

To: Derek Loveday
Rick Reinke
Larry Henchel

From: Nick Miles
Agrimin Limited

Copy: Dr Dean Lanyon, Dr Fiona Taukulis

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File: 1-MM-HG-0073-Infill Drilling_July2019

Reference: Mackay Potash Project – Infill Drilling and brine sampling at T02a and T13.

1. Background:

Stantec (US) (*Ref: Lake Mackay Project – Brine Sampling SOP and Analyses for Feasibility Study. June 7, 2019*) highlighted the importance of installing shallow, closely spaced monitoring bores at T02a's and T13's test sites. These holes drilled to a target depth of 6mbgl were designed to provide a range of hydrogeological and geochemical information. This data is crucial for resource modelling of Lake Mackay and integral to the Definitive Feasibility Study. Drilling locations were determined by Stantec with the purpose of the brine sampling to bring the project from prefeasibility-level to feasibility-level by addressing the following:

“• To determine short spaced brine grade variability for the purposes of identifying measured and indicated resource limits through geostatistical analysis of the data.

• Compare brine grade analyses with NMR and core sample porosity and Sy results.

• To obtain viscosity sample test results for groundwater modeling.

• To obtain stable isotope ($\delta^2\text{H}+\delta^{18}\text{O}$) and radiocarbon $^{13}\text{C}/^{12}\text{C}$ ($\delta^{13}\text{C}$) plus ^{14}C age data from dissolved inorganic compounds from near surface to sand and gravel beds at depth.”

Agrimin's inhouse Hydrogeological team have long considered how to install piezometers to ~6mbgl into Mackay's lakebed sediments, in a way that is time and cost efficient. All previous shallow installation work has been achieved by hand augering, or by utilizing a mechanical auger attached to the 40T amphibious excavator during trench construction. Mechanical augering with the excavator is effective, taking around 2.5-5 minutes. It was later realized the hole ID was too wide to conduct accurate NMR profiling with Vista Clara's Dart tool. Additionally, the excavator was demobed from site at the end of 2018. Hand augering is slow and labour intensive and has a heightened associated risk of injury. In areas bearing large evaporite crystals, downhole pressure was not enough to auger to target depth.

Discussions with GeoSonic Drilling in Perth, Western Australia early 2019, resulted in the construction of a light weight, helicopter and quadbike portable shallow vibracore drilling rig. This rig was mobilized to site late June 2019 to begin operation. See figure 1.

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2. Completed Work:

During June and July 2019, 22 infill vibracore drill holes were completed at T02a's (11) and T13's (11) test sites. These holes were drilled to depths ranging between 5.5 and 12.7mbgl. Infill drilling locations are shown in Table 1. Locations are centered around the trench. T13H-010 was drilled deeper than 6m due to its position on the island 2000mW of the trench. Core samples were collected from almost all T02a holes, and all T13 holes during drilling. Brine samples were collected from each location subsequent to purging as per Stantec's instructions. Subsequent to all physical sample collection, down hole NMR depth profiling was conducted at all infill drilling locations. Further benchtop NMR testing was completed in early August 2019 on the recovered core samples. This data is now ready to be analysed and correlated with the down hole NMR.

3. Methodology:

All infill drill hole locations have identical bore completion specifications, except for total hole depth, as shown in Table 1. All holes were drilled using a vibrating coring method. The rig was either towed or lifted into position. The internal diameter of the cored hole is approximately 90mm. It is then cased using 50mm or 2" PVC. Slotted PVC was installed to depth, with a 1m long solid length breaching the surface (0.5m solid PVC stickup, 0.5m solid PVC below ground level, slotted PVC to EOH). Well sock was applied to the slotted PVC lengths. No gravel pack was used in construction of the bore*. All bores were capped with PVC to prevent any contamination. On average each hole took around 2.5 hours to complete from start to finish.

*The exception is T13H-010. Initial plans called for a nested piezometer set up to selectively screen the island and lakebed sediments. The diameter of the drilled hole wasn't wide enough to allow for a side by side 50mm and 25mm installation. The lakebed sediment interface was grouted from 12.7mbgl to ~6.5mbgl. 50mm slotted PVC was then gravel packed to approximately 1m below ground level.

Brine sampling was conducted in accordance with Stantec's instruction (*Ref: Lake Mackay Project – Brine Sampling SOP and Analyses for Feasibility Study. June 7, 2019*)

Sampling procedure is as follows:

1. Static brine level measured from ground surface. Date and time of measurement taken.
2. Hole is then purged of brine and left to recharge (See figure 3). Time and date when the hole is purged noted (See tables 2-3.) All holes were purged for a minimum of two full bore volumes using a 12v submersible (Figure 4).
3. Brine should be left in hole for a minimum of 48 hours to allow for complete recharge and settling out of mud in the hole.
4. Return to site 2 to 3 days later, record the static brine level from surface, date and time.
5. Collect samples in 500ml LDPE bottles. 3x 500ml bottles for every site except T2AH-001, T13H-001 and T13H-010. At these sites 5 bottles were collected.
6. Record sample number, date, time, depth, and requested analyses on laboratory supplied sample instruction sheet that also serves as the chain of custody form.
7. Samples were placed in portable cooler and transported to Perth for testing together with a copy of the chain of custody and instructions form.

Figure 1. GeoSonic's VibraCore Rig in position at T13H-005.



Figure 2. Core recovery in progress at T13H-010.



4. Bore Purging Process.

Figure 3. Measure SWL using an electronic dip meter.



Figure 4. Insert 12v submersible pump until it reaches the bottom of the bore.



Figure 5. Pump out >2 bore volumes into a bucket until the turbidity is low.



5. Data Collection:

Table 1. Infill drill hole construction details.

Site	Hole ID	Location			Drilled Depth (mbgl)	Screen Interval (mbgl)	Blank Casing Interval (magl to mbgl)
		Description	X -UTMmE	Y - UTMmN			
Trench 2A	T2AH-001	At trench	463865	7499406	6.6	0.5 to 6.6	0.5 to 0.5
	T2AH-003	500m E	464365	7499406	6.5	0.5 to 6.5	0.5 to 0.5
	T2AH-004	2000m E	465865	7499406	6.5	0.5 to 6.5	0.5 to 0.5
	T2AH-005	1000m SE	464572	7498699	6.4	0.5 to 6.4	0.5 to 0.5
	T2AH-006	2000m S	463865	7497406	6.5	0.5 to 6.5	0.5 to 0.5
	T2AH-007	1000m SW	463158	7498699	6	0.5 to 6	0.5 to 0.5
	T2AH-009	500m W	463365	7499406	6.5	0.5 to 6.5	0.5 to 0.5
	T2AH-010	2000m W	461865	7499406	6	0.5 to 6	0.5 to 0.5
	T2AH-011	1000m NW	463158	7500113	5.5	0.5 to 5.5	0.5 to 0.5
	T2AH-012	2000m N	463865	7501406	6	0.5 to 6	0.5 to 0.5
	T2AH-013	1000m NE	464572	7500113	6.5	0.5 to 6.5	0.5 to 0.5
Trench 13	T13H-001	At trench	496002	7530043	6.2	0.5 to 6.2	0.5 to 0.5
	T13H-003	500m E	496502	7530043	6.5	0.5 to 6.5	0.5 to 0.5
	T13H-004	2000m E	498002	7530043	6.3	0.5 to 6.3	0.5 to 0.5
	T13H-005	1000m SE	496709	7529336	6.5	0.5 to 6.5	0.5 to 0.5
	T13H-006	2000m S	496002	7528043	5.5	0.5 to 5.5	0.5 to 0.5
	T13H-007	1000m SW	495295	7529336	5.5	0.5 to 5.5	0.5 to 0.5
	T13H-009	500m W	495502	7530043	6.5	0.5 to 6.6	0.5 to 0.5
	T13H-010	2000m W	494002	7530043	12.7	0.5 to 6.6	0.5 to 0.5
	T13H-011	1000m NW	495295	7530750	6.5	0.5 to 6.6	0.5 to 0.5
	T13H-012	2000m N	496002	7532043	6.5	0.5 to 6.6	0.5 to 0.5
	T13H-013	1000m NE	496709	7530750	6.5	0.5 to 6.6	0.5 to 0.5

Table 2. Infill Drill Hole sampling details.

Site	Hole ID	Location			Prior to Purging		Purged after measuring SWL (Y/N)	Subsequent to Purging		Sample ID
		Description	X - UTMm	Y - UTMm	Date & Time	SWL (mbgl)		Date & Time	SWL (mbgl)	
Trench 2A	T2AH-001	At trench	463865	7499406	1350 26/7/2019	1.15	Y	1025 28/7/2019	1.15	T2AH-001 A, B, C, D, E
	T2AH-003	500m E	464365	7499406	1455 26/7/2019	0.67	Y	1012 28/7/2019	0.67	T2AH-003 A, B, C
	T2AH-004	2000m E	465865	7499406	0823 26/7/2019	0.58	Y	0940 28/7/2019	0.58	T2AH-004 A, B, C
	T2AH-005	1000m SE	464572	7498699	1518 26/7/2019	0.62	Y	0958 28/7/2019	0.62	T2AH-005 A, B, C
	T2AH-006	2000m S	463865	7497406	0700 26/7/2019	0.585	Y	0800 28/7/2019	0.585	T2AH-006 A, B, C
	T2AH-007	1000m SW	463158	7498699	1138 26/7/2019	0.87	Y	0840 28/7/2019	0.87	T2AH-007 A, B, C
	T2AH-009	500m W	463365	7499406	1056 26/7/2019	0.44	Y	1123 28/7/2019	0.44	T2AH-009 A, B, C
	T2AH-010	2000m W	461865	7499406	1025 26/7/2019	0.66	Y	0900 28/7/2019	0.66	T2AH-010 A, B, C
	T2AH-011	1000m NW	463158	7500113	1207 26/7/2019	0.45	Y	1106 28/7/2019	0.45	T2AH-011 A, B, C
	T2AH-012	2000m N	463865	7501406	0957 26/7/2019	0.56	Y	0917 28/7/2019	0.56	T2AH-012 A, B, C
	T2AH-013	1000m NE	464572	7500113	1229 26/7/2019	0.54	Y	1044 28/7/2019	0.54	T2AH-013 A, B, C

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Site	Hole ID	Location			Prior to Purging		Purged after measuring SWL (Y/N)	Subsequent to Purging		Sample ID
		Description	X -UTMm	Y - UTMm	Date & Time	Date & Time		Date & Time	SWL (mbgl)	
Trench 13	T13H-001	At trench	496002	7530043	1350 28/7/2019	1.145	Y	1600 31/7/2019	1.145	T13AH-001 A, B, C, D, E
	T13H-003	500m E	496502	7530043	1438 28/7/2019	0.725	Y	1609 31/7/2019	0.725	T13AH-003 A, B, C
	T13H-004	2000m E	498002	7530043	0845 29/7/2019	0.655	Y	1620 31/7/2019	0.655	T13AH-004 A, B, C
	T13H-005	1000m SE	496709	7529336	1341 29/7/2019	0.77	Y	1631 31/7/2019	0.77	T13AH-005 A, B, C
	T13H-006	2000m S	496002	7528043	1400 29/7/2019	0.785	Y	1640 31/7/2019	0.785	T13AH-006 A, B, C
	T13H-007	1000m SW	495295	7529336	1418 29/7/2019	0.66	Y	1651 31/7/2019	0.66	T13AH-007 A, B, C
	T13H-009	500m W	495502	7530043	1430 29/7/2019	0.96	Y	1700 31/7/2019	0.96	T13AH-009 A, B, C
	T13H-010	2000m W	494002	7530043	1500 29/7/2019	3.715	Y	1709 31/7/2019	3.715	T13AH-010 A, B, C, D, E
	T13H-011	1000m NW	495295	7530750	1524 29/7/2019	1.62	Y	1722 31/7/2019	1.62	T13AH-011 A, B, C
	T13H-012	2000m N	496002	7532043	0900 29/7/2019	0.85	Y	1735 31/7/2019	0.85	T13AH-012 A, B, C
	T13H-013	1000m NE	496709	7530750	1500 28/7/2019	0.785	Y	1747 31/7/2019	0.785	T13AH-013 A, B, C