HIA meetings and focus group discussions, respiratory, cardiovascular and stress related illness being mentioned most frequently. It was also claimed that there was higher incidence of diabetes, brain tumours, skin and eye disease and congenital abnormalities in communities near the opencast mine.

A cluster of seven cases of gastroschisis was identified in the Bridgend area in 2004 and investigated by the NPHS (2005). Despite detailed clinical interviews and review of environmental data, it was not possible to identify a cause or any possible suggestion to explain the cluster that could be investigated by a formal study. No research evidence was found to link incidence of gastroschisis with ambient air pollution.

This HIA concentrates on impacts on communities directly adjacent to the opencast mine. There are no readily available statistics on disease incidence in this relatively small area with populations in three different electoral divisions (ED). Parts of these divisions are at some distance from the site and may not be affected by pollution to the same extent as those adjacent to it. ED level statistics that are available may not, therefore, be helpful in identifying health impacts of the opencast mine. The introductory section (Profile of Bridgend County Borough) shows that mortality rates are higher for all causes and for respiratory disease in Middle SOAs adjacent to the opencast site (appendix 3) but that these cannot be directly attributed to pollution from the site.

A thorough investigation of all diseases mentioned by the residents is beyond the scope of this exercise and would require well funded epidemiological research to determine whether or not they are linked to pollution from the site. Such research is, therefore, beyond the scope of this health impact assessment.

The psychological effects of the present opencast workings and the proposed extension were evident from comments and discussions in five out of six focus groups and were also apparent during all meetings with residents. People taking part in focus groups, especially younger parents, seemed more directly concerned about physical health but the psychological effects were apparent when discussing the general negative impacts of living near the site. These are dealt with in the following sections, especially under Stress, Anxiety and Depression.

Nuisance Dust

There is no precise definition of dust amounting to a nuisance but the suggested figure of 200 milligrammes per square metre per day for non respirable dust is often mentioned as a threshold. The origins of this figure have not been traced but it was undoubtedly developed many years ago when tolerance for dust was greater. Levels that currently comply with this suggested figure are not now acceptable. The measurement is based on

annual rather than weekly or daily averages, so could allow episodes of very high dust pollution. It has been recognised by Celtic Energy Ltd. that coal dust in excess of 80 milligrammes per square metre per day would be likely to generate complaints from residents.

Table 2 shows the annual average daily rates of dust amounting to nuisance measured at two sites in Kenfig Hill. The annual rate exceeded 80 milligrammes per square metre in 2002 and was close to the limit in 2003, though this was considered to be a poor year across the UK due to prolonged high temperatures. In conditions of global warming, the UK is likely to be subjected to more frequent periods of prolonged high temperature, which is likely to aggravate dust pollution. It should also be noted that this table shows annual rates, these figures being derived from measurements on days of high and low pollution. It is therefore likely that residents in this area were exposed to unacceptable levels of nuisance dust on some days in years when the annual rate was below 80 milligrammes.

Table 2
Annual dust deposition rate at two sites in Kenfig Hill

Period	Annual dust deposition rate (milligrammes per square metre per day)	
	Crown Road	Swn yr Afon
1997	36	No measurement
1998	35	No measurement
1999	47	No measurement
2000	40	No measurement
2001	50	No measurement
2002	89	No measurement
2003	78	69
2004	43	43

Source: Bridgend County Borough Council

Examples were given by people taking part in focus groups of instances when dust emissions from the site have been worse at certain times, during summer months especially when some residents have to keep their windows closed.

A resident from Cefn Cribwr stated that:

“You cannot leave your windows open – on a nice day it’s nice to leave your windows open. I don’t leave my windows open any more” (Group 2)

Having to keep windows closed because of dust was also mentioned by residents from Kenfig Hill (Group 3). The problem of dust was reported to be worse at certain times of

year (Residents and group 4), and a Cefn Cribwr resident describes how there is sometimes a haze over the whole valley and *“It’s like living in a cloud.”* (Group 2)

One young man who lived in Coytrahen described how an opencast mine used to be near to the school he attends and that on a hot day you could smell the dust:

“The first few years I was there the opencast was still going – now its been shut and we don’t get the dust over there as we used to because you could guarantee on a dry day you could smell the opencast” (Group 4)

An ex-miner also made a similar statement about the opencast near Kenfig Hill:

“If you go over the ‘Waun’⁴ then definitely there ... I can smell the sulphur, the coal smell, the mine gases that are associated, such as methane and butane, because the coal has just been mined – you can smell it” (Group 4).

Residents differentiate this dust from ordinary traffic or household dust as being gritty with large particles in deposits on garden furniture, window sills, rain gutters, inside kettles and inside shop premises (Groups 2, 3, 4, 5 and 6)

“I felt if I could sort of brush it all together I could make one of those briquettes and start burning it” (Resident from Cefn Cribwr, Group 2)

“Now there is dust and dust ... sometimes you have what I call grey dust which is what you get mostly in the house but then you get what I call black dust”(Shop keeper, Group 5)

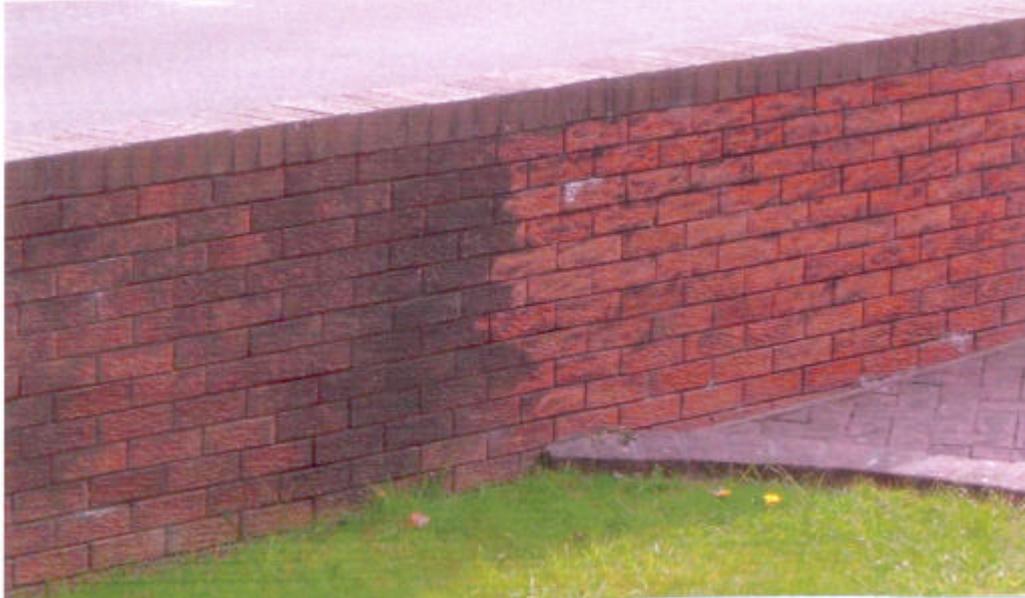
The method of dust control used by Celtic Energy Ltd. comprises static masts and mobile bowsers spraying a fine mist of water droplets. Residents report that agreed damping down procedures on the existing site are often not adhered to and that this has frequently been drawn to the attention of the council. Even if the agreed procedure were followed rigorously, it only operates on sections of the site such as spoil heaps, coal storage areas and roads, whereas the whole site is a source of dust. Bridgend CBC states that the prevailing wind is south westerly and that any dust is blown away from the community when the wind is in this direction. This correlates with local authority records which show an increase in nuisance dust deposition rates during episodes of north and north easterly winds. The masts are placed to entrap dust during periods of north easterly wind but the Company’s management acknowledge that, if the wind direction changes, spraying has to be discontinued at some locations to avoid soaking their workers.

Members of the group explained that the dust could be particularly bad when work was taking place near the top of the site. This occurred when beginning a new excavation and less severely when topping off soil retention areas (group 2). Residents agreed that dust nuisance was very dependent on wind direction.

As one Pen y Bryn resident explained:

“If you go back to the weather, it doesn’t matter how much legislation and monitoring and all the precautions they put in, you are at the mercy of the weather”(Group 4)

⁴ ‘Waun’ is ‘Waun Cimla’ the land lying between Crown Road and Bedford Road.



This photograph shows a deposit on a garden wall which was taken by the resident of a property in Swn Yr Afon, Kenfig Hill, close to Crown Road and the current opencast workings into the south west corner of the site. The resident whose property was being affected reports that the deposit is coal dust. The resident stated that this was the second time that year that the wall had been cleaned with a power washer (area to right of photograph).

There are other indications that dust is affecting people's way of life and recreation out of doors (Groups 1, 2, 3, 4 and 5):

"We could sit out and eat al fresco – can't do it now unless you want to eat coal dust sandwiches" (Kenfig Hill resident, Group 3)

As well as affecting local residents dust also affects those using nearby open farm land for recreational purposes (Group 4, see Loss of Amenity section). A rambler stated that,

"I think we will be walking around not with wet weather gear on but with umbrellas to stop the dust falling on our heads basically... dust will fall over a much larger area than just the locality by the opencast. The dust is going to be borne wherever the wind goes at the end of the day". (Rambler, Group 4)

Local businesses (Group 5, see Local Economy section) also described how they were affected by the present opencast mine, for example:

"– now I have to pay staff and we have to dust the shelves frequently. Now normally before this happened I could get away with it maybe once /twice a week. Now I'm doing it at least every other day if not every day depending upon what the conditions are. It's not fair to my staff having to work in it and it's not fair to my customers ...would you buy somewhere where the shop had dirty shelves?" (Shopkeeper selling grocery and green grocery, Group 5).

Older people were also especially concerned that there may be a time when they cannot clean their windows or their homes, anymore. One older woman who explains how her house is black with dust twice a week stated:

“At my age I can do it right now ... but in five years time I will not be able to do it and I will have to look through dirty windows” (Group 3), and

“I am not going to be able to cope with it – I am not going to be able to keep my home clean” (Older woman, Group 3)

Both Bridgend CBC and Celtic Energy Ltd. are aware that complaints regarding dust have been received over the past two years and that the geographical pattern of complaints reflects the areas most affected (see Complaints, Consultation and Liaison section). There has been a significant increase in complaints to Bridgend council in 2005 over those received in previous years which is explained in the section, ‘Complaints, Consultation and Liaison’. Residents from Hazelgrove also complained of dust blown onto their property from passing coal wagons, but the group’s technical advisor stated that the loaded trucks had been sprayed with a polymer sealant to control the dust since 2001 and that there had been few complaints since this practice had been initiated. A resident from Pyle (Group 1) reported that he had previously complained to Bridgend CBC who had done a survey of coal trucks to assess if they were gel coated. This resident complained that the gel coating of coal on trucks was not always sealed and that there was on occasions a “*dust cloud*” all the way down to Cornelly.

Three residents in the study reported eye problems experienced personally and by other people, which they believe are associated with exposure to pollution from the site. A review article states that the eye is vulnerable to air pollution (Klopfer 1989) and, in specific situations, for example in contact lens wearers, air pollution can cause severe adverse effects. The author states that ocular effects of air pollution are often missed by optometrists when examining patients. It should be noted, however, that this review is based on 26 separate studies where pollution may be at higher levels and of different composition to that experienced at the opencast site. Nevertheless, it is a fact that dust in the eye causes irritation and pain and that residents have reported levels of indoor and outdoor dust that the general population would find unacceptable. It would therefore follow that they are likely to be at greater risk of ocular dust irritation.

Some residents in the study (Groups 1, 2, 3, 4 and 6) were concerned about how the dust is aggravating existing medical conditions. For example a Pen y Bryn resident explained how she was affected by a dust cloud whilst out walking her horses, which precipitated an asthma attack lasting for three days (Group 4).

A resident of Cefn Cribwr was more concerned about the effect dust was having on her own health and that of her relatives than about the nuisance element:

“Everyone could sweep their windowsills here because your windowsills are covered in this black dust. I don’t want it going on my washing – but it’s my lungs I’m more concerned about, and my grandchildren’s lungs” (Group 2).

A local shopkeeper was also concerned about how dust may be affecting health:

“There was a time when you could blow your nose and it would be a nice creamy grey colour – sometimes you blow your nose and it is actually black. Now that is not what you get in a normal healthy environment.” (Shopkeeper, Group 5)

There was concern about dust on food and the effect that this may be having on health.

“If dust is in the air its going to go on those foods”(food being sold in shop) (shopkeeper, Group 5)

One young mother stated that: *“I worry about the food because the filter in the kettle – have to rinse it out a few times – residue in there, black specks. Is this getting into the food? Are we then going to ingest it and what effect is this going to have on us?”* (Group 6)

Dust deposition onto vegetation may effect photosynthesis, transpiration and allow the penetration of phytotoxic gaseous pollutants, causing decreased productivity (Farmer 1992). Gardening, especially the growing of vegetables and fruit, may suffer pollution from the proximity of the open-cast working. This could mean that local people will be denied an active hobby in a pleasant environment and the possibility of enjoying home grown produce. This would not help WAG strategies to increase physical activity and fruit and vegetable consumption (table 1). The problem can only become worse if the extension, which is much closer to a greater number of houses, is granted planning permission. No specific complaints about dust on produce have been received by Bridgend CBC but residents in more rural parts affected by the opencast workings are very aware of this problem and report that they have made complaints elsewhere.

Particulates

Particulate matter is any type of solid in the air in the form of smoke, dust and vapours, which can remain suspended for extended periods. Particulates are produced by activities central to opencast mining including earth moving, excavation, coal extraction and diesel fumes from heavy plant carrying out these operations. Microscopic particles less than 10 microns in diameter (PM₁₀) can be breathed into lung tissue, causing respiratory disease and lung damage. The Air Quality (Wales) Regulations 2000 and Air Quality (Amendment) (Wales) Regulations 2002 prescribe that PM₁₀ should not exceed 50 micrograms per cubic metre as a 24 hour mean, with no more than 35 exceedences in a 12 month period and an annual average not exceeding 40 micrograms per cubic metre.

As the regulations refer to a 24 hour mean, it is possible that an undertaking could produce very high particulate levels during the working day (12 hours or less) that could be balanced against low night-time readings when no work is taking place. An opencast mine could, therefore, meet the requirements of the regulations whilst producing health damaging levels of PM₁₀ during the working day and additionally 35 times per year when they are allowed to exceed the daily mean limit. Although the current regulations would seem to afford somewhat limited protection, data collected by Bridgend’s environmental health department shows that this type of scenario is very unlikely to be occurring at the present site.

Bridgend CBC reports that PM₁₀ levels are within allowable limits and a graph illustrating data produced by their monitoring equipment appears as appendix 6. In addition, the monitor measures PM₁₀ concentrations as 15 minute averages allowing fluctuations during the day to be tracked. The graph for 22nd September 2005 is typical of the series showing data on dry days for that month, which show that, though there is some fluctuation in measurements, the variation does not usually exceed 10 micrograms during a 24 hour period.

Bridgend CBC states that the PM₁₀ concentrations measured at Station Road, Kenfig Hill compare favourably with other rural sites and are at just over half the current objective expressed as an annual mean. In the opinion of Bridgend CBC, evidence suggests that emissions from the opencast coal site are unlikely to breach national air quality objectives. Further data from Bridgend CBC shows that the number of periods when emissions

exceeded the limit was 16 in 2000, two in 2001, three in 2002 and 11 in 2003. (Figures are not available for 2004 and 2005.) However, the Steering Group's advisor on environmental monitoring states that these exceedences are likely to have been connected to regional high PM₁₀ levels observed at several monitoring points across Wales. Local area comparisons with Swansea are shown in graphs presented in appendix 6. Though the number of exceedences recorded is well within the maximum number allowed, it does indicate that residents have been, at times, exposed to health damaging levels of particulates, though this may not have been due to activities on the opencast site. Evidence below indicates that there is some risk associated with transient exposure.

Current regulations do not require that smaller particles are monitored separately, but many experts in the field believe that it is these (PM_{2.5} or smaller) that may be more harmful to health. For example, fine particles, especially fine sulphate particles, are more strongly associated with acute respiratory health effects in school children (Schwartz 2000). No air quality standards exist for protecting the public against the health effects of PM_{2.5}, so a local authority has no statutory means of controlling emissions of these smaller particles.

There is evidence that long term exposure to small particle ambient air pollution (PM_{2.5}) is associated with cardiovascular morbidity and mortality. Animal data suggest that air pollution contributes to atherosclerosis which underlies many of these diseases. A recent study (Kunzli 2005) measured carotid intima-media thickness (CIMT), a measure of sub-clinical atherosclerosis (thickening of the inner arterial wall), and exposure to PM_{2.5}. (The carotid intima artery supplies blood to the brain.) The researchers found that for a cross sectional exposure contrast of 10 micrograms per cubic metre CIMT increased significantly, especially in women aged 60 or more. This study therefore provides epidemiological evidence of an association between atherosclerosis and fine particle ambient air pollution.

The finding that women are more susceptible to air pollution is confirmed by a study recently accepted for journal publication (Chen 2005). The researchers examined the long-term effects of ambient particulate air pollution on fatal coronary heart disease (CHD). A cohort of 3,239 non-smoking adults without CHD at baseline was followed for 22 years, monitoring their exposure to air pollution and controlling for several confounders, including lifestyle. The relative risk for CHD in females for each 10 micrograms per cubic metre increase in PM_{2.5} was 1.42 and 2.0 for PM_{2.5} plus ozone.

Epidemiological evidence demonstrates that acute exposure to particulate air pollution is associated with cardiovascular death, myocardial infarction (MI), ventricular fibrillation and increased risk of sudden cardiac death (Dockery 2001). The Determinants of Myocardial Infarction Onset Study (Peters 2001) has demonstrated a link with elevated concentrations of PM_{2.5} in a two hour and 24 hour period before onset. Results suggest that elevated concentrations of fine particles in the air may transiently increase the risk of MI within a short period after exposure. This finding may indicate that mean measurements, combined with regulations that allow recommended maximum limits to be exceeded up to 35 times in a 12 month period, may not be adequate as they give only limited protection against transient and repeated episodes of high pollution.

Increased daily mortality has been associated with exposure to particulate air pollution. A study in six USA cities showed that PM₁₀, PM_{2.5} and sulphate particles were each significantly associated with increased daily mortality (Schwartz 1996). The strongest association was found with PM_{2.5}, the largest increases being deaths from obstructive pulmonary disease and ischemic heart disease.

It has been reported that reductions in particulate air pollution can lead to reductions in death rates. A study of deaths before and after a ban on coal sales in Dublin found that average black smoke pollution fell by 70% following the ban, respiratory deaths fell by 15.5% ($p < 0.0001$) and cardiovascular deaths by 10.3% ($p < 0.0001$) (Clancy 2002)

In the UK the Committee on the Medical Effects on Air Pollution (COMEAP) provides information to government departments and agencies on the potential toxicity and effects upon health of air pollution. COMEAP states that there are clear associations between both daily and long term exposure to air pollution (COMEAP 2005), with effects on the cardiovascular system, including increased hospital admissions and premature death. COMEAP concludes that many of these effects are likely to be causal and, in the interests of public health, recommends a precautionary approach to future planning. The Committee found epidemiological evidence of association between long term exposure to $PM_{2.5}$ and a reduction in life expectancy. This was confirmed by re-analysis of the data by the US Health Effects Institute, which has shown that the reduction in life expectancy is due to cardiovascular disease. COMEAP states that this is a fairly recent finding and more research is needed. The Report is currently out for consultation and regulations are likely to change in due course.

Though the impacts are not as great as those of smoking, family history or hypertension, they are nevertheless important and the precautionary principle should prevail. The precautionary principle has been described as follows:

"When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public, should bear the burden of proof. The process of applying the precautionary principle must be open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action." - [Wingspread Statement](#) on the Precautionary Principle, Jan. 1998

The Department of Environment, Food and Rural Affairs (DEFRA) Air Quality Expert Group (AQEG) has produced a detailed report entitled Particulate Matter in the United Kingdom (June 2005) Chapter 3 has the following opening statement *"Both short-term and long-term exposure to ambient levels of PM_{10} are consistently associated with respiratory and cardiovascular illness and mortality as well as other ill health effects. The associations are believed to be causal."*

The Report goes on to state that it is currently not possible to discern whether there is a threshold particle concentration below which there are no adverse effects on population health. Estimates for the UK indicate that short-term exposure to the levels of PM_{10} prevalent in 2002 led to 6,500 deaths and 6,400 hospital admissions brought forward that year, although it is not possible to discern by what length of time the events were brought forward (COMEAP 1998). Susceptible subgroups of the population are identified as those with pre-existing lung, heart or other disease and/or the elderly and children. Currently available evidence suggests that it is combustion-derived components of PM_{10} which are comprised predominantly of fine and ultra fine carbon-containing particles, possibly enriched with trace metals or specific organic compounds, which are primarily responsible for the harmful effects.

There is generally less evidence to connect secondary inorganic PM and coarse particles with adverse health effects. However, coarse particles cannot be ruled out since certain

sources may be enriched with components of putative high risk (for example, soluble trace metals). The coarse fraction also contains biological material such as pollen and may be proportionally enriched with endotoxin, both of which factors can lead to adverse health effects.

The AQEG report states that epidemiology has consistently demonstrated an association between adverse health effects and PM₁₀. Recent evidence from time-series studies is that displacement of daily mortality and hospital admissions is not of just a few days. This view is supported by Schwartz (2001) who has calculated that most of the deaths that are brought forward by airborne pollution are advanced by months to years. An increase in effect estimates with increasing duration of exposure to PM₁₀ is consistent with the larger health impacts observed from long-term studies. The balance of evidence suggests the combustion-derived components of PM₁₀, comprised predominantly of fine and ultra fine particles and possibly metal and other organic compounds are primarily responsible for the harmful effects. There is generally much less compelling evidence to connect secondary inorganic particles (that is, ammonium and sodium nitrates and sulphates) and coarse particles with adverse health effects.

The consistent demonstration of population health effects associated with PM₁₀ indicates that it is a relevant metric for air quality standards in spite of the important issues of PM₁₀ composition and the relationship between ambient and personal exposure. The World Health Organisation (WHO) has recommended the development of air quality guidelines for PM_{2.5} alongside the retention of measurement of PM₁₀ for public health protection. A health-based PM_{2.5} limit value should be derived from PM_{2.5} data since scaling the PM₁₀ limit value according to the prevailing PM_{2.5}/PM₁₀ ratio assumes that both fractions have the same toxicity and leads to no extra targeting of health benefits. Furthermore, given that the coarse fraction of PM cannot currently be considered innocuous, development of a PM_{2.5} target would need to be accompanied by health-based targets for the coarse fraction either indirectly via retention of a target for PM₁₀ (as recognised by WHO) or directly via a target for PM_{coarse} instead of PM₁₀.

Residents who took part in the focus group study for this HIA reported that some conditions had improved when away from the area, for example one younger woman (Group 1) reported an improvement in her asthmatic condition when living away at university in Birmingham and subsequent deterioration on returning to live at Kenfig Hill. Another Cefn Cribwr resident recounted how she had experienced an improvement in her general well-being, mobility, breathing and sleeping when on holiday in Ireland (Group 2). Participants also knew of relatives and friends whose conditions had improved when away from the local area. There were examples given of people's condition improving when moving to or travelling just the few miles to Bridgend (Group 1 and 2), the son of one resident experiencing an improvement in his asthma after moving to Bridgend and the mother of another improving after shopping trips there.

Residents also reported cases when conditions had worsened for people moving back to, or visiting Kenfig Hill and Cefn Cribwr especially (Groups 1, 2 and 3). For example a Cefn Cribwr resident described how the asthmatic condition of a grandchild worsened when visiting there (Group 2) and one resident commented that her asthma worsened after she moved to Crown Road, Kenfig Hill (Group 3). People living at Crown Road were believed to be those most affected at Kenfig Hill regarding their health:

“We are talking about something we have had for 55 years – some results in the doctors should show what’s happening to people, especially down the bottom of Crown Road” (Older man, Group 3)

There were accounts of instances when health problems have worsened under certain conditions. Two older women, one a Kenfig Hill resident and the other from Cefn Cribwr, both with asthma stated that they had experienced a worsening of their condition at certain times, for example when the company was stripping back the soil and when sprays or bowsers were not on. Health effects were also reported to be worse when excessive dust was being blown up in windy weather or when the wind was in a particular direction (Group 2, 3 and 4). Another older resident who has cancer and heart failure reported difficulty in breathing when the bowsers (sprays) are not turned on (Group 3). There were two accounts of adults and children, developing irritating and niggling coughs fairly recently and this was of particular concern to younger parents (Group 6). One parent had written to the Secretary of State for Wales about his existing complaint of emphysema, and how an acute asthmatic condition in his 11 year old daughter was affecting her schooling (letter from Kenfig Hill resident, 29.03.05).

Evidence from residents at HIA meetings and focus groups suggests that they consider the effects of particulates on health to be severe (especially Groups 1, 2, 3, 6). For example:

“All I know is that if I take the dogs for a walk ... I come back and I have to put stuff up my nose to breathe. Now you don’t tell me that there is nothing there.” (Older woman, Group 3).

Residents believed that there was a high incidence of asthma in the area from observations they had made when delivering leaflets to local addresses and from a school survey (table 3) completed in 2005 (Group 4).

It is difficult to estimate the increase in morbidity and mortality associated with opencast mining. A recent attempt was made to calculate the impact of a similar development at Merthyr Tydfil (Lowe 2004). The environmental statement for this development estimated that it would cause an increase of two micrograms per cubic metre in PM₁₀ and it was calculated that this would result in less than one death and less than one extra hospital admission per year in those aged over 65 years. However, the author stated that these estimates are uncertain and that there are major problems with data quality in the emergency admissions calculation. Given this statement and factors such as distance from the source of pollution, fluctuation in pollution levels, and emerging evidence on the role of PM_{2.5}, the authors considered that it would not be worthwhile to attempt a similar estimate for the effect of Margam Opencast mine.

Concerns about the health effects of opencast mining are not new to South Wales. Thirteen years ago a paper was published in the British Medical Journal (Temple 1992) which showed that a practice in Glynneath experienced a significant rise in consultations for asthma coinciding with the start of excavations at a new opencast mine. Doctors at the practice who recorded consultations were blind to the date on which work commenced.

Vulnerable Groups

Older people: In a study that examined the associations of small particulate exposure and disease, statistically significant associations were observed, suggesting that exposure to PM_{2.5} may be one of the multiple factors that influence heart rate variability and blood markers of inflammation in elderly subjects. (Pope 2004).

A recent study (Rich 2005) suggests that air pollution, particularly black carbon, nitrogen dioxide and sulphur dioxide, can provoke ventricular tachyarrhythmia among people with acutely predisposed conditions. For the highest risk patients an appreciable increased risk was identified for each 10 micrograms per cubic metre increase in particulate pollution. It has also been found that patients with implanted cardioverter defibrillators experience more life-threatening arrhythmias, triggering defibrillator discharge interventions during periods of elevated air pollution (Peters 2000). It has also been found that increases in PM_{2.5} and ozone were associated with increased ventricular arrhythmias within 24 hours of 19% and 21% respectively (Rich 2005). The authors concluded that these results confirmed previous findings that matching of pollution periods with arrhythmias is important in detecting such associations. This indicates that the present regulations may not provide adequate protection against the health impacts of transient particulate pollution.

Particulates have also been associated with exacerbation of asthma in adults. A study examining the effects of fine and ultrafine particles found that cumulative exposure over 14 days was associated with increased use of medication (von Klot 2002).

There is evidence from focus groups that the effect on older people may be more severe, especially for those with existing health complaints (especially Groups 2 and 3).

Children: A recent World Health Organisation Report (WHO 2005) states that epidemiological studies of outdoor air pollution, including PM₁₀, found associations between exposure and health effects in children, often at levels well below WHO guidelines. The developing lung is more susceptible to air pollutants and doses below the no-effect level for adults can be harmful in the foetus and in infants. Air pollutants interact with viruses, diet and other exposures to produce negative health impacts. Studies of lung function in children show that living in areas of high pollution is associated with lower lung function. These effects are modest but cumulative and it is uncertain whether the chronic effects are reversible. The Report found that particulate pollution had an important role in the exacerbation of asthma in children but that there are too few studies on coarse and ultra fine particles to define the role of different size particulates.

Several studies show that children may be more sensitive to particulate pollution than adults. In Merseyside the parents of children (mean age 7.5 years) were surveyed to determine respiratory symptoms in areas where there was exposure to pollution from coal dust and in unexposed control areas (Brabin 1994). There was a high response rate (92%) and the children in both areas were of similar height and weight and had similar rates of paternal and maternal asthma. After controlling for parental smoking and unemployment, it was found that wheeze, excess cough and school absences for respiratory symptoms were significantly higher in the group exposed to coal dust.

A study that examined the effects of opencast mining on children's health (Pless-Mullale 2000) found that children in opencast communities had significantly more GP consultations for respiratory illness within the study period than children in control communities. Children in opencast communities were exposed to a small but significant amount of additional PM₁₀, to which the opencast mines were a measurable contributor.

Further research has investigated the different health effects of indoor and outdoor PM_{2.5} particulates in children with asthma, using exhaled nitric oxide as a marker for airway inflammation (Peters 2001). Only ambient generated components were significantly associated with exhaled nitric oxide and these effects were seen only in children not using corticosteroid therapy. The researchers concluded that ambient PM_{2.5} exposure is

consistently associated with airway inflammation and that indoor generated PM_{2.5} is less strongly associated. This study is interesting in that it indicates that though children spend more time indoors, it is outdoor generated pollution that is likely to be the prime exacerbating factor in asthma. However, this was a small study and more research is needed in this field.

Local residents are fearful about the impact the present opencast workings and proposed extension could have on the health of their children and grandchildren, including dust and particulates being breathed in and deposits on food (especially Groups 2, 3 and 6).

Studies carried out by residents

Residents have carried out two studies of asthma prevalence near and further distant from the existing site, with some interesting results. They asked teachers in seven Bridgend CBC schools how many children had asthma medication in school, either held by the class teacher or in the school office. Table 3 lists schools in order of proximity to the site and shows that the proportion of children with asthma medication in school fell with distance from the site, though the results are not statistically significant. These results are supported by a second residents' survey of GP practices which also showed a trend of those nearer to the site having more patients aged under 16 with a history of asthma concurrent with opencast mining than before and more than those living further from the site.

These were lay studies and, as such, did not control for possible confounding variables such as housing conditions and did not produce statistically significant results. They are, nevertheless, interesting in that a trend emerges which supports professional research quoted above that has reported an association between childhood asthma and opencast mining.

Table 3

Schools by distance from opencast and presence of asthma medication in school (Spring 2005)

Schools listed by proximity to opencast	Total on role	Asthma medication in school	
		Number	Per cent
Cefn Cribwr Primary & Nursery	160	26	16%
Mynydd Cynffig Infant & Nursery	208	26	13%
Mynydd Cynffig Junior	210	30	14%
Pil Primary	202	24	12%
Afon-y-Felin Primary & Nursery	154	22	14%
Corneli Primary & Reception	280	28	10%
Newton Primary/Reception/Nursery	235	21	9%

Transportation, plant on site and diesel fuel

(See also previous section on particulates)

The proposed site will be worked with mechanical excavators and dump trucks, supported by a fleet of allied plant. All coal will be transported from the site by rail, with coal screening taking place adjacent to the railway siding at the top of the site.

Residents expressed concerns about the effects on asthma, bronchitis and heart conditions of diesel emissions from heavy plant used for excavating and vehicles used for transporting coal and spoil within the site. Residents' believed that their concerns about the opencast affecting health were confirmed from observations made whilst delivering leaflets. They reported that each of the first six houses called at in Kenfig Hill had someone suffering from asthma (Kenfig Hill resident, Group 4).

A study of acute short term exposure to diesel exhaust has shown that it produces systemic and pulmonary inflammatory response in healthy human volunteers, which can be underestimated by standard lung function measurements (Salvi 1999). The local authority has installed additional monitoring sites to establish current levels of nitrogen dioxide (NO₂) as a baseline marker to calculate levels of pollution from diesel fuel prior to any further development of the site. The first results for August show NO₂ concentrations for that period to be lower than suburban background concentrations. This would indicate that residents are not exposed to health damaging pollution emanating from diesel fuel. However, it has been reported that dose dependent increases in chronic bronchitis and other respiratory disease have been associated with increasing exposure to airborne particulates, the risk appearing to continue to concentrates below the ambient air quality standard (Schwartz 1993).

The problem of emissions from vehicles on site was raised in two focus groups (Group 2 and 4): for example, a Cefn Cribwr resident was concerned about the fumes from juggernauts and lorries on the site (Group 2). A young man was particularly concerned about the removal of coal itself and how this was adding to the greenhouse effect because of fumes emitted by lorries used in opencast mines. Another local resident agreed with this statement and compared the fuel used in opencast with that used in deep mines:

“Opencast mining is the worst form of mining you can have – fossil fuels for a start-burns the dirtiest of all fuels – diesel. With deep mining ... it is electric”. (Group 4).

A European review published in 2001 made a critical assessment of 15 reviews of published research linking air pollution and adverse health affects and concluded that the associations were both valid and causal (Dab et al 2001). Although the individual health risks of air pollution are relatively small, the public health consequences are considerable (Kunzli et al 2000).

Air pollution is associated with a rise in hospital admissions and deaths (Anderson 1991), morbidity and mortality (Department of Health 1998). Transport causes 25% of UK carbon dioxide emissions, contributing to climate change and subsequent affects on health. It has been shown that long term exposure to fine particle air pollution such as that generated by traffic is an important risk factor for lung cancer (Pope 2002).

High-risk groups for adverse affects of particulates include the elderly, infants and those with existing acute respiratory infection or cardiovascular problems (Pope 2000). There is increasing evidence that elevated levels of particulate matter can exacerbate existing asthma, but only limited evidence for its induction (Gavett 2001). The evidence of a

causal affect of traffic for asthmatic symptoms is not conclusive, as a study of wheeze in children found that this activity was not a major determinant (Venn 2000).

Residents from Pyle were concerned about nuisance from rail transportation, having already experienced disturbance due to rail maintenance (Male resident from Pyle, Group 1). They feared that noise from transportation and from track maintenance at unsocial hours would increase if the development were to go ahead (Group 1). In the opinion of Bridgend’s planning department, these fears are unlikely to be realised. However the stated intention is to increase production by 1,000 tonnes per week, so it seems likely that there will be some increase in noise both on site and from the railway. Table 4 shows that pollutants resulting from petrol and diesel powered vehicles are associated with adverse health effects but that some associations are difficult to quantify.

Table 4 – Pollutants associated with motor vehicles and their health effects

Pollutant	Health Effect	Comment
Benzene	Carcinogen (petro-chemical workers, e.g. pump attendants)	No evidence of general traffic affect, but any amount may be hazardous to health
Carbon monoxide	Cardiovascular disease (CVD)	Some effect, but greater exposure from passive smoking
Nitrogen dioxide	Lung function, response to allergens, CVD	Definite association but difficult to quantify - may be a marker for fine particles
Ozone	Respiratory symptoms, lung function	Ozone effect appears at some distance from the traffic source
Fine particles	Respiratory, asthma, CVD, myocardial infarction, carcinogen	Definite effect of fine particles from motor fuel, especially diesel
Sulphur dioxide	Respiratory, CVD	Definite association, but difficult to quantify

Stress, anxiety and depression

“Already stressed out of my mind when I think about it ...not know what to do... Absolutely devastated ... As if the bottom of my world had dropped out” (Group 1)

This is how an older woman, living in a house that will overlook the proposed development, described how she felt when she found out about the proposed extension to the opencast mine.

Whilst there is no direct evidence that demands on primary care will increase as a result of the development, it is possible that there could be an increase in stress related consultations, especially for those most adversely affected by the opencast extension. Residents reported that they were already suffering stress as a result of worries about how

the development might affect their health, their quality of life and the value of their property. Focus groups also revealed how the planning process itself had become stressful, as well as disappointment at the present opencast not ending and for older people especially, that they will be living with something that will outlive them.

The belief that one is exposed to toxic substances seems to be a strong predictor of poor self-reported health and it is possible that this may be, in some part, due to the unpleasant appearance of associated sites. There have been numerous studies of self-rated health in populations living near sites that have present or past connections with pollutants. In most of these investigations it has been found that poor self-rated health is more closely linked to belief in the toxicity of the site rather than actual toxicity. For example, people living near a chromium contaminated site reported similar health to that of a control group, but those living near the site who believed that the chromium was harmful to health had lower health scores, indicating that low score was linked to perception and anxiety (McCarron 2000). Nevertheless, this perception can be detrimental to the wellbeing of those exposed to unpleasant industrial landscapes.

Many illnesses are related to stress (Brunner 1997). Stress, such as that caused by worry over the future of the local environment can leave people vulnerable to psychological or minor psychiatric problems, which show correlations with living in underprivileged areas (Harrison 1998). It has been reported that disadvantaged areas make higher demands on primary care and that many of the additional contacts relate to psychological problems (Carlisle 1998). It is possible that there could be an increase in stress related consultations if the extension gains planning permission, especially in people most adversely affected by the process. For example, those living close to the proposed area are already worried about how the inevitable increase in pollution might affect their health and wellbeing.

Stress can be a product of the psychosocial environment and contribute to health inequalities between groups by raising concentrations of cortisol in the body, contributing to high blood pressure (Brunner 1997). Data from the Caerphilly Study (May 2002) show that psychological distress was a predictor of fatal ischemic stroke in men aged 45-59 years. The Whitehall II Study (Stansfield 2002) reported that psychological distress conferred increased risk of coronary heart disease, which was not explained by health behaviours or work characteristics.

The psychological impact of the proposed extensions, including stress and depression, was revealed during focus groups where residents' worries were based upon the following main themes: fear for physical effects on themselves and their families, living with the opencast day-to-day, potential impact of proposed extensions on the view, loss of local amenity and quality of life, disappointment at the present opencast not ending, involvement in this and previous campaigns, and for older people especially that they will be living with something that will outlive them.

Living with the present site has the greatest impact upon those residents from Cefn Cribwr living in streets facing the present opencast site and residents from Crown Road, Kenfig Hill (Focus groups 2, 3, 4 and 5).

As a Cefn Cribwr resident overlooking the present site stated:

"Sit looking over it every day of your life. Unless you actually live with one of these things, you couldn't imagine the sort of feeling it gives you – the level of depression.... 'black void' actually mirrors the way you feel" (Group 2)

“I cannot put up with this worry anymore. The stress of it is driving me round the bend every morning when I hear that noise and I’ve got double glazed windows” (Older resident from Crown Road, Focus Group 3)

Residents have been looking forward to the present workings ending and describe their disappointment, desperation, anger and frustration at finding out that the present proposal had been put forward (Focus Groups 1, 2 and 4). As a Cefn Cribwr resident pointed out:

“The biggest impact for us is that we were actually told that this opencast would finish after the stage they are just finishing now. The level of disappointment is unbelievable because we are people who walk a lot and we like to use that area for recreation. We have already lost the biggest part of it but the little bit we had left- going towards Kenfig hill –now they are asking us to give that up as well” (Group 2)

This same resident described how the level of desperation can make one feel suicidal or like committing murder and she felt that prison bars were prettier to look at than the ‘black hole’ (group 2).

Other residents describe how the proposal is affecting their psychological well-being (Groups 1 and 3), for example: *“it will probably drive me crazy”* (Group 1).

Indeed, the anticipation of the opencast getting closer was also causing anxiety to Kenfig Hill residents (Group 1, 3, 5) and to residents on the other side of the valley at Pen y Bryn:

“At the moment I walk up the road and have a look at the pit to see how big its getting – how deep its getting – and getting more and more depressed all the time. Because you are just looking at this big huge hole ... cause you are thinking to yourself ‘My God, that’s coming a bit closer, that’s moving down...’”(Shopkeeper in Kenfig Hill, Group 5)

“Beginning to think they are winning again – what are they doing to me? They are coming closer. Now I can stand on the front steps of my house and can see it and I am visualising that moving across”. (Older resident of Kenfig Hill, Group 1)

A Kenfig Hill publican is dreading the new phase starting because of the visual impact:

“You look out now and its pleasant, you feel good but er..it’s going to be depressing. I’m sorry it’s going to be depressing to live here, you know. I might decide to up and move if someone wants to buy it. But who will want to buy it anyway?” (Group 5)

Some residents describe the stress of opposing the current planning application because of the unequal power relationship between residents and the company, Celtic Energy Ltd.. The Company could afford barristers whilst residents are anxious about how to raise the necessary finance to defend the case (Group 4).

Some older residents describe why they are not involved in campaigning this time because of being disillusioned, cynical and in despair (Groups 1, 3). Campaigning was also reported to be very time and energy consuming. One older person stated that she was unable to cope this time due to an existing health problem (Group 3) and another who is now living alone was in despair:

“When I heard (about the proposed extensions) I thought ‘They can’t do this to us again, they just can’t’ I just felt completely hopelessly in despair. I just couldn’t go through all that again (campaigning)” (Group 1)

Older residents themselves (Group 3) and other participants (Group 5) were concerned about the psychological impacts upon the older population especially:

“We must surely take into account under Mental Health, the depression which occurs in people – old people in particular who are staring at something and telling themselves this will outlive them. Will outlive them – full stop- that’s there until the end of my days says this old man or woman” (local writer, Group 5)

As one older woman put it: *“Will we be alive when all this putting back is done - reed beds and clean air? We’ll be dead. How is it affecting us? It is affecting us to the end of our days”*(Group 3)

The focus groups revealed the depth of psychological impact of the present and proposed opencast workings experienced by residents. The impacts upon mental well-being have been discussed in this section but these effects are also embedded in other sections of the report.

A Pen y Bryn resident summed up how residents feel about inferences that because particulates, noise and vibration levels are within regulatory limits, residents are not being affected:

“anxiety can never be measured – the anger and frustration that residents feel” (Group 4)

Physical activity

A report of the U.S. Surgeon General (U.S. Department of Health and Human Services, 1996) which summarises research on physical activity and health concludes that higher levels of physical activity reduce overall mortality. Physical activity is protective against cardiovascular disease, raised blood pressure, colon cancer, type II diabetes and obesity. Exercise improves health related quality of life, improves mood, encourages optimum skeletal development in children and may be helpful in preventing falls in the elderly.

The presence of green space acts as a motivator for physical activity and a catalyst for social interaction. An increase in opencast mining activity in the area is likely to lead to restrictions on children playing outdoors (Hillman 1990) and thus less physical activity. Obesity rates in British children have trebled since 1982 and the first recognised UK cases of type II diabetes in white adolescents have been reported (Dyer 2002). The Safe Routes to School Initiative introduced in 1999/2000 aims to show children that there are alternatives to the car, encouraging them to take regular exercise and to develop healthy travel habits for the future. This work may be damaged if more parents transport their children to school to protect them from exposure to pollution.

Parents in focus groups expressed concerns about the loss of a local outdoor amenity for their children, and grandchildren but were in general more concerned about dust, pollution and the effect on children’s health. For example, one young parent admitted that it will affect allowing children out to play in the garden because *“We are not going to let them out to breathe in that air”* (Group 6). There was criticism of the present area designated for leisure (Bedford Park), especially the children’s area situated beside the opencast and therefore getting maximum exposure to dust (Group 2).

Perceived attractiveness of the local environment has been associated with levels of physical activity. (Ball 2001), respondents living in less aesthetically pleasing environments reporting less frequent walking for recreation or exercise. A recent study that analysed levels of physical activity and obesity in eight European countries, controlling for age and social class, found that living in a green environment was associated with frequent physical activity (Ellaway 2005). Conversely, less pleasant

environments were associated with lack of physical activity and higher prevalence of obesity.

Participants in all focus groups describe how at present it is not pleasant for a variety of reasons to walk in the area, especially adjacent to the present workings as an older man explains: *Noise from pumps – have had this for 55years ... you can only walk for 2% of the year* (Group 3) and dust is also a deterrent to people using the area for recreation (see section on Nuisance Dust).

Other participants explain how the removal of some of the footpaths has affected their using the area for walks, and report that some footpaths have not been reinstated by previous remediation (Group 2). Families also describe how walking routes have been blocked off, especially the ‘Oaks’⁵ (Group 6) and the ‘Waun’ has become virtually unusable due to its close proximity to the site (Group 4). There is also evidence that other groups of people including rambblers, the local Rugby Club and young athletes of international standard, who did use to the area no longer do so (Group 4 and see Loss of Amenity section).

Walking and cycling can make an important contribution to improving public health and strategies to encourage this type of activity are likely to reach a greater proportion of the inactive population than efforts to increase the use of exercise facilities. (NHS Centre for Research and Development 2000). It has also been shown that non-facility based exercise, such as walking is more sustainable than activities that are reliant on facilities such as leisure centres (Health Development Agency 2005).

Many people in the study mentioned that the presence of the site was detrimental to open air physical activity and two specifically mentioned the idea of a ‘green gym’ in the remaining natural open land between Kenfig Hill, Pen y Bryn and Aberbaiden (Groups 1 and 4). This land will be gone if the proposals go ahead. As one resident of Pen y Bryn stated:

“People are being told now not to pay for Gyms, not to join clubs but to get out there and use your own ‘green gym’ but where is ours going to be?” (Group 4).

It is doubtful that anyone would wish to walk or cycle for pleasure in an area with constant noise and dust. It is therefore likely that the amount of outdoor physical recreation taken by people in all age groups will decrease rather than increase, as advocated by WAG’s aspirations for improving public health via physical activity (see table 1). People who are especially concerned about ensuring and maintaining their health feel frustrated with the apparent contradictions between Welsh Assembly Government policies and the local situation.

Some participants (Groups 2, 4 and 6) felt that they had put an effort into keeping fit by maintaining a healthy diet and active lifestyle but were particularly frustrated because:

“... you can actually taste the coal dust as you walk past. They (Government) want you to have healthy lifestyles but you cannot because of the dust”. (Resident of Cefn Crib wr, Group 2)

⁵ The ‘Oaks’ was a row of houses by Aberbaiden Colliery. The term in this context refers to a footpath, now in the void, that used to link to Heol Fadog Farm.

“They are trying to get more people on their bikes to cut down green house gases from cars and everything else, and they are trying to get a healthier nation. This opencast is actually contradicting what this government wants to do” (Young person who uses the area regularly for exercise, Group 4)

A Pen y Bryn resident felt frustrated and patronised by Government policies and initiatives encouraging healthy lifestyles. She uses the natural open space on a regular basis and commented:

“They talk about socio-economic factors why our health is bad. Bad lifestyles are the cause they say. How can the government blame bad lifestyles? It’s so patronising!” (Group 4)

There is also frustration with recent local initiatives which encourage outdoor activities in designated forestry parks (South Wales Evening Post, 2005) when residents feel they already have local forestry trails to which access through Pen y Bryn, and from neighbouring villages, would be affected if the proposed extensions go ahead (Pen y Bryn resident, Nov 2005).

Regular exercise can reduce mental illness, has a modest beneficial effect on cognitive function and is associated with a reduction in anxiety (Scottish Forum for Public Health Medicine 1996).

A local shop keeper described what she does when she feels down and how this will change if the extension goes ahead:

“I take the dog for a walk and walk down the lane. You’ve got the trees there its lovely, well that’s gonna go for starters and where do people go who just want to unwind? Where are we going to go in Kenfig Hill there is nowhere. They will get in their car and drive ... it is wrong ... we have got the facility on our doorstep and we are gonna lose it” (Group 5)

An older woman also describes how she deals with stress in a similar way:

“I like to walk and if I feel like things are getting on top of me I like to get out and walk”(Group 3)

Cefn residents (Group 2) were also in agreement that walking in peaceful scenery *“lifts the spirit”*

If moderate physical activity for 30 minutes on at least five days per week became the norm, about a third of coronary heart disease and strokes could be avoided, 25% of type II diabetes and 50% of hip fractures (Scottish Forum for Public Health Medicine 1996). It has also been shown that gentle exercise such as walking improves mental health in older people and may reduce falls (NHS Centre for Reviews and Dissemination 2000). This type of activity is likely to decrease if communities lose access to the countryside. The local community in this instance will lose even more natural open space and amenity if the present proposal goes ahead (see also Loss of Amenity section).

Social capital

The concept of social capital is based on reciprocal support, informal social networks and a sense of attachment (Gatrell 2000). It has been recognised that the physical environment is important for community morale and social interaction. It has been observed that walkable mixed use neighbourhoods are connected with higher levels of social capital

including knowing one's neighbours, political participation, trust and social engagement (Leyden 2003). The character of the environment around the proposed opencast extension will change if planning permission is granted. People are less likely to walk within the neighbourhood as it becomes more subject to dust and noise pollution (see Physical Activity and Loss of Amenity sections).

When people in communities affected by new developments feel that their opinions and needs are being disregarded by those in authority, feelings of mistrust develop. In the area surrounding the present and proposed development residents have lost trust in the developer and in their local authorities, as assurances on time limits to open-cast operations here have not been honoured. In a recent study carried out in Hungary, social capital deficit was significantly associated with middle age mortality, with levels of mistrust showing the strongest association (Skrabski 2003). Mistrust may be aggravated by the perception that those who are involved in the planning process do not see population health and wellbeing as the priority issue. People on the Bridgend side of the proposed development believe that, because the majority of those who will be adversely affected live on this side of the border, Neath Port Talbot Council, will have less opposition from residents so will view the application more favourably. Owing to the history of open-cast mining in the vicinity, the majority of those likely to suffer adverse impacts do not trust the Local Authority or their elected representatives to defend their interests. Feelings of mistrust which were highlighted in focus groups are based upon residents' past and present experiences.

The way that residents were initially informed about the proposed extension caused anxiety and anger amongst the community (Groups 1, 2 and 3). Notices were posted on telegraph poles on the Neath Port Talbot side of the development first (Group 1) and on gate posts at the end of local footpaths (Group 2). Two days later notices were posted on telegraph poles in High Street, Crown Road and Station Road, Kenfig Hill. As one resident put it, it was left to us to "*beat the drums*" to inform other residents. Residents report that they felt that their feelings were irrelevant to local authorities (Group 1).

Residents in the study also felt they were not valued or respected in public meetings, feeling that their concerns were dismissed and that planning officers totally disregarded what they had to say (Groups 1 and 2). Residents referred to the "*poor attitude*" of those on the platform at public meetings and felt that they had been "*treated like idiots*" (Resident from Cefn Cribwr, Group 2).

Feelings of distrust are further fuelled by changes made by the Company, as part of the planning process from statements in the original planning application. Examples of these changes include increasing the height of the overburden mound by 10 metres, removing the baffle mounds in the south west corner of the site and working within 200 metres of housing in the south west corner. Residents report that several other important changes to the original application have been made. (Steering Group Member, 22.09.05 and Cefn Cribwr resident, Group 2). The Steering Group's advisor on environmental matters has advised that these changes came about due to unexpected geological conditions, but residents believe that these conditions should have been predictable at the time of the original application. Modifications to the original planning application are permissible as long as an application for any proposed change is submitted to local authority planning departments for consideration and approval. Any changes to the original planning application have been made with the appropriate permissions.

Local people are aware of the discrepancies between planning regulations in Wales and the rest of the UK and have brought this to the attention of their elected representatives,

with, they believe, little effect. However, Plaid Cymru stated in a recent press release (10/5/05):

“People and their homes are entitled to separation from these developments. A buffer zone in principle would ensure that planning authorities would have to justify any exceptions to this protection”

Feelings of distrust are not helped by instances such as that where a politician who opposed open-cast development in his own constituency in England supported similar developments in Wales (Western Mail 2005). Distrust is also fuelled by inconsistencies between the intentions expressed in high level planning documents and the reality of support for the industry. For example, whilst the overall policy is to become less reliant on fossil fuels, opencast mining continues to receive support from governments and planning authorities.

Residents feel isolated (Group 1 and 2). Those taking part in focus groups felt that they had no advocates in the local authorities concerned and that in some cases elected representatives were not supporting them. Residents (Groups 1, 2 3 and 4) were unhappy about the amount of support from some elected representatives which was summed up by the questions below:

“Who is here to protect us?”(Group 2) and *“Who is looking after us?”* (Group 2)

Not all Members of Parliament, AMs and local elected representatives came in for criticism which was highlighted in a discussion between participants concerning the amount of support from one elected member in particular (Group 3). Indeed, residents have had support from some MPs and AMs, and assistance is ongoing (see below).

There have been a number of deep mines in the area previously, including Mill Pit and Bryndu Colliery (Adamson, 22.09.05) but Celtic Energy Ltd. managers told members of the HIA Steering Group (Lead for Health Inequalities and Equity, NPHS and Research Associate, WHIASU) that the site is best suited to opencast coal recovery and that drift or deep mining operations would be unsuitable. This statement was made at a site visit on 1st September 2005, when the two Steering Group members were accompanied by the Group’s environmental advisor. However, in a letter the Head of Planning, Neath Port Talbot CBC, stated that *“the construction of the deep mine is technically feasible, however Celtic cannot raise the necessary finance”* and that there is *“no reason to believe that the mine would not be viable”* (Reply to letter from MP on behalf of local resident, 25.07.05). Access to a drift mine through the present void had been investigated by Celtic Energy Ltd. as a report given at a meeting of the Site Liaison Committee demonstrates:

“Celtic Energy had been advised by consultants that construction of the access ‘tunnels’ on and within opencast backfill could, together with the extensive zone of disturbance associated with the geological fault known as the ‘Kenfig Thrust’, lead to conditions which may risk future access and egress from the mine. As such it had been decided to look at more favourable surface locations to provide a long term, secure access for the mine” (minutes dated 18.09.01).

However, in letters received by one resident from both Bridgend and Neath Port Talbot planning departments, it is stated that neither local authority received copies of the feasibility study carried out by Celtic Energy Ltd into the development of the Margam Drift Mine (Adamson letters, Oct and Nov 2005). Residents report that representatives of the Company had told a public meeting that any further mining would be via deep or

drift mines and these proposals have been discussed at meetings of the Site Liaison Committee (minutes of the Site Liaison Committee). However, Celtic Energy Ltd. stated that “...*due to current economical conditions (low price of coking coal on the world market)*” as well as the loss of a long term coal contract the project was deferred (minutes dated 11.03.03). Later that year it was announced that the deep mine project would not proceed as planned (minutes dated 09.09.03) and that a feasibility study of extending the existing site in a westerly direction was being carried out (minutes dated 16.12.03).

In most circumstances it is not possible to make categorical statements about the feasibility of different mining methods before geological investigations are made, but residents think that they were led to believe that further opencast mining was not being contemplated. (On this basis, it is reported that people have bought houses in the area, had new houses built, and bought or started new businesses). There is some controversy about who has seen engineering reports concerning the site and about who is qualified to make statements on the most suitable method of coal extraction and the community believes that the several seemingly contradictory statements that have been made give further cause to distrust the Company’s intentions.

People participating in focus groups felt deceived (Groups 1, 2, 3, 4 and 5) by Celtic Energy Ltd. and now feel foolish that they had believed statements about a deep mine (Group 2 and 5). Residents also felt deceived by promises made at meetings that the currently operating opencast mine would be the last and it was stated that:

“We were promised faithfully – and it was a packed meeting (meeting regarding the overburden mound)... Council officials and Celtic Energy Ltd. ran roughshod over what people had to say but they did promise faithfully that this would be the last application ... last one granted and of course we took it from there, we believed them. We took them at their word and now all this time later they are going ahead” (Cefn Cribwr resident, Group 2).

“I think it was always going to be the case – been to a number of meetings prior to this because ... and there was categorical assurances in the last meetings we had, Tondu and Cefn, that this was going to be the last extension because of the surface topography is most unsuitable than it has ever been for opencast and here we are looking towards an extension” (Ex-miner, Group 4).

Residents feel betrayed over promises that there would be a deep mine. There were comments that this was a “*big red herring again*” (Shopkeeper, Group 5) and “*a sprat to catch a mackerel*” (Male resident, Group 4)

“We fought a good fight then. We just lost because people gave in because they promised to put this new mine in (deep mine) which they lied to us about because they weren’t going to go ahead with it” (Older woman who had been involved in a previous campaign, Group 1).

“Said they were going to do a deep mine, that was the carrot” (Older woman, Group 3)

Some of those who took part in the study feel that the Company had “blackmailed” residents and local authorities about the remediation. Participants report that the company was supposed to manage a fund to remediate the present workings (Groups 1 and 5) and that this is now insufficient to finance land remediation on the present site. This has been confirmed by a representative of Bridgend CBC who provided information that the expected cost of remediation has been estimated by Celtic Energy Ltd. as £20 million and that the current remediation fund was expected to amount to less than £2 million by 1st January 2006. Residents further report that Celtic Energy Ltd. has stated that if they do

not get permission for this extension then they will not restore the present site, as the profit from the new site is necessary to supplement the existing remediation fund (Groups 1 and 5). Residents fear that if the void is left unfilled, there is a risk that it may be used for landfill (Groups 2, 4 and 5) but, in the opinion of the Group's environmental advisor, this is unlikely due to the high cost of adequate lining. Residents were also concerned that restoration will need to be completed using public money (Group 1).

There were fears about what might happen when the proposed next stage ends. A local publican was concerned that the company may say the same thing after this next phase (local publican, Group 5) Fears about the remediation and whether the company will keep moving down the valley with further extensions to backfill previous workings was also expressed by parents (Group 6) It was said that some Cefn Cribwr residents were afraid to oppose the current application due to fears that the current site would not be restored if work on the new site was not permitted (Group 4).

Some residents believe that the opencast will keep going down the valley as the company has been doing this a "*bit at a time*" (Group 1) and that workings will be "*deeper and wider*" each time (Group 5). The current application is for a bigger site than that currently operating. A local shopkeeper believes that the company will not stop until they reach the A48 to get to the existing coal seams (Group 5) and similar views were repeated in other groups:

"There's no guarantee it will ever stop. It's incremental, one phase at a time."(Group 3)

"It's going to go down that basin. It's not going to finish at the A48... the basin is rich with coal" (Ex-miner, Group 4)

"Not going to end where it is now – going to go down to the A48 – diverting the A48 to go down to the channel (Bristol Channel)" (Older man, Group 4)

Several residents in the study explained how they felt powerless: "*Impotent that's the word- completely helplessly impotent*" (Older woman, Group 1) and "*The apathy comes because they (residents) think they have got no hope*" (Cefn Cribwr resident, Group 2)

Residents feel that the Company has an unfair economic advantage (Groups 1, 2 and 4) "*Celtic Energy Ltd. has the money to run a campaign. We sell raffle tickets*" (Male resident, Group 1)

And the fact that the valley is rich with coal, "*You can do whatever you like but they will do what they want ... Going to take it (coal) one way or the other*" (Male resident, Group 4)

It is possible that opposition to the opencast extension may give residents a common interest, which may lead to greater social interaction. Involvement in issues around childcare and schooling (in this case relating to increased pollution and its effects on children) has been shown to unite communities. There is evidence that good social networks reduce the risk of coronary heart disease, depression and infections (Wilkinson et al 1998). Residents state that the area has always been a close-knit community. Even if opposition to the development is unsuccessful, social networks may persist and continue to be beneficial, though this may prove difficult for those living in areas such as Pen y Bryn, Bryndu and Aberbaiden where physical isolation will be a barrier to social interaction.

There are feelings of fatality about the whole process but also agreement that some residents had gained strength from each other:

“A lot of people will give in to that (apathy) but being part of PACT – knowing other people are there with you and feel the way you do is strength in itself. You get strength from each other” (Cefn Cribwr resident, Group 2).

An older resident reported that during the previous campaign young people were not concerned and did not realise the effects of the opencast. She was corrected by another resident that this time it was different, *“This time they (younger people) are very interested”* (Group 3).

Several people said that there was more of a spirit of determination this time around:

“We need to find a way to stop them” (Older woman, Group 3)

“It’s about time an end was put to this – it’s been with us since 1947”. (Older man, Group 4)

“Have heard no-one this time who is in favour” (Local resident, Group 4)

“If we win it, when we win it - it will be of benefit to everyone in the community. Nobody wants it to go ahead – not talked to anyone who wants it ... always a few people who have got to fight”. (Cefn Cribwr resident, Group 2)

This is evident as residents are questioning the way that dust and particulates are measured and the question of a buffer zone for open casting, as well as the expertise of those making and informing decisions (Groups 1 and 4 especially). They reported errors including inaccurate grid referencing in documents and the omission of housing on some maps and stated that some of those dealing with the application appeared to be lacking knowledge concerning the history of the application. Residents also questioned the independence of surveys and the timing of environmental studies (Groups 1, 2 and 4). Many of these deficiencies were remedied at the request of the two Local Authorities involved and the environmental statement is being revised.

“We’ve got more rights and people know more” compared to the previous campaign (Older resident, Group 3).

“There should be stricter planning legislation as in Scotland. If the 500 metre rule was applied, there wouldn’t be an opencast” (Older resident, Group 3)

Indeed there were feelings that an opencast should be miles from local communities, not yards (Female resident, Group 4) and there were frustrations that replies from local authorities just state that levels are within regulatory limits (Older woman, Group 1 and Male resident, Group 4).

Some residents, especially those who were involved in a previous campaign (Group 1 and 3) but other residents as well (Group 4) felt powerless and expressed feelings of inevitability about it all:

“No matter how much residents do, ‘powers that be’ will please themselves.”(Group 4)

A participant of one group (Group 4) stated that they did not know of any Celtic Energy Ltd. application that had not been approved.

“I have sat in on lots of meetings now and cannot think of anything they (Celtic Energy Ltd.) have been turned down on. First of all was the one in Tondy, Parc Slip ... everything they have asked for, everything people have objected to, can’t think of anything they have been turned down on.” (Male resident, Group 4)

Severance

The existing site has already closed off Bedford Road in Cefn Cribwr and Crown Road in Kenfig Hill. Road closures have already caused problems for local businesses, increased traffic congestion and prevented access to routes to the countryside. Residents have cited a long list of rights of way affected by the current and previous workings which have not been replaced which used to give access to and link both sides of the valley. The footpaths and routes which used to exist prior to the previous planning applications can be clearly seen on a map (Appendix 4). Residents report that some of these footpaths have been closed for 25 years (Adamson, Nov 2005). If the present application for the proposed extension goes ahead footpaths 84 and 85 will also be lost for many years, and hence access from Kenfig Hill, by public rights of way, to Pen y Bryn, Aberbaiden and Bryndu. The two existing footpaths, 84 and 85, as well as footpaths already lost to residents, are highlighted on a further map of the present, and proposed, opencast workings (Appendix 4).

Severance will therefore be exacerbated if this proposal goes ahead. Several footpaths and bridal ways connecting villages will cease to exist for the duration of operations on this site or will no longer be useable due to their proximity to the source of pollution. Footpaths that will be lost for approximately 15 years are those that cross the valley, linking Kenfig Hill to Pen y Bryn and Aberbaiden. These villages regard themselves as part of one community, as they share amenities, friendships and family ties, some families having lived in the area for generations. The absence of footpaths will sever walking routes and involve longer journeys by car. Individuals and families without a car will suffer greater disadvantage and some community support that contributes to health and wellbeing may be lost. (See also Social Capital) Some people living in rural locations near the site are very concerned about possible isolation if the extension goes forward.

One family was already experiencing difficulties in visiting each other, the daughter of this resident having no car and two small children. She used to cross the fields with her children using a *“lovely peaceful walk”*. This grandmother was now advising her daughter not to use this footpath because she did not want the baby to be exposed to dust from the opencast (Group 2). A resident who has recently moved to Kenfig Hill also describes how the present workings may affect those without cars, and the elderly, and that this is likely to worsen if the proposed extension of the opencast workings goes ahead:

“What they are actually creating is not going to be a community because people will be in prisons. Because the elderly, the young unless they have got cars, unless they have got access to vehicles are not going to be able to get healthy lifestylesIf they can get out and about the only path is the one that is currently being affected by the workings (the ‘Waun’) which will become worse because the prevailing winds will send far more emissions onto the pathway ... people are going to become prisoners in their own homes” (Group 4).

There were also accounts of friends not being able to visit each other if the proposal goes ahead, as remaining footpaths between Kenfig Hill, Aberbaiden and Pen y Bryn will also be destroyed (Group 1). The farmer living at Aberbaiden farm is described as already *“living on the far side of the Atlantic”* (local writer, Group 5).

Another family that participated in the study was also likely to be affected since daughter and son-in-law were considering moving away from the area as they did not want to raise

any future children in the local environment (Group 2 and 6) and as this Cefn Cribwr resident stated:

“that makes me feel desperate as well ... when you can see the break up of your family, its something extra to knock you back every time...” (Group 2)

Local Economy

“An economic case for the development has not been made – quite the reverse. The local multiplier effects claimed by the developers rests on a very weak case and would easily be swamped by the social costs arising out of health and externalities. It is clear that matched against sustainable development criteria, the development would fail at properly constructed cost-benefit analysis” (Quote provided to PACT by Dr Charles Smith, Economist, Business School, Swansea Institute, 01.09.05)

Employment

Opencast mining is not a labour intensive industry and the present site employs 65 people (personal communication from A. Helmore, site manager). This number represents both those directly employed or as permanent contractors and includes management, supervisory and administrative staff. Of these 39 (60%) live within a 10 mile radius of the site and 19 live in Kenfig Hill, Pyle, Cefn Cribwr, Pen y Bryn and Margam. Celtic Energy Ltd.’s management expects similar numbers to be employed if the extension goes ahead and the Company’s policy is to recruit locally wherever possible.

There is some discrepancy between the Company’s figures and claims by residents that very few local people are employed. There have also been reports that the local people who do work on site are employed in lower paid jobs. Whatever the truth of these allegations, only relatively small numbers of jobs are involved. Residents who oppose the extension are still naturally concerned about job losses for existing workers (Groups 1 and 2) but say that nearby industrial estates in Pyle and Kenfig offer clean light industrial, technical and service jobs. On 10th February 2005 a local resident identified at least 100 industrial vacancies, including heavy plant operators, within a 20 mile radius of the site (De Celis letter, Job Centre Plus website, 2005). Some participants felt that it was not worth the sacrifice being made by the local community for the small number of jobs at the opencast site (Groups 1, 2 and 4).

“I think the financial losses to people haven’t really been realised that the opencast is for very few workers and it is for a short duration compared to a deep mine” (Ex-miner, Group 4)

Unemployment and poverty are strongly associated with illness and premature death. This has been demonstrated notably by the Black Report (Townsend 1988) and more recently by the Acheson Report (1998). Working close to home can confer both physical and mental health benefits (Halpern 1995), giving people more time for recreational activities. However, to achieve health benefits, jobs should be of good quality: minimum wage jobs may create pressure to work long hours, which could be health damaging. Even if local people have access to skilled work, the risk associated with working in a polluted environment must be balanced against possible benefit.

Though open-cast coal mining carries much less risk to the health of miners than underground mining, it is by no means risk free. A study of occupational exposure and disease in 1249 open-cast workers in the UK (Love 1997) found that 4.4% had radiographic small opacities. Five had some pneumoconiosis and two had progressive massive fibrosis. The risk of small opacity profusion was estimated to be doubled for every ten years worked in the dustiest jobs, which were drilling and bulldozer driving. Symptoms of chronic bronchitis were present in 13% of workers. Asthmatic symptoms were present in 5%, which is close to the norm, but this could be due to selection bias, as men with existing asthmatic symptoms would be unlikely to apply for work in the industry. Celtic Energy Ltd. has a workplace health policy which seeks to minimise risks and provides regular health checks for its workers.

It is possible that the predicted jobs will not materialise or that workers will be drawn in from a wider area, with no appreciable benefit to local people. It is not possible to verify or refute job creation/sustainability forecasts, as they are necessarily speculative, but experience at this and other locations suggests that the number and quality of jobs for local people is usually over-estimated, added to which opencast mining is not a labour intensive industry.

Impact on existing businesses

“Tourism is at the forefront of the Welsh economy, showcasing us to the world and bringing our welcome to the millions who come to us from across the UK and overseas” (Andrew Davies AM quoted in Western Mail, 12.12.05).

Several businesses that depend to varying degrees on having a pleasant outlook and/or clean air could be damaged by the development. These include a pub with a garden used by families, a restaurant, horse riding, livery stables, a racing yard, kennels, stud and agricultural farms, bed and breakfast establishments, and holiday letting. Prior to this latest application, plans were being developed for small businesses to provide guided walks and horse riding and holiday accommodation for disabled people. In fact, holiday chalets which can be used by disabled people have now been completed and residents believe that the tourist industry would be adversely affected if the proposal goes ahead (Group 2). Further extension of open-cast mining could damage the local economy and ultimately cause a net decline in employment.

In all focus groups it was agreed that there would be a negative effect on local businesses, which was of particular concern to people representing some local businesses in focus group 5. They agreed that there was no economic benefit for them from the present opencast site.

“I don’t derive any advantage from the opencast being there. I have no economic advantage whatsoever. No-one specifically comes to drink here because the opencast is there which was the case many years ago ... I have to say that... the place was full with opencast workers. (now) they come, they do their job, they go home to suburbia.... So, I derive no economic advantage at all from the existence of the opencast – contrary to what they will have you believe” (local publican, Group 5)

Another local publican runs a family-oriented public house with a beer garden and believed that: *“People will not want to come out to look at a ‘big black hole”*. Group members felt that this was a sad thing for the community as this particular public house had been there for 100 years (Group 5).

It was also feared that the proposed extension could affect other businesses, such as holiday accommodation, restaurant, local shop and post office, and horse riding (Groups 1, 3, 4, 5 and 6). One resident stated that she was very concerned about how the opencast was affecting her daughter's business of holiday cottage lettings (Group 1).

The negative effect on local businesses through the loss of passing trade has been raised by the Ramblers' Association (letter to Bridgend CBC dated 4th March 2005). A local shopkeeper had described how dust in her shop was already a problem for herself and potential customers (see section on Nuisance Dust) but she also describes how the present site adversely affected her business due to the closure of some roads:

"They closed off the road and a lot of our customers came up that road. They came up that road in order to go to the industrial estate down in Pyle here and they also used it as a short cut as well for the motorway (M4). So of course we lost a lot of very early morning trade. As a matter of fact it dropped dramatically. But we have persisted – we have got to keep open because of.. But I am concerned that if they are going to move it further over we will lose even more trade."(Local shopkeeper, Group 5)

A young mother also believes that the closure of roads could affect local trade:

"If they are cutting off more access points it is going to affect them (local businesses). If you need something you are not going to shoot here from Maesteg if you have to go all the way round" (Group 6)

Passing trade may also be affected by the closure of some rights of way if the proposals go ahead:

"You've got a lot of people who do use the walk who come to the pub and have come from Bridgend – and have been on their bikes back and forth and call in for a drink. I can't see that happening you know ...you're not going to get the business ... Why create a footpath for people to use when they are going to wreck it by doing all this?" (Local publican, Group 5)

It was believed that if people were depressed because of the opencast moving nearer Kenfig Hill, they would be more likely to go elsewhere to shop to get away from the area (Group 1 and 5). It was stated that people will want to move out of the area for recreation, including shopping and therefore businesses in Kenfig Hill will close.

Economic gain for company

Those taking part in the study believed that the present proposal for a further opencast mine rather than a deep or drift mine is driven by profits for the company (Group 2 and 4). In the words of local resident:

"And everything is in their (the company) favour – the price of coal has shot up – everything is in their favour for it to be accepted" (Ex-miner, Group 4)

There was also discussion about opencast mining wasting much of the coal that it mines through the process of extraction (Groups 2 and 4) and there were comments made about profits being considered more important than the health of the population (Groups 2, 3 and 6):

Three women from Cefn Cribwr agreed that it is about:

"Profit – all profit. They are not prepared to have a little less profit and make it healthier for everybody" (Group 2)

“It’s ... pound per ton more for a deep coal mine than to opencast it – where are the economics against people’s health” (Older person, Group 3)

“Profits are more important than the health of the public” (Young mother, Group 6)

“Money is more important than people these days and we come a very poor second” (Older woman, Group 3).

Cost to the NHS, local authorities and the community

The question was raised by study participants of the potential cost to the NHS through more GP consultations and through increased ill health and depression leading to a higher number of prescriptions for anti-depressant drugs (group 1, 3 and 5). An older woman believed that the cost must be higher for the NHS than it is to *“dig the coal”* (Group 3) and a local writer thought that the cost to the NHS should be assessed through local statistics on ill-health (Local writer, Group 5). Unfortunately data from GP practices is not sufficiently robust for this type of calculation to be made.

A number of people (Group 1, 4 and 5) felt that residents should be compensated by having a reduction in their council tax. One woman had applied for a reduction in council tax and was told that she could only get it if she could see the opencast and if this was affecting her health. When this is the case and word gets around she believed that this local authority would be flooded with applications for reduction in council tax (Group 1). The greatest financial burden would fall on Bridgend CBC as most of the housing is within this local authority boundary. However, it was believed that the biggest cost would be to the local community:

As one older woman put it is *“Not cheap coal as we are the ones paying for it”*

“Cefn has had this for 60 years now ... 60 years is a long time to be living with this. Also as others have said the immediate benefits to our locality are very small. The benefits go elsewhere, financial benefits, the employment benefits go elsewhere. We in this locality live with the effects of the work being done so we are the fall guys, we are the people who pay the cost”. (local writer, Group 5)

Noise

The impact of noise from the site is an important consideration in the Public Protection Department’s response to the planning officer. Unless noise levels can be maintained within current noise control targets, the department would object to the proposal and, at the time of writing, this issue is still being considered. If planning consent is granted the company will be regulated for plant noise, blasting noise and vibration under the Environmental Protection Act 1990 and by way of planning conditions.

The Company anticipates that noise levels on the proposed site will be similar to those associated with the existing operation. Noise disturbance to residents is likely to increase if planning permission for the extension is granted, as production is predicted to increase by 1000 tonnes per week and working will be closer to a larger number of houses than the present development. On working days there will be constant noise from heavy plant during the operational hours which are expected to follow the existing pattern of 7am to 7pm Monday to Thursday, 7am to 5.15 pm Friday and 7am to 12 noon on Saturday. However, the Company reserves the right to retain the option of the prescribed slightly longer working hours, which are 7am to 7pm on all weekdays and 7am to 1pm on

Saturday. Essential maintenance will need to take place outside these hours, including pumping, operation of the fitting workshop and some use of vehicles. Blasting is likely to occur daily between 10am and 12pm and 2pm and 4pm Monday to Friday and 10am to 12pm on Saturdays. A system of audible warning before blasting will be agreed with the Mineral Planning Authority and noise from blasting will not exceed the threshold for statutory nuisance. The Company is prepared to agree a scheme relating to control and monitoring of vibration.

Cefn Cribwr residents (Group 2) report that they have heard the operation of the site outside the hours of 7am – 7pm, especially before 7am, and participants agreed that lights could be seen on site after 7pm, particularly in the winter months.

Noise from the present site is not audible in local schools but, as the extension site is considerably closer, teachers expect to experience some disturbance if operations go ahead (telephone interview with spokesperson for Mynydd Cynffig School, 15.9.05). Noise will cause direct disturbance to those near the site and background noise levels will increase over a wider area. The developer's environmental policy (Celtic Energy Ltd. 2000) states that it will, "utilise natural or artificial screens/baffles to minimise noise transmission". A resident reports that on being granted permission in 2001 the company applied to remove baffle mounds and that there are no plans for baffle mounds between the proposed site and Kenfig Hill (Adamson, 14.11.05). Due to the proximity of the nearest housing and the location of most homes on rising ground, it is very unlikely that noise could be minimised by these means.

A meta-analysis (van Kempen 2002) has stated that it is biologically plausible that noise exposure can contribute to the prevalence of cardiovascular disease (CVD), but that the mechanism is complex. A further review (Stansfield 2000) found only weak association between noise in the community and CVD, but found that aircraft and road traffic noise were both associated with psychological symptoms and use of psychotropic medication. A second review by the same author (Stansfield 2003) found that environmental noise was associated with hypertension. Stansfield (2000) and Berglund (1996) both reported that the negative psychological effects of noise are greater when the subject has no control over their own exposure. Noise also appears to produce respiratory impairment (Berglund 1996). The preceding references (Van-Kempen, Stansfield (2), and Berglund) refer to meta-analysis or review level evidence, sometimes of over 200 individual studies. Therefore they comprise studies of different types and levels of noise which may not be similar to those produced by an opencast site. The message, however, is consistent in that physical and psychological effects are produced by increasing levels of noise. Noise from very heavy diesel vehicles and plant on the current site, although not breaching regulations has been sufficiently intrusive to generate complaints from local residents. Bridgend's Environmental Health Department has responded by asking the Company to modify its working practices, to which the Company has responded.

It has been suggested that the poorer health experienced by people of lower socio-economic status may be related to chronic stress, including that caused by noise pollution (Baum 1999). It has also been shown that external noise is a stressor in children with elevated resting systolic blood pressure in those exposed (Evans 2001).

Some residents who took part in the study are already experiencing noise which in some cases is impacting upon a 'normal' life, including having to keep windows closed and being unable to use their gardens or nearby walks. One resident could hear the lorries very loudly with every window closed, all of which were insulated with double glazing.

Cefn residents described the noise as “*absolutely dreadful*” and a “*constant drone*”. (Group 2)

Kenfig Hill residents also mentioned the impact from noise. One older woman stated that she could not have a conversation with the windows open (Group 3) and an older man said that there was constant noise from the pumps in the background and that the community had experienced this for 55 years.(Group 3) Another older resident was being affected by noise and dust and this was preventing her enjoyment of the garden (Group 3). It was stated that there was tremendous noise from lorries when they start up to go down into the void and come back at lunchtime (Group 3). There were comments that the noise effect had worsened due to the longer hours that the opencast now operates and because the void had become deeper (Group 3).

The potential impact upon sleep was mentioned, especially for older people, children and shift workers. One older woman stated that it was affecting her sleep early in the morning:

“You just cannot sleep after a quarter to seven – I am retired and do not particularly want to be up at quarter to seven – been there, done that”(Older woman, Group 3)

Some older people (Group 3) wondered what effect the noise had on children sleeping. Although this was not a major concern for parents (Group 6), one parent commented that the noise would affect children if the opencast was operating late into the evening. A local shop keeper from Kenfig Hill stated that noise was already a problem in the evening and wondered “*How would shift workers sleep?*”(Group 5). This group agreed that the nuisance from noise could only worsen as it would be coming closer to residential areas (Group 5) and that it would be particularly marked because of the configuration of Kenfig Hill on rising ground:

“Well it’s like an amphitheatre isn’t it? And when you go to these places in Rome they stand in the arena and they sing and you can hear it on the top. And that is exactly what is going to happen to Kenfig Hill” (older woman, group 3).

Vibration

Residents have reported that vibration from the present operational site can be felt in some homes, and this causes anxiety regarding possible structural damage. If the extension goes ahead, vibration may become a greater problem as more homes are likely to be affected due to their closer proximity to blasting and excavation.

One Cefn Cribwr resident who overlooks the site describes how her garden path is cracked and sinking and another resident says that windows vibrate too. This resident also reported that the vibration from blasting could be felt in several rooms, including the kitchen and lounge. In fact, one Cefn Cribwr resident describes how a door-to-door salesman felt the vibration whilst in her house. He was shocked and asked if this happened frequently (Group 2).

Residents who live in Kenfig Hill (Group 3) also complained that they could feel the vibration. As one older woman stated (Group 3)

“You can feel the vibration around the cottage now ...they (Celtic Energy Ltd.) say we can’t feel it but we can feel it.” (Older woman, Group 3)

Bridgend CBC states that monitoring of vibration has taken place on numerous occasions over prolonged periods and is well below levels likely to give rise to a Statutory Nuisance

and that these levels are well below those that would give rise to structural damage even for sensitive buildings. The Steering Group's environmental advisor has confirmed that, despite vibration from the current opencast site being within recommended limits, it would nevertheless be possible to feel and observe the effects of blasting within homes. Ground vibration effects are low for opencast blasting but the resulting overpressure wave could be sufficient to rattle windows and crockery.

Waterways, pollution and risk of flooding

Residents reported at HIA meetings that Celtic Energy Ltd. has been fined on two separate occasions for polluting the Afon Cynffig. Celtic Energy Ltd. was convicted of pollution offences at Bridgend Magistrates Court in April 1998, on account of two incidents at Parc Slip West, where suspended solids entered the Nant Iorwerth Goch (letter from Environment Agency for Wales, 24.06.05). On both occasions the pollution was identified by local anglers and not by the Company's monitoring systems. Local people claim that Celtic Energy Ltd. has a poor record for pollution control on other sites that it operates and fear that fish stocks and the appearance of the river are likely to suffer further if planning permission is granted.

Celtic Energy Ltd. states that it will be necessary to divert the Afon Cynffig to a permanent realignment to the east but the risk of flooding associated with this has been assessed as very low. New water treatment areas will be constructed in the south west of the site to standards agreed with the Environment Agency for pollution control and drainage. Some residents are concerned about the re-rooting of the river and the ecological effect that this would have on the valley as it continues down to the sea (Group 1), including Kenfig nature reserve.

Safety issues

Safety was a less important issue for those who took part in the study but a few concerns were mentioned about the safety of the site itself, including its potential instability due to sand, slurry and water (Group 2, 3). There were concerns about a split in the hillside and part of the mountain sliding into the void which could result in "*another Aberfan*" (Cefn Cribwr resident, Group 2)

There were also concerns for children's safety as residents believed that children could find a way to get onto the site, if determined (Group 3). There was mention of children getting on to the present site and being brought back in trucks (Group 4) and that this would get worse as the proposed extension towards Kenfig Hill would be closer to housing (Group 3 and 4). There were also fears that if there were to be no remediation due to lack of finance if the proposal did not go ahead, this would be a long term safety risk. For example, if the hole filled with water there would be a risk of drowning (Group 1, 3)

Residents were also concerned about the road safety risk if new roads were similar to that built after a previous remediation, as this road is used as a 'race track' by some drivers (Group 4). Residents believed that there would also be increased traffic at Pen y Bryn and danger from lorries using the proposed new site entrance at Aberbaiden (Group 4). Other villages may also be affected in a similar way:

"Transport links are going to be affected, if only in a minor way. When I worked at Maesteg I used to take the route up to the 'Oaks', across the top of Llan and Bryndu

...every other day I would do it. But that is gone now. The opencast is in the way and a lot of the cross links .. they are gone. So there is going to be an impact on the amount of traffic in the villages.” (Male resident, Group 4).

Parents (Group 6) agreed about present congestion at Kenfig Hill being due to the opencast mine, as there is now only one artery due to the opencast, which has blocked off roads that were formerly used as short cuts.

Light pollution

Some areas visible from residential property will be illuminated during operational hours of darkness and some lighting will be required for reasons of safety or security outside operational hours. Residents are concerned about light pollution at night from arc lights and consequent sleep disturbance.

At present it is mainly Cefn Cribwr residents whose houses are adjacent to the opencast site who are affected by light pollution:

“It’s also the lighting part because they have got – I don’t know what they call them – arc lights or whatever – they glare at you from down there in the night. You used to be able to sit in the park before it came that far and you didn’t have the light pollution at the back there – can’t see a thing, can’t even look up into the sky” (Group 2)

Another Cefn Cribwr resident said: *“It takes away the night sky and it’s a novelty to see the stars now”* (Group 2).

If the opencast mine moves further down the valley it will be Kenfig Hill residents who will be most affected by light pollution (Group 2). New UK regulations on light pollution have been approved but have not yet come into force.

Loss of amenity

Loss of amenity was discussed in all focus groups, particular emphasis being placed on this by people involved in walking, cycling, horse riding and other outdoor pursuits. Indeed, the local area has many cycle tracks, country walks, rights of way and footpaths including those which give access to bridleways, forestry trails and other footpaths. This is seen by residents as a free ‘outdoor gym’ (letter from Pyle resident, 27.06.05). Celtic Energy Ltd. acknowledges that opencast mining causes disturbance to the environment and loss of amenity. Whilst, as they assert, it is true that this disturbance is “temporary”, the length of time necessary to complete coal extraction and restore the landscape to anything resembling an acceptable state will be at least 15 years. To put this in perspective in human terms, it constitutes a complete childhood or possibly total years spent in retirement, important lost years that can never be replaced. This was of particular concern to older people who believed that if the proposed extension went ahead it would outlive them (Groups 2, 3 and 5)

“How temporary is temporary? They say temporarily closing footpaths and roads. One footpath has been closed for ten years. Say they will reopen them but when?”(Older woman, Group 3)

The proposed site is characterised in the north by hills, ridges and river valleys and bounded in the south by Cefn Cribwr ridge. It is mainly agricultural with woodland belts and, if the proposed development goes ahead, people whose houses now look out on

fields and woodland would be confronted instead by a black industrial landscape. An established green belt area will be converted to industrial use, constituting a significant loss of amenity. As one man from Pyle pointed out:

“In the wider context there are two types of country. The country you can look at and the country you can access”. He stated that residents would be losing both (Group 1).

The area has already lost many footpaths since the mid 1980s. The loss of public rights of way is clearly visible on maps of the present workings (Appendix 4) which illustrate the present extent of the loss to the community. If the proposed extensions to the opencast goes ahead, footpaths 84 and 85 will also be lost for many years (Appendix 4), including access to Pen y Bryn from Kenfig Hill across open countryside. Loss of the footpaths is of concern to residents who use the area on a regular basis for walking, cycling and horse riding. Losing rights of way and access to forestry routes is of especial concern to ramblers, young people training for sports and other people involved in outdoor pursuits.

“Footpaths are used as circular routes by the community. This is going to be lost. Paths at the moment can be rather wet ... but they are walkable. If we lose these then we are obviously going to lose this facility of using our countryside in general.”(Rambler, Group 4)

Residents are also concerned about the loss of the amenity, older women and younger men alike commenting about the loss of footpaths and the affect on the National Cycle Network (Group 1 and 4), including routes used by athletes:

“It is horrible to ride there now – training will be affected by it because of the quality of the air. It is not just me using it but I saw Nicole Cooke (international champion) down there and other athletes. You get the runners and cyclists and on mountain bikes – they won’t be there” (Younger man, member of the Welsh cycling team, Group 4).

Participants had already noticed a decline in the number of people using the area for outdoor activity. Joggers would use the footpath from Crown Road to Cefn Cribwr (the ‘Waun’) as part of a circular route, but this is affected by the present workings, as one local man explained:

“I used to use the ‘waun’ regularly for running and so forth. The only time I go there now ... is to have a nose to see what they (the company) are up to now because you need a dust mask, a pair of goggles and maybe ear defenders to run past it”(Group 4)

And an older resident from Kenfig Hill had noticed a decrease in the number of joggers and cyclists using the area:

“So I always saw lots of cyclists and sometimes if I was out the front they would stop and say ‘Are we on the right track? Is this the way’ I don’t see cyclists any more” (Group 1)

Older people described how they had used the area with visitors for picnics but that this was no longer possible (group 3) and there was concern that residents’ children and grandchildren will not be able to make use of the existing open space for play and recreation (Group 3 and 5). There was also concern about the further effects on lanes leading to Pen y Bryn, Bryndu and Aberbaiden which currently lead onto many trails and forestry links (Group 4).

In its environmental policy (Celtic Energy Ltd. 2000) the Company undertakes to balance commercial aims with the need to minimise the effect of its activities on the environment. Residents believe that the nature and location of the proposed operation means that the balance will be heavily in favour of the commercial interest, to the detriment of local

people. The company says that it will, *“make use of natural features such as topography and woodland to screen operations”*. There is little possibility of such screening at the proposed site: in fact woodland will be destroyed by the extension.

The Hafod Heulog wood comprises a variety of deciduous trees, such as oak and ash trees with significant areas of diverse ground flora and a bird population which includes peregrine falcons, merlins, fieldfares and barn owls as well as many other species of birds. Bats and badgers have been observed and proposals exist for their long-term security. Otters were also noted as part of the environmental survey. One male resident describes how the area, especially between Pen y Bryn and Margam Park, is species rich, for example with rare grasses and the lesser spotted woodpecker (Group 4). Residents, with the assistance of Glamorgan Moth Group, have conducted their own moth and invertebrate survey near Hafod Heulog woods between 27th June and 27th September 2005 and have recorded over 100 species of moths. The environmental statement states that *“Hafod Heulog wood is clearly of nature conservation value for invertebrates as indicated by the number of species recorded and the presence of two nationally scarce species”*. (For full details of the environmental survey see the Environmental Statement). A photograph (below) of part of this ancient woodland, where the Afon Cynffig flows through, illustrates the natural beauty of this particular area.



There are, however, no statutory sites of nature conservation or non statutory sites within or adjoining the site of the proposed working. There is some concern that animal and bird habitats would be compromised by the development and Bridgend CBC has requested the developers to carry out a further bio-diversity study, which should be completed by the end of 2005.

Particular concern was expressed about the loss of ancient woodland. The location of the woodland in relation to the proposed extension is illustrated in Appendix 4. Residents feel that this ancient woodland can never be replaced:

“It is sort of screaming in your head ‘If you don’t stop them now, that’s gone’ ... something as ancient and timeless as that wood can be destroyed for a couple of buckets

of coal” (Resident of Cefn Cribwr, Group 2) residents from Kenfig Hill also expressed concern about the loss of the ancient woodland (Group 3 and 5):

“Ultimate horror of all horrors is Hafod Heulog woods ... we are looking at ancient woodland by ‘ere. A loss to here ... that is just something that can not ever, ever be replaced. Not in our lifetime, not in our children’s lifetime, not even in our great great grandchildren’s lifetime ... it’s not only that but the habitat below those trees”. (Local publican, Group 5)

Coed Cadw (the Woodland Trust) has also expressed concern about the potential loss of Hafod Heulog woods:

“Ancient woods are our richest most important sites for a vast range of insects, birds, animals, flowers and trees and are home to more threatened species than any other UK habitat. Ancient woodlands are one of the glories of our natural heritage; they are places of inordinate beauty, reservoirs of evidence for environmental change, archaeology and economic history. We simply cannot afford to lose them” (Rory Francis, Woodland Trust, 07.12.05)

People involved in various outdoor pursuits believed that the loss of woodland, fauna and flora will affect the pleasure of walking, cycling and riding in the local area (Group 4)

“When you are out in the open air wanting to do exercise, walking and cycling and horse riding, whatever you want to do you want to be able to see all the nature around you. When walking cycling and riding in the area I have seen deer, foxes, owls, rabbits ...where are they gonna go if the opencast is extended?”(Young woman, Group 4)

Residents had observed some recent changes in the movement of wildlife, reporting that animals and birds had been moving away from the opencast mine, and blasting. All of those participating from Cefn Cribwr agreed that they had not heard the cuckoo nearly as frequently as they used to (Group 2), whilst other people also commented that foxes, squirrels and badgers are invading back gardens due to loss of habitat (Group 2 and 4) and that there were fewer herons (Group 3).

Those taking part in the study were also concerned about the effect that loss of countryside will have on local children, who will lose the opportunity to appreciate wildlife and foliage if countryside and rights of way are lost (Group 5). A retired school teacher of children with special needs was also concerned that an educational opportunity for children would be lost. Her approach had been to use the local community, heritage of the area and links to nature and wildlife locally to enhance the education, and learning, of the children she taught (Group 4). The natural environment was believed to be important for all members of the community as one young person who uses the area regularly for exercise commented:

“People cannot live without the natural environment around them, without any greenery around them at all – talking of the whole basin being full of this coal that is so valuable. If you think it’s there so you have got to take it you are just going to keep going and you are not going to be able to stop and in the end there won’t be any natural environment left”(Group 4)

Loss of amenity has an additional health inequalities aspect, as households without a car will be disproportionately affected. This is the only rural area that is easily accessible on foot, by bicycle or on horseback. Residents may continue to use the area for recreation due to lack of choice, but may not derive the same health benefits if the character of the area changes, whereas those with cars have the option of easy access to other locations in

order to enjoy the countryside. This will also affect older people, when they are no longer able to drive a car to get away from the vicinity of the opencast mine (Group 3).

The Bedford Road area has been cut off for many years. People used to be able to gain access to the Forestry Commission and to Aberbaiden from Cefn Cribwr. This amenity has now been lost as one has to access it by car and go the long way round (Group 2) and this is also the case when accessing other areas of Kenfig Hill (Group 2 and 3). The loss of amenity in this area will be particularly disappointing to residents in view of the fact that they have twice been reassured that opencast mining will terminate within a specified period and that the contractors will undertake remediation work to restore the countryside. (A detailed description of proposed remediation work to the extension site is contained in the Environmental Statement, Celtic Energy Ltd., 2004)

Residents were very critical of the present remediation work (Groups 1, 2 and 4), especially Parc Slip which has been described as comprising “*mounds with brown grass*” (Group 4), as “*rubbish*” (older person, Group 1) and a “*moonscape*” (younger person, Group 1). Residents stated that there had been no adequate restoration of land from the phase previous to the present one (Groups 1 and 4) and that any planting is not taking as there is little sub-soil. The terrain comprises sparse grass and gravel (Group 2) and it looks unnatural, with fir trees instead of trees native to the valley (Group 2). Residents believe that remediation can never recreate the natural landscape that will be lost (Group 2, 4 and 5) and in the words of one older resident:

“The impact it has had on the environment has been one of complete devastation ... land restored is not usable as arable farming again – a wastage of that ground” (Older man, Group 4)

The photograph on the back cover illustrates the difference between natural landscape and that following the remediation after opencast working. A senior geologist was also critical of the quality and sustainability of the remediation at the former Parc Slip site:

“I have personally made a number of visits to the ‘flagship’ restoration site of Parc Slip at Aberkenfig in Mid. Glamorgan and have been very disturbed by the fact that far from maturing, the site now appears to be undergoing decay. The quality of the soil is extremely poor and the planted grasses are rapidly being overtaken by rushes. Bird life is minimal. Although adequate work has been done on the whole subject of coalfield restoration, what seems to occur is that the rock material brought up to the surface in the course of excavation, far from being inert, is strongly mineralised, particularly with iron compounds. Under natural conditions, these high mineral levels would be reduced by leaching over tens of thousands of years, ultimately allowing a relatively rich soil to develop. However, under current restoration schemes, these minerals percolate into the soil, in quantities which allow only a limited flora to develop. This high level of mineralization gives rise to a rapid cementation in which hard, impermeable soil layers form which are prone to water logging” (Dr Chris Walley, see below)

At the time of this statement Dr. Walley was a consultant geologist for the Earth Resources Institute at University College Swansea and in a current communication (8.12.05) Dr. Walley states, “*although I have not seen the Parc Slip site for over a decade, nevertheless the basic science of what I said about the coal waste still holds.*”

There was a feeling amongst residents that there should be a rolling programme of restoration and that the Parc Slip remediation should be restored to an acceptable standard before any further excavations take place (Groups 2 and 4):

“This should at least be put right – and there should be legislation that any form of extraction, the ground, should be restored before they are allowed to move on to the next phase” (Older man, Group 4).

The Ramblers’ Association has written to the planning authorities objecting to the proposed development on the grounds that it will destroy the green wedge which is, “vital to the quality of life of both residents and walking groups”. The Association objects to the removal of widely used rights of way which create links to forest trails and other rights of way. The letter goes on to say that,

“The proposed development will have a considerable visual and noise impact on the area and will undoubtedly affect the local economy, which relies on ‘passing trade’ generated by walking and leisure activities.” (John Nash, Area Countryside Officer, Ramblers’ Association, to Head of Planning Bridgend CBC, 4th March, 2005)

Visual Impact

“Opencast mining is one of the most environmentally destructive processes being carried out in the UK. The sites are among the most ugly examples of the ravages of industrial exploitation” (House of Commons Energy Select Committee, 1987)

Cefn Cribwr residents surveyed describe how before the present workings you “*couldn’t have paid for the scenery*” and the view from their houses was “*the most beautiful sight to see*” (Group 2) prior to the present opencast workings.

The visual impact of the development for local residents has been assessed by Celtic Energy Ltd. to be moderate to substantial for areas north and south of the proposed extension to the present site, but only slight to moderate for areas east to west, as some existing features will screen the site in this direction. The fact that some residents are indeed affected more than others was acknowledged by some of those who took part in focus groups:

“Where you live in Cefn does determine or does influence the way you look at this. It is certainly in Cefn with properties on the north side – in Bryndu facing the north that would naturally have a much stronger view than those like myself who are just a few yards the other side of the crest” “Naturally it is those looking down into the void who are facing this day after day” (Local writer, Group 5)

Celtic Energy Ltd. undertakes to restore the backfilled area to conform generally to pre-site working levels. The restoration however will not conform to previous topography. Residents contend that the appearance of the landscape at previous sites has not been restored to its former state and that winding country lanes have been replaced by wide straight roads, which are not in keeping with the area. Complete rehabilitation will take many years and ancient woodland areas cannot be restored within a lifetime. However, part of Hafod Heulog wood and some other areas of hedgerow and grassland that are within the site, but not needed for excavation will be retained, together with some sites of archaeological interest, including Bryndu House. A full explanation of these arrangements can be found in the Environmental Statement (Celtic Energy Ltd., 2004).

The nature of the development is certain to have a negative aesthetic impact, as the area of housing that would be affected presently looks out on fields and woodland. The proximity of the proposed site to housing and the topography of the area would prevent effective screening, as the adjoining houses are on rising ground and thus would inevitably overlook the site. This could be described as an ‘arena’ configuration, where the eyes of

viewer are drawn to the excavation. Indeed, one resident described the opencast as an “*amphitheatre*” (older woman, group 3) and one man stated that:

“I think there is something relatively unique possibly about the opencast in this area ... because it is in lowland visually. The impact from either side of the valley is ... really marked” (Group 1)

Though it is true that some streets run laterally to the site, so that the working area will not be visible from some windows in these streets, more houses than at present will directly overlook the site as streets facing the proposed site are on rising ground.

Three older women (Group 3) mentioned how they will be directly affected visually if it goes ahead and another older woman stated how the “*glorious view*” will be totally destroyed (group 1). All young parents who took part were concerned that the views across the fields to Margam Mountain will be gone (Group 6),

Even if the site is not directly visible from indoors in some homes, operations will be clearly visible in close proximity to houses, including some gardens and residential streets:

“When I moved to Kenfig Hill I moved here because I came from a similar area where within a hundred yards I was in the countryside. When I came to Kenfig Hill from the front of my shop I could look over and see nice green fields. Well I will still be able to look at nice green fields but I will now have the noise that goes with it. I have only got to walk to the end of the road and what do I see? A big black hole. I didn’t come to Kenfig Hill for that ... If I had realised we were going to have this sort of thing on my doorstep so soon then I would have thought twice about even coming to Kenfig Hill.” (shopkeeper, Group 5).



This photograph shows the opencast that residents were referring to in focus groups. Participants in almost all focus groups (1-5) made adverse comments about the present site, such as “*big black hole*”, “*blot on the landscape*”, “*like a scene out of horror movie*”, “*large black void*” and simply, “*ugly*”. There were also accounts of the impact upon visitors to their homes, such as one visitor who spent holidays in Kenfig Hill but on a recent visit had been amazed at the change in the area, especially when viewed from

Victoria Road. He was horrified and said he had never seen anything ‘so horrendous’ (Group 3).

One older person describes the expanse of the site and having to see it to believe it:

“The wheels, tyres are taller than a man but when you look down the hole they are like dinky toys – that gives you some idea of the vast expanse of hole there is” (older person, group 3).

And another older person believes that this will deter people from visiting the area:

“You can see it from everywhere now, from the motorway, from the sand hills just about everywhere. Welcome to Wales’ ... look at our slag heaps; look at our bunds – because this is the first thing they see as they come down the motorway. What sort of a welcome to Wales is that? – come and look at our dirty great big black holes” (Group 3)

There is some evidence that a pleasant view can promote health and wellbeing and that an unpleasant view can be detrimental. It has been reported that surgical patients whose recovery took place in a room with a view of trees had a shorter post-operative hospital stay and took less pain relieving drugs than matched patients with a view of a brick wall (Ulrich 1984). Nurses made more negative comments on the state of mind of patients with the wall view, indicating that this might have a depressing effect. Natural views elicit positive feelings, reduce fear in stressed subjects and may block or reduce stressful thoughts (Altman 1983).

Some older residents describe how they had moved to the area because of the beautiful view from their homes (Group 1 and 5). An older person describes how she and her husband had put “*blood, sweat and tears*”, and money into renovating the cottage she now lives in and made it a beautiful place to live, but her life was narrowing daily due to ill-health.

“I spend a lot of time in the conservatory laying down, looking at our beautiful garden... looking at the woods, and looking at the fields, and watching the birds ... my life is narrowing daily you know. It is the only pleasure I have left now” (Group 3)

Another resident explains how she had also moved to Kenfig Hill specifically for the view and how she is now being affected by the present proposal

“I came here for the view and the thought of what’s going to happen is just absolutely depressing” (Group 1)

Indeed, three women residents in particular (Group 1) who live in Kenfig Hill have superb views across the valley and down to the sea but now “*could cry about it*” and “*feel trapped*”. Residents feel that all they will be left with nothing but an industrial landscape.

Effect on property and character of the neighbourhood

Local people have chosen to live in what many believed, due to previous statements from the Company, would remain or be restored to a rural or semi-rural area. Housing in this area is on rising ground and residents over a wide area will be affected by the industrial landscape that will replace their pleasant rural environment. Communities around the development fear that property will be devalued and become difficult to sell and they may be compelled to remain in an area which has totally changed in character. For example, one rural property would be bordered on three sides by the proposed site, suffering loss of natural light, possible damage to field drainage and views across the valley to Kenfig Hill

and Cefn Cribwr. The property would also lose the benefit of a nearby footpath which presently provides access to essential amenities in Kenfig Hill and Pyle. (Pen y Bryn resident, letter, 2005).

In recent years new settlements have been established at locations including Kenfig Hill and Margam Village/Coed Hirwaun, including two housing association estates close to the proposed site. People have been attracted to the area by easy access to the M4 motorway combined with the advantages of a country village lifestyle. Their chosen lifestyle will be adversely affected by extended opencast working. One person who moved to the village because of the rural environment and village atmosphere stated that:

“It’s a very old village and a lot of people have lived in the village for generations. People have chosen to stay, or to come back, because of that village status and that community feel ... but the village with that eye sore in front of you and no end to it – it is causing people to move away from the village”(Young mother, Group 6)

Some of those participating in focus groups, including younger parents, said that they may, or had, considered moving away from the area (Groups 2 and 6). One young woman said that she had bought a house there to be near family but would not now consider purchasing property in the area and she believed that other young people would be thinking likewise (Group 1). An older man also believed that younger people will be moving out unless there is investment in different industries (not heavy industry or opencast mines) (Group 3).

There were worries about the potential negative impact upon local house prices (Groups 1, 4, 5 and 6) and the saleability of local housing, and businesses (two local publicans, Group 5), in the area. For example, it was reported that a house in Crown Road had been up for sale for at least six months but had to be taken off the market because it could not be sold (Group 3).

Comments were made about who would be likely to buy houses anyway:

“You’d have to be a lunatic to want to buy a house here now!” (Cefn Cribwr resident, Group 2)

“They are selling land for houses - who is going to live in these houses?”(Older man, Group 3).

“ The future is bleak”. (Older woman, Group 3)

Indeed, there are a number of new housing developments in the area, which has astonished some of those taking part (Groups 2, 3 and 4). Some residents pointed out that these new developments are not even acknowledged by Celtic Energy Ltd., some housing not even appearing on the maps used by the Company (see Social Capital section).

Two older women especially talked about their properties having been intended for their retirement. One older woman was living in Kenfig Hill and would be overlooking the development if it goes ahead:

“I live in a house overlooking the area that is going to be open-casted. In fact I will be looking at the great big hole. I live on my own. I’m a widow. My husband’s inheritance to me was my house..... that’s my inheritance – however long it is going to be. That’s what I have got to keep me in my old age ... This is going to have a devastating effect on me. It’s going to affect me in so many ways..... have no chance of getting out now” (Older woman, Group 1).

Another older resident stated that:

“With a lot of us our house is our future – eventually they will be sold so that in old age we can be looked after – if that opencast comes there we are not even going to be able to sell the house –no-one is going to want to buy a house overlooking and opencast” (Group 3).

There are fears that the opencast workings may extend even further, increasing the potential impact. There were accounts of how the company is currently buying up available land. Residents believed that the company now owned all the land that they want to mine, (namely Bryndu House and farm land) (Group 3) They were concerned that the company would continue opencast mining down to the sea, as the valley was rich with coal (see also Social Capital section).

Residents were noticing a change in the neighbourhood with new housing developments and an increasing population (Group 4). There were corresponding fears that this would lead to a lack of balance between housing and open, green spaces in the local area (Group 4). They feared that opencast mining in the area would take away any remaining open spaces and destroy the rural environment (groups 1-6).

The neighbourhood around the proposed site is not disadvantaged within the definitions of the Welsh Index of Multiple Deprivation, nor do the wards adjoining the site have poor Townsend deprivation scores. But if this proposal is approved, local people fear that many of the more affluent residents will move away and the area will begin to descend into deprivation with all the accompanying implications for health inequalities and diminishing social capital.

Three people (Group 1) agreed that there would be a vicious downward spiral; no-one will want to move to the area, people will get older, there will be empty houses which will be unsaleable as there will be a *“blot on the landscape for ever more”* (Group 1).

Heritage

Local people fear that their children will never be able to enjoy the area as they have and that some landscapes and species will be lost for ever. There were recollections of childhood and past use of the natural open space by families and as children for recreation and play (Groups 1, 2, 3, 4 and 6). Residents remembered the area around Hafod Heulog woods and there were stories of how children would play by the stream and climb trees (Group 6) how they themselves had paddled in the river at Crown Road and walked to Pen y Bryn through Bluebell Wood and Nut Wood (Group 3):

“I feel absolutely disgusted that they have taken away all the paths and all the innocent pleasures of childhood” (Older woman, Group 3).

Residents from Cefn Cribwr had watched the area change because of the opencast workings (Group 2) and one young woman especially remembers growing up as a child in Cefn Cribwr, watching the land from Tondu to Cefn Cribwr being *“totally destroyed”* (Group 1).

Residents wished to preserve the rural environment for future generations. There were feelings of depression, and helplessness, that grandchildren will not be able to see what they themselves have enjoyed (Cefn Cribwr resident, Group 2)

“It’s the effect on children – big black hole – not seeing greenery, not seeing birds – nothing just the noise of these machines” (local shopkeeper, group 5)

Residents felt that they would not see the end of the opencast in the locality in their lifetime (see Stress, Anxiety and Depressions section). Some residents believed that the site did not only affect older people in this way but that people of all ages will be affected due to the duration of the proposed opencast workings and subsequent remediation of the land, which residents believe can never replace any natural landscape:

“There will be children who will be married with children of their own who have lived with it too ... youngsters who are going to be born and live with it and going to be 18 or whatever”(Older person, Group 3).

“These 18 year olds (who want to train) – they don’t have a second go at being young. The generation behind them as well – chance to go down to the river... Same for everybody whether you are 40 or 50 – never going to get these years back” (Pen y Bryn resident, Group 4)

People of all ages may also lose having a sense of belonging to the area:

“In terms of cultural, social wellbeing – when something is destroyed then the whole community loses by it ... Bryndu and Kenfig Hill is losing everything ...Parts of the troubles in society are because people have no sense of belonging to somewhere ... Once you lose everything that makes Bryndu and Kenfig Hill distinctive – all the old buildings, all the landscape – why on earth should anyone want to live there?” (local writer, group 5).

Human Rights Act

The Human Rights Act (1998) was incorporated into Welsh law in 1999 as part of the Government of Wales Act, and into English law in 2000. This Act gives further effect to freedoms established under the European Convention on the Protection of Human Rights and Fundamental Freedoms. Articles in the Act are applicable to the situation of communities around the proposed site.

Article 8 (1) states that everyone has the right to respect for his private and family life, his home and his correspondence. This is a very broad statement that has wide ranging implications. It has been used for the right to protection against aircraft noise and pollution and includes a duty to inform the public about environmental hazards. (NHS Wales Equality Unit, undated).

Article 14 requires access to the Act’s other conventions to be equal and refers to different treatment of people ‘placed in analogous situations’. This part of the Act could be invoked in the present situation where there is inequity of protection, i.e. planning guidance differs across the UK, in that in Scotland (Scottish Executive 2005) and in England, where the coal industry claims that similar policies have “decimated” the opencast mining sector (Boddy 2005a), a larger buffer zone between communities and opencast operations is recommended than in Wales

Where there is evidence of a failure to address a particular health concern which disproportionately affects one community or section of a community, this may raise issues under Article 2 taken with Article 14. Whilst some health issues are addressed by the planning process, others including anxiety and depression are not.

Article 2 states that public authorities have a positive obligation to protect life in some situations. State authorities will have violated their positive obligation to protect the right to life if it is established that they failed to take measures within the scope of their powers which, judged reasonably, might have been expected to avoid that risk. This could be applied to local authorities and the granting of planning permission.

Comments were made by residents about how they believed their quality of life had been adversely affected and their human rights taken away.

“Our liberty has been taken away, our quality of life, human rights - I feel like a sub zero person.”(Older woman, Group 3)

One man from Pyle said that the term ‘strip’ mining as used in America was more descriptive because they “*strip the landscape*” and:

“I will feel stripped of my landscape, I will feel stripped of my dignity, I will feel stripped of my quality of life, I will feel stripped of my assets. Strip mining is far more appropriate than opencast”. (Group 1)

Residents felt that their liberty had been taken away and that they were the ones who had to live with the opencast on a day-to-day basis (Groups 2 and 3) “*like somebody grabbing you and tearing your skin off. That’s what it feels like – just laying you naked*” (Cefn Cribwr resident, Group 2).

“The quality of life is going down hill. You can put up with something really awful for a short time because you know that there is an end. Because you know that next year it will be gone and can start my life all over again but when you know it is there until the day you die – you don’t know how you are going to put up with it.” (Older woman, Group 3)

Complaints, liaison and consultation

Celtic Energy Ltd. states that it operates a system for dealing promptly with complaints which will continue if the extension goes ahead. Any future planning consent would require the Company to establish a site liaison committee of local residents, local councillors, Celtic Energy Ltd., Bridgend CBC and Neath Port Talbot CBC similar to that which exists for the current site. However, residents report that the existing arrangements are not satisfactory because they are unable to influence processes which they believe to be damaging their health (see section Social Capital),

Residents were critical of Celtic Energy Ltd. managers for not attending most of the public meetings and report that Company employees in the audience dismissed their views (Group 1 and 2). At one meeting which was attended by management staff from Celtic Energy, the attitude of staff from the company and some local authority officers was criticised by residents as well as the apparent lack of preparation to answer questions (Group 2) Residents felt that their views expressed through the two local community councils, Cefn Cribwr and Kenfig Hill, were also disregarded. Both local community councils, which represent local interests, opposed the extension of the current opencast into the south west corner of the proposed site and this was, it was reported, the first time the local community councils had done so (Group 1).

Residents were frustrated that although public meetings were very well attended, the company and local authority departments have stated that there were no, or only few, complaints especially as many local people spoke at these meetings (Group 1 and 2). One resident reports that at the meeting about a planning application to increase the

overburden mound, it was stated that there had not been any complaints. This resident maintains that she had taken 18-19 signed letters to the local authority planning department the next day but that it was still stated that complaints had not been received (Cefn Cribwr resident, Group 2). Table 5 shows complaints received by Bridgend CBC's Public Protection Department only but complaints may have been received by other departments and/or by Neath Port Talbot CBC. Residents who attended these meetings report that it appeared that minutes were not taken, neither were numbers attending nor comments made by residents recorded (Residents' meetings and focus groups 1 and 2).

Indeed, there are several disputes about the number of complaints made by residents, and received by local authorities and Celtic Energy Ltd.. However, it has been observed by the Environmental Health Department of Bridgend CBC that the volume of complaints correlates with adverse weather conditions. A summary of complaints received by Bridgend CBC's Public Protection Department, 1996-2005 (Table 5) shows that the number of complaints received so far this year far exceeds those in previous years. A significant number can be explained by an increase in complaints about a lack of dust suppression measures employed by the Company. The following quote illustrates the type of complaint made:

“They just dump it (coal) in mounds on the surface and it's transported by train and by lorry, open. The dust suppression measures there – well I've got a garden sprinkler that could do better” and “There is no shower curtain - one sprinkler that just oscillates around” (ex-miner, Group 4)

Table 5
Complaints received by Bridgend CBC's Public Protection Department

Year	Noise	Dust	Blas ting vibration	Miscellaneous	Total
1996	3	2	0	0	5
1997	2	9	1	0	12
1998	0	2	0	0	2
1999	0	10	0	0	10
2000	8	4	0	0	12
2001	4	2	0	0	6
2002	0	4	0	0	4
2003	1	7	0	0	8
2004	1	1	1	0	3
2005*	15	30	6	8	59

Since 2001, the company has been using a polymer sealant to coat the coal in railway wagons and improved dust suppression systems around the loading and stocking area. and there were a higher number of complaints before this date (1997 and 1999). Between 1999 and 2000 especially the higher number of complaints was due to adverse weather conditions, including strong winds. The increased number of complaints made between 2000 and 2001 about noise were in connection with the noise of lorries being driven in convoy from the top of the site into the void at 7am. As a result of these complaints this practice has ceased and lorries on site are now sent out in pairs. Complaints about noise

made in 2005 have been measured by Bridgend CBC and are within regulatory limits. Complaints that fall under the 'Miscellaneous' heading in 2005 include two complaints about the alleged dumping of waste by the Company. Indeed, allegations have been made about the dumping of controlled waste which the Company refutes. Celtic Energy Ltd. does admit that small quantities of waste arising from the works canteen have been incorporated into the backfill. A question about the legitimacy of this practice has been referred to the Environment Agency by Bridgend CBC.

There is additional evidence of a number of letters of complaint and completed complaint forms which have been sent to local authorities by residents during 2004 and 2005. Indeed, Bridgend CBC states in a letter that its planning department has received 413 letters of objection up to 20th December 2005 (Assistant Director of Planning, 20.12.05).

Table 5 shows the number of complaints to Bridgend CBC's Public Protection Department made via telephone, letter and in person from 1996-2005. Figures for 2005* (Table 5) are complaints received up to 20th December 2005. If it has been the case that the number of complaints has declined or reduced at any time this may be because people have become used to the opencast regarding noise, vibration and dust and/or feel powerless to bring about any change or improvement. Comments made by residents from Cefn Cribwr (Group 2) may indicate that this is the case as one resident explained,

"It's just something you have to put up with basically – there is nothing you can do about it" (Group 2). And another Cefn Cribwr resident who has lived with the opencast for 40 years explains: *"We are quite used to the dust"* (Group 2).

There were also comments about liaison and consultation during the planning process, including the Liaison Committee itself:

"The Liaison Committee is another cosmetic exercise. It has been set up to give the impression that there is representation. But it is not even getting to the surface. It is just being met head on with 'within limits' and that's it" and *"And they use it in the plannin' (planning applications) well you had liaison - which you have. You have had consultation – which you have. But they just don't take any notice of the points that are being raised"* (Older resident, Group 4)

There was certainly a lot of frustration about legal limits, guidelines and statutory measurements for the operation of the site in respect of noise, vibration, dust and particulates, with feelings of incredulity that these could be stated as 'within limits' as the majority of participants felt that the opencast was having a detrimental effect upon their health and wellbeing. This is captured in a comment made by one older resident:

"The value of our lives – how can you measure this?" (Older woman, Group 1)

Climate change

Climate change and the use of fossil fuels were raised by comparatively few people participating in the study and this is understandable, as they have more immediate concerns. However, comments were made about the potential conversion of Aberthaw Power Station, and that there are far more efficient and alternative sources of energy, such as wind farms. (Group 1 and 4). Younger and older people expressed views about opencast mining, alternative energy sources and global warming:

"If it is a choice between having a ditch up there or windmills out in the Bristol Channel I vote for the windmills every time" (Older man, Group 4)

One young man commented about the ‘greenhouse effect’ from the burning of fossil fuels and pointed out that energy is expended in removing the coal from the ground as well:

“Any kind of mining will affect the atmosphere and add to the greenhouse effect. Even just removing the coal, or just lorries, any kind of burning of fossil fuels but even getting the fossil fuels is emitting greenhouse gases let alone when you start using the fuel that you have dug up in the ground.” (Group 4)

Sustainable Wales, a Porthcawl based environmental charity is opposed to an extension to the present opencast workings at Kenfig Hill. One of its main objections is the contribution that fossil fuels make to climate change (letter dated 15.09.05).

European policy recommends reducing reliance on opencast coal as part of an overall energy policy. Climate change and the burning of fossil fuels is a complex issue which is beyond the scope of this assessment. However, climate change will inevitably have damaging effects on human health and current scientific opinion is that the world should become less reliant on coal and oil based fuels. To quote the environmentalist George Monbiot:

“Our success or failure in tackling climate change depends on just one thing: how much fossil fuel we leave in the ground” (Monbiot. 2005).

Conclusion

Throughout the process of planning application and consultation on the extension to Margam Opencast Mine, the community feels that it has been misled and misinformed. The reasons are firstly because they had been told that there would be no further applications for extension to opencasting once work at the current site was completed and secondly, because when a further application *was* made, they had been led to believe that there would be a deep mine. Further, they were given the impression that, if this application did not succeed, then the site which is currently being worked could not be adequately remediated, due to lack of funds. Residents feel strongly that a series of conflicting statements and misinformation has aggravated levels of stress which are inevitable in communities involved in such campaigns. They feel that their human rights are being disregarded in favour of the economic interests of a powerful industrial company.

An important point to consider in dealing with this application is the difference in planning guidance at the time of writing between Wales and other parts of the UK. Scottish and English guidance would tend to reject this application on the grounds that it is too close to housing and that the community has already been subjected to opencast mining for many years. However, the Assembly is currently revising its own planning guidance and when this becomes available, it is possible that the provisions will be similar to those of Scotland and England, thus providing better protection for the community.

It has become clear both from focus group data and by observation of the site from the different perspectives of operators and residents, that this planning application has some unique aspects. Not least of these is the fact that the local community has been exposed to opencast mining for between 50 and 60 years and had believed that this would come to an end when the present site was exhausted. During this time local people have had to endure an unpleasant industrial site which has spoiled their enjoyment of outdoor activities and caused severance of parts of the community by the closure of footpaths. Residents can no longer enjoy the local countryside and are reluctant to walk or cycle in such an unpleasant environment. Because the surrounding housing is mainly on rising ground and the opencast mine is in close proximity, it has been impossible for residents to avoid seeing the 'big black void'. This arena-like configuration means that the eye is inevitably drawn to the mine working and that noise generated on site is somewhat amplified above. The proposed extension will be closer again to existing houses and many homes will be facing directly into the void.

The loss of amenity, visual impact, nuisance dust, noise and pollution are strong arguments against further open casting close to this community. Evidence has been presented on exacerbation of asthma in local children and, though it has not been possible to present evidence of ill health in adults that can be directly attributed to the site, there is a growing body of evidence that particulates similar to those associated with opencast mining are damaging to health. Emissions from the current site comply with present guidelines and limits but these are being reviewed. A new Technical Advice Note on opencast mining will be issued in 2006 and further guidance on fine particulates is expected in the near future. On balance, there is sufficient uncertainty regarding the negative health impacts to apply the 'precautionary principle', which would not allow opencast mining to proceed in such close proximity to residential areas.

Strong evidence has been presented regarding the negative impact on general wellbeing of living near ongoing opencast mining in the area. This is partially due to the long-term nature of this development, so that those born in the area can spend the whole of their childhood living next to a potentially health damaging industry and elderly people can spend the whole of their retirement with dust noise and pollution, rather than the rural landscape they had expected to enjoy. Data from the focus groups showing the distress this is causing indicates that there are profound impacts on psychological wellbeing.

Regarding remediation of former opencast sites in the area, many residents believe that this has been of a poor standard and they have presented expert opinion to support this assertion.

Devastation of the natural landscape was also raised as a disincentive to existing and potential economic development in the area. Evidence was presented of enterprises relying on the countryside environment which would be likely to fail if the extension were to go ahead. It was contended that more jobs would be lost than the relatively small number provided by the site.

Though residents were concerned about business failure and devaluation of property, it was apparent throughout the HIA process that the main interest was not compensation. The community feels strongly that, in the interests of their health and wellbeing and that of their children, no further opencast mining should take place in this area. Exposure to such a potentially health damaging environment is not compatible with WAG policies to improve health and wellbeing and to reduce health inequalities. Neither does it fit with sustainable development policies and initiatives such as Mentro Allan that promote physical activity in the open air.

Residents were asked to make suggestions about what they would like to see in the future. Most of those taking part in the study had a clear idea of the outcome they wish to see, which can be summarised as:

- *No further opencast in their area*
- *Complete remediation and appropriate restoration of the present site*
- *Though compensation in monetary terms was not possible – some recompense for those who have suffered as a consequence of opencast mining.*

There were also some broader outcomes which participants wished to see:

- *Better protection by means of improved regulation and legislation*
- *Improved communication between developers, residents and local authorities*
- *Greater respect for human rights regarding the right to enjoy family life,*

This HIA has shown that the likely negative impacts on health and wellbeing of an extension to the Margam Opencast site are far in excess of positive health impacts. In coming to a decision on the future of opencast mining in this area, the HIA Steering Group recommends that the following principles should prevail:

1. Individual health and wellbeing should be the prime consideration and, where there is doubt, the precautionary principle should be applied.

2. The economics of coal extraction should not override the basic human rights of the local population.
3. Sustainable development and a move away from reliance on fossil fuels should be an underlying aim.

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Appendix 1

Membership of the Health Impact Assessment Steering Group

Dr. Alison Golby, Health Impact Assessment Development Officer and Research Associate, Welsh Health Impact Assessment Support Unit, Cardiff Institute of Society Health and Ethics

Carolyn Lester MSc, Lead for Health Inequalities and Equity, National Public Health Service

Resident's group representatives:

Allan Jones, Chair of PACT

Gaynor Ball, Secretary for PACT

Suzanne DeCelis, resident of Pen y Bryn

Jan Adamson, resident of Kenfig Hill

Linda Flye, resident of Cefn Cribwr

John Summers, resident of Coed Hirwaun

Public Health Medicine Advisor: Dr. E. Coyle, Public Health Director, Bridgend Local Health Board

Pollution Control and Planning Advisor: Philip Stanton BSc BA MCIEH MIOA, Principal Environmental Health Officer, Bridgend County Borough Council

Appendix 2

Health Impact Assessment Timetable

June

Preliminary meetings: Welsh Health Impact Support Unit (WHIASU) and residents

Preliminary meeting: WHIASU and National Public Health Service (NPHS)

July

20th July – First Steering Group Meeting (Subsequent residents' representatives plus other PACT members)

- Identify potential health impacts
- Agree focus, roles and workplan

During August the Steering Group would:

- Gather and appraise published literature
- Locate local and national statistics
- Formulate questions and determine participants for focus groups

August

Focus group interviews completed

Analysis of focus group data commenced

Local and national statistics obtained

Published research gathered and appraised

September

Evidence from literature and statistics collated

Complete analysis of focus group data

Triangulation

Second Steering Group meeting, 22nd September

- Discuss evidence and statistics
- Discuss data generated by focus groups
- Agree a draft report.

October

Complete analysis and final draft report

November

Third Steering Group meeting, 14th November

- Finalise report – content, style, etc.
- Agree on wider distribution.

Appendix 3
Middle Super Output Areas
Maps, tables and graphs

Mortality at middle super output area level in the Kenfig Hill area, Bridgend

Middle super output areas

Traditionally, small area statistics have been reported at electoral division (or ward) level. The advantage of using this geography is that it is understood at local level and, of course, delineates the areas represented by councillors. There are, however, disadvantages which make electoral divisions unsuitable for presenting some types of data, particularly health data. Firstly, since electoral divisions are an administrative geography, the Boundary Commission for Wales frequently alter boundaries to ensure fair democratic representation. This makes the presentation of data covering a number of years difficult and prone to error. Secondly, and most importantly, electoral divisions are heterogeneous in terms of their population size. In Wales there are just under 900 electoral divisions. Their populations range from less than a thousand persons to over 15 thousand. It is impossible to present reliable data on health for very small populations because the number of events, for example deaths, occurring in such areas will be relatively small. When this is the case, numbers tend to fluctuate very considerably over time making it very difficult to determine whether the pattern exhibited is genuine or merely a chance occurrence.

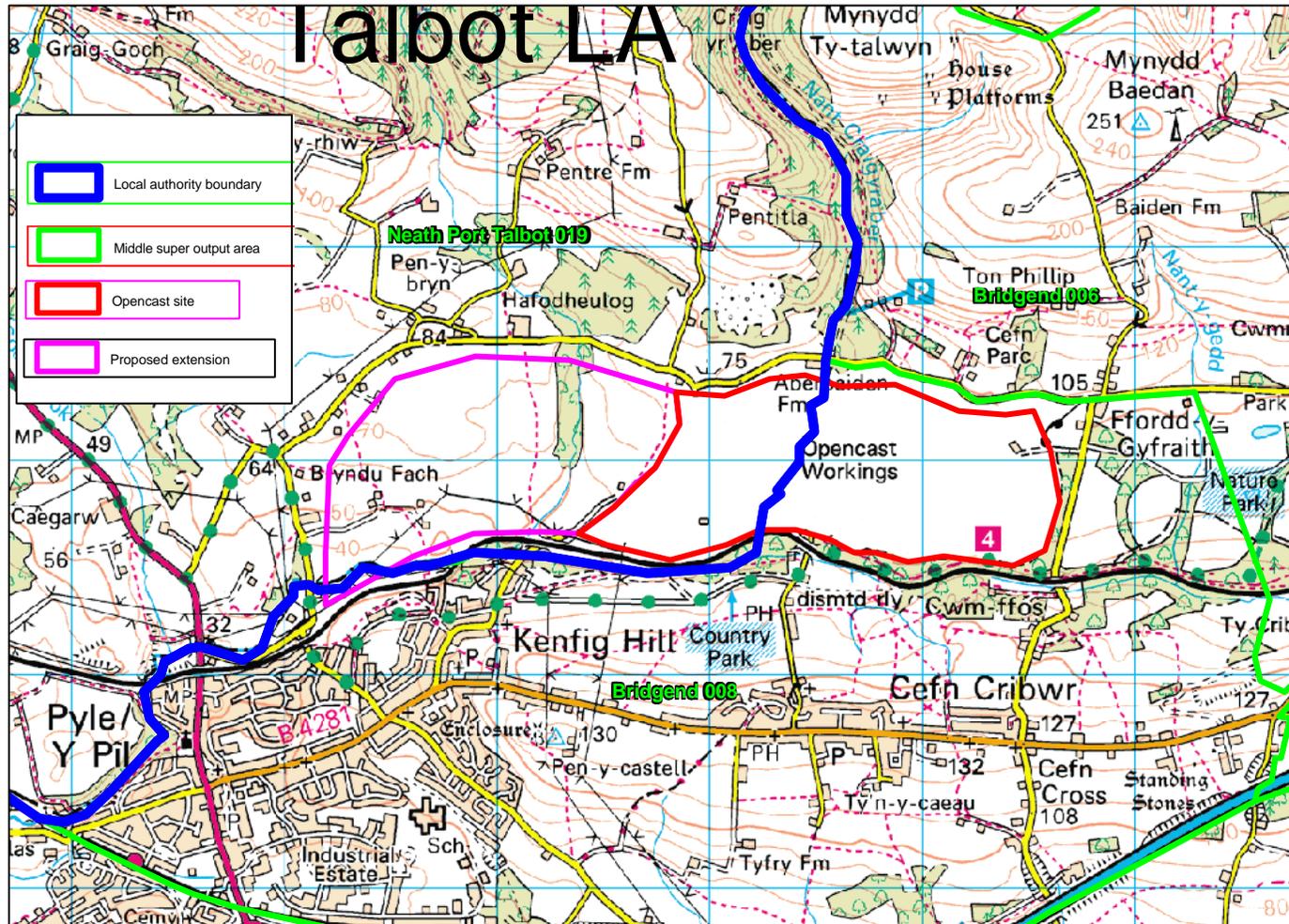
In order to try to overcome some of these problems the Office for National Statistics has created two new statistical geographies for England and Wales called Super Output Areas (SOAs) which are based on 2001 Census geography. The base units for the reporting of Census data are output areas. There are approximately 9,000 output areas in Wales. Lower SOAs have a mean population of 1,500 and a minimum of 1,000 and there are approximately 2,000 LSOAs in Wales. Middle SOAs have a mean population of 7,500 and a minimum of 5,000 and there are just over 400 in Wales. Upper SOAs are planned for 2006 with a mean population of around 25,000 persons. SOA geographies are designed not to straddle local authority boundaries. The ONS have stated that SOA geographies will be fixed for at least 10 years. So, the advantage of using these new statistical geographies is stability and homogeneity. However, the main drawback is that they do not relate to local democracy and, at present, they do not have names. This makes them less amenable to the public and local government.

The NPHS has concluded that the MOSA geography represents the best compromise between the need for small area data whilst at the same time ensure that the data, and hence any conclusions drawn, are robust.

Kenfig Hill opencast mine

Figure 1 shows a map of the site. Two MSOAs in Bridgend County Borough include or share a border with the current and proposed opencast workings, 'Bridgend 006' and 'Bridgend 008'. Borders of the opencast may have changed slightly since this map was compiled.

Figure 1 Map of the site.



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Mortality at middle super output area in the vicinity of Kenfig Hill

The following maps and tables and graphs show European age standardised mortality rates (EASRs) per 100,000 people for Wales, Bridgend and the MSOAs of Bridgend006 and Bridgend008. The MSOA of Neath Port Talbot019, although containing part of the current site and all of the proposed extension, is not included in the analysis because it is very sparsely populated.

Table 1 All cause mortality, European age standardised rate per 100,000, all persons, 1999-2003

Area	Population *	Number of deaths	Rate	95% lower confidence limit	95% upper confidence limit	Statistical significance compared with Wales
Bridgend006	5027	453	948.6	853.4	1043.9	Significantly Higher
Bridgend008	8753	468	736.5	668.5	804.5	Higher
Bridgend	128700	7442	754.7	736.8	772.6	Significantly higher
Wales	2910200	168803	721.2	717.7	724.8	

* 2001

Source: ONS

Table 1 and figure 2 show the EASR for all persons. In addition, 95% confidence limits are shown. Confidence limits are used to indicate the level of uncertainty that lies around the death rate. This uncertainty does not relate to any lack of knowledge about the actual number of deaths that occurred. Rather, it relates to the fact that the number of deaths occurring is known to vary randomly over time. The smaller the number of events under study (in this case deaths) the greater is the level of random variation. This principle is demonstrated in the table and the graph; Wales has a large number of deaths and the confidence interval is narrow at about 7 per 100,000, in Bridgend the interval widens to about 36 per 100,000 and at MSOA level the intervals are much wider at around 140 or more per 100,000. Confidence intervals are therefore used to test whether any differences between areas are likely to be due to chance alone. In the data above, compared with Wales, Bridgend and the MSOA Bridgend006 have a rate which is statistically significantly higher than Wales since their lower confidence limits are higher than the upper limit of the Wales rate. Although the rate for Bridgend008 is higher than Wales it is not statistically significant because the lower confidence interval is lower than the rate of Wales. These points are best illustrated by figure 2.

Figure 2

All cause mortality, all persons, 1999-2003

Source: ONS

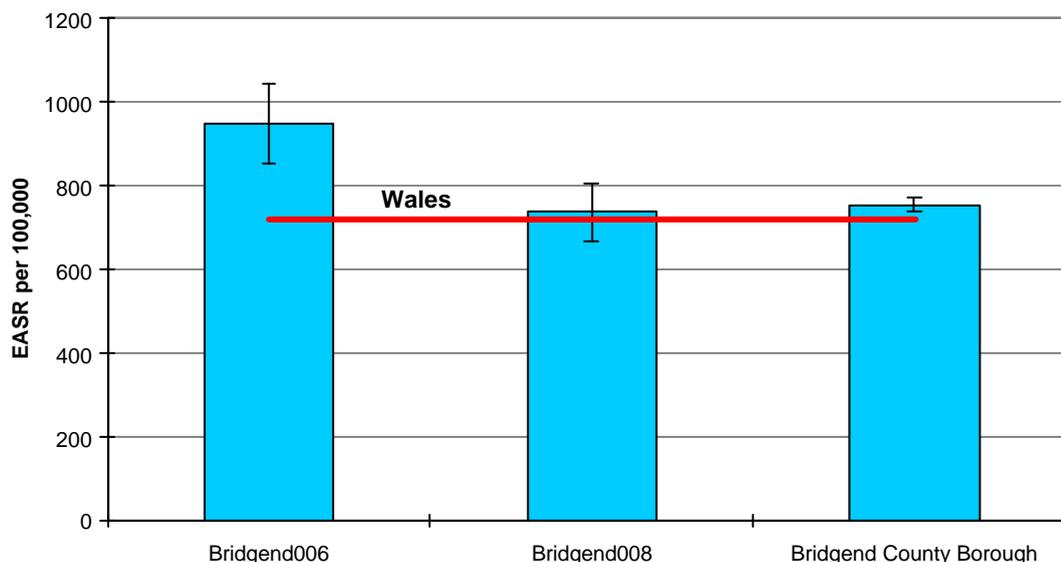
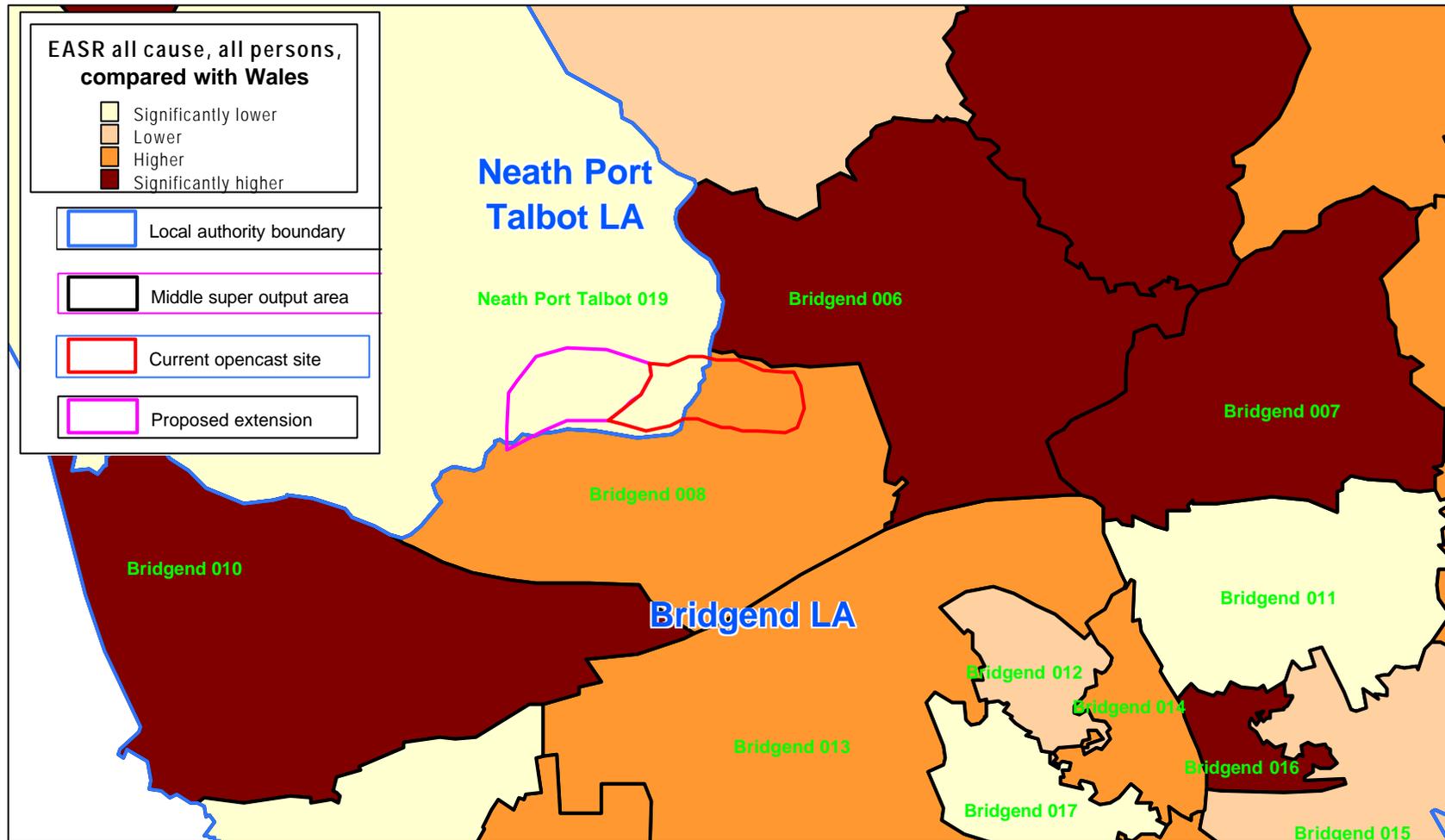


Figure 3 All cause mortality, European age standardised rate per 100,000, all persons, MSOAs in the vicinity of Kenfig Hill opencast site 1999-2003



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Figure 3 shows the EASR for all cause mortality for MSOAs in the area surrounding the opencast site. The MSOA names are labelled in green font and, in addition, the map shows where the main settlements are.

Table 2 All cause mortality, European age standardised rate per 100,000, persons aged under 75 years, 1999-2003

Area	Population *	Number of deaths	Rate	95% lower confidence limit	95% upper confidence limit	Statistical significance compared with Wales
Bridgend006	4554	125	470.6	386.9	554.3	Significantly Higher
Bridgend008	8090	182	400.9	342.6	459.2	Higher
Bridgend	118900	2733	386.7	372.1	401.4	Higher
Wales	2668500	60863	380.3	377.2	383.3	

*2001

Source: ONS

The pattern exhibited for premature mortality is similar. However, since, of course, the number of deaths for under 75s is lower than for all persons the confidence limits are wider making it less likely that differences will be significantly different. Nevertheless the rate for with Bridgend006 remains statistically significantly higher than that for Wales.

Figure 4

All cause mortality, persons <75, 1999-2003

Source: ONS

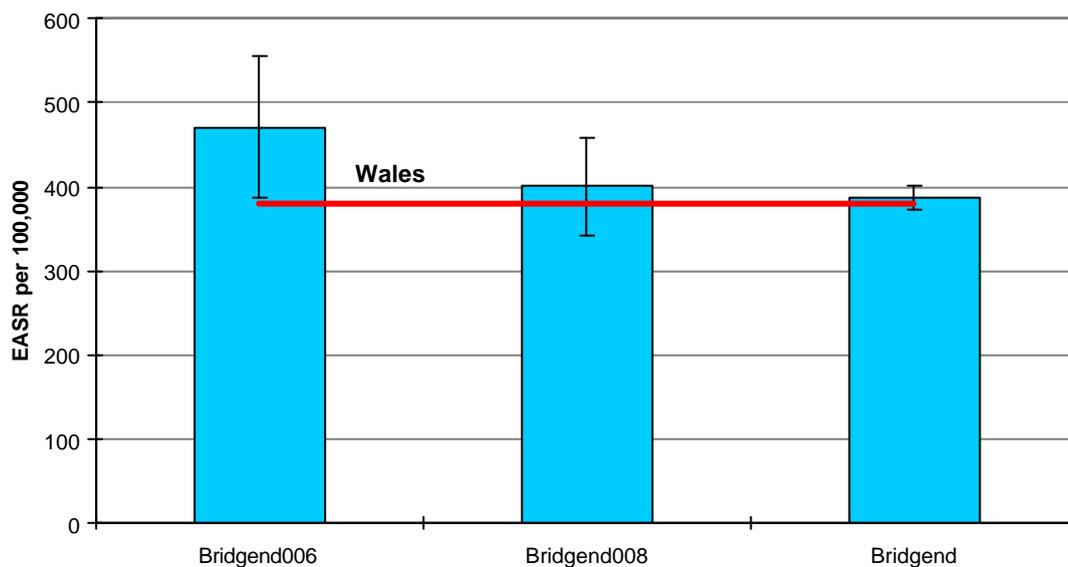
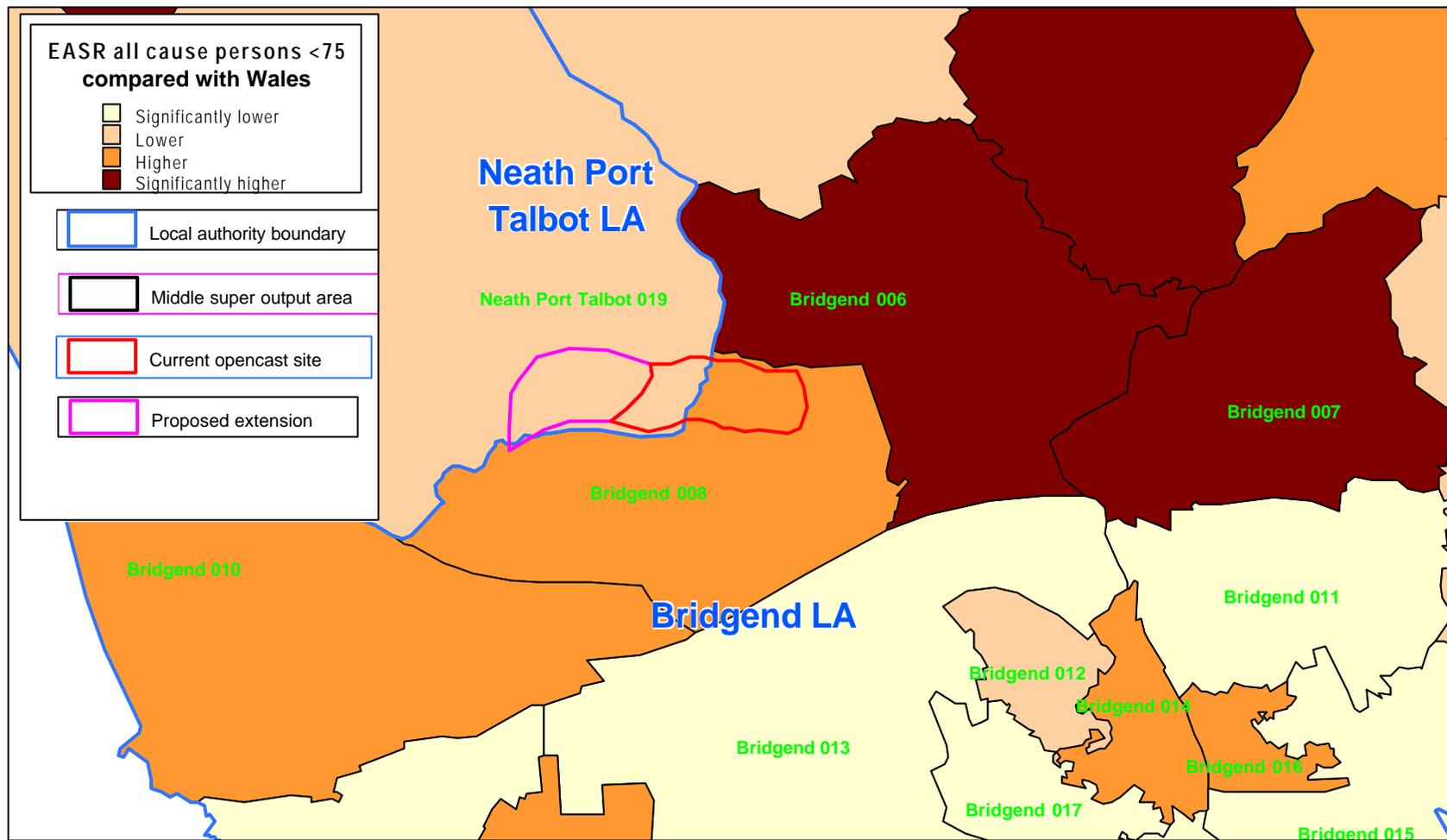


Figure 5 All cause mortality, European age standardised rate per 100,000, persons under 75 years, MSOAs in the vicinity of Kenfig Hill opencast site 1999-2003



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Figure 5 shows the EASR for all cause mortality in persons under 75 years of age for MSOAs in the area surrounding the opencast site. The MSOA names are labelled in green font and, in addition, the map shows where the main settlements are.

Table 3 Respiratory disease mortality, European age standardised rate per 100,000, all persons, 1999-2003

Area	Population *	Number of deaths	Rate	95% lower confidence limit	95% upper confidence limit	Statistical significance compared with Wales
Bridgend006	5027	86	151.6	116.7	186.5	Significantly Higher
Bridgend008	8753	71	102.1	77.5	126.8	Higher
Bridgend	128700	1141	106.5	100.1	112.9	Significantly Higher
Wales	2910200	24935				

*2001

Source: ONS

Table 3 shows EASRs for the same areas but for mortality due to respiratory causes. Respiratory disease accounts for about 15 per cent of deaths in Wales. Due to the smaller numbers of deaths the confidence limits are relatively wide making it less likely that any differences between MSOAs and Wales will be statistically significant. Despite this, the rate for Bridgend006 is significantly higher than that for Wales.

Figure 6 Respiratory mortality, all persons, 1999-2003

Source: ONS

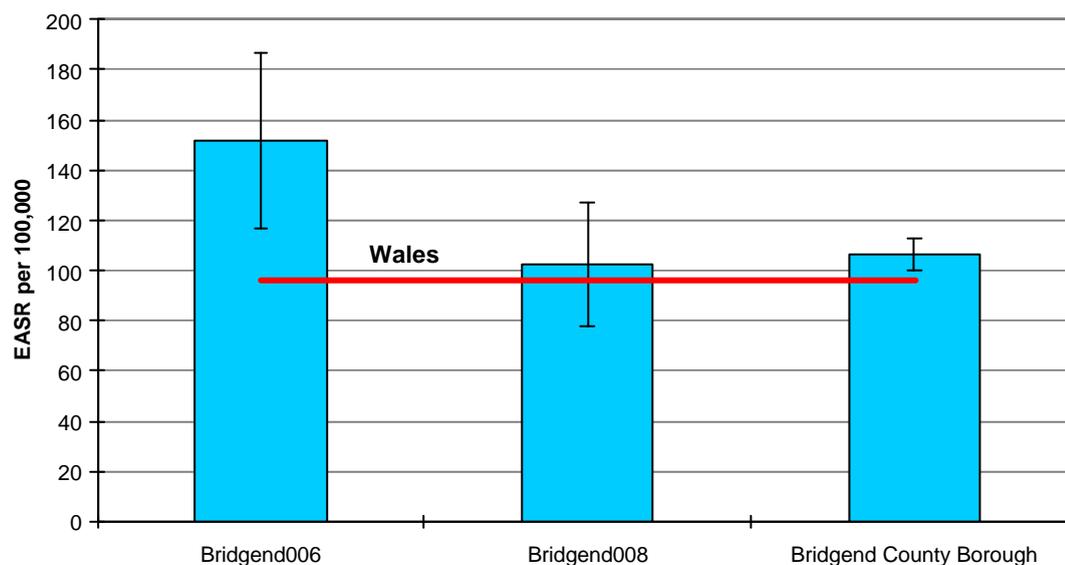


Figure 7 Respiratory mortality, European age standardised rate per 100,000, all persons, MSOAs in the vicinity of Kenfig Hill opencast site 1999-2003

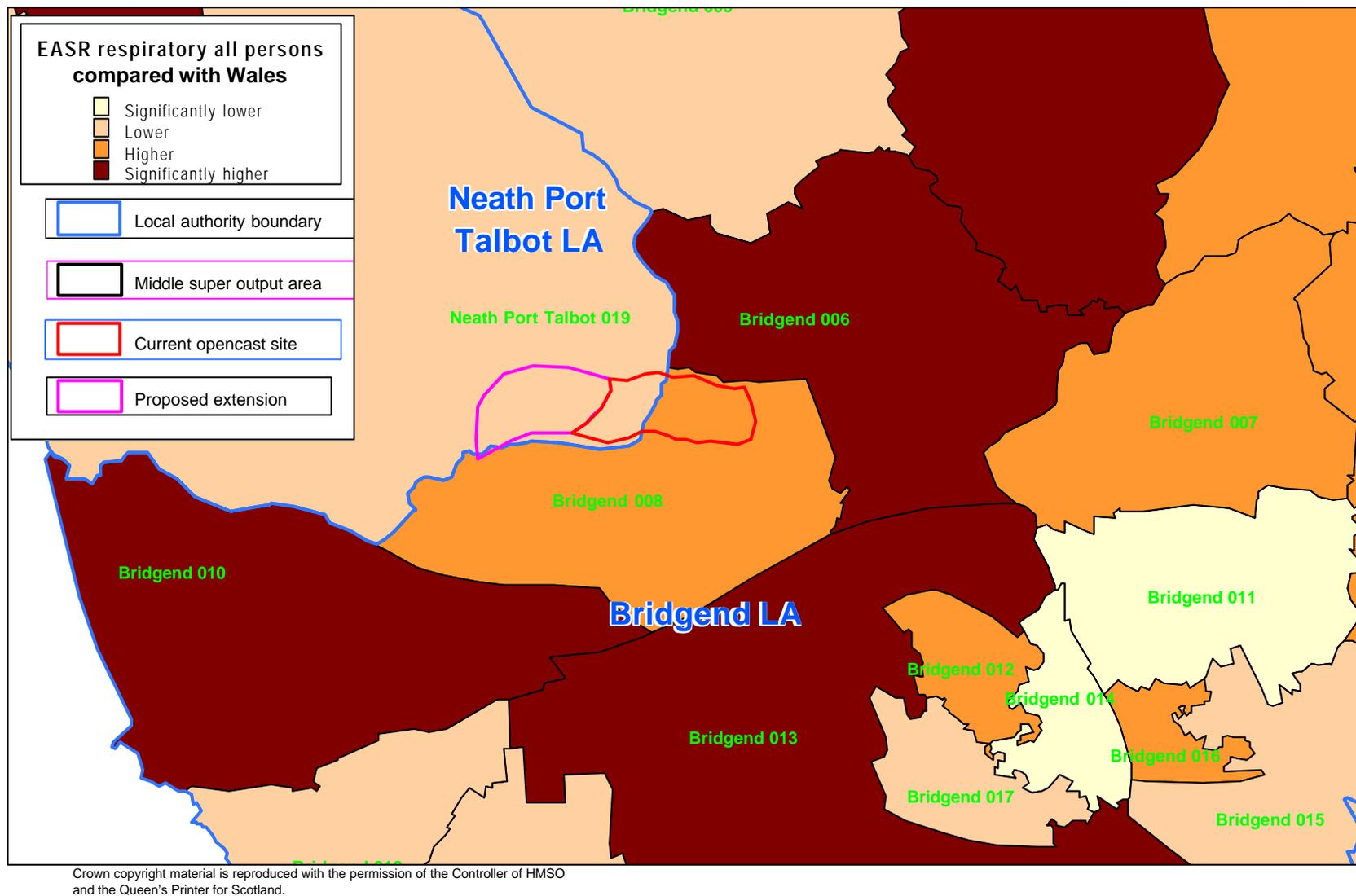


Figure 7 shows the EASR for respiratory mortality for MSOAs in the area surrounding the opencast site. The MSOA names are labelled in green font and, in addition, the map shows where the main settlements are.

Table 4 Respiratory disease mortality, European age standardised rate per 100,000, persons under 75 years, 1999-2003

Area	Population *	Number of deaths	Rate	95% lower confidence limit	95% upper confidence limit	Statistical significance compared with Wales
Bridgend006	4554	13	46.7	21.0	72.5	Higher
Bridgend008	8090	17	37.8	19.7	55.9	Higher
Bridgend	118900	278	37.3	32.8	41.7	Higher
Wales	2668500	5868	34.2	33.3	35.1	

*2001

Source: ONS

Table 4 shows EASRs for premature mortality due to respiratory causes. Here, the numbers are much smaller and the confidence intervals are very wide relative to the rate. None of the areas shown exhibit a rate that is statistically significantly different to that for Wales.

Figure 8

Respiratory mortality, persons <75, 1999-2003

Source: ONS

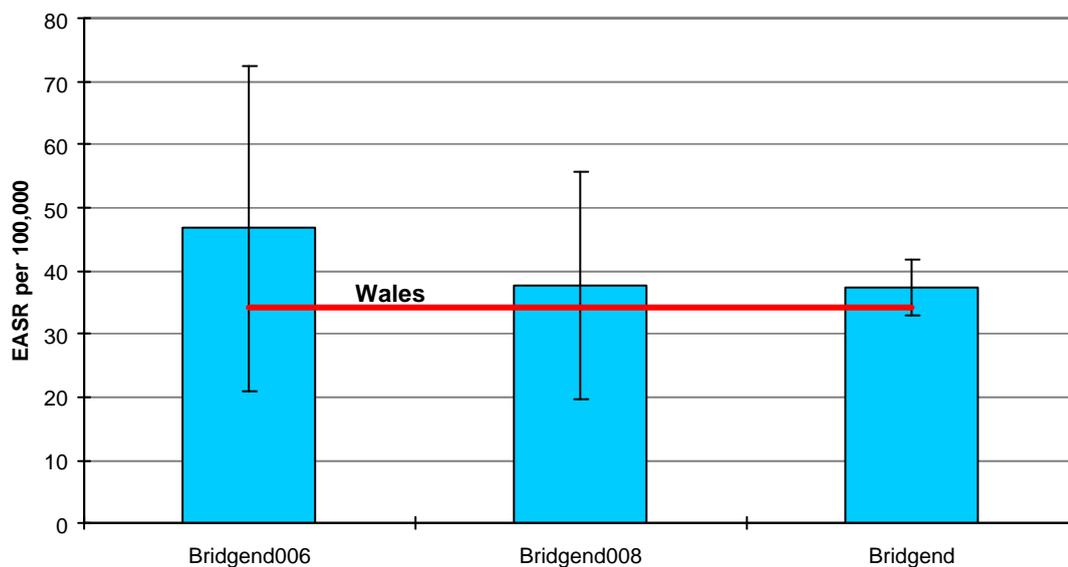
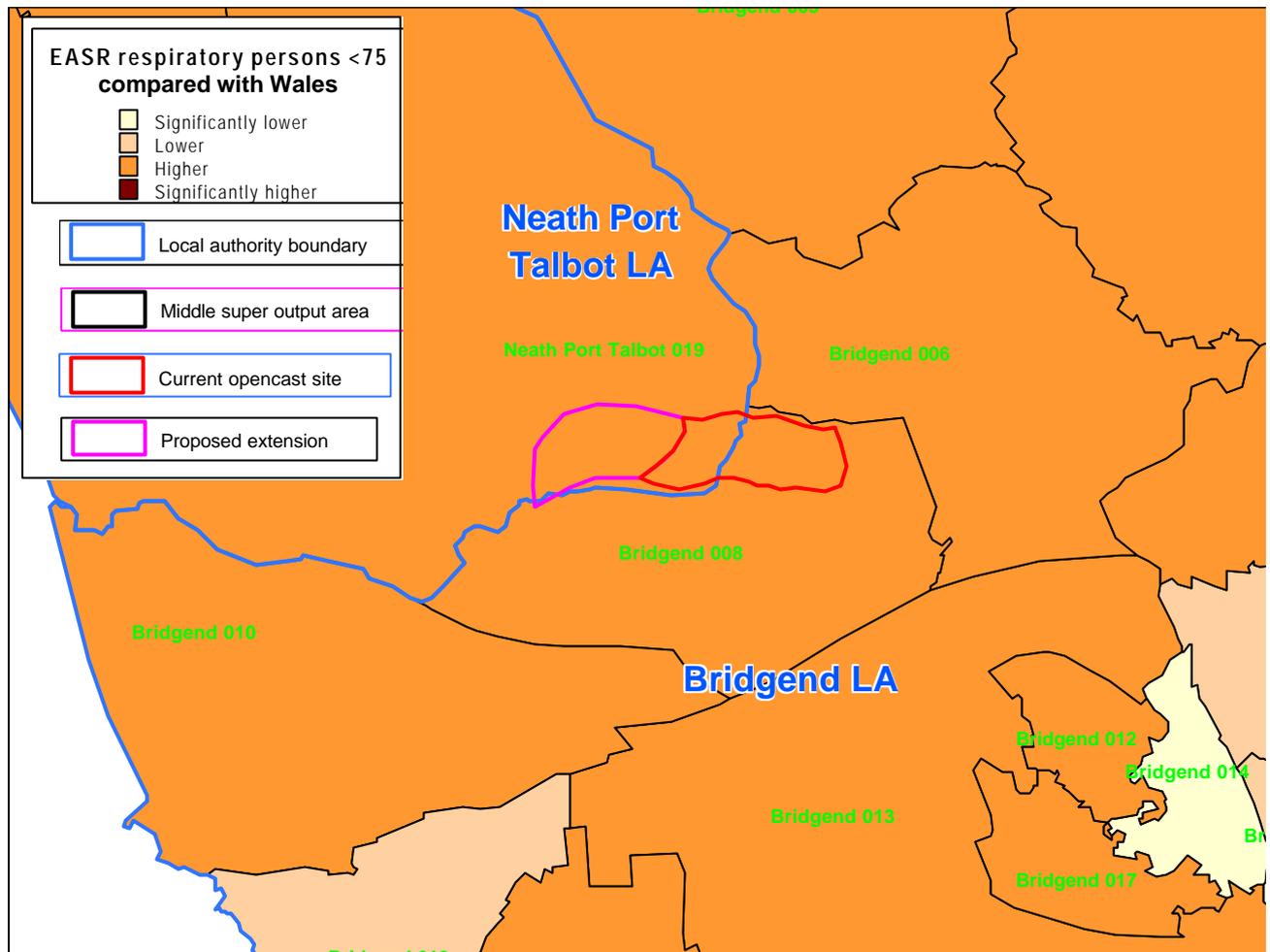


Figure 8 Respiratory mortality, European age standardised rate per 100,000, persons aged under 75 years, MSOAs in the vicinity of Kenfig Hill opencast site 1999-2003



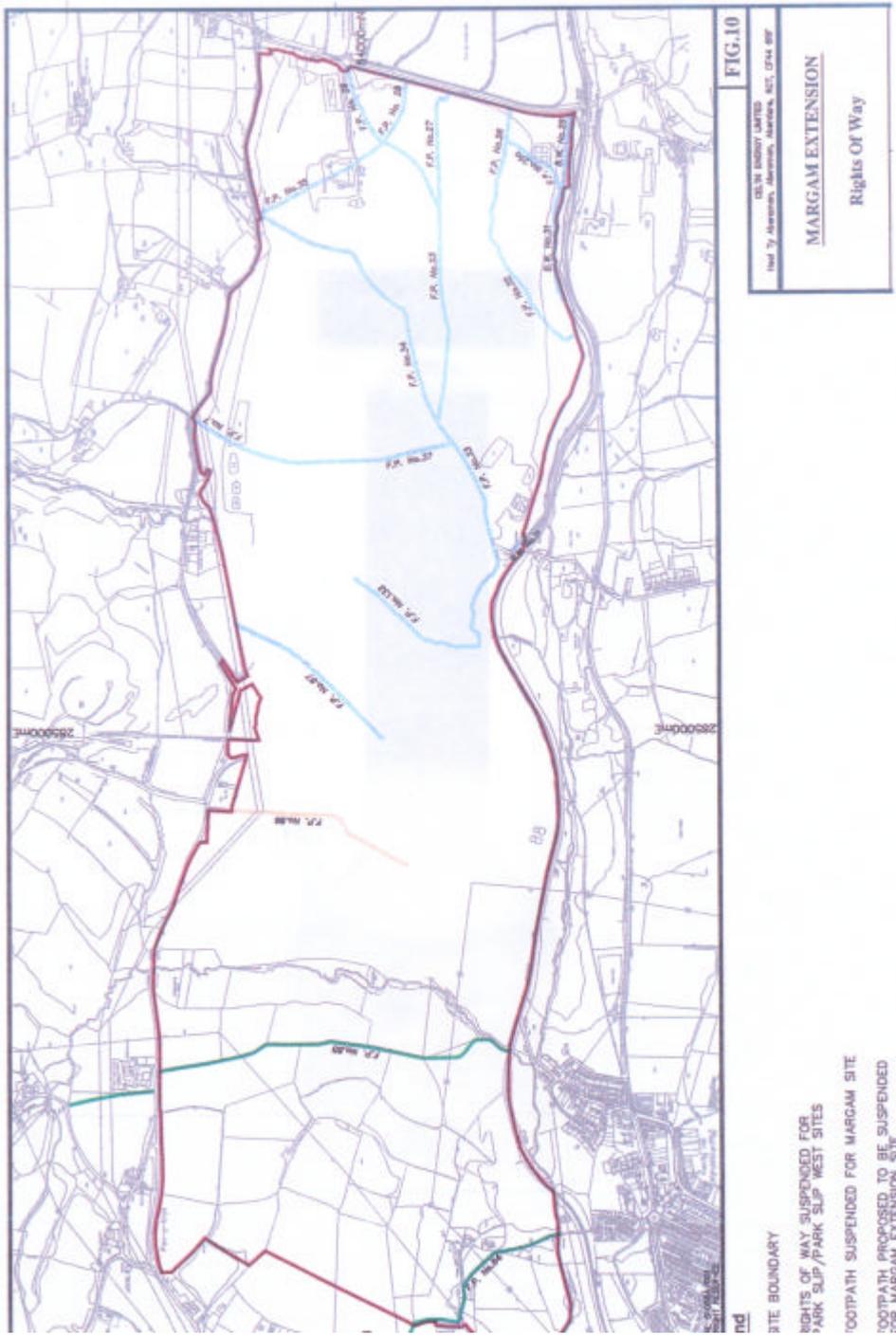
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Figure 8 shows the EASR for respiratory mortality in persons aged under 75 years for MSOAs in the area surrounding the opencast site. The MSOA names are labelled in green font and, in addition, the map shows where the main settlements are.

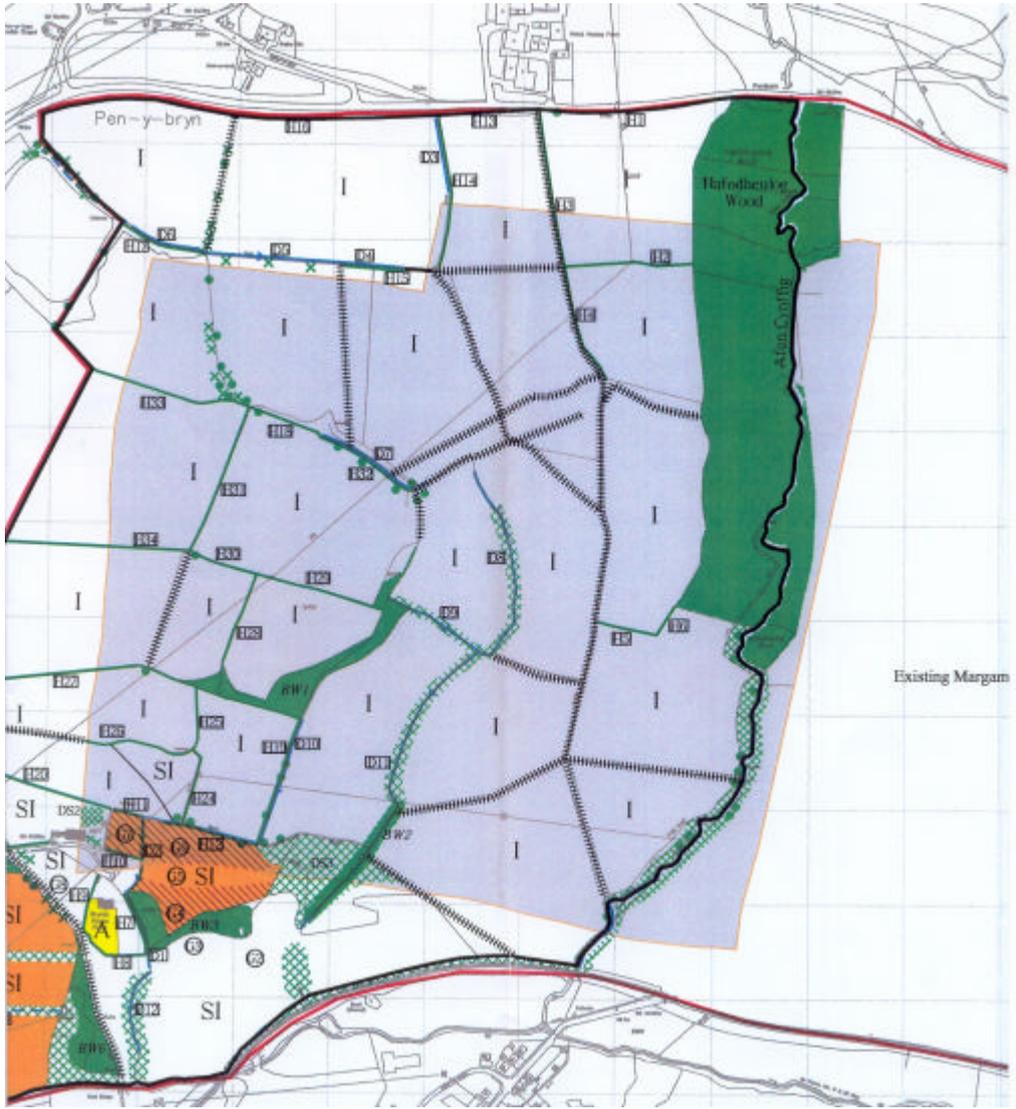
Appendix 4 Maps and Plans



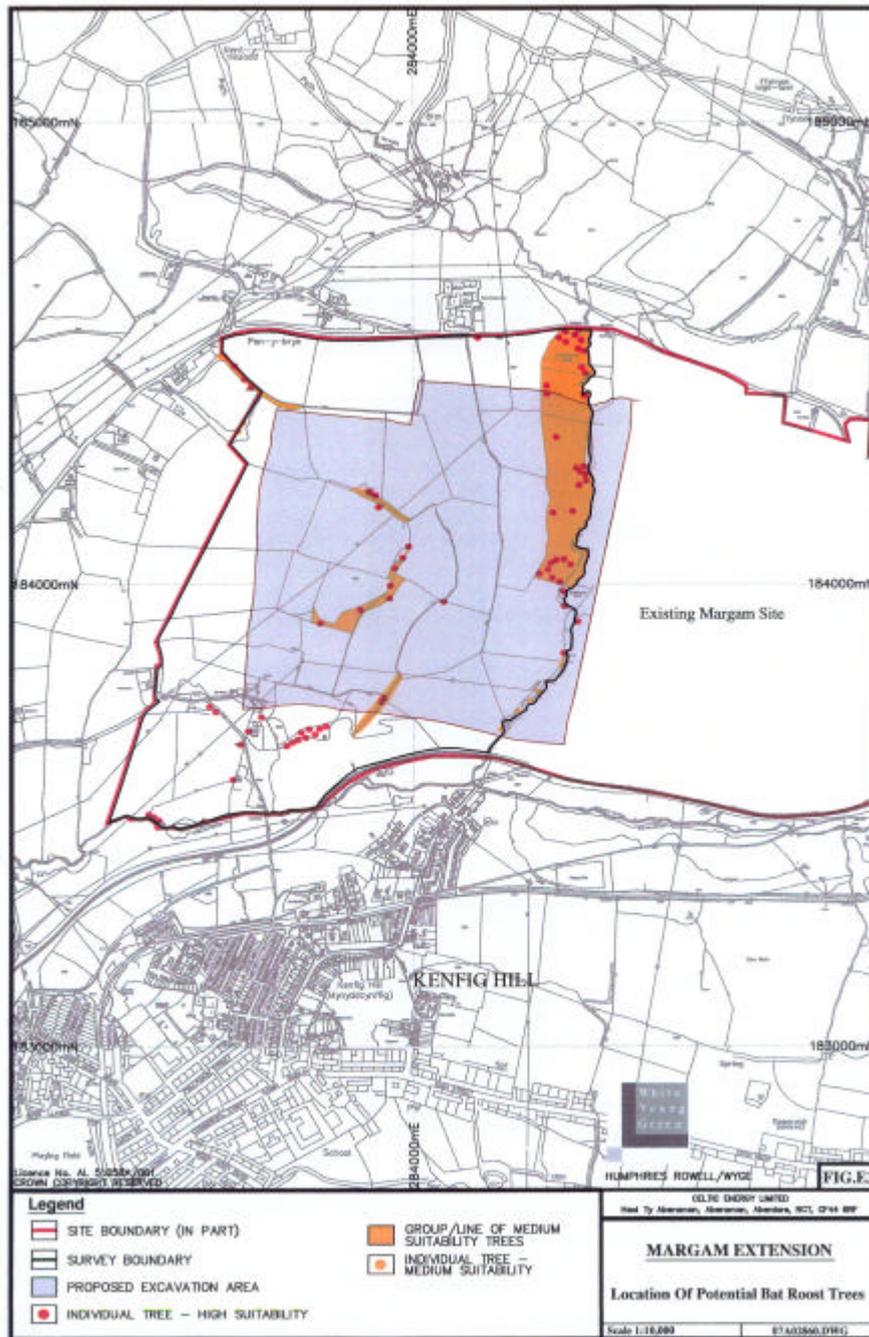
Map showing footpaths and routes that existed prior to opencast.



Map showing footpaths 84 and 85, as well as footpaths already lost. Not all new housing is shown on the map.



Plan showing Hafod Heulog woods in relation to the proposed extension to the opencast mine.



Plan showing Hafod Heulog woods in relation to the proposed extension to the opencast mine and local housing. All new housing may not be shown on this plan

Appendix 5

Planning Applications – Margam Opencast Mine

Application	Date	Consultation Process	Date approved
1 st Application Park Slip West Opencast Site Park Slip extension	Pre 1979	Details are not available but would have followed the planning consultation and notification procedures for that time.	1979 1984
2 nd Application P/89/1483 Parc Slip West (O.C.C.S)	16/10/89	Planning consent granted on appeal after refusal by the planning authority. In addition to consultation responses from the Environmental Health Department, public views would have been considered and played a part in the Planning Authorities original decision.	21/9/93
3 rd Application P/98/377 Parc Slip West Extension/ Margam Mine In addition to the full planning applications above, there have been two minor ones requesting variations on existing consents.	30/4/98 24/10/01	Consultations commenced on the 12/5/98 and included public meetings. This was the application that included the proposal for a deep mine ⁶ after a limited period of opencast working. The delay in determination was due to the legal process of securing a restoration scheme under a section 106 agreement. Decision made not to sink a deep mine through the void.	2/3/01 25/9/00

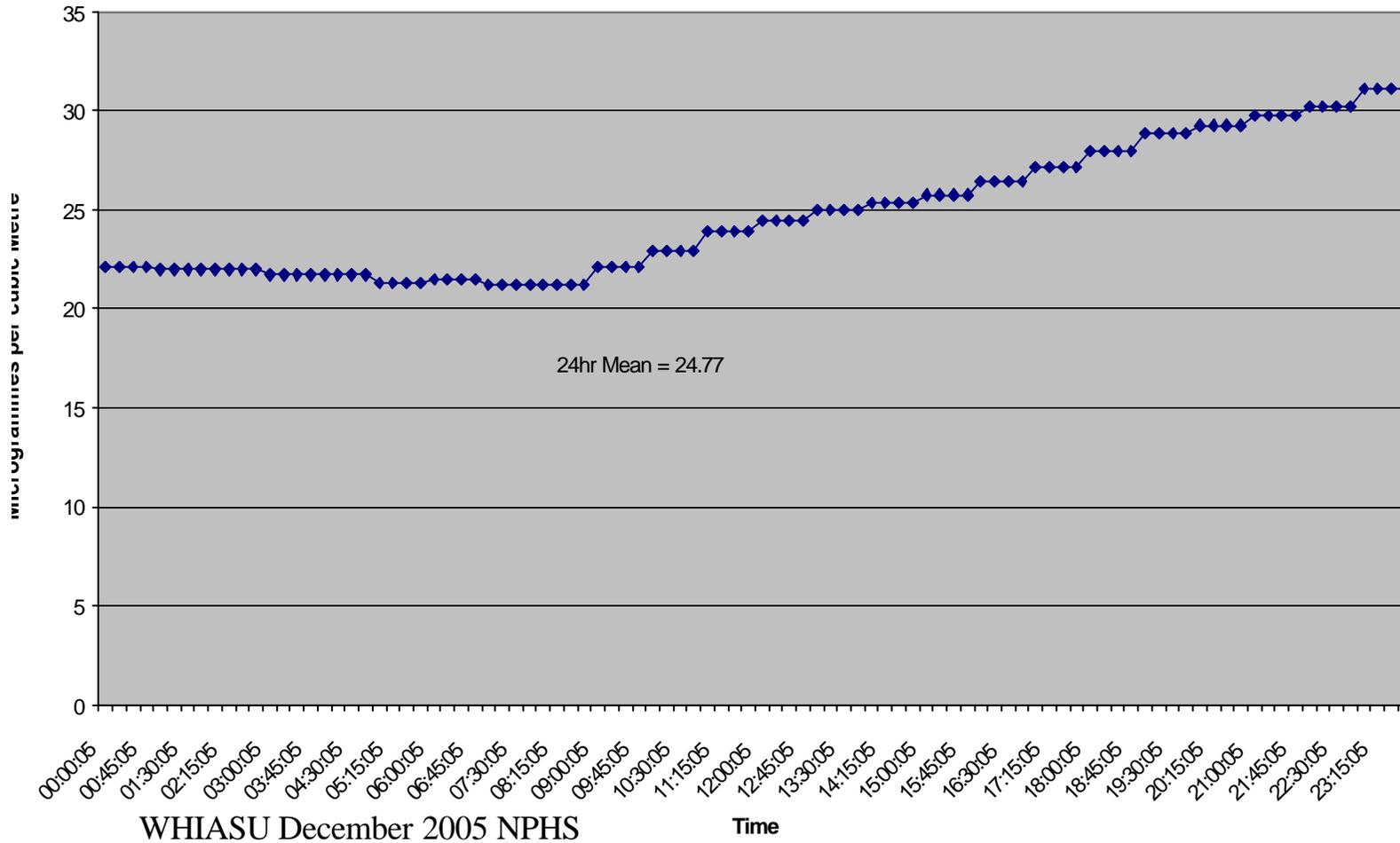
⁶ Application was for a deep mine accessed through an extension westward of the opencast void. Hence the new name: Margam Mine

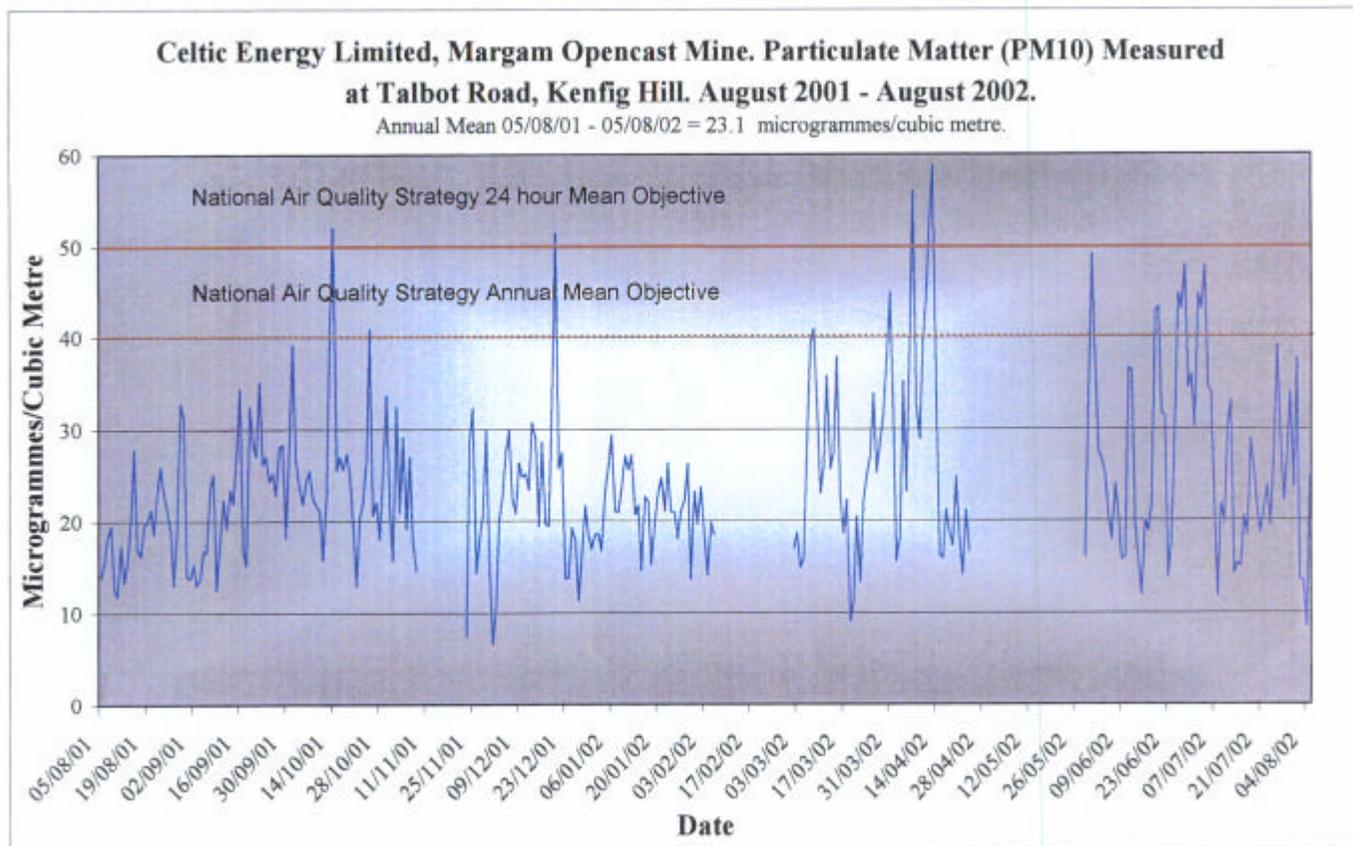
<p>P/00/685</p> <p>Relaxation of existing condition to allow deposition of slurry onto an overburden mound.</p>	<p>2/8/00</p>	<p>This was made public and included a public meeting with the residents of Cefn Cribwr as the work was carried out on the far eastern side of the site. It was also subjected to an environmental assessment as part of the consultation process with the Environmental Health section of the Public Protection Department</p>	<p>3/12/01</p>
<p>P/01/962/OBS</p> <p>Extension of the extraction area to the south western corner of the site, locate Margam surface area to north of site outside current boundary and to extend the area of a mound.</p>	<p>24/10/01</p>	<p>This was an application made to Neath Port Talbot County Borough Council and determined by them.</p>	
<p>Current Application Margam Extension P/04/1736/MIN</p> <p>Time extension until January 2007, with restoration to 2010.</p>	<p>23/12/2004</p> <p>2005</p>	<p>General consultation with various organisations commenced 24th December 2004.</p> <p>Wider consultation involved public notification of the receipt of the application: press on the 13th January 2005 and by way of site notices on the 17th January 2005.</p> <p>In addition two public meetings were called, one at Cefn Cribwr Community Centre on the 21st of March 2005 and another at Pyle Leisure Centre on the 22nd of March 2005. Both were well attended.</p>	<p>To be determined.</p>

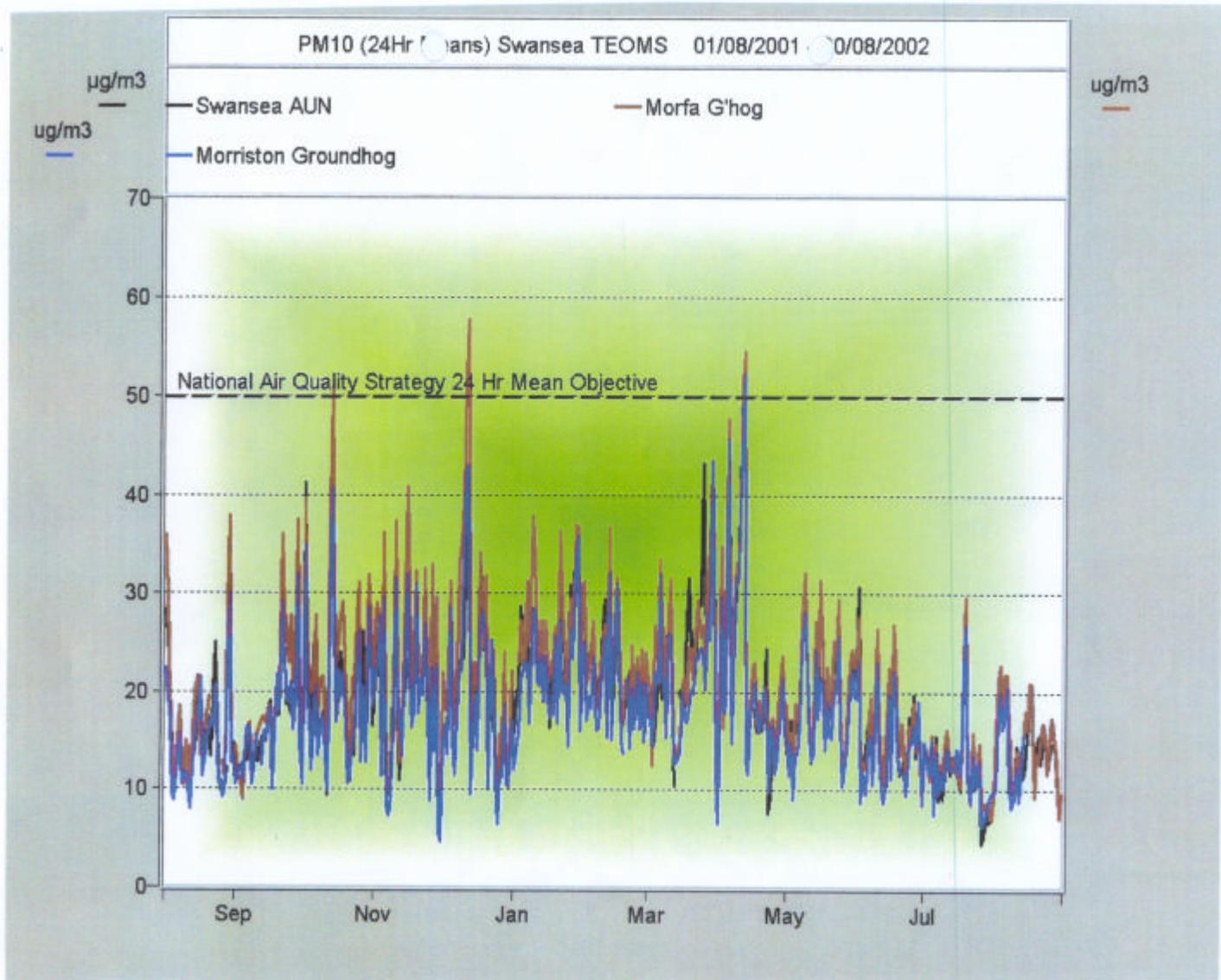
Main source: Bridgend CBC.

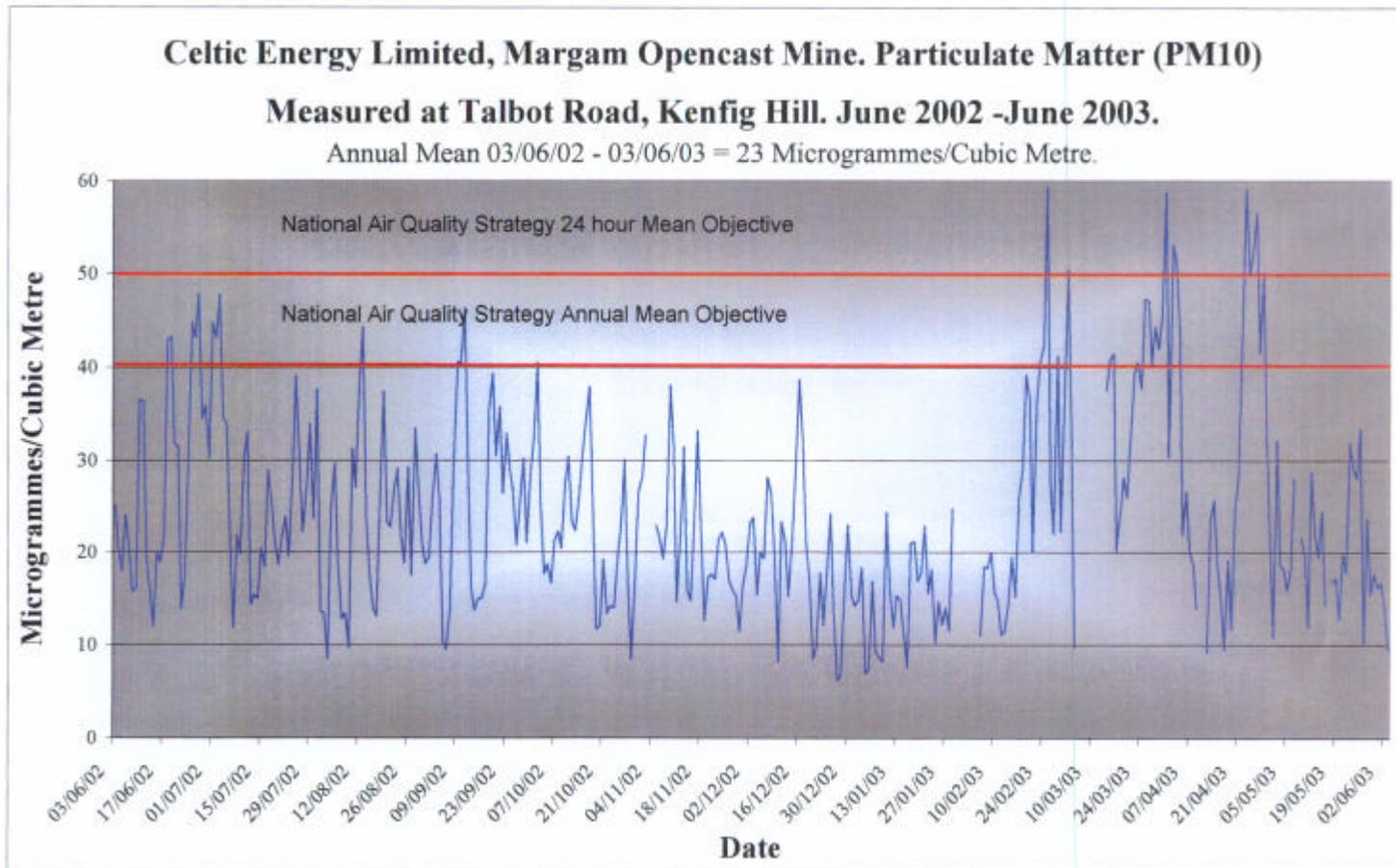
Appendix 6 - PM10 concentrations measured at Kenfig Hill
Source: BRIDGEND CBC)

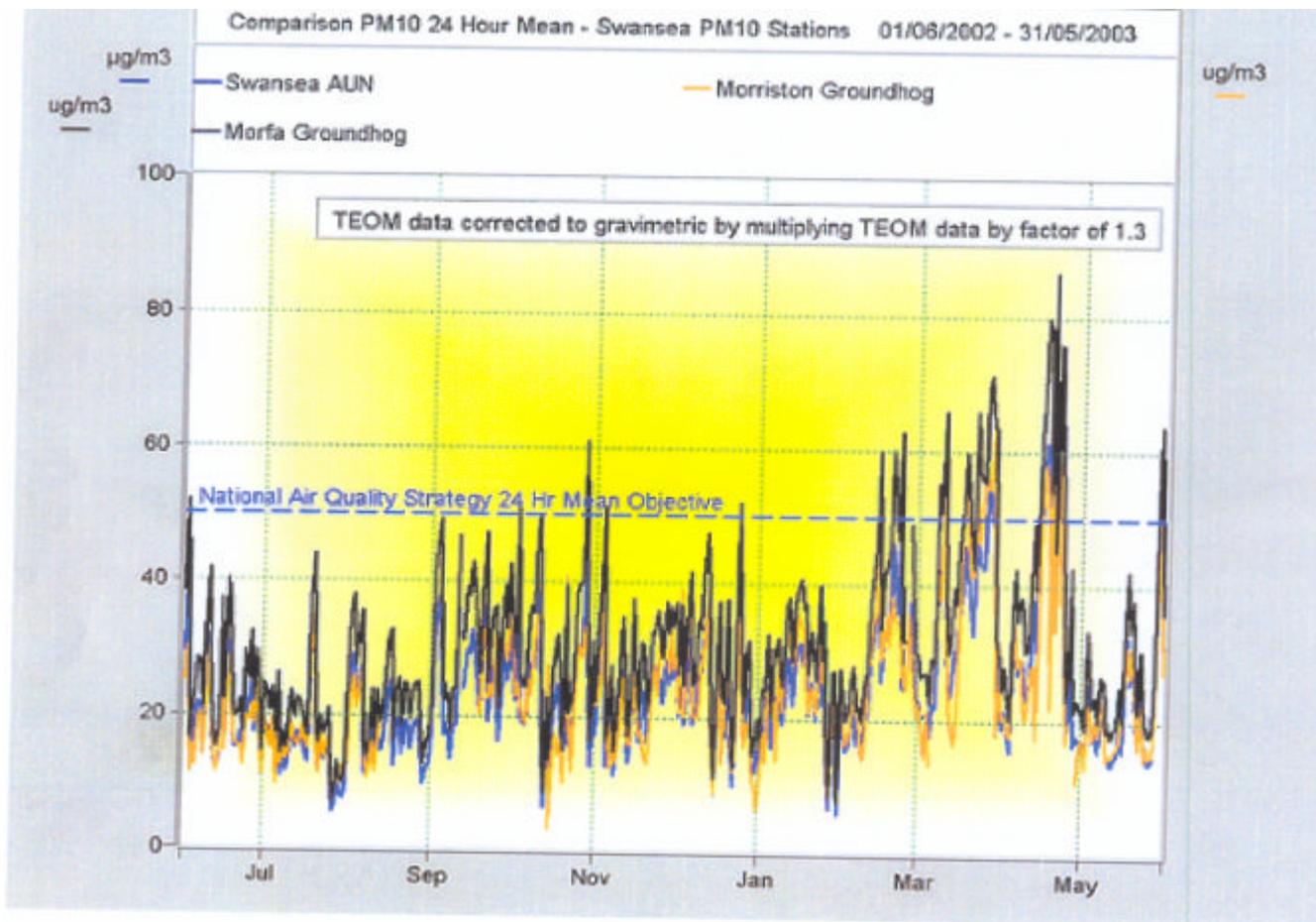
22nd September TEOM 24hr Mean (Corrected)











Aerial photograph of the present opencast workings

