Conclusion 6

This report relates to the second phase of an investigation to determine if community health complaints are related to emissions from the M5 East stack. We find no evidence of an association between prevalence of reported symptoms and modelled emissions from the M5 East stack. The methodology used represents the best feasible epidemiological approach to determining if there are population health effects from the M5 East stack emissions.

With any epidemiological study, there are limits in the study's ability to detect an effect. This study was not designed to assess long-term health impacts of emissions. It does not exclude the possibility that certain sensitive individuals do experience symptoms which are related to the M5 East stack. There is no feasible scientific method to establish or disprove either of these possibilities.

As no association has been detected we conclude that there is no scientific justification to conduct further epidemiological studies into the reported health effects in the community surrounding the M5 East stack.

Glossary

Causal Pathway – The sequence of actions, factors or events (risk factors), which lead to the outcome of interest. An intervening factor lies on the causal pathway and can cause the outcome of interest, but is itself determined by another factor. An example would be that a person's cholesterol level can determine their risk of having a heart attack but a person's cholesterol level is itself determined by their diet. In other words cholesterol is an intervening factor lying on the causal pathway between diet and heart attack.

Confidence Interval (95%) – The 95 per cent confidence interval provides a range of values that should contain the actual value 95 per cent of the time. In general, a wider confidence interval reflects less certainty in an indicator estimate. If two confidence intervals do not overlap then the observed point estimates are significantly different.

Confounder – A third variable that distorts the association being studied between an exposure and an outcome. For this to occur the confounder needs to be associated with both the exposure and, independent of that exposure, be a risk factor for the outcome. An example can be seen in the relationship between asbestos exposure, lung cancer and smoking. If asbestos workers were generally non smokers and you compared lung cancer rates in this group to a population where smoking was common you may see similar rates of cancer in the two groups. This may lead you to falsely conclude asbestos exposure is not associated with lung cancer due to the protective effect of low smoking rates among asbestos workers – smoking is a confounder in this case.

Effect modification – Effect modification occurs when the association between the exposure and the outcome being studied varies dependent upon the level of a third factor (the effect modifier). An example of such a situation could be seen if exercise prevented men getting heart attacks to a greater extent than for women. In this case the exposure would be exercise, the outcome is having a heart attack and the effect modifier would be gender.

P-Value - The p-value indicates the probability that the result obtained in a statistical test is due to chance rather than a true relationship between measures. Small p-values indicate that it is very unlikely that the results were due to chance. Therefore, if the p-value is small, statisticians would be confident that the result obtained is 'real.' When p is less than 0.05 ($P<0.05$)- this means that there is a less than 5 per cent chance that the relationship is due to chance - statisticians usually conclude that the relationship is strong enough that it is probably not just due to chance. A p-value of 0.05 or less is the commonly used standard to determine that a relationship between variables is significant.