# EXHIBIT / FOOT NOTE
# 12

LithiumNevada

Filterability of LNC Neutralized Clay Slurry

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*Abstract*

It is generally known that clay is a relatively difficult material to dewater. This is due to the inherent fine size of clay particles (< 75µm) and from rheological and physicochemical properties of the clay itself. Filtration of native clay slurry is notoriously slow and problematic, and Lithium Nevada Corporation (LNC) has even experienced this phenomenon at their local research facility.

In the LNC process flowsheet, there is a filtration step of clay slurry. However, it is of critical importance to highlight that this clay slurry is not native clay, but rather a slurry of clay that has been treated with concentrated sulfuric acid. When clay is exposed to acidic solution, the fundamental nature of the clay changes significantly as does the dewatering behavior.

Extensive filtration test work has been performed by LNC as well as by external vendors on acid treated clay slurry. All data shows the slurry exhibits good filterability while producing dry, competent filter cakes. LNC has extremely high confidence that there will be no challenges to create the same quality filter cake on production scale as observed at the bench and pilot scale.

*General Background on Acid Treated Clays*

Treating clay with acid causes many changes in the physical characteristics of the native clay structure. For example, acid $H^+$ can exchange with $Al^{3+}$, $Fe^{3+}$ and $Mg^{2+}$ located within smectite crystalline structure. This in turn greatly increases surface area and pore volume,[1] and similar behavior is observed for kaolinitic clay.[2]

The large surface area and large pore volume of acid-modified clays make them good adsorbents. In fact, acid modified clays are used as adsorbents in various industries to remove undesirable compounds. For example, removing undesirable colors and compounds from edible oils or contaminants in water. In many applications, the acid activated clay is contacted with the solution of interest and then filtered once the clay has adsorbed the contaminant. Thus, filtering of acid modified clays is an accepted process in common industries and practiced worldwide.

*Internal Filtration Tests: LNC Research Facility*

LNC has a research facility located in Reno, NV that has been working with clay samples from the Thacker Pass proposed pit for over two years. The research facility includes large leach/neutralization batch tanks along with a pilot scale size filter press (Figure 1).

**Figure 1:** Pilot scale plate and frame filter press

To date, >90 large leach/neutralization batches have been performed (~800 lbs/batch), with each being filtered on the filter press shown in Figure 1. This filter press is known as a "membrane" style press. In these presses, every other filter plate has a chamber that can be filled with pressurized fluid, causing the chambers to squeeze residual liquid out of the slurry to generate low-moisture content filter cakes.

An example of a filter cake directly out of the press is shown in Figure 2 below.

**Figure 2:** Photos of filter cakes directly out of filter press

As shown in the photo, the cakes are solid in nature, competent, friable, and can easily be broken by hand. Once filter cakes are collected from each batch, composite samples are taken and dried in an oven at 105°C to determine the moisture content. In Figure 3, the results of measured filter cake % solids of 93 samples are shown.

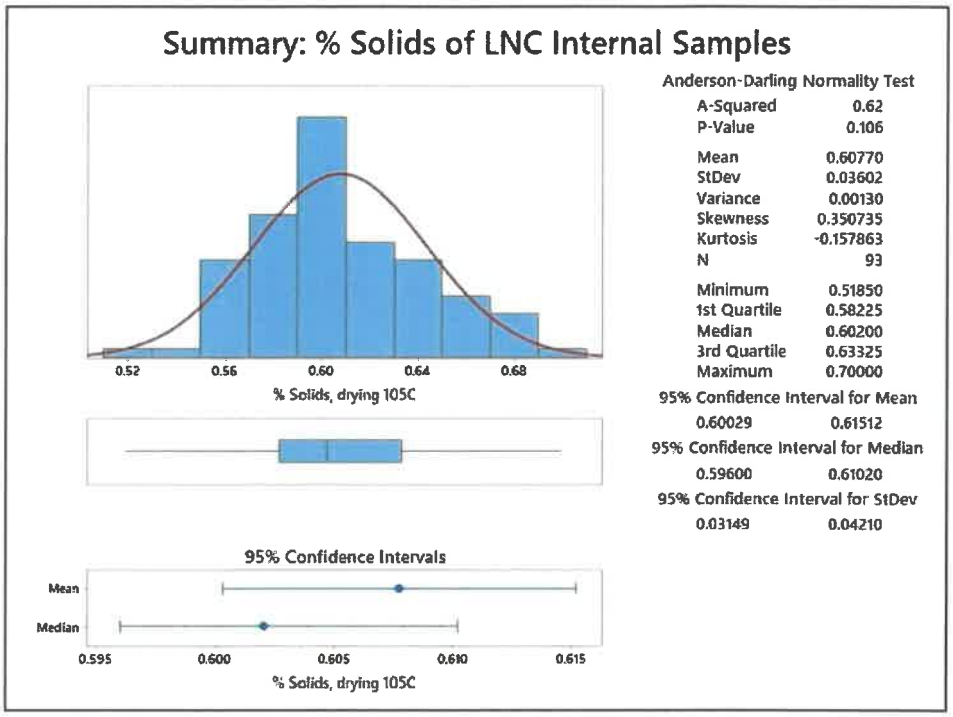



**Figure 3:** Descriptive statistics for filter cake moisture data, internal LNC data

On average, filter cakes are measured to contain 61% solids, with the 95% confidence interval ranging from 60% to 61.5% solids. Note that the pilot scale filter press operates at a squeeze pressure of 200 psig.

*External Filtration Tests: Outside Vendors*

LNC has also contracted multiple filtration studies by outside vendors to confirm results obtained internally.

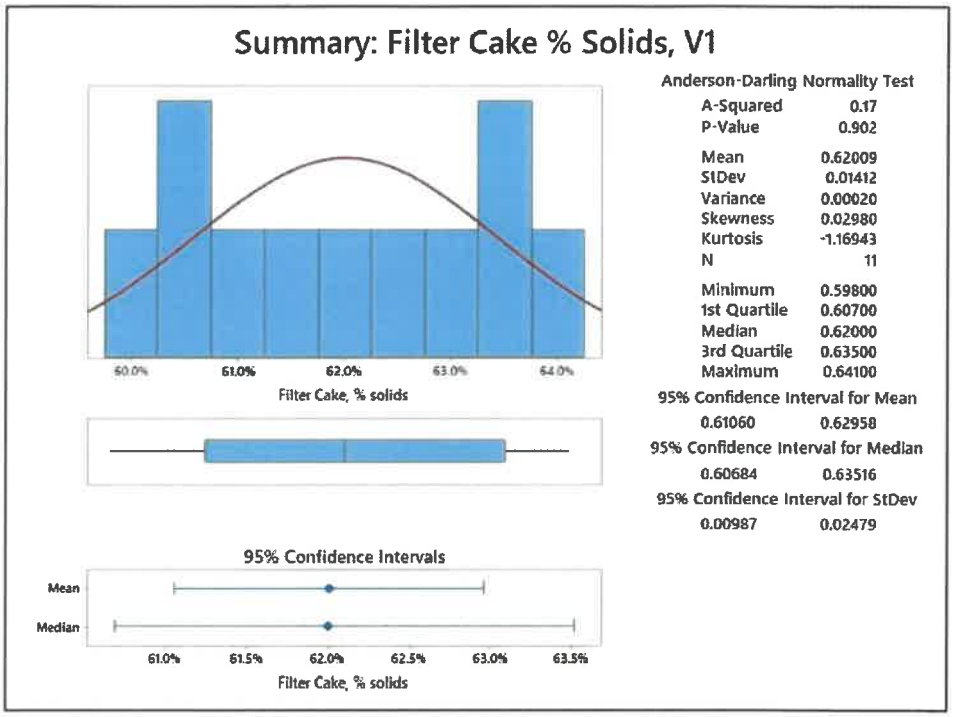
The photos in Figures 4 and 5 show filter cakes collected by two separate vendors on different acid treated process clay slurries. The vendors obtained filter cakes very similar in nature to the filter cakes collected at the LNC research facility.

Note that the vendor who has performed the most filtration tests on the slurry states in their final report that "...the samples demonstrate good filterability, in terms of filling and compaction time, obtaining a well-formed and compact filter cake after squeezing."[3]

**Figure 4:** Filter cake from Vendor 1 test

**Figure 5:** Filter cake from Vendor 2 test

A summary of the filter cake moisture content collected by the two vendors is provided in Figure 6. The average percent solids of the filter cakes determined by each vendor were 62% and 69% solids, respectively. The filter cake moisture was determined by drying at 60°C versus 105°C at the LNC facility. Additionally, vendors were able to achieve higher squeeze pressures in their testing, and both of those variables can result in a higher measured filter cake % solids. For more discussion on drying temperature, see the *External Filter Cake Drying Tests* section.



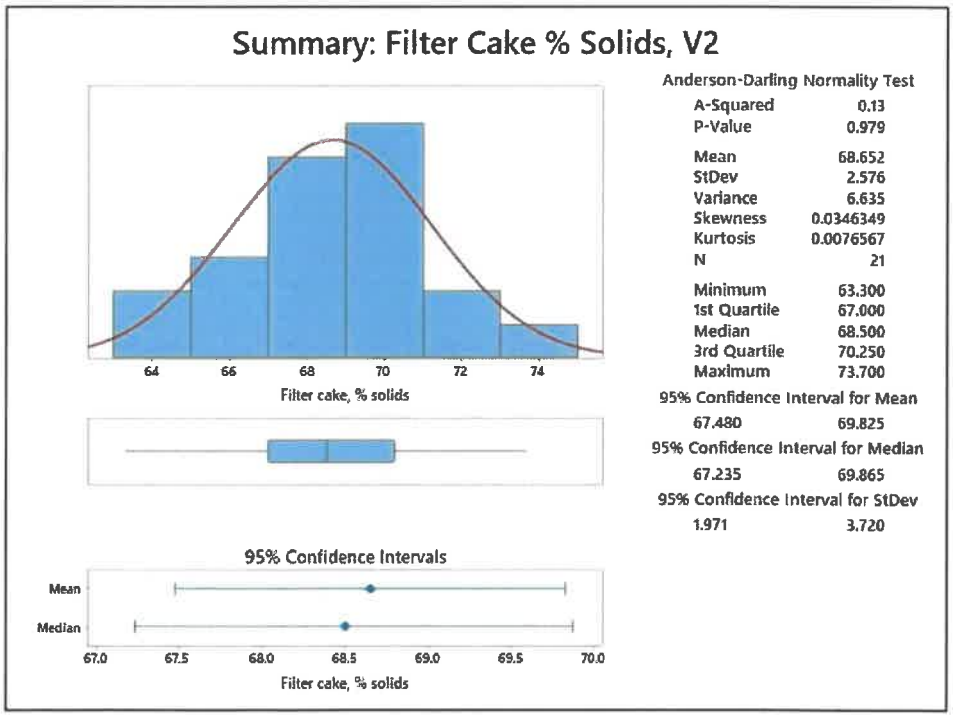




**Figure 6**: Descriptive statistics for filter cake moisture data, Vendors 1 and 2

*External Filter Cake Drying Tests*

At the end of 2020, LNC contracted an engineering services company to investigate the moisture content and other characteristics of the filter cake. They collected filter cake samples directly from the filter press in Reno, NV (Figure 7), bucketed the samples "as-is", and then performed drying tests at multiple temperatures.

**Figure 7:** Filtered clay tailings directly from press, used for drying tests

It was found that the drying temperature has a large effect on the measured % solids (Figure 8). The hypothesis is that two forms of water are in the clay: structural water which is bound in the crystal structure of the material, and free water which is representative of moisture on particle surfaces and in pores. As drying temperature increases, the structural water is removed, thus resulting in a lower measured % solids (i.e. higher moisture content). It was concluded that 45°C be used as the reference temperature, as it is thought to better represent free water rather than structural water.[4]

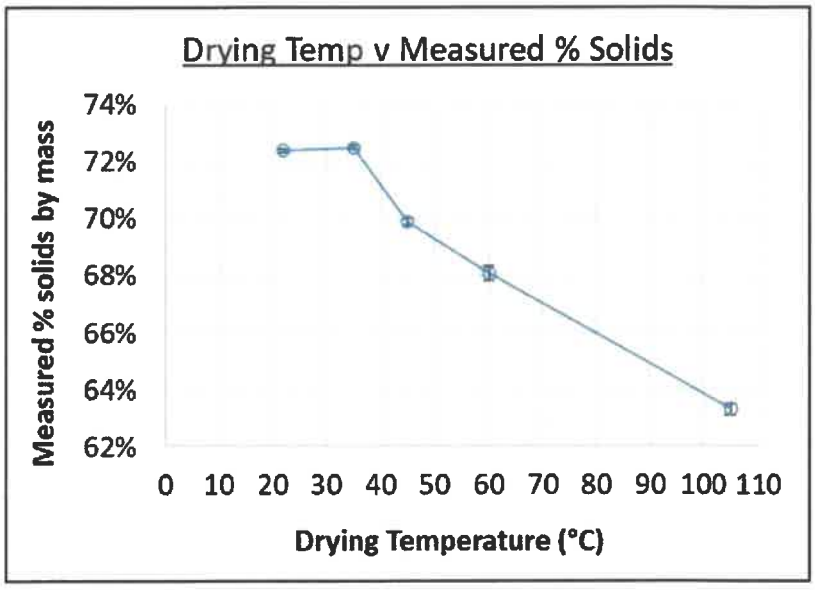



**Figure 8:** Effect of drying temperature on measured cake % solids

As shown in Figure 8, at 45°C, the measured % solids is ~70% by mass. The samples dried at 105°C were closer to 63% solids, comparable with the results measured at the LNC research facility (Figure 3).

The evaporation rate at 22°C (air-drying, room temperature) on three different samples was also examined (Figure 9).

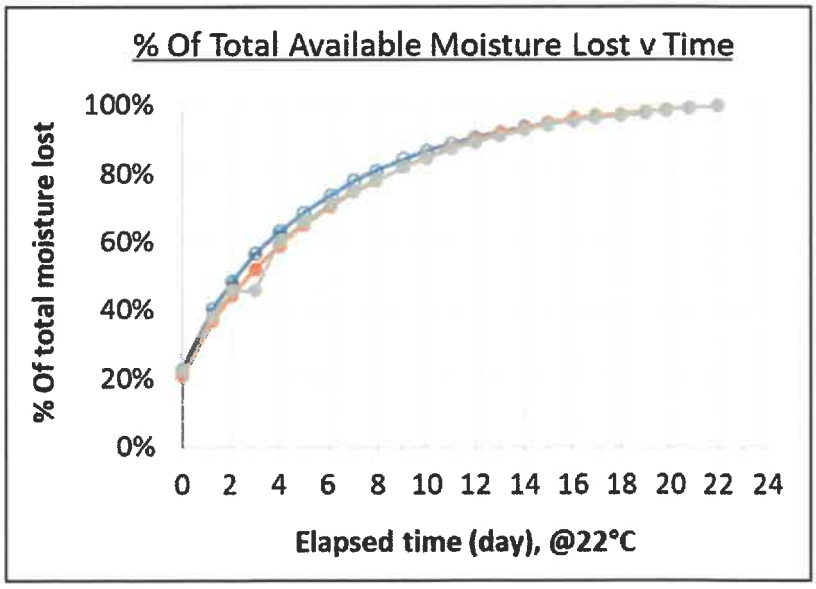



**Figure 9:** Moisture loss vs time, air drying at room temperature

From Figure 8, the filter cake is measured to contain ~72% solids at 22°C, thus every kilogram of cake contains about 0.28 kg moisture. According to Figure 9 then, after 4 days of air drying at room temperature, it is expected that 60% of that moisture would evaporate, or ~ 0.17 kg moisture. As temperature increases, the evaporation rate also increases as expected.

*Conclusions*

To date, LNC has been testing filtration of acid treated process clay slurry for about 2 years. Over the course of this time, more than 90 large batches (~800 lbs/each) have been run through a pilot scale filter press with consistently good filtration and final filter cakes at 61% solids on average (determined by drying at 105°C). Filter cakes are dry to touch, competent, friable, and easily broken by hand. Work done by external vendors has validated the data collected by LNC, with filter cakes having similar moisture contents and physical properties.

It is known that the drying temperature of the filter cake can have a large effect on the measured % solids, with higher temperatures resulting in artificially lower reported % solids due to structural water being liberated. Thus, it is likely that the "real" percent solids of filter cakes are closer to 70% solids. The filter cakes will dry when exposed to air at room temperature, with about 60% of the total free moisture evaporated over the course of 4 days.

Considering the results, LNC has very high confidence that filtering the process clay slurry will not be problematic. It has been demonstrated on multiple scales (bench to pilot) and by multiple parties. Throughout the testing campaigns performed by equipment providers, there has never been a concern with scale up of the process. LNC is also confident that cakes will dry even further when exposed to air, with the drying rate increasing as the ambient air temperature increases.

*References*

[1] Tomić, Z. et. al. Modification of Smectite Structure by Sulfuric Acid and Characteristics of the Modified Smectite. *J. Ag. Sc., 56, 1, 25-35*. 2011.

[2] Panda, A.K. et. al. Effect of Sulphuric Acid Treatment on the Physico-chemical Characteristics of Kaolin Clay. *Colloids and Surfaces A: Physicochem. Eng. Aspects 363(2010) 98-104*.

[3] Grosso-Kaswalder. Confidential Test Report Prepared for LNC, #LAB321011. 05/12/2021.

[4] Confidential Clay Tailings Filter Stack Design Review Summary Report Prepared for LNC. Project #2074210170, Dec. 2020.

Aqseptence Group

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To Whom It May Concern,

It has come to our attention that there are questions surrounding the scale up from a filter press test unit to a commercial-sized filter press. Namely, there is concern that the commercial unit will not achieve the same results as the lab unit.

Aqseptence Group Srl, also know as Diemme Filtration, has been manufacturing filter press technology since the 1950s. We offer the widest-range of filter press technologies from laboratory units to the largest unit in the World (currently being manufactured). We have experience dewatering a plethora of applications including some of the more difficult ones such as bauxite residue.

Our laboratory test unit, designed by us and pictured nearby, is our standard for emulating the process parameters of a commercial filter press. More often than not, the commercial unit will exceed the targeted values established on the test unit. It is with confidence that we can say that the parameters achieved with the laboratory test filter press will be repeated in our commercial filter presses provided the slurry characteristics and the filter parameters are the same.

In the case of Lithium Nevada and their Thacker Pass project, the "neutralization" slurry was tested extensively. In 20 separate tests, we achieved a minimum filter cake solids of 64.9% (wt basis, 60 deg C oven dry) to a maximum of 73.7% with an average of 69.4%. All the filter cakes, including the cake with 64.9% solids, was compact and stackable. Our conclusion is that the slurry filters well and achieves the targeted filter cake solids. Provided the slurry characteristics are the same, the commercial filter press will achieve the same results.

Respectfully,

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