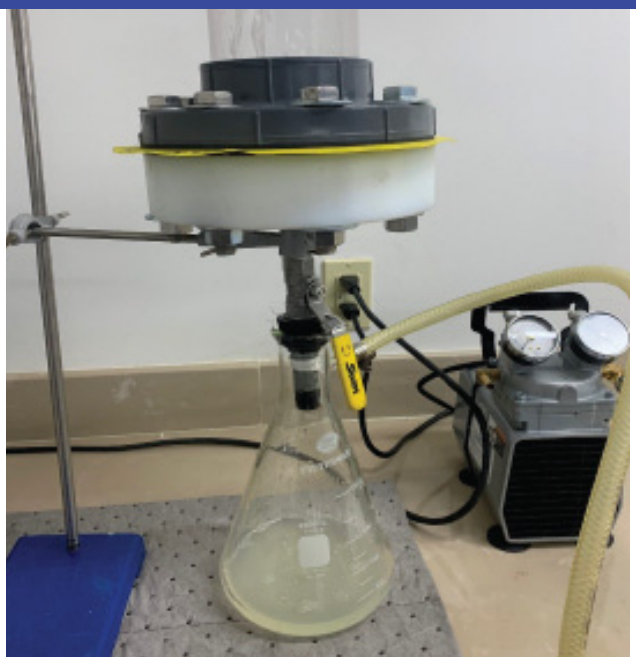
Solid/Liquid Separation Laboratory

FILTRATION OF ORGANIC AND INORGANIC PROCESSING SLURRIES INCLUDING TITANIUM DIOXIDE, ALUMINA, RARE EARTH, FLOTATION CONCENTRATE, CORN GLUTEN AND SYRUPS

NFM Separations Laboratory provides the service of performing vacuum and pressure solid-liquid separation studies, that then can support NFM Pilot Scale Equipment Test Work, and finally support the Customer's operating filters. Industry standard cake filtration procedures are followed, to simulate commercial conditions, for continuous and batch processes.

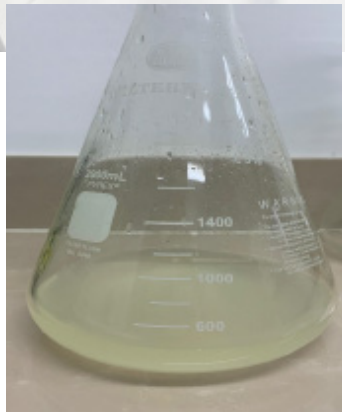
For vacuum, NFM utilizes the Industry Standard 0.1 ft² Filter Leaf. For pressure, NFM utilizes an Industry Standard 0.1 ft² with 0.028 ft³ Laboratory Filter Press.



Each Customer Test shall utilize a uniquely written lab procedure – to be approved by the Customer, to make sure the test objectives are met. The lab procedure shall be designed to develop a mass balance with specific operating setpoints, prioritizing process targets such as Cake Moisture, Cake Purity, Filtrate Turbidity, and Production Rate. In filtration, there are often trade-offs that must be understood. For example, the study of Cake Resistance Values at different Cake Thicknesses can yield data supporting a particular machine design and operating setpoints, for example, with a Rotary Drum Vacuum Filter, balancing Slurry Feed Rate, Vat Level, Drum Submergence Percentage, and Drum Speed.

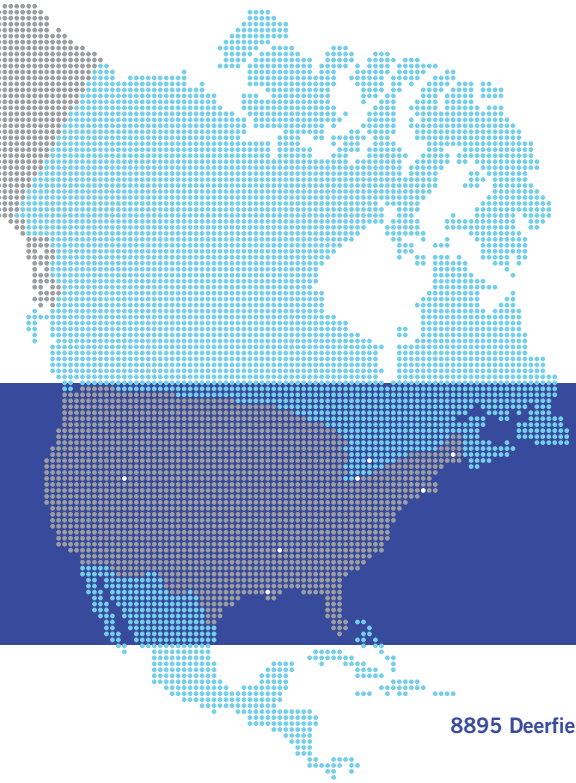
The NFM Technical Report, to be presented after the completion of the lab or pilot study, shall typically present the following information:

- Projected Mass Balance Model of a Commercial Filter, noting operating setpoints such as Drum or Belt Speed, Vacuum Air Flow at different Vacuum Levels, Cake Washing Co-current or Counter-Current Circuits.
- Filter Fabric Selection, maximizing particle retention, low pressure drop, good mechanical and dimensional stability, consistent cake release and cleanability properties, and low annual OPEX fabric cost/dry pound of product filtered
- Cake Formation Curve, based on target cake thickness at different feed rates, over time
- Cake Dewatering Curve, based on cake moisture, over time
- Cake Washing Curve, if required, based on cake purity over number of wash displacements, or wash:solids ratios, over time
- Final Filter Cake and Filtrate Analysis, i.e., final cake moisture, wet cake density, cumulative filtrate turbidity/suspended solids
- Projected Production Rate based on the optimized Cake Thickness with the Highest Cake Porosity for Washing and/or Dewatering, meeting target cake quality and target cake moisture. The filter sizing required for the production rate shall be presented in terms of dry solids per hour per square foot (or kg/hr/m²) of effective filtration area, and gallons per minute per square foot (or liters/hr/m²) of effective filtration area
- Formal Technical Report describing test methods, summaries, conclusions and recommendations shall be presented to the Customer, for review and further comment



Typical Mother Liquor Filtrate Quality

Typical Filter Cake Quality



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8895 Deerfield Dr, Olive Branch, MS 38654 Phone: 801.363.6736 Toll Free: 800.777.4248 Fax: 801.531.1293