The Carpentaria Basin of the NT – more sand than the Sahara

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In January 2020, Territory Sands Pty Ltd was granted four Extractive Mineral Exploration Tenements (EMEL) south of Larrimah township to explore for Frac sand. First pass drilling in October 2020 indicated potential for high-quality quartz sand deposits over multiple kilometres in strike length and of sufficient quality to pass API spec for Frac sand with minimal processing. Further geological investigation 30 km west of Larrimah indicated the potential for deposits of construction sand/concrete sand suitable for export to Singapore via the port of Darwin. Successful first-pass drilling took place in September 2021. Elsewhere, further research led to the application of 23 EMELs in the Newcastle Waters region where exploration indicated the potential to uncover large deposits of silica sand in proximity to the Adelaide–Darwin railway line.

Projects

Territory Sands Pty Ltd are exploring three sand projects in the Carpentaria Basin 470–700 km south of Darwin between Larrimah and Newcastle Waters (**Figure 1**): the Larrimah Frac Sand Project, the Middle Creek Construction Sand Project,

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Figure 1. Location map of Carpentaria Basin sand projects.

and the Newcastle Waters/Murranji Silica Sand Project.

The Larrimah Frac Sand Project contains three Frac sand deposits, 5–40 km south of Larrimah, over which the company has nine Extractive Mineral Lease (EML) applications. Permitting is expected to take at least 12 months. In October 2021, 152 air core holes were drilled for 3492 m to delineate three deposits totalling 108 Mt of sand (non-JORC).

The Middle Creek Construction Sand project contains four granted EMELs and two EML applications. The tenements are located 30–40 km west of Larrimah. In September 2021, 36 air core holes were drilled for 750 m delineating 130 Mt of construction sand (non-JORC).

The Newcastle Waters/Murranji Silica Sand Project is located northwest of Elliot, between the Stuart Highway and the Adelaide–Darwin railway line. Extensive fine- to medium-grained sand sheets exist in this area to depths exceeding 70 m. Twenty-three EMELs are pegged in this area. First-pass drilling will take place here in 2022.

Geology

The sand beds around Larrimah in the Carpentaria Basin are 5-30m thick and interbedded with siltstone. Limestone and sandstone underlie the sand deposits. The sand beds are generally flat lying (Figure 2 and 3), unconsolidated and dry. The silt and clay content averages 15-25%. Geological mapping of outcrop is poor according to the Larrimah First Edition Geological Map 1969 edition. The Carpentaria Basin sedimentary rocks above the limestone are Cretaceous in age and shallow marine in origin. The sand has weathered from poorly-sorted to well-sorted friable sandstone that outcrops in numerous places throughout the basin (Figure 4 and 5). The unconsolidated sands around Larrimah have some similarity to the Howard Sand Member of the Cretaceous Darwin Formation (Doyle 2001) in the vicinity of the Howard Springs area; however, around Larrimah the sand is dry, cleaner and contains much less sticky clay.

Initial geological investigations of the sand in the Newcastle Waters/Murranji area indicate thicker but finer grained sand deposits that may be suitable for high-purity silica sand.

Processing and test work

Frac sand from Larrimah can be processed by standard methods to produce a high-quality, clean quartz sand (**Figures 6 and 7**). The average of 20×5 kg composite samples, which were upgraded by washing, screening, and gravity and magnetic separation, yielded an average silica content of 99.45% SiO₂ and a highest value of 99.7% SiO₂. Frac sand testwork from an American laboratory produced crush test results of 9 K and 10 K psi for heavy 100 mesh sand with extremely low turbidity.

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Figure 2. Flat-lying sand bed over 2.4 km strike length underlying siltstone at the Vermelha deposit.



Figure 3. Shallow flat-lying sand over 3.2 km strike length at the Forest Hill South deposit.



Figure 4. Cretaceous sandstone outcrop 30 km south of Larrimah.

Figure 5. Friable sandstone from Larrimah.





Figure 6. Larrimah 20/40 mesh proppant quartz grains.

Reference

Doyle N, 2001. Extractive minerals within the outer Darwin area. Northern Territory Geological Survey, Special Publication Report 14.



Figure 7. Larrimah 40/70 mesh proppant quartz grains.