APPENDIX J MATERIAL SAFETY DATA SHEETS - FERROSILICON

MEMORANDUM

Memo: 23902-MEM-PR-001

To: Blair Duncan – Core Lithium

From: Josh Paterson, Patrick Watson – Primero

CC: Noel O' Brien – Trinol; Linsey Townsend – Core Lithium; Brad Brown – Primero

Date: 21 January 2019

Re: Safe Use of ferrosilicon DMS Powder

This memorandum addresses a query raised by The Department of Environment and Natural Resources (the Department) relating to the draft Environmental Impact Statement (EIS) submitted by Core Exploration Ltd (now Core Lithium Ltd) for its Grants Lithium Project in November 2018. The query relates to section 2.8.4 of the draft EIS with regard to the proposed use of ferrosilicon (FeSi) as a Dense Medium Separation (DMS) powder at Core Lithium's Grants project.

The Department has expressed concern that FeSi has the potential to release toxic or flammable gases when contacted with water. This perception is informed by the Department's reference to a Material Safety Data Sheet (MSDS) for the use of FeSi in foundry applications (i.e. using FeSi as an additive to molten metal). As the physical conditions experienced in foundries differ profoundly from those contemplated in the Grants Lithium Project, reference to this MSDS is not appropriate for this application.

Attached are two MSDS from suppliers of FeSi powder, for use of FeSi as a DMS powder – as is contemplated for the Grants Lithium Project. A review of this information reveals that FeSi, when used as a DMS powder, evolves no toxic fumes or gases.

It is possible for FeSi, when slurried with water and stored under depleted oxygen conditions for prolonged periods, to generate small quantities of hydrogen. For this reason, Core Lithium Ltd will ensure equipment that may contain FeSi slurry will be well ventilated prior to maintenance work being conducted.

Any residual risk of harm to personnel, plant or environment can be mitigated through storage and operating procedures that include good housekeeping and hot work permitting. FeSi DMS powders have been used in multiple Australian and global mineral processing projects without any known incident.

DMS POWDERS

Material SAFETY DATA SHEET

Atomised and Milled Ferrosilicon

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Product name	Atomised, Milled Ferrosilicon.
Product use	Slurry density adjuster in mineral and metals separation sink-float processes (Dense Media Separation).
Supplier	DMS Powders (PTY) Ltd PO Box 945 Meyerton , 1960 SOUTH AFRICA Tel: +27 (0) 16 360 5200 Fax: +27 (0) 16 360 5296 Email: enquiries@dmspowders.com
Emergency telephone number	+27 (0) 16 360 5200 (not 24 hours)

2. HAZARD IDENTIFICATION

Classification according to SANS 10234 (GHS), CLP and (EC) No 1272/2008:

Skin Irritant, Category 2
Eye Irritant, Category 2

Pictogram:

Signal Word: Warning

Hazard Statement:

H315 Causes Skin Irritation
H319 Causes Serious Eye Irritation

Precautionary Statement:

P261: Avoid breathing dust/ fume/ vapour
P280: Wear protective gloves/protective clothing/eye protection/face protection
P305+P351+P338: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present, and easy to do. Continue rinsing.
P362: Take off contaminated clothing.
P332+P313: If skin irritation occurs: Obtain medical attention
P337+P313. If eye irritation persists: Obtain medical attention

3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	CAS Number	EC Number	Classification	%
Iron Silicide (FeSi 6–18%)	12022-95-6	234-670-2	Not Classified	100

4. FIRST AID MEASURES

Eye contact	Immediately flood the eye with plenty of water for at least 10 minutes, holding the eye open. Avoid contaminating unaffected eye. Obtain medical attention if soreness or redness persists.
Skin	Wash skin with soap and running water. Obtain medical attention if soreness or redness persists.
Inhalation	Remove from exposure. Obtain medical attention if symptoms appear.
Ingestion	Do not induce vomiting. Keep warm and at rest. Obtain medical attention if symptoms appear. Obtain medical attention if large quantities have been ingested.
Advice to physicians	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Extinguishing media	Not combustible. Select extinguishing media according to surrounding materials
Special exposure hazards	None.
Protection for fire-fighters	No special measures required. Select protection for fire-fighters according to surrounding material.
Other hazards	None.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Wear appropriate protective clothing. Avoid creating a dust cloud.
Environmental precautions	No special measures required.
Methods for clean-up	Sweep up into suitable containers for re-use, recovery or disposal. Avoid creating a dust cloud. If wet, do not re-pack with dry material and do not place in a closed or sealed container.

7. HANDLING AND STORAGE

Handling	Avoid creating dust. Avoid inhaling dust. Keep container closed when not in use.
Storage	Storage area should be dry and well ventilated. Store in original containers. Suitable storage materials: polypropylene bags. Under depleted oxygen conditions, a small amount of hydrogen will evolve if product is stored in slurry form with water for prolonged periods Equipment like magnetic separators, pumps or transfer pipes that may contain residual substance must be well ventilated before any maintenance work is carried out, especially maintenance involving hot work.

8. EXPOSURE CONTROLS

Occupational exposure limits	Nuisance dust – TWA (8hr) =10mg/m3
Occupational exposure controls	Use of the basic principles of Industrial Hygiene will enable this material to be used safely. Exposure to this material may be controlled in a number of ways. The measures appropriate for a particular worksite depend on how the material is used and on the potential for exposure. If engineering controls and work practices are not effective in preventing or controlling exposure, then suitable personal equipment, which is known to perform satisfactorily, should be used.
Respiratory protection	Mask should have a filtration efficiency of 95% minimum against PM10s. FFP2 masks recommended and should be replaced regularly.
Eye protection	Safety spectacles or chemical goggles
Skin protection – hands	Leather or other general purpose gloves.
Skin protection - body	Normal work wear. Overalls.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Metallic grey silver powder
Odour	None
Melting point	1260 degC
Flash point	Not applicable, inorganic substance
Flammability	Not flammable
Explosive properties	Not explosive
Oxidising properties	Not oxidising
Vapour pressure	Not applicable, melting point >300 degC
Relative density	2 – 7
Granulometry	PM10 content: <3%. PM20 content: 3-10%
Water solubility	Negligible
Partition co-efficient (octanol/water)	Not applicable, inorganic substance
Other properties:	Magnetic susceptibility (Magnasat) 6700 x 10^{-7} m^3/kg min; Non-magnetics (Davis tube) 0.75max; homogeneity 80% Phosphorus controlled below 0,15%

10. STABILITY AND REACTIVITY

Conditions to avoid	Storage under wet or damp conditions
Materials to avoid	Strong acids
Hazardous decomposition products	Stable under normal conditions. Under depleted oxygen conditions, a small amount of hydrogen will evolve if product is stored in slurry form with water for prolonged periods. If exposed to water the material can harden and cause corrosion of metals. Corrosion inhibitors can be used to minimise this effect.

11. TOXICOLOGICAL INFORMATION

Toxicokinetics, metabolism and distribution	The product is expected to be poorly absorbed.
Acute effects (acute toxicity and irritation/ Corrosivity)	The product is expected to have a low order of acute toxicity by all routes of exposure. The product is not expected to be irritant to the skin. The product may cause transient eye irritation.
Sensitisation	No known reports of skin sensitisation.
Repeat dose toxicity/Carcinogenicity	No component of this product at levels greater than 0.1% is identified as a carcinogen by the International Agency for Research on Cancer (IARC) or the European Commission (EC).
Mutagenicity	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a mutagen.
Reproductive toxicity	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a reproductive toxin. No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a teratogenic or embryotoxic.

12. ECOLOGICAL INFORMATION

Below is a Table containing test results. The analysis was done according to the Direct Estimation of Ecological Effect Potential (DEEEP) DWA recommended protocols and hazard classification.

	Results	12727 (Fe8)
Water quality	pH @ 25°C (A)	5.6
	EC (Electrical conductivity) (mS/m) @ 25°C (N)	2.63
	Dissolved oxygen (mg/l) (N)	8.4
V. fischeri (bacteria) (A)	Test started on yy/mm/dd	16/08/04
	%30min inhibition (-) / stimulation (+) (%)	-26(F)
	EC/LC20 (30 mins)	64
	EC/LC50 (30 mins)	n.r.
	Toxicity unit (TU) / Description	<1
S. capricornutum (micro-algae) (N)	Test started on yy/mm/dd	16/08/31
	%72hour inhibition (-) / stimulation (+) (%)	-14(F)
	EC/LC20 (72hours)	n.r.
	EC/LC50 (72hours)	n.r.
	Toxicity unit (TU) / Description	<1
D. magna (crustacea) (A)	Test started on yy/mm/dd	16/08/02
	%48hour mortality rate (-%)	-5
	EC/LC10 (48hours)	n.r.
	EC/LC50 (48hours)	n.r.
	Toxicity unit (TU) / Description	<1
Fish (N)	Test started on yy/mm/dd	16/07/28
	%96hour mortality rate (-%)	0
	EC/LC10 (96hours)	n.r.
	EC/LC50 (96hours)	n.r.
	Toxicity unit (TU) / Description	<1
Estimated safe dilution factor (%) [for definitive testing only]		64
Overall classification - Hazard class* **		Class II - Significant chronic hazard
Weight (%)		25

Key:
WQ = Water quality at the time of starting the *Daphnia magna* testing
% = for definitive testing, only the 100% concentration (undiluted) sample mortality/inhibition/stimulation is reflected by this summary table. The dilution series results are considered for EC/LC values and Toxicity unit determinations
n.r. = not relevant, i.e. the 100% concentration caused less than 10/20/50% (effective concentration) mortalities or inhibition
(F) = Inhibition/Mortality rate with "(F)" indicates that the sample was filtered, this is often essential with turbid or coloured samples to perform the algae and bacteria tests. Filtration could potentially lower the toxicity for the specific test, but daphnia and guppy test samples are never filtered and hence toxicity will still be detected if affected by filtration
***** = The overall hazard classification takes into account the full battery of tests and is not based on a single test result. Note that the overall hazard classification is expressed as acute/chronic level of toxicity, due to the fact that the *S. capricornutum* (micro-algae) and the *V. fischeri* tests are regarded as short chronic levels of toxicity tests and the overall classification therefore contains a degree of chronic toxicity assessment**
Weight (%) = relative toxicity levels (out of 100%), higher values indicate that more of the individual tests indicated toxicity within a specific class
A = Accredited; N = Non accredited; O = Outsourced; S = Sub-contracted; NR = Not requested; RTF = Results to follow

Ecotoxicity	Based on its low water solubility, this product is expected to be practically non-toxic to aquatic species.
Mobility	If released to water the product will sink slowly. The product is insoluble in water. The product is not absorbed on to soil or sediments.
Persistence and degradability	The product is inorganic and not subject to biodegradation
Bioaccumulative potential	The product is expected to have a low bioaccumulation potential

13. DISPOSAL CONSIDERATIONS

Substance disposal	Dispose of in accordance with all applicable local and national regulations. Recycling or landfill is the recommended method of disposal.
Container disposal	Containers should be cleaned by appropriate methods and then re-used or disposed of by landfill or incineration as appropriate. . Labels should not be removed from containers until they have been cleaned. Do not incinerate closed containers. Containers containing wet or damp material should not be closed or sealed.

14. TRANSPORT INFORMATION

Regulatory information	UN number	Proper shipping name	Class	Packaging group
ADR/RID classification		Not classified		
IMDG classification		Not classified		
IATA classification		Not classified		

15. REGULATORY INFORMATION

Hazard symbol	None
Indication of danger	None
Risk phrases	None
Safety phrases	None
Other	This datasheet has been compiled in accordance to GHS (SANS 10234), (EC) 1272/2008 and CLP as amended and adapted and the parts of EU regulation 1907/2006 in force at the date of issue. REACH Registration No:01-2119485286-28-0049

US regulatory
TSCA: Listed under CAS number 12022-95-6
RCRA: not classified as a hazardous material under RCRA or its regulations 40 CFR 261
CERLA: not classified as a hazardous material under CERLA regulations 40 CFR 302
SARA: Not an extremely hazardous material under section 302 and not a toxic chemical subject to the requirements of 313.

16. OTHER INFORMATION

Date of issue:	1st issue; 10 March 2009 2nd issue; 12 January 2017
Notice:	The information contained in this publication is based upon data considered to be accurate at the time of Preparation. We accept no liability whatsoever (except as otherwise expressly provided by law) arising out of use of the information supplied. We are not responsible for any damage or injury resulting from incorrect use or from any failure to follow appropriate and accepted practices or from any hazard inherent in the nature of the product.

σ **Sigma Wear Parts Pty Ltd.**

MATERIAL SAFETY DATA SHEET

Version 1.1
Issued 10 January 2013

I. PRODUCTION INDENTIFICATION

Product name: MILLED DMS POWDER ,DMS POWDER, ATOMISED DMS POWDER
Manufacturer: Sigma Wear Parts (Pty) Ltd.
Web Site: www.teamsigma.com.au
Address: 3/6 Field Road, Lilianton
Boksburg, South Africa.
Telephone: +27 11 823 4443
Fax: +27 11 823 3555

Product Description: FeSi 14% Milled DMS Powder

Chemical Family: Ferrous

II. Hazardous Ingredients.

The term HAZARDOUS should be interpreted as a term required and defined by laws, regulations, Statutes or ordinances, and does not necessarily imply the existence of any hazard when the products are used as directed by Beta Steel steel.

Chemical Name	**CAS Reg. No**	**% Weight**	**ACGIH TLV (mg/m^3)**	**OSHA PEL(mg/m^3)**
Carbon (C)	7740-44-0	<0.4	3.5 (Carbon Black)	3.5 (Carbon Black)
Iron (Fe)	7439-89-6	Balance	5 (As Oxide Fume)	10 (Total Particulate)
Manganese (Mn) Elemental and Inorganic compounds, as Mn Fume as Mn and Mn Oxide	7439-96-5	<0.8	0.2 (Fume)	5 (Ceiling) 5 (ceiling)
Silicon (Si) As Silicon Dioxide ($Si0_2$)	7440-21-3 14808-60-7	14 - 16	10 (Dust). 0.05 (Respirable fraction)	5 (Respirable) 10/(%Si02 +2); SiO2 measured as Respirable fraction

III. PHYSICAL DATA

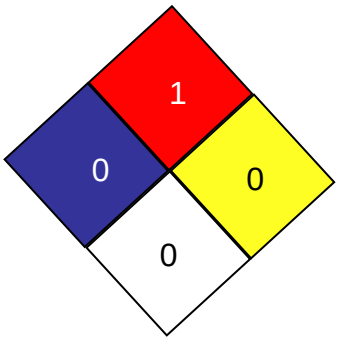
Cast steel shot and grit is in a non-hazardous condition when received. Fine metallic dust is generated as the shot breaks down from impact and wear during normal use. The Fe content of the product is greater than 90% and thus the dust or fume produced will consist of mainly of Iron Oxide, this dust so created can be a small explosion hazard.

Boiling Point:	3123-3423°C	**Melting Point**:	1410°C - 1480°C
Specific Gravity (at 293°K):	7.7g.ccm	**Vapour Pressure**	Not Applicable
% Volatile by volume	Not Applicable	**pH**:	Not Applicable
Evaporation Rate	Not Applicable	**Vapour Density**	Not Applicable
Solubility in Water	Not Applicable	**Percent Solid by Weight**	100%

IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable
Auto-igition Temperature: (Solid iron exposed to oxygen)-1200°K
Flammability Limits: Not Applicable

DMS 14% Powder will not burn or explode. A mild fire or explosion hazard situation may be created due to the fine dust that may result from use, when charging as dust created due to use-use Class D extinguishing agents or dry sand to exclude air. Do not use water or other liquids or foam.



NFPA HAZARD RATING

4= Extreme	**3=High**	**2=Moderate**	**1=Slight**	**0=Insignificant**
Health (blue): 0	**Flammability (red):** 0	**Reactivity (yellow):** 0	**Special (Colourless):**	

V. HEALTH HAZARD DATA

Threshold Limit Values: Permissible exposure limits – see Section II

Carcinogenicity:

Fumes can be generated by welding or flame cutting surface containing new or used stainless steel shot or the dust created by use of the abrasive. Welding or flame cutting may convert a small portion of the chromium to hexavalent chromium [VI]. IARC reports that welding fumes are possibly carcinogenic to humans.

Over exposure to dust and fumes may cause mouth, eye and nose irritation. Prolonged over exposure to manganese dust or fume affects the central nervous system. Chronic over exposure can cause manganese poisoning and attendant apathy, loss of appetite, uncontrolled laughter, insomnia followed by sleepiness, headache, difficulty in walking, frequent falling, tremors, salivation sweating and mental detachment. Prolonged over exposure to iron oxide fume can cause siderosis or “iron pigmentation” of the lung. It can be seen on a chest x-ray but causes little or no disability.

Target Organs: Lung during inhalation

Primary Routes of Entry: Inhalation of dust formed during use or shot or dust particles in eyes

Emergency and First Aid Procedure: If inhaled, move out of the area into fresh air. Flush eyes with running water and have any remaining particles removed from eyes by a qualified person.

VI. REACTIVITY DATA

Stability: Stable
Hazardous polymerization: Will not occur
Hazardous decomposition products: None, Shot will break down into progressively smaller particles and dust during normal use.

VII. SPILL OR LEAK PROCEDURES

Shot spilled or leaked onto floors can create hazardous walking conditions. No special precautions need to be followed when cleaning up spills or leaks of shot. When cleaning up large quantities of dust an OSH approved respirator should be used. Spilled shot can be reclaimed for reuse or disposed of as a non-hazardous solid waste. Collected dust from blast cleaning or shot preening operations always contains contaminants from the surface of the parts being processed and therefore the dust may be classed as hazardous waste and, as such, must be disposed of according to appropriate local, state or federal regulations.

VIII. SPECIAL PROTECTION INFORMATION

Ventilation: General Ventilation and local exhaust should be provided to keep the dust levels below the TLV's shown in Section II

Respiratory protection: If the dust created by use exceeds the ACGIH TLV's and OSHA PEL's indicated in Section II, an OSH approved respirator should be worn.

Eye Protection: Approved safety glasses with eye shields should be worn
Other Protective Equipment: None required

IX. SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Observe maximum floor loading limitations, Keep Dry, fine metallic dust may under extreme conditions become flammable.