Fingerboards Project

Radiation Assessment

Kalbar Resources

12 May 2021

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Presentation

- Some basic principles
- Regulatory framework
- Baseline data collected – to date
- Occupational and Member of the public impacts
- Non-human biota impacts
- Transport
- Conclave summary and submission overview
- Future work required

Radiation Assessment

- Characterisation of existing background conditions
- Identification of the radioactive constituents in the mineral ore, intermediate product and waste
- Review of regulatory framework
- Assessment of radiological impacts (workers, members of the public, and environment)
- Radiation protection and management

Basic Radiation Concepts

- **Radioactive decay**
  - Alpha, beta, gamma radiation
  - Radionuclides – radioactive isotopes of various elements
  - Natural uranium (U-238) and thorium (Th-232) series

- **Radiation units**
  - Activity
    - becquerel (Bq) – one disintegration per second
  - Concentrations
    - Soil and other solids – $Bq \cdot g^{-1}$
    - Water - $Bq \cdot L^{-1}$
    - Air - $Bq \cdot m^{-3}$
  - Effective Dose
    - Humans - sievert (Sv) – risk of biological damage

Key Regulatory Framework

- Victorian Department of Health (DHS)
- *Radiation Act 2005, Regulations 2017*
  - Provisions for radiation safety, dose limitation, legal definition for prescribed radioactive materials (> 1 Bg/g), transport, waste disposal.
  - Management Licence (ML) issued to a Radiation Practice with 'Conditions'

- *Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing 2005 (RPS 9)*
- U and mineral sands industry specific Code of Practice
- Additional Codes for transport, fixed gauges, etc applicable

- RPS 9 Code requires provision of a
  - Radiation Management Plan (RMP),
  - Radioactive Waste Management Plan (RWMP),
  - Radiation Environment Plan (REP)
- A ML permitting operation will not be issued without these documents completed and approved by DHS.

Radioactivity in Heavy Mineral Sands

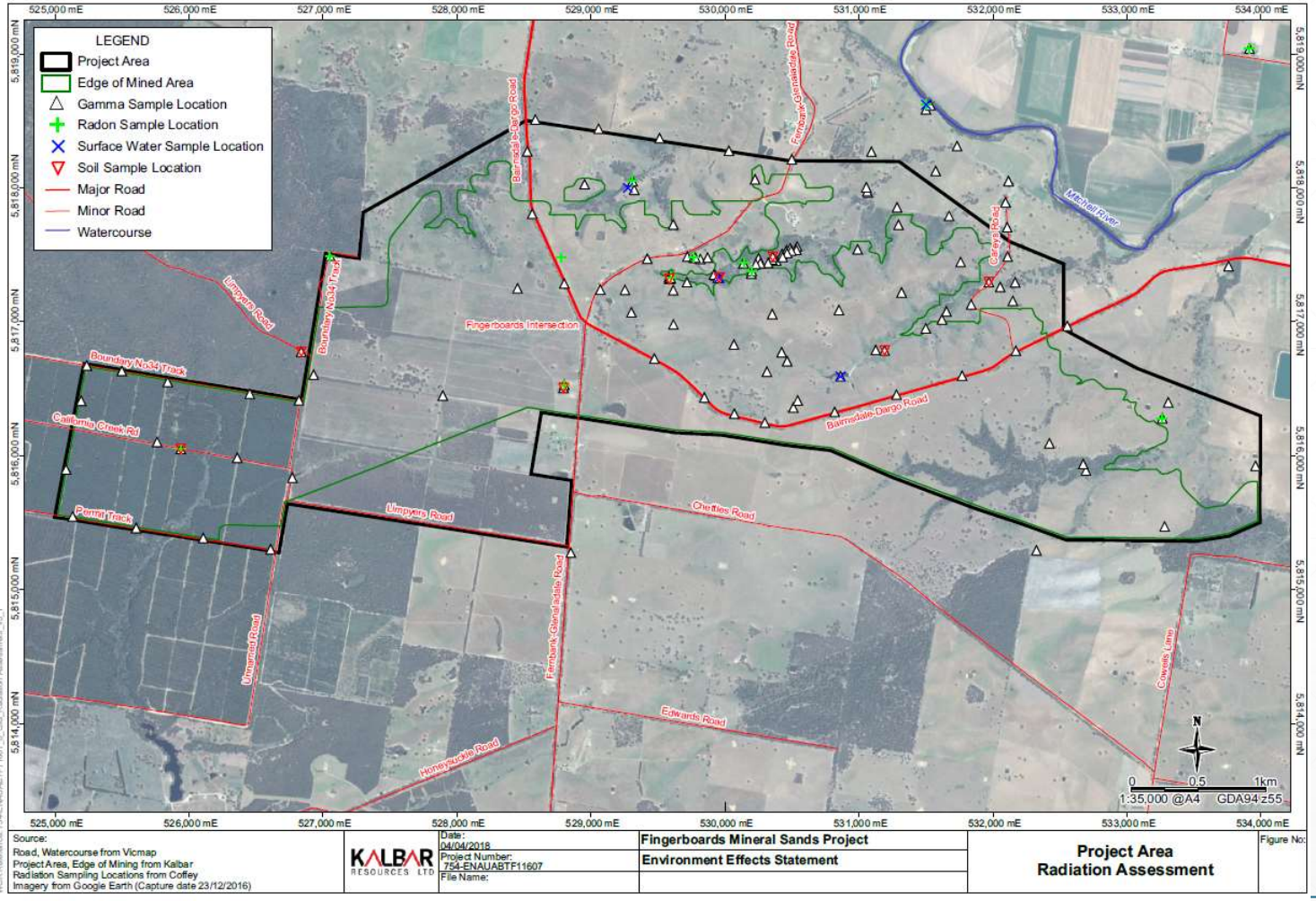
- Heavy Mineral Sand Constituents
  - Ilmenite (~73%)
  - Rutile (~5%)
  - Zircon (~20%)
  - Monazite (< 1%)

- U-238 & Th-232 content ($Bq \cdot g^{-1}$)
  - Ilmenite
    - 0.1-0.4 U / 0.2-2 Th
  - Rutile
    - 0.1-0.2 U / 0.2-1.5 Th
  - Zircon
    - 2-4 U / 0.6-1 Th
  - Monazite
    - 10-40 U / 200-300 Th

Source: International Atomic Energy Agency, *Radiation Protection and NORM Residue Management in the Zircon and Zirconia Industries,* Safety Report Series No. 51, IAEA, Vienna (2007).

Radiation exposure pathways

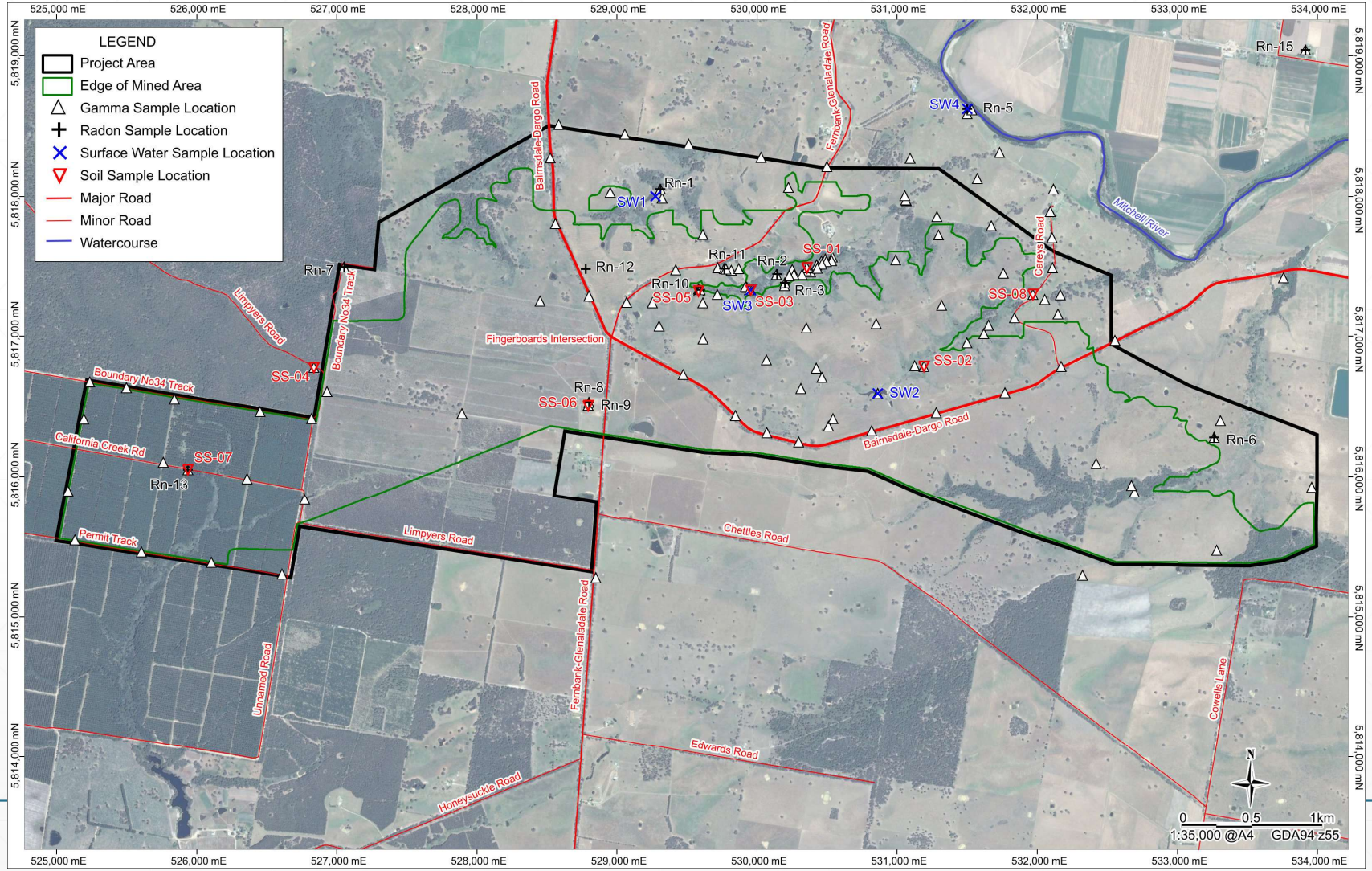
- External radiation from ore body, during processing
- External radiation during transport of mineral sand materials
- Internal exposure from inhalation of dusts
- Inhalation of radon gas released from minerals during mining or processing
- Direct ingestion of material during handling of ore dust and other heavy mineral products and tailings
- Indirect ingestion of food impacted by the resuspension of dust



External gamma radiation

- Preliminary radiation survey (156 locations)
  - Mining area – 0.13 µGy/h
  - Outside project area 0.09 µGy/h
  - Perry Gully (0.14 – 0.33 µGy/h) – following identification

- Always anticipated additional measurements required pre-mining.


LEGEND
Project Area
Edge of Mined Area
Gamma Sample Location
Radon Sample Location
Surface Water Sample Location
Soil Sample Location
Major Road
Minor Road
Watercourse
525,000 mE
526,000 mE
527,000 mE
528,000 mE
529,000 mE
530,000 mE
531,000 mE
532,000 mE
533,000 mE
534,000 mE
5,819,000 mN
5,818,000 mN
5,817,000 mN
5,816,000 mN
5,815,000 mN
5,814,000 mN
Rn-1
Rn-2
Rn-3
Rn-5
Rn-6
Rn-7
Rn-8
Rn-9
Rn-10
Rn-11
Rn-12
Rn-13
Rn-15
SW1
SW2
SW3
SW4
SS-01
SS-02
SS-03
SS-04
SS-05
SS-06
SS-07
SS-08
Bairnsdale-Dargo Road
Fernbank-Glenaladale Road
Mitchell River
Careys Road
Limpyers Road
Boundary No34 Track
Fingerboards Intersection
California Creek Rd
Permit Track
Chettles Road
Unnamed Road
Edwards Road
Honeysuckle Road
Cowells Lane
N
0
0.5
1km
1:35,000 @A4
GDA94 z55

Surface soils

- 2017 gamma-ray spectrometry analysis of soil samples

  (7 locations)

  - Collected in conjunction with gamma survey points
  - Included Perry Gully following identification
  - To identify any ‘disequilibrium’

- May 2018 composite samples from farming district

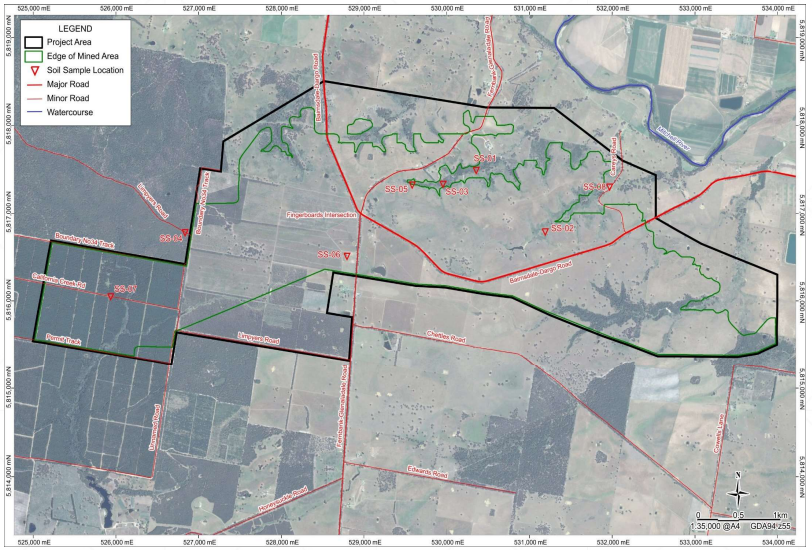
  (60 locations, 6 composite samples)

  - Used for vegetable uptake baseline assessment

- December 2018 soil samples from farming district

  (10 locations)

  - To assess variability



Radioactive variability in soil in farming districts

Soil Sample Area	Sample ID	Radionuclide Activity (becquerel per kilogram dry weight)					
		K-40	Uranium (^{238}U) series			Thorium (^{232}Th) series	
			U-238(as Th-234)	Ra-226	Pb-210	Ra-228	Th-228
River Flats	1A	555 ± 53	50.1 ± 10.4	39.3 ± 3.3	36.9 ± 9.3	51.0 ± 4.5	54.0 ± 5.2
	1B	564 ± 52	41.9 ± 6.5	38.1 ± 3.0	39.0 ± 6.4	47.8 ± 4.0	45.7 ± 4.2
Margin to flats	2A	145 ± 17	54.0 ± 7.6	45.9 ± 3.6	53.2 ± 7.7	73.5 ± 5.9	68.0 ± 6.9
	2B	196 ± 22	52.9 ± 8.6	55.1 ± 4.3	58.8 ± 9.3	88.4 ± 7.0	89.8 ± 9.1
Grazing land	3A	49 ± 14	40.6 ± 7.2	27.7 ± 2.8	34.1± 6.8	32.8 ± 3.7	36.6 ± 4.2
	3B	38 ± 15	43.6 ± 7.8	34.7 ± 3.4	37.6 ± 7.6	34.9 ± 3.7	39.4 ± 4.6
Grazing land	4A	<28	10.4 ± 3.5	7.9 ± 1.1	12.6 ± 3.7	6.1 ± 1.5	7.4 ± 1.1
Mixed Use	5A	88 ± 18	31.4 ± 6.4	24.1 ± 2.5	38.8 ± 7.2	29.1 ± 3.5	31.1 ± 3.7
	5B	46 ± 13	23.6 ± 5.5	25.3 ± 2.5	32.6 ± 6.4	32.6 ± 3.6	32.1 ± 3.7
Native Forest	6A	77 ± 17	65.8 ± 9.8	66.0 ± 5.8	94.1 ± 13.0	70.5 ± 6.3	68.5 ± 7.6

Conservatively, dust deposition from Fingerboards could alter radioactive content of soil by a maximum of **1%**

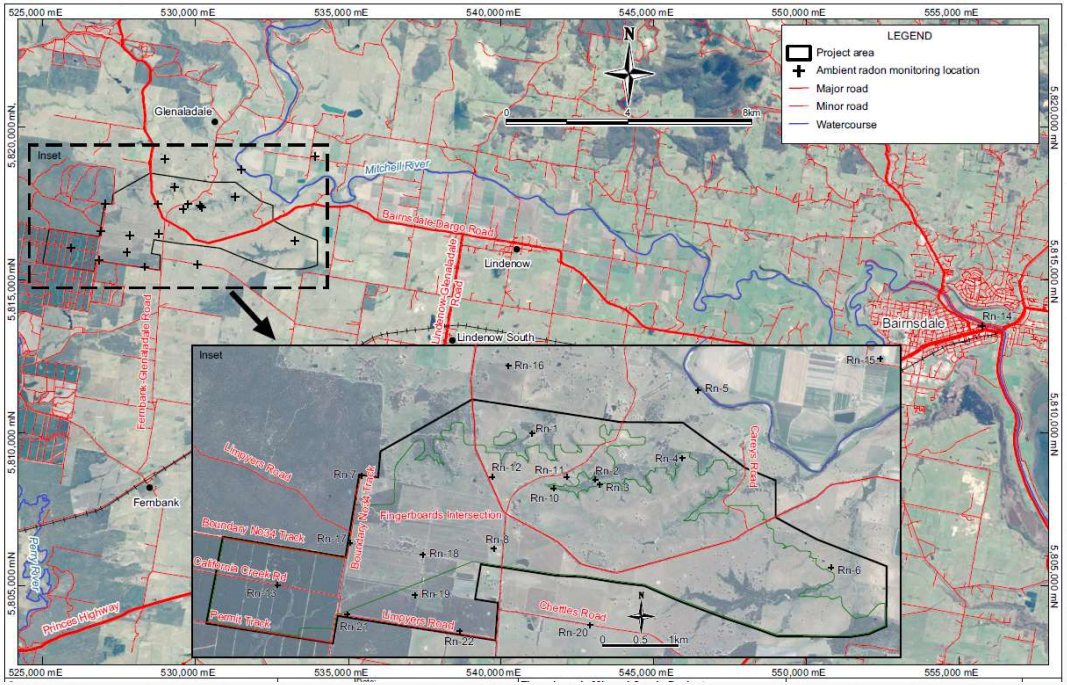
Radon gas

- 15 outdoor locations

  (Jan 2017- Dec 2018)

- 7 additional locations added in Jan 2019 to encompass southern area of the lease

- Test pit monitoring recommended



Location ID	Issue 1 9/5/17-06/10/17		Issue 2 6/10/17-17/05/18		Issue 3 17/5/18-13/12/18		Issue 4 12/12/18-09/08/19		Issue 5 12/8/19-05/03/20		Issue 6 5/3/20-10/08/20	
	Rn-222 (Bq/m^3)	Rn-220 (Bq/m^3)	Rn-222 (Bq/m^3)	Rn-220 (Bq/m^3)	Rn-222 (Bq/m^3)	Rn-220 (Bq/m^3)	Rn-222 (Bq/m^3)	Rn-220 (Bq/m^3)	Rn-222 (Bq/m^3)	Rn-220 (Bq/m^3)	Rn-222 (Bq/m^3)	Rn-220 (Bq/m^3)
Rn-1	32 ± 4	<20	28 ± 4	< 20	27 10	< 30	23 ± 4	21 ± 16	18 ± 6	22 ± 14		
Rn-2	39 ± 6	< 20	23 ± 6	< 30	24 ± 8	< 30	32 ± 6	25 ± 18	< 15	24 ± 14	34 ± 8	< 20
Rn-3	30 ± 6	< 20	25 ± 4	< 20	20 ± 6	< 30	< 15	49 ± 20	< 15	33 ± 14	19 ± 6	< 20
Rn-4	18 ± 4	< 20	< 15	< 20	< 15	< 30	19 ± 4	29 ± 16	< 15	< 20	16 ± 6	< 20
Rn-5	26 ± 4	24 ± 16	19 ± 4	< 20	15 ± 8	33 ± 20	17 ± 4	33 ± 16	15 ± 6	20 ± 14	22 ± 8	< 20
Rn-6	29 ± 6	22 ± 18	17 ± 4	< 20	< 15	< 20	15 ± 4	< 20	< 15	< 20	16 ± 6	< 20
Rn-7	39 ± 6	< 30	25 ± 4	< 20	24 ± 8	< 30	24 ± 8	37 ± 22	16 ± 6	29 ± 14	22 ± 6	< 20
Rn-8	30 ± 6	< 20	<15	<20	< 15	< 30	< 15	< 20	< 15	< 20	< 15	< 20
Rn-10	48 ± 6	< 30	28 ± 8	119 ± 30	45 ± 8	77 ± 30	25 ± 4	33 ± 18	N2	N2		
Rn-11	< 15	< 20	16 ± 4	< 20	33 ± 8	< 30	< 15	< 20	< 15	< 20	< 15	< 20
Rn-12	< 15	< 20	< 15	< 20	< 15	< 20	< 15	< 20	< 15	< 20	< 15	< 20
Rn-13	26 ± 4	< 20	15 ± 4	22 ± 14	23 ± 6	< 30	< 15	< 20	< 15	< 20	30 ± 12	< 30
Rn-14	48 ± 6	< 30	36 ± 6	< 20	32 ± 8	< 30	34 ± 6	< 20	27 ± 6	< 20	43 ± 8	< 20
Rn-15	37 ± 6	< 30	17 ± 6	39 ± 20	< 15	33 ± 20	13 + 4	27 + 4	19 ± 8	< 30	15 ± 6	< 20
Rn-16							< 15	< 20	< 15	< 20	< 15	< 20
Rn-17							< 15	< 20	< 15	24 ± 14	23 ± 8	< 20
Rn-18							28 ± 6	25 ± 18	17 ± 6	< 20	18 ± 6	45 ± 14
Rn-19							21 ± 4	< 20	< 15	< 20	16 ± 6	< 20
Rn-20							< 15	< 20	N3	N3	N1	N1
Rn-21							18 ± 4	< 20	< 15	< 20	18 ± 12	< 30
Rn-22							< 15	< 20	< 15	< 20	20 ± 12	34 ± 24

Airborne dust

- 101 samples collected from EPA Air quality assessment
  - U and Th mass concentrations (μg/m^3) reported less than MDL for each
- 4 samples chosen that exceeded 5000 m^3 and analysed for gross μBq$_\alpha$/m^3

Client Sample ID	Start Date	End date	Sample volume (m^3)	Dust Concentration (μg·m^3)	Gross radioactivity concentration (μBq·m^3)	
					Gross alpha	Gross beta
GL-067 (PM2.5)	20/01/2018	24/01/2018	5869	7.2	1080 ± 130	340 ± 110
GL-085 (PM2.5)	30/03/2018	3/04/2018	6026	5.8	439 ± 85	254 ± 98
KBRV1 (PM2.5)	20/05/2019	27/05/2019	10643	5.9	283 ± 49	780 ± 78
KBRV2 (PM10)	20/05/2019	27/05/2019	10571	5.5	319 ± 52	842 ± 80

Ground and surface water

- Radionuclides in groundwater
  - 10 wells, 25 samples
  - May 2017- Sep 2019

- Radionuclides in surface waters
  - Mitchell River, creeks, dams
  - 7 locations, 13 samples
  - May 2017- Dec 2019

Sample Location	Gross Radioactivity Concentration (Bq·L^{-1})[a,b]		Radionuclide concentration (Bq·L^{-1})[a,b]				
	Gross alpha	Gross beta[c]	U-238 (as Th-234)	Ra-226	Pb-210	Ra-228	Th-228
MW01 (May 17)	0.178 ±0.041	0.189 ±0.048	-	-	-	-	-
MW01 (Sep 18)	0.096 ±0.030	0.052 ±0.035	< 0.18	0.030 ± 0.012	0.077 ± 0.054	<0.110	<0.030
MW01 (Dec 19)	0.395 ±0.086	0.122 ±0.041	< 0.18	0.024 ± 0.018	0.143 ± 0.052	<0.076	<0.027
MW02 (May 17)	0.085 ±0.031	0.061 ±0.040	-	-	-	-	-
MW02 (Sep 18)	0.069 ±0.024	0.080 ±0.036	< 0.20	0.030 ± 0.011	<0.190	<0.110	<0.033
MW02 (Dec 19)	0.848 ±0.163	0.232 ±0.053	0.082 ± 0.046	0.023 ± 0.013	0.138 ± 0.063	<0.120	<0.033
MW03 (May 17)	0.425 ±0.068	0.204 ±0.046	< 0.11	0.077 ± 0.015	0.050 ± 0.040	0.083 ± 0.029	0.027 ± 0.010
MW03 (Sep 18)	0.117 ± 0.030	0.121 ±0.039	< 0.16	0.062 ± 0.013	<0.150	0.055 ± 0.022	<0.025
MW03 (Dec 19)	0.164 ± 0.047	0.091 ± 0.038	< 0.19	0.037 ± 0.011	<0.170	0.056 ± 0.025	<0.025
MW04 (May 17)	0.270 ±0.044	0.314 ±0.050	< 0.34	0.149 ± 0.026	< 0.320	0.149 ± 0.045	< 0.063
MW04 (Sep 18)	0.238 ±0.035	0.313 ±0.041	< 0.14	0.106 ± 0.017	0.076 ± 0.050	0.207 ± 0.037	< 0.037
MW04 (Dec 19)	0.854 ±0.165	0.288 ±0.067	0.506 ± 0.090	0.068 ± 0.019	0.155 ± 0.065	0.074 ± 0.032	< 0.025
MW06 (May 17)	0.272 ±0.050	0.347 ±0.051	< 0.19	0.083 ± 0.016	0.075 ± 0.050	0.065 ± 0.026	< 0.030
MW06 (Dec 19)	0.801 ±0.141	0.889 ±0.127	< 0.525 + 0.079	0.196 ± 0.021	0.301 ± 0.064	0.268 ± 0.035	0.010 ± 0.010
MW07 (May 17)	0.159 ±0.039	0.065 ±0.026	-	-	-	-	-
MW07 (Sep 18)	0.231 ±0.028	0.302 ±0.037	< 0.39	0.173 ± 0.036	< 0.340	0.229 ± 0.074	< 0.079
MW07 (Dec 19)	0.244 ±0.060	0.238 ±0.059	<0.130	0.164 ± 0.022	< 0.340	0.214 ± 0.035	< 0.028
MW08 (May 17)	0.065 ±0.026	0.091 ±0.044	-	-	-	-	-
MW08 (Sep 18)	0.277 ±0.043	0.169 ±0.044	< 0.11	0.051 ± 0.018	0.082 ± 0.070	0.066 ± 0.040	< 0.036
MW08 (Dec 19)	0.699 ± 0.143	0.477 ±0.081	0.202 ± 0.059	0.102 ± 0.015	0.113 ± 0.046	0.142 ± 0.030	< 0.031
LA-01-DM (Dec 19)	0.075 ± 0.033	0.062 ± 0.039	< 0.016	0.052 ± 0.013	< 0.14	< 0.088	< 0.022
LA-02-DM (Dec 19)	1.06 ± 0.20	0.449 ± 0.087	0.202 ± 0.057	0.049 ± 0.017	0.227 ± 0.057	0.089	< 0.025
LA-01-SM (Dec 19)	0.150 ± 0.042	0.057 ± 0.038	< 0.14	< 0.046	< 0.13	< 0.14	< 0.030
MW09d (Dec 19)	0.151 ± 0.043	0.113 ± 0.043	< 0.18	0.062 ± 0.019	0.125 ± 0.066	0.087 ± 0.039	< 0.043

Kalbar ID		Location	Gross Radioactivity Concentration (Bq·L^{-1})[a,b]		Radionuclide concentration (Bq·L^{-1})[a,b]				
			Gross alpha	Gross beta[c]	U-238 (as Th-234)	Ra-226	Pb-210	Ra-228	Th-228
PG-1	May-17	Perry Gully (wombat hole)	0.173 ± 0.040	0.118 ± 0.046	< 0.15	0.015 ± 0.010	0.052 ± 0.040	< 0.075	0.024 ± 0.009
SW-1	Sep-18	Creek - No.34 Track	0.395 ± 0.061	0.139 ± 0.038	< 0.16	0.041 ± 0.012	0.071 ± 0.049	0.055 ± 0.022	< 0.022
SW-1	Dec-19	Creek - No.34 Track	2.39 ± 0.42	0.39 ± 0.103	< 0.200	0.073 ± 0.019	0.205 ± 0.059	0.121 ± 0.026	< 0.030
SW-2	Sep-18	Creek - Permit Road	0.190 ± 0.034	0.106 ± 0.036	< 0.21	0.028 ± 0.012	< 0.160	< 0.120	< 0.035
SW-4	May-17	Property Dam	0.031 ± 0.022	< 0.066	-	-	-	-	-
SW-4	Sep-18	Property Dam	0.035 ± 0.019	0.055 ± 0.042	< 0.12	< 0.034	< 0.130	< 0.110	< 0.021
SW-4	Dec-19	Property Dam	0.056 ± 0.026	< 0.075	< 0.150	< 0.053	< 0.150	< 0.160	< 0.036
SW-6	May-17	Property Dam	0.035 ± 0.021	< 0.071	-	-	-	-	-
SW-6	Sep-18	Property Dam	0.041 ± 0.020	0.042 ± 0.041	< 0.12	< 0.042	< 0.079	< 0.140	< 0.029
SW-6	Dec-19	Property Dam	< 0.034	0.075 ± 0.043	< 0.110	< 0.030	< 0.110	< 0.130	< 0.021
MR-3	May-17	Mitchell River (downstream)	0.055 ± 0.024	< 0.071	-	-	-	-	-
MR-1	May-17	Mitchell River (upstream)	0.041 ± 0.022	< 0.071	-	-	-	-	-
Mortons	Dec-19	Property Dam	0.091 ± 0.030	0.034 ± 0.04	<0.14	0.020 ± 0.011	< 0.130	< 0.066	< 0.027

3 Important facts about Fingerboards Project

1. The ore and tailings has a low activity concentration (< 0.8 Bq/g). Additionally, it would be exempt from regulation if there was no processing.

2. Existing naturally occurring radionuclides are present in soils, waters and food in the region impacting the dose we currently receive.

3. There is no mineral separation. Care should be given comparing with other operations in Australia and internationally.

Radioactive content of ore and products

Material	Uranium mass Concentration (ppm)	Thorium mass Concentration (ppm)	U-238 activity ($Bq \cdot g^{-1}$)	Th-232 activity ($Bq \cdot g^{-1}$)	Total ($Bq \cdot g^{-1}$)
Surface Soils	2 - 9	4 - 15	0.02 - 0.11	0.02 - 0.06	0.04 – 0.18
Overburden	0.5 - 14	2 - 79	0.01- 0.17	0.01 – 0.32	0.01 – 0.49
Ore*	25	120	0.31	0.48	0.79
Tailings*	14	79	0.18	0.32	0.5
HMC*	250	1600	3.11	6.51	9.62
Mag. Concentrate*	240	1700	2.95	6.8	9.75
Non-Mag. concentrate	300	1400	3.69	5.6	9.29

* Concentrations quoted are maximum quantities expected

Radiological Impacts - Occupational

Work operation	Estimated annual external dose (mSv)	Estimated annual internal dose (mSv)	Estimated total effective annual (mSv)
Mining operations including MUP's	0.72	0.19	**0.9**
Wet Concentrator Plant - desliming cyclones	0.1	0.01	**0.11**
Wet Concentrator Plant - gravity separation	0.71	0.09	**0.77**
Wet Concentrator Plant – WHIMS circuit	1.24	0.12	**1.36**
Maintenance personnel – all areas	0.69	0.1	**0.79**

Compare with **20 mSv/year** limit. However ALARA must be applied.

Transport requirements

- The Transport company must have a Management Licence under the *Radiation Act*
- A likely condition, *Code of Practice for the Safe Transport of Radioactive Materials* (C-2) 2019, prescribes:
  - Activity and dose limits, package types, labelling, documentation as well as placarding of vehicles
  - Exemption limits for bulk uranium and thorium (10 $Bq \cdot g^{-1}$ total)
  - Fingerboard shipments are unlikely to require Class 7 placards
- Irrespective, strict requirements imposed on transport company and Kalbar

Radiological Impacts - Transport

Activity	Separation distance from product (metres)	Exposure duration	Annual exposure (hours)	Estimated Annual radiation dose (mSv)
Road Transport (Site - Corner Inlet Port)				
Truck Drivers – self-loading in FEL into loading hopper, driving	2	5 h per shift 250 days per year	1250	1.45
FEL Operator, Corner Inlet Port – pushing up stockpile	2	1.5 h per day	375	0.72
FEL Operator – loading ships	2	2 days per month	192	
Road/Rail option (Site – Maryvale – Port of Melbourne)				
Forklift Operator, site – loading containers onto trucks	2	1 day per month	96	0.12
Truck Driver – road transport from site to Maryvale	2	4 h per shift 250 days per year	1000	1.27
Forklift Operator – unloading containers from trucks, loading trains	2	16 h per month	192	0.24
Freight train drivers during rail transport of products	>10	8 hours	-	Negligible
Wharf handler, Port of Melbourne	>10	-	-	Negligible

Radiological Impacts – Environment

- Impact on non-human biota
  - New area of regulation
  - Tiered approach (Tier 1-3)
  - Tier 1 - Identify if screening levels exceeded
  - Consideration of baseline levels, radiation sources, exposure pathways, mechanism for transfer in the environment, and identification of reference organisms.
  - Documented in a Radiation Environment Plan.

Preliminary Tier 1 Assessment

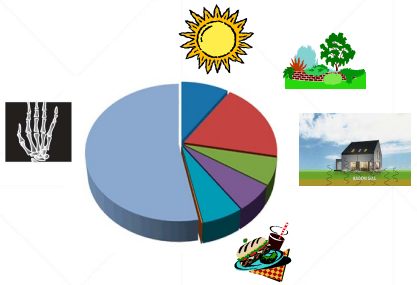
Assumptions:

- Dust deposition 0.5 g/m^2.month
- Dust deposition for 20 years
- 10% dust is HMC (or 100% is ore)
- Reference organism: Lichen & Briophytes (most limiting)
- **Result: <10 uGy/h screening value**

Radiological Impact – Member of the Public

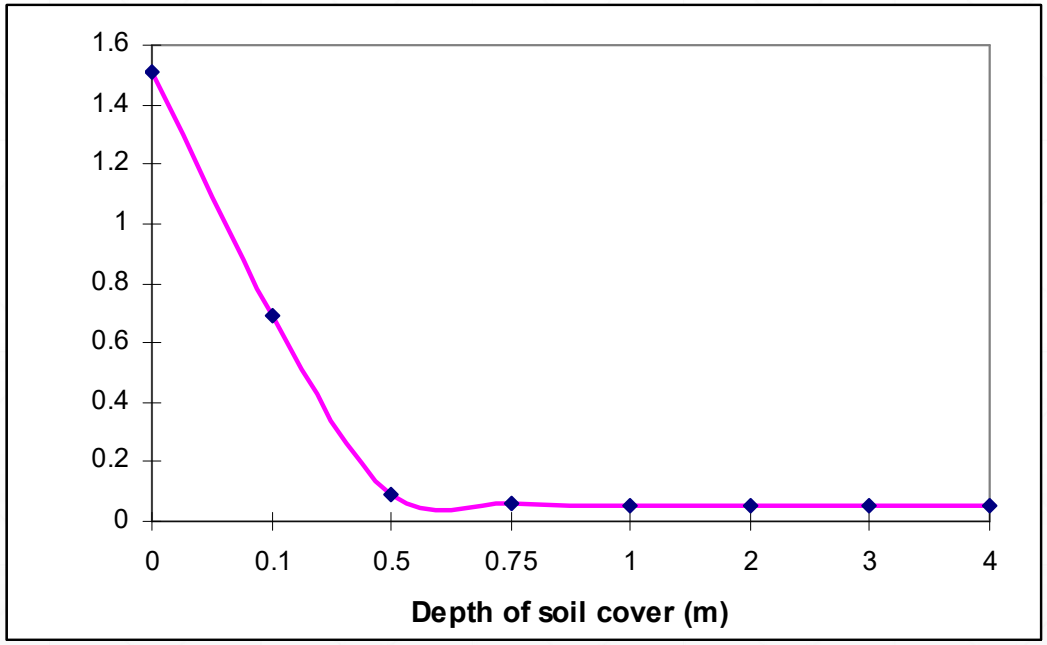
Exposure pathway	Annual Dose Adult male Year 20 (µSv)
Airborne dust inhalation, 60 ug/m^3, ore material, 1 µm AMAD, occupancy at residence 8760 hours, 100% outdoors, breathing rate 0.93 m^3/h	29
Radon and thoron inhalation dose as a result of Project	negligible
Consumption of leafy vegetables grown solely in 'Margin to Flats'. Ore deposition at 0.2 g/m^2/month, distributed evenly through top 2 cm of soil and displaced to root depth.	5.8
Ingestion of ore as a result of dust deposition, 50 mg/day, 10% ore fraction.	1.2
Drinking water originating from Waterglen WTP which sources water from the Mitchell River.	negligible
Following a truck loaded with HMC, 5 metre separation distance, 1 hr/year	negligible
Waiting at rail crossing when HMC shipment passing, 2-metre separation, 1 hr/year	1.2
Consumption of beef, solely from livestock grazing in the mining area	0.4
Consumption of milk, solely from dairy cows grazing in mining area	0.3
Total:	**38 µSv**

So what does ‘38 µSv’ mean?



- Everyone receives ~**2300 µSv** <u>on average</u> per year from background radiation.
- The risk of an effect from ‘38 µSv’ is equal to the risk from:
  - A return plane flight from Melbourne to Darwin from cosmic radiation, or
  - Receiving a chest X-ray.
- The annual dose limit for a member of the public is **1000 µSv** (excluding background)

Attenuation of gamma radiation dose rate with soil cover thickness



Radiation Conclave – Key issues discussed

- Extent of additional baseline data to be collected.
- Consideration of lower dose limits for the project than currently apply from a regulatory perspective.
- Assessment of radiological impact on children in addition to adults
- Applicability of nuclear non-proliferation and suitability for export based on uranium content

Submissions – Key concerns

- General concern on radioactivity and radiation.
- Baseline measurements and their purpose.
- Occupational radiation protection
- Transport of the HMC product
- Airborne radioactive dust and its impact on surface waters and locally grown vegetables

What is still required

- Finer grid gamma radiation survey of mining areas, and areas of exposed ore at the surface.
- Additional groundwater and surface water samples to identify Ra-226/228 concentrations.
- Air sampling for Total Suspended Particulates (TSP)
- Radionuclide content in local crops.
- Commitment to assess impact on livestock for human consumption.
- Preparation of all necessary Management Licence documents including RMP, RWMP and the REP.

In summary…

- Substantial baseline data has been collected to date.
- The Fingerboards Project/Kalbar will need to comply with the requirements of the Victorian Radiation Act 2005.
- Estimated doses to workers and members of the public are well below regulatory dose limits, even with conservative assumptions applied.
- Impact on non-human species living in natural habitats concluded the radiological impact is insignificant.
- Whilst additional baseline data is warranted to supplement existing data, any results will not modify the outcomes of the impact assessment conducted.

Thank you