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Port Talbot PM_{10} Data Team

Output Focused Work Programme

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Contents

1. Port Talbot PM_{10} Data Team

The PM_{10} Data Team is the technical working group that currently scrutinises the further evidence needed to improve PM_{10} concentrations in Port Talbot. It is tasked to review the data on PM_{10} and to improve the management and interpretation of the data across the different organisations. This group assesses the performance of investments and trials and takes forward the recommendations from the UWE Study and the AQEG advice note.

The purpose is to facilitate a close working relationship between Welsh Government, Environment Agency, Neath Port Talbot CBC and local industry in analysing and understanding air quality data for the Port Talbot AQMA.

The main aim is to better understand the most significant sources of PM_{10} that impact the Port Talbot AQMA. This is done by ensuring that the correct priorities have been identified for action.

The meetings involve discussion of progress against each item within this PM_{10} Action work programme. This includes:

- monitoring,
- data quality,
- data analysis,
- source apportionment,
- chemical speciation measurements, and
- dispersion modelling.

The Port Talbot PM_{10} Data Team provides updates to the steering group to enable their strategic and resource planning.

2. Key Evidence

Independent reviews of air quality in Port Talbot have recently been undertaken by the UK Air Quality Expert Group (AQEG) and the University of West England at the request of the Welsh Government and suggest the likely source of high PM_{10} is the steelworks site, but outline that further work is needed to pin point the on-site activities responsible. The Welsh Government, regulators and industry operators are working in partnership to implement the recommendations from these reports.

UWE Report

The Welsh Government commissioned an independent expert review of PM_{10} monitoring and modelling work within the Neath Port Talbot area from the University of West England to provide advice to Ministers on further measures to pinpoint sources of particulate matter.

The findings of this review were published in November 2009. The report makes several detailed recommendations for further work, which are currently being implemented.

AQEG Report

In order to move forward with the next phase of work and to ensure it is scientifically robust, the Welsh Government asked the Air Quality Expert Group (AQEG) to undertake an advice note on Port Talbot. AQEG provides scientific advice on air quality to Ministers in Defra and the Devolved Administrations in Wales, Scotland and Northern Ireland.

The AQEG published their advice note and made 12 recommendations in March 2011. The recommendations have been accepted and will be used to assist further understanding of the potential sources of particulate matter. The successful implementation of the recommendations requires actions from all stakeholders.

AQEG undertook an open evidence session to support this work in Port Talbot in November 2010 and have held additional information gathering meetings with Tata Steel. The regulators, industry operators, local residents and pressure groups attended and gave evidence at the open session.

AQEG Recommendations

3. AQEG Recommendation 1

Recommendation

AQEG recommends that a priority for further work should be to model the impact of all the sources within industrial complex on PM_{10} concentrations observed in Port Talbot.

Recommendation Detail

The modelling should have an hourly resolution covering the whole year, with the results verified by comparison with the monitoring data. There will need to be close linkage between the modelling and the emission inventory, with feedback from the modelling used to highlight areas for improvement within the inventory. The modelling should allow for terrain effects on wind flow and dispersion, which will require a model domain extending beyond the immediate vicinity of the site to include the hills to the east. The modelling should also consider buildings, in so far as they will affect initial dispersion (not wind flow); both these effects can be accounted for in readily available dispersion models.

Data Team Response

The Data Team welcome this recommendation. Developing a robust modelling evidence base and supporting emissions inventory is viewed as a priority. Work, already started, will continue to develop an emissions inventory and periodic dispersion modelling exercises will be completed, accounting for the influence of terrain and buildings. Difficulties have been experienced in identifying all possible impacting sources and how they vary over space and time, however, it is acknowledged that this will be an iterative process with robustness and accuracy being developed as further work is completed and new information becomes available. Tata Steel and other operators at the Steelworks already undertake an on-site measurement programme to quantify fugitive emissions and will continue to develop this, whilst also ensuring it feeds into the development of the emissions inventory.

Lead organisations: Tata will be responsible for delivering an updated dispersion model and comprehensive emissions inventory for the industrial complex. This will be periodically updated as new information becomes available. The Data Team will be fully engaged in developing the scope and reviewing outputs from this process.

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

4. AQEG Recommendation 2

Recommendation

AQEG recommends that an initial dispersion modelling exercise should be carried out using readily available information on emissions from all sources, which can be supplemented over time with a more detailed time-resolved emission inventory.

Recommendation Detail

It is recognised that some components of the inventory will be difficult to quantify with a high degree of accuracy, but this should not constrain the development of an initial best possible inventory using available information. Once an inventory is established and modelling carried out the results will help identify those sources for which more accurate data are required, i.e. there should be a feedback loop between the emission inventory and the modelling. AQEG would expect to see an initial modelling study carried out within 6 months.

Data Team Response

The Data Team welcome this recommendation and consider it a priority. Work to develop a dispersion modelling programme, alongside a comprehensive emissions inventory is outlined above in response to Recommendation 1. An initial dispersion model has already been undertaken for known Steelwork's emissions by Tata Steel but it is recognised that this requires updating to incorporate the latest and more comprehensive information. As already outlined, the iterative nature of this process is integral to enhancing the accuracy of a dispersion model. However, the use of this process to also enhance the emissions inventory is acknowledged and this feedback loop will be incorporated within the dispersion modelling framework. The scope for the overall programme for completing dispersion modelling will be considered by the Data Team within the resource constraints which it operates. The data group are, however, committed to an initial dispersion model exercise based on current and readily available information.

Lead organisations: Tata will lead this activity with full input from the Data Team (see Recommendation 1).

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

5. AQEG Recommendation 3

Recommendation

AQEG recommends that an early review should be carried out of the available meteorological data to establish whether the meteorological monitoring sites are sufficient to characterise the air flows over the industrial complex and the surrounding area.

Recommendation Detail

The review should identify the most appropriate site(s) to use and whether new sites should to be established, or existing sites modified (such as installing a new mast to ensure the wind monitor is 10 m above the ground). This review should consider all existing monitoring data and recognise the potential for local factors to influence the wind data near to a monitoring site that might make the site unrepresentative of the general flow across the industrial complex. AQEG has given careful consideration to the potential benefits of CFD modelling of the wind field across the site.

Action

The review must identify and characterise all met stations that are currently in operation. These must be assessed against available guidance on siting of wind speed and direction sensors. In this way the sites can be graded in terms of the likely quality of data produced. Recommendations can then be made about how to improve the quality of data at each site.

A judgement will be made about whether the existing sites are sufficient to provide information for triangulation in source apportionment. Similarly, consideration will be given as to whether existing sites are sufficient for purposes of dispersion modelling.

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

6. AQEG Recommendation 4

Recommendation

AQEG recommends that CFD modelling at the building scale would be of limited benefit and should not be pursued.

Recommendation Detail

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Data Team Response

The Data Team agree that CFD modelling is not a high priority at this stage and commit to proceed with characterising wind flows at a lower resolution within the modelling exercise outlined in the recommendations. CFD modelling will not be pursued as part of the Data Team work programme.

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

7. AQEG Recommendation 5

Recommendation

AQEG recommends that all of the monitoring sites currently in operation should be retained for a minimum of a further two years.

Recommendation Detail

This will provide sufficient data to allow for robust data analysis. After this period it would be appropriate to evaluate the results with a view to reducing the number of sites. AQEG recognises that Environment Agency Wales has deployed one of its mobile monitors at the Prince Street site and as such its permanence is unknown. If the Prince Street site is to be decommissioned, then AQEG suggests that consideration be given to relocating one of the Council's FDMS monitors to the Prince Street location. The Theodore site may be suitable for this relocation. If it is required, this relocation should occur as soon as possible, to allow data from comparable instrumentation to be made available for analysis. AQEG is also aware that there was poor data capture from the FDMS instrument at the AURN site during 2010. Given the importance of the data from this site, AQEG would expect to see a high priority given to ensuring a high level of data capture in future.

Data Team Response

The Data Team view a high level of data capture from all monitoring sites as a priority. We also acknowledge that retaining a consistent long-term data set is a central component of the management strategy. Recent enhancements have also been made at Princes Street with the existing TEOM being supplemented with an FDMS instrument (as recommended) and a Partisol monitor shortly to be installed at the site. Reference equivalent hourly data for will now be available from all existing monitors surrounding the industrial complex. We also consider the current network of one AURN (fire station) site, six NPTCBC sites and one Environment Agency Wales site sufficient to characterise PM_{10} in the urban area. This provides sufficient data to allow for robust data analysis. Each of these sites will remain in place for a minimum of two years.

Lead organisations: Respective responsibilities for the organisations responsible for operating the existing monitoring sites.

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

8. AQEG Recommendation 6

Recommendation

AQEG recommends that an FDMS monitor should be located to the west of the industrial complex on the coast, co-located with a wind monitor 10 m from the ground.

Recommendation Detail

AQEG has identified an important need for an up-wind monitor to allow the contribution of the industrial complex to be isolated from the background PM_{10} being imported into the area. The use of an FDMS monitor is to ensure consistency with the monitors currently operational in Port Talbot (which would be appropriate for the purposes of hourly subtraction of up-wind data). It should be operated to AURN standards. The location of the TEOM monitor currently operated by Tata near the coast is considered suitable for this monitor and AQEG would encourage Tata to make this site available.

Data Team Response

The Data Team recognise the value of locating and FDMS monitor on the coast, which will provide an indication of the proportion of observed emissions that can be attributed to regional/transboundary sources during elevated PM_{10} levels. However the Tata beach site is not appropriate for this undertaking due to it being impacted by industrial and non industrial particles. Consideration will therefore be given to the most appropriate site location for a monitor to characterise PM_{10} imported into the area for data assessment.

Lead organisation: NPTCBC and the Environment Agency will be responsible for determining a suitable site, agreed by the Data Team.

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

9. AQEG Recommendation 7

Recommendation

AQEG recommends that a central repository, ideally web-based, should be established to hold all long-term monitoring data.

Recommendation Detail

(for all sites with a minimum of 6-months data). This repository should hold data on the monitoring sites, including accurate 6 figure grid references, as well as a full set of 1-hour data, clearly marked as hour beginning (or hour ending), whether GMT or local time, whether provisional or ratified and with the method used. It is important that the repository includes wind data as well as PM_{10} data. The wind data should be from as many sites as possible. The data on the repository should be freely available to any external party. The Welsh Air Quality website (www.welshairquality.co.uk) is an example of a good model for the data repository.

Data Team Response

The Data Team agree that appropriate storage of and access to all monitoring data is a high priority. However all Port Talbot Air Quality Management Area data is currently available or will shortly be available via the Welsh Air Quality website (www.welshairquality.co.uk). The data team will consider including additional on-site data if it is made available. Whilst the Welsh Air Quality website may currently be a fit-for-purpose solution it should be pointed out that the purpose of the website is to provide information, advice and data to stakeholders across Wales and this must not be affected. Careful consideration will be given for the most appropriate method of hosting a central repository if and when additional monitoring data becomes available.

Lead Organisation: to be agreed by the Data Team

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

10. AQEG Recommendation 8

Recommendation

AQEG recommends that a high time resolution monitoring programme in support of a multivariate receptor modelling study should be developed.

Recommendation Detail

Such a programme would need to employ both comprehensive chemical speciation and a high time resolution (of one hour or better) in order to differentiate between sources of similar composition.

Data Team Response

The Data Team accept that a high time resolution monitoring programme in support of a multivariate receptor modelling study could provide a useful tool for identifying the potential on-site sources. This is a resource intensive exercise that may require a Cost Benefit Analysis to be undertaken. We need to carefully consider how an exercise such as this is developed and run.

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

11. AQEG Recommendation 9

Recommendation

AQEG recommends that an on-site measurement programme should be developed to quantify the emissions from fugitive sources.

Recommendation Detail

This should include the temporal variation in emissions and the factors influencing this; and emissions arising from vehicle movements. The latter will require information on vehicle movements across the site.

Data Team Response

The Data Team agree that improving the understanding of and data available for fugitive sources within the industrial complex is extremely important. Improving this evidence base is currently incorporated as a key part of developing a comprehensive emissions inventory (see Recommendation 1). As already outlined Tata and other operators on the Steelworks site have already initiated an on-site measurement programme to quantify fugitive emissions and will continue to develop this. The development of robust emissions factors and activity data associated with fugitive emissions is a key aim for this work.

Lead organisation: Tata will be responsible for undertaking an on-site measurement programme. The Data Team will have input into the on-going development and review of outputs from this programme.

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

12. AQEG Recommendation 10

Recommendation

AQEG recommends that the actions set out in this Advice Note should be developed as a programme of work to be taken forward in a coherent and consistent manner.

Recommendation Detail

The programme of work should be resourced as an overall package and not carried out in an ad-hoc manner. This should replace the rather ad-hoc approach to studies that appears to have been in place for the last decade and will build on the recent programme of work developed to implement the recommendations of the UWE report. It will require clear leadership from one organisation.

Data Team Response

The Data Team are committed to using the recommendations contained within the advice note to review the data team action plan (existing work programme of the group) and revise the existing work programme, which will be overseen by the Steering Group.

Lead organisation: WG.

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

13. AQEG Recommendation 11

Recommendation

AQEG recommends that the working arrangements currently in place should be continued, with all parties contributing in an open and transparent manner.

Recommendation Detail

Data Team Response

The Data Team welcome this recommendation. The Welsh Government will continue to chair the Data Team and overarching Steering Group and provide continued leadership. However, each organisation within the Data Team recognises the importance of their individual role and responsibilities and are committed to delivering against these. Data Team members also recognise the importance of working in partnership and reaffirm the agreed terms of reference of the group. A strong working relationship between organisations has been established and the Data Team is committed to continue to work collectively in a pragmatic open and transparent manner.

Lead organisation: the Data Team and each organisation involved.

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

14. AQEG Recommendation 12

Recommendation

AQEG recommends that there would be merit in the involvement of external peer reviewers to help ensure that the future programme remains focussed and is making best use of the scientific data and analysis resources.

Recommendation Detail

Data Team Response

The Data Team value the benefit of including external peer reviewers to independently assess the quality and progress of the measures to be contained within the revised work programme. A key priority will be to review the existing action plan and work programme. External peer reviews shall be undertaken by a party that is impartial to the stakeholders of air quality at Port Talbot.

Lead Organisation:
Who will deliver:
Relevant Stakeholders:
Project detail (including time scale and expected outcomes):
Relevant links:
Progress Comments:
Final Conclusions and Outcomes:
Peer Review:
Date recommendation closed:

UWE Recommendations

15. UWE Recommendation 4

Recommendation

Updating NPTCBC AQAP: The NPTCBC AQAP is now a dated document and while most of the options identified in the NPTCBC AQAP have either been implemented or are ongoing, the understanding of PM_{10} sources in the vicinity has advanced substantially.

Lead Organisation:
Actions Completed:
Outstanding Actions:
Conclusions and Outcomes:
Date action closed:

16. UWE Recommendation 5

Recommendation

Utilising the WAG Short-Term AQAP: It is recommended that WAG incorporate the findings of this independent review into the utilisation of their short-term AQAP for the South Wales Zone to generate a 'future' AQAP. Additionally, WAG should ensure that their 'future' AQAP is a dynamic and evolving document so that the findings from any future studies recommended from this review can be incorporated.

Lead Organisation:
Actions Completed:
Outstanding Actions:
Conclusions and Outcomes:
Date action closed:

17. Summary of the AQEG Report Main Findings

- The review undertaken as part of the advice note led the Air Quality Expert Group to produce a series of recommendations that can be broken down into four key areas:

(i) Strategy

- the actions in this advice note should be developed as a programme of work to be taken forward in a coherent and consistent manner;
- the working arrangements currently in place should be continued, with all parties contributing in an open and transparent manner;
- involvement of external peer reviewers to help ensure that the future programme remains focussed and is making best use of the scientific data and analysis resources.

(ii) Monitoring

- review of the available meteorological data to establish whether the meteorological monitoring sites are sufficient to characterise the air flows over the industrial complex and the surrounding area;
- an FDMS PM_{10} monitor should be located to the west of the industrial complex on the coast, co-located with a wind monitor 10 m from the ground. This will allow the contribution of the PM_{10} sources within the industrial complex to be isolated;
- all the PM_{10} measurement sites currently operating should be retained for a minimum of a further two years;
- an on-site measurement programme should be developed to quantify the emissions from fugitive sources;
- a high time resolution monitoring programme in support of multivariate receptor modelling should be developed.

(iii) Modelling

- model the impact of all the sources within the industrial complex on PM_{10} concentrations observed in Port Talbot;
- an initial dispersion modelling exercise should be carried out using readily available information on emissions from all sources, which can be supplemented over time with a more detailed time-resolved emission inventory;

(iv) Data

a central repository established to hold all long-term monitoring data.

18. Summary of the UWE Report Main Findings

- The majority of PM_{10} recorded at the AURN monitoring site, i.e. the data reported to the EC, appears to be associated with pollution sources from the direction of the steelworks site. However a single source of PM_{10} leading to exceedences can not be identified from the site.

- There has been a general trend for average concentrations of PM_{10} to reduce over the last 9 years, but there has not been a particularly large or noticeable reduction in the frequency or magnitude of peak events.

- There is a tendency for PM_{10} concentrations to be highest in the middle of the day, which could result from grounding of pollution plumes or daytime activities raising dust. PM_{10} concentrations are also highest during the second quarter of the year, although the reason for this is unclear.

- PM_{10} exceedences are sometimes, but not always related to elevated concentrations of CO and SO_2, suggesting combustion sources, (N.B. There is no risk of either CO or SO_2 leading to a breach of their respective air quality objectives), but are not related to NO_x or $PM_{2.5}$, which are associated with road sources.

- There is a large variation in pollution patterns on different exceedence Days – this study has looked at differences between the correlations of different pollutants, and in the number of hours exceeding the objective concentration. There have been over 300 exceedence Days over the period covered by this study, each with the potential for its own characteristics, particularly when PM_{10} concentrations are analysed in relation to other pollutants and meteorological conditions.
- In order to pinpoint the exact sources of PM_{10} leading to exceedences in the Port Talbot Air Quality Management Area, the report makes a number of recommendations for future work to be undertaken by WG, the regulators and Corus (now Tata). The recommendations include:

    - Better use of data available in Neath Port Talbot County Borough Council (NPTCBC) Review and Assessment Reports.
    - Generation of an emissions database and undertaking a new dispersion modelling study.
    - Undertaking new chemical analysis of particulates in the area.
    - Updating the NPTCBC Air Quality Action plan.
    - Updating the WG Short Term Air Quality Action plan.
    - Further information on agreed course of actions following the EAW PM_{10} Permit Review and NPTCBC Corus Permit Review.
    - Additional analysis of data.