6th April 2021

For the attention:
Liam Jukes
Senior Planner – Major Assessment
City Development Branch
Council of City of Gold Coast

Dear **Liam Jukes,**

Objection submission COM/2019/81 -

Dangers of introducing Silica Fume (amorphous silica) to the Nucrush quarry site

Please accept this objection as it highlights the dangers of the introduction of silica fume (amorphous silica) onto the Nucrush quarry site that does not appear to have been considered as part of the development application.

Why is the 'Silica Fume' on the Nucrush quarry site?

As part of the concrete manufacturing process that is carried out on the Nucrush quarry site at 33 Maudsland Road, Oxenford , 4210, 'Silica Fume' is used to strengthen the concrete produced.

As discussed before, I do not believe the Nucrush Concrete Production/Batching Facility is a compliant use of the quarry site as clarified in the current approval, by way of the Rezoning agreement, dated 17th March 1992. This Rezoning agreement has areas zoned for extractive industry (extractive footprint) and ancillary areas which include: 'Weighbridge and offices', 'Decantation Ponds', 'Workshops/stores', 'Stockpiling', 'magazines', 'water storage', 'Processing plant', 'Buffer land' and 'Permanent tree and shrub planting' (Attachment A1). It does not, however, I firmly believe, include the facility to operate a concrete batching facility or any other production facilities on this site.

Therefore, I believe the silica fume, required for concrete production, has no place on this site as it bears no part of the Nucrush quarry core operation. However, as the concrete batching facility is currently operating on the site, albeit believed to be contra to the current approval, and is thought to be part of the plan for the next one hundred plus years, the safety implication of silica fume should be considered.

About the Concrete Production/Batching Facility

The existing Concrete Production/Batching Facility within the Nucrush quarry is shown in Attachment A2. It is roughly four thousand square metres area positioned near the entrance to the quarry (Attachment A3).

What additional products are brought into the quarry site for the on-site manufacture of concrete?

The Nucrush Material Data Sheet lists the following ingredients for their concrete manufacture (Attachment B1):

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

All significant constituents are listed below:

Ingredient	CAS	Proportion
Portland Cement	65997-15-1	0 – 60%
(Chromium VI)	1333-82-0	2-20ppm (trace impurity in Portland cement)
Crushed Stone:	Not Required	20 – 85%
Sand:	14808-60-7	20 – 85%
Water	7732-18-5	0 – 20%
Other ingredients may be added:		
Blast Furnace Slag or Fly Ash:		0 – 20%
Pozzolands:		0 – 10%
Pigments: (metallic oxide colours):		0 – 10%
Silica Fume (amorphous silica):	7699-41-4	0 – 10%
Chemical Admixtures:		1 – 10%
Polypropylene fibres:		0 – 10%
Steel fibres:		0 – 10%

Silica Fume (amorphous silica)

It is clear from the components list above that Nucrush concrete can contain up to ten percent Silica Fume (amorphous silica).

I will use the upper concrete production limit as per the Stormwater management plan (Attachment C1) which is claimed to be 93,309 m^3 per annum (However, I do believe this to be actually in the region of 128,000 m^3 as proven in another objection, but, I will use their claimed limit for complete transparency).

Therefore, of the estimated 93,309 m^3 of concrete produced on-site at the Nucrush quarry per annum up to 9,330 m^3 could be 'Silica Fume' or 23,325 tonnes pa (based on 2.5 tonnes per cubic metre) which equates to up to 1,166 trucks per annum of 'Silica Fume' delivered to the site or four trucks every single day (assuming trucks delivery is in the region of twenty tonnes capacity).

Thus, it can be clearly seen that the silica fume could be a highly significant aspect of the on-site safety precautions required.

Is Silica Fume Dangerous?

Safe Work Australia lists fumed silica as Hazardous (Attachment D1). It notes an experiment on exposed rats at an airborne concentration of 50mg/m^3 that the majority died within three to five months from pulmonary obstruction. It recommends to protect workers from pulmonary dysfunction that the TWA (time weighted average) exposure standard of 2mg/m^3 (respirable dust) be adopted.

Please note, It does not, however, offer any limits for the chronic 24/7 exposure of local residents who will be within approximately 250 metres from the assumed plant location when it is moved to the northern end of the quarry when the extractive footprint engulfs the current plant areas location as proposed.

The Hazardous Substance Fact Sheet (Attachment D2) indicates that silica, amorphous (fume) can affect you when breathed in, it can irate the eyes on contact and repeated exposure can damage the eyes and case lung damage (fibrosis).

A further Material Data Sheet for Elkno Products Inc. (Attachment D3) identifies that this can cause cancer and is considered hazardous by the OSHA (Occupational Safety and Health Administration) Hazard Communication Standard. It lists an ACGIH (American Conference of Government Industrial Hygienists) TWA value of 0.025 mg/m^3 respirable factor and an OSHA TWA value of 0.8 mg.m^3 . It is noted, again, there are no chronic 24/7 exposure limits specified for local residents. It also indicates a level of <0.5% Quartz (crystalline silica) can be present.

There appears to be no doubt that Silica Fume (amorphous silica) presents a clear health and safety issue.

Conclusion

It is clear to see that the introduction of silica fume onto the quarry site will be highly controversial for local residents bearing in mind the health and safety implications associated with it.

This coupled with the fact that this is a quarry site and was never supposed to be a concrete production site is also highly controversial.

To bring additional large quantities of hazardous material on to this quarry site is utterly ridiculous especially considering the already highly polluting nature of the quarry operation. This coupled with the fact that the separation buffers at this quarry are currently a fraction of the DES guidelines and this development application is attempting to further reduce these significantly by quarry encroachment towards the local residents is utterly untenable.

The complete absence of any mention within the development application of the use of this controversial substance within the quarry land is, I believe, highly culpable as is the claim that the concrete batching facility is not part of the development application (Attachment E1). It would seem the Concrete Batching facility has been largely omitted from the development application because it is known it should not be there.

I implore the Council Planners and Decision Makers to consider these highly important aspects that would seem to be conspicuously absent from the development application when they consider if it contained sufficient information, at the time of submission, to warrant its approval or does the

absence of key information, such as this, ultimately mean this development application cannot be approved?

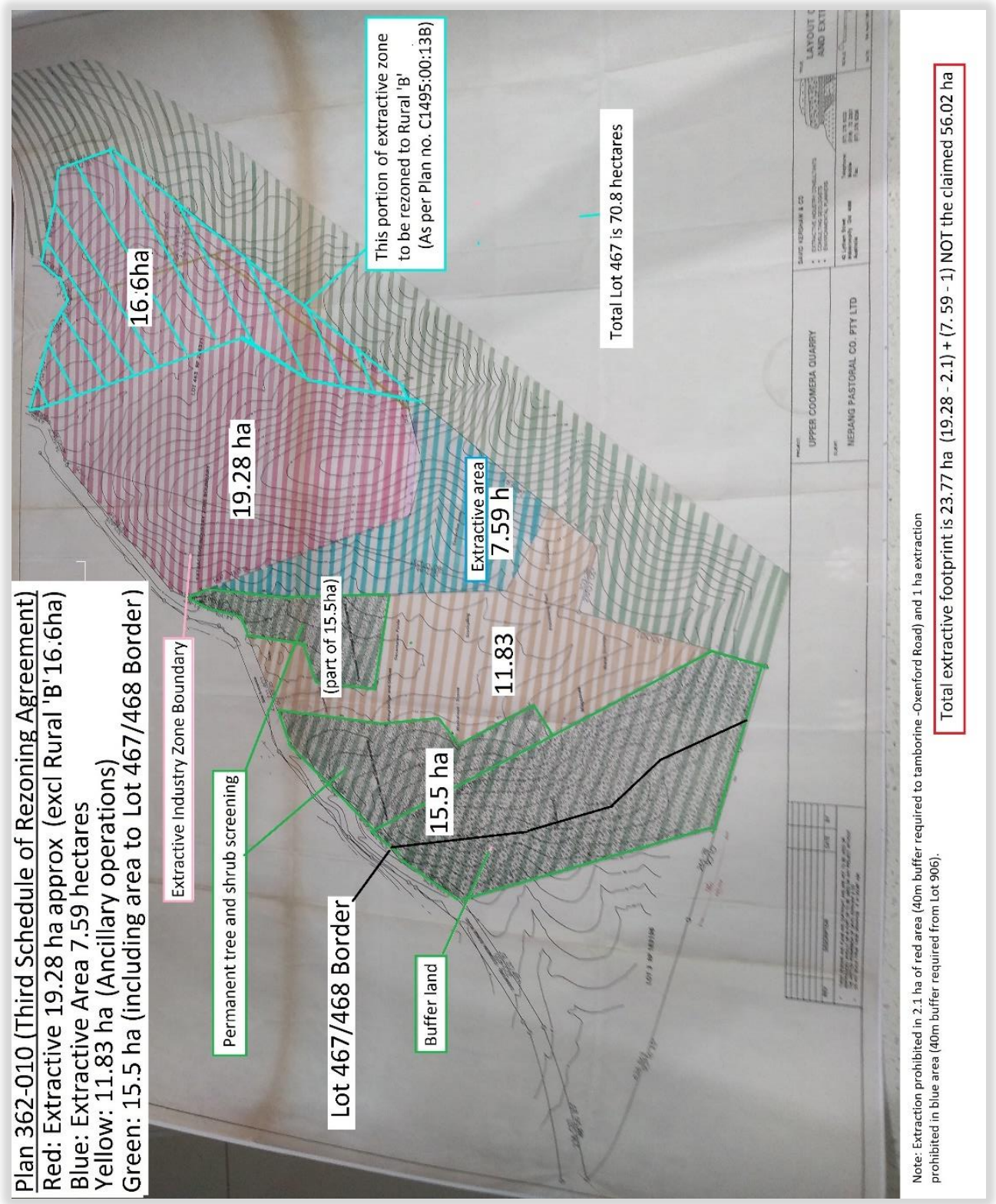
Thank you in anticipation,

Kind regards

Tony Potter

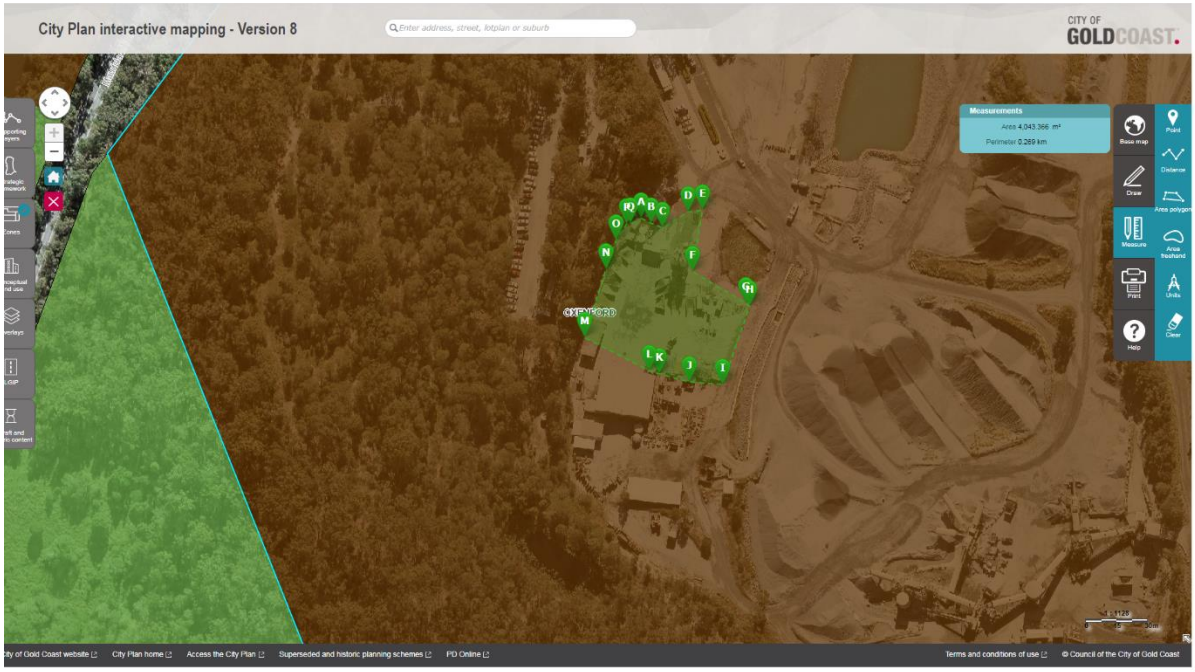
* Disclaimer. Please note my findings are believed correct and are to the best of my ability. However, there may be errors and assumptions I have made that are incorrect. I do not believe this to be the case, but, realise with the vast amounted of submitted data from the applicant, errors and assumptions on my part may occur. Hopefully this is not the case, but please accept my apologises if this is so. Thank you.

Attachment A1 - Annotated Plan 362-010 (or Third Schedule of the Rezoning Agreement)



Attachment A2 - Concrete Plant at Nucrush quarry

Attachment A3 - Concrete Batching Plant location within Nucrush quarry



Attachment B1 - Nucrush Material Data Sheet - Premixed Concrete + Ingredients

NUCRUSHGROUP

SAFETY DATA SHEET

Telephone: (07) 5573 8000
Fax: (07) 5573 2908
ABN 23 010 119 981

PRODUCT: PREMIXED CONCRETE

SECTION 1: IDENTIFICATION OF MATERIAL AND SUPPLIER

Product:	**Premixed Concrete**
Other Names:	Concrete, Pool Spray
Use:	As a material used extensively in concrete for building construction and civil engineering activities.
Company Details:	**NUCON PTY LTD**
Address:	**Hart Street, Upper Coomera, QLD, 4209**
Telephone:	**07 5573 8000**

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

All significant constituents are listed below:

Ingredient	CAS	Proportion
Portland Cement	65997-15-1	0 – 60%
(Chromium VI)	1333-82-0	2-20ppm (trace impurity in Portland cement)
Crushed Stone:	Not Required	20 – 85%
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Silica Fume (amorphous silica):	7699-41-4	0 – 10%
Chemical Admixtures:		1 – 10%
Polypropylene fibres:		0 – 10%
Steel fibres:		0 – 10%

Attachment C1 - Concrete production estimates

2019-05-20 Section 4 - Noise and Dust assessment and Stormwater.pdf

Appendix C Water Cycle Management Strategy

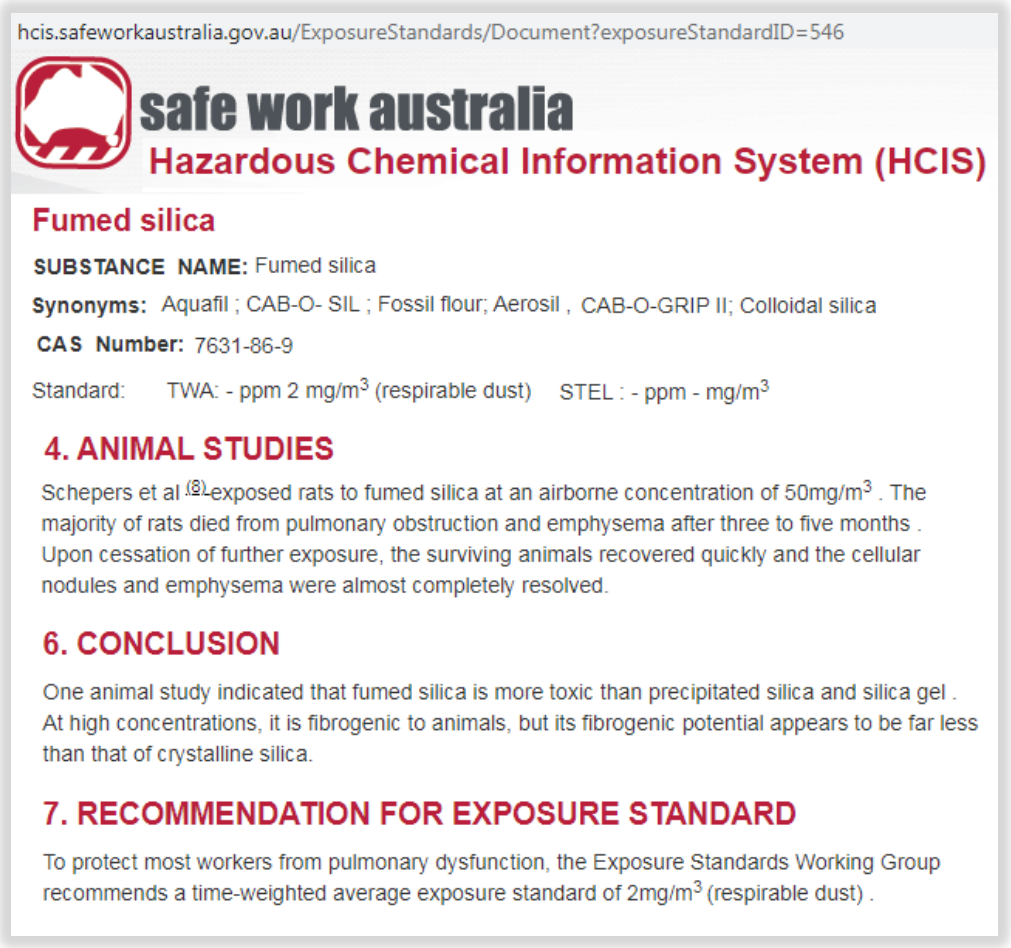
C.1 Preamble

This appendix describes and assesses the recommended water management strategy for the site for the existing site conditions and ultimate site conditions, for the following 3 scenarios:

- *Low concrete production*: where annual concrete production is considered 'low' (with 17,616 m^3 per annum identified by Nucrush);
- *Medium concrete production*: where annual concrete production is considered 'medium' (49,000 m^3 per annum identified by Nucrush); and
- *High concrete production*: where annual concrete production is considered 'high' (93,309 m^3 per annum identified by Nucrush).

The results demonstrate that the proposed strategy for each of the two site conditions will ensure the water demands of the site operations will be satisfied. (include in here section on low, med, high production of concrete production.

Attachment D1 - Safe Work Australia - Silica Fume



hcis.safeworkaustralia.gov.au/ExposureStandards/Document?exposureStandardID=546

safe work australia

Hazardous Chemical Information System (HCIS)

Fumed silica

SUBSTANCE NAME: Fumed silica

Synonyms: Aquafil ; CAB-O- SIL ; Fossil flour; Aerosil , CAB-O-GRIP II; Colloidal silica

CAS Number: 7631-86-9

Standard: TWA: - ppm 2 mg/m^3 (respirable dust) STEL : - ppm - mg/m^3

4. ANIMAL STUDIES

Schepers et al [8] exposed rats to fumed silica at an airborne concentration of 50mg/m^3 . The majority of rats died from pulmonary obstruction and emphysema after three to five months . Upon cessation of further exposure, the surviving animals recovered quickly and the cellular nodules and emphysema were almost completely resolved.

6. CONCLUSION

One animal study indicated that fumed silica is more toxic than precipitated silica and silica gel . At high concentrations, it is fibrogenic to animals, but its fibrogenic potential appears to be far less than that of crystalline silica.

7. RECOMMENDATION FOR EXPOSURE STANDARD

To protect most workers from pulmonary dysfunction, the Exposure Standards Working Group recommends a time-weighted average exposure standard of 2mg/m^3 (respirable dust) .

Attachment D2 - Silica Hazardous Substance Fact Sheet

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **SILICA, AMORPHOUS (FUME)**

CAS Number: 69012-64-2

HAZARD SUMMARY

* **Silica, Amorphous (Fume)** can affect you when breathed in.
* **Silica, Amorphous (Fume)** can irritate the eyes on contact. Repeated exposure can damage the eyes.
* High exposure to **Silica, Amorphous (Fume)** can cause a flu-like illness with headache, fever, chills, aches, chest tightness and cough.
* Repeated exposure to **Silica, Amorphous (Fume)** can cause lung damage (fibrosis).
* **Silica, Amorphous (Fume)** contains no detectable *crystalline Silica* and should not be confused with other NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEETS ON SILICATES and SILICAS.

REASON FOR CITATION

* **Silica, Amorphous (Fume)** is on the Hazardous Substance List because it is cited by ACGIH and IARC.
* Definitions are provided on page 5.

WORKPLACE EXPOSURE LIMITS

ACGIH: The recommended airborne exposure limit is **2 mg/m^3** (as the *respirable fraction*), averaged over an 8-hour workshift.

WAYS OF REDUCING EXPOSURE

* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Silica, Amorphous (Fume)** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Silica, Amorphous (Fume)** to potentially exposed workers.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Silica, Amorphous (Fume)**:

* **Silica, Amorphous (Fume)** can irritate the eyes on contact. Repeated exposure can damage the eye.
* High exposure to **Silica, Amorphous (Fume)** can cause a flu-like illness with headache, fever, chills, aches, chest tightness and cough.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Silica, Amorphous (Fume)** and can last for months or years:

Other Long-Term Effects

* Repeated exposure to **Silica, Amorphous (Fume)** can cause lung damage (fibrosis).

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

Attachment D3 - Elkon Products Inc Material Data Sheet

elkonproducts.com/pdf-new/Elkon%20Products%20-%20Silica%20fume%20MSDS,%20April%202013.pdf

April 1st 2013

Silica fume

Material Safety Data Sheet

Product Name: Silica Fume

Synonym: Microsilica, amorphous silica

Company Identification: ELKON PRODUCTS INC

#22016-1166 Melville Street

Vancouver, B.C., Canada V6E 4P5

For information, call: 1-800-313-5566

For emergencies, call: 1-800-313-5566

SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

CAS#	Chemical Name	%
69012-64-2	Silica fume	100
14808-60-7	Quartz (Crystalline Silica)	<0.5

SECTION 3 - HAZARDS IDENTIFICATION

Hazard Statement: IT CONTAINS MATERIAL WHICH CAN CAUSE CANCER. MAY BE HARMFUL IF INHALED.

Can cause moderate irritation due to abrasive action.
Keep container tightly closed.
Avoid inhalation of dusts.
Avoid ingestion.
Avoid contact with the skin, eyes and clothing.
Wash thoroughly after handling.

OSHA/HCS status: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Carcinogenicity and chronic toxicity:

Carcinogenicity: Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with occupational exposure limits:

- crystalline silica

OSHA:

TWA value 2.4 millions of particles per cubic foot of air. Respirable
The value is calculated from a specified equation using a value of 100%. Lower values of % will give higher exposure limits. See regulation for specific equation.

TWA value 0.1 mg/m. Respirable
The value is calculated from a specified equation using a value of 100%. Lower values of % will give higher exposure limits. See regulation for specific equation.

TWA value 0.3 mg/m3. Total dust
The value is calculated from a specified equation using a value of 100%. Lower values of % will give higher exposure limits. See regulation for specific equation.

- Silica fume

ACGIH: TWA value 0.025 mg/m3 Respirable fraction

OSHA:

TWA value 20 millions of particles per cubic foot of air

TWA value 0.8 mg/m3;
The exposure limit is calculated from the equation, 80/ (%SiO2), using a value of 100% SiO2. Lower percentages of SiO2 will yield higher exposure limits.

Attachment E1 - Concrete Plant is claimed to be not part of this application

4.0 DEVELOPMENT TRAFFIC ESTIMATES

As discussed previously, the proposal will result in an extension of the life of the quarry and not an intensification of current operations. The proposal will simply allow the current level of traffic generation to continue for the foreseeable future. The extended life of the quarry depends upon market demand.

Given that the quarry has been in operation for many years, the surrounding road network has been upgraded, and the design of such works has accounted for the project. On this basis, the surveyed traffic volumes shown in Attachment B (and summarised below) include traffic generated by the quarry and such will not change as a consequence of the proposed increase in area to be extracted.

Approximately 20% of the vehicles shown below are light vehicles (cars, utes etc) with the balance typically being the following mix of heavy vehicles:

- Heavy rigid - 45%
- Semi trailer - 15%
- Truck and dog trailer - 40%

It is noted that the volumes below include traffic generated by the concrete plant, which is not part of this application.

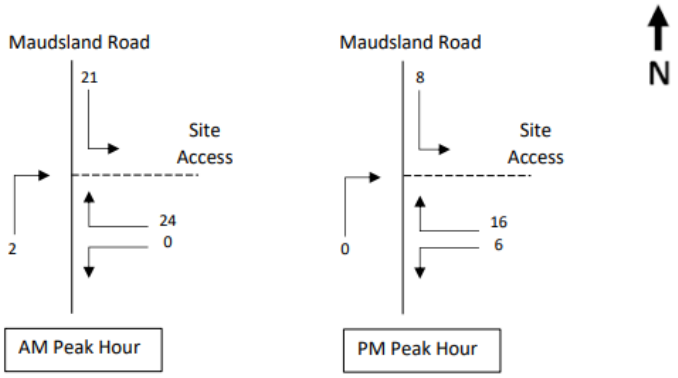


FIGURE 4.1 – SURVEYED PEAK HOUR TRAFFIC VOLUMES AT THE MAUDSLAND ROAD / SITE ACCESS ROAD INTERSECTION (AUSTRAFFIC – 2014)