Amy Selvaraj (DELWP)

From: Andrew Helps [redacted]
Sent: Saturday, 6 February 2021 10:51 AM
To: Amy Selvaraj (DELWP)
Cc: [redacted]
Subject: KALBAR -Fingerboards Radionuclides Mine
Attachments: 8330 Rev 33.pdf

[redacted]

[redacted]

EXTERNAL SENDER: Links and attachments may be unsafe.

Good Morning Amy.

I am getting very confused with all the schedule changes and attempts to modify data etc.

As the UNEP's senior delegated toxic metal expert in Asia Pacific, I have grave concerns that this project is not being subject to the full and proper due diligence that is mandatory for this type of project.

These concerns are such that last week I sought advice from one of my colleagues who is a QC (we both worked together in the Melbourne Coroners Court in the mid 1960's).
He reinforced my view that it is very clear that the Departmental project management is not getting the independent advice on its duties under Common Law which should be its absolute priority.

The KALBAR project is globally unique in that it is a highly toxic radioactive metal mine in an International listed RAMSAR wetland catchment.
The proponent (KALBAR) have no track record in developing this type of project in a RAMSAR Wetland.

There are a two jurisdictions in Asia that have similar REE deposits that have not been developed due to their location in RAMSAR Wetlands.

Obviously the Australian Federal Environment Department does not have a similar view.
I have arranged for a question on this issue to be asked of the Federal Environment Minister in the Parliament

And, at this time, the rapidly changing proposal involves the transport (by the lowest price contractor) of highly toxic and radioactive ore to another RAMSAR wetland for shipment.
This would not be allowed by the US EPA or the TVA (Tennessee Valley Authority)!

Amy I have developed a Rare Earth/Toxic Element/Compound spreadsheet for this orebody (copy attached).
KALBAR have never published a similar document
I have grave concerns because none of the highly paid KALBAR "experts" have bothered to do this work.
When you have a US EPA listed suspected Carcinogen (Lanthanum 138) in the ground water at **16,044** times the USEPA safe limit there is no wonder the Lindenow farmers face financial ruin.

Would you please arrange a meeting for me with Mr Hurst next week so that I can explain to him in plain language the reasons why this proposal should never have been contemplated by his Department.

I look forward to your notification of a convenient time for this meeting.

Kindest Regards

Andrew Helps
[redacted]

Mobile [redacted]
UNEP Global Mercury Partnership
Waste Management Partnership - designated expert
Mercury added products and alternatives – designated expert
Mercury Fate and Transport Group

UNEP Global Mercury Partnership

Partnership Areas: Mercury in Gold Mining, Mercury Supply and Storage, Mercury Air Transport and Fate, Mercury in Products.

DATA From Envirolab Analysis #22941 dated 16/10/2020

Author: Andrew Helps [redacted]

HI = +QTY Chemical / TDD

Conversion Factors

To Convert concentrations in air(at 25^{0}C) from PPM to mg/m^3 = **6/12/2020**

(ppm) x (molecular weight of the compound) / (24.45) e.g for Antimony 1 ppm = 4.97 mg/m^3.)

Note*

A Hazard Index in excess of 10 requires investigation and or remediation

PDRV - Prioritised Dose Response Value

KALBAR Resources Lindenow (Vic) Project

Rare Earth/Toxic Element/Compound Calculation Template

Revision 33

6th February 2021

Lindenow Testing on 13/10/2020

Rare Earths in Italics

	CHEMICAL ELEMENTS/COMPOUNDS: mg/kg - ug/kg	Specific Gravity	Metal Group	Formula Weight (Molecular Weight)	California Rated as Carcinogen	ATSDR Rank	HBTOM* Ref Pages	Ignition Temperature (Dust ^{0}C)	Solubility in 100 parts Cold Water Formular Dependent D= Dissolves	ATSDR MRL's Chronic mg/kg/day	Australia Residential Soil mg/kg (HIL A)	ATSDR & USEPA Resident Air Carcinogenic Target Risk ug/m^3	ATSDR & USEPA Resident Tapwater mg/L	Australia Resident Tapwater ug/L	ATSDR SPL THEORETICAL Daily Dose TDD (mg/day) (Fit 70kg male)	USEPA PDRV* Non Cancer	CHRONIC INHALATION Data Source	USEPA PDRV* Cancer	USEPA PDRV* Cancer micrograms	13/10/2020 Water L-25 ug/L	Exceedence USEPA Tapwater	13/10/2020 Water L-28 ug/L	Exceedence USEPA Tapwater	13/10/2020 Sand L26 mg/kg	13/10/2020 Sand L27 mg/kg	13/10/2020 Sand L29 mg/kg	13/10/2020 Sand L30 mg/kg
1	Aluminium (Al)	2.70 g/cm^3	Group 13	26.97	Carcinogen	183	549-560	650	i	1		0.52	2000		10.323	Neurological	ATSDR		12000	6	43000		13000	4700	28000	14000
2	Antimony (Sb)	6.69 g/cm^3	Group 15	121.76	Carcinogen	232	565-572	420	i	0.0003		0.021	0.78	3	0.103992	0.2ug/m^3	IRIS IARC 2B	0.2ug/m^3	0.2	<1		<1		<7	<7	<7	<7
3	Arsenic (see note 1)	5.73 g/cm^3	Group 15	299.64	Carcinogen	1	582-610	815	i	0.0003	100	0.00065	0.052	10	0.071278	0.015ug/m^3	Cal IARC 1	0.015ug/m^3	0.0043ug/m^3	3	57.69	4.00		5.00	<4	8.00	4.00
4	Boron	2.47 g/cm^3	Group 13									2.1	400							30	0.08	60.00		<3	<3	15.00	<3
5	Arsine (gaseous AsH3)	2.769 g/cm^3	Group 15	77.93	Carcinogen	1	615	285	20cc			0.005	0.007			0.05 ug/m^3	IARC 1	0.0043ug/m^3	0.0043					?	?	?	?
6	Barium	3.51 g/cm^3	Group 2	137.36		134	625-633	725	D	0.2		0.00108	0.51499		0.61652					37.00	71.85	150.00		18	15.0	58.0	22.0
7	Beryllium (glucinum)	1.85 g/cm^3	Group 4	9.02	Carcinogen	43	636-651	1278	i	0.002	60	0.00000	2.50	60.0	0.0078	0.01 ug/m^3	IRIS IARC 1	0.0024ug/m^3	0.0024	<0.5		3.00		<1	<1	<1	<1
8	Bismuth (Bi)	9.72 g/cm^3	Group 4	209.00			655-663	271.3	i											<1		<1		<1	<1	<1	<1
9	Cadmium (Cd)	8.65 g/cm^3	Group 12	112.41	Carcinogen	7	668-708	1040	i	0.0005	20	0.00001	0.92	2	0.045127	0.01 ug/m3	ATSDR	0.0018ug/m^3	0.0018	<0.2		<0.2		<0.4	<0.4	<0.8	<0.4
11	Ceric Oxide (Cerium)CeO_2	6.71 g/cm^3	Group 3	172.13	Suspected	570	101-102	3500	i	1 mSv/yr		0.094								14.00		66.00					
14	Chromium compounds (Cr)	7.19 g/cm^3	Group 6	52.01	Carcinogen	66	717-739	580	i	0.0009		0.00001			0.00263					11		48					
15	Cobalt (Co)	8.85 g/cm^3	Group 9	58.94	Carcinogen	52	743-759	760	i	1 mSv/yr	100	0.000031	0.6		0.67523	0.1 ug/m^3	ATSDR			1.0	1.67	6.00		2.00	1.00	8.00	3
	Caesium																			<1		2.00		1.00	1.00	1.00	1.00
16	Copper (Cu)	8.94 g/m^3	Group 11	63.57		125	765-782	900	i	0.01	6000		80	2000	0.47242					<2		5.00		<1	<1	570	<1
17	*Dysprosium Dy20 $_3$*	8.53 g/m^3	Group 3	162.5	Suspected			2567	i																		
18	*Erbium Er20 $_3$*	9.04 g/m^3	Group 12	167.26	Suspected			1529	i																		
19	*Europium Eu0 $_3$*	5.25 g/cm^3	Group 3	151.96	Suspected	575		1800	i																		
20	*Gadolinium Gd2p0 $_3$*	7.87 g/cm^3	Group 3	157.25	Suspected			3545	i																		
21	*Gallium*	5.91 g/cm^3	Group 13	69.72	Carcinogen		787-797	29.78				0.00001			0.00011									4.00	2	13	6.00
22	*Germanium*	5.32 g/cm^3	Group 14	72.63			800-813		i																		
23	*Holmium Ho20 $_3$*	8.80 g/m^3	Group 12	164.93	Suspected			1474	i																		
24	Iron	7.87 g/cm^3	Group 8	55.85			878-902	420	i			0.01626	11.29		18.07					8100.00	717.45	30000.00		30000	12000	37000	26000
25	*Lanthanum -138*	6.17 g/m^3	Group 3	138.92	Suspected	711	903-908	920	i			0.00018	0.00268		0.02188					9.00	3358.21	43.00	16044.78	16	9	27	15
26	Lead - not 210 (Pb)	11.34 g/cm^3	Group 14	430.42	Carcinogen	2	129-131	710	i		300		15	10	0.330938	0.15 ug/m^3	OAQPS			6	0.40	30.0		10	4	29	11
27	*Lithium Oxide Li $_2$ O*	0.53 g/cm^3	Group 1	29.88	Suspected	335	969-974	2600	to LiOH	0.404424			0.3835		0.404424		ATSDR			3.00	7.82	15.00		4	1	11	5
28	*Lutetium -176*	9.84 g/cm^3	Group 3	174.99	Suspected			1936	i																		
29	Magnesium	3.58 g/cm^3	Group 2	24.32				520	i			0.0907	33.3369		35.96134												
30	Manganese	7.47 g/cm^3	Group 6	54.93		140	975-1005	1246	D	0.3 ug/m3	3800	0.05	43	500	1.61855	0.03 ug/m^3	ATSDR			120	2.79	93		33	10	190	31
31	Mercury	13.55 g/cm^3	Group 12	200.61	Suspected	3	1014-1064	to gas @10^{0}C	i	0.0002 mg/m3	40		0.063	1	0.051981	0.3ug/m^3	IRIS			<0.05		<0.05		<0.1	<0.1	<0.1	<0.1
32	Methyl Mercury	215.63g/mol	Group 12	417.22	Suspected	120	448-450	within organics	i	0.0003			0.2			0.1 ug/m^3	IRIS	0.1 ug/m^3	0.1		0.00						
33	Molybdenum	10.22 g/cm^3	Group 6	95.95		326	1077-1107	720	i	0.00004 mg/m^3			10	50	0.2412	0.2ug/m^3	IARC 2B			<1		<1		<1	<1	<1	<1
34	Nickel	8.90 g/cm^3	Group 10	58.69	Carcinogen	57	1091-1107	950+	i	0.00009 mg/m^3	400		20	20	0.38969	0.09 ug/m^3	ATSDR/CAL	0.00024 ug/m^3	0.00024	4	0.20	12.0		4.0	1	15	4
35	*Neodymium 144*	7.00 g/cm^3	Group 3	144.27	Suspected			1021	D											2.70		2.40					
36	*Palladium*	12.99 g/cm^3	Group 10	106.7	Suspected	173	1113-1121	2963	i			0.012000			0.00018												
37	*Platinum*	21.45 g/cm^3	Group 10	195.23			1125-1138		i																		
38	*Praseodymium Pro $_6$*	6.78 g/cm^3	Group 3	140.92	Suspected			3512	D																		
40	*Radium 222 , 226 or 228*	5.5 g/cm^3	Group 2	226.05	Carcinogen			1500	i			5pCi total combined per litre of water															
41	*Radium Bromide*	5.79 g/cm^3	Group 2	385.88																							
42	*Rhodium*	8.85 g/cm^3	Group 9	102.91			1143-1171		i																		
43	*Rubidium*	1.63 g/cm^3	Group1	85.48	Suspected	711			D			0.00001			0.000091					8.00		31.00					
44	*Samarium 147 (Chloride)*	7.54 g/cm^3	Group 3	150.43	Suspected				NK	:PA Doc EPA/690/R-09/050F																	
45	*Scandium Sc2O $_3$*	2.99 g/cm^3	Group 3	45.1	Suspected	584			NK											<1		8.00					
46	Selenium	4.50 g/cm^3	Group 16	631.68	Suspected	146	1176-1203	950+	i	0.005 mh/kg/day	200	0.00002	0.03657	10	0.03778	20 ug/m^3	CAL			<1		5.00		<2	<2	<2	<2
47	Silica PM$_{2.5}$ Faction)	2.33 g/cm^3	Group 14	60.06	Carcinogen		102	780	i				0.31000		Annual av												
48	Sulphur (%)	2.067 g/cm^3	Group 16	32.06				392	i			0.00122			0.01829												
49	Strontium SrO (Stable)	2.64 g/cm^3	Group 2	87.63	Carcinogen		455	768.85	D	2 mg/kg/day										28		69		5	2	31	4
50	*Tellurium*	6.24 g/cm^3	Group 16	127.61	Carcinogen		1218-1226	449.51	i			0.00003			0.00039					<0.5		<0.5		<1	<1	<1	<1
51	*Terbium Tb40 $_7$*	8.27 g/cm^3	Group 3	159.2	Suspected			1356	NK																		
52	*Thallium*	11.86 g/cm^3	Group 13	204.39	Suspected	279	1229-1238	303	i			0.00007	0.01355		0.01579					<1		<1		<2	<2	<2	<2
54	*Thorium 229*	11.73 g/cm^3	Group 3	232.12	Carcinogen	227		270	i								IARC I	0.000185 pCi/m^3		1.0		5.0		6	3	5	6
55	*Thulium Tm2O $_3$*	9.33 g/cm^3	Group 12	169.4	Suspected			1950	i																		
56	Titanium	4.54 g/cm^3	Group 4	47.9	Carcinogen	310	1287-1294	460	i	0.0001 mg/m3			0.021		2.271688	0.01 ug/m^3	ATSDR	Respiratory		110		76					
57	Tin	7.29 g/cm^3	Group 14	118.7		307	1242-1276	630	i	0.3 mg/kg/day			1200	1200	0.09981					2.0		<1					
58	Tungsten	19.25 g/cm^3	Group 6	183.92			1297-1305	950	i											<1		<1					
59	Uranium 234	19.05 g/cm^3	Group 7	238.07	Carcinogen	97	1308-1338	20	i	0.00004 mg/m3										0.6		3.5		<1	<1	2	1
60	Vanadium (86%)	6.10 g/cm^3	Group 5	50.95	Carcinogen	200	1348-1364	500	i	0.0001 mg/m3			8.6		0.123043		CAL		0.00034	13		53		50	28	62	54
61	*Ytterbium Yb2O $_3$*	6.95 g/cm^3	Group 3	173.04	Suspected	581			NK																		
62	*Yttrium Y2O $_3$*	4.47 g/cm^3	Group 3	88.92	Suspected	711			D			0.0000006			0.000118					6.70		33.00		7.60	4.8	15	7.8
63	Zinc	7.14 g/cm^3	Group 12	65.38		75	1369-1382	600	i	0.3 mg/kg/day	7400		600		1.96084					9		25.0		4	1	280	3
64	Zirconium	6.51 g/cm^3	Group 4	91.22	Carcinogen	701		20	i				0.16	0.000022	0.00032												
65	Hydrogen Cyanide	0.69g/cm^3		179.16	Reproductive	35			NK		250		0.15	80	1.3058												
66	PM10								Particle	ICPMS Analysis					24 hour av												
67	PM2.5				Carcinogen				Particle	ICPMS Analysis					24 hour av	Annual Average											
	Radionuclides (Uranium)	18.7 g/cm^3	Group 3	238.03	Carcinogen	102	1307-1345		i									0.000185 pCi/m^3									

Note 1 **USEPA Residential level Average fit healthy 70 kg male inhales 50.4 m3 a day**

HBTOM - Handbook of the toxicology of Metals - Nordberg et al Fourth Edition
ATSDR Minimum Risk Levels (MRLs December 2019