Marcus Aldren Submission
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Appendix 1: Barford case health impact Doctor statement

Hearing Statement by Malcolm Eykyn

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In 2020 the World Health Organisation published a Report that PM 10 and PM 2.5 were contributing to 4.2 million deaths globally by penetrating deep into the lungs and entering the blood stream causing arterial disease in the heart and brain and cancer and that maternal exposure to air pollution can lead to low birth weight and congenital defects in the new born. (PM 10 and PM 2.5 refers to minute particles of dust invisible to the naked eye that can float in the atmosphere for variable distances. PM 2.5 is a quarter of the size of PM 10.) Evidence exists that exposure to air pollution in children causes heart and lung disease and is associated with childhood cancers. This damage is particularly concerning because the particulate matter is damaging lung tissue permanently which is still in the process of developing.

As a Representative of 2000 residents principally in the village of Barford and the nearby hamlets of Wasperton and Sherbourne and as a retired GP, I feel it is my duty to draw the Inspector's attention to the rapidly progressing scientific evidence of toxic, fine particulate air pollution generated from the mining of fresh sand and gravel being inhaled deep into the lungs of residents living nearby. This inhalation of fine particulate toxic dust including PM10 and more especially PM2.5 silica cannot be got rid of by the body's natural defences nor by treatment and lodges deep in the lungs permanently and accumulates through the duration of the exposure. The longer the excavation period, usually at least 10 years, the more accumulation of these particles in the lungs leading to a disease called silicosis. Because of the toxic nature of these silica particles in the deep innermost recesses of the human lung, the body sets up an immune response which leads to permanent scarring of those delicate tissues thus preventing oxygen from the air getting into the blood stream.

(1)It is well documented amongst protected workers involved in this mining process that this accumulated dust leads to permanent lifelong breathlessness called chronic obstructive pulmonary disease otherwise known as COPD. There is increasing evidence that these freshly mined silica particles are also carcinogenic leading to lung cancer and other auto immune diseases and death in some.

While the science of the effects of inhaled crystalline silica on workers' morbidity and mortality annually are undisputed, there remains contention about the effects on the residential populations living in the immediate vicinity of these active excavation sites. This is highly misleading as it merely reflects lack of global research to date of health impact. If crippling and

fatal disease can happen to protected workers at risk, then that same risk must also apply to unprotected residents living close by.

Fortunately this risk is now being recognised especially in the USA, Canada, Australia and Europe after decades of denial by powerful industry lobbing,. Emerging expensive litigation combined with the upsurge of "fracking" for oil using sand, has made these nations much more risk aware. Remember a similar situation where it took decades for the authorities to accept the link between cigarette smoking and lung cancer and heart disease. Similarly the link between asbestosis and lung cancer. In the US this has led the "Environmental Protection Agency" (EPA) through the "Clean Air Act" to regulate national and regional rules to reduce emissions. Over time, the EPA have reduced the maximum allowable exposure (2) concentrations of PM 2.5 to 12 micrograms per cubic meter. (3)Another respected "Environmental Working Group" Is a US based organisation specialising in research and advocacy who quote " none of the air quality standards for silica are adequate to protect people living or working near sand mining sites. The danger of airborne silica is especially acute for children. Freshly mined silica is more damaging to the lungs by producing a more severe inflammatory response as opposed to older, smoother particulates weathered by heat, wind and moisture such as silica dust blown from crop land". (This is now established science). "Silica air pollution has become a danger for residents near open sand mining and processing. Children, older adults and others with existing disease are especially at risk. As a result, 6 States have set their own standards ranging from 3 micrograms per cubic meter in California to 0.06 micrograms in New York". The EWG have concerns for residents 750 – 1500 meters from excavation sites. Silica levels measured near open sand mining in Wisconsin and Minnesota were at least 10 times higher than the 3 micrograms per cubic meter recommended limit.

The National Institute of Health (USA) quotes "residents near quarries and sand and gravel operations are potentially exposed to respirable crystalline silica. Citizens living near sand and gravel mines in Wisconsin have found layers of silica dust on their belongings and `are concerned about the health of children attending a school a quarter of a mile away. Symptoms of silicosis may not manifest themselves for 15 to 20 years after exposure and the negative effects on health from silica dust exposure will not be fully understood for decades".

The Canadian Centre for Occupational Health and Safety has issued the following edicts for Silica dust.

1. May cause cancer if inhaled
2. Very toxic if exposed to long term inhalation
3. American Conference of Government Industrial Hygienists recommend exposure limits for silica of 25 micrograms per cubic meter over an 8 hour day.

(4)'Gravel Watch' is a citizens advocacy group that liaises with government and the aggregates industry based in Ontario , Canada and comments on dust blown off site. "Recent studies show

that fine particulates pose a greater danger to our health than better known kinds of air pollution such as smog, sulphur dioxide and carbon monoxide. There is incontrovertible evidence that increased PM10 is related to increases in heart and lung disease and premature death in those with pre-existing disease. Mitigation measures for quarries in dust suppression are inadequate"

The Occupational Safety and Health Administration (OSHA) which is the American equivalent of our HSE had in 2018 announced a limit of 25 micrograms per cubic meter of PM2.5 over an 8 hour day the same as the standard set by the American Conference of Government Industrial Hygienists . They hope this new edict will save 700 lives per year and prevent 1600 new cases of silicosis annually. Our own HSE states that the workplace exposure limit (set in 2002) is 100 micrograms per cubic meter over an 8 hour day – 4 times that of the USA, Canada and Australia. Those limits of the HSE are now 18 years out of date.

Even the World Health Organisation has an Air Quality guideline of 20 micrograms per cubic metre. They state further that "there is no evidence of a safe level of exposure or threshold below which no adverse health effects occur".

As recently as 2016 the Royal Colleges of Physicians and Paediatricians produced a Report concluding that the concentration limits set by Government and the WHO are not safe and improved air pollution monitoring was needed.

The Social Dialogue Agreement (SDA) is a Pan European initiative to improve control of silica dust exposure even when recommended controls are in place. They state further that "there is some evidence that many more cases of silicosis will occur than are currently identified by the HSE".

In November 2017 'The Lancet' published an article on child and adolescent health saying that PM2.5 was associated with pre-term birth and low birth weight, both of which increase risk of developing asthma in later life.

We should note that the Institute Air Quality Management, a respected industry organisation, published recent guidance on the assessment of silica dust liberated from the demolition and construction industry processes only refers to PM10 particles and not PM 2.5 and yet PM 2.5 is far more damaging in its effects on human health. In May 2016, the IAQM quoted " the location of residential areas, and schools within 1 kilometre of a sand and gravel excavation site should be identified and need to consider topography and prevailing winds".

In 2018/19 the European Heart Journal estimates annual deaths globally of 8.8 million attributable to air pollution containing PM10 and PM 2.5. In the same year, the British Medical

Journal quoted a study finding first evidence of particulates PM2.5 and less passing through pregnant mothers' lungs and lodging in the placenta harming unborn children.

(5)In 2019 the British Medical Journal printed an article that studied 95 million hospital admissions in the USA having measured the PM 2.5 levels the day before admission and were able to confirm previous association between PM 2.5 and respiratory, cardio vascular, Parkinson's Disease and Diabetes Mellitus. Further for every one microgram per cubic meter increase in PM 2.5 there were an extra 2050 hospital admissions. Particulate matter below PM 2.5 has been found in brain and heart tissue. The reason for using such a large study was that it made the findings much more powerful statistically.

Dust mitigation is the stated aim of the County Council Minerals' Planners. In practice dust can only be reduced and not eliminated and therefore can only partially limit the release of respirable crystalline silica and in particular PM2.5. You cannot stop it as is evidenced by documented disease and death continuing to occur among workers as a consequence of silicosis in spite of personal protection and mitigation measures. It is now accepted by Civil engineers working in the industry that dust mitigation processes employed by the sand and gravel industry are inadequate and do not prevent a significant proportion of fine particulate silica release into the atmosphere.

County Council Mineral's Planners say there is no evidence of residential impact from fine particulate matter pollution. That is because no scientific studies have yet been completed on residents living nearby sand and gravel quarries. All studies completed to date have so far only reported on scientific data of workers engaged in construction and mining of silica based materials. As has been highlighted earlier, it takes several years to several decades from the time of exposure or even end of exposure before symptoms of disease become evident.

So far it seems that most County Council Mineral Planners in the country apply an offset minimum limit of anything between 100 and 350 meters between sand and gravel mining sites and residential areas. We know that there are concerns in North America that those distances should be at least 750 meters and preferably 1500 meters.

In 2009, a major legal case (reported in a BBC 2 Horizon documentary in March this year) shared new light on the question of how far small dust particles can travel on the wind. The litigation related to the demolition of the old Corby Iron and Steel Works in Northamptonshire and the subsequent reclamation of land contaminated with toxic waste. A cluster of children born with anatomical defects had been identified, whose families lived within a 3 kilometre radius of the toxic site. A key question in the case was whether any dust arising from these operations could travel in the air for such a distance. The scientific experts on opposite sides could not initially agree on this point, which was eventually resolved when the Claimants' expert found an arithmetic error in a well-known 1995 research report "The Environmental Effect of

Dust from Surface Mineral Workings", relied upon by the Defendants' experts. Both sides' experts then agreed that this was an error .

The effect of this error was that the PM10 particles would be typically carried 3 kilometres on the wind rather than the 1 kilometre previously thought. (For PM 2.5 particles, the distances are far greater). The Judge found in favour of the Claimants and this decision was upheld after Appeal. It is now established case law. The Claimants' Air Dispersion expert was Dr Tony Cox MBE, MA, PhD, CEng. FIMechE (a Fellow of the Institute of Mechanical Engineering). I attach a letter recently received from him confirming these facts.

Barford is situated in a shallow river valley where the proposed quarry sits 350 metres south west of the village in flat terrain where there is no impedance of air flow meaning that the residents are directly under the flight trajectory of the prevailing winds and if this quarry goes ahead, they will be exposed to the inhalation of fine particulates of silica generated from the quarry during a period of at least 10 years of the expected excavation lifetime. In addition the shallow valley will exert a funnelling effect of the ambient air mass of winds emanating lateral to the south west direction.

Not only is silicosis a real risk but it is an inevitable risk to our residents if this quarry goes ahead.

The onus has now surely shifted to the point where residents should no longer have to prove there is a risk to health but to now where it is the duty of the Minerals Planning Authorities to prove there is no risk to residents living nearby.

NB. As a footnote to the Inspector , I would like to say the following :

That the information I have provided has been extracted from published specialist documents from trawling through research papers, specialist journals and on-line articles.

References :

1. Extracts from research papers on silicosis sent to me by the Library of the Royal Society of Medicine in London.
2. Environmental Protection Agency (EPA USA) 21/6/2016
3. Environmental Working Group (EWG, USA) 25b September 2014
4. Gravel Watch (Canada) 27 June 2017
5. British Medical Journal 27 November 2019

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