

Before Independent Commissioners Appointed by the Canterbury Regional Council and Selwyn District Council

In the matter of The Resource Management Act 1991

And

In the matter of Applications by **Fulton Hogan Limited** for all resource consents necessary to establish, operate, maintain and close an aggregate quarry (**Roydon Quarry**) between Curraghs, Dawsons, Maddisons and Jones Roads, Templeton

REBUTTAL EVIDENCE OF ALEC JULIAN RASK JORGENSEN ON BEHALF OF FULTON HOGAN LIMITED

EQUINE HEALTH – DR FITCH EVIDENCE

DATED: 30 OCTOBER 2019

Counsel Acting: David Caldwell
Email: david.caldwell@bridgesidechambers.co.nz
Telephone: 64 21 221 4113
P O Box 3180
Christchurch 8013

Introduction

1. My full name is Alec Julian Rask Jorgensen. I am a director at the Waikato Equine Veterinary Centre in Cambridge, New Zealand. I have worked at the parent company Hamilton Veterinary Services Ltd since 2005.
2. I hold a Bachelor of Veterinary Science degree from the University of Bristol in the United Kingdom graduating in 1998.
3. I hold additional postgraduate qualifications in the form of a Certificate in Equine Practice from the Royal College of Veterinary Surgeons London and I am a Diplomate of the American Board of Veterinary Practitioners - Equine Specialty.
4. I have over 20 years' experience working in equine veterinary practice. After an initial period of employment as veterinarian in a private practice in Worcestershire UK, I completed an internship at the Liphook Equine Hospital, Hampshire UK before moving to the United States and completing a residency in Equine Sports Medicine and Ambulatory Practice at the University of Pennsylvania. I remained at the University of Pennsylvania in the position of a Clinical Lecturer for a further two years after the completion of my residency before moving to New Zealand to commence work for Hamilton Veterinary Services.
5. My current work at the Waikato Equine Veterinary Centre is primarily lameness diagnosis, diagnostic imaging, poor performance investigations and purchase / sales work in sport horses and Thoroughbred racehorses. Additionally since 2012 I have provided veterinary care and advice for New Zealand Eventing Teams competing in the Southern Hemisphere and am involved with veterinary support and education for development squads for eventing and showjumping through Equestrian Sport New Zealand.
6. My relevant experience relates directly to my professional experience detailed above. The area of equine veterinary practice that I work in is focused on aiding in the selection of equine athletes of all disciplines and then aiming to try to maintain and maximise their performance potential and longevity.
7. I confirm I have read and agree to comply with those parts of the Environment Court Practice Note that bear on my role as an expert witness.

Scope

8. With respect to this proposal, I was contacted by counsel for Fulton Hogan recently to provide a professional opinion on evidence received regarding equine veterinary health concerns.
9. In relation to my rebuttal evidence I have considered the following documents:
 - (a) The evidence submitted by Gareth Fitch BVetMed MS DACVS as an equine veterinary expert; and
 - (b) Evidence submitted to date as part of the Application particularly pertaining to Air Quality with the purpose expanding my understanding of potential risks to equine veterinary health in the vicinity of the proposed quarry. Specifically the two statements by R Cudmore on air quality for the applicant and evidence submitted to date as part of the Application by Kevin Bligh covering Project and Conditions and Project and Consent Conditions.

Submission of Gareth Fitch BVetMed MS DACVS

10. In the evidence of Dr Fitch it is stated that there are a number of equine facilities within a 5 km radius of the proposed quarry. I accept this as accurate and acknowledge that equine training and racing is an important contributor to jobs and the local economy in the Christchurch area, along with providing valued recreational and sporting opportunities to non-professional equestrian riders.
11. The principal equine health concerns discussed by Dr Fitch relate to exposure to silica and silicates.
12. Dr Fitch outlines (in paragraph 3) concerns regarding inhalation of silica aerosolised by the quarrying processes and states that this has been shown in human studies and rats. I am not familiar with human studies relating to this subject. No human studies are referenced in the evidence submitted, and it is beyond my expertise to comment in this area. The paper referenced, does conclude that lung injury was induced in rats following silica inhalation. However, I note that in the study 50mg of silica was administered intratracheally (directly into the airway) of rats whilst under general anaesthesia in the experimental model. In my opinion this seems a poor comparison to the risks of low level environmental exposure in the horse.

13. With reference to paragraph 4, I agree that horses are constantly exposed to the inhalation of particulate matter while grazing pasture and that this particulate matter is likely to contain silica particles. From my simplistic geological research, silica is the second most abundant element on earth after oxygen and silicate minerals constitute 90% of the earth's crust. As such any particulate matter inhaled by horses, regardless of location, is likely to consist of a significant proportion of silica.
14. I think it is relevant to note that training tracks for racehorses and equestrian arenas are commonly surfaced with sand and fine aggregate mixes. It is common for horses to have temporary or permanent stabling consisting of small yards or covered yards frequently surfaced with sand. These surfaces will inherently contain a significant silica content. The dust generated from training tracks and arenas appears to create significant nuisance dust with visible dust clouds produced by horses working in dry conditions and visible coating of dust downwind on neighbouring pasture. I am aware of a number of instances where there have been neighbour disputes involving a local council due the dust generated from these surfaces.
15. It is common practice for grazing yards / paddocks to be positioned within and surround the perimeter of the tracks in order to maximise use of the available land area. Dust from the tracks is blown onto the neighbouring pasture presenting the same risks while grazing outlined by Dr Fitch. Typically, a perimeter fence is all that separates the pasture from the track surface. Horses will often work in pairs or in the case of Standardbred racehorses, they may be exercised behind a motorised vehicle or "jogger". This significantly increases the likelihood of inhalation of particulate dust matter from the track as the horse exercises.
16. From my understanding of the evidence on air quality, the predicted potential particulate contamination from the proposed quarry, with numerous mitigating factors employed and monitoring in place, is minimal beyond a 200 m radius from the boundary. In many training situations, if silicates were a major concern for equine health, the greatest scope for reducing the risk of inhalation and exposure through grazing would be from within the property.
17. With further reference to paragraph 4, there is a paper referenced on Silicate Pneumoconiosis and Pulmonary Fibrosis in horses. The paper concluded that silica present in the pulmonary lesions of the nine horses in the study was the causative agent. The paper supports the fact that high levels of

inhaled silica can cause severe pulmonary lesions in horses. I consider it important to add context to the frequency or incidence of this condition in horses. The paper was published in 1981 and all subjects were from a localised geographical area in California. In a search of the veterinary literature there is little reference to pulmonary silicosis in horses and to my knowledge all research and case reports published relate to the same localised geographical area in California. There has been no industrial link associated with these spontaneous cases. It was proposed that the high exposure to silicates in the area that resulted in equine disease was related to local geology posing a natural environmental hazard, increased residential construction on the hillsides leading the clearance of vegetation and then subsequent predisposing management factors of the horses such as housing in dusty corrals and feeding supplementary feed on the ground. I have not knowingly seen a case of silicate pneumoconiosis in 20 years of working as an equine veterinarian. I am not aware of any case relating to a quarry adversely affecting the health of horses kept in the vicinity of a site.

18. There is circumstantial evidence of silicate associated osteoporosis in the study referenced in paragraph 4, relating to cases originating in the same regional area of California previously mentioned.
19. Stress related bone pathology and fractures are of significant concern in Standardbred and Thoroughbred racehorses. This relates to the biomechanical stresses on bone from training and racing and failure of sufficient adaptation of the bone to sustain the cyclical loading.
20. Theoretically, high level exposure to silicates and development of a subsequent osteoporosis would predispose to fracture. However, in my opinion, it is unrealistic to link a condition only reported circumstantially in a very small number of horses in a localised geographical area in another part of the world; to an elevated risk of pathological fractures in the equine population within the vicinity of the proposed quarry. The primary risk factors for stress fractures in racehorses are training methods, training surfaces and the immature equine skeleton. Extensive time and research is invested worldwide to find ways to minimise the risks of fracture development but it is an unfortunate inherent risk of training and racing and in my opinion will not be influenced by the environment concerns raised.

21. In line with my aforementioned comments, I am therefore in agreement with the comment in paragraph 4 stating that there is not a concern for the increase in incidence of fulminant disease.
22. I am also in agreement with the statements regarding inflammatory airway disease (IAD) in paragraph 5. Compromise of lower airway function is a common cause of poor performance in the racehorse. I agree with the statement that organic matter in the environment such as moulds and pollen can contribute to its development.
23. I am in agreement with the statements regarding the nature of training as a profession in paragraph 5 and the effect that minor impediments in performance can have a huge impact of perception and professional success.
24. With reference to paragraph 5, I concur that silicate microspheres have been used as part of a suspension in an experiment model of recurrent airway obstruction in horses in a clinical study.
25. However, it is my opinion that important factors have been omitted when referencing the study. The purpose of the study was to design a model to induce inflammation in the lower airway, so that subsequently various therapies and treatments to resolve RAO could be studied. The purpose was not to identify agents that may cause naturally occurring inflammation in the lung. The purpose was not to establish what concentration of agents would cause inflammation. The horses in the study were subjected an inhaled suspension of 10^8 spores of 3 fungal isolates, 10 μ l of lipopolysaccharide in addition to the 10^8 silica spheres (1 μ m diameter). The silica microspheres were therefore one component of three agents designed specifically to induce inflammation. The size of the silica spheres where intentionally designed of a diameter to reach the alveoli. This selection of the diameter of the microspheres was not to mimic natural environmental exposure to silica dust. Rather it was to maximise the extent to which the particles would be carried deep within the lung to maximise potential subsequent inflammation. The whole suspension was then administered by nebulisation. This means that a mask was placed over the nostrils of the horse and the suspension was mechanically converted to minute droplets that are inhaled through the nostrils and into the airway as the horse breathes. This would result in massive concentrations of inhaled particles over a short period of time and far beyond any model of natural environmental exposure.

26. The impression is created that the inhalation of silicates alone have been used as viable model for inducing RAO. This is not the case and the exact role of the silicate microspheres in the induction of the experimental inflammation is not clear. Potentially the lipopolysaccharide and the fungal spore isolates may have been responsible for all the resulting inflammation in the lower lung. The experiment would need to be repeated using only inhaled silica microspheres to establish how, or whether, these spheres induced inflammation in the lower airway. Even if this were done, it would still not establish that exposure to silica dust in the environment caused inflammation. That would require a separate study using particulates of varying sizes (to mirror natural exposure) with subjects exposed at varying concentrations. By this method it could be determined if silicate particles cause inflammation and, if so, what concentration would be a risk for adversely affecting the lower airway.
27. The study quoted was designed to devise a model to induce RAO that could subsequently be used for future standardised studies. In my opinion it is not reasonable to conclude that the intentional, direct inhalation of the preparatory solution outlined (of which specifically designed silicate spheres were one component) proves that environmental silica dust a low levels would increase the incidence of IAD.
28. Paragraph 6 appears to question data regarding dust emissions. I am not qualified, as an expert in the equine veterinary field, to comment on the accuracy of dust emission data.
29. Paragraph 7 comments on health concerns for local human residents. I accept that there are similarities between RAO and human asthma and that the horse has been proposed as a potential model for the human syndrome. Commenting on the human health risks posed by the proposed quarry is not in my expertise. However, I do feel that this comparison raises an interesting point. I would assume that the research, testing and burden of proof required to display a lack of risk to human health would be detailed, rigorous and would far exceed those surrounding equine health. It would seem that if the dust emissions are acceptable for human health then by default they must also be acceptable for equine health, assuming the scientific similarities outlined between humans and horses exist.
30. With reference to the summary; I am not qualified to comment on human health in my capacity as an equine veterinary expert. For all the reasons

outlined above, I do not agree that the evidence provided indicates that the quarry proposal will be detrimental to horse health.

31. The evidence provided by Dr Fitch is well researched, referenced and scientifically accurate. However it is my opinion that it is selective in its use of the science and lacks context and accordingly could be misleading in the impression that it creates to a non-veterinary reader. The key points in my opinion are as follows:
- (a) Silicates are potentially inflammatory to the lower airway of horses.
 - (b) Horses are constantly exposed to dust and particulates containing silica in the natural environment and in the domesticated equestrian environment.
 - (c) Many of our normal practices of husbandry and training elevate this potential exposure.
 - (d) In many instances, if there is a desire to decrease the exposure of horses to particulate matter containing silica, the most effective control measure would commence with the changing of practices within the property.
 - (e) Despite this constant environmental exposure to silica at varying levels, pulmonary silicosis is only reported in a localised geographical area of California.
 - (f) I agree that inflammatory airway disease (IAD) is a major concern for the health and performance of horses.
 - (g) The causative agents of IAD are many and varied in the environment and there may be individual genetic predispositions. If exposure to silicates plays any role in the development of IAD, it is likely to be minor and dose dependent.
 - (h) My comprehension of the detailed evidence regarding air quality is that the proposed quarry is not going to fundamentally change the exposure of horses to silicates in the neighbouring area beyond the normal fluctuations and variations encountered in the natural environment.

Alec Jorgensen

30 October 2019