

Bishopton Action Group

Appendix F
Meteorology Aspects
AND
Concerns about
Remediation through Burning

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1 Implications of Meteorology on Remediation Proposals

The Outline Remediation Strategy document states at paragraph 7.6.2:

‘Firing will only take place when the weather is "suitable" (i.e. no high winds or heavy rain is forecast, and wind direction is forecast to be away from built up areas. ‘

The term “suitable” and its accompanying explanation are inadequate to provide confidence that the process will not expose the local community to significant risk. The following information is provided to support this statement:

There are three meteorological conditions which determine dispersal from a pollution incident no matter how small.

1. Wind speed at the site and surrounding area. Clearly the higher the wind speed, the faster the dispersion of the pollutants.
2. The stability of the atmosphere in the first few hundred metres around the site. **NB It is important to understand this concept as it is vital in pollution control.** A detailed explanation of this is included below.

(The stability is determined by the temperature profile from the surface upwards. The usual situation is for temperature to fall the higher you go. This means that warm air at the surface will tend to rise as the surrounding air at height is colder. The air will continue to rise till it meets air of a similar temperature then stop rising. In certain situations with much colder air aloft, air will rise a long way- 20 to 30,000 feet. These are the days there are big towering shower clouds. During these days, the air is said to be Very Unstable. In other situations there can be a pocket of warm air as low as 100 metres above the surface. This means that as air warms up at the surface, it tries to rise but the warm air higher up prevents it doing so. This air is said to be Stable with a temperature inversion trapping pollution underneath.)

3. Precipitation. Rain will wash out particles, dust, smoke, chemicals and deposit them on surfaces.

To have optimum dispersal conditions, would involve having strong winds. This tends to happen when low pressure is nearby. Low pressure also brings outbreaks of rain. It would also need unstable atmosphere allowing pollutants to rise quickly from site. This set up would also produce showers again with washout of particles. To be sure of dry conditions then high pressure would need to be close by. This would also bring light winds and a marked temperature inversion with smoke/dust/toxic particles rising briefly before settling around the site. This means that optimum conditions would be hard to predict as far as planning the building work is concerned.

The statement that the prevailing wind direction is southwesterly is also cause for concern. It is certainly true looking back over the past 60 years. If we look at the past 10 years it is not

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true. Changing weather patterns have meant we have had long periods of easterly winds over the past few years and there is no way anyone can say over a period sometime in the future that winds for planning purposes will be southwesterly. Finally if burning takes place, it will not be obvious immediately if toxic particles are washed out in the local area or an inversion means they are trapped in local area. So clearly independent air quality monitoring will have to be in place around the site.

The Environmental Statement, in paragraphs 9.98 and 9.110 uses the phrase "with appropriate mitigating measures in place the remedial burning is unlikely to result in adverse impacts on air quality". This gives no information on what these measures might be. The only mitigation measures identified in paragraph 9.114 relate to building separation distances. It also states 'is unlikely to result in adverse impacts on air quality'. This does not inspire confidence, especially when there is no evidence to support the statement.

Para 9.114 of the Environmental Statement states

"To minimise the potential impact from the proposed burning of building, the following mitigation measures were identified as a result of the detailed air quality modelling assessment;

- Where only a single typically sized building of approximately 200m² or less is burned, or buildings of a typical size are burned which are widely dispersed across the site (at a minimum distance of 500m between each) the burning should only be undertaken when the wind direction is such that the nearest sensitive receptors to any of the buildings are at least 300m downwind.
- Where groups of buildings in close proximity (less than 500m apart) are due to be burned, the wind direction should be such that the nearest sensitive receptor locations are at least:
 - 150m downwind for two buildings;
 - 200m downwind for three buildings;
 - 300m downwind for four buildings;
 - 300m downwind for five buildings; and
 - 400m downwind for six buildings.
- The large buildings at the north end and centre of the site should be burned singularly and should only be burned when the wind direction is such that the nearest sensitive receptor locations are at least 100m downwind of the building to be burned."

There appears to be some inconsistency here. In the first bullet point it states that the nearest sensitive receptors should be at least 300m downwind. It then goes on to cite the arrangements for multiple buildings and cites distances of 150m and 200m for two and three buildings respectively. This appears to suggest that shorter distances can be used for multiple building burns, **which is clearly erroneous!**

A further factor that is worth emphasizing relates to planning for the effects of global warming. Increased periods of heavy rain will become a feature in future with greater flood problems. Under the development plans, huge areas of natural drainage will be covered in concrete. The rain will run off to surrounding fields which in heavy rain situations are likely to flood anyway. Clearly a much improved drainage system will be required to cope. There is no indication that this factor has been taken into account.

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2 Review of Air Quality Assessment – Remediation through Burning Report

We have many concerns regarding Appendix 9.3 of the Environmental Statement titled Air Quality Assessment – Remediation through Burning, which assessed the process of burning buildings. Our concerns are listed below:-

1. Table 2 on page 7 shows values as micrograms per cubic metre. Table 3 on page 8 does not actually state the units so one is left to assume that it is the same as table 2.
2. Comparing the data in tables 2 and 3 shows the following:
 - The baseline long term level for carbon monoxide is already very close to the ERL 319/350
 - The baseline PM₁₀ level is nearly one third of the ERL 12.7/40
 - The baseline benzene level is nearly half of the ERL 1.57/3.25
 - The baseline cadmium level already significantly exceeds the ERL 0.18/0.005
3. Examination of the results provided from the dispersion model table at Appendix 1 are quite disturbing. We need to confirm what the EAL values relate to. Are they relevant only to the value at the point of measurement or do they relate to anywhere including close to the source of the pollution? Some of the values quoted for "all locations" are several times the EAL value especially for nasty items such as benzo(a)pyrene.
4. There is no indication of how they derived what by products would be produced as a result of the burning process. We would be interested to know where this data came from and how credible it is.
5. We would expect the values for lead and copper to vary considerably depending on the nature of the building being burned, and its previous operational history.
6. In scenario 2 the value for benzo(a)pyrene is only a small fraction of that in scenario 1. Why the massive change?
7. In scenario 3 benzo(a)pyrene isn't even reported!
8. In scenario 4 benzo(a)pyrene is reported and again shows alarming high levels at "all locations".
9. Appendix 1 page 15 states "*Whilst the interiors of the majority of buildings are painted, it is unlikely that lead containing paints have been used at the site at any time as lead can react with the explosives in a hazardous manner (Ref. 1). On this basis emissions of lead are anticipated to be negligible.*"

While it is true that lead was avoided in the paintwork, there were a number of the explosive compositions which contained lead salts. There were also some buildings which were used for the preparation of lead salts for production use, but didn't

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necessarily contain explosives. In these cases it is not reasonable to state that "...emissions of lead are anticipated to be negligible".

10. *"During the building preparation any concentrated areas of explosives and propellants are removed manually. As a consequence, it is likely that contamination with explosives would be minimal. It is estimated that the quantity of explosive contamination in a building is, at most, 100 grams, depending on size of building and use (Ref. 1). Consideration was made of emissions of substances evolved from combustion of these contaminants, but these are unlikely to contribute significantly to impacts on air quality ."*

While the above statement may be generally true it is not true for all circumstances!

11. *"The temperature of the fire is estimated to reach 1200 to 1400 Celsius. At this temperature the possibility exists that metal fumes may be evolved from metals within the buildings, such as zinc from galvanised steel and aluminium fume. It is anticipated that quantities would be low compared to other emissions and on this basis no detailed consideration has been made of metal fume ."*

This is another paragraph above which gives me cause for concern. It is dismissive of the risk of metal fumes without producing any evidence to support the statement! The demonstration burn by BAE held on 10th November 2005 to an invited audience showed a green cloud which has never been satisfactorily explained. This could have been copper or barium.

12. *"The surface roughness is a factor which defines the degree of turbulent mixing of the air at ground level. This parameter depends upon the surrounding land use including the presence of buildings, trees, vegetation and other obstructions. The sensitivity analysis tested surface roughness heights of 0.3m (the maximum defined values for flat agricultural areas) and 0.5m (the maximum defined values for parkland and open suburbia similar to the area surrounding the majority of the Bishopton site). On the basis of the sensitivity testing the higher of these two values was selected for use in the assessment, as this resulted in the higher predicted ground level values."*

This statement refers to the parkland and open suburbia surrounding the ROF site. It doesn't seem to allow for the situation within the site which may have a positive or negative impact on the results. There does not seem to be any allowance for the fact that the majority of the site is low lying and often suffers from a temperature inversion.

13. *"This dataset was manipulated to remove meteorological conditions where the wind direction was between 140 degrees and 320 degrees and the wind speed was between 2.2m/s (5mph) and 13.3m/s (25mph). This data represented conditions where the wind direction was away from Bishopton village and is at optimum burn conditions ."*

If this is the optimum, then why remove this dataset. Surely this is the dataset which would apply in most circumstances when burning would be taking place?

"For assessing long term impacts, the assumption was made that five "typical" buildings are burned per week throughout the year. In reality it is more likely that a maximum of three buildings would be burning in a week ..."

This assumes that it will be possible to burn every week. Experience of weather conditions around Bishopton would suggest otherwise as there could be long periods when the conditions are not optimal for burning.

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14. The statement regarding the background figure for formaldehyde seems unreal! It is based on data from Harwell, Oxfordshire as there is limited data available and this seemed the most appropriate source.
15. In the dispersion model a release height of 2m is used. According to page 23 of the report *“The release height of emissions from the fire is an important factor in the dispersions from the fire. The sensitivity testing demonstrated that defining emission source with a release height of 0m (ground level source) greatly increased the predicted impacts. However these impacts occurred in very close proximity to the fire and when compared to a release height of 2m the predicted impacts further away from fire were lower. On this basis a release height of 2m was used in the assessment as this was likely to be a realistic release height and also result in higher impacts away from the immediate vicinity of fire.”* It seems the higher the emission height the further the spread of pollution. Emission height of 2m seems too low. Even single storey buildings have a roof height of 3m. The larger buildings could easily be two or three times this, or even more in some cases. Did this dispersion model reflect the true situation that will occur?