Facts on Dust

Created by sand mines

05-0137 Somersby Fields Sand Extraction Project

This Report contains collected evidence of the health effects of dust. There are discussion of the specific impacts of the Somersby Fields Sand Extraction Project. A list of criticisms of clauses in the EA is attached at the end.

- **World Health Organization** states "Free crystalline silica, SiO_2, it is one of the most common minerals in the earth's crust. It is found in sand, sandstone….the three most common forms are quartz. Silica dust is released during operations in which rocks, sand, concrete and some ores are crushed and broken. Work in mines and quarries are particularly risky. Respirable Silica Dust is so light that it can remain airborne for a long time. It can thus travel long distances in the air and so effect populations not otherwise considered to be at risk. There is widespread lack of awareness of the problem and its magnitude."
- **The Hon. Dr A Chesterfield-Evans. Hansard, NSW Parliament.** 17 /11 /98 "As a medical practitioner I am aware of the incredible harm caused by dust diseases. Silicosis in its more virulent forms-particularly that caused by Sydney sandstone which is very high in silica-can cause a healthy person to become a respiratory cripple in only a few months. Asbestosis and silicosis are debilitating lung diseases. Even today on building sites, some people do not even wear dust masks, and yet this House is debating these diseases.
- Excavators & bulldozers pulling rippers and scrapers will mine the sand on the site. The dust created by this machinery contains high volumes of Respirable Crystaline Silica. Huge dust clouds of this Respirable Quartz can rise up in white clouds to 300 metres from one ripper. The very finest particles are invisible to the eye. Sandstone comprises of 80 - 100% quartz.
- **Minesafe.org** "All respirated dusts must be considered harmful in some degree. Even where there may be only slight danger to the lungs, there is very likely some adverse effects on the respiratory system particularly to asthmatics or sufferers from hayfever.
- **September 1995 Non-Metal Mining** "When the sand and gravel deposit are consolidated to the point where digging with a front-end loader or power shovel is too difficult, a bulldozer equipped with a ripper is used to loosen the

material. A ripper consists of a large tooth (or series of teeth) which is attached to the rear of the bulldozer and pulled through the material as the bulldozer moves forward."

- **New Jersey Department of Health, USA** "Do not take contaminated work clothes home. Family members could be exposed." This is called secondary or domestic exposure and has occurred in Australia with Asbestos. Wives have contracted asbestosis from washing work clothes laden with dust.
- The proposed Somersby Fields sand mine is set to dig and crush enough sandstone to take 7.4 million tonnes of sand from the hilltop adjacent to Somersby village, school and Ag station. The proposed sand mine is a large open cut sand mine on a 42 hectare site.
- **Significant Dust Dispersion Models for Mining Operations by W.R Reed, Ph.D., P.E**. "One-third of the emissions (dust) from mining activities escape the open pit"
- **Unionsafe-factsheet** "The only protection against silicosis is the prevention of dust exposure. Work clothing should be vacuumed before removal. Quartz is the most important form of crystalline silica in the Australian context."
- Dust settling on **residents roofs** will cause contamination of water supplies captured as rainfall runoff.
- **Mine Fact 85** printed in November 1997 states that "dust can be bothersome to those neighbouring mines as it may affect washing, cars and crops. Dust at mines is caused by: Digging activities, truck and vehicle movements, wind on bare areas."
- The only effective protection against silicosis and other diseases is to prevent silica dust in the air. The exposure limit for silica dust is now 0.1 mg/m3. Silicosis is difficult to detect at the early stages because of the absence of symptoms that it is often mis-diagnosed. In all cases there is no medical treatment. The disease is difficult to detect in the earliest stages.
- **"Quarrying Occupational Health and Safety Committee "Quarry Safe-Hazardous Substance in Quarries"** by D. Orme Feb 1998. It states.... "In sand the one exception which could be a risk area are the haul roads if adequate dust suppression techniques are not applied. It is wrong to assume that water sprays are effective in eliminating respirable dust. The nuisance dust is reduced but not necessarily the invisible respirable dust which can even be breathed in on very fine water particles. There can be a natural reticence to use water suppression anyway since water sprays cause fines to adhere to the product which in some cases can render some products out of specification and possible un-saleable. The key hazards from generation of dust in the mining and crushing process relate to the dust and silica having potential for harmful effects in four main areas:
  1. The upper respiratory tract which traps the larger particles of dust
  2. The bronchii; associated with disease of the airways
  3. The lungs; smaller particles (-7 microns) trapped in the alveolae
  4. Other internal organs

- There is wide concern that dust generation may result in unacceptable risks of silicosis as a human health hazard for residents, school children and staff surrounding the proposed mine.
- **Rindeen Quarry Court Case,** Quote from the Commissioners of the Land and Environment Court of NSW, Commissioner AJ Nott and Commissioner T J Moore, pointed out in the summarization of the case. "It was the evidence of each if the three neighbours that they experience significant dust nuisance from quarrying operations despite these dust management practices. The dust affected them in two distinct fashions. The first related to dust intrusions into their houses with possible effects in health. Secondly, there was dust contamination of their domestic water supply. Each of them operated by a rainwater tank system that had as its primary source the run-offs from the roofs of the dwellings. Each of them also supplemented this water supply, by drawing on a groundwater supply through a bore. The groundwater was used to supplement the tank supply for domestic consumption during the summer or other periods of low rainfall."
- **Thomas A. Faunce.(Published 17th of June, 2006 Australia and New Zealand Health Policy).**
  "The Australian Safety and Compensation Council will need to address evidence presented to the "White" Senate Inquiry suggested that toxic dust workplace exposure presents greater health problems to the Australian community than is currently recognized. Community exposure through wind-borne dust and rain water, for example, clearly has been insufficiently investigated."
- **Workers Health Centre Fact Sheet**-"Work clothing should be vacuumed before removal."

- **USA OSHA** "Dr Linda Rosenstock, who pointed out that we now know that silica exposure is a risk factor for several new conditions, and that deliberations should be expanded to consider other health problems such as cancer, autoimmune diseases, nephritis and other kidney diseases, and tuberculosis. There is also accumulating epidemiology evidence that occupational silica exposure is linked with kidney diseases such as nephritis and end-stage renal disease."
- **Unionsafe-factsheet** - "Silica is the main component in sand. Silica dust is usually created when such building products, sandstone or rocks are cut, or worked on in any way that creates fine particles of silica in the air. It is breathing in this crystalline form (quartz) silica that causes silicosis. Initial exposure to silica dust will cause irritation to the eyes, nose and throat like most other dusts. However, if excessive amounts of silica dust are breathed into the lungs over a period of time, it can cause damage to the lung tissue. **The most common form of silicosis develops after long exposure to relatively low concentrations.** Once the disease has begun it will progress slowly but relentlessly even if the worker is removed from further exposure. There is no medical treatment for silicosis. People with silicosis are also at greater risk of developing lung cancer. In 1996, the International Agency for research in Cancer classified crystalline

silica dust as a human carcinogen (Group 1). Minimise exposure to nearby workers or the public."

Silicosis Information

Dr Anthony Johnson Consultant Thoracic Physician - Workers Compensation Dust Diseases Board

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Silicosis is a respiratory disease caused by inhalation of crystalline silica dust which leads to inflammation and then scarring of the lung tissue. It may result in silicosis, lung cancer, pulmonary tuberculosis or airways disease.

There are different types of Silicosis: simple chronic silicosis -- which usually results from long-term exposure (more than 20 years) to low amounts of silica dust. Nodules of chronic inflammation and scarring caused by the silica dust form in the lungs and chest lymph nodes. People with this condition usually have no symptoms acute and accelerated silicosis – These are more severe forms that occur more quickly (1 to 15 years after exposure) They cause shortness of breath and scarring of the lungs. They are not seen these days.

Progressive massive fibrosis. A small minority of workers with simple chronic silicosis may progress to progressive massive fibrosis. Progressive massive fibrosis means increasing, more severe scarring in the lungs. Workers with this condition are usually short of breath.

Causes, incidence, and risk factors

Silica is a common, naturally occurring crystal. It is found in most rock beds and it forms dusts during mining, quarrying, tunnelling, and work with many metal ores.

Risk factors include any work that includes exposure to silica dust. Mining, stone cutting, quarrying, road and building construction, work with abrasives manufacturing, sand blasting and many other occupations and hobbies involve exposure to silica.

Intense exposure to silica may result in disease in a year or less, but it usually takes at least 10 or 15 years of exposure before symptoms develop. Silicosis has become less common since regulations requiring the use of protective equipment and wetting of processes have come into effect.

Symptoms

Simple chronic silicosis does not usually cause any symptoms and is only picked up by examination and xrays.

Chronic cough. Shortness of breath with exercise, usually in patients who have progressive massive fibrosis

Signs and tests

Silicosis is diagnosed by a chest xray, the nodules of scarring can be seen in the upper lobes of the lungs.

Progressive massive fibrosis is associated with decreased lung function which is measured using spirometry. Simply put the lungs are restricted and unable to move the normal amount of air.

Treatment

There is no specific treatment for silicosis. Removal of the source of silica exposure is important to prevent further worsening of the disease. Supportive treatment includes cough suppression medications, bronchodilators, and oxygen if needed. Antibiotics are prescribed for respiratory infections as needed. Other considerations for treatment include limiting continued exposure to irritants, smoking cessation.

Complications

Silicosis increases the risk of contracting some other illnesses.

1. Lung Cancer
2. Tuberculosis
3. Airways disease (something like asthma or emphysema)

Prevention

The disease is completely treatable by preventing exposure to crystalline silica. Current NIOSH recommendations are that no worker be exposed to a time weighted average (TWA) concentration of free silica greater than 50 mcg per cubic metre of air as determined by a full shift sample for up to a 10 hour workday, 40 hr work week.

Surveillance

It is recommended that workers exposed to silica be examined regularly (yearly or second yearly) with a doctor examination, chest xray and lung function testing to identify any signs of the disease early. Removal from exposure can prevent the disease worsening and getting to a stage where the worker is short of breath

The Dust Diseases Board has a Lung Bus which can go to a worksite and do all the required testing on workers on site

"White" SENATE TOXIC DUST INQUIRY CONCLUSIONS

Somersby Action Committee 29th September 2005

- The risk of silicosis is the main consideration but increased risks of asthma attacks and other respiratory diseases are also a problem. Australia has a high incidence of asthma compared to other countries around the world, and the children at the school are likely to be quite vulnerable. A school with over one hundred and ten children and staff are located next door to the proposed sand mine, which raises very real health concerns in relation to dust. Some of the children have been placed there for health reasons because of their asthmatic tendencies, as the mountain air is known to be clean and pristine

- Can health professionals and experts in the field of silicosis, asthma and other breathing diseases guarantee that the children would be under **no** risk of heightened health problems as a result of dust generated from the proposed quarry? If this proposal goes ahead, the determining authority **must bear full liability and responsibility for the health and wellbeing of the children.** Dust will be generated from the physical excavating of the sand, blow-off from the anticipated stockpiles and dust from all the internal tracks as a result of up to 300 truck movements a day.

- There is no town water supply in the Somersby plateau. Local residents, businesses, the Somersby Research Centre and local school all rely on tank water. Dust settling on roofs will cause contamination of water supplies captured as rainfall runoff.

- The school community have concerns that a consequential increase in the amount of airborne dust from a sand mine has the potential to impact on the health of not only students but also staff, parent helpers and volunteers. Children are more sensitive receptors to respiratory illness and the potential for related illness is uncertain. Long term health cannot be assured and concern exists that the potential for adverse side effects may not be realized until it is too late. Independent tests carried out on a school at Maroota from October 1999 to September 2000 identified that, at the school site, the insoluble solids portion of the dust exceeded EPA guidelines for four of the twelve months that recordings were taken.

- There are over 62 families living within 1km of the proposed mine and a number of agricultural and village businesses surrounding the site at Somersby. There will be approximately seventy staff working at the Somersby Research Station. As mentioned there are over one hundred students and staff at Somersby school. In total there will be close to four hundred people within a one kilometer radius of the proposed sand mine. The senate inquiry has to recommend urgent legislation to put a distance limit from a mine to surrounding populations. This distance has to be in kilometers not meters. If on a still day, large dust clouds are formed from one ripper, reaching 300meters into the air (as shown in aerial photographs submitted to the senate inquiry) imagine the impact a twenty nine hectare open cut sand mine will have on the surrounding community. Legislation should be put into place urgently to protect Australian citizens across the country from the greed of a few.

- Our governments have a duty of care to protect the health of their constituents. It is vital that our leaders and government representatives consider the old-fashioned concept of social responsibility that seems to be extinct in our modern society. People should come

before trees…. if supplies of construction sand are becoming exhausted in the Sydney region then it is my belief that parts of National Parks should be mined instead of allowing sand mines and quarries to be located in populated areas. OR off shore sand mining be allowed.

- In practice the policing of the rules and regulations associated with sand mines is done by the residents living close-by. This should not be the case and is a major problem for the community. For example, trucks coming and going from the mines do not have covers on their loads. This only adds to the dust problem. The roads within the mines are not sealed and large dust clouds are stirred up as trucks travel around the site. Stockpiles of sand are supposed to be regularly wet down to reduce dust and this practice is not regularly followed, as the consumer does not want to pay for excess water in their load and if the sand is too wet it cannot be used in construction.

- We would like to recommend to the Senate that the Federal Government put in place legislation that overrides the zoning laws that allow mines and quarries to be positioned next to residences, businesses and schools. A national plan for all states should be in place to safeguard the population.

- Developers should be made to pay for Independent Government Environmental Impact Statements.
  When a developer has to organize their own EIS, then the result is not an accurate one and open to corruption.

- Unless the generation of airborne dust is prevented, persons who are even removed from the source of dust will also be exposed in an unsuspected way.

Thank you for your consideration.

R. D.

Somersby Action Committee (Somersby Action Group)

Elton Humphery
Committee Secretary

The Senate Community Affairs Committee 11th July 2005

Senate Toxic Dust Inquiry Submission

from the Somersby Action Committee

- After many months of investigating the problems of toxic silica dust, we conclude that it is vital to have sand mines / quarries located in unpopulated areas.
- We believe that it is vital that the inquiry is extended to include the impact of sand /quarry mining on surrounding populations, not just employees working on site and that the Senate inquiry makes recommendations to the State Governments regarding proximity or "how close" can sand mines / quarries be located to residences, schools, businesses, highways and roads. At the very least it should be several kilometres from human habitation.
- Overseas research is now showing an increase of lung cancer in surrounding populations. See attachments and photographs of dust clouds from ripping machinery.
- The Somersby Plateau already has thirteen quarries in the middle of domestic and rural land use. See Sydney extractive materials strategic study. Due to the toxic dust blowing onto surrounding populations we believe that no more mines should be allowed on the Plateau. The most harmful dust is that which is less than 10 microns in size. As this dust is not visible to the naked eye, it does not follow that because dust cannot be seen there is no danger.
- If levels of Asthma increase when air quality decreases, then toxic silica dust will surely have a detrimental effect on the local population. For example, a resident living 20m from a quarry access road suffers from a chronic asthma condition, with the trucks passing her bedroom around 30 to 40 times per day, it would not be very beneficial for her health.
- Policing the site to enforce the DA conditions that reduce the levels of dust in the air rely on self regulation and the surrounding residents report breaches of conditions. Fines for any breaches are too low to act as a deterrent. DIPNR in NSW have acknowledged this and research from residents living near mines at Maroota, Central Mangrove and Somersby, have reported total lack of implementation of the DA conditions. See DVD's enclosed, roads are not damped down as required.
- Due to the nature of sand mining there is no guarantee of effective dust control. In fact within the industry it is regarded as virtually impossible particularly in windy weather conditions and hot dry weather. This is now typically the Australian Climate. See attached aerial photographs.
- What can governments at all levels do to guarantee the long term health of the local residents surrounding a mine? It is wrong to assume that water sprays are effective in eliminating respirable dust. The nuisance dust is reduced but not always the respirable dust which can even be breathed in on very fine water particles. Ref: Mining and Quarrying Occupational Health and Safety Committee "Quarry Safe-Hazardous substance in Quarries" by D.Orme Feb'1998
- In relation to the Rindean sand mine submission to extend their existing sand mine operation, Commisioners of the land and Environment Court of NSW, AJ Nott and TJ Moore, pointed out in the summarisation of the case. "It was the evidence of each of the three neighbours that they experience significance dust nuisance from quarrying operations despite these dust management practices. The dust effected them in two distinct fashions. The first related to dust intrusions into their houses with possible effects on health. Secondly, there was dust contamination of their domestic water supply."

- The enquiry should include studying the accuracy of current Silica dust monitoring equipment currently used by the EPA. As recently a five years ago it was stated by an expert in the field –Dr David Douglas- that the monitoring equipment used by the EPA in Australia did not measure fine particles less than 10 micron. As these fine particles are the ones which cause Silicosis it is imperative that accurate monitoring equipment be used by the EPA in determining whether or not the extractive industry has safe levels of dust.

Please keep us informed as to any developments and the results of the enquiry.

Yours sincerely,

P. & R. D., Somersby 2250 NSW. (Somersby Action Group)

Report on Cable Sands WA

If mineral sand mining proceeds, the environmental consequences within a few years of the initiation of mining will be severe. Mineral sand mining involves the complete devastation of soils due to alteration of soil chemistry and the utter destruction of the soil profile. As vegetation and hence faunal habitat depend entirely on the nature of soils, the structure and species richness of flora and fauna communities will be forever altered, despite revegetation efforts. Rehabilitation of the ecosystem is impossible in the short term to medium term. Whether it can be in the long-term should not be experimented inside a national park or a conservation reserve. Cable Sands WA has little experience (~2ha) in revegetating native flora such as is found in the excised zone.

The CSIRO report on the hydrology of the Lake Jasper area identified a connection between the groundwater, surrounding surface water and the lake. Lake Jasper's recharge area occurs to the north and west of the Lake Jasper corresponding with the proposed mine area. Likely impacts on the hydrology include the lowering of the water level of the lake and surrounding wetlands and contamination of surface or groundwater, which may have drastic effects on the aquatic ecosystem as well as breeding sites for the regions birdlife.

A recent report by the Department of Environmental Protection reveals that Cable Sands has, for three consecutive years, failed to audit its rehabilitation efforts and to meet statutory environmental requirements in relation to its current Jangardup mine. Cable Sands has thus failed to demonstrate that its environmental performance can be trusted.

If not stopped Cable Sands may cause irreversible damage to this world class area.

SAND MINING UPDATE ~ Health before Wealth

It is too late There are already too many sand mines on the Somersby Plateau and with the expansion of existing mines, water resources will be depleted even further. There are too many permanent residents living around the proposed Somersby Fields sand mine and a school next door. **This mine proposal is not in the public's interest.**

Water In 1994 at a total cost of around 20,000 dollars, a local resident in Dog Trap Road, Somersby deepened an existing bore to provide a more reliable water supply. A local farmer's bore (D. P.) was deepened to 488 ft with a disappointing supply of only 25 gallons per hour. If you deepen an existing bore there is no guarantee of any further water supply. Every person I have spoken to that lives near a sand mine has lost most of their existing water supply. This will be a COST to the community, not a benefit. **This proposal will mean an over development of the Plateau.**

Health Issues The creation of air pollution from an open cut mine is well known. A local resident (K. M.) lives next door to a sand mine at Mangrove Mountain. He reports at times the dust is so thick that the sun is darkened. This dust is not ordinary dust, it has fine particles of silica in it. This is a major health hazard and the effect on the lungs produces a medical condition called silicosis. Silicosis is very much like asbestosis. Recent overseas studies provided by the Australian Medical Association show that lung cancer has increased in populations surrounding sand mines. Another cost to the community. Asbestos is made of 4 different silica compounds and sand is silica. Work Cover's web site shows Silicosis is a real problem in Australia as it has established a silicosis committee that looks after claims from workers in the industry. Greg McCrea, geologist with the Dept' of PI (minerals) stated that sand which is Silica dioxide is the same the world over. Therefore overseas health reports from the AMA sent to the committee regarding silicosis and respiratory illnesses apply to Australian mines and quarries. Reports from Maroota residents confirm that dust is a regular problem and exceed the limit three fold at times.

Somersby School and the Local Community It is **irresponsible** to locate a sand mine so close to an existing school and a large number of local residences. If there are any risks on any ones health, that alone should be enough to prevent the approval of the proposed sand mine. The school has operated for about 80 years.

Noise The constant truck movements to and from the mine will destroy the peace and quiet existing residents and the school community enjoy. The proposed operating hours of 5.00am till late at night is unacceptable. The school motto "Worth daily living" will no longer apply to the school with the constant distraction of noise from the mining equipment and the beeping of trucks. **DIPNR has acknowledged that policing a mine site is very difficult.**

Local Roads Local residents are asking who is going to pay for the impact of the huge increase in the volume of traffic. How is the F3 going to cope with the large increase in truck movements to and from the mine? One local resident has suggested that the state government will eventually request that the truck movements be restricted to times which are not peak times on the express way. This will mean night operation of the mine. This will be a COST to the community, not a benefit.

Issues of Equity and Justice To date the consultation process has created only impressions and vague promises. Nothing has been put in writing to create binding security with compensation

for loss of quality of life, loss of water and loss of income for business effected As a result of the reduction in the water supply within a one and a half kilometers of the proposed sand mine. How can we be sure that the current owners of Somersby Fields will not sell or lease the development to a large mining company for example CSR or Vulcan Minerals. Will any promises made by the existing owners, either verbally or in writing, be effectual if the mine is sold off?

The Rights of Existing Long-term Land Holders Newly arrived on the scene, Somersby Fields may not have realized that there is a very long queue of local community members with very genuine equity issues relating to land use in this locality. The many nearby properties will be de-valued if the project goes ahead. All land owners affected will have to be compensated in full if the project goes ahead.

State Government Planning It is unfair for local residents to be told for 30-40 years that rural/residential subdivision should not occur on the plateau because it is prime farming and agricultural land. Because of these restrictions values have been kept low and many residents see this as a way of keeping large holdings available for future sand mining for the Sydney market. For the state government to change the zoning of many areas of the Somersby plateau in planning instrument REP 9 to allow sand mining is in direct conflict with the position they have held and limited the existing land owners for many years.

How will the community benefit from this proposal? Feedback from the community raises questions as to the need for an additional major number of sporting fields in 20 years time, if it uses an enormous amount of water to maintain. The community unfortunately sees the sporting fields as a bribe to justify, to the so-called wider community, the granting of an approval for the sand mine. "…creating the opportunity for a sporting, recreational and nature conservation complex." , does not seem to indicate that Somersby Fields is going to pay for the full completion and maintenance of the proposed sporting fields. This will be yet another cost to the community.

Database GeoRef **Accession Number** 2002-003442

Title Airborne particulate quartz and related health effects in Iowa.

Author Filloon Ryan S. Wulff Andrew H

Book Title In: Geological Society of America, North-Central Section, 35th annual meeting.

Book Author Anonymous

Source

Abstracts with Programs - Geological Society of America. 33; 4, Pages 4. 2000.

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Geological Society of America (GSA). Boulder, CO, United States.

Year2000

Abstract

Iowa is one of the five dustiest states in the nation due primarily to extensive perturbation of loess and glacial tills by modern agricultural practices. As a result, Iowa residents are subjected to an elevated risk of overexposure to particulate matter and the adverse health effects accompanying it. Crystalline quartz is classified as a group 2A carcinogen by IARC and is a primary constituent of airborne particulate matter 10 microns in diameter and smaller. OSHA's current exposure limit for a dust composed of 10% quartz is 1.0 mg/m (super 3) . Although the Iowa DNR monitors PM10 and PM2.5 statewide, this study will provide a more detailed look at the individual components of dust according to their relative sizes and abundance. Respirable dust is broken down into ten size classifications using a Multi-Orifice Uniform Deposit Impacter (MOUDI (super TM)). Particle size is sieved as a function of velocity in the following steps: 10 mu m, 5.6 mu m, 3.2 mu m, 1.8 mu m, 1.0 mu m, 0.55 mu m, 0.335 mu m, 0.180 mu m, 0.098 mu m and 0.055 mu m. The particulate matter is deposited onto a 47 mm filter, which is then dissolved and its material sorbed onto a 25 mm silver membrane filter for use on an X-ray diffractometer. The X-ray analysis not only provides the mineral identifications, but in conjunction with a calibrated set of standards can yield quantitative results. Modal mineralogy may then be compared regionally, statewide, or nationwide. Sampling will occur throughout the year in both rural and residential areas to record fluctuations caused by seasonal agricultural implementation and climatic changes. These results along with archived PM2.5 data from the DNR will be utilized in compiling statistical airborne particulate silica data. Prolonged exposure to high levels of airborne particulate quartz may be related to health risks including pulmonary diseases, such as **silicosis**, mesothelioma, and lung cancer. This study, coupled with demographic and health data from across Iowa, will help identify possible high-risk regions statewide.

Subject Heading

atmosphere. carcinogens. clastic sediments. dust. environmental analysis. framework silicates. Iowa. medical geology. particulate materials. pollutants. pollution. public health. quartz. sediments. silica minerals. silicates. United States

13/11/2000 6pm MEETING WITH VULCAN MATERIALS (MIKE HOSKINS.

JOHN LOCKETT. DR. DAVID DOUGLAS. ROB CORKERY, AND ASSISTANT ROBIN.

P. & C. MEETING: To meet with their Occupational and Environmental Health Consultant. Dr. D. Douglas in regards to health issues directly related to Vulcan's proposed development.

" RESPIRABLE DUST; Causes Silicosis. Silicosis is caused when this dust gets right down into the lungs. In order to do this it must be very small – the size is important. It must be less than 10 microns.

INSPIRABLE DUST; causes asthma and all the bronchial types of illnesses. To do so it must get into the bronchial tubes and not the lungs. The size of these particles are anywhere between 75-100 microns.

"Sand Dust is different from general dust."

SILICOSIS & SILICA DUST – DISEASE LAWYERS

www.silicosis-injury-attorneys.com

Silicosis is lung disease caused by overexposure to crystalline silica that workers breathe when exposed to fine sand dust. The particles are much smaller than sand found at a beach and are often microscopic. Silicosis kills thousands of people around the world every year. Working in dusty areas where silica is airborne can increase the chances of getting silicosis. Since silica dust is created when rocks, sand, concrete and mineral ores are crushed or broken in certain occupations. Certain agricultural work such as working in dusty conditions from disturbing the soil, or even ploughing or harvest. Basically any type of work that involves the creation of large dust clouds containing silica can be hazardous. Silica dust is invisible to the naked eye and is very light and often remains airborne for long periods.

DUSTS (Extract from Hazardous Substances in Quarries) (Section 5)

Description of Group

Dusts are one of, if not the major hazard to health from substances in quarries. Dust is generated at all stages of the production process and the smallest, indeed invisible particles are the most hazardous due to their ability to reach the lower part of the lung (the alveolae).

The most widely recognized hazardous component of the dust is crystalline silica which due to excessive exposure can cause severe respiratory problems or even silicosis and as a class 1 carcinogen may cause cancer.

None of the commonly quarried rocks or minerals can be guaranteed silica free although many basalt deposits (but not all) test to be less than 1% crystalline silica. Rocks classified as limestone have been shown to contain up to 40% crystalline silica and granites 55% crystalline silica. Quartzites and natural sands are normally in the range 80-100% crystalline silica. Recycled concrete should be given a precautionary classification as greater than 80% silica.

Precautions for Avoidance.

1. **Avoid all eye contact.**
2. **Introduce a regular, planned programme of dust monitoring, both personal and by location to ensure that dust control methods remain effective.**
3. **Health surveillance should be undertaken on a yearly basis as minimum in hard rock quarries. For wet sand processes each 3 years should be sufficient. (Unless advised differently by occupational health physician.)**
4. **Change and wash facilities should be provided and used.**
5. **Wash dusty clothes regularly and separately to other clothes. Research suggests contamination of other clothes by dust during the washing process may put other persons at risk.**
6. **Smoking has been shown to amplify risks from dust exposure and non-smoking programmes should be actively encouraged.**
7. **Clean all personal protective equipment prior to storing or re-use.**

Protective Clothing and Equipment.

1. **Long sleeved shirt and trousers or suitable overalls.**
2. **Use safety glasses or goggles in all crushing plant areas.**
3. **Use particulate dust mask as per Australian Standards 1715 and 1716 in dust risk areas.**

SILICA: THE NEW ASBESTOS

(Article taken from Official Journal of the Construction Forestry Mining & Energy Union (Construction & General Division) "UNITY" Magazine. June 2006.

Silica is shaping up as a bigger health problem and compensation nightmare than asbestos with a federal Senate committee due to report its findings to parliament on May 31 2006.The committee is investigating claims that the number of Australians with sand-scarred lungs is grossly under-reported and that those with injuries have not received adequate compensation.The employers most at risk from claims are likely to be governments who had thousands of workers digging roads and railways out of sandstone.As with asbestos, silica-related diseases can take a long time to manifest themselves. Silicosis – lung damage from inhaling silica dust – is a long-term disease affecting sandblasters, labourers, miners and spray painters.If you are working on an excavation site and you are concerned about the risk of atmospheric contaminants such as siliceous dust contact the CFMEU office.

SENATE ENQUIRY INTO TOXIC SILICA DUST Given on Friday 30th September, 2005 at 11.30.

Extract of Report to The Senate Community Affairs Reference Committee written by Ken and Glenys Mxxxxxxxx of xxx Wisemans Ferry Road, Central Mangrove NSW. Dated 28th September, 2005 and Extract from a separate Dated 30th June, 2005 and

"Against Council guidelines, we did not receive notification of the Development Application, so were unable to examine the proposal and were denied our right to object. To this date we have been unable to view the Development Application, Development Approval or EIS.

When noise, dust, fumes and visual impact on our property and health became unbearable, in August 2004 we lodged complaints with Gosford Council. When we were finally able to view the 1993 EIS and 1996 Development Consent at this time, the full extent to which this quarry had

been allowed to operate without complying with development approval conditions became apparent.

Most of the Conditions of Development Approval have not been adhered to. Eg: No wheel washing facility. No bunding of fuel storage area to contain fuel spills. No bund wall to screen neighbour's properties. No fence from dangerous deep dams. Hours of operation ignored. No dust suppression measures. Dumping of dangerous waste in quarry (from a subsidiary business) in a water catchment area. Excavating to 3- ft deep (with heavy machinery) within 6 feet of our boundary fence, etc.

With clouds of dust and sand being dumped on our property, our windows must be kept closed even in hot weather; our drinking water (from the roof) is contaminated; our outdoor BBQ area is unusable (covered in dirt); our pool is covered in floating dirt; clothes lines must be wiped clean of dirt before washing is hung out; working outside in the garden has become unpleasant and unhealthy. Dust penetrates every part of our house and we must keep windows closed. Dust and noise prevents outdoor eating and entertaining. The clothesline must be washed before clothes can be hung out. Dust settles on our roof and is washed into our drinking water tank. Last year 6 inches of sludge was cleaned out from the bottom of the water tank. Every day, clouds of dust rise from the quarry site where machines are gouging out the sandstone to extract the truckloads of sand. The trucks then follow a dusty dirt track around our side boundary with dust billowing up behind them. As the quarry does not employ wheel washing facilities, this dirt is then trucked into the bitumen road and, as the trucks and subsequent traffic drive down the front boundary of our property on a busy road, more clouds of dust are produced. To add to that, many of the trucks leaving this site do not cover their loads.

Our health has been severely affected – we both suffer constant eye irritation – and I have developed increasingly severe respiratory problems over the last three years which last year resulted in being bedridden for 6 weeks, using nebulizers and asthma drugs, and being ill for three months. X-rays show some small nodules on the lungs. I have had further X-rays recently to monitor my health and do not have the results yet. I have a constant, chronic cough, which is present every day. I do not want X-rays to show that I have developed Silicosis and trust that this is not the case – but the point is that I am affected by this constant dust and it could develop into Silicosis. Several hundred schoolchildren who have been exposed to this ever present dust could develop silicosis or lung cancer in years to come as a direct result of allowing this dangerous activity in close proximity to human habitation. In fact, overseas studies have shown that, as the particle size of the airborne silica is so small, it can remain suspended for vast distances and affect large populations. Our health is being affected by the ever present dust and noise.

Arial photographs (included) show that this Somersby/Peats Ridge Plateau area are comparatively small ridgetop areas of prime agricultural land (traditionally used for vegetable and citrus growing, nurseries and chicken production) intersected by large areas of deep timbered valleys (most of which flow into our water catchment areas). There is very little vacant land as most of this prime agricultural land is taken up by relatively small holdings. Any extractive industries approved in this area need to be isolated from this fairly heavily populated area and sited down in the valleys (as several are) to have minimal impact.

With environmental concerns, and silicosis being recognized by the World Health Organisation as potentially having wider repercussions that asbestosis, ultimately the necessary sand will be extracted by dredging offshore.

It would seem that duty of care to the public should necessitate notifying surrounding populations of the dangers involved in breathing respirable silica when these developments are approved."

MINE DUST AND YOU www.health.nsw.gov.au (Extract from Environmental Health Website January, 2006).

"Generally, it is thought that fine particles below 2.5um in diameter may be of a greater health concern than larger particles as they can reach the air sacs deep in the lungs. However, coarse particles (PM_{25-10}) are also associated with adverse health effects.

People who may be more susceptible to the health effects of fine and coarse particles are:

1. **infants, children and adolescents**
2. **elderly**
3. **people with respiratory conditions such as asthma, bronchitis and emphysema**
4. **people with diabetes.**

If health effects arise from exposure to coarse particles, such as from mining activities, the symptoms are most likely to be:

1. **cough**
2. **wheeze, or worsening of asthma**
3. **increased need for medications (eg puffers, antibiotics)**
4. **increased breathlessness.**

High levels of TSP may also cause coughing, sneezing or sore eyes.

The impact of dust from a nearby mine on local amenity depends on the distance from the mine site and climatic conditions, such as wind. Other amenity impacts include dust depositing on fabrics (such as washing) or on house roofs, and the transport of dust from roofs to water tanks during rain. NSW Health's Rainwater Tanks brochure provides advice on how to maintain water tanks for safe drinking. Strategies to reduce dust in water tanks include first flush devices and desludging.

Consents also provide that where these standards are not being met at residences within the mine's acquisition or management zones, then the property owners are entitled to have their property acquired by the mine at a price established according to a set formula.

A further key control is keeping the area of disturbed land to a minimum, through progressive mine rehabilitation. This helps reduce dust from wind erosion. Locating mines some distance from surrounding neighbours, the design of mine layouts and choice of equipment and work practices can also reduce potential dust impacts on both health and amenity.

Quote from Pxxxxx Family Dated February 15, 2006 to Chris Holstein at Gosford City Council.- DUST

"When the quarry previously operated, all surrounding residences experienced significant dust nuisance. We are concerned with impacts from dust in two ways. Air-borne dust has the

potential to enter our house and impact on the health of our family. We have two (2) children, who suffer allergies to dust-mite and are fearful that the quarrying operations will create an increased level of dust within our house. We note that the Department of Health has expressed concern regarding the location of a quarry so close to rural-residential properties due to potential health impact from dust deposition. Council has approved these rural residential properties over the years including some recent approvals. It is inappropriate for Council to now approve a development which has a totally incompatible land use so close to these rural residential properties.

The second area that the dust can impact upon us is dust contamination of our domestic water supply. We rely upon rainwater (supplemented by bore water) as our main source of drinking water. We do not have the luxury of town water. Therefore, it is imperative that we are able to maintain a domestic water supply that is healthy. We note that the abovementioned concerns in relation to dust deposition were shared by the Land & Environment Court in relation to the refusal of the Section 96 application we mentioned earlier."

THE TOTAL COST OF DIRECT AND INDIRECT HEALTH IMPACTS OF MINING DUST ON SURROUNDING COMMUNITIES; A Feasibility Study By Shomenthree Moodley

PARTICULATES

Fine particulates are inhaled by man and enter the lung. They are light in weight and can exist in the atmosphere for days. Coarse particles between 2.5 and 15 microns are important from a health standpoint as they cause problems when people breathe through their mouths and no filtering takes place. Dust may be fine particles of 2.5 microns or larger particles of 10 microns. (NACA, 1996).

The importance of particulate pollutants relates to several considerations. Especially in the case of human health, it is the actual concentration of airborne dusts within the respirable size range, which is relevant. This range is taken to include all particles less than 2.5 microns as larger particles are intercepted in the nose. (Down & Stock, 1978)

HUMAN HEALTH

Dust can affect man and his environment in several ways. When the concentration of dust as pollutants increases without being adequately dispersed because of the meteorological, topographical or other factors, serious problems may result.

THE HEALTH EFFECTS OF CHRONIC EXPOSURES TO LOW LEVELS OF AIR POLLUTION ARE NOT AS DRAMATIC AS THAT DUE TO ACUTE EXPOSURES. THIS DOES NOT DETRACT FROM THE SERIOUSNESS OF REDUCED QUALITY OF LIFE DUE TO HEALTH PROBLEMS CAUSED BY LESS, DIRECT AND ACUTE EXPOSURE TO DUST.

International studies indicate that there is a close relationship between dust pollution and upper respiratory diseases but air pollution also causes other effects such as burning and tearing eyes, blurred vision, dizziness, headaches, throat irritation, sneezing and coughing.

WHAT ARE THE HEALTH RISKS ATTACHED TO MINE DUST?

This study is concerned with the long term, chronic less concentrated exposure of communities and has isolated chronic obstructive pulmonary disorders and upper respiratory tract infection as disorders that need to be studied. This is particularly hard to determine as health personnel

interviewed indicate that there is a very high incidence of misdiagnosis and the additional problem is that environmental considerations are not considered in diagnosis.

Diesel Fumes are also an issue as there are now many truck movements each day. ~The problem is not just silica dust

www.epa.gov/ARD-R5/naaqs/pm.htm Last updated on Friday, May 25th, 2007. USA

What is Particulate Matter?

Thick, black smoke belching out of the exhaust pipes of trucks. White smoke that comes from burning leaves or burning wood in the fireplace. A hazy brown layer in the morning sky. Visible material (other than steam) puffing out of smoke stacks. Swirls of dust stirred up by a car on a dirt road. These are all examples of particulate matter.

Health and Environmental Effects

Numerous recent studies have shown that airborne particles (either solid or liquid) cause serious health problems. EPA has estimated that airborne particles cause over 15,000 premature deaths in the United States per year. Scientists have correlated exposure to airborne particles with increased hospitalizations for asthma attacks, worsening of lung disease, chronic bronchitis, and heart damage. A March 2002 study suggests furthermore that airborne particles can cause lung cancer. In addition to these human health effects, particulate matter is the main cause of haze which decreases visibility. Particulate is eventually settles on land or water which can acidify lakes, deplete the nutrients in soil, and damage sensitive forests and crops.

Particulate matter is present in many different sizes. The smaller the particle, the more dangerous, because it can travel deeper into the lungs.

Submission by Richmond Action Coalition on Freeways (RACOF) by Ian Wood

Community health-danger from particulates

Particulates (PM10 and especially PM2.5) are now regarded as the most dangerous pollutants from motor vehicles, with a disproportionate amount of PM2.5 being emitted from diesel engines. The effects of airborne particles are cumulative and there is no safe level: every 10ug increase in their concentration in ambient air results in a 1 % increase in local mortality, as the EPA pointed out in its submission on the Scoresby Transport Corridor EES in September 1998.

A string of studies have now been done that link vehicle pollution to increased mortality and cancer. The latest is a Denver (Colorado) study reported in the February issue of the *Journal of the Air and Waste Mangement Association*, which shows that children living near arterial roads are at greater risk of developing cancer, including leukemia.

Motor vehicle pollution causes around 400 premature deaths each year in cities like Melbourne and Sydney.

"To put this into some type of context and to bring some vision to this issue, consider the eruption of Mt. St Helens back in the 1980s. Those people that may have been exposed to Silica and contracted silica related respiratory injuries would mostly be inhaling tridymite or crystobalite in the dust after explosions. Those people in the Trade Centers in 2001 would mostly be inhaling quartz coming from the concrete dust. The point is simple. Although all are different in chemical structure, all forms of crystalline silica can eventually be deadly."

" Over the past 6 or 7 years, silica had popped up every so often as another environmental issue with catastrophic potential. The issue would be debated, but no action was taken. That was the good news. However, last year the industry saw some issues start attaching silica exclusions to standard liability policies to ensure they did not cover third-party liability associated with exposure to the material."

"Another issue that covers to mind is the collapse of the World Trade Center (WTC). In addition to other airborne contaminants, silica dust was a major concern created by the actual collapse of the buildings in that section of the city. The population exposed to those contaminants could easily reach into the millions when you think of the people that directly inhaled the dust during emergency response and evacuation, during the post-collapse demolition, and through contaminated ventilation systems of buildings in the area. While tragic, the mitigating factor here is the concentration of exposure-primarily limited to lower Manhatten. Silica as with other contaminants, is considered a pollutant by definition."

Concerns of Horticultural Businesses within 1km.

Dust settling on plants will potentially interfere with their normal metabolism.

Dust settling on plastic and polycarbonate greenhouses will interfere with normal light transmission levels and potentially impact on research trials conducted inside these structures.

Dust settling on roofs will cause contamination of water supplies captured as rainfall runoff-this is likely to be a significant source of potable water for the new Institute.

There is concern that dust generation may result in unacceptable risks of silicosis as a human health hazard for residents and staff on our property.

Information Circular 9478
Significant Dust Dispersion Models for Mining Operations

By W. R. Reed, Ph.D., P.E.
DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health
Pittsburgh Research Laboratory
Pittsburgh, PA
September 2005

HEALTH EFFECTS OF DUST

" Other studies have shown that children are affected by short-term PM10 exposure and that increased chronic cough, chest illness, and bronchitis were associated with a 50-µg/m3 increase in the 24-hr average PM10 concentrations [EPA 1996]. Long-term effects from PM10 would depend on the amount of exposure to PM10 over the life of a person."
www.cdc.gov/niosh/mining/pubs/pdfs/2005-138.pdf

REF: EPA [1996]. Executive summary. In: Air quality criteria for particulate matter. Vol. I. Research Triangle Park, NC: U.S. Environmental Protection Agency, National Center for Environmental Assessment, EPA publication No. EPA/600/P–95/001aF, pp. 1–1 to 1–21.

What EPA USA says about crystalline silica:

Health Effects of Inhaled Crystalline and Amorphous Silica (from the EPA website)

ABSTRACT: Recently, public concern regarding nonoccupational or ambient silica exposure, mainly to crystalline silica, has emerged making it important to evaluate background and ambient concentrations. Ambient emissions of silica rarely are estimated or measured in air pollution studies of particulate matter.

Crystalline silica is widely used in industry and has long been recognized as a major occupational hazard, causing disability and deaths among workers in several industries. This is a health risk assessment covering the causes and studies of crystalline silica exposure.

To view the entire report, click the link below:

EPA/600/R-95/115 (PDF) (Doc Stats: One 1.68MG

Not-so-simple silicosis: A case for public health action

File Format: PDF/Adobe Acrobat
respirable silica for 45 years), the Findings. of Kreiss and Zhen [**1996**] **...** probably exceeds **ambient**. air levels of crystalline **silica** in some areas, **...**
doi.wiley.com/10.1002/(SICI)1097-0274(200003)37:3%3C245::AID-AJIM1%3E3.0.CO;2-2 - Similar pages - Filter

31 December 2004

NOHSC declares amendments to the exposure standards for crystalline silica

The National Occupational Health and Safety Commission (NOHSC) has declared amendments to the adopted national exposure standards for atmospheric contaminants in the occupational environment. Notification of the amendments appears in the Australian Government Chemical Gazette of 7 December 2004 and the Australian Government Notices Gazette of 8 December 2004. These amendments update the national exposure standards maintained by NOHSC by replacing existing standards for three forms of crystalline silica - quartz, cristobalite and tridymite. The date of effect for these amendments is 1 January 2005.

Certain exposures to crystalline silica can cause serious harm to human health. Prolonged

exposure to respirable crystalline silica can cause silicosis. The revised national exposure standard for crystalline silica has changed for quartz, from 0.2 mg/m3 to 0.1 mg/m3.

The revised exposure standard for all three forms of crystalline silica should be measured in accordance with the new methodology in Australian Standard Workplace Atmospheres – Method for sampling and gravimetric determination of respirable dust AS2985-2004. These changes have been recommended to reduce the potential incidence of silicosis.

EA comments on dust:-

1) 4.4.2 Existing Air Quality

4.4.2.1 Introduction

Air quality standards and goals refer to total pollutant levels from both existing sources and proposed activities. To fully assess impacts against all the relevant air quality standards and goals, it is therefore necessary to obtain data or estimates on existing particulate matter airborne concentration and dust deposition levels.

Existing air quality around Somersby is influenced by dust generated from unsealed roads or tracks (eg. Sections of Dog Trap Road), unpaved areas, and rural/agricultural pursuits. Until mid 2006, an area opposite the entrance to Somersby Public School was a constant source of dust – a feature that has reduced noticeably since sealing of frequently trafficked areas.

"This is not true. The road and parking areas at the Somersby Store were re-graded during December and January 2005and 2006 which made the dust levels at their highest readings during that time. The area was finally sealed on the 12th of January 2006 and the date confirmed with Gosford Council. (see table 4.29) This one off highly inflated PM10, caused by the extensive roadwork's to seal the 1 acre area opposite the school, was incorrectly and unjustly used by Heggies in the dust recordings to give a higher than average background PM10 reading when it should have been completely omitted. The community told the proponents a number of times about this anomalous situation and they have shown the time of the road works to be completed at mid 2006 (see above)

This is a serious problem for the school and community as Heggies has used this the high PM 10 reading throughout the whole Air Quality assessment, when it should never have been included. Our air is well known to be cleaner than most parts of the state of NSW and lower than the readings for Wyong, just 13 minutes drive north from Somersby. This is confirmed by table 4.28 showing the lowest reading of deposited dust during mid 2006.

This flaw proves that the data is totally unreliable as the readings so contrasting. This can be verified by the correct reading of 12.5 % ash read at site SD-3 for the period 29 Dec 2005 to 29 January 2006. Finally, inconsistency in the percentage ash, such as SD-3 during the period 29 December 2005 to 29 January 2006 was also used to identify anomalous values. Page 3-17 Volume 1. This was not an inconsistency and should have not been deleted as an anomaly. It was proof of the high readings of PM10 at that time."

Page 4-83
Average monthly PM_{10} concentrations varied from 9µg/m^3 in November 2005 to 46.2µg/m^3 in December 2005 with an average of 17.7 µg/m^3. This average is comparable to both the results of PM_{10} concentration monitoring undertaken by P. Zib and Associates Pty Ltd between 29 September 2000 and 28 November 2000 (Zib, 2000) at a similar location (22.5µg/m^3) and PM_{10} monitoring undertaken at DEC maintained sites at Richmond, 57km to the southwest of the Project Site, and Wallsend , 62km to the northeast of the Project Site, which provide annual average PM_{10} concentration of 18µg/m^3 (2004 data set). **Figure 4.18** presents the 2004 monitoring results for the Richmond and Wallsend monitoring sites and the typical range of measured 24 hour PM_{10} level.
The background PM_{10} concentration in the Somersby area has therefore been set at 18µg/m^3.

The air at Somersby is much cleaner than that at Richmond and probably at Wallsend. Therefore, using this information to set project criteria is not acceptable.

2) 4.4.2.2 Dust Deposition
Information on dust deposition levels in the vicinity of the Project Site has been, and is continuing to be, obtained from five dust deposition monitoring locations established surrounding the Project Site. These monitoring locations, numbered SD1 to SD5 and presented on **Figure 4.17**, have been established in accordance with the following Australian Standards. Summary

It is anticipated that PM_{10} monitoring will be continued at this site during the operational phase of the Somersby Fields Project. Recommended monitoring is discussed in further detail in **Section 8**. Volume 1

SD-5 monitor was completely removed during the first week of Pubic Viewing of EA August 2007

3) Page 4-83
This average is comparable to both the results
of PM_{10} concentration monitoring undertaken by P. Zib and Associates Pty Ltd between
29 September 2000 and 28 November 2000 (Zib, 2000) at a similar location (22.5µg/m^3)

These can be two of the windiest months of the year and should not be used as a comparison for a yearly average. The two months above (Zib, 2000) do not give an accurate reading. In table 4.29 the SD1 readings for the same times in 2005 are half the 2000 readings. Showing that the 2000 reading of 22.5µg/m3 is only a two months average and not unreliable and should not have been used as a comparison to justify the inflated 18µg/m3. Also where was the exact location? Similar is not good enough.

4) Page 4-85

It is acknowledged that this approach produces a conservative estimate because it is based on a sample taken at a depth from the Project Site and in reality much of the landform in the Somersby area is covered by grass, native flora, bitumen and concrete and will not be affected by wind erosion.

Yes. It is going to be extremely dusty with such a large open cut sand mine.

5) 4.4.3.3 Goals Applicable to Total Suspended Particulate Matter (TSP)

The annual goal for TSP is 90µg/m3
,
as recommended by the National Health and Medical
Research Council (NHMRC) in 1981.
In areas such as the Project Site, where road traffic is not the dominant particulate source, the PM10 proportion is typically approximately 50% of TSP. The TSP goal would therefore be consistent with an annual PM10 goal of approximately 45µg/m3 under these circumstances. Thus, the historical NHMRC goal may be regarded as not as stringent as the newer PM10 goal of an annual average of 30µg/m3.
As the annual TSP goal would easily be achieved if the annual PM10 goal is satisfied, TSP has not been considered further in this assessment

The most up to date TPS standard should be used.- not the 1981 recommendation level.

6) Page 4 - 89

ENVIRONMENTAL ASSESSMENT 4 - 89 **SOMERSBY FIELDS PARTNERSHIP**
Section 4 – Assessment and Management of Somersby Fields Project
Key Environmental Issues Report No. 521/09
R. W. CORKERY & CO. PTY. LIMITED
Table 4.32
DEC Goals for Allowable Dust Deposition
Averaging Period Maximum Increase
in Deposited Dust Level
Maximum Total
Deposited Dust Level
Annual 2g/m2/month 4g/m2/month
Note 1. Dust is assessed as insoluble solids as defined by AS 3580.10.1-1991.
Source: "Approved Methods & Guidance for the Modelling and Assessment of Air Pollutants in NSW", DEC 2001
Source: Heggies (2006b) – Table 8

Given the established background dust deposition for the area is 1.2g/m2/month, the maximum deposited dust level goal at surrounding residences and Somersby Public School is reduced to 3.2g/m2/month.

The 2g/m2/month allowable increase in dust for our community should not be allowed as it contains so much silica. See point 13

7) 4.4.4 Potential Sources of Air Contaminants

4.4.4.1 Particulate Emissions

The main sources of particulate matter (dust) generated by the project would include the following.
• Topsoil stripping and overburden removal.
• Excavation of sand.
• Loading and unloading of raw feed and products to trucks and stockpiles.
• Screening of the raw sand material within the mortar sand plant.
• Vehicles travelling on unsealed surfaces.
• Wind erosion from stockpiles and exposed unsealed, unvegetated areas.

There is not mention of the use of rippers here which cause most of the dust in the excavation process.

Also, the crushing plant is only partially enclosed. This will be a large source of dust.

8) 4.4.5 Management of Air Quality

The Proponent proposes to adopt the following design features, and operational safeguards and management procedures to limit the generation of particulate matter from project activities.

Design Features

(i) The sand wash plant would be enclosed with limited openings to allow entry and exit of conveyors and access by personnel.

(ii) The area of surface disturbance available for wind erosion would be limited by ensuring that clearing and soil stripping is limited to the area required for immediate sand removal activities and conducting progressive rehabilitation on available areas.

Aerial photographs of all mines in Somersby and Maroota show large open cut exposed mines with little revetetation.

9) ENVIRONMENTAL ASSESSMENT 4 - 91 **SOMERSBY FIELDS PARTNERSHIP**

Section 4 – Assessment and Management of Somersby Fields Project
Key Environmental Issues Report No. 521/09
R. W. CORKERY & CO. PTY. LIMITED

(iii) The construction of earth mounds, bund walls and acoustic barriers adjacent to dust generating activities.

Aerial photos show that dust rises straight up into the air and spreads over and past these barriers.

(iv) The raw feed material delivered to the mortar sand and sand wash plants would have a degree of inherent moisture (estimated to be 8%) that would contribute to the overall control of dust.

We do not believe that 8% is enough moisture to stop the production of silica dust from the machinery.

10) 4.4.7 Impact Assessment

4.4.7.1 Dust Deposition

Figure 4.19.

With the project design features and operational safeguards discussed in Section 4.4.5 being implemented during the operation of the project, incremental monthly dust deposition rates are predicted to be well below the 2.0g/m2/month at all assessment locations for the two scenarios modelled.

Heggies (2006b) note that the incremental dust deposition would be chemically inert and therefore when considered in conjunction with the <2.0g/m2/month increment, would not present any significant impact on the local vegetation, including the horticultural activities at local nurseries.

We do not want to have any silica dust landing on plants as nursery staff handle the plants when detailing for sale and the silica dust lands on the rooves of our residences. This contaminates our tank water.

11)Figure 4.19 Dust Deposition.

Ariel photos show that dust spreads a lot further than shown. A similar quarry at Somersby (Hansen) had huge clouds of white silica laden dust from just one ripper and a bulldozer going 300m into the air and spreading right over the site.

12) Figure 4.20 PM_{10} Concentrations

Heggies (2006b) cite that approximately 28.6% of the PM_{10} particle size fraction can be assumed to constitute $PM_{2.5}$.

According to Figure 4.20 showing large areas of PM10 dust moving right out of the mine, this means that the community are exposed to a high level of respirable dust, considering 28.6% of the PM10 particle size fraction can be assumed to constitute PM2.5. (see above.)

13) Page 4-100

It is concluded that the risk of silicosis as a result of operations of the Somersby Fields Project is negligible. This conclusion is consistent with the statement made by the World Health Organisation that "*to date, there are no known adverse health effects associated with nonoccupational exposure to quartz dust"* (CICAD, 2000).

They should read:-

THE TOTAL COST OF DIRECT AND INDIRECT HEALTH IMPACTS OF MINING DUST ON SURROUNDING COMMUNITIES; A Feasibility Study By Shomenthree Moodley

What California says about crystalline silica:

The State of California requires the above warning label on play-sand containing crystalline silica. That is because much of the play-sand found in today's stores is not natural sand, but actually derived from quarried quartz rocks. Children, who have developing lungs, breathe in crystalline silica dust as they play in the sand. Frequent sandbox play creates continued exposure to this known carcinogen.

Chapter 3. Safe Drinking Water and Toxic Enforcement Act of 1986 ⁄12000. Chemicals Known to the State to Cause Cancer or Reproductive Toxicity.

Research Extracts

CASE STUDIES OF ENVIRONMENTAL SILICA/PULMONARY CONDITIONS

Epidemiologic and clinical studies of occupationally exposed cohorts comprise most of the human exposure data associated with crystalline silica. Occasionally there have been case reports of pulmonary ailments suggestive of silicosis or fibrotic lesions related to ambient dust exposure; most of these reports have been from underdeveloped arid portions of the world and are lacking control patients or specific silica dust exposure assessments (Bar-Ziv and Goldberg, 1974; Nouh, 1989; Norboo et al., 1991; Saiyed et al., 1991). Many of these reports also do not differentiate clearly between outdoor occupational exposures and ambient background environments. Bar-Ziv and Goldberg (1974) described the results of 54 autopsies of nomadic Bedouins from the Negev Desert of Israel. The authors detected silica dust particles in the lungs of 46 of the subjects, and, although the investigators did not detect fibrotic silicosis, they described a

condition termed as "simple siliceous pneumoconiosis". These findings were confirmed by a parallel radiology study of 18 Bedouin women by Hirsch et al. (1974), who reported fine diffuse reticulation and micronodular opacities. Bar-Ziv and Goldberg noted that these findings may be due to domestic work done by Bedouin women who clean tents, cook, tend sheep, and spin wool. Although desert dust is assumed to play a role in this benign condition, the women's work activities suggest that this observation is not truly an environmental lung disease, but may be occupational.

Saiyed et al. (1991) conducted a silicosis prevalence study within Himalayan villages where dust storms are rare (Saboo), moderate (Shey), and severe (Chushot). A random sample of residents over the age of 50 years was evaluated in each city. Pulmonary symptoms were significantly greater in Shey and Chushot than in Saboo. The authors reported radiographic prevalence of silicosis of 2.0% in Saboo, 20.1% in Shey, and 45.3% in Chushot. The silica fraction in dust storms ranged from 60 to 70%, and there were additional exposures from soots and dust produced in residential cooking. Assuming all villages were involved with farming to the same degree, these data appear to have an environmental component.
Norboo et al. (1991) compared the prevalence of silicosis among 50- to 62-year-old residents of two Indian Himalayan agricultural villages: one with frequent dust storms (Chushot) and the second, a control (Stok), with fewer storms. Using chest films and International Labour Organization (ILO) (1980) criteria, Norboo and co-workers found a greater proportion of X-ray opacities consistent with silicosis in Chushot (14 of 16) than they did in Stok (10 of 24). Dust from the upper surfaces of house support beams were analyzed and found to contain 16 to 21% quartz. In another study of dust from the same region, Franco and Massola (1992) found dust containing 6 to 9% silica. Both authors suggest that the data reported by Norboo et al. (1991) demonstrate environmental (nonoccupational) silicosis. However, given that both Himalayan villages were agricultural and that women also are exposed to a significant amount of dust during 5-11domestic housework, these silicosis data should be considered partially occupational, rather than strictly environmental. Epidemiologic studies by Coultas et al. (1994), Valiante and Rosenman (1989), and Xu

Xu et al. (1993) used chest radiographs, cellular classification from bronchial lavage fluid, and biopsies to assess nonoccupational siliceous pneumoconiosis in the Minghua Desert of Gansu Province, China. The authors reported environmental dust measurements and histopathology of camel lungs in a prevalence study of two dusty communes and a control commune. Xu et al. (1993) surveyed 395 persons in Minghai and Lianghua communes, where winds and dust levels were high, and surveyed 88 subjects in Qiawtan, the control location. Dust samples were taken three times per day during April 1991 (the windy season). Details on the sampling methods for environmental dust measurements were not provided. The average dust levels ranged from 8.25 to 22 mg/m3 at the dusty sites, whereas they ranged from 1.06 to 2.25 mg/m3 at the control commune. Silica ranged from 15.5 to 26.1%, and between 12.5 and 21.5% of the particles were between 2 and 5 Fm diameter. At the dusty site, 28 cases of siliceous pneumoconiosis were found among 395 subjects, producing a prevalence of 7.09%. Based on Chinese national pneumoconiosis criteria, there were 18 cases of Stage I fibrosis; seven cases of Stage II, and three cases of Stage III, with a clear effect of age in the distribution of the disease. No cases were found in the control population. Evidence of silicosis was found in the lung tissues of a 20-yearold camel, though none was detected in a 4-year-old camel.
There are some other reports of silicosis among domesticated grazing animals, including horses, water buffalo, and camels (Roperto et al., 1995; Schwartz et al., 1981; Berry et al., 1991). The relevance to humans of these findings in grazing animals is not clear. However, these cases, which are based primarily on veterinary clinical observations, suggest that some potential exists for environmental silicosis to human populations.
"Environmental silicosis" is not a well-defined entity. Nevertheless, the case study literature and a modest amount of epidemiology research (Valiante and Rosenman, 1989; Saiyed et al., 1991; Coultas et al., 1994; Xu et al. 1993) suggest that clarification of this term deserves

consideration. The findings of Coultas et al. (1994) suggest that, in New Mexico, there is

In China and in the Himalayas, there is
evidence of radiographically defined desert pneumoconiosis (Saiyed et al., 1991; Xu et al., 1993). Given the poor sensitivity (39%) of chest X rays as a diagnostic tool when investigators are looking for this disease (Hnizdo et al., 1993), it is possible that low levels of environmental silicosis may have been overlooked in the general population, particularly in dusty, arid regions of the country.

A surveillance system developed by Valiante and Rosenman (1989) identified approximately 60 individuals per year in the state of New Jersey with the diagnosis of silicosis for the years 1979 through 1987. More than 95% of those identified were through hospital discharge or death certificate records. Thus, it is likely that these investigators identified a higher percentage of severe cases than did Coultas et al. (1994), who also examined physician referrals and autopsy data. Still, Valante and Rosenman's estimate of annual cases was nearly one-quarter of the entire national estimate reported by the U.S. Department of Labor for a comparable time frame (U.S. Department of Labor, 1983). Extrapolating their data to the entire country, Valante and Rosenman predicted that 1,500 individuals would be diagnosed as silicotic each year. Given the gross nature of their diagnostic method and the reported hospital discharge data for New York and California (>100 silicotics designated per year from each state), the actual national number is 5-12
likely to be higher. Valiante and Rosenman were able to evaluate "completed work histories" for 278 of the 401 silicosis cases they identified for the 1979-to-1987 period. Fifteen of the 278 individuals, or approximately 5%, "had no obvious source of exposure from their work histories," suggesting the existence of an environmental impact or incomprehensive reported work histories.

Grobbelaar and Bateman (1991) described a condition called "Transkei silicosis". The authors studied 25 South African women with this syndrome and seven control women from urban areas of Xhosa, South Africa. They concluded that silica dust produced during domestic grinding of corn and biomass cooking fires may cause this respiratory condition, which they suggest be named "hut lung". From local dust samples, the investigators concluded that the quartz levels were not sufficiently high to produce occupational silicosis, although they mentioned that one grinder was exposed to silica levels similar to that of gold miners. Although hut lung may exist, it appears to be related to domestic work, rather than being true environmental silicosis.

Nouh (1989) described four cases of nonoccupational pneumoconiosis among Saudi Arabian desert dwellers. The author referred to this condition as "desert lung syndrome", and only one individual (a shepherd) reported occupational exposures.

Evidence for environmental silicosis was presented by Tosi et al. (1986). They compared the lymph nodes of 12 lung cancer cases determined to have had no occupational silica exposure, with six lung cancer patients with both occupational silica exposure history (miners) and silicotic lymph nodes and six lung cancer patients with no silica occupational exposure history and no silicotic lymph nodes. All of the 12 patients being compared to controls had either peribronchial, mediastinal or hilar silicotic lymph nodes. Although the authors suggested that all 12 cases lacked any occupational exposure history, 6 of the patients were classified as either farmers or woodworkers, occupations that can involve high levels of silica dust exposure. The occupations of the other six patients, housewife, barman, car washer, bailer, and merchant, are less likely to have involved silica exposure.

14) 4.4.9 Monitoring

Subject to the agreement of the respective land owners, the Proponent would continue to monitor PM_{10} concentrations at the established HVAS monitoring location (SD1) within the grounds of Somersby Public School and deposited dust at the five established dust monitoring locations (SD1 to SD5). In addition to these locations, the Proponent would establish a dust monitoring location within Stage 2 of the Project Site to monitor the operational emissions created during Stage 1 sand removal. This additional deposited dust gauge would be positioned approximately 260m from the closest activity in Stage 1 to replicate the closest distance between the class rooms at Somersby Public School and the closest point on the Stage 2 sand removal operations.

The school children are going to play outside and close to the boundary fence of the mine to watch the machinery. All larger PM greater than PM10 should be monitored as this is the trigger for Asthma and other respiratory conditions Also PM10 and PM2.5 should be monitored at the boundary.