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PRACTICAL HARMONISATION OF DISPERSION MODELLING IN THE REAL WORLD - 'THE ERM WAY'

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Abstract: Different countries in the EU have different regulations and use different tools for dispersion modelling. This observation is a reality that ERM faces every day as we deliver projects across the globe. By using a tailored protocol and widespread knowledge sharing, ERM has found a way to harmonise dispersion modelling on a global scale, guiding any environmental practicioner, anywhere in the world to consistent models tailored to any type of project. Key to this has proved to be the balance between being prescriptive and not unduly constraining practitioners. For our global clients this is critical in allowing them to have a firm legal basis on which project design can be developed.

Key words: *list of approved dispersion models, locally developed model, Regulatory Dispersion Model, ERM Air Quality Technical Community, Decision Tree, most fit-for-purpose, model inputs, Guidelines on Modelling Best Practice, purpose of the modelling job, significance framework, sensitive ecology, global scale*

INTRODUCTION

Different countries in the EU have different regulations and use different tools for dispersion modelling. This observation is not limited to the EU but is in fact a reality that ERM faces every day as we deliver projects anywhere in the world.

These differences in model approach can ultimately result in different results and conclusions. This might lead to different plant design and application of mitigation, such as stack height, abatement technology and to some extent even more stringent emission limits. For a company like ERM with offices across the globe and with global clients with global projects it is of the utmost importance to be as consistent as possible whether a project is situated in UK, Germany, US, Ethiopia, Vietnam or Australia.

SOLUTION – 'THE ERM WAY'

ERM recognises that many countries have their own *list of approved dispersion models* (AERMOD, CalPUFF), if not their *locally developed model* (AUSTAL, IMPACT, ADMS, NNM) which then often is compulsory. It is also acknowledged within ERM that most of these dispersion models are adequate for the majority of projects, but each model very much has its own advantages, disadvantages and limitations.

Within ERM our preferred approach is to use AERMOD and CalPuff as these tend to be the most widely accepted dispersion models or the local *Regulatory Dispersion Model* (RDM). As ERMs Business Units (BUs) started working more closely together ERM noticed, particularly for industrial sources, a systematic BU-specific preference for a particular dispersion model. Obviously this would ultimately result in different models being used for similar projects (emission type and environment) in the same country when different BUs were performing the projects.

In order to harmonise modelling across the company, the *ERM Air Quality Technical Community* developed a protocol presented as a *Decision Tree* (that guides specialists to the dispersion model *most fit-for-purpose*. It is set up to work across geographies, and will guide any specialist to the same model for the same project, taking into account local regulations (eg. use of RDM), required model domain size, local environment (eg. topography) and project specifics (eg. type of emission sources).

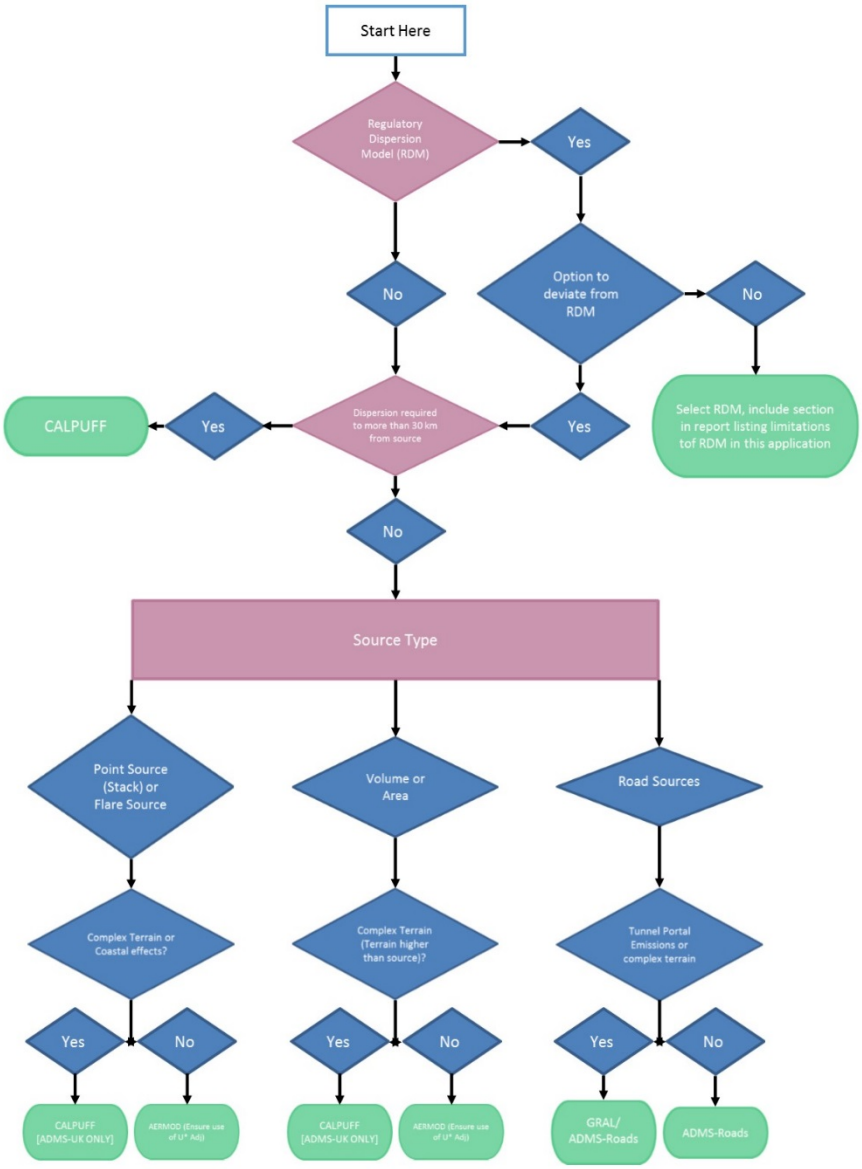

Figure 1. Dispersion Model Decision Tree

Being consistent in model choice is only one of several measures to assure best practice project delivery. Equally important is defining and handling the detailed *model inputs* (eg. source parameters, meteorological data, surface parameters, terrain etc.) and knowing how to work the model of choice. Alongside the protocol we therefore have *Guidelines on Modelling Best Practice* to ensure consistency and technical robustness. These are designed so that modelling is standardised worldwide, deviating only where there are specific regulatory requirements, client requirements or project needs. This becomes especially important when considering the actual *purpose of the modelling job*. Parameters like grid size and grid resolution, building downwash and meteorological data period tend to be defined differently depending on whether the modelling job fits within an EIA framework (National Regulator or International Lender), or for instance stack height sensitivity testing or an investigation into a specific incident.

Besides model choice and model setup there are still other aspects that prove the subject of discrepancy. The *significance framework* against which results are evaluated is particularly important. In the UK, for example, 1% of an air quality standard is the threshold above which a significant impact is considered possible; however, the International Finance Corporation define the threshold at 25%. There are also discrepancies in what needs to be assessed. In the UK impacts to *sensitive ecology*, both through ambient air and deposition to land, are a critical aspect of impact assessments and tend to be the overriding driver. This is reflected in the Netherlands and Belgium, but is considered in a far more simplistic form elsewhere in the EU.

Project experience across countries and regions, expert judgment and modelling expertise are what deal with all of these challenges, which is one of the reasons the *ERM Air Quality Technical Community* was created. It provides not only a gateway to knowledge, but actively encourages knowledge sharing and discussing ideas and challenges with peers and experts all over the globe. As such it serves as a platform to gain insights into and aligning solutions to specific modelling conundrums.

CONCLUSION

Through the use of the *Descision Tree* and widespread knowledge sharing, ERM has found a way to harmonise dispersion modelling on a *global scale*, guiding any environmental practicioner, anywhere in the world to consistent models tailored to any type of project. Key to this is finding the balance between being prescriptive and not unduly constraining practitioners. For our global clients this is critical in allowing them to have a firm legal basis on which project design can be developed.