



MINEX CRC 2022 YEAR IN REVIEW

CHEAPER, FASTER, SAFER, CLEANER MINING TECHNOLOGY

KEY NUMBERS:

ZERO

Reportable WHSE incidents

29

peer-reviewed scientific publications

35

Postgraduate students enrolled

57-43%

pro-female gender split on MinEx CRC Board of Directors (excluding CEO)

318/318 ONE

Phase 1 quarterly milestones met

14/14

Commonwealth Milestones met

TWO

Postgraduate completions

5211M

drilled by the CT drilling platform in total

ONE

National Drilling Initiative (NDI) Campaign completed in the Delamerian region of South Australia

4652M

drilled by the CT drilling platform during the Delamerian NDI Campaign

1976M

of rotary/mud/diamond meters drilled during Delamerian NDI Campaign

24

Participants Sponsors.

25

Affiliate Sponsors.

RESEARCH FOCUS:

MinEx CRC remains focused on delivering 1) cheaper, faster, safer, cleaner drilling technologies, 2) in-field sensing and data science to enable informed decisions while drilling, and 3) pre-competitive geoscience data to de-risk exploration in frontier mineral provinces, delivered by the National Drilling Initiative.

ADVANCING TECHNOLOGY:

Program 1: Drilling

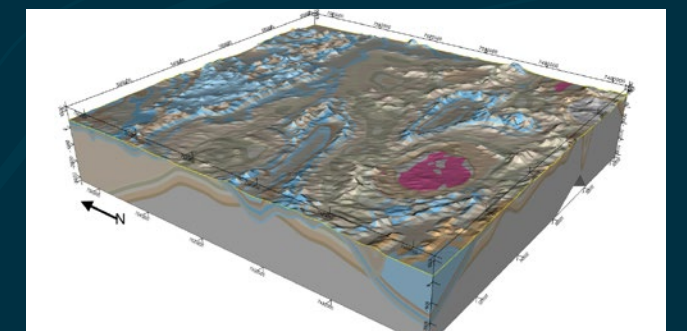
- The first-of-a-kind discreet impact experimental setup for percussion drilling (“Woody”) is commissioned and producing experimental data which will provide insights into the physical mechanisms controlling the anecdotal “sweet spot” of percussion drilling.
- MinEx CRC-designed measurement, monitoring and control systems (“DTrol”) have been installed on two drill rigs, a Reverse Circulation percussion drill rig and a Diamond drill rig and will be tested in a real-world drilling environment during the second half of 2022.
- The prototype fluid management system for Coiled Tubing drilling, CTiFluid, has been incorporated into the Hydraulic Processing System for Coiled Tubing drilling and deployed in drilling trials at Mawson Lakes and Kapunda and the Delamerian National Drilling Initiative (NDI) campaign.
- The MinEx CRC Coiled Tubing drilling platform completed 19 drill holes for a total of 5211m during the reporting period – almost tripling the total number of meters drilled on the CT platform.



MinEx CRC CT drill rig on site during the Delamerian NDI Campaign.

Program 2: Data From Drilling

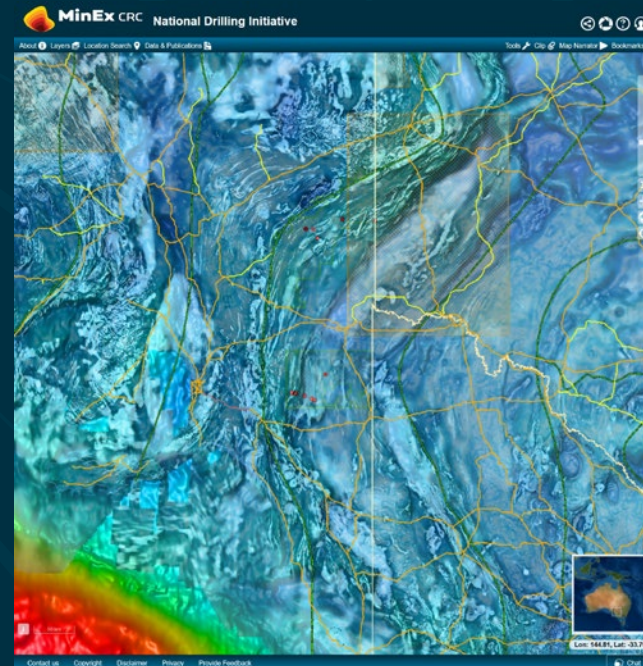
- The MinEx CRC prototype LIBS downhole assay tool, including a new design of front-end optics and two independent spectrometers, has been built and deployed in laboratory experiments. Experiments to assess the performance of LIBS on water-saturated samples and samples with centimetre-scale surface roughness are underway.
- The MinEx CRC borehole total counts gamma tool (Gamma GeoSub) was deployed in a CT drill hole. Multiple data streams (gamma, three component accelerations, gyro hole orientation and temperature) were successfully transmitted to the surface from the bottom of the hole.
- Preliminary laboratory tests indicate that the laboratory prototype of the MinEx CRC swept EM tool is highly sensitive and suitable for downhole geophysical logging applications.
- An optic fibre distributed acoustic sensor (DAS) was fitted inside the Coiled Tubing for the CT drilling rig and tested using a surface source and the drill bit (and hammer) as a source. The data show great promise for identifying geological features and delivering a seismic velocity profile from the drilled formations.
- Conducted 3D seismic surveys using optic fibre distributed acoustic sensors (DAS) as ‘land-streamers’ at the BHP Bonobo prospect in the Pilbara. The data were quick and cheap to acquire and provide valuable constraints on rock properties and depth to basement.
- Researchers are implementing an online self-service platform to access and run the 3D geological modelling and inversion software tools developed by MinEx CRC.



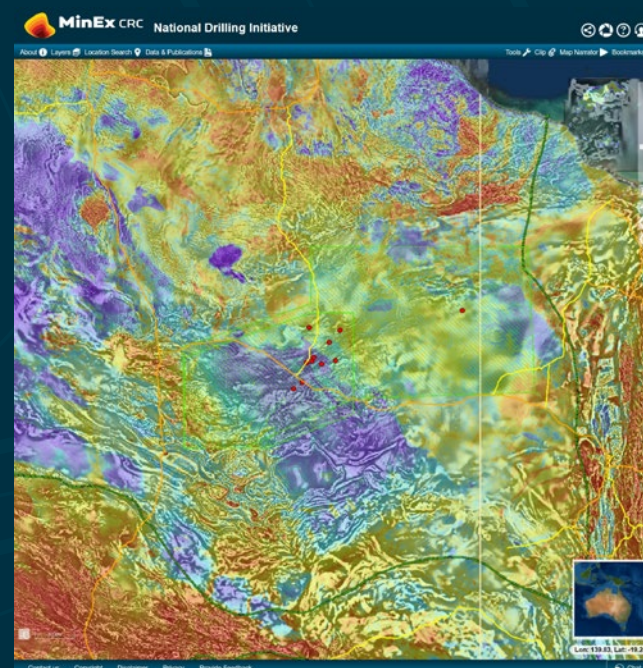
3D model of the Hamersley region, Western Australia, showing the Mt Brockman and Mt Turner synclines with Rocklea Dome. Adapted from Lindsay et al 2022 Geosci. Frontiers.

Program 3: National Drilling Initiative

- Post-drilling analyses of drill cuttings and drill core from the East Tennant NDI campaign have confirmed that the basement rocks in the East Tennant NDI campaign area are of comparable age and characteristics to the rocks which host the well-known copper-gold Tennant Creek mineral deposits.
- Six rotary mud/diamond drill holes (1976m) and 17 Coiled Tubing drill holes (4652m) were completed between October 2021 and April 2022 as part of the Delamerian National Drilling Initiative (NDI) campaign in eastern South Australia.
- Researchers have developed a machine learning workflow for the objective classification of drill hole portable XRF geochemical data into geological units.
- Researchers have implemented “Occam” techniques to improve airborne electromagnetic (EM) inversions so that the output is more likely to honour stratigraphic layering and the location of paleochannels.
- The continent-scale set of argon-argon thermochronological data (collaborating with the National Argon Map initiative) continues to grow with over 90 analyses contributed by MinEx CRC, including samples from the East Tennant NDI campaign.
- Supported development of in-situ Re-Os and Lu-Hf geochronological techniques suited to dating minerals formed during mineralisation (e.g. sulphides, carbonates, phosphates and garnet).
- Progressed our understanding of Cu-isotope fractionation in mineral systems with parallel studies of modern-day sites (volcanos and seafloor hydrothermal vents) and ancient volcanic sequences (e.g. the 1590Ma Gawler Range Volcanics) and mineralising systems, including the Cambro-Ordovician Kanmantoo Cu deposit in the Adelaide Hills and the Tennant Creek Cu-Au mineral system.



Delamerian margin area showing completed drilling in South Australia (red dots), while in early 2023 MinEx CRC will be conducting drilling on the NSW side. Image shows magnetics coloured by gravity (Geoscience Australia national coverages).



East Tennant and Carrera sub-basin drilling (red dots) shown in regional context with magnetics background coloured by radiometrics (Geoscience Australia national coverages).

132

press articles generated

27K

website visitors

3.1K+

YouTube views

RESEARCH ENGAGEMENT:

- Field trials of the MinEx CRC CT drilling platform (including the drill rig and hydraulic processing system) were conducted at the Kapunda field site of Affiliate EnviroCopper.
- MinEx CRC-designed measurement, monitoring and control systems (“DTrol”) have been installed on two drill rigs, a Reverse Circulation percussion drill rig and a Diamond drill rig, operated by MinEx CRC Participant McKay Drilling.
- MinEx CRC maintained its relationship with OMNI GeoX to coordinate and manage aspects of the Delamerian South NDI campaign.
- Participant Imdex Limited provided significant in-kind contributions of people and equipment to research projects and logging equipment for the NDI drilling program. The equipment was a valuable aid to the project and provided Imdex with important feedback on the use and development of recently released products.
- MinEx CRC’s seismic research project conducted field trials at Anglo American and BHP field sites.
- Cooperation is ongoing with European-based METS companies Sandvik, Epiroc, LKAB Wassara and Sercel. Staff from the Anglo American London office have become involved with the pull-through of MinEx CRC CT drilling technology, which has prompted discussions with international companies interested in the commercial manufacture of the CT platform. Chilean-based drilling company Geotec Boyles remains an active participant in Project 1, with field trials in South America being planned for the calendar year 2023.

COMMUNICATIONS:

- Three quarterly episodes of the MinEx CRC vNews were published on MinEx CRC TV (the MinEx CRC Annual Conference serves as the Q4 update for researchers and sponsors).
- Eight videos were published on MinEx CRC TV, with over 3.1K views in total.
- One promotional video was released on the CT Kapunda Field Trials featuring key researchers and community leaders.
- 132 press articles generated.
- 27K visitors to the MinEx CRC website, with 62K page views in total.

EQUITY, DIVERSITY, AND INCLUSION (EDI):

MinEx CRC is committed to growing and supporting an equitable, diverse, and inclusive environment where everyone feels safe, valued, supported, and treated fairly, with dignity and respect. MinEx CRC undertook the following EDI actions during the reporting period:

- The MinEx CRC ‘Code of Conduct’ was established to ensure a collegiate, inclusive and encouraging atmosphere is maintained when undertaking the work of the CRC.
- The MinEx CRC EDI Committee and Chairperson appointed.
- The MinEx CRC EDI Action Plan and Policy were both finalised and endorsed by management. These documents are publicly available on the MinEx CRC EDI webpage.
- The MinEx CRC Board (excluding the CEO) comprises seven members, 57% female and 43% male.
- Research leads for the nine primary programs are 78% male and 22% female.

SPONSORS

Majors, METs & Survey Participants



Research Participants & Affiliates



REVENUE & EXPENDITURE

Revenue (\$'000)	FY22	FY21	FY20	FY19	Total
Commonwealth Funding	5,500.0	5,798.5	6,597.0	2,729.5	20,625.0
Participant Contributions	5,600.0	7,023.0	4,811.8	12,067.5	29,502.3
Affiliates Contributions	210.0	185.1	285.0	150.0	830.1
DET CRC Unspent Participant Contributions	-	-	-	113.6	113.6
Non-financial asset acquired for Nil Consideration	-	-	850.0	-	850.0
Interest Income	70.1	112.9	300.5	124.0	607.5
Royalty Income	52.1	34.1	-	-	86.2
Other Income	79.8	9.6	122.2	30.8	242.4
Total Revenue	11,512.0	13,163.2	12,966.5	15,215.4	52,857.1

Expenditure (\$'000)

Research Program Expenditure

- Program 1	1,905.5	2,576.7	2,121.4	486.1	7,089.7
- Program 2	1,292.8	1,610.1	1,524.6	544.8	4,972.3
- Program 3	5,686.0	10,405.2	1,859.8	653.5	18,604.5
- Opportunity Fund & Other Projects	580.2	204.8	-	-	785.0
Total Research Program Expenditure	9,464.5	14,796.8	5,505.8	1,684.4	31,451.5

Education & Training	432.3	504.4	384.5	200.0	1,521.2
Management Expenses	745.9	440.2	492.3	503.8	2,182.2
Salaries & Wages - Drill Crew	987.8	97.2	-	-	1,085.0
Salaries & Wages - Head Office (incl Directors Fees)	1,049.8	1,046.7	996.9	1,005.3	4,098.7
	3,215.8	2,088.5	1,873.7	1,709.1	8,887.1
Total Expenditure	12,680.3	16,885.3	7,379.5	3,393.5	40,338.6

Restricted (Deficit)/ Surplus	(1,168.3)	(3,722.1)	5,587.0	11,821.9	12,518.5
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