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## **LAKE TARGETS 2020 PRE-PRODUCTION AT KACHI WITH PILOT PLANT CONSTRUCTION**

- **Lake is targeting early 2020 pre-production of initial lithium products at Kachi Lithium Brine Project, Argentina.**
- **First pilot plant module completed, with delivery expected soon after year-end using Lilac Solutions' direct extraction ion exchange process.**
- **Plant designed to produce 50-60,000 mg/L lithium concentrate, more than 10 times the concentration of conventional processes, within a few hours, based on six months of successful lab processing of lithium brines from Kachi.**
- **Lake plans to produce a high quality, low impurity product capable of attracting premium pricing in current market for lithium.**
- **Sample product to be available from pilot plant production process in first quarter 2020 for customer qualification purposes for off-takers and potential project partners.**

Lithium explorer and developer **Lake Resources NL (ASX: LKE)** announced today plans for pre-production in early 2020 of initial lithium products from its flagship Kachi Lithium Brine Project in Argentina, using a pilot plant under construction with delivery to site expected soon after calendar year-end.

The pilot plant, which has been designed by Silicon Valley-backed Lilac Solutions and international engineering company Hatch, will demonstrate Lilac Solutions' groundbreaking direct extraction ion exchange process on brines produced at Kachi.

The first module of the plant has already been completed. Results from lab testing have been incorporated into the pre-feasibility study (PFS) at Kachi, which is currently 75% complete, on time and on budget, and scheduled for release by year-end.

Lake expects to produce a high quality, low impurity product that is likely to attract premium pricing in the current market for lithium, amid rising demand for electric vehicles (EVs) and increasing interest in the project from potential off-takers and project partners. Intermediate products will also be prepared.

Lab testing has shown that lithium concentrations of 30-60,000 mg/L lithium can be produced from brines of ~300 mg/L lithium in a few hours after dewatering, more than 10 times the concentration of conventional processes, together with lower impurities.

This direct extraction process will be a major advance for the lithium brine industry, producing high quality low impurity lithium products, flexible and scalable to suit end user needs.

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**AT THE HEART OF THE  
LITHIUM TRIANGLE**

The pilot plant has been designed in modules to produce concentrate for either lithium hydroxide or lithium carbonate, or intermediate products of lithium sulphate and/or lithium chloride, at approximately 10 tonnes per year, sufficient to supply samples to selected downstream battery plants and cathode plants.

The design is based on more than 6 months (1,000 cycles) of successful lab processing of brines from Kachi which have shown excellent performance over an extended period, with high selectivity and durability.

Significantly, the Lilac technology is environmentally friendly, as the salty water (brine) is reinjected into the aquifer once the lithium has been removed. Traditional evaporation ponds are not required. This offers a potential ethical, sustainable solution for an industry at the forefront of the global clean energy revolution.

The Kachi project ranks amongst the top 10 global lithium brine resources, with a maiden resource estimate of 4.4 million tonnes lithium carbonate equivalent (LCE) (Indicated 1.0 Mt and Inferred 3.4 Mt) within a much larger exploration target (refer ASX announcement 27 November 2018).

A Phase 1 Engineering Study completed in December 2018 showed its potential to cut production costs to the lowest cost quartile globally, with high recoveries (80 to 90%) compared to conventional brine operations in South America with typical lithium recoveries below 50%. The Lilac technology could also potentially slash production times compared to the lengthy nine to 24-month waiting period for standard evaporation processes to produce a suitable concentrate for processing.

Lake's Managing Director Steve Promnitz said: *"We are pleased to see the excellent results at lab scale will be demonstrated with the pilot plant and look forward to seeing it on site as part of our PFS for Kachi."*

*"The production of samples from the plant will give potential partners, including battery makers and cathode makers, increased confidence in the technology to produce consistent high quality, low impurity products that suit the downstream market amid an increased focus on the cost-competitiveness of lithium brines."*

*"This will be potentially a disruptive force for the lithium supply chain by delivering a quick, efficient, flexible, scalable and sustainable extraction method compared to traditional evaporation methods that are coming under increased scrutiny due to their impact on local ecosystems."*

Lilac's CEO Dave Snyder commented: *"The performance of the Lilac method on the Kachi brines has been exceptional – a fast, low impurity product has been produced with the ion exchange beads performing even better than expected."*

*"We look forward to continuing to demonstrate the high potential for low cost premium lithium product in partnership with Lake Resources, which has shown its readiness to adopt industry-leading solutions for the benefit of all stakeholders."*

### Lilac Direct Extraction Process - Benefits

Lilac's unique direct extraction process offers a number of benefits for the Kachi project and the industry more broadly:

- Increases grade to 30-60,000 mg/L lithium from lithium brines of 200-600 mg/L lithium
- Increases recoveries to 80-90% (from 40-50%); doubles recoverable grade
- Reduces lead time to production by at least 12 months
- Produces a premium product for lithium hydroxide or lithium carbonate with low impurities
- Smaller environmental footprint without the need for large evaporation ponds
- Forecast operating cash costs in the lowest quartile, based on the Phase 1 Engineering Study.



Figure 1: Pilot Plant under construction at Lilac's facility in Oakland, California. Lilac materials engineer Garrett Lau (Ph.D. Northwestern University, B.S. Massachusetts Institute of Technology) and process engineer Amos Indranada (B.S. University of California Berkeley) showing the controls.

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## Direct extraction.

### Ion exchange

Lilac Solutions (Silicon Valley backed)

Much faster than current methods (3 hrs vs 1-2 years)

Saves time and money. Faster to production.

Produces much higher concentrate with lower impurities



**3 HOURS**  
To produce  
Concentrate

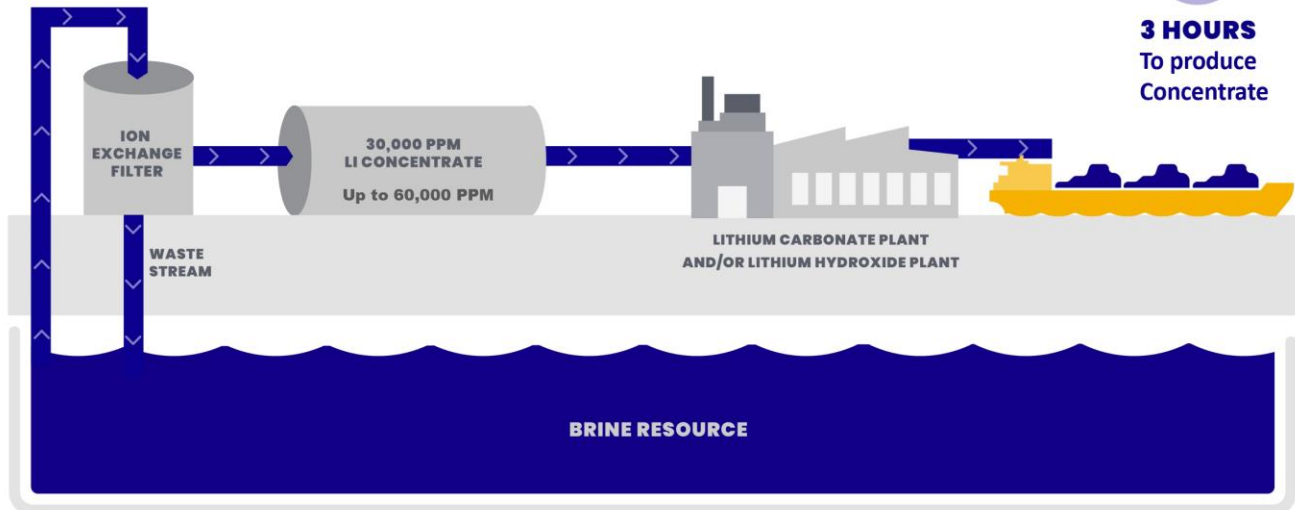


Figure 2: Diagram showing the Lilac direct extraction process using ion exchange over 2-3 hours to produce an improved lithium concentrate prior to conventional processing of lithium carbonate or lithium hydroxide.

## Conventional extraction.

### Evaporation ponds



**1-2 YEARS**  
To produce  
Concentrate

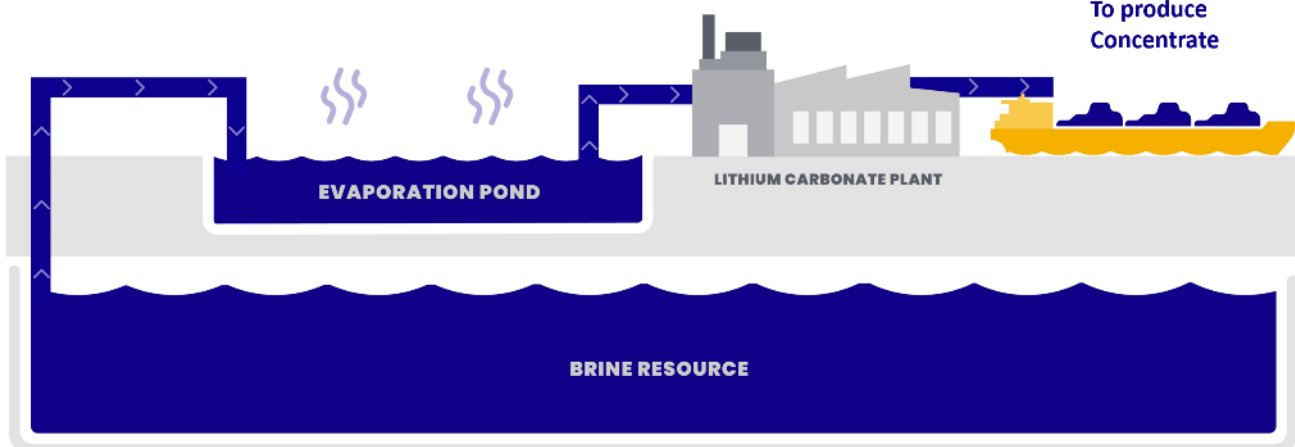


Figure 3: Diagram showing the conventional lithium extraction process using evaporation ponds taking 9 months to 2 years to produce a lithium concentrate prior to conventional processing of lithium carbonate or lithium hydroxide.

## **About Lake Resources NL (ASX:LKE)**

Lake Resources NL (ASX:LKE, Lake) is a lithium exploration and development company focused on developing its three lithium brine projects and hard rock project in Argentina, all owned 100%. The leases are in a prime location among the lithium sector's largest players within the Lithium Triangle, where half of the world's lithium is produced at the lowest cost. Lake holds one of the largest lithium tenement packages in Argentina (~200,000Ha) secured in 2016 prior to a significant 'rush' by major companies. The large holdings provide the potential to provide consistent security of supply, scalable as required, which is demanded by battery makers and electric vehicle manufacturers.

The Kachi project covers 70,000 ha over a salt lake south of FMC's lithium operation and near Albemarle's Antofalla project in Catamarca Province. Drilling at Kachi has confirmed a large lithium brine bearing basin over 20km long, 15km wide and 400m to 800m deep. Drilling over Kachi (currently 16 drill holes, 3100m) has produced a maiden indicated and inferred resource of 4.4 Mt LCE (Indicated 1.0Mt and Inferred 3.4Mt) (refer ASX announcement 27 November 2018).

A direct extraction technique is being tested in partnership with Lilac Solutions, which has shown 80-90% recoveries and lithium brine concentrations 30-60,000 mg/L lithium. Phase 1 Engineering Study results have shown operating costs forecast in the lowest cost quartile (refer ASX announcement 10 December 2018). This process is will be trialed on site with a pilot plant in tandem with conventional methods as part of the PFS underway, ready by year end. Discussions are advanced with downstream entities, mainly battery makers, to jointly develop the project.

The Olaroz-Cauchari and Paso brine projects are located adjacent to major world class brine projects either in production or being developed in the highly prospective Jujuy Province. The Olaroz-Cauchari project is located in the same basin as Orocobre's Olaroz lithium production and adjoins the Ganfeng Lithium/Lithium Americas Cauchari project, with high grade lithium (600 mg/L) with high flow rates drilled immediately across the lease boundary.

The Cauchari project has shown lithium brines over 506m interval with high grades averaging 493 mg/L lithium (117-460m) and high flow rates, with up to 540 mg/L lithium. These results are similar to lithium brines in adjoining pre-production areas under development and infer an extension and continuity of these brines into Lake's leases (refer ASX announcements 28 May, 12 June 2019).

Significant corporate transactions continue in adjacent leases with development of Ganfeng Lithium/Lithium Americas Cauchari project with Ganfeng announcing a US\$237 million for 37% of the Cauchari project previously held by SQM, followed by a further US\$160 million to increase Ganfeng's equity position to 50% on 1 April 2019, together with a resource that had doubled to be the largest on the planet. Ganfeng then announced a 10 year lithium supply agreement with Volkswagen on 5 April 2019. Nearby projects of Lithium X were acquired via a takeover offer of C\$265 million completed March 2018. The northern half of Galaxy's Sal de Vida resource was purchased for US\$280 million by POSCO in June-Dec 2018. LSC Lithium was acquired in Jan-Mar 2019 for C\$111 million by a mid-tier oil & gas company with a resource size half of Kachi. These transactions imply an acquisition cost of US\$55-110 million per 1 million tonnes of lithium carbonate equivalent (LCE) in resources.

For more information on Lake, please visit <http://www.lakeresources.com.au/home/>

## **About Lilac Solutions**

Lilac Solutions is a lithium extraction company based in Oakland, California. Lilac offers a full-service ion exchange technology for lithium extraction from brine resources that is cheap, fast, effective, and environmentally friendly, and that is adaptable to a wide variety of brine chemistries.

It has been working with Lake to transform lithium production with its innovative ion exchange technology for extraction of lithium from brine resources. Lilac deploys unique ion exchange media and related processes to extract lithium from a wide variety of brine resources with high recoveries, minimal costs, and rapid processing times. This approach eliminates the need for evaporation ponds, which are expensive to build, slow to ramp up, and vulnerable to weather fluctuations.

A significant environmental benefit comes from the removal of evaporation ponds, which significantly reduces the footprint of the operation. Further, the method allows for the remaining brine to be reinjected into the same aquifer from where it is sourced, without significantly adjusting the water quality, thereby preserving an aqueous resource in an arid environment.

Lilac's technology can economically access brines with low lithium concentrations and high concentrations of other salts, such as magnesium. Cost advantages come from reduced time, higher recoveries and a simplified extraction flowsheet with fewer reagents. The technology is modular to suit various project sizes and integrates with conventional plant designs for production of battery-grade lithium carbonate and lithium hydroxide. The technology has been successfully tested with real brine samples from across the Americas.

For more information on Lilac, please visit <http://www.lilacsolutions.com/>