

**A Report of a Health Impact Assessment Study
of an Opencast Scheme at Ffos-Y-Fran, Merthyr Tydfil**

Ffos-Y-Fran Health Impact Assessment Steering Group



Title Although the official title of the scheme at Ffos-Y-Fran is ‘Land Reclamation Scheme incorporating the extraction of Coal by Opencast Methods’, residents chose this title as they feel it more accurately describes the scheme, namely involving coal recovery. Indeed, the inspector to the inquiry into a compulsory purchase order for land in 1999 explained that “much of the works themselves will be for coal extraction, not reclamation” (East Merthyr Land Reclamation Scheme, Inquiry, 1999).

Photograph: Front Cover The photograph shows the proposed opencast site viewed from the main A470, Cardiff to Brecon road. The site is in an elevated position towards the top right hand corner of the photograph.

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Other national and local organisations

Finally, local people who attended the workshop, wrote to WHIASU, participated in the house-to-house survey and who provided other valuable information and insights

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Introduction

Background to the health impact assessment

The health impact assessment was a response to public concern about the potential health effects of the Ffos-Y-Fran Land Reclamation Scheme Incorporating Extraction of Coal by Opencast Methods. Indeed, an approach was made to the Welsh Health Impact Assessment Support Unit (WHIASU) in March 2006 by a group of residents concerned about the potential health effects on local people and the community of the proposal to extract coal using opencast methods, and the removal of waste from former landfill sites on the proposed site. A researcher from the WHIASU met with a small group of local residents on 25th April and with a much larger group of people on 27th April. The second meeting was attended by 28 people, including local residents, an Assembly Member and four local elected representatives. The meetings identified the concerns of local people, and the potential positive and negative effects of the proposal on the health and wellbeing of people living in close proximity to the proposed site, WHIASU agreed to provide support for the group of residents in doing a health impact assessment (HIA). WHIASU has a remit to support the development of HIA in Wales which involves building the capacity of all sectors, including citizens, to use the approach as a way of informing healthy decision-making.

Early in 2005, the WHIASU had made an offer to the Chief Executive (CEO) of Merthyr Tydfil County Borough Council (CBC) to support a health impact assessment of the Ffos-Y-Fran proposal (letter dated 17/03/05), but the offer was not taken up. Prior to the Public Inquiry a health statement had been produced by Merthyr Tydfil Local Health Board (LHB), which provides some objective information on the impact of the scheme on the health of the population, but the document does not replace a health impact assessment. Indeed, the document recommended that “the company should undertake a detailed prospective participative health impact assessment prior to work commencing and act upon its findings” (Lowe, Recommendation 3, p.8). After the initial meetings with local residents at the end of April 2006 the CEO of both Merthyr Tydfil CBC and Merthyr Tydfil Local Health Board were informed of the HIA and invited to participate in the HIA process (letters dated 10/05/06), but this offer was not taken up. However, local councillors have actively participated in the HIA and monitoring data has been requested from the Environmental Health Department, Merthyr Tydfil CBC, the location of some of the data requested has been identified by them, obtained by the researcher and is contained in this report.

The Welsh Health Impact Assessment Support Unit

WHIASU is based in Cardiff Institute of Society Health and Ethics which is part of Cardiff University’s School of Social Sciences. It is funded by the Welsh Assembly Government, through the Wales Centre for Health and is resourced to cover both North and South Wales. The key roles of the Unit are:

- To provide direct information and advice to those who are in the process of conducting health impact assessments;
- To contribute to the provision of new research, and provide access to existing evidence, that will inform and improve judgements about the potential impacts of policies, programmes and projects;

- To support the development and effective use of the health impact assessment approach in Wales through building partnerships and collaborations with key statutory, voluntary, community and private organisations in Wales.

The Unit provides advice, guidance and support through the provision of awareness raising presentations, training sessions, facilitation of rapid appraisals and support for other ongoing HIAs.

Health impact assessment

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 (WHIASU, 2004, p.5).

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).

Health impact assessment can therefore explore impacts likely to affect the health and wellbeing of local communities outside the current regulatory framework for the assessment of proposals or major plans such as this.

Methods

The health impact assessment study followed guidance set out in *Improving Health and Reducing Inequalities* (WHIASU, 2004), following the various stages set out in this document. Although published research and other evidence on the effects of open-casting on local communities has already been appraised and presented in report form in December 2005 for an HIA of the proposed extension to Margam Opencast Mine, Kenfig Hill, Bridgend, South Wales and which is referred to in this report, local information and evidence was needed in order to assess the potential effects upon the local population living and working in close proximity to the proposed opencast site at Ffos-Y-Fran.

As part of this local evidence gathering, a one day HIA workshop was held at Cyfartha Upper High School on 17th June 2006 with 36 local people attending, which included local residents, local elected representatives and people representing local interest groups. The workshop was facilitated by WHIASU, with Dr Eva Elliott, Dr Alison Golby and a researcher from Cardiff Institute of Society Health and Ethics taking notes. Break out sessions were facilitated by Professor Gareth Williams and Drs Elliott and Golby, and the workshop was chaired by Professor Williams. The Environment Agency Wales (EAW) also attended to explain their regulatory role, answer questions and provide information. The workshop gathered, and identified further sources of information from local people under the following headings: Trecatti landfill site, waste extraction and disposal; heritage and effect upon the neighbourhood; economic impacts on the local area; air quality, dust and asthma, and; Urban Common, open spaces and land remediation. This framework forms the basis of this health impact assessment study.

Data collected by local people, in addition to the Residents' Workshop include:

- documentation and reports which were submitted during the planning process
- newspaper articles, published research and local population statistics
- residents' house-to-house survey which was completed by one of the residents. This comprised brief written and signed statements from local people.
- More detailed signed correspondence from local residents and local businesses

Other evidence and information used to assess impacts includes:

- findings of the Health Impact Assessment of the Proposed Extension to Margam Opencast Mine (Margam HIA report, 2005: www.whiasu.wales.nhs.uk)
- reports produced by organisations such as, the Met Office, Environment Agency, Department for the Environment Food and Rural Affairs (DEFRA), Merthyr Tydfil County Borough Council and Local Health Board and the Welsh Air Quality Forum.
- local population statistics produced by the National Public Health Service, and the Office for National Statistics

- semi-structured interviews (in person or by telephone) with local businesses, the Environment Agency Wales and the Scottish Executive (Planning Division). The interviews were conducted and analysed by a researcher from WHIASU.
- a ‘census’ survey of residents living closest to the proposed scheme conducted and analysed with guidance from a researcher from WHIASU
- published research and other reports

WHIASU provided support in assessing the scientific credibility of evidence collated and signposted to new scientific evidence relevant to this assessment. Within the confines of this health impact assessment, as wide a range of evidence as possible has been used to assess impacts on health and wellbeing.

Phases in the Ffos-Y-Fran Land Reclamation Scheme: I, II, III and IIIa

The proposal being assessed as to the likely health impacts on the local population is the third phase of the East Merthyr Land Reclamation Scheme which was the initiative of the former Merthyr Tydfil Borough Council and Mid Glamorgan County Council in the mid 1980s (Environmental Statement (ES), 2003).

An aerial photograph (below) of the area around Ffos-Y-Fran shows the sites of phases I and II of the Merthyr Land Reclamation Scheme, which also comprised opencast workings, as well as the proposed site of Phase IIIa. However, it does not accurately demonstrate the size of the proposed Ffos-Y-Fran opencast development in comparison to the previous two phases since much of the proposed site is outside the parameters of photograph 1 (below).

Photograph 1: Phases of the East Merthyr Land Reclamation Scheme



Source: Statement of Evidence by Stephen Tillman. Figures. Figure 9 (2004)

Phase I lasted for 18 months, beginning in January 1992 and ending in June 1993, and the site of Phase I (towards bottom left of photograph) is now a housing development, Bradley Gardens. Phase II (middle of photograph) lasted for 37 months, beginning in August 1993 and ending in September 1996, and bordered the OP Chocolate factory. This previous opencast site has now been developed to provide infrastructure improvements, including a new slip road for the A4060T, and new factory build.

Phase III, a land reclamation scheme by coal extraction, was approved by the Planning Division of the Mid Glamorgan County Council in 1988. There was no local opposition to this application which would have been for a period of between 8-9 years, and involved the extraction of approximately 5 million tonnes of coal by opencast workings over an area of 208 hectares. A map of the proposed Phase III of the Merthyr scheme is presented at appendix 1 and which clearly shows the parameters of the scheme approved in 1988 (thick outline marked on the Ffos-Y-Fran site following the boundary of the previous A4060).

There was a reapplication of stage 111 in 1993, but this was withdrawn from the Public Inquiry, and it was formally proposed in 1994 that the scheme be revised to reclaim a larger area of derelict land and extract more of the coal reserves on the Ffos-Y-Fran site (Miller Argent, 2003). The inspector appointed by the National Assembly for Wales to the inquiry of a compulsory purchase order of land in 1999 listed the main disadvantages of this larger revised scheme as including the following: the duration of the scheme (17 years), adverse environmental and visual impacts over a larger area and longer period, common land access issues, overburden affecting 2-3 scheduled monuments and lengthy time scale which could be disrupted by uncertainty of the power industry and market for coal (East Merthyr Land Reclamation Scheme, Inquiry, 1999). The revised Scheme was withdrawn in May 1999 because of land access issues, and has therefore been delayed while access to the land was sought (Miller Argent, 2003). Miller Argent (South Wales) Limited, a company formed from CLH, Dowlais Top Investments, Miller, and the Argent Group, submitted a further application in 2003 involving the extraction of 10.8 million tonnes of coal over a 998 acre (400.6 hectare) site. Part of this phase is shown in the top right-hand corner of photograph 1 (Miller Argent, 2003). Phase IIIa, also referred to as the FLRS, is much larger than the previous Phase III approved in 1988 which can be clearly seen when comparing the boundaries of Phase III (Appendix 1) with Phase IIIa (FLRS) (figures 1 and 2).

Public Inquiry and Determination by the Assembly

The planning application for the FLRS was called in for determination by the Assembly on 1st December 2003.

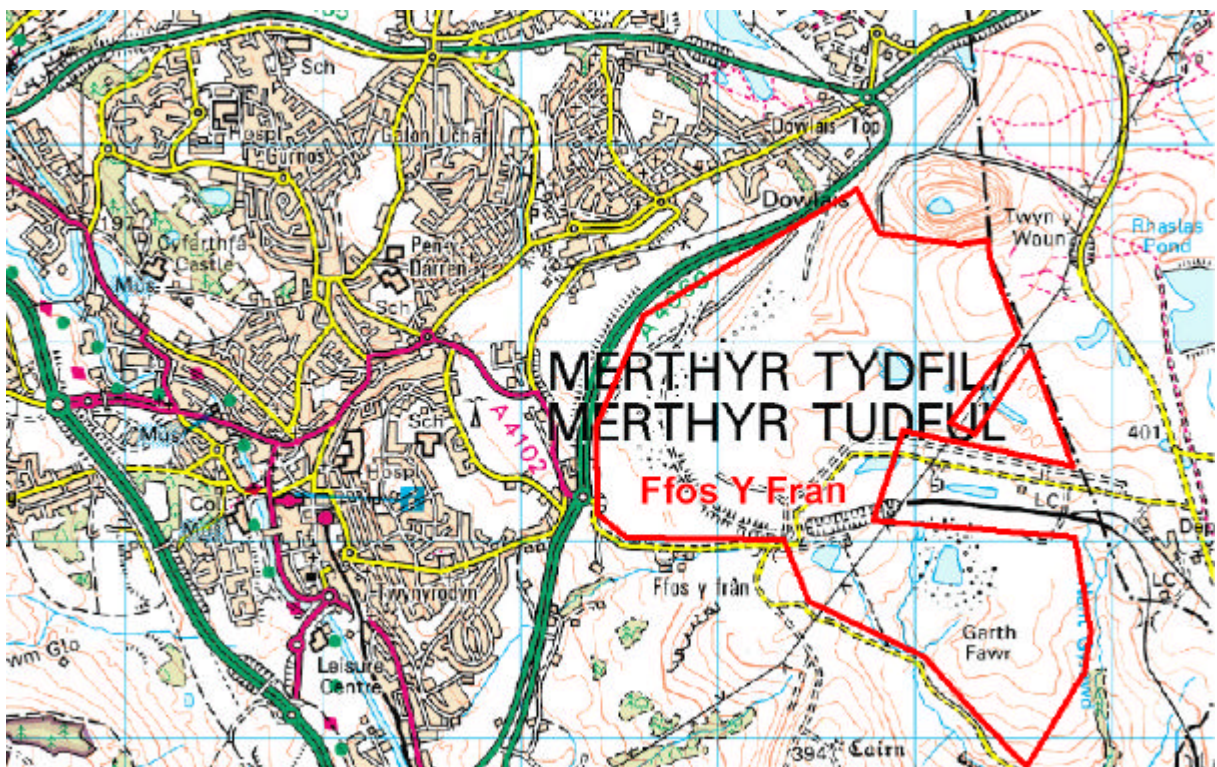
A public inquiry in relation to the application was held during September 2004 at which a variety of evidence, including that of local residents was heard. The Inspector appointed by the Assembly recommended that the Assembly grant planning permission for the scheme, subject to conditions. The public inquiry took place under the Town and Country Planning Act 1990 - Section 77/ Town and Country Planning (Inquiries and Procedures) (Wales) Rules 2003/ Town and Country Planning (General Development Procedure) Order 1995. Planning permission was granted by the Planning Decision Committee of the Assembly on 11th April 2005.

Local residents challenged the grant of planning permission of 11th April 2005, although that decision was later overturned by the Court of Appeal in autumn 2006. There are a number of legal points outstanding relating to that decision that have been referred back to the Welsh Assembly Government for their consideration.

The Ffos-Y-Fran Land Reclamation Scheme (FLRS)

Figure 1 (below) shows the proximity of the site to the town of Merthyr Tydfil, including a hospital, secondary school, trading estate and housing at Incline Side (south of site), Twynnyrodyn (south west of site), Mount View (west of site) and Dowlais (north and north west of site). Figure 1 also shows the size of the site in relation to the town of Merthyr Tydfil as the map includes most of the development in and around Merthyr Tydfil between the main trunk roads (marked in green) of the A470 (left of map), the A4060 (running south to north - middle of map) and the new Heads of the Valleys road (top of map). The site is in an elevated position as contours contained in the map show.

Figure 1 Map showing the proposed site and its proximity to Merthyr Tydfil town centre



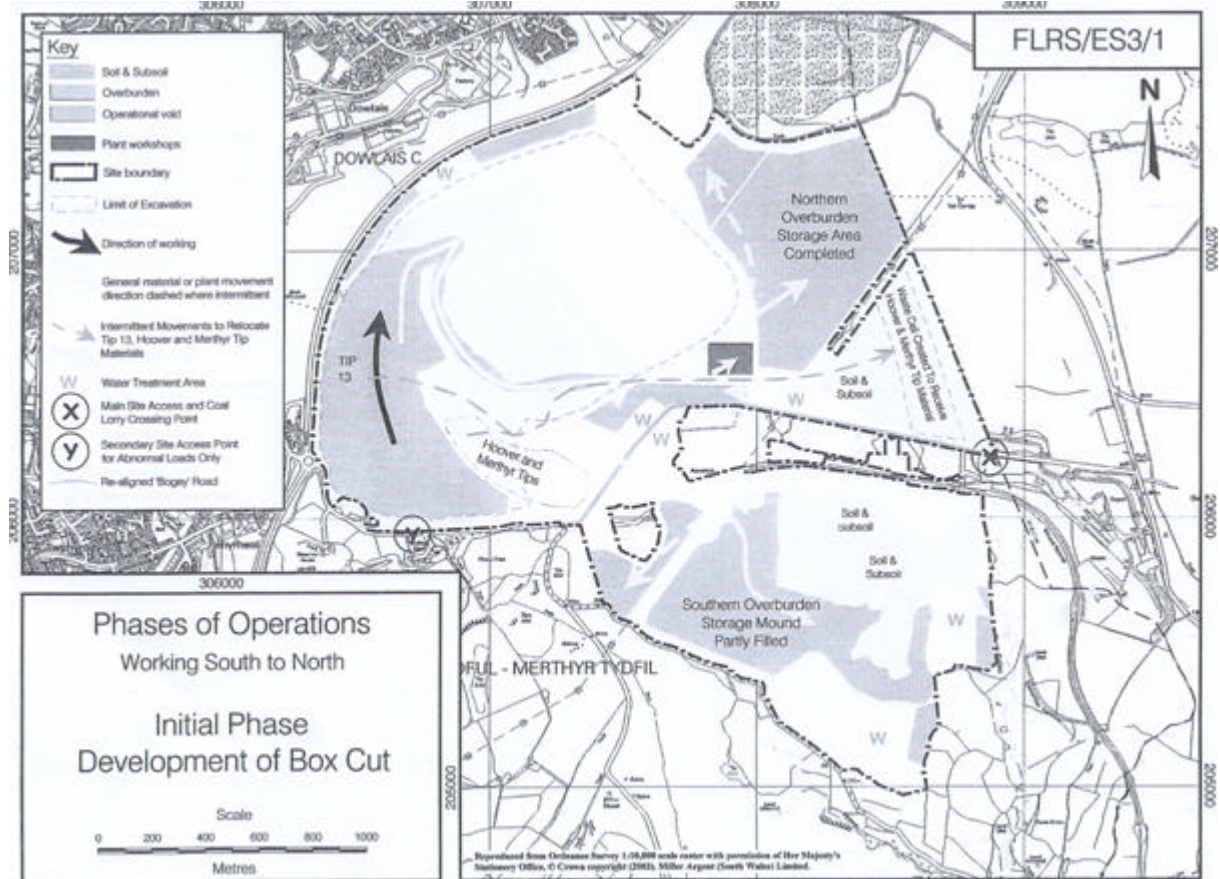
Source: This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. **Modified by:** National Public Health Service for Wales

The Environmental Statement (ES) (Miller Argent, 2003) outlines the extent of the proposed scheme, stating that the FLRS is the largest of the three phases covering an area of 400.6 hectares with an area of excavation of 140 hectares. The Maximum depth of the void is 178 metres and maximum void area is 39 million square metres to extract 10.8 million tonnes of

coal. Furthermore, 123 million cubic metres of overburden material will need to be moved to gain access to the coal reserves. There will be overburden mounds on all boundaries of the site, namely north, south, east and west. Southern, eastern and northern overburden mounds are marked on figures contained in the Environmental Statement (FLRS/ES3/1; FLRS/ES3/2; FLRS/ES3/3; FLRS/ES3/4) but the western overburden mound is not, although this would be smaller than the other mounds and temporarily lie over the western end of the excavation (ES, Miller Argent, 2003). This mound would be close to the A4060 and local housing.

The FLRS would last for up to 17 years with a further five years for restoration, namely lasting for a period of up to 22 years in total. The hours of working of the scheme would be 06.00-22.00 hours Monday to Friday, and 07.00-18.00 hours on Saturday (Environmental Statement, 2003). After the Public Inquiry, hours of working were specified as being 07.00-23.00 Monday to Friday. Operational activities would be contained within these periods with maintenance and emergency operations being carried out at other times (Environmental Statement, 2003). Coal haulage vehicles of 20 tonne capacity would be used, between 750,000 and 1 million tonne of coal per year would be extracted, between 781 and 1045 loads would be transported to the disposal point each week with a corresponding number of return journeys. Blasting would take place for short periods between 10.00 and 13.00 hours and 14.00 and 16.00 Monday to Friday, and 10.00-13.00 hours on Saturdays (Environmental Statement, 2003).

Figure 2: map showing proposed workings, with access points Y and X



Source: Environmental Statement (2003)

The site will be accessed using two points, marked as X and Y in Figure 2 (p.13 above). The main site access to the site will be at point 'X' on the northern side of the Bogey Road and opposite an existing entrance to Cwmbargoed Disposal Point. Coal will be extracted and hauled by lorry to the Cwmbargoed Disposal Point and then transported by rail. The second access point 'Y' at the western end of the Bogey Road is described in the Environmental Statement (ES) as having "temporary intermittent use for the delivery and dispatch of plant and machinery" (p.9) and is expected to be used at the outset and conclusions of operations, and sporadically throughout. However, this access point will be used for heavier, larger plant and machinery which will be accessing via the main A4060 trunk road on an incline and close to local housing.

Ffos-Y-Fran Health Impact Assessment Steering Group

The health impact assessment study has drawn upon the findings of the health impact assessment of the Proposed Extension to Margam Opencast Mine (Margam HIA report, 2005) and available evidence relating to local circumstances. This study does not therefore comprise a comprehensive health impact assessment of the proposed scheme.

The Ffos-Y-Fran Health Impact Assessment Steering Group was set up to consider and assess evidence collected. The group received advice and guidance from the Welsh Health Impact Assessment Support Unit based at Cardiff Institute of Society Health and Ethics, part of Cardiff University's School of Social Sciences. In particular, guidance was sought on health impact assessment processes and methods, the collation and analysis of local primary data and the appraisal of existing research data. This support was necessary to maximise the quality and scientific rigour of the assessment. The conclusions and recommendations are those of the Ffos-Y-Fran Health Impact Assessment Steering Group whose members are as follows:

Paul Brown, local councillor
Tony Chaplin, resident and community representative of Coal TAN Steering Group
Clive Thomas, resident
Terry Evans, resident
Elizabeth Condron, resident

Other residents made substantial contributions in identifying, providing and collecting local evidence of relevance to this health impact assessment.

Section One: A Health and Social Profile

Inequalities: disadvantaged and vulnerable populations

Merthyr Tydfil: a profile of its population

Health

Local residents draw attention to articles appearing in local and national newspapers, such as the *Merthyr Express*, which highlight Merthyr Tydfil as having the lowest life expectancy in Wales. Indeed, the Office for National Statistics (ONS) who looked at death rates from 1999-2003 found that Merthyr Tydfil's average life expectancy was the lowest in the whole of the UK (Merthyr Express, 20/07/06). The poor state of health in Merthyr Tydfil has also been reported in national newspapers. An article appearing in the *Independent* describes the town as the "sickest place in Wales, if not Britain" (Dobson, The Independent, 21/09/99) The newspaper reports the findings of research carried out by the National Assembly for Wales in 1999, stating that almost half the population is suffering from a chronic illness, one in five residents suffer from some sort of mental illness and one quarter has heart disease. The town's legacy of heavy industry is thought to be part of the reason for these figures. These issues are discussed below.

Health statistics have been referred to in the Needs Assessment produced by Merthyr Tydfil Local Health Board and Social Services Department in 2003. Death rates in persons under 75 years from ischaemic heart disease and strokes, 1990-2001, was higher than in the rest of Wales (Merthyr Tydfil Needs Assessment, 2003). The diagnosis of chronic obstructive pulmonary disease (COPD) is long-term worsening cough, wheeze or breathlessness and evidence of decreased lung function. Death rates are also significantly higher for COPD in Merthyr Tydfil than in the rest of Wales. Hospital admissions due to COPD were also much greater in the Merthyr Tydfil and Rhondda Cynon Taff area than in Cardiff and the Vale of Glamorgan. Using data from the Welsh Health survey (1998) the level of self-reported respiratory problems was almost 20% higher in Merthyr Tydfil than for Wales as a whole (Merthyr Tydfil Needs Assessment, 2003).

Since 1991 there has been an increase in low birth weight babies and children in Merthyr Tydfil do not experience the same level of health as other parts of the UK, although this position has improved it has not improved at the same pace as elsewhere (Merthyr Tydfil Needs Assessment, 2003, p.14). Merthyr Tydfil also has a high number of people self-reporting that they suffer from anxiety or depression. The Welsh Health Survey (1998) asked people questions about their perceptions of their physical and mental health. The mean Mental Component Summary (MCS) score of 47.7 for Merthyr Tydfil is the lowest score of all local authorities in Wales. This score is statistically significant and suggests that adults in Merthyr Tydfil experience poorer mental health than adults in the rest of Wales (Merthyr Tydfil Needs Assessment, 2003).

There is significant data, and continuing reports, about the poor health of the population of Merthyr Tydfil.

The underlying causes of ill-health in Merthyr Tydfil

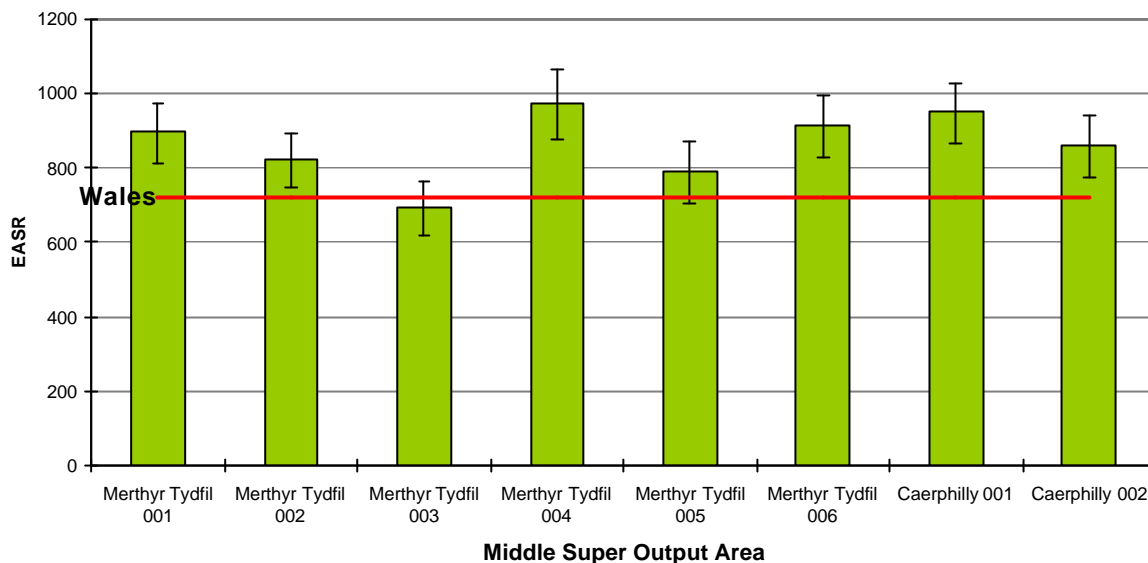
The Needs Assessment for Merthyr Tydfil completed by Merthyr Tydfil Social Services and Local Health Board in 2003 shows that the local authority area has one of the highest unemployment rates in the UK, the area having been designated an Objective One area and able to apply for funding for regeneration projects. Child poverty in the town is also discussed and Merthyr Tydfil has the highest number of children living in households dependent upon income support and as stated in the Needs Assessment, the lack of employment opportunities and lack of income is likely to impact upon people's health (Merthyr Tydfil Needs Assessment, 2003). Educational achievement is well below the Welsh average for GCSE attainments, degree or equivalent qualifications and above the national average for population with no qualifications at all (44% compared to 33%) (Merthyr Tydfil Needs Assessment, 2003).

Lifestyle factors were identified in the Merthyr Tydfil Needs Assessment as possible reasons for the high incidence of ill-health. For example, COPD is associated with smoking and, as stated in the Needs Assessment (2003), possible causes for the poor record on health in Merthyr Tydfil are high rates of smoking amongst the population (higher number of smokers than for the rest of Wales) as well as other lifestyle factors, including lack of weekly physical exercise. However, COPD is also associated with urban settings, air pollution, poverty and deprivation, genetic and occupational factors. Indeed, the industrial legacy of the South Wales Valleys was also thought to have influenced the health of older people, particularly men (Merthyr Tydfil Needs Assessment, 2003). In an article appearing in a local newspaper, Richard Reast, a Healthy Living coordinator in Merthyr Tydfil, states that some of the reasons for these statistics are the high levels of deprivation and lack of access to amenities. He also emphasises the need to address the root cause of these poor health figures, and the importance for local people of having "quality of life" (Merthyr Express, 20/07/06).

Electoral ward comparisons : a social, economic and health profile

A health profile of local neighbourhoods in Merthyr Tydfil using data supplied by the Office for National Statistics (ONS) of the Middle Super Output Areas (MSOA) is presented below in figure 3. These new statistical areas have been developed to overcome some of the problems associated with presenting health data at electoral ward level. The graph (figure 3) shows European age standardised mortality rates (EASRs) per 100,000 people for Wales, and the MSOAs in the vicinity of the proposed open case site. In addition, 95% confidence limits are shown (these are the black vertical lines on the bars). In the graph below, compared with Wales, most of the MSOAs shown have a rate which is higher than Wales. In addition, in those MSOAs whose lower confidence limits are higher than the Wales rate, it is likely that the difference is statistically significant, or in other words, not due to random variation. Only MSOA Merthyr Tydfil 003 has a lower death rate than the rest of Wales, and this neighbourhood is the furthest away from the site. For wards in closest proximity to the proposed opencast site shown in the map presented at Appendix 1a, the EASRs for all causes among people under 75 years is statistically higher than for the rest of Wales.

Figure 3 All deaths (all persons) European age standardised rate per 100,000 1999-2003



As highlighted in the figure 3 (above) every MSOA in Merthyr Tydfil, except Merthyr Tydfil 003, experiences the highest death rates in Wales. The MSOAs Merthyr Tydfil 005, 006 and 002 border the proposed opencast workings (see Appendix 1a). Indeed, the communities in closest proximity to the proposed Ffos-Y-Fran site are located in the Dowlais and Town wards of Merthyr Tydfil.

Using the Welsh Index of Multiple Deprivation (WIMD) (2000), Dowlais ward is the 39th most deprived in terms of employment in Wales and 47th most deprived in terms of Income (cited by Adamson et al, 2004) and parts of the electoral ward are designated as a Communities First¹ area. The Welsh Index of Multiple Deprivation (2000)² has now been superseded by the Welsh Index of Multiple Deprivation (2005) which provides smaller area information at Lower layer Super Output Area³ (LSOA) level rather than ward level.

¹ The Communities First programme is a long-term strategy for improving the living conditions and prospects for people in the most disadvantaged communities in Wales. The programme seeks to ensure that the funds and support available from the Welsh Assembly Government and other public sector agencies are targeted at the poorer areas. 142 areas are included in the programme- the 100 most deprived electoral divisions according to the Welsh Index of Multiple Deprivation (2000 edition), 32 pockets of deprivation below ward level (or sub-wards) and 10 communities of interest or imaginative proposals.

² The first edition of the Welsh Index of Multiple Deprivation (WIMD) was released in August 2000 and was designed to examine concentrations of deprivation so that areas at electoral division (EDiv) level can be compared. Multiple Deprivation was represented as being made up of six separate domains of deprivation: Income; Employment; Health and Disability; Education, Skills and Training; Housing; and Geographical Access to Services. Made up of data at the electoral division level, it uses a scale for each ward in Wales from 1 to 865 (The number of wards in Wales) with 1 being the most deprived area and 865 being the least deprived. The first edition was commissioned by the National Assembly for Wales in partnership with the Welsh Local Government Association and produced by a team from Oxford University. The Local Authority Analysis Report was produced in 2001 by the National Assembly for Wales. It groups the deprivation scores of electoral divisions by local authority.

³ The Office for National Statistics (ONS) has created two new statistical geographies for England and Wales, called Super Output Areas (SOAs), which are especially useful in overcoming some problems associated with using electoral divisions (or wards) in Wales, namely varying population size and changing boundaries, for making statistical comparisons.

Statistical data on the death rates using these new geographical boundaries has been presented above but the HIA makes use of evidence on health and deprivation presented at ward level as well.

The Social Audit completed by the University of Glamorgan highlights the irony of Dowlais's historical position at the centre of the industrial revolution and its current position as the 46th most deprived ward in Wales in the Welsh Index of Multiple Deprivation (2000) ranking. For example, compared with the rest of Merthyr Tydfil the highest percentage of benefit claimants aged 60 and over can be found in Gurnos, Penydarren and Dowlais wards (Merthyr Tydfil Needs Assessment, 2003, p.18) which are the most deprived wards in Wales. Dowlais is also ranked 35th in Wales in the health domain. The ward is situated close to Trecatti landfill, and north west of the proposed Ffos-Y-Fran opencast site, and will be the area most affected during the second phase of the Ffos-Y-Fran scheme, years 12-22, whereas the community in closest proximity to the proposed scheme, Twynrodyn and Mountain Hare, will be the community most affected during the first part of the scheme, as work will be commencing in the south west corner of the proposed site. These two locations fall within Town ward.

Although Town ward is less deprived than Gurnos, Penydarren and Dowlais, all electoral wards in Merthyr Tydfil are more deprived than the average for Wales. Although Town ward ranks 139th in the WIMD (2000), and as 279th in the income domain, it has much poorer rankings for employment (ranked 80th in Wales) and especially for health, which is ranked as 41st in Wales. The ranking for health in Town ward is comparable with Dowlais ward, being ranked as 35th in Wales (WIMD, 2000).

Twynrodyn: proximity of schools, shops and housing

Residents (W T Evans, January 2007) report that the socio-environmental problems of noise, odour, dust, and air pollution from coal extraction would be far more acute at Ffos-Y-fran than at most opencast coal sites because of its very close proximity to homes and schools; for the fact that it adjoins the Trecatti landfill site and because of the considerable quantities of hazardous and toxic waste that are contained on site as a result of the former use of the site for landfill. The presence of toxic substances has not been verified by bore-hole testing, but reports of local residents about the presence of such substances are discussed elsewhere in this report.

Of concern in this section is the close proximity of homes. As one resident (W T Evans, January 2007) reports it was suggested at the Public Inquiry and accepted by the Inspector that the nearest homes to the coal extraction were situated around 125 metres away at Incline Side, a small hamlet comprising eight houses. However, the Air Quality Statement of Evidence (2004) describes the nearest receptor to the haul road as Incline Side at 85 metres. In estimating emissions from the working areas the nearest receptor was assumed to be approximately 125 metres, as although the site boundary is 36 metres from the nearest receptor, the coal would not be extracted close to the site boundary (Air Quality Statement of Evidence, 2004, pp.27-28). Residents point out that the potential effects on the community of Mount View and Pwllwhaiadd which is just 60-70 metres from proposed coal extraction activities wasn't acknowledged; with some homes being as close as 36 metres from the site

boundary. Furthermore, the Ffos-Y-Fran site is in an elevated position and would tower over the housing in this location. The proximity of housing, as the resident states, is not clear from the Developer's Environmental Statement unless the geo-technical drawings and maps with cross-section analysis (FLRS/PA2, FLRS/PA3, FLRS/ES1/2/3/4/5) contained within this document are analysed for the purpose of measuring distances. Although the housing at Incline Side, and especially the community at Mount View and Pwlllywhaiadd, is clearly visible on most of these drawings and maps, the main purpose of the geo-technical drawings is to highlight the phases and processes in respect of the extraction of coal, removal of waste from former tips and land reclamation in relation to the nearby trunk road and are not designed to highlight the proximity of the site to residential homes. Indeed, it is quite difficult from these diagrams to assess distances with accuracy. An estimation of the distance of housing, schools, local businesses and other community facilities and services to the proposed site has been completed by a local resident and this is presented in Table 1 (below).

Table 1: Estimated number of properties between 36 and 1000 metres from the boundary of the proposed Ffos-Y-Fran scheme to the boundary of properties

Distance from site (metres)	Cumulative figures
Up to 50 metres	14 properties 3 Gypsy and Traveller caravans
Up to 100 metres	25 properties 3 Gypsy and Traveller caravans
Up to 200 metres	30 properties 3 Gypsy and Traveller caravans
Up to 300 metres	49 properties 3 Gypsy and Traveller caravans 1 public house 1 rugby football field
Up to 400 metres	75 properties 3 Gypsy and Traveller caravans 1 public house 1 rugby football field 1 football field
Up to 500 metres	180 properties, including part of new Redrow housing estate 3 Gypsy and Traveller caravans 1 public house 1 rugby football field 1 football field 1 nursery school Children's play centre Food manufacturer Numerous factory units

Source: Local resident (T Evans)

Table 1 continued: Estimated number of properties between 36 and 1000 metres from the boundary of the proposed Ffos-Y-Fran scheme to the boundary of properties

Distance from site (metres)	Cumulative figures
Up 1,000 metres	Over 500 properties, including entire Redrow housing estate (comprising over 100 properties) 3 Gypsy and Traveller caravans 5 public houses 2 rugby football fields 2 football fields Thomastown Park 1 nursery school 1 primary school 1 comprehensive school New Welsh primary school 2 additional schools Children’s play centre 1 hotel 1 food manufacturer 2 major supermarkets Numerous shops and retail units Numerous factory units Health centre and GP surgery

Source: Local resident (T Evans)

Residents also report that a large part of Merthyr Tydfil town centre would fall within 1,500 metres of the boundary of the proposed opencast site. The town centre includes 1,000s of properties, numerous public houses (some serving food), eight more schools, a hospital, numerous rugby and football fields, numerous retail outlets (including a large Tesco store) and numerous hotels and guest houses in addition to those identified in table 1 (above). Although Gwen Lowe, Acting Public Health Director of Merthyr Tydfil Local Health Board, and Mark Temple provided evidence about the health of people in Merthyr Tydfil at the Public Inquiry, there has been no attempt to provide a population profile of the communities living in closest proximity to the proposed site. As part of this health impact assessment, a profile of the community in closest proximity is presented below.

A community living closest to the proposed site: a profile

Presented here are the findings of a simple population census of people living in properties at Mount View and Pwlllywhaiadd, a housing development comprising 18 properties within closest proximity to the proposed opencast scheme being situated between Goat Mill Road and the main A4060 trunk road. Indeed, the properties border the junction where Goat Mill Road joins the A4060, and the housing development is only separated from the proposed Ffos-Y-Fran site by the A4060 dual carriageway (photograph 2). The statistical information collected from residents who reside in these properties is presented at Appendix 1b and discussed in more detail below.

The 18 properties at this location would, under Scottish Planning Policy most likely constitute a ‘settlement’ or ‘community’ as, “‘communities’ can also consist of small clusters of houses” as well as towns and villages ((SPP16: Opencast Coal, 2005, para 12, p.6). In Scotland under previous guidance a community was said to comprise ten houses or more but the revised guidelines state that this decision should be left to planning authorities, and could therefore comprise more or less than ten houses depending on local circumstances (SPP16, para 12, p.6; Scottish Executive Planning Division, August 2006). In Wales, a community or settlement is defined in the Draft MTAN (January, 2006) as:

the curtilage of a residential cluster of ten or more properties, or a density of twenty-five or more people per hectare, (in The Rural and Urban Area Classification 2004 based on a grid framework of cell size 1 hectare.)

Under guidelines for opencast coal extraction in both Scotland and Wales, the housing development at Mountain Hare would constitute a “settlement”. As stated above, properties in this particular housing development are located between 36 and 100 metres of the proposed opencast site and are those likely to be most affected if the scheme goes ahead, especially at the early stages of the scheme.

Photograph 2: The junction of the A4060(T) with Goat Mill Road, showing housing in closest proximity to the Ffos-Y-Fran site



Photograph 2 (above) shows the edge of the proposed Ffos-Y-Fran site boundary (fencing towards the bottom left-hand corner) to the housing development, Mount View and Pwlllywhaiadd, situated on the opposite side of the dual-carriageway. In Scotland as a general rule ‘site boundaries within 500 metres from the edge of a community are likely to be

unacceptable' (SPP16:Opencast Coal, para 11, p.6) (see Pollutants section). 40 residents over 16 years of age living in the 18 properties completed profiling questionnaires which was a 100% response rate to the survey. Written information was also provided by some of the residents which is included in this summary and referred to elsewhere in the report.

Of the 18 men and 22 women who completed questionnaires the vast majority (32 residents) were home owners with a further four people living with parents. Only two people, in one household, are living in rented accommodation. There is uncertainty of the housing status of two respondents (stating 'other' as their form of accommodation). The vast majority of the residents who are owner occupiers are therefore likely to be financially disadvantaged, seeing a fall in the value of their properties and decline in the saleability of houses, which is usually the case during major developments, including open-casting (Beynon, Cox and Hudson, 2000, p.89) (see Economic Impacts section). Although house prices generally recover after major works are completed, the position after phases 1 and 2 of the Merthyr Tydfil scheme (local estate agent interview, 19/07/06), these workings will be for a greater duration, lasting for 17 years which does not include a period for land reclamation. In comparison Phase I lasted for 18 months, beginning in January 1992 and ending in June 1993, and Phase II lasted for 37 months, beginning in August 1993 and ending in September 1996.

Although over half of residents are between the ages of 30 and 59 (22:55%), just under one third are 60 years or over (12:30%) twice as many as those between the ages of 16 and 29 (6). Five residents are aged 75 years or over and each respondent in this age-group self-reported that they had an existing health complaint or disability. Elderly people are especially vulnerable to the effects of pollutants, including those associated with open-casting (Margam HIA Report, 2005, pp.22-23) (see Air Pollution section). There are seven children (aged 0-15) living in this housing development, including two infants aged 0-4, one child aged 5-9 years and four older children, aged 10-15 years of age. Infants and young children are most at risk from pollutants associated with open-casting at well-below WHO guidelines (Margam HIA Report, 2005) (see Air Pollution section).

Just under half of residents (19: 47.5%) stated that they were not in paid employment. This number does not include students (3) but would include people retired or not working due to age or disability. This means that just under half of adult residents are likely to be spending time at home during working hours as well as two infants, and 5 school age children during school holidays. The school age children will also be attending local schools and nurseries, including a pre-school nursery approximately 500 metres, and Twynyrodyn Community Primary School approximately 600 metres, distance from the proposed development. Furthermore, a new Welsh school will be approximately 500 metres away from the site. These residents, and their children, will therefore be those at greatest exposure to any potentially harmful air-borne pollutants, noise and vibration associated with open-casting as well as nuisance dust (Margam HIA Report, 2005). The proximity of the proposed Ffos-Y-Fran opencast to this housing development is closer than housing at the Margam Opencast Mine, Kenfig Hill. Residents at Cefn Cribwr and Kenfig Hill reported having to clean black coal dust from windowsills and garden furniture on a regular basis, having to keep windows closed because of dust and describing how dust was affecting their use of the out-of-doors. Residents also reported the adverse effects of noise of open-cast vehicles and machinery during hours of operation as well as experiencing rattling of windows and crockery and movement of furniture during blasting (Margam HIA Report, 2005). These same effects

were also reported by residents close to opencast workings at Ystradowen, Cwmllynfell (Gwyn-Evans, 2007, Appendix 2c) which are discussed further in 'Nuisance dust and quality of life' section and presented at appendix 2c.

The small scale study found that there are a number of vulnerable residents living in this development. Almost two thirds of residents (24:60%) self-reported that they had existing health complaints or a disability. Ten people (25%) self reported having a respiratory complaint, including asthma, emphysema and chronic bronchitis. Research has found that particulates are associated with exacerbation of asthma in adults although the effects on children are greater (Margam HIA Report, 2005, p.23). The number of residents with existing respiratory complaints included two children, one aged 5-9 and the second aged 10-15 years of age, with asthma. Concern for the effects on children's health has been expressed by two parents living in this development whose children suffer with asthma and who also attend Twynyrodyn Community Primary School.

Two residents reported existing heart conditions, including cardiovascular disease, and a further five residents stated that they had hypertension. Research has also found that pollutants associated with open-casting exacerbate these conditions (Margam HIA Report, 2005, pp.18-24). A quarter of residents (10: 25%) reported that they were suffering from physically disabling conditions such as osteoporosis, arthritis, physical disability due to brain tumour, spinal problems, compound fractures and paraplegia. One of the houses where one of the occupants is physically disabled and confined to home 24 hours a day is located within 36 metres of the proposed opencast. Although all residents will be affected during working hours, 7am-11pm Monday-Friday, of the proposed opencast workings residents with mobility problems will be those most affected if the scheme goes ahead. Residents with mobility problems will be least able to stay away from their property during normal working hours and would also be those most at risk from any potentially health-damaging pollutants and toxins from both the opencast workings and former landfill sites which are being removed and relocated as part of the opencast scheme (see Waste Extraction and Removal section).

Residents in this development have also reported feelings of anxiety and stress about the potential forthcoming opencast site and waste extraction close to their homes.

Gypsy and traveller site

As well as 18 properties in the housing development described above, and the eight houses at Incline Side, there is also a Gypsy and Traveller site comprising three caravans on the Bogey Road at Incline Side in close proximity to the proposed site. Indeed, the Gypsy and Traveller site is within 50 metres of the southern boundary of the proposed Ffos-Y-Fran scheme. The Traveller site has been present in the area to the south of the proposed opencast for approximately 30 years. Gypsies have a distinct way of life and have advocates through the Gypsy and Traveller Law Reform Coalition (www.travellerslaw.org.uk) which is currently supporting the Caravan Sites Security of Tenure (and related clauses) Bill 2006. At present gypsies and travellers have no right of tenure. However, a different situation exists at Ffos-Y-Fran as the gypsies and travellers own the land on which they live. A Welsh Assembly Government draft circular (2007) states that local authorities when granting planning permission for Gypsy and Traveller sites should consider the provisions of the European Convention on Human Rights as an integral part of its decision-making. If the scheme goes

ahead it is likely that the proposed site would have a disproportionate impact upon the health and wellbeing of this vulnerable and disadvantaged community which lives a unique way of life, and which has also resided in this location for in excess of 30 years.

A local resident describes how in the late 1990s Celtic Energy and Merthyr Tydfil Council purchased the houses of seven families which had resided on Cwmbargoed Common for generations, and explains that:

The house holdings at Cwmbargoed lived a unique way of life on the Cwmbargoed Common, and this community was lost forever (local resident, written statement, March 2007).

A similar situation would arise if the gypsy and traveller site relocated from this area.

Section Two: Health Impacts

Air-borne Pollutants

The Newcastle Study

The 'Newcastle study' (Pless-Mullooli et al, 2000) presented at the Public Inquiry was used as evidence to assess the potential impacts on air quality (Air Quality statement, 2004, MA 010/3, A4-1/11). The study measured PM10 levels in 5 matched pairs of communities in northeast England, and the findings were also used as evidence by Neath Port Talbot CBC Planning Department to assist in deciding whether to allow planning permission for an extension to the Margam Opencast site at Kenfig Hill, Bridgend (Neath Port Talbot Planning, 2006). However, residents living close to the Ffos-Y-Fran scheme cite a number of reasons why the findings of this study are not comparable with the Ffos-Y-Fran site, and should therefore be considered alongside other evidence about the effects of open-casting on health. The reasons are as follows:

- The distance the monitoring of the sites was from local housing. Sites chosen in the Newcastle study were between 750 to 1400 metres from operational activity on opencast sites and the centre of communities, and therefore few sites were less than 500 metres from property boundaries and the opencast sites in the study. The Ffos-Y-Fran site is 36 metres to the nearest property, with 100's of properties within 500 metres (see 'Profile of Communities') and 1.5 kilometres from Merthyr Tydfil town centre.
- The study only measured PM10 levels, and not the finer particles (PM2.5 and PM1) which can travel further distances. Finer particles can be found in the emissions from vehicles on opencast sites using diesel fuel (see discussion below)
- The study only looked at the effects on children, and not on the elderly or people with existing complaints (see discussion of effects upon people with existing complaints below)
- The sites under study were relatively small in size with the largest being 123 hectares. The operational area of the Ffos-Y-Fran site will be 400.6 hectares with far larger quantities of coal and overburden being extracted as well as the contents of former landfill sites (see 'Introduction' for description of the scheme)
- The sites studied in the Newcastle Study have a different topography to south Wales, and especially the Merthyr Tydfil area. A description of the topography of the coal measures in south Wales is presented in the section 'Nuisance Dust'.
- In the study any sites with associated contaminated land were expressly excluded from the study in contrast with Ffos-Y-Fran which will involve the extraction of around 400,000 tonnes of waste including quantities of potentially hazardous waste (see 'Waste Extraction and Removal' section).

- The sites studied for the Newcastle Study lasted from between 2-5 years whereas the Ffos-Y-Fran scheme will involve the extraction of coal and overburden for 17 years, with a further 5-year period of restoration (see 'Introduction' for a description of the scheme).

Furthermore, the Newcastle Study did find that children in opencast communities had significantly more GP consultations for respiratory illness within the study period than children in control communities. The authors also recommend that detailed studies of the dispersion of particulate matter generated on opencast sites are needed (Pless-Mullooli, 2000).

PM10s, finer particles and nitrogen dioxide: monitoring, effects and sources

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 associated with opencast mining including earth moving, excavation, coal extraction and diesel emissions from vehicles and machinery necessary for the open-casting operation.

Microscopic particles less than 10 microns in diameter (PM10) which can be breathed into lung tissue, causing respiratory disease and lung damage, are those generally measured in the UK. Coarse particles (greater than PM2.5) are formed from a variety of different processes, including mining, quarrying, construction, road dust and tyre debris. Most concern is given to particles small enough to penetrate into the lungs reaching the alveoli where the delicate tissues involved in the exchange of oxygen and carbon dioxide can be found. Up to 30% of particles between 7 and 1 microns are deposited in the alveoli (Environment Agency, 2002). Indeed, DEFRA has produced a report entitled Particulate Matter in the United Kingdom (June, 2005) in which it states that:

Both short-term and long-term exposure to ambient levels of PM10 are consistently associated with respiratory and cardio-vascular illness and mortality as well as other ill health effects. The associations are believed to be causal (cited in Margam HIA Report, 2005, p.20).

Primary particles are those emitted directly by combustion processes and are generally less than PM2.5, and often less than PM1 (DEFRA, 2000). Air Quality Regulations, the baseline upon which levels are monitored, is not currently available for the measurement of smaller particles. Therefore, air quality standards do not exist for protecting the public against the health effects of PM2.5. The World Health Organisation (WHO) has recommended the development of air quality guidelines for PM2.5 for public protection, alongside the measurement of PM10. The limit value for PM2.5 however should be derived from PM2.5 data since any scaling of the current PM10 limit value would assume that both coarse and finer particles have the same toxicity (Margam HIA Report, 2005, p.21). This therefore has implications for the collection, measurement and monitoring of PM2.5s currently being collected by a TEOM (Tapered Element Oscillating Microbalance) monitor installed at Twynrodyn School.

Secondary sources of particulates are those formed in the atmosphere by chemical reaction, and which include sulphates and nitrates. A substantial source of nitrogen dioxide (approximately half) is road transport (petrol and diesel) with significant contributions to

emissions from the industrial and commercial sectors, and the electricity supply industry (DEFRA, 2000). Once formed nitrogen dioxide takes part in chemical reactions in the atmosphere that convert it to nitric acid and nitrates. Both can be removed by wet weather but nitrates can remain in the air as very small particles which can be dispersed widely in the atmosphere, contributing to concentrations of PM10 (Environment Agency, 2002) but these secondary particles are generally less than PM2.5 (DEFRA, 2000). Experts in the field suggest that the finer particles (PM2.5 or smaller) are more harmful to health, especially the fine sulphate particles which are strongly associated with acute respiratory health effects in school children (Schwarz, 2000 cited in Margam report, p.19). Both daily and long term exposure to air pollution is also associated with cardiovascular morbidity and mortality, supported by well-respected government departments and agencies, such as The Committee on the Medical Effects of Air Pollutants (COMEAP) which recommends that a precautionary approach should be taken to future planning in the interests of public health (COMEAP, 2005 cited in Margam HIA Report, 2005, p.20).

Photograph 3: Opencast equipment in operation at Margam Opencast Mine, Kenfig Hill, Bridgend



Source: resident of Kenfig Hill, Bridgend, 2005

As photograph 3 (above) illustrates, open-cast operations involve the use of large vehicles to extract soil, rock and coal, and for the transportation of coal and overburden to other areas of the site as well as off site. The health effects from exposure to transportation and diesel fuel is discussed in greater detail as part of the Margam HIA (Margam HIA report, 2005, pp.25-26) and appended to this report.

Appendices to the Air Quality Statement of Evidence (2004) presented at the Public Inquiry for the Ffos-Y-Fran scheme includes details of machinery that will be utilised on site as well as the number, operating hours and power ratings of these vehicles. Machinery will include hydraulic backhoe and excavator, coaling plant, coal trucks, drilling rigs, excavators, 85T dump trucks, 150T dump trucks, land rovers, 35T coal trucks, tractor and other equipment. Table 2 (below) contains details of some of the machinery and vehicles with the highest power rating, and having the highest fuel consumption, likely to be used at various site locations and throughout the various stages of the scheme.

Table 2: machinery with the highest power rating to be used on site

Plant (number) Presented as equivalent to stages 1&2 ⁴	Power rating (hp)	Assumed operating hours per week
150T dump trucks (16)	1348	85
Hydraulic excavator (4)	1279	85
85T dump truck (18)	937	85
Water bowsers (4)	650	85
Drilling rig (2)	523	85
Hydraulic backhoe (1)	489	85
(35T) coal truck (12)	420	65
Dozer (2) ⁵	370	85

Source: extract from Air Quality Statement Appendices, 2004.

Information provided by Swansea Friends of the Earth (letter dated 27/06/06) provides more detail about the capacity of these vehicles, as well as their fuel consumption. Literature produced by a manufacturer of machinery for off-highway mining and quarrying industries states that a typical fuel rate for a 485hp engine is in the region of 41 litres (equivalent to 11 ¼ gallons) per hour. This machinery is marketed by the company as having a reduced environmental impact (Terex literature). The operation of machinery and vehicles on and off site was of concern to local residents. As one resident stated, vehicles on site will use a tremendous amount of diesel, fuel consumption being approx. 2 gallons (equivalent to 7.26 litres) per hour (which is an under estimate) as well as working long hours, from between 12 and 18 hours per day (resident, workshop, June 2006). Indeed, the Environmental Statement (2003) specifies that hours of work would be 06:00 to 22:00 Monday to Friday (after Public Inquiry, 07.00-23.00), and 7:00 to 18:00 on Saturdays.

Heavy vehicles will also be accessing the site via the main trunk road (A4060T). Although at the Ffos-Y-Fran development the coal will be extracted and taken by lorry to access point 'x' on the northern side of the Bogey Road and then by rail to Aberthaw Power Station. This point will also be used as general access to the site for personnel carriers, service and delivery vehicles (see figure 2, introduction). However, the second access point 'y' at the western side of the site, and close to local communities, will be used intermittently for the delivery and dispatch of plant and machinery, namely the larger and heavier vehicles which may require police escort. The developers expect that this access will be used at the outset and conclusion of operations with sporadic use during the interim period (Environmental Statement, 2003).

Diesel used by motor vehicles is associated with the following pollutants; benzene, carbon monoxide, nitrogen dioxide, ozone, sulphur dioxide and fine particles especially from diesel. The potential health effects of these pollutants are presented in tabular form at Appendix 2a. The HIA will focus upon the effects of nitrogen dioxide (NO₂) and fine particles, currently

⁴ The Air Quality Statement refers to, and presents data for, Dispositions 1-4 (equivalent to stages 1-5). Presented here is information about machinery and vehicles utilised on site for Disposition 1 (equivalent to stages 1 and 2).

⁵ Two dozers of a lesser power rating will also be in operation.
FYF HIA, Final Report, June 2007

being measured by the local authority in various locations around the proposed site, including the Twynrodyn Community Primary School, located approximately 600metres from the boundary of the proposed opencast workings. Data on nitrogen dioxide levels collected at various locations around Merthyr Tydfil is published on the Welsh Air Quality Forum website (www.welshairquality.co.uk).

PM10 and PM 2.5 monitoring

Predicted annual mean concentrations of PM10 levels in the area surrounding the proposed site have been estimated to be well within National Air Quality Objectives (NAQO)⁶ (Air Quality Statement of Evidence, 6.1 and 6.2, 2004). The Air Quality Statement assesses the effects of PM10s as not exceeding the annual mean NAQOs during the scheme, which includes the provisional objective for 2010. The annual mean objectives for PM10 is 40 micrograms/m³, and 50 micrograms/m³ when expressed as a 24 hour mean, and which should not be exceeded more than 35 times in a twelve month period (Air Quality (Wales) Regulations, 2000 and Air Quality (Amendment) (Wales) Regulations, 2002). This means that as regulations refer to a 24-hour mean it is possible that high particulate levels could be produced during the day, and balanced against low night-time readings (when there is no operational activity). An opencast could therefore meet the requirements of air quality regulations but be producing health damaging levels of PM10 during the working day, and additionally 35 times a year when allowed to exceed the daily mean limit (Margam HIA Report, 2005, p.18).

The Air Quality Statement estimates that the effects of smaller particulates, PM2.5s which can travel further distances (up to 1km from source), as being small since the majority of “particles emitted from mineral workings are large particles”. However, this depends upon the topography of an area (see ‘Nuisance Dust’ section below) and finer particles are also associated with emissions from motor vehicles and machinery used during opencast mining operations (see above). The three year study carried out by the University of Exeter of the effects on air quality of the opencast coal workings at Brynhenllys concluded that there was a change in air quality since coaling operations had commenced. The study also found that whilst the coarser coaling derived minerals fell within ten metres of the site, the finer mineral particles persist in the air, being transported to the most distant monitoring station, 400 metres away. Indeed, the dust content included quartz as well as calcite, feldspars and shale typical of the dust in this south Wales location (Merefield et al, 1998).

A Monitoring Station is currently in operation at the Twynrodyn Community Primary School. The Station has been designed to measure air quality, rainfall, windspeed and wind direction. As part of this activity PM2.5 as well as PM10 air-borne particles are now being monitored using TEOM monitors. The Airborne Particles Expert Group (APEG) recently published a report that concluded that for concentrations around 50ug/m³ the TEOM tends to under-read compared with a gravimetric sampler by between 15% and 30%. When measuring PM10 using a TEOM for the purpose of the national air quality standards guidance it is therefore recommended that a correction factor of 1.3 is applied. As stated previously Air Quality standards for measuring levels of PM2.5 are not currently available and a local authority has no statutory means of controlling emissions of the smaller particles.

⁶ National Air Quality Objectives (NAQO) are set out in *The Air Quality (Wales) Regulations, 2000* FYF HIA, Final Report, June 2007

A request for data being collected at this location was requested from the local authority on 22nd January 2007, and a report containing measurements from various locations is awaited. Construction activity at the Gellidawel housing development will have raised levels of PM10 and PM2.5, both being measured at the Twynrobyn School, during this period.

Nitrogen dioxide monitoring

The Air Quality statement reports that predicted annual mean concentrations of NO₂ levels have been estimated to be well within National Air Quality Objectives (NAQO) (Air Quality statement, 6.1 and 6.2, 2004). The monitoring of NO₂ levels has been carried out within Merthyr Tydfil since 1993. Samples collected using ‘passive diffusion tube samplers’ were used as the basis for estimating ambient NO₂ concentrations and whether the air quality objective would be achieved by 2005 (prior to any opencast workings commencing). A ‘hotspot’ site, a kerbside location at Twynrobyn Hill, had an estimated annual mean concentration in 2005 of 35.8 micrograms/m³ due to a construction related activity (Davies, Response to Questions, date?). This is very close to the WHO air quality guidelines (1994/95) and air quality objectives for Wales as the annual mean guideline level for NO₂ is 40 micrograms/m³. (DEFRA, 2000 and Air Quality (Wales) Regulations, 2000). The Air Quality Statement states that “if the annual mean objective value is achieved, the short-term (one-hour) objective would also be achieved” (Air Quality statement, 2004, p.21). DEFRA specifies the one-hour mean objective as 200 micrograms/m³ for nitrogen dioxide. However, more recent monitoring of levels of Nitrogen Dioxide has taken place since the production of the Air Quality statement in 2004 at various locations around Merthyr Tydfil. Although the exact date that readings were taken is not clear, and/or for which specific time periods, data presented on the Welsh Air Quality website (www.welshairquality.co.uk) which was requested for the twelve month period, 01/01/06 to 31/12/06, show much higher readings than the 35.8 micrograms/m³ annual mean concentrations for 2005 at Twynrobyn Hill. This data is presented in table 3 (below).

Table 3: Nitrogen dioxide monitoring data measured at Twynrobyn Hill, Merthyr Tydfil, Jan-Dec 2006

RAW data measurements supplied by netcen on 19/2/2007				
All Data GMT hour ending				
Status: R=Ratified P*= Ratified by data provider				
P=Provisional				
		Twynrobyn Hill		
End Date	Nitrogen dioxide	Status	Units	
#####	58	P	ugm-3	
#####	56	P	ugm-3	
#####	51	P	ugm-3	
#####	39	P	ugm-3	
#####	44	P	ugm-3	
#####	45	P	ugm-3	
#####	47	P	ugm-3	
#####	34	P	ugm-3	

Source: Welsh Air Quality Forum website: data supplied by NETCEN

In table 3 (above), seven of eight data measurements of nitrogen dioxide collected using a diffusion tube are much higher than the estimated annual mean concentration above, namely being between 47 and 58 micrograms/m³ with only one (34 micrograms/m³) being below the annual mean objective of 40 micrograms/m³. For the same period, eight readings at the Twynyrodyn Infants School are lower, between 9 and 28 micrograms/m³ whereas those at a location described as Dowlais Upper are between 18 and 37 micrograms/m³ with the majority of readings much closer to the annual mean objective level of 40 micrograms/m³. Tables containing air quality monitoring data are presented at appendix 2b. The realignment of the A4060 bringing it in closer proximity to housing at upper Twynyrodyn and Dowlais may explain the higher levels of NO₂ measured at Twynyrodyn Hill (Table 3) and Dowlais Upper (appendix 2b) but this also has implications for the cumulative effect upon the health of these communities once opencast working begins.

Monitoring of NO₂ levels has been taking place at the Twynyrodyn Community Primary School since June 2003. It was stated at the Public Inquiry that “no results exceeded the recommended level, although one was very close” (Statement of Evidence, A N Davies, 2004). The school is approximately 600 metres from the proposed opencast workings. The housing development of Mount View and Pwyllywaidd at Mountain Hare, and Incline Side, are in much closer proximity to the main trunk road (A4060T), in close proximity to the slip road, and the Ffos-Y-Fran site, and therefore would be more likely to show higher levels of NO₂, both before and during opencast operations.

Reports about the effects upon health

Residents who attended the workshop (June 2006) were concerned about dust and fumes that would be produced by the opencast site and its effects on health. One resident stated that coal dust goes straight into lungs, and would especially affect children for the rest of their lives.

Some reports of local people about the effects on health of former opencast sites in the local area, and elsewhere in south Wales are presented in the Section on ‘Dust’. 193 residents responded to the house-to-house survey or wrote to the researcher about their concerns. Many of these residents were concerned about the effects of dust from the opencast workings and emissions from vehicles on site on their health or that of their families. This had also been of concern to residents attending the workshop (June 2006). A large number of residents and/or family members had existing health conditions, and residents were concerned about the effects upon their health if the scheme went ahead.

Correspondence was also received from an ex-miner, a school teacher and health professionals (5). Health professionals were invited to attend the workshop in June 2006 but no health professionals attended, one health professional who works at Prince Charles Hospital sending apologies in writing (Letter from Respiratory CNS, North Glamorgan NHS Trust., 15/05/06) However, four health professional either responded to the house-to-house survey (1) or wrote to the researcher (3) giving accounts of how industries such as mining can damage the health of workers and people within the community, including asthma, obstructive pulmonary disease, and cardiovascular disease. A staff nurse working on a hospital respiratory ward nursing patients with chronic obstructive airways disease describes the effects on reduced quality of life for patients, and the psychological suffering for both

patients and their families. The staff nurse also believed the opencast scheme would exacerbate the health status of people in the area, which already has a high incidence of respiratory disease (see 'Profile of Communities'). Another hospital nurse has also experienced, during her work, the effects of dust and pollution on people's health. A school teacher writes how she is aware of the prevalence of asthma amongst children she teaches, and is especially concerned about the proximity of the Twynyrodyn School to the proposed Ffos-Y-Fran scheme, and an ex-miner reports that he is suffering breathing problems after 18 years of working in the coal mining industry.

Vulnerable populations

Residents who attended the workshop believe that the smaller particles associated with the use of machinery on site, and in the transportation of coal on and off site, which uses diesel, would have a detrimental health effect, especially on child-hood asthma (workshop, June 2006). It was the finer PM2.5s and PM1s that residents were especially concerned about and its effect upon children attending the local primary school and pre-school nursery which is even closer to the proposed development (workshop, June 2006). Furthermore, a small number of children (6), two with existing respiratory complaints, live in the housing community at Mountain Hare, 36-100 metres from the site boundary. Research has found that particulates are associated with exacerbation of asthma in adults although the effects on children are greater (Margam HIA Report, 2005, pp.23-4). For example, 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 (Margam HIA report, 2005, p.23)

Concern for the effects on children's health has been expressed by two parents living in a housing community in closest proximity to the proposed site whose children suffer with asthma. These children also attend the Twynyrodyn Community Primary School. As one of the parents writes:

My concern is particularly about the effects on chest conditions as my child has asthma and there are family problems of various chest conditions. It seems incredible that after getting rid of mines in the valleys the local council now want opencast mining...

Research has also found that pollutants associated with open-casting can exacerbate these conditions (Margam HIA Report, 2005, pp.18-24, which is appended to this report). For example, a paper published in the British Medical Journal (Temple, 1992) thirteen years ago showed that there was a significant rise in consultations for asthma at a Glynneath GP Practice which coincided with the start of excavations at an opencast site (Margam HIA Report, 2005, p22). A more recent study which examined the effects of fine and ultrafine particles found that cumulative exposure over 14 days was associated with increased use of medication for asthma in adults (von Klot, 2002 cited in Margam HIA Report, 2005, p.23).

Research has also found that there are associations between exposure to small particulates and heart conditions especially in the elderly. For example in one study found that exposure to PM2.5 may be one of the multiple markers that influence heart rate variability and blood markers of inflammation in elderly patients (Pope, 2004 cited in Margam HIA report, 2005,

p.22). Recent studies (Peters, 2000 and Rich, 2005 cited in Margam HIA report, 2005, p.23) found associations between black carbon, nitrogen dioxide and sulphur dioxide (air-borne pollutants associated with opencast mining operations presented in Appendix 2a) and ventricular tachyarrhythmia among people with acutely predisposed conditions.

The health effects of air-borne pollutants and high risk groups including the elderly, infants and those with existing respiratory conditions and cardiovascular problems is covered in much greater detail in the Margam HIA report (2005, pp.18-26) and which appended to this report.

Baseline local population data which would include any individuals living in close proximity and who may be vulnerable to the effects of air-borne pollutants, namely people with existing respiratory and cardio-vascular conditions, children and older people, is absent from the Public Inquiry, Air Quality Statement and Environmental Statement produced on behalf of the company. A profile of people living in closest proximity to the proposed scheme was carried out as part of this health impact assessment and is contained in section one of this report.

Section Two: Health Impacts

Nuisance dust and effect on quality of life

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 (Margam HIA report, 2005) As stated in the Air Quality Statement of Evidence (2004) people's response to dust deposition varies depending on quantity deposited, frequency of exposure, living conditions and tolerance to dusty conditions as well as the colour of dust. Indeed, residents living closest to the opencast workings at the Margam site distinguished between 'grey' household dust, and 'black' dust from the opencast site (Margam HIA report, 2005). The current measurement of dust deposition is based on annual rather than weekly or daily averages, so could allow episodes of very high dust pollution. It was recognised by the company operating the Margam opencast site that coal dust in excess of 80 milligrammes per square metre per day (far less than the suggested 200 milligrammes) would be likely to generate complaints from residents. At the Margam site the level of 80 milligrammes per square metre per day was exceeded in 2002, and was close to this level in 2003, being 78 milligrammes (Margam HIA report, 2005).

The Air Quality statement (2004) states that "current air quality in the Merthyr Tydfil area is good" but goes on to report that "no data is available on local dust deposition rates". In answer to questions during the Public Inquiry (Statement of Evidence, A N Davies, 2004) it was stated that dust monitoring was undertaken during phases one and two of the scheme, utilising sticky pads and a reflexometer to collect samples and that a dozen complaints were received (see 'Complaints' below).

Complaints

The Margam Opencast HIA (2005) considered complaints provided by Bridgend County Borough Council's Public Protection Department. Complaints from 1996-2005 were presented in the HIA report. The majority of complaints over this period were in connection with 'dust', with a smaller number received in relation to 'noise'. A much smaller number of complaints were received about vibration/ blasting during this period. This information is presented in tabular form below (table 4).

Table 4: Complaints received by Bridgend CBC's Public Protection Department

Year	Noise	Dust	Blasting 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

Source: Bridgend CBC's Public Protection Dept. (Margam opencast HIA, 2005)

A summary of complaints received by Bridgend CBC's Public Protection Department made via telephone, letter and in person, 1996-2005, shows that the number of complaints received in 2005* far exceeds those in previous years even though figures for this year are complaints received up to 20th December 2005. Complaints about noise made in 2005 were measured by Bridgend CBC and were within regulatory limits. A significant number of complaints about dust can be explained by an increased number being received about a lack of dust suppression measures employed by the Company at that time. Between 1999 and 2000 especially the higher number of complaints was due to adverse weather conditions, including strong winds. It was observed by the Environmental Health Department of Bridgend CBC that the volume of complaints correlates with adverse weather conditions (Margam HIA report, 2005) (see 'Weather Conditions' below).

Attempts were made by the researcher, on two separate occasions, under the Freedom of Information Act 2000 to obtain the number of complaints under the same categories (as above) made to Merthyr Tydfil CBC during phases I and II of the scheme. Phases I and II involved the extraction of coal using opencast methods on two separate sites in the area. Responses were received from Merthyr Tydfil CBC that they "were unable to locate any complaints on our system concerning phase I and II" (Email dated 13th July 2006) and "unfortunately we do not hold the information you have requested" (Email dated 21st August 2006). This could be due to the fact that work on open-casting in these two locations was completed by 1996 and records may not have been retained for this length of time. In answer to questions during the Public Inquiry (Statement of Evidence, A N Davies, 2004) it was stated that during phases I and II one dozen complaints were received by Merthyr Tydfil CBC but that these were "not linked to the results" of the dust monitoring. It was also stated that additional complaints may have been received by the Liaison Officer who worked with the Coal Board at that time. The Air Quality Statement reports that there were few complaints about dust recorded from Phase I, although more dwellings (918) were within 200m compared to 61 houses for this proposed development (Air Quality Statement of Evidence, 2004). However, the two previous phases of open-casting were both completed by 1996, over 10 years ago. An article appearing in the *Merthyr Express* quotes a resident of Mount View talking about the impacts of phase I as follows:

Although there have been very few complaints, it does not negate the fact that residents are living in a cloud of dust (Trainor, Merthyr Express, 1992).

Comments made by residents in relation to the health impact assessment of the proposed Margam Opencast Mine extension, may indicate that residents sometimes become accustomed to the noise, vibration and dust, and/or feel powerless to bring about any change or improvement and this is reflected in the number of complaints made by residents, and received by the planning and regulatory authorities (Margam HIA report, 2005, p58).

A later article appearing in the Merthyr Express in 2005 disputes claims that there were few complaints made about previous opencast sites in the area by describing how residents met with British Coal on several occasions to express their concerns, and how a petition with 200 signatures was handed in at a meeting at the Town Hall at which the local authority and British Coal were present. During this meeting photographic evidence was provided showing the accumulation of 'black' dust on the outside of properties facing the opencast mine (Collins, Merthyr Express, 21/04/05).

Dust deposition

Residents who attended the workshop stated that the site at Ffos-Y-Fran will involve a lot of movement of earth, stone and rock before even extracting any coal, therefore an amount of dust from all these substances is likely to be created (workshop, June 2006). Indeed, the Air Quality Statement (2004) identifies the type of activities involved in the extraction of coal from the Ffos-Y-Fran site that may give rise to dust emissions. Sources of dust emissions include: soil stripping, haulage and storage; waste excavation, treatment and removal; overburden handling haulage and storage; drilling and blasting; coal extraction and handling activities; transport of coal to the rail head; and, restoration and soil reinstatement (Air Quality Statement of Evidence, 5.4.2, 2004). The statement goes on to state that:

There is no reliable methodology for estimating the emissions from these sources, and there is little good monitoring data to extrapolate an indicative contribution from each (Air Quality Statement of Evidence, 2004, 5.4.3).

The effects of dust, and associated particulates, on health have been discussed elsewhere in this health impact assessment ('Air-borne pollutants' section). However, it is worthwhile to mention a study carried out into the effects of opencast mineral dust on healthy rats which although it concludes that airborne mineral dust and diesel exhaust particles "did cause some slight, but insignificant, changes in lung permeability and inflammation" (Reynolds et al, 2003) goes on to discuss the possible reason for these results. The article states that the findings could be due to the fact that surrogate opencast dust used in this experiment had low quartz content. Residents claim that the Ffos-Y-Fran development would involve the removal of a substantial amount of stone, including sandstone, before coal can be extracted (workshop, June 2006). Indeed, the Environment Statement explains that 123 million cubic metres of overburden material (which would include rock and stone) would need to be moved in order to extract 10.8 million tonnes of coal (Environment Statement, 2003). The study of the effects of opencast mineral dust on rats mentioned above states that:

This study may emphasise the importance of characterisation of the minerals at opencast sites It is possible that an opencast site with geology dominated by quartz-rich rocks (siltstones, sandstones, etc.) could potentially generate a more bio-reactive dust than the dust from a shale-dominated (clay, minerals-rich) location (Reynolds et al, 2003, p.150).

The Air Quality Statement(2004) reports that the impact of dust emitted from mineral workings varies considerably depending on the hardness of the materials being handled. Blandford, a Geologist with the National Coal Board Geological Services at the time of publication, (Merthyr Teachers Centre Group, 1981) describes the Merthyr Tydfil area as being situated on coal measures, as part of the Main Productive Group in South Wales which “contains most of the thick workable coal seams” and ironstone bands. The coal measures are characterised by:

Structure-less rocks beneath the coal seams ... separated by blocky, silty, grey mudstones which contain many thin clay-ironstone bands. These mudstones are often finer-grained, darker and carbonaceous immediately above the coal seams (Blandford, 1981, p.48)

Sandstones are also present in the form of quartz-cemented quartzite (Blandford, 1981, p.48). A mineralogical different dust would be observed where coal seams are separated by strata dominated by sandstones. Indeed, the study carried out on rats describes the quartz component present in the Merthyr Tydfil area as the ‘Merthyr diamond’ and quartz as a highly bio-reactive mineral which is toxic in the lung and causes fibrosis following occupational exposure. Indeed, the study found that much lower instilled masses of quartz, compared to a carbonaceous material, will ‘cause early and persistent increases in permeability and inflammation’ in the lungs of rats (Reynolds et al, 2003).

The study of the effects of opencast operations (above) also examined the effects on the *healthy* lungs of rats. As discussed elsewhere (Margam HIA report, 2005) dust associated with opencast workings can affect the health of vulnerable individuals, exacerbating existing respiratory and cardio-vascular conditions. An ex-miner attending the workshop stated that to extract approximately 10m ton of coal the operators will need to also remove approximately 100m ton of rock and stone which will produce both coal and stone dust associated with serious respiratory disease in miners (see Air Pollutants section). Residents believe that this would be the case, namely that the removal of earth, stone and rock as well as minerals would exacerbate existing health complaints and conditions (workshop, June 2006).

Mitigation and monitoring measures

The Air Quality Statement (2004) states that the effect of opencast activities is dependent upon; weather conditions, mitigation measures and proximity to the nearest community. The Statement also outlines some of the dust mitigation measures to be put in place, which mainly involve the suppression of dust using water methods on haulage roads and the construction of baffle mounds. The Environmental Statement states that lorries will be washed before leaving the operational areas and entering the highway (Environmental Statement, 2003). The Air Quality Statement also reports that a monitoring strategy would

be agreed by Miller Argent (South Wales) Ltd. with Merthyr Tydfil CBC planning department and would include monitoring of dust, airborne particulate matter and meteorological conditions. Monitoring of airborne particulate matter and nitrogen dioxide is already taking place in various locations around Merthyr Tydfil.

Residents who attended the Workshop in June 2006 reported they had little trust in Merthyr Tydfil CBC as they believe that the local authority is a “vigorous supporter” of the Miller Argent scheme. Residents report they do not trust Merthyr Tydfil CBC to ‘police’ the opencast due to a conflict of interest (Workshop, June 2006). One resident in particular was not happy about Merthyr Tydfil as the regulators of the Ffos-Y-Fran site and stated that residents have no confidence in their abilities to monitor the site. Residents cited experience of the Trago Mills development on the West of town and asked “who is the watchdog watching the Merthyr Tydfil CBC?” One resident reported that she had approached the local authority, and had received the following reply:

‘Too expensive to monitor’ is the answer from Merthyr Tydfil CBC – ‘we haven’t got the capacity’ we are told.

At the residents’ workshop the Environment Agency Wales suggested that residents could go to the ombudsman if they are concerned about this issue.

Food companies who have businesses in the area also made comments about the monitoring of the proposed site. Two of the food companies mentioned the importance of controls in place. Both stated that if the opencast was adequately monitored it should not be a problem, for example:

If it all happens as intended then that is OK. It’s when things go wrong with the actual contractors working and how they respond when things go wrong (food manufacturer, interview, 06/07/06)

Residents living close to Ffos-Y-Fran and who attended the workshop stated that there are more than 60 planning conditions and believe that the council will not be able to monitor the site effectively. These views were also based upon recent experience of building work, and past experience of open-casting in the area (workshop, June 2006). For example, one resident who wrote to the researcher about building work that was taking place near to their home reports that the local authority and the developer did not respond to complaints about dust (Resident letter dated 24/05/06) and two Penyard residents also report that complaints were not acted upon during the building of Cyfartha School and the Redrow development (House-to-House survey, 2006). Another resident, writing about the effects of dust and noise from a previous phase of opencast coal mining, describes how this was:

... unbearable, the water problems with our property were horrendous, our complaints went on deaf ears, we just had to put up with it, something that nobody should have to live with (Resident letter dated 15/06/06)

Local councillors also report in an article in the *Merthyr Express* how complaints from residents were not acted upon by the development liaison committee, and resigned from this committee as a result (Loderick, *Merthyr Express*, 29/06/06).

One resident also describes how the dust suppression measures promised during a housing development in the area never materialised (Penyard resident, house-to-house survey, 2006). A resident of Twynnyrodyn describes how the 'dust was unbelievable' from the building of a junior school behind their property 'even though it was dampened down with water' (Resident letter dated 14/06/06). Dust control on the Margam opencast site consists of static masts and mobile bowsers spraying a fine mist of water droplets. Residents living close to this site reported that damping-down procedures were often not adhered to. Furthermore the procedure only operates on certain sections of the site such as spoil heaps, coal storage areas and roads, whereas the whole site is a source of dust (Margam HIA report, 2005). Damping down in opencast mines is different to underground and Merthyr Tydfil residents claim that measures to be taken by Miller Argent (South Wales) Ltd. will only be 25% effective as water dries out very quickly (workshop, June 2006). This contrasts to claims made in the Air Quality Statement of Evidence (2004) that "the impacts of dust nuisance on local residents and other sensitive receptors would be minimal" and in the Environmental Statement that using recommended mitigation measures for dust suppression will "reduce this adverse minor impact, to give no residual impact"(Environmental Statement, 2003). Residents state that even though dust will be damped down, there will still be dust falling on properties (workshop, June 2006).

Indeed, residents who took part in the workshop (June 2006) and who responded to the house-to-house survey (2006) believed that the impacts from dust, noise and vibration would be far greater than is stated in documents (above) referred to during the planning process. The potential health impacts of noise and vibration, consequences of opencast activity, has been discussed at length in the Margam HIA report (2005, pp.41-44), which is appended to this report. The impacts of Nuisance Dust on quality of life and psychological wellbeing discussed as part of this HIA (pp.13-18) is presented below as well as more detailed effects being appended to this report.

Quality of life and psychological wellbeing

Residents living closest to an existing opencast site at Margam, at a further distance than would be the case for housing in closest proximity at Ffos-Y-Fran, reported how dust in the air was affecting their quality of life and how this was worse during summer months.

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 (resident, focus group, Margam HIA report, 2005)

They also described how dust being deposited on windowsills, gardens, and on open land adjacent to the opencast site affected their using the out-of-doors as well as their quality of life, not being able to enjoy their gardens or take walks in the fields and woodland adjacent to the site due to dust (Margam HIA report, 2005).

There were also reports from young people that you could smell the opencast which used to be near to the school they attended. Dust was also reported as being deposited inside a local shop, affecting staff and customers (see Economics section) and older people described how it was especially a problem for them keeping their houses clean (Margam HIA report, 2005).

Residents attending the workshop were concerned about how the scheme would affect their quality of life, for example affecting them out-of-doors during summer months, not being able to leave windows open, disturbed sleep of children due to noise pollution from the site working from 7am until 11pm at night. It was felt that the effects would be worse for those living in closest proximity, seriously affecting residential amenity being imprisoned in their own homes due to dust, noise and poor air quality (workshop, June 2006). Indeed, residents living at Ystradowen, Cwymblynfell reported how the opencast close to their homes was affecting their quality of life and a personal account of these effects is presented at appendix 2c. These effects were experienced by local residents living 300 metres away even though mitigation measures for damping down dust were in place and the regulatory limits for air quality, noise, vibration and other standards were being met (Evans, resident letter, 30/03/07). The wellbeing and quality of life of local residents was still affected (appendix 2c).

Some residents living in the area adjacent to the proposed opencast site, have experienced previous open-casting in the area. One resident writes that:

My property was very close to phase I of the opencast operation by Penyard and Mountain Hare. This opencast scheme lasted for about 2 years. I can categorically say this was the worst 2 years of my life. I never want to go through that again ... The proposed Phase IIIa Ffos-Y-Fran opencast is very close to my property, about 250 metres away, we will have another life of hell, but this time it will be for 22 years, there are toxic waste tips being dug up to get at the coal, this will mix with coal dust and diesel fumes and pollute the air all around us and Mountain Hare (Resident letter dated 15/06/06)

Some residents who took part in the house-to-house survey (2006) have experienced dust from phase I (2), and the 'Redrow' housing development (4) and are concerned about the potential effects on health if the proposed Ffos-Y-Fran scheme goes ahead. Six people living at Penyard who took part in the house-to-house survey specifically mentioned how they had been affected by the removal of coal and land clearance of the 'Great White Tip'. Residents were affected by dust, noise, traffic and pollutants, and were concerned about the effects on health if the proposed opencast operation went ahead, lasting for 22 years as planned.

Residents have also experienced dust and noise from building work which has taken place in the area. Residents living at Heolgerrig have experienced dust and noise from the Trago Mills site (2) as well as drilling taking place in the Winchfawr area prior to the development of housing (3). One parent was especially concerned about the potential effects of the Ffos-Y-Fran scheme on the health of her two sons, who both have asthma, since they are already affected by drilling operations in a field behind their property at Heolgerrig. The sleep patterns of the children had been disturbed, and parents had had to increase their childrens' inhaler dosage. This was also affecting the children using the out-of-doors:

The dust was so bad over the Easter holidays that I couldn't allow them to go outside to play and I have become so paranoid of their health and safety that I regularly send them to their grandparents to stay (Resident letter dated 24/05/06).

A school teacher writes about her concerns regarding outdoor play and the health of children attending the Twynyrodyn School especially:

This is going to be even more of a problem when the government's plans regarding outdoor play come into force. From that time, children in the school will have to play outside for prolonged periods each day, irrelevant of weather conditions and their potential impact on pollution levels (Resident letter dated 12/06/06).

An article in the *Merthyr Express* describes how the Trago Mills development is affecting the quality of life of residents living in close proximity. A 72 year old woman explains how she cannot keep windows open due to dust, and how inside the house needs constant cleaning (Loderick, *Merthyr Express*, 29/06/06).

Residents attending the workshop expressed concern about the psychological effect that the development would have on the local community, affecting mental health because the area would be an unpleasant place to live. One resident stated that "no account is taken of the psychological impacts". Another resident explained how "waking up to hear that damn noise" would add further to the health problems experienced by people living in Merthyr Tydfil (workshop, June 2006).

Weather Conditions

As stated elsewhere the dispersion and suppression of dust is dependent upon weather conditions (Planning Refusal, Margam Opencast, 2006) as well as mitigation measures employed on opencast sites. Indeed, residents living close to Margam opencast coal mine described how dust emissions and dust deposits were subject to weather conditions:

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 (resident, focus group, Margam HIA report, 2005)

Weather conditions in the Merthyr Tydfil area were studied as part of the planning application process. Meteorological data was used to assess the potential for nuisance dust in the vicinity of the opencast site (Air Quality Statement, 2004) and has also been of interest to other agencies, such as the Environment Agency Wales whose responsibility it is to monitor the Trecatti Landfill site, adjacent to the proposed development.

Whilst there doesn't appear to be any dispute over claims during the planning application process that Merthyr Tydfil's climate is wet (Environmental Statement, 2003; Inquiry report, 2004, para 98, Air Quality statement, 2004), residents are concerned about the way wet weather in Merthyr Tydfil during winter months has been presented in these various documents. Residents dispute the 'wet weather' argument in the following ways:

- Residents point to the very hot and dry summer of 2006, and to projections about global climate change. If predictions are accurate, very hot and dry weather during summer months is likely to increase the effects from dust and pollutants on the local population.

- Local lay evidence (Powell, 1986, Merthyr Teachers Centre Group, 1981) has been presented during the planning application process which challenges data on the direction of the prevailing wind in the local area presented on behalf of the company, for example the Environmental Statement (2003) and Air Quality Statement (2004).

Lay studies, and studies completed by the Environment Agency Wales, the Met Office and on behalf of the company, are presented below.

Weather predictions on behalf of Miller Argent (South Wales) Ltd

Documents produced as part of the planning application and Public Inquiry have presented information about the wind speed and direction and claim that the prevailing wind for most of the year is away from nearby communities (Air Quality Statement of Evidence, 2004). The Statement claims that due to the lack of availability of suitable meteorological data and being unable to obtain long term data from the adjacent Trecatti landfill site, data was analysed from the Cardiff Weather Centre (located at Southgate House, Wood Street, Cardiff). The wind roses from Cardiff show that the prevailing wind is south-westerly (which is also the case for most locations in the UK) for on average a quarter of the time. From this weather station in Cardiff the second most common wind direction is from the northeast (approximately 15% of the time). Wind from this direction has a higher potential to cause nuisance as airborne dust would be blown towards housing at Incline Side. However, dwellings to the northeast of the site (which would include Fochriw and Pontlottyn), namely in the path of the prevailing wind, are outside the recommended 100-200m 'stand-off' zone recommended in a Department of Environment report (CD051), and therefore are at relatively low risk of dust nuisance. (Air Quality Statement of Evidence, 2004, p.39) The Statement goes on to explain that there may be some difference in weather patterns between, Cardiff, close to the Bristol Channel, and Ffos-Y-Fran which is located on "an exposed inland hilltop" (Air Quality Statement of Evidence, 2004, p.31). Indeed, as discussed below the wind at this location can also come from a north easterly direction thus affecting houses at Incline Side, four of which are within 200 metres as well as housing at Mountain Hare which includes Mount View and Pwlllywhaiadd.

Short time series data, from January 2003 to June 2004, was available from the operators of the Trecatti landfill site and is also discussed in the Air Quality Statement. The Statement explains that in 2003 the wind was predominantly from the west, with the second most common wind being from the east. In the first half of 2004, the wind was for more than half the time blowing away from Merthyr Tydfil (Air Quality Statement of Evidence, 2004). A fuller analysis of this data, and other weather studies in this location, are presented below.

In the Air Quality Statement, it is reported that data collected from the Cwmbargoed weather station for the period 1969 to 1980 (see lay weather studies discussed below) suggests that wind is from the west for 19% of the time, the northwest for 17% of the time and the north east for 10% of the time and suggests that dust would blow away from Merthyr Tydfil town. The statement goes on to state that the data from this amateur source may not be a true representation of average wind direction (Air Quality Statement of Evidence, 2004). Data from the Cymbargoed monitoring station is discussed below alongside other wind studies in the locality.

Local lay knowledge

People in the area have experienced problems with litter and odour from two existing facilities, a meat factory and a landfill site. Local people have stated that in this location at the top of a hill wind comes from all directions (workshop, June 2006), and in an interview a local food retailer stated that:

At the top of Merthyr Tydfil we get the wind coming from everywhere on a windy day (food retailer, interview, 21/07/06).

One resident attending the residents' workshop stated that the opencast scheme will be sited 1220 ft above sea level, and explained the following effect in relation the dispersal of dust:

The higher it is then the more movement of air and wind which will create a tremendous amount of dust (local resident, workshop, June 2006)

Other residents attending the workshop reported a drop-down effect because of the topography and that this would maximise the effect of pollution on the local population. Indeed, it was claimed by one resident that the whole of Merthyr Tydfil would be affected by the opencast workings (workshop, June 2006) whilst other residents who wrote to the researcher report that:

Living at Ffos-Y-Fran I can assure you being so high it is always windy.

This resident also comments that those waiting outside the Twynyrodyn School couldn't help but notice that the wind indicator located there is always 'racing round' (Resident letter dated 30/09/06).

To support this, the resident reports how hand gliders used to use the area, and would therefore be an ideal place for a wind farm. Using the land in this way would be looking towards the future for young people (Resident letter dated 30/09/06)

Younger people attending the workshop expressed concerns about the way 'official' documents have reported the effects of the wind direction in the area. Young people stated that they do not trust the argument about prevailing wind direction, stating that although Bargoed (on eastern Caerphilly side of the site) would be affected, the communities in which they live would also be affected (younger person, workshop, June 2006). The Environment Agency representatives attending the workshop also reported that the wind direction is not always westerly (see Environment Agency Wales weather studies below)

Lay weather studies

Information from lay local weather studies was presented and considered at the Public Inquiry and in the Air Quality Statement of Evidence (2004) but some of this information is also presented in this report alongside other supporting data.

Meteorological data was collected at the Cwmbargoed Weather Station located close to the Ffos-Y-Fran site between 1967 and 1986, namely over a considerable number of years.

Wind roses showing the direction of prevailing winds on an annual basis for periods between 1967 and 1986 have been presented in a number of publications (Our Changeable Weather, 1986; Merthyr Tydfil: A valley community, 1981; and, Living in the Clouds, 1986) and show that wind in this location can come from several different directions over a twelve month period, and especially over much longer periods of time. The studies carried out by Josh Powell show that average wind direction for the period 1967-1980 came from the north west for 60 days, west for 65-70 days but south west for only 35 days over this period (Powell, 1986). The wind also came from a north easterly direction for just over 40 days of the year, more frequently than from a south westerly direction (35 days). Similar results carried out by Josh Powell at the Cwmbargoed Weather Station have been reproduced elsewhere (Merthyr Teachers Centre Group, 1981) and are presented at Appendix 2d.

Although this evidence was not accepted in the Public Inquiry, residents report how well-respected Josh Powell's studies are in the area, and how his weather station was very well-equipped (resident letter dated 30/09/06).

Met Office wind studies

Wind studies carried out in South West England by the Met Office between 1971 and 2000 at St Mawgan (www.metoffice.com), a coastal location in the Bristol Channel, show that mean wind speeds⁷ and gusts are strongest during the winter months, November to March. The south west of England is described as one of the most exposed areas of the UK, second only to western Scotland, where weather conditions are similar to other coastal areas. In-land areas are stated as having lower wind speeds but that these tend to increase with increasing altitude, with the highest parts of Exmoor and Dartmoor likely to have similar speeds to those on the coast. Indeed, this Met Office summary states that wind speed is sensitive to local topographic effects.

A wind rose (Appendix 2e) displays meteorological data collected at Avonmouth, near Bristol for the period 1991-2000. This shows that the prevailing wind direction is from a south westerly direction but also shows that wind direction can also take a north easterly course which can be strong if depressions pass along the Bristol Channel. A maximum of winds from the north east tends to occur during spring-time (www.metoffice.com).

Environment Agency weather studies

A study carried out by the Environment Agency as part of hydrogen sulphide monitoring in Dowlais provides useful data on wind direction and strength measured at Trecatti landfill site by the operator. The sites at Dowlais Top (see location map, appendix 2f) are located at one of the highest points in the Dowlais area. The meteorological data was collected over a two month study period, 10th February-11th April 2000, at the two sites and a wind rose was produced (Appendix 2g) which shows that the wind direction for the majority of the time was from the west and south west, and that winds were often very strong (in excess of 10 m/s). As stated in the report, and confirmed by the Met Office (www.metoffice.com) this is fairly typical of UK weather conditions, especially in the south west, but winds may be stronger because the landfill site is at the top of a hill. Indeed, the mean wind speeds compare to wind

⁷ The mean wind speed is the average of a continuous record
FYF HIA, Final Report, June 2007

speeds recorded at St Mawgam monitoring station where mean wind speeds ranged from just under 10 m/s in summer months to 14 m/s in winter months (www.metoffice.com). However, data from the Trecatti monitoring station also shows that on occasions, winds of a similar strength came from a north easterly direction.

A further study of air quality was carried out by the Environment Agency (Study of Ambient Air Quality, 2003) using an MMF⁸ located on a car-park adjacent to Dowlais Rugby Club which is situated on lower ground than the previous study but over 100m from any buildings of greater or comparable height to reduce any influence on wind distribution. Although the purpose of the study was to analyse concentrations of air-borne PM10s and hydrogen sulphide in an area adjacent to the Trecatti landfill site, it does provide valuable data on wind speed and direction relevant to this area.

From data collected a wind rose was produced which displays aggregated data for a four month period, 17 December 2002-14 April 2003 (wind rose, Appendix 2h), and shows that the strongest winds during these winter months were from the west south west and south west (wind rose - blue shading, Appendix 2h). Mean wind speeds and gusts are stated as strongest during the winter half of the year and as coming from the south west and south south west which compares to findings of the earlier EAW study and with Met Office data for south west England (above). This Agency study also examined wind direction and shows a much greater frequency of wind coming from a northerly direction than previous studies, but at slightly less strength (5-7 m/s). Indeed, at this location during this period the prevailing wind was east north east (wind rose, Appendix 2h).

The Environment Agency Wales state that the topography of an area dominates wind direction and that Merthyr Tydfil is at the head of a deep valley. The prevailing wind direction of 'east north east' in the study carried out adjacent to Dowlais Rugby Club in 2003 means that wind coming from the south west is being channelled by a valley (EAW representative, interview, 13/10/06). The Air Quality Statement of Evidence (2004) reports that:

The topography of a site and surrounding area can have a large influence over local wind patterns. Open, exposed sites are likely to be most susceptible to dust emissions. Activities within a void would be sheltered from external winds, restricting the potential for dust to disperse beyond the site. Therefore the impact of the proposed development on dust emissions is likely to reduce as the workings deepen (Air Quality Statement, 2004, 7.1.8).

The site is in an exposed location at the top of a hill, with housing, schools and local businesses on an incline. Even if dust emissions were less once a void was being worked, coal and overburden will still need to be transported to the surface, and work at the surface will need to be carried out extracting waste from former tips as well as soil and rock before coal can be extracted. As part of a health impact assessment, residents living close to the operational opencast site at Kenfig Hill, Bridgend reported that they were experiencing dust nuisance from this site even though work was taking place in a void (Margam HIA report, 2005).

⁸ Mobile Monitoring Facility
FYF HIA, Final Report, June 2007

Discussion about weather conditions

The various studies carried out in the south west of England, Cardiff and the vicinity of the proposed opencast site, at different times of year and for varying time periods indicate that the strongest wind comes from the a south westerly direction. However, depending on locality of the monitoring equipment, time of year and topography, wind direction, and strength, varies and can come from a north easterly direction as well. The topography present at Ffos-Y-Fran indicates that wind will prevail from the north east as well as the south west and will be strong at times.

The location of housing in relation to the opencast workings at Kenfig Hill, Bridgend and the prevailing south westerly wind direction is similar to the situation at Ffos-Y-Fran site. Any dust is blown away from local communities when the wind is in a south-westerly direction, but local authority records show that there is an increase in dust deposition rates during episodes of north and north easterly winds. It therefore seems likely that when the wind comes from a north easterly direction that dust and potentially damaging particulates will blow onto communities living close to the proposed scheme at Ffos-Y-Fran.

Wind strength and direction, as well as air-borne pollutants, will be measured at the Twynnyrobyn School. However, residents report that the wind indicator that sits at the top of the school has been missing since early last year (spring 2006) and has not been reinstated.

Separation zones

Residents have asked for a 500m separation or buffer zone to be applied to coal extraction operation. This has been refused throughout the planning process even though the Welsh Assembly Government stated that this would be a requirement of the planning permission. The need for a buffer zone was one of the grounds of challenge in the High Court. The strength of feeling in relation to the matter of a 500m buffer zone can perhaps be measured by the amount of support residents have received from people of Merthyr Tydfil and elsewhere in Wales. Over 5,000 letters signed by residents of Merthyr Tydfil and surrounding area was sent to the House of Lords in December 2006 (Evans T, petition letter, December 2006) and over 5500 letters of support from residents of other local authority areas and boroughs in South Wales were presented to the chair, Mr Glyn Davies AM, of the Assembly's Environment, Planning and Countryside Committee in November 2006 (Evans T, letter, 11/12/06). The action from various towns and boroughs in South Wales demonstrates the extent of support for a 500m buffer zone for Wales, as is the case elsewhere in the UK, namely Scotland.

Although the company states that it has adhered to Mineral Planning Guidance Wales (Environmental Statement, 2003). In Wales, these guidelines are currently under review, new draft guidance in Wales recommending three levels for separation zones, namely low and medium (200m-350m) and high constraints (200m) and buffer zones (Coal MTAN Draft, Jan 2006). Due to the close proximity of housing at Mountain Hare and Incline Side, under this proposed planning guidance, the extraction of coal by opencast methods at the Ffos-Y-Fran site would exceed these guide lines for low, medium *and* high constraints. Indeed, housing at Incline Side is 125 metres away from the site boundary and at Mountain Hare

even closer at 60-70 metres from proposed coal extraction activities; with some homes being as close as 36 metres from the site boundary (W T Evans, January 2007)

Residents (W T Evans, Summary dated January 2007) report that the developer has presented a positive view of the proposed scheme but it is widely recognised that opencast coal extraction is noisy, dirty and highly polluting to the extent that in some countries there is a presumption against such coal extraction (see 'Human Rights Act' section). In Scotland for example, there is a presumption against opencast coal extraction although this is conditional. Indeed elsewhere in the UK more stringent guidelines for separation zones are in operation, for example Scottish guidelines stipulate that:

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 (SPP16, 2005, para 11, p.6).

It should also be noted that the separation distance applies to the distance from *site boundaries*, and not workings, and to *the edge* of local communities (for definition of 'community' see 'Inequalities: disadvantaged and vulnerable populations' section), and not the closest house. It should also be emphasised that any variation in the 500 metre separation distance would be 'exceptional' and would need to be justified by the developer (Scottish Executive Planning Division, interview, 14/08/06).

Miller Argent (South Wales) Ltd. states that separation zones for opencast sites should be no different to those for the extraction of aggregates. Indeed, Miller Argent in their response to the Draft Coal TAN (2006) state that:

We have made representation previously on the differences between buffer zones for aggregates and the greater distances that are proposed for coal. We have seen no evidence or justification as to why coal is to be prejudiced in this way (www.ffos-y-fran.co.uk).

However, planning guidance now in force in Scotland which applies to the extraction of opencast coal (SPP16:opencast coal, 2005), was based upon evidence explored in detail by the Committee of Medical Effects on Air Pollutants (COMEAP) and the University of Newcastle-upon-Tyne study. The Newcastle study (2000) contains a framework to guide the assessment of PM10 particulates against air quality objectives. Scottish guidance recommends that the framework should be adopted when drawing up and considering proposals "if there is a residential property or other sensitive establishment within 1 km of any site activity with the potential to generate dust" (SPP16, 2005, Air Quality, para 25, p.9) and the designation of a 500 metre separation distance is based upon experience in East Ayrshire, the largest producer of opencast coal in Scotland, where operators found that fly-rock from blasting could travel 500 metres (Scottish Executive Planning Division, interview, 14/08/06).

Section Two: Health Impacts

Economic impacts

The producers of coal tend to concentrate on the cheapest forms of extraction. Extracting coal using opencast methods employs less people. It is estimated that to extract a million tonnes of coal per year a deep mine will require 701 workers whilst an opencast mine requires almost half the number of workers (389). The operating costs of opencast methods is also much less because it only requires excavation and transport equipment, such as diggers, graders and lorries, which is much cheaper than the infrastructure needed to operate a deep coal mine (Newnham, Guardian Weekend, 1997). However, the Ffos-Y-Fran scheme is presented as a scheme that will create a number of jobs, including employment for local people (www.Ffos-y-fran.co.uk).

Job creation

The literature on opencast mining states that the economic arguments for open-casting are quite strong especially as most sites are situated in areas of high unemployment (Beynon, Cox and Hudson, 2000), such as Merthyr Tydfil. The developer of the proposed Ffos-Y-Fran open cast site is no exception, stating in various documents that a substantial number of jobs will be created. Miller Argent (South Wales) Ltd. state that there will be 200 direct jobs created by the scheme(www.ffos-y-fran.co.uk) The company report that from their experience the ratio of indirect jobs is a factor of 1.5 to 2.0 times the number of the directly employed workforce on opencast mines, and hence claim that a further 400 indirect jobs will be created. It is stated that the scheme “will contribute to the continued vitality of the Welsh Coal Industry and that of Aberthaw Power Station, thus providing security for over 2350 jobs” (www.ffos-y-fran.co.uk).

Actual number of jobs on site

Historically, there has been a substantial gap between the expected and actual number of jobs created by new planning initiatives. Beynon, Hudson and Sadler (1991) discuss the promise of job creation in the north east of England to offset the closure of steel works during the 1980s. The Derwentside Industrial Development Agency set up to assist small firms continually revised its claims of replacing the 3,700 jobs lost through the closure of the Consett steelworks within a five year period. In 1985 this was revised to 5,000 job *commitments* with claims that 2,000 jobs had already been created between 1979 and 1984. The 2,000 jobs however only offset jobs lost through other plant closures in the area after the steel works closed. Furthermore many of the *new* jobs resulted from existing companies switching location and no account was taken of the sustainability of these jobs as some new jobs created subsequently disappeared. The net job gains were therefore much smaller than original claims (Beynon, Hudson and Sadler, 1991).

Experience in the opencast industry itself indicates that a similar differential between job outcomes and expectations exists. Firstly, one of the reasons open-casting is a profitable industry is because it employs less people than a deep mine, as well as the comparatively lower levels of wage costs (Beynon, Cox and Hudson, 2000). Secondly, as discussed above jobs promised may not materialise. For example at two major opencast sites in

Northumberland British Coal stated that 620 jobs would be created, whereas the actual number employed once the site was operational was 102. Reasons given for this differential were increased use of technology and the sub-contracting of work to companies outside the area (Beynon, Cox and Hudson, 2000).

Sustainable local jobs

The company are to introduce training programmes to enable ‘most of the labour force to come from the local community’. The company is currently in discussion with the Transport and General Workers Union about recruitment and training programmes (www.ffos-y-fran.co.uk). A local employment agency believed that the development could provide training opportunities for young people with whom they have contact. However, this would depend on the sort of job and training opportunities on offer by Miller Argent (South Wales) Ltd.(local employment agency, interview, 06/07/06).

An analysis of employment applications received to the 11th June 2004 show that 110 (out of 153) applications were from residents within 15 kilometres (10 miles) of the proposed site. 52 applications were residents of Merthyr Tydfil but although other data on local authority residency is presented in tabular form, it does not specify the residency, or proximity to the proposed site, of those applying for any of the available positions (Statement of Evidence, Stephen Tillman, August 2004).

Residents attending the workshop believed that local people will not be the recipients of the jobs on offer by the company, stating that the high quality jobs will be taken by people from outside the area. As one resident stated, “We will be left with the low quality, low paid jobs”. Younger people attending the workshop also stated that the scheme would have negative impact upon the local economy and would not generate jobs for local people (workshop, June 2006). Residents are also concerned that the low skilled jobs may also not be taken by local people, going instead to migrants from Eastern Europe, which has been the case in other industries and businesses in the locality, and indeed the experience in other parts of Wales.

Experience elsewhere in Wales has shown that promises about employing local people have not always been sustained. Local men working at the Brynhennlys site in the Swansea Valley for example were subsequently laid off. This led to feelings of betrayal amongst local people (Beynon, Cox and Hudson, 2000). An article appearing in a *Guardian* supplement confirms that very few local people were employed at this site. The mining company claimed that jobs were given to 61 local people, but the resident being interviewed knew of only two employees living in the village. This was also the experience in Scotland where an opencast company offered 50 jobs, but local residents knew of only a ‘handful’ of local people who work at the site (Newnham, *Guardian* Weekend, 1997). Furthermore opencast sites are operated by national companies which are keen to maintain a regular workforce, hence they tend to move employees from site to site (Beynon, Cox and Hudson, 2000).

Safeguarding existing jobs elsewhere

Miller Argent (South Wales) Ltd. state that coal from the Ffos-Y-Fran development will be needed to help maintain Aberthaw Power Station, located at Barry, Cardiff. The company

states that the Ffos-Y-Fran opencast site will mean that further jobs will be secured at Aberthaw Power Station. As part of its calculation of jobs likely to be created, the company states that the power station employs 244 directly with a further 65 resident contractors and 400 contractors during most summers (www.ffos-y-fran.co.uk). However, the chairman of Tower Colliery in Hirwaun is quoted as saying that coal supplies would be assured for Aberthaw “in any event”(Unknown newspaper cutting, 02/09/03). At the time of writing the chairman states that Tower Colliery has access to further coal reserves which it will be exploring as part of the five year and seven year plans for the pit, and is intent on expanding its production (Unknown newspaper cutting, 2.9.2003). However, Tower Colliery is expected to close by 2008, with 60 staff being made redundant.

Residents attending the workshop cite media reports, including a Dragon’s Eye programme, that discusses the proposed conversion of Aberthaw Power Station so that it can burn cleaner fuel. Residents were also concerned about the global effects on climate change if the burning of fossil fuels at Aberthaw continues (workshop, June 2006).

Types of jobs available

Dowlais’s economic problems (and indeed those of other electoral wards in Merthyr Tydfil) are not limited to high rates of unemployment and economic inactivity but also include the local economic mix and, crucially, the quality of the jobs that are available (Adamson et al, 2004).

Miller Argent in an appendix to the Statement of Evidence (Tillman, 2004) provide an analysis of the employment applications received to 11th June 2004. Out of a total of 153 applications the skills mix includes machine operators (103), including excavator (34), front end loading shovel (10), dump-truck (51), dozer (8) and other machines (4) compared with applications for employment using other skills (21) or as labourers (25). It seems unlikely, given the qualifications and skills available in the local area that many local people will have the necessary skills to apply for the more highly skilled, and higher paid jobs. Although, Miller Argent (South Wales) Limited has been negotiating with the TGWU about education and training for local people.

Alternative employment

Residents acknowledge the need for jobs in the Merthyr Tydfil area but would like to see a continuation of the light industrial work opportunities now available on nearby industrial estates. Younger people attending the workshop stated that jobs being created by the opencast scheme would be detrimental to health (workshop, June 2006). One young person who responded to the house-to-house survey (2006) stated that young people ‘don’t want dirty industry for jobs’.(see also ‘Heritage and effect upon the neighbourhood’ section).

Furthermore, residents living close to the Margam opencast site were able to identify a number of alternative work opportunities for heavy plant operators within a 20 mile radius of the opencast site (Margam HIA report, p.38).

Effect upon existing businesses

There are a number of businesses involved in the manufacture and sale of food located in the vicinity of the proposed opencast scheme. Some of these are within 500 metres of the proposed site. The effects of opencast activity on food-related business have been documented elsewhere (Margam HIA report, 2005). Indeed, local businesses in close proximity of the Margam opencast site described how they were already being affected by dust from the existing site as one shop keeper stated:

...now I have to pay staff ... to dust the shelves frequently. Now normally before this happened (*opencast working moving closer to the local community*) I could get away with this maybe once/twice a week. Now I am doing it at least every other day if not every day depending upon what conditions (*weather 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, focus group, Margam HIA report, 2005)

Some local businesses close to the proposed development at Ffos-Y-Fran were concerned about the potential development and these businesses include a food manufacturer, hot food outlet, and large food retailer who have businesses in the vicinity of the proposed scheme.

The food retailer and hot food outlet were both experiencing problems connected with Trecatti landfill site and the meat factory, and this has entailed a financial cost to one company having to call in an infestation and pest-control company. The food retailer and hot food outlet both experience nuisance from odours from existing facilities located at Dowlais top. The retailer states that this is worse first thing in the morning and in the evening. The hot food outlet representative states that:

... the smell can be horrendous at times and in my opinion this has affected my business negatively. A lot of customers make comments on the unpleasant odour and many do not return (Letter dated 24/08/06).

The food manufacturer had experience of living with previous open-casting in the area but was not affected by the Trecatti landfill site, being some distance away.

Although one local food retailer stated that there is passing trade from migrant workers employed at the meat factory. At the Ffos-Y-Fran site this may not be the case as day-to-day access from Merthyr Tydfil would be from the A4060T via the Bogey Road (Environmental Statement, 2003).

Threat to future and potential customers

The food retailer reported that there were potentially problems for the elderly or people with asthma, and that this may affect the business as the company had a lot of elderly customers and would not want to lose these customers.

I would not want them saying that 'every time we go to ... we are covered in dust' (food retailer, interview, 21/07/06)

This food retailer's main concern was air pollution and its potential effect on customers (food retailer, interview, 21/07/06). The hot food outlet was also concerned about the potential negative effect upon customers:

I am greatly concerned that the Ffos-Y-Fran opencast site will exacerbate the problems we have already experienced with Trecatti and make business and social life intolerable especially with the dust and diesel fumes. Opencast and the food industry do not make good companions – if I feel this then I am sure my customers feel the same (letter dated 24/08/06)

The food manufacturer was also concerned about how they would be perceived by their customers when considering the awarding of contracts. This company manufactures products for other companies and is branded by the receiving companies themselves.

We take the presentation of the business very seriously – both inside and outside. This could have a derogatory effect on how our customers perceive us (Food manufacturer, interview, 06/07/06).

For this company, whilst open-casting was underway there would be a lot of questions posed by customers and potential customers (food manufacturer, interview, 06/07/06).

Another concern for the food manufacturer was risk to the water courses. The company representative stated that there are a lot of caverns underneath the factory as it was built on the site of the former Dowlais Iron Works. The Dowlais culvert runs underneath the factory and water is an important part of the manufacturing process (see section 'Waste Removal').

The food retailer did not believe that employees would be affected by the proposed site but the food manufacturer did have concern as some of the employees lived in the locality. The manufacturer was concerned about how this scheme could potentially affect their health and employees' consequent work attendance.

Inward business investment

There would be inward investment if the scheme did not go ahead. What entrepreneur wants to come to Merthyr when the opencast is right next to it? (resident, workshop, June 2006)

Beynon, Cox and Hudson (2000) cite the arguments put forward by the Mineral Planning Authorities and local authorities in the 1990s that open-casting could have an adverse economic impact on a local area. This was demonstrated in Northumberland where a Korean corporation specifically asked the local council about potential shock waves and dust pollution from a nearby non-operational opencast site (Beynon, Cox and Hudson, 2000). This had been the experience with a previous phase of the Merthyr Tydfil Reclamation scheme, when open-cast activity was taking place adjacent to a local factory. Customers of a food manufacturing company had asked some difficult questions about the potential effects of a previous opencast site on the manufacture of its food products and it was anticipated that this would also be the case if the Ffos-Y-Fran scheme went ahead (food manufacturer,

interview, 06/07/06). An article appearing in a Guardian supplement also reports of a potential blight on local areas as open-casting tends to discourage Japanese business especially and damages tourism (Newnham, Guardian Weekend, 1997).

Residents attending the workshop believed that the scheme would have a negative effect on inward investment. One resident stated that:

It is clean industries we are looking for, but this will put off those industries. We'll lose more jobs than we gain (resident, workshop, June 2006)

A food retailer believed that people and businesses thinking of moving to the area would be looking for a good environment, and may be deterred if they had a choice of where to locate or live. Expectations today were for green belt and parks around developments (Food retailer, interview, 21/07/06). Residents point out that the proposed open-cast is likely to have a negative impact on inward investment, especially in attracting clean industry. As one resident stated:

There would be inward investment if the scheme did not go ahead. What entrepreneur wants to come to Merthyr when the opencast is right next to it (resident, workshop, June 2006)

And a local economist points out:

Also on economic regeneration grounds, if Merthyr is to attract business and job opportunities fit for the 21st century then the last thing we want is a huge dirty opencast site. We need to attract clean business that brings long term sustainable jobs in. (letter dated June 2006)

Since the remediation of previous open-cast activity in the area, new housing, business and retail parks have been developed in the vicinity.

One resident stated:

Good quality of life needs a good quality environment: full employment of clean factory and office work plus the normal construction employment of houses, hospitals etc. But it is my belief that employers who might otherwise be persuaded to come to Merthyr, for instance to the Goat Mill Road Area, will turn away when they know the implications of the proposed development at Ffos-Y-Fran (letter dated 11/06/06)

A representative of a local food retail business believed that potential business investment may be deterred, if companies have a choice of where to locate. However, this representative believed that businesses already committed to move to the area will continue to do so, especially in the area some distance from Trecatti Landfill and the proposed opencast (food retailer, interview, 21/07/06).

The food manufacturer believed that in the short term there would be a negative effect on inward investment but that in the long term it would be beneficial, as the area had started to attract investment after the remediation of previous opencast workings but these

developments had lasted for shorter periods (Food manufacturer, interview, 06/07/06). Indeed, previous opencast sites had been of much shorter duration (2-3 years). This opencast development would involve 17 years of waste and coal extraction before any land remediation commences. The land remediation itself will take up to 5 years to complete.

One resident who wrote to the researcher points out the contradiction between current regeneration in the area and the proposed opencast mine:

Merthyr Tydfil has just begun a regeneration plan for the town. Seventeen years of open-casting just over a mile from the town centre would be a deterrent to inward investment that has been acknowledged by potential investors. A meeting in Newport (*South Wales*) of entrepreneurs noted the present proposals for open-casting in Merthyr and stated that they would not come to the area if it (*opencast site*) went ahead. Many of them require a clean air environment (letter dated 13/06/06)

(see also 'Heritage and effect upon the neighbourhood')

Effects upon tourism

Many tourist related businesses, such as tourist boards, hotels, bed and breakfasts, restaurants and local pubs, have viewed opencasts as a deterrent to visitors, many giving evidence against proposed developments at public inquiries (Beynon, Cox and Hudson, 2000). Residents attending the workshop believed that the scheme would have a negative effect on tourism, and visitors to the area. One resident especially stated that tourism was an important part of the local economy (workshop, June 2006). Indeed, Chance Encounters: Heritage Interpretation Company which provides services to national bodies as well as local customers in the field of heritage interpretation and education have been advised that the company should consider relocation if the opencast goes ahead (letter dated 12/06/06). The company points out the detrimental effect that such a development would have on the tourist industry:

During discussions with various international tour operators and other travel professionals, it has clearly emerged that few things are a bigger deterrent to incoming travellers than opencast mining. This will in turn have a knock-on effect on the local economy and, perhaps more crucially, local self-esteem and the development of a sense of self worth. Marketing an area with such a development would be a nightmare! (letter from Chance Encounters, dated 12/06/06)

A youth worker also points out the negative effect on tourism, and leisure activity in the area:

Some of my concerns also spring from my professional background. As a graduate in Leisure and Tourism Management, I am well aware of the detrimental impact of this kind of development on both the appeal of the area to travellers, whether on holiday or on business, and on the leisure pastimes of local people.(letter dated 12/06/06)

(See also section on 'Heritage and effect upon local neighbourhood')

House Prices

There are few systematic studies of the effects of proposed open-casting on house prices. Beynon, Cox and Hudson (2000) argue that there are effects upon the attractiveness of these areas to potential buyers and consequently developments have an effect upon local house values. Trigg and Dubourg (1993) carried out a survey of local estate agents in north Staffordshire. The estate agents had experience of both house prices and open-casting in the area. The study concluded that the impact on house prices totalled several million pounds, equivalent to the profits from extracting the coal.

Residents attending the workshop believed that the scheme would have a negative effect on the value of houses in the area, and cited the experiences of residents living near the Margam Opencast Site and historical local evidence. Residents believed that houses would consequently go down council tax bands which would need to be paid for by other people, the extraction of coal would therefore be subsidised by tax payers (workshop, June 2006). Some of those residents who responded to the house-to-house survey (2006) or who wrote to the researcher were concerned about the potential effect on their properties which they had purchased in recent years. Fifteen respondents from the Bradley Gardens (12), Goat Mill Road (1), Penyard (1) and Hawthorn Drive (1) areas who took part in the house-to-house survey specifically expressed concern about the resale value of their homes. Experience from the open-cast site at Brynhenllys showed more than a 50% drop in house prices over a ten year period. One resident living in a nearby village has estimated the total loss in house prices as £20 million, and goes on to state that the mining company should be obliged to buy the houses at the original market value (Newnham, Guardian Weekend, 1997). In another newspaper article, local residents of Ystradowen at the top of the Upper Tawe Valley were taking legal action against the mining company because of reductions in the value of their homes. Residents had also been successful in having the council tax bands lowered by two bands from D to B and believed that £6million had been knocked off property prices in the village (Carr, Unknown newspaper, no date).

A local estate agent of Merthyr Tydfil with over 30 years experience of selling houses in the local area stated that during previous phases of open-casting in the area houses did not sell well. In recent years there had been an increase in house prices in the area, and it had become a popular area due to easy access to Cardiff via the A470. The Estate Agent believed that house prices would be negatively affected in the area all the way down to Pentrebach (close to the a 4060T junction with the A470) and that house prices are likely to be depressed for the duration of the opencast scheme. The estate agent believed that the drop in values would be down by 20% based on past experience of a previous opencast mine at Dowlais Top. Since that time house prices in the area had improved and demand had risen. However, this had started to change and the estate agent pointed to evidence that houses in the locality of the proposed scheme are difficult to sell at present citing the fact that housing developers are currently offering incentive packages, for example paying estate agent fees (Estate Agent, interview, 19/07/06 and letter dated 15/06/06).

One resident wondered how many properties on the new housing developments would have been sold had details of the opencast been known at the time:

Another worry I have is the devaluation of properties in the area, if this scheme were made known before these properties (*Bradley Gardens*) were purchased I wonder how many would have sold. This was a much sought after area, being regarded as one of the best places in Merthyr to live (resident Bradley Gardens, letter dated 13/06/06)

Some residents (5) stated that they had purchased houses in the locality in recent years but were unaware at the time of purchase of plans for the opencast development, some stating that they had not been informed by the housing developers. One resident wanted to know why the authorities decided on this scheme after new houses had been built in such close proximity (letter 16/06/06). Younger people attending the workshop thought it was negligent and unfair to build housing in the area when an opencast scheme was proposed (workshop, June 2006).

Some of those living in newly built properties purchased them because they thought they would be moving their families to a safe and healthy environment (house-to-house survey, 2006 (2), and letters dated 11/06/06 and 16/06/06), as one parent writes:

We along with many others are extremely concerned about the above proposed venture (*opencast scheme*). We bought the property with visions of a happy future, a home with a safe, peaceful and most importantly a healthy environment to raise our kids. To learn of the above proposal has significantly affected our outlook on life (Bradley Gardens resident, letter, 11/06/06).

Residents attending the workshop mentioned the psychological impacts of the devaluation in housing in the area, many residents feeling trapped for a significant length of time (workshop, June 2006).

An indication that properties closest to the proposed scheme may already be blighted is perhaps illustrated by a recent report of a local resident that two properties at Mount View have been on the housing market for 18 months but have failed to attract buyers (resident email, 28/05/07).

Benefits to the local community

As stated by residents attending the workshop, Miller Argent (South Wales) Ltd. is funding local community projects, such as the funding of specific projects in the school in closest proximity to the site (resident, workshop, June 2006). The Scottish Opencast Action Group is concerned about the way mining companies offer to fund projects, such as swimming pools, sports facilities and minibuses, in opencast communities which can tend to make proposals more attractive to local communities (Newnham, Guardian Weekend, 1997).

Economic gain for the local authority and company

The economic beneficiaries of opencast mines are usually the company and the local authority. This is stated as being especially the case when open-casting also involves the removal, or disposal, of waste during or after open-casting activity. This provides local authorities with a cheap way to dispose of waste when the void is used as landfill after the

completion of open-casting activity, and saves the company the expense of restoration (Newnham, Guardian Weekend, 1997). Although, the future use of the void as landfill is of concern to residents, the proposed scheme is described as a land reclamation scheme (see 'Common land, open spaces and reclamation' section).

Tillman who presented evidence in the Public Inquiry calculated the cost of land restoration, including the removal of waste tips but without the extraction of coal as being £54.3m. This included the reclamation of 317 ha of land (£35m) and landfill costs of £19m. The costs for Phase II (Great White Tip) was £2.8m for 62ha, and Phase I £3m for 35 ha, however these schemes also included the extraction of coal. With these figures in mind, the cost of the scheme at lowest previous scheme rates is calculated as £12.2m (Statement of Evidence, Stephen Tillman, August 2004).

Local authorities can also benefit financially when opencast activity also includes the removal of contaminated land. This was the case in Chesterfield where a developer offered to remove soil contaminated with arsenic, cadmium, asbestos, mercury, cyanide, strontium and lead from a former coke works which represented a saving to the local authority not having to clean-up contaminated land (Newnham, Guardian Weekend, 1997). The Ffos-Y-Fran scheme also involves the removal of former official and unofficial landfill sites.

Residents attending the workshop found it ironic that Merthyr Tydfil was reintroducing mining after all the pit closures of the 1980s. Residents would not object to deep-mining as the community is used to this form of coal extraction which could make use of new technologies. Residents believed that open cast methods have been chosen as it's the cheapest and quickest way of making a profit as the company had refused to sink a deep mine (workshop, June 2006). Residents who wrote to the researcher and took part in the workshop mentioned that the scheme was putting 'profits before people' and that the benefits would be for 'outsiders' and not for the locality (Mountain Hare resident letter dated 08/06/06). Younger people who attended the workshop asked "Why should we suffer for other people's benefit?" (workshop, June 2006) and a local resident writes:

May I express as a local and very near resident to the proposed site my utter disgust and dismay that once again the health of the people of Merthyr Tydfil is being sacrificed for financial gain (resident letter dated 31/05/06).

Costs: health and externalities

Older people and Young people who attended the workshop pointed to the additional costs that will be borne by the NHS in treating people's health complaints and increased number of hospital admissions as a result of the scheme. People with existing complaints were concerned about support for them and their families if they are affected by the scheme. It was noted by all of those present at the workshop that although health professionals had been invited to attend the workshop, no health professional was present. One resident asked the question, "Who is caring for us?" (workshop, June 2006) (see Air-Borne Pollutants for correspondence from health professionals).

A study was carried out by an ad-hoc group set up to look at the economic impacts of the health effects of air pollution (Department of Health, 1999). The study examined the

potential cost benefits of bringing about reductions in air pollution in relation to mortality, hospital admissions, and quality of life. The report concludes that the health benefits dominate the overall benefits of reductions in air pollution but calculating quantified benefits was difficult. Deaths brought forward would likely affect older people with existing cardiovascular complaints and the benefits from quality of life is likely to be smaller than reductions in cardiovascular deaths which would bring about higher benefits for younger people with a higher quality of life. NHS costs in relation to hospital admissions are unclear and the effects of air pollution on more minor symptoms could have significant impacts if larger numbers of people are affected. However, this is unknown. A final comment of the report is that the:

... absence of quantified benefits should not necessarily be taken to mean there are no health benefits. We hope that further work will clarify the extent of these additional non-quantified benefits. (Department of Health, 199, p.8).

Indeed, residents taking part in the health impact assessment of the proposed extension to Margam Opencast Mine felt frustrated at attempts by the authorities to quantify the effects of the existing opencast on their lives, as this quote from an older woman illustrates:

The value of our lives – how can you measure this?
(Older woman, focus group, Margam HIA report, 2005)

The social costs of the FFos-Y-Fran scheme arising out of health and externalities for Merthyr Tydfil were commented on in a letter to the researcher:

The tiny number of jobs that this scheme would create for local people and the small intended investment in the town would not compensate for the disastrous consequences for the people of Merthyr Tydfil. The health, both physical and mental, of everyone living in the town would suffer as a result of the pollution, noise, congestion and environmental damage if this scheme were to go ahead. Merthyr Tydfil is already recognised as the unhealthiest place to live in the UK so I do not see how this scheme could be contemplated (resident letter, dated 09/06/06)

Section Two: Health Impacts

Heritage and effect on the neighbourhood

Respondents in a study carried out by the University of Glamorgan (Adamson et al, 2004) mentioned the new opportunities that are being created by the new Industrial estate at Goats Mill Road and the Heads of the Valley Road, areas adjacent to the proposed opencast site. However, in this same survey regeneration in the area was contrasted with the general feeling that the area is also facing decline with financial centres, agencies and facilities closing. Statistical evidence derived from the study confirm these findings. For example one third of respondents stated that the area had deteriorated, whilst just over half (54%) felt it had stayed the same. Only 10% stated that the area had improved (Adamson et al, 2004).

Findings of the workshop (June 2006) held with local residents support the results of this locally based survey and the following themes emerged:

Visual impacts and image of the valleys

Residents who attended the workshop (June 2006) stated that the area is pleasant at present but that this will be destroyed if the scheme goes ahead. Residents were especially concerned about the visual impacts of the soil overburden mounds, and the 600 feet deep void. They also stated that the opencast site would be highly visible from every road point in the area, including the main Brecon to Cardiff road (A470). The photograph (below) illustrates the elevated position of the site in relation to housing in Merthyr Tydfil as well as the potential visual impacts from various locations around the town, including this road junction on the A470. The site would be located on elevated ground at the top right hand corner of photograph 4 (below).

Photograph 4: View of the proposed opencast site from the main A470, Cardiff to Brecon road



One resident describes the opencast workings as “a gaping mouth 600 feet deep”. Young people stated that there would be no green spaces remaining in the area, and the whole area would appear depressing (workshop, June 2006). A 14 year old writes that the mountain where it is proposed that the opencast will be situated can be seen from the school he attends (Lewis, Merthyr Express, 17/02/05). Younger people attending the workshop (June 2006) believed that the scheme would affect the whole of Merthyr Tydfil.

Older and younger residents believed that this development would reinforce the stereotypical image of the valleys as ‘black and dirty’ and a bad place to live and will deter people travelling through Wales via the new Heads of the Valleys road. Residents reported that the visual impacts, as well as the effects of noise and dust, would have a negative effect on the psychological wellbeing of local people, especially those who lived in closest proximity. One resident stated that the scheme would be a ‘living hell’ and another that people would be imprisoned in their own homes (workshop, June 2006).

Impact on profile of the community

There has already been a change in the ethnic profile of this local authority area, as in common with the rest of Wales, there are increasing numbers of migrant workers from eastern Europe. Indeed, a local food retailer reports that migrant workers from European countries, such as Poland, are employed in the meat factory and are some of the company’s regular customers (interview, food retailer, July 2006).

Younger people

The Needs Assessment completed in 2003 states that Merthyr Tydfil is already experiencing an outward migration of younger people (Merthyr Tydfil Needs Assessment, 2003).

Older people who attended the workshop stated that the opencast scheme will exacerbate the depopulation of the area, with people moving to cleaner areas and hence changing the population profile of Merthyr Tydfil. Some people attending the workshop had moved to Merthyr Tydfil from other areas. One stated that “it will affect the development of the town” as this resident would never have moved to the area if the scheme had been known at the time (workshop, June 2006).

It was reported that the effects upon younger people would be greater. As one resident stated, “younger people will not want to work in an opencast mine”. Young people who attended the workshop, other residents who wrote letters and an article appearing in the *Merthyr Express* (Lewis, Merthyr Express, 17/02/05) expressed the sentiment that younger people will move away because Merthyr Tydfil will be viewed as a polluted area. People brought up in the area were also considering leaving (workshop, June 2006). In the words of one young man who wrote to the researcher:

As a young, professionally qualified man who was born and raised in Tywnyrodyn, I hoped to make my long-term home in the locality. For various reasons, this proposed development would have to make me consider the wisdom of this decision (letter dated 12/06/06).

A 17 year old writes of wanting to keep his roots in Merthyr Tydfil but that the dust and fumes is a deterrent to staying in the area:

I was born in Merthyr Tydfil and am currently studying A level to hopefully become a teacher, and my ambition is to teach in the school that I attend, keeping my roots in Merthyr Tydfil and passing my knowledge on to the children of Merthyr Tydfil. I feel I could not go to work in the dust and fumes that would be created from this opencast, and would certainly not want to bring my children up in an environment where they would be exposed to this on a daily basis, so I would have no other alternative to work out of Merthyr Tydfil and take my skills elsewhere (young person of Twynyrodyn, letter, no date).

Parents too stated that they were planning on leaving the area for a healthier life because of fears about their children’s health if the scheme goes ahead (Bradley Gardens resident, house-to-house survey, 2006). Examples were given where local children are already attending schools outside the area because of parents’ fear about the effect of the proposed scheme upon their children’s health (workshop, June 2006).

Older people

Younger people who attended the workshop were concerned about the effects upon older family friends and relatives (see Air Pollutants section). One resident was concerned about the psychological effect on older people of the opencast scheme as “older people will see the clock being turned back yet again on the greening of the valley” (workshop, June 2006). Older people themselves were concerned about the effects on themselves and others, as a 90 year old resident writes:

I am 90 years old and I don't think my health will stand for the extra dust, diesel and pollution. I am also concerned for the younger generations. (resident, house-to-house survey, 2006).

Indeed, residents who responded to the house-to-house survey (2006) and who wrote to the researcher were concerned about the long-term effects on future generations as well as on themselves and their families.

A Regressive step for Merthyr

People who attended the workshop believed that the scheme would be a regressive step for Merthyr Tydfil. Residents could not believe that Merthyr Tydfil CBC had been trying to improve the appearance of the area, and view this scheme as a regressive step, undoing progress made in the locality. Residents reported that the scheme will reinforce the stereotypical image of ‘dirty Merthyr’ just as its starting to become greener again (workshop, June 2006). Young people who attended the workshop also highlight the recent improvement in Merthyr Tydfil, but that this scheme would be like ‘going back’, ruining all the regeneration plans for the area. They believed that all the investment in the area so far would be wasted. A 14 year old boy writing in the *Merthyr Express* states that Merthyr Tydfil council should be improving the way of life for people in Merthyr not making it worse by supporting an opencast scheme (Lewis, *Merthyr Express*, 17/02/05).

Young people believed that the scheme would take away the history of the area (workshop, June 2006) which as older people stated continued the trend of destroying the heritage of Merthyr Tydfil (workshop, June 2006). People attending the workshop and local businesses believed that the scheme would deter people visiting the area and tourism is an important part of the local economy. The scheme would destroy this (see Economic section).

Some people who took part in the house-to-house survey felt that the people of Merthyr Tydfil had suffered enough, for the benefit of others outside the area and this was also mentioned in correspondence to the researcher:

The valley has been raped continually for the making of money not for the locality but for outsiders (Mountain Hare resident letter dated 08/06/06)

Other residents expressed similar sentiments, for example:

“The Merthyr Tydfil populous have suffered enough through industrial work and the health of our town needs to come first and foremost” and another asked “Why should the Welsh valley people be the ones to suffer?”

(Mountain Hare residents, house-to-house survey, 2006)

Section Two: Health Impacts

Common land, open spaces and land reclamation

The Ffos-Y-Fran site occupies higher land about 1.5 km to the east of Merthyr Tydfil town centre and includes part of Merthyr and Gelligaer Urban Common (Environmental Statement, 2003). The Environmental Statement describes the area to be reclaimed as part of the FLRS as “derelict and unsightly land” (p.10). It has been identified as such in Merthyr Tydfil Borough Local Plan by Policy GR1 and is included in Merthyr’s Priority Reclamation Programme by Policy GR2. However, a local councillor explains that:

Existing dereliction at Ffos-Y-Fran is a direct result of coal recovery from tip washing, three former local authority waste disposal sites and the disposal and storage of mineral waste from Merthyr Vale compounded by indiscriminate and illegal fly tipping. Yes, reclamation of the area of predominant common is required but it does not require further degradation of the land by an extensive opencast mining scheme with potential environmental and health impacts unknown to achieve this (Chaplin, letter to editor of *Morning Star*, 6 June 2006)

An Historical Industrial Landscape

The area has been identified by historical societies as a historical location. For example, the website of the Glamorgan and Gwent Archaeological Trust describe the area as:

an extensive and nationally important landscape of industrial sites associated with the Dowlais Iron Works, mainly comprising features associated with iron ore extraction and, to a lesser extent, coal, and in use between the late 18th and early 19th century. The area is characterised by extractive features (mainly waste tips), the Dowlais Free Drainage System associated with the Dowlais and later the Ivor Iron Works, and mineral railways and tramways as well as public rail (now disused). The historic landscape area of Ffos-Y-Fran comprises an important industrial extractive landscape; the area is dominated by coal and ironstone workings along the western outcrop of Merthyr Common, associated with the Dowlais and Penydarren Ironworks ... Today's landscape is essentially the product of a succession of 19th century extraction phases (including re-working of earlier areas). (www.ggat.org.uk)

Although the company acknowledges the historical aspects of the site, the Ffos-Y-Fran scheme would remove all known shafts and other features previously associated with historical iron ore and coal workings in this location. The prehistoric settlement and a wooded valley to the east of the site, and a well-preserved portion of the Dowlais Free Drainage system will be preserved. The company admits that it will not be possible to avoid removal of heritage features. The historical features will be subject to detailed historical research, archaeological excavation, monitoring of site works and documentation of industrial iron/coal extraction processes (Environmental Statement, 2003).

Common land

The area that is proposed for the extraction of coal, and the removal of waste from former waste tips, is an area which is designated as Urban Common. A resident who attended the workshop (June 2006) and who has lived close to the site all his life, spoke about the designation of the Urban Common at Cwmbargoed by an Act of 1926 (CLA publication, 1992) which affords:

The public a right of access for air and exercise over metropolitan and urban commons, (i.e. those commons which were within the areas covered by the former district councils).

Large sections of this Urban Common Land have already been closed off and so local people are unable to walk across large areas. One resident stated that there should be a public inquiry into the closure of the public rights of way (workshop, June 2006). A Public Inquiry looking at public rights of way at Ffos-Y-Fran took place in May 2007.

Residents explained that in 1958 there was open-casting at Rhymney and Trecatti, and local people lost 886 acres of this land. An order had been placed by British Coal for the duration of 40 years. The open-casting at Trecatti finished in 1983 after which it became a landfill site. The 40 year order is still in place until 2014. Residents state that this land is common land with fences still in place today but the rights of way were never restored or returned to local people. Residents are therefore naturally mistrustful of the authorities when promises are made about the future use of the land at Ffos-Y-Fran (workshop, June 2006).

One resident states that:

Ffos-Y-Fran will take out the last remaining rights to access and rights to fresh air.

Open spaces: loss of amenity

Although the proposal includes a land reclamation scheme to take place after the extraction and removal of the contents of former waste tips and coal national organisations as well as residents are concerned about the loss of common land. As stated above, common land has already been lost through the extraction of coal at the former opencast site at Trecatti (now a landfill site) and the landfill site will be in operation for a further 15 years. The Ffos-Y-Fran scheme will remove a further 900 acres of the remaining urban common land from the mountainside, preventing people from accessing the Urban Common under the 1926 Act. This is the only remaining Urban Common Land in Merthyr Tydfil.

The Open Spaces Society writes that:

The area under threat is common land which is vital to the many communities that surround it. It is an extensive area of open country upon which local people and visitors to the area depend for recreation and refreshment. They have the right to walk and ride over the whole area. There are public paths here which are immensely valuable too but which are not shown on any official map and have therefore been grossly abused by the mining company, backed by the county council. The society is

working with local people to try to protect the common from further encroachment and degradation, and to restore it for the enjoyment and recreation by the public (Letter dated 16/06/06).

Miller Argent (South Wales) Limited state that three legal rights of way cross the site (Environmental Statement, 2003). A local resident states that there is evidence dating back to the 1890s that further footpaths exist on this site. A map showing existing footpaths and rights of way to be 'stopped' or created for the Ffos-Y-Fran scheme are presented at appendix 2i. Indeed, the company admits that other footpaths are 'claimed footpaths', not registered by the local authority (Environmental Statement, 2003). The resident reports that the footpaths are still used today for walking and riding horses. The environmental report states that in order to carry out the Ffos-Y-Fran scheme, all footpaths crossing the site will need to be temporarily closed for the duration of site operations, this also applies to footpaths and bridleways that crossed the former Trecatti Opencast Site (now Trecatti Landfill Site). Public access from the A4060 to the remainder of the urban common to the east of the site, a temporary route will be provided on the northern boundary. The company acknowledges that the public have access over Urban Common for air and exercise but state that:

It will be necessary for the land to be fenced out of the common for the duration of operations and public access denied (Environmental Statement, 2003)

The company would reinstate public access to the common as well as a footpath network to replace the one that currently exists. However, this would reflect the new landscape and features which can be seen in figure 4 at the end of this section. Residents firmly believed that however the land is reclaimed, it can never be the same as "once footpaths are gone, they are gone – historical sites and environmental sites". It was the psychological effect of this loss that was a significant issue for local people, as well as the impact on lifestyles as the scheme would remove the opportunity for people to exercise on open spaces in the locality. Residents see a contradiction between government policy for tackling obesity, and then taking away the few places there are to walk in the local area (workshop, June 2006).

One resident reports how housing at Cwmbargoed has been purchased by mining companies since the 1990s, changing the unique profile of the population living on the Urban Common Land. This resident who attended the workshop stated that the area was for people with poor health. To access open land, local people will need to travel five miles if the scheme goes ahead which would especially affect people without their own transport (workshop, June 2006).

Two older residents wrote to the researcher and stated that:

... we feel that a resource that could be used for healthy activities will be lost. Most of the area that will supposedly be 'reclaimed' is in no way in need of reclamation and is, in fact, rich in biodiversity and, prior to the enclosing of the common, was ideal for walking and horse-riding. Now, with tipping going on in an uncontained manner and much of the mountainside fenced in, it is almost impossible to use it in an adequate way. This land which we have personally used over a period of over eighty years (Resident letter dated 12/06/06).

The impact on local communities of loss of amenity, as well as the benefits of natural open areas for increasing physical activity thus improving physical health and mental wellbeing is presented in the Margam HIA report (2005), pp.29-31 and pp.45-50.

Protected species

There are no statutory or non statutory sites of nature conservation importance within or in the vicinity of the proposed site (Environmental Statement, 2003). However, residents attending the workshop in June 2006 expressed concern at the loss of some rare species if the scheme goes ahead. Indeed, residents report that the Welsh hill mountain pony is present on the land and is a protected breed and will be affected by the removal of its grazing land. This breed has been present on this land for hundreds of years. This mammal is not identified in the Environmental Statement (2003). The area is the breeding ground of the lapwing and residents are in contact with the RSPB. The Lapwing and other species, including Barn Owl, Kestrel, Snipe, Curlew, Cuckoo, Redstart, Stonechat and Willow Warbler, are recorded as breeding at the site (Environmental Statement, 2003). Residents also reported that the Great Crested Newt is present on the land (workshop, June 2006). The food manufacturer also mentioned the presence of rare newts and thought that this usually takes priority (food manufacturer, interview, 06/07/06). The Great Crested Newt is included in Annex IV of the EC Habitats Directive (and hence in Schedule 2 of the UK Habitats Regulations) and is listed in Schedule 5 of the Wildlife and Countryside Act 1981, under which act it is afforded full protection under section 9 (Environmental Statement, 2003) . A representative of the food manufacturing company believed that there were only one or two sites in the country where this rare species of newt was present (interview, food manufacturer, 06/07/06).

Land Reclamation

Some residents who attended the workshop did state that the former tips were a scar on the landscape and that if it were just a reclamation scheme this would be more acceptable, but residents had to endure 15 years of open cast activity before any reclamation work begins. Residents who attended the workshop also felt frustrated and powerless that because the scheme involved coal extraction, the company was allowed to do whatever they like. Residents also commented that the attitude of the company was that residents “should be grateful” that the site will be subject to reclamation, which would later include a visitor’s centre. However, residents stated that not everyone agrees with the proposed plan. One resident stated that reclamation of the land could be achieved by means other than a scheme of coal extraction lasting for 17 years with a further period for land reinstatement (workshop, June 2006).

Reinstatement

Local residents also believe that the land cannot be completely reinstated and point out that there are rare species on site. Footpaths will not be replaced in the same as is currently the situation on the Urban Common. One resident had walked along a new right of way and it was adjacent to the dual carriageway. The resident described this footpath as “boring” and “awful” (workshop, June 2006). Residents gave examples locally, for example the top of Dowlais Valley, where land after opencast activity had been reinstated as “plastic” countryside. It was reported that the area consists of rye grass, the hedges are mono-culture

and concrete gutters have replaced natural brooks, not contributing to the diversity of the countryside. Residents also gave an example of Parc Slip at Margam, South Wales which was a previous opencast site. One resident stated that when this was restored they put in alder trees, which had to be held up because the roots of the trees could not take to the shale (workshop, June 2006) (see Margam HIA report, 2005, pp.49-50). One resident living near the proposed Ffos-Y-Fran site stated that, “It can never be put back to our satisfaction and it will take centuries to come back” (workshop, June 2006) and a local businesswoman also writes about the experiences of previous phases of the scheme:

I am very concerned about the local environment and, especially having seen the soulless monoculture introduced after one previous “reclamation” and the broken promises that followed another, I have no hope of a healthy ecology being restored or helped at the end of this project (Twynnyrobyn resident letter, 12/06/07)

A local retailer observed that a lot of the natural beauty of the area had already been taken away. Open spaces had been replaced by housing (food retailer, interview, 21/07/06).

For many residents 22 years would be too long to wait for the land to be reinstated. Residents would have to live with the removal of earth, former waste tips, and coal on an extensive site for 17 years before any land reclamation was begun. Indeed, as residents stated in the workshop local communities would not have access to the site for in excess of 20 years and will not be able to look forward to using the land for the next generation (workshop, June 2006).

A young man wrote to the researcher stating that:

The sheer size and length of the proposed work makes it infinitely more worrying. Although I am a young man now, I am very aware that I would be well beyond that by the time there was any prospect of work coming to an end. Moreover, even when it is finally completed, there is little hope that the countryside will have been genuinely reclaimed – open access, with all its health benefits, to an area of what could be, if real reclamation took place, an outstanding environmental and ecological resource seems unlikely to occur given the track record of earlier schemes in the area (Twynnyrobyn resident letter dated 12/06/06)

Future use of the site

Miller Argent (South Wales) Limited, is part of the Miller Group Limited, acquiring the mining interests of Wimpey Mining who were British Coal’s nominated sub-contractor for Phase I and Phase II of the East Merthyr Land Reclamation Scheme.

The Company is a joint venture between:

- The Miller Group Limited
- Argent Group PLC, and
- Bernard J. Llewellyn JP

The Miller Group Limited is the UK’s largest privately owned Housebuilding; Property Development; and Construction Services Company and the Argent Group PLC is a large

London based Property Development company. The family of Bernard J. Llewellyn JP have been involved in coal recovery operations, drift mining and coal washing, in South Wales for three generations (www.ffos-y-fran.co.uk).

The Environmental Statement (2003) and Miller Argent through their website have promised that the land will be returned to local people as a local amenity. Although some of the reinstated land will include wooded areas (mainly on the boundary with the A4060 trunk road), grassland, hedgerows, and a small area reinstated to wet heath land using existing soils, the majority of the restored site will comprise an upland grassland grazing area (www.ffos-y-fran.co.uk, Environmental Statement, FLRS/ES3/5).

Residents are concerned that at least part of the land may be utilised for housing development as with previous phases of the land reclamation scheme, such as the site of Phase I of the scheme which has been developed by 'Redrow' as a housing estate known as Bradley Gardens. An area adjacent to the slip road between the old A4060 and the new A4060 trunk road currently owned by Merthyr Tydfil CBC has been identified as potential land for employment development in the emerging Local Development Plan currently being prepared by the Planning Division of Merthyr Tydfil CBC in partnership with local communities and will aim to:

- Help stimulate economic growth,
- Help promote social inclusion,
- Protect the best elements of the environment.

The new Local Development Plan (LDP) in accordance with the Planning and Compulsory Purchase Act 2004 will supersede all previous local planning guidance upon adoption in October 2009 (www.merthyr.gov.uk).

An article in the *Merthyr Express* describes the broken promises made by British Coal and the local authority that once the site of a previous opencast was reinstated, this would benefit the local community through the planting of trees and landscaping. The resident goes on to state that:

This was something to look forward to after the five years of dust and noise and it did take place – however, once the grass and trees had grown they were only to be ripped up and burnt on site then replaced with dust and noise with the building of the housing estate called Bradley Gardens (Collins, *Merthyr Express*, 21/04/05).

A resident attending the workshop firmly believed that the void left after open-casting will become a landfill site. A newspaper article reports fears of another resident about the future use of the proposed opencast as a massive landfill site (Thomas, unknown newspaper) and this was also reported in an article appearing in a Guardian supplement citing the landfill use of former opencast sites elsewhere (Newnham, *Guardian Weekend*, 1997). Residents also raised concern about the potential for future opencast mining to the south of the Ffos-Y-Fran site, towards Pentrebach.

Section Three: Health Impacts

Waste Extraction and Disposal

The remit of the Environment Agency Wales (EAW)

At the workshop held with local residents and community groups, Gary Evans and Gwyn Jones of the Environment Agency Wales (EAW) spoke to the audience and answered questions about both the Trecatti Landfill Site, and the removal of waste from the Ffos-Y-Fran site (workshop, June 2006).

One of the roles of the Environment Agency is to build trust in local communities through effective communication with local people as well as liaising with the developer (EA, *Creating a Better Wales*, 2006). At the workshop the Environment Agency Wales spent some time speaking to people individually, taking peoples' contact details with the promise that the EAW will attempt to answer people's questions at a later date if not able to do so at the workshop (EAW, workshop, June 2006) and have offered to participate in any further events that involve local people (EAW, interview, 23/04/07). EAW representatives have provided information to the researcher on request and during interviews held 18 August 2006, 13 October 2006 and 23 April 2007.

Better Environment, Healthier People (2005) shows how the Environment Agency has achieved success in reducing pollution from many industries that they regulate and continue to target a range of high polluting industries that pose the highest risk to health (Environment Agency, *Better Health, Healthier People*, 2005). The Environment Agency is well aware of the fact that human health and the physical environment are inextricably linked, including the impact of the environment on quality of life (Environment Agency, *Creating a Better Wales*, Corporate Strategy, 2006).

Regulatory role of the EAW, Ffos-Y-Fran site

The Environment Agency Wales (EAW) stated that their role in the proposed Ffos-Y-Fran scheme is different to that at Trecatti Landfill site, which was also of concern to residents (see below). The day-to-day operations of the proposed scheme at Ffos-Y-Fran, are the responsibility of Merthyr Tydfil CBC as the monitoring body, with limited involvement for the Environment Agency Wales. The EAW will have a regulatory role in the first six months when the former waste tips are being screened and removed, and any hazardous waste is being disposed of off-site and a monitoring role in relation to surface water for the duration of the scheme (EAW, interview, 23/04/07, and workshop, June 2006).

Mobile plant licenses will more than likely be needed to allow Miller Argent (South Wales) Limited to screen the waste on site which is extracted during excavations (EAW, workshop, June 2006). At the time of the workshop the EAW had not approved any mobile plant licences to the company (EAW, workshop, June 2006) but a licence will be required if the company chooses to treat the contents of any existing waste tips on site. The permit allows the use of equipment at any site operated by the company in England and Wales. When a new licence is issued, there is a six month appeal period during which time an appeal can be

submitted to the Planning Directorate. However, the licence is attached to the mobile plant equipment and not to a particular site, and there is no right of appeal against the use of equipment at a particular site. However, in this case the operator will be required to submit details of the deployment of the equipment to the EAW which will only permit the use of the equipment at the Ffos-Y-Fran site if the Agency is satisfied that the environmental issues directly surrounding its use are adequately controlled. The EAW will also have a duty to inspect the 'mobile plant' (EAW, interview, 23/04/07). The Ffos-Y-Fran scheme will not require either a Pollution Prevention and Control (PPC) Permit or a Waste Management Licence (WML) since the scheme does not involve the acceptance of additional waste material on site (EAW, interview, 23/04/07).

Trecatti Landfill site –synergistic effect

The Environment Agency Wales also has an opportunity to monitor the cumulative or synergistic effect of the Trecatti landfill site and the Ffos-Y-Fran scheme and are working with both Miller Argent (South Wales) Ltd and the operators of the Trecatti landfill site (EAW, workshop, June 2006).

Trecatti Tip is a large landfill site situated at Dowlais Top, close to housing and a retail park. The presence of the tip was a key source of complaint for residents throughout the area but especially for residents of Dowlais Top. The main reported problems from the Tip are smells, swarms of flies, dust and noise (Adamson et al, 2004). This is confirmed by the Environment Agency Wales which is the primary regulator at the Trecatti Landfill site and conducts routine inspections. The Agency holds quarterly meetings with Dowlais Forum, a local liaison group, and most complaints received were about 'odour' although there were also complaints about flies, litter and birds (EAW, workshop, June 2006).

In the study carried out by Glamorgan University, 14% of respondents recorded Trecatti Tip as the 'one main issue' which concerned them about their environment, with 11% reporting that the tip was the main issue in relation to 'health and well-being' in the area. Issues relating to Trecatti were affecting residents' quality of life (e.g. the ability to open a window or enjoy the garden in the summer months) (Adamson et al, 2004). Interviews and correspondence received by the researcher supports these findings. A food retailer describes the effects of the Trecatti Landfill site, and the meat factory (food retailer, interview, 21/07/06) and a resident describes the unpleasant odour when shopping at a local supermarket (house-to-house survey, 2006). People who live, or have lived, close to Trecatti (4) describe the effects on health, such as runny eyes and respiratory complaints, as well as nuisance in streets, gardens and communal parks from odour, insect infestations, seagulls and rubbish (house-to-house survey, 2006).

The proximity of the Ffos-Y-Fran site to Trecatti landfill site is of concern to local people who attended the workshop, especially potential risk of damage to the lining of the landfill through activities associated with opencast mining, such as blasting. The EAW state that there was no evidence that this will occur (workshop, June 2006). Miller Argent (South Wales) Limited indicate that an approximate buffer zone of 400 metres will exist and be maintained in the "surface levels" of the site (Miller Argent, April 2007). In 2004, a decision was made by the Scottish Executive to protect rural communities from the worst effects of pollutants associated with open-casting. The Scottish Executive rules that new open-cast

mines should ensure that communities are not subject to disproportionate negative impacts where sites are to be located near existing mines, quarries or landfill sites. The rules have been drawn up to avoid the “cumulative impact” of multiple sources of pollution on local residents (Morning Star, 03/09/04). Indeed, SPP16 (2005) states that it is particularly important if there are two or more operational sites located within 5km of nearby communities and that:

In such circumstances, an assessment of the likely cumulative impacts of additional workings, if approved, on all communities within a radius of 5 km of the proposed boundary should be undertaken (SPP16, 2005).

Water courses and flooding

The effects of the Ffos-Y-Fran scheme upon water courses and flooding were of concern to local residents and a food manufacturer (see Economics Section) and this was based upon past experience of former opencast schemes in the locality. Based on previous experience with the extraction of waste in former landfill sites, the EAW also state that ‘water’ could potentially be a problem (EAW, interview, 18/08/06). The Agency has a regulatory role in relation to the monitoring surface water discharge at the Ffos-Y-Fran site (EAW, workshop, June 2006).

Local residents had experienced problems with flooding during former opencast coal recovery and coal washing in the area. One local resident reports that flooding of the slip road and bogey road occurred during a much earlier phase of opencast coal extraction during the 1960s and 1970s. Properties affected were those at Incline Side and Mountain Hare. When coal extraction ceased in 1970, there was no further flooding of these areas. This resident feared that the proposed scheme would again see flooding of properties at these two locations. Water from previous opencast sites, and building work, has been a problem for people living in houses close to the proposed scheme. Residents living near to the Trago Mills site describe the effects of dust, noise, and the flooding of gardens (Heolgerrig resident, house-to-house survey, 2006). Thomastown residents (3) report of having first-hand experience of the removal of some small tips near their home during the 1980s which changed the underground watercourses and caused flooding every time it rained (Resident letter dated 15/06/06). This resident provided photographic evidence of these problems caused by the removal of these tips to enable playing fields to be made available to Cyfartha High School. Several properties had outbuildings, such as garages flooded to a depth of 6-9 inches with a large amount of slurry left behind. This event had never happened in this location before, with some residents having lived there for 40 years (Letter from Queens Road resident to CEO Merthyr Tydfil council dated 13/09/82). The EAW state that the proposed process of open-casting, extraction and backfilling, will alleviate the risk of flooding, nature taking away most of the water on site (EAW, interview, 23/04/07).

Residents also gave more recent examples of risk of flooding. One resident living at Bradley Gardens describes how during heavy rain in May 2006 water could not drain away through culverts which were blocked with rubbish and debris and questions whether the small embankments constructed to take rain water will be able to cope with excess water from the proposed Ffos-Y-Fran site (Bradley Gardens resident, letter dated 17/06/06). Excess water will be taken away from the Ffos-Y-Fran site by open culverts at the side of the A4060 trunk

road, and travel down hill towards Pentrebach (EAW, interview, 23/04/07). Another resident reports that the Trecatti site is part of the Dowlais Free Drainage System which is a very complicated drainage system on the mountain, having formally been used to feed water to Dowlais Steel works (www.ggat.org.uk).

Residents are also concerned that waste from Trecatti will leak into the opencast site, and hence into water courses. The EAW state that there is no evidence of any leachate in the samples taken from water on site to date (EAW, workshop, June 2006). Any future risk will only occur if the company go below the water table in which case water will be pumped out, and may need to have discharge consent. The Environment Agency Wales will regulate this activity. If there is evidence of any leachate, then this will be put into enclosed tanks and taken away to a licensed disposal point (EAW, workshop, June 2006). The EAW will carry out routine sampling and this activity is ongoing, and if leachate does escape and is discovered in groundwater then it will need to be treated (EAW, workshop, June 2006). Residents were concerned about the transporting of any leachate through town and the possibility of the explosion caused by methane gas, the explosive element present in landfill waste. The EAW state that the likelihood of methane gas being present is very rare, and that the leachate would be in a diluted state and contained in a confined tanker for transportation (EAW, workshop, June 2006).

Bore-hole testing

Bore-hole testing has taken place on the Ffos-Y-Fran site and surveyed bore-hole positions appear in the Geoenvironmental Ground Investigation report (Figures 11992/020, Miller Argent, 2003) with a map of the site identifying the location of bore-holes appearing at Appendix 3a. From the investigation, the report concludes that “landfill materials generally comprise sand and gravel size ash and colliery shale with some domestic and demolition debris” which included wood, cloth, metal and glass. This sort of material will be removed before it is reused on site as earthworks fill (Miller Argent, July 2003). Household waste such as this will most likely be disposed of at the adjacent Trecatti landfill site (EAW, interview, 23/04/07). Two areas in the Merthyr Landfill had a high proportion of putrescent material which if encountered during excavation work would need to be subject to a higher degree of treatment and would need to be disposed of off-site at a suitable licenced/permitted waste facility (Miller Argent, Geoenvironmental Ground Investigation, 2003). Any waste identified as ‘hazardous’ would be disposed of at an appropriate facility at Swindon (EAW, interview, 23/04/07). The Geoenvironmental Ground Investigation identifies several ‘hotspots’ of higher concentrations of potential contaminants which are presented in table 5 (below) which will require “suitable disposal”.

Table 5: Identified ‘hot spots’ of elevated concentrations of potential contaminants

Landfill name	Borehole	Sample depth (bgl)	Contaminant	Classification
Hoover	BH2/03	2.0m to 4.0m	Zootoxic metals Phytotoxic metals Fluoride Mineral oils	Non-hazardous
Hoover Hoover	BH4/03 BH6/03	2.0m to 4.0m 4.0m to 6.0m	Diesel range hydrocarbons Phytotoxic metals Fluoride TDS Mineral oils	Inert Non-hazardous
Merthyr	BH8A/03	0.0m to 4.5m	Biodegradable content	Non-hazardous
Merthyr	BH12/03	0.0m to 4.2m	Biodegradable content	Non-hazardous
Tip 13	BH16/03	4.0m to 6.0m	Zootoxic metals Phytotoxic metals	Non-hazardous
Tip 13	BH18/03	2.0m to 4.0m	Zootoxic metals Phytotoxic metals Sulphate Mineral oils Diesel range hydrocarbons	Hazardous

Source: Geoenvironmental Ground Investigation, Miller Argent, July 2003

The ground investigation did not find any asbestos, plasterboard or other hazardous or harmful material but suggest that a “watching brief” for such materials be put in place. The report also suggests that workmen will need to take precautionary measures due to the slight risk of accumulation of harmful gas in confined spaces. Perched water tables will also need to be carefully handled during the excavation of landfill waste to avoid contamination of surface water courses (Miller Argent, Geoenvironmental Ground Investigation, 2003).

Residents attending the workshop wanted to know who guided the developer towards the tips, and hence the location of test bore-holes (workshop, June 2006). A proposal on the location of bore-holes was presented to the EAW by the company and their agents (Peter Brett Associates, consulting engineers) and agreed with the EAW to allow testing to begin (EAW, interview, 23/04/07). A decision was made on the best available evidence but the EAW did acknowledge that the investigation using representative samples did not take community knowledge into account, although it recognised the benefits of local knowledge (EAW, workshop, June 2006). Further bore-hole testing has taken place following evidence presented to the High Court in December 2005 about Tips 4 and 5. The site of bore holes in this second investigation is presented at appendix 3b. From the available evidence from sampling, the report concludes that Tips 4 and 5 are most likely made up of reworked colliery spoil materials, and low levels of potential contaminants. However, samples collected and analysed for Total Petroleum Hydrocarbons (TPH) showed elevated concentrations and strong hydrocarbon odours and paint tins recorded at TP403 and TP406 (Appendix 3b). The report continues that these results are “significant and these ‘hotspots’ of contamination will need to be addressed during any proposed excavation operation” (Miller Argent, Geoenvironmental Ground Investigation, 2006).

One person attending the workshop stated that certain tips on the site had been missed by the bore-hole testing. Limited local knowledge had been used to locate Tips 4 and 5. The resident who assisted in this process remembers that tips had been concreted over and although water samples have been taken, the presence of heavy metals had not been tested. It was reported that these were well-above the European limit. The resident continued to stress the need for the tips to be treated as landfill sites, and not simply as old mine shafts as stated in the Geoenvironmental Ground Investigations (2003 and 2006). One resident asked:

Who is going to protect us? Who can we trust with the people's health? It is upsetting and depressing and worrying (workshop, June 2006).

Waste removal: toxic substances, and local knowledge

The Environment Agency Wales acknowledges that there is potential for odours from the removal of waste from the former tips. At this time there will be the potential for dust and odour and the EAW will take any measures to minimise any negative effects (EAW, workshop, June 2006). Whilst investigative drilling of boreholes was taking place a chemical was used to suppress any odour and the Agency reports that it did not receive any complaints. From work done so far, the Agency states that there doesn't appear to be any evidence of hazardous waste at Ffos-Y-Fran but that it is possible that hazardous waste will be uncovered. The Agency are ready to use regulatory tools should the need arise (EAW, workshop, June 2006). It is envisioned that the mobile plant used to screen extracted waste will not generate excessive emissions but the EAW will have powers to regulate this (EAW, interview, 23/04/07). However, the Agency's main regulatory role will be limited to monitoring surface water discharge (EAW, workshop, June 2006) (see below) and had limited powers in relation to the land reclamation scheme. Merthyr Tydfil CBC is responsible for monitoring air quality, dust, noise and vibration, and vehicular movements (EAW, interview, 23/04/07).

Residents attending the workshop reported that they had evidence of waste having been tipped at the Ffos-Y-Fran site from different places and that many toxic substances were discarded on the Ffos-Y-Fran site during the 1960s and 1970s before systematic records of waste disposal were kept by local authorities (workshop, June 2006). At a Council meeting in 2003, it was stated that Tip 13 had been granted planning permission for the "tipping of household waste" in 1972, Cwmbargoed Main (Merthyr) Tip for "Disposal of inert material" in 1979 and Hoover Tip for "tipping of waste materials from the Hoover extension site" in 1970. There was uncertainty at this meeting about whether Merthyr Tydfil council had consent to tip, and that materials may have been tipped by private contractors at this time (Merthyr Tydfil CBC, Council meeting, 10 Nov 2003). Some of those who attended the workshop could remember playing on the tips at Ffos-Y-Fran when they were children and this would have been much earlier than the 1970s. One individual stated that there is evidence of Calcium Sulphate Dihydrate having been disposed of on site (resident, workshop, June 2006). One employee of the former Croda Factory, an electro-plating plant, recalls the type of chemicals used in the process, which includes cyanide, acids, caustic soda, caustic potash, cadmium and trichloroethylene. Waste products of these chemicals left the factory during the 1960s and 1970s, and possibly the 1950s, in drums and barrels for disposal (Gellideg Estate resident letter dated 01/06/06). Another resident remembers that the contents were legally tipped but there was no monitoring and/or records were lost (workshop, June

2006). Another resident reports in a letter to the researcher that her late father followed lorries at night and watched them dumping chemical waste. This resident's father had always worked with chemicals and knew of the dangers they posed to health. He had said that "if these undisclosed sites are ever touched it would be like a time-bomb over our town". The resident is therefore shocked that Merthyr Tydfil CBC is allowing the removal of landfill which has unknown contents and believes that the 'cap' should be left firmly in place (Resident letter dated 30/09/06). Residents were not the only people concerned about the removal of potentially harmful chemicals; a food manufacturer had concerns about the removal of waste from the site:

If they dig something up that they do not realise is there. They will have to run a cordon around it (food manufacturer, interview, 06/07/06)

Residents have identified a study carried out by Rust Environmental in 1994 on land owned by the O'Sullivans, an area between Tip 13 and Longtown Tip. It was reported that tipping had taken place in the area between 1975 and 1978, and that this had affected land owned by the O'Sullivans. By 1990 an area of 0.9 acres was affected by leachate from tips. Grass had grown on the top of the tips but not on this land, or on channels scoured into the tips and this was presented as evidence of contamination. This was supplemented by photographic evidence and a chemical analysis of soil samples taken from three locations on the O'Sullivans' land (table 6). The data was analysed by Anchem Laboratories Limited located at Llandarcy, Neath, an independent analytical laboratory, in June 1995 and the results are presented in table 6 (below).

Table 6: Analysis of soil samples taken from land between Tip 13 and Longtown Tip

Determinant	Sample 1	Sample 2	Sample 3	EC Guide	Maximum
pH	3	2.9	2.9	6.8-8.5	
Sulphate(SO4)	1978 ppm	1830ppm	1931ppm	25.00ppm	250.00ppm
Cyanide(Cn)	<0.1	<0.1	<0.1	-	0.05
Iron (Fe)	41	58	16	0.05	0.20
Aluminium (Al)	28	32	51	0.05	0.20
Magnesium (Mg)	155	153	136	30.00	50.00
Calcium (Ca)	307	274	250	100.00	-
Manganese (Mn)	15	15	15	0.02	0.05

Source: Anchem Laboratories Limited, June 1995

The samples presented as parts per million (ppm) are exceptionally acidic with many in high concentrations compared with the then EEC standards. Each determinant far exceeds the EEC guideline and indicates very high sulphate content. The report states that "the combination of all of these metals makes the water highly toxic" (Rust Environmental report, 1995). Since this study was completed in 1995 the European safety levels for hazardous substances are likely to have become more stringent. Indeed, the classification of waste as 'hazardous' has changed over time (EAW, workshop, June 2006). Lay knowledge about the dumping of waste on the Ffos-Y-Fran site over a number of years therefore is important. Furthermore, the Environment Agency Wales state that the changing classification of waste historically now also has implications for waste previously disposed of at the Trecatti landfill site (EAW, workshop, June 2006).

As stated above residents attending the workshop mentioned a number of hazardous waste and chemicals, including asbestos, that may have been disposed of at the Ffos-Y-Fran site as well as there being unofficial dumping sites that are uncharted and un-logged (workshop, June 2006). A recent newspaper article (Hall, Merthyr Express, 14/09/06) explains that evidence from the National Archives in London shows that 240 tons of asbestos compound and more than 100,000 face pieces from gas masks were dumped down a disused Dowlais mine shaft between 1946 and 1948. There are also other recent national media reports about the dumping of toxic waste by companies, such as Monsanto, at landfill sites across the UK in the 1960s and early 1970s (Vidal, The Guardian, 12 February 2007). Residents firmly believe that Ffos-Y-Fran has long been an unofficial 'dumping ground' for undocumented waste and that this is well known locally (workshop, June 2006).

Residents who attended the workshop want the waste left where it is, buried, and do not want it extracted and exposed (workshop, June 2006).

Section Four: Discussion, conclusions and recommendations

Cumulative Impacts

Scottish Guidance on coal extraction states that:

... planning authorities must ensure that proposals will not subject any community to a disproportionate burden of environmental impacts or perpetuate unacceptable disturbance to a particular community. This will be particularly important if there are already two or more operational or consented sites that could raise similar impacts within 5 km of any nearby community. Such sites will include:

- Other opencast sites
- Sites for the extraction of other minerals; and
- Landfill sites

In such circumstances, an assessment of the likely cumulative impacts of additional workings, if approved, on all communities within a radius of 5km of the proposed site boundary should be undertaken (SPP16, 2005, para 13).

Residents report that if the proposed Ffos-Y-Fran scheme goes ahead there would be a number of cumulative effects, as follows:

Waste extraction and existing polluting industries

The adverse effects of the Trecatti landfill site and the Meat Factory on local communities close to the proposed FLRS was reported by local businesses, residents attending the workshop and in correspondence to the researcher as well as by the Environment Agency and independent research conducted by the University of Glamorgan. Residents believe that this scheme would add cumulatively to effects of odour, swarms of flies, dust and noise already experienced, especially since the Ffos-Y-Fran scheme includes the deposit of the contents extracted from other former landfill sites. The site boundary will also be close to the Trecatti landfill site itself, although there will be a 400 metre buffer zone between opencast workings and the Trecatti site.

Letters received from local residents and the house-to-house survey explain how some residents are currently being affected by building work taking place in the locality and believe that the effect of the FLRS would add cumulatively to effects from dust already experienced from these activities (see Nuisance Dust section).

The scheme proposed for this site is unusual as it also includes the extraction of the contents of former waste landfill sites, some of which were used during the 1960s and 1970s before accurate recording began.

As well as the Meat Factory, there are also additional operating landfill sites in the area, Brynpica Landfill Site, Rhondda Cynon Taff within 5 km of the scheme and Trecatti Landfill Site which is within 0.5 km of the Ffos-Y-Fran site.

On this basis, the scheme would most likely not be approved under Scottish Planning Policy where unacceptable cumulative impacts cannot be mitigated (SPP16, 2005, para 14) (see above).

Health and effect on the neighbourhood

The people of Merthyr Tydfil have the worst health than any other local authority in Wales in terms of COPD, Heart disease, stroke and mental health, and this is well-documented. Residents have stated (workshop and correspondence) that the Ffos-Y-Fran scheme which will last for 22 years, with 17 years of opencast coal extraction, will worsen the health of local people, as one resident writes:

I believe that Merthyr Tydfil in its history has suffered enough industrial pollution which is now presenting itself in our older citizens, ie, chest and heart problems (Bradley Gardens resident letter dated 15/06/06)

Statistical evidence on the poor health of people living within this local authority area, including the wards and statistical areas in closest proximity to this scheme, supports this statement and has been reported as part of this study.

The workshop highlighted how local people felt that Merthyr Tydfil had a negative image, and that this development would be regressive in terms of inward investment of cleaner industries and in raising the image of the town with local people and with people elsewhere.

Extent of the scheme and duration

The Ffos-Y-Fran scheme will involve the extraction of 10.8 million tonnes of coal over a 998 acre (400.6 hectare) site and will last for 17 years, with a further five years for restoration (22 years in total).

The Coal Technical Advice Note (Wales) states that:

the (planning authority) should be encouraged to judge the level of activity that a particular locality and its community can reasonably be expected to tolerate over a particular period, as well as the potential benefits, such as job opportunities, the value to the economy and the scope for landscape and amenity improvements (Coal MTAN, Jan 2006, p.4)

The workshop highlighted the fact that local people had already experienced opencast mining and related activities in the area since the 1950s, and wanted to see an end to it, especially as this scheme was a much bigger scheme in terms of size and duration than any previous opencast activity in the locality. For example, letters received and the house-to-house survey show that those living near the proposed site were very concerned about the 22 year duration of the Ffos-Y-Fran scheme.

Phase III which was approved by the Planning Division of Mid Glamorgan County Council in 1988 would be more acceptable to local residents. This was a much smaller scheme extracting 5 million tonne of coal which would be completed in a much shorter time, 8-9

years. The duration of this previously proposed scheme would have a lesser negative economic effect upon local businesses, inward investment and house prices. Although, there would still be negative economic effects as well as adverse effects upon health, quality of life and wellbeing but for a shorter period of time.

Conclusions

The report raises doubts about the economic benefits stated by the company in documentation produced during the planning process. Although there will be employment generated by this development, the extent of job creation and the number of jobs that are taken by people living in Merthyr Tydfil has been questioned. It seems likely that there would be an adverse effect on some existing companies, especially the food industry and tourism, and on inward investment and house prices, at least for the duration of the scheme.

The evidence presented in this report shows that there is an element of doubt about the contents of former landfill sites, and that although in the second bore-hole testing completed by the company in 2006 some local knowledge was used, bore holes were still not sunk at all locations and at depths indicated by local people. Residents therefore are concerned that hazardous, dangerous and potentially health damaging materials will be extracted during the waste removal process, and this adds cumulatively to the effects of opencast workings.

The Coal MTAN (2006) states that:

(planning authorities) should set out their strategy for the sustainable management of the coal resource, directing coal operations away from sensitive locations and ensuring that any environmental or community impacts can be mitigated (Coal MTAN, 2006, p.9)

Based on previous experience of responses to residents' complaints from the local authority and the complex nature of this particular scheme, local people who took part in this study are concerned that Merthyr Tydfil CBC will not be able to adequately monitor dust, noise, vibration and potentially damaging air-borne pollutants, and take the necessary action if air quality and other standards are breached. For example, nitrogen dioxide levels at one location, Twynnyroddyn Hill, have been identified by Merthyr Tydfil CBC as a 'hotspot' and data from this location is contained in this report. However, even when noise, vibration, dust and air-pollutants are within regulatory limits, local communities can still be affected adversely, and some local communities and vulnerable populations are within much closer proximity to this site than at other opencast coal sites in other parts of Wales, namely Margam and Brynhenllys.

Doubts have been raised about current regulatory limits on air pollutants, noise, vibration and dust, and that there are currently no agreed standards against which smaller particles can be measured which are potentially more damaging to health. This report also raises questions about evidence on the prevailing wind direction presented during the planning process and concludes that wind in this locality due to its unique topography can also prevail from a north easterly direction for a high proportion of the year. Climate change may also affect this as Britain is likely to experience hotter and drier summer months. Proposed mitigation and monitoring taking account of current regulatory guidance therefore would not afford local

communities in closest proximity adequate protection from the worst effects of this scheme, namely noise, dust, vibration and air-pollutants which is likely to affect their health, quality of life and wellbeing for a substantial length of time. The closest community is within 36-100 metres of the proposed site and this community contains a number of vulnerable adults and children. The developer has accepted the value of buffer zones by relying upon the need for such a distance between the Trecatti landfill site and the coal extraction workings. The Draft Coal TAN for Wales (2006) recommends a distance of between 250-350 metres, and in Scotland the recommended distance is 500 metres from the edge of a community to site boundary.

Residents agree that the area is in need of reclamation but believe that the previous scheme proposed in 1988 would have been able to reclaim the Urban Common land and protect bio-diversity and historical landscapes, thus retaining the distinctive topography of Ffos-Y-Fran and the character of the area.

The inspector appointed by the National Assembly for Wales to the inquiry into a compulsory purchase order of land in 1999 for the revised Phase III scheme concluded that:

I see the coal extraction as the operational means chosen to achieve the reclamation and in that context I believe it is excessive and harmful.
(East Merthyr Land Reclamation Scheme, Inquiry, 1999)

Human Rights Act

The Human Rights Act (1998) was incorporated into Welsh law in 1999 as part of the Government of Wales Act, when powers were transferred from the Secretary of State for Wales to the new Welsh Assembly. The Act extends freedoms established under the European Convention on the Protection of Human Rights and Freedoms. Articles in the Act are applicable to local people living near the proposed opencast site and land reclamation scheme, namely different treatment and a ‘presumption against’.

Different treatment of people

Article 14 of the Human Rights Act refers to different treatment of people ‘placed in analogous situations’. This part of the Act could be invoked at Ffos-Y-Fran as there is inequity of protection compared to the rest of the UK, for example planning guidance in Scotland where larger buffer zones, 500 metres, between opencast workings and local communities are in force differs to Wales (see sub-section ‘Separation Zones’). Larger separation zones from “defined settlement boundaries” and “operational boundary”, namely between 200-350 metres, are contained in the Draft MTAN for Wales, but at present there is no ‘presumption against’ (COAL MTAN Draft, 2006). The Ffos-Y-Fran scheme in effect contains no buffer zone since operations will take place within 36 metres of the nearest property, and between 36 and 100 metres of the community in closest proximity.

Cumulative impacts have been identified and discussed (pp. 79-81) and the scheme would most likely not go ahead under Scottish Planning Policy if unacceptable cumulative impacts cannot be mitigated (SPP16, 2005, para 14).

In Scotland, there is also a general principle “presumption against” development in Scottish Guidelines for Open-casting (Scottish Executive Planning Division, Letter dated 27/07/06, SPP16, para 8) unless it meets one of the following tests:

- Is the proposal environmentally acceptable (this includes impacts upon local communities as well as the environment) or can be made so by planning conditions and/or agreements?
- Does the proposal provide local or community benefits which clearly outweigh the likely impacts to justify the grant of planning permission? This includes improvements of a local amenity or future development opportunities resulting from the clearance of a substantial area of derelict or despoiled land and/or where extraction generates employment where jobs are genuinely available to local communities (SPP16 para 8, pp.4-5).

Evidence presented in this report shows that the communities living in closest proximity to the site are not therefore afforded the same protection as elsewhere in the UK, namely in Scotland, and would be adversely affected if the scheme went ahead.

Respect for private and family life

Article 8 (1) – right to respect for private and family life, home and correspondence. This article has broad coverage and 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).

Failure to address a particular health concern

Article 2 taken with article 14 – failure to address a particular health concern which disproportionately affects one community or section of the community. Whilst some health issues have been considered in the planning process, other health concerns have not. This would include mental health, such as anxiety and depression that may be exacerbated or caused by major developments such as this scheme.

Aarhus Convention

The Convention on Access to Information, Public Participation in Decision-making and access to Justice in Environmental Matters, Aarhus, 25 June 1998, entered into force for the United Kingdom on 24 May 2005, and is mentioned in the Draft Coal Tan (January 2006). The consultation process for the Ffos-Y-Fran land reclamation scheme may not have met the requirements of the Aarhus Convention as detailed below:

Article 6 (6) Access to information relevant to decision-making

Some organisations and agencies have been open and transparent, providing information and reports on request. Organisations and agencies include local businesses, National Public Health Service for Wales, the Ramblers Association and the Environment Agency Wales.

Information has also been requested of the local authority. Although advice has been given as to the location of certain information, some requested information has not yet been provided by the local authority environmental health department. Monitoring data on levels of particulate matter taken at various locations around Merthyr Tydfil is awaited.

Article 6 (8) Decision did not take due account of outcome of public participation

Local residents felt that evidence that was produced and presented by lay people during the planning application process was not given equal weight compared to evidence presented by 'experts'. For example, lay knowledge about the location of former landfill sites was ignored until fairly recently (June, 2006).

The workshop was well-attended by a wide range of people drawn from the local community. People attending this workshop, were concerned about the potential health effects of both the proposed extraction of coal by opencast methods as well as the contents of former landfill sites.

Residents requested a health impact assessment to which they could contribute. This study has gone some way in enabling the local community to participate. In order to ensure that there is proper and effective participation in the consideration of the scheme, it is important that the points raised during the assessment are properly taken into account by carrying out a review of the decision of the proposal.

Recommendations

- That the findings of the assessment properly inform the decision to extract coal from Ffos-Y-Fran, for example, by carrying out a review of the Welsh Assembly Government's decision of 11 April 2005.
- An independent in-depth examination of the wider effects upon the population, as well as potential effects upon physical health on populations in closest proximity to this site should be undertaken. Undertaking epidemiological studies using health statistics in small-scale studies is always problematic as small numbers are usually not statistically significant, and the study would need to be much more inclusive and comprehensive in depth and coverage.
- That any decision to extract coal takes into account the need for a 500 metre buffer zone, to afford the local community a similar level of protection as elsewhere in the UK, namely Scotland.
- Propose that the much smaller scheme that would have less effect economically, and on health, wellbeing and quality of life. This would also need to include the reclamation and restoration of the Urban Common for local people in a sensitive way taking account of the biodiversity and topography of the area and adequate monitoring of pollutants associated with open-casting, keeping up-to-date with developments in the measurement and monitoring of pollutants.

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