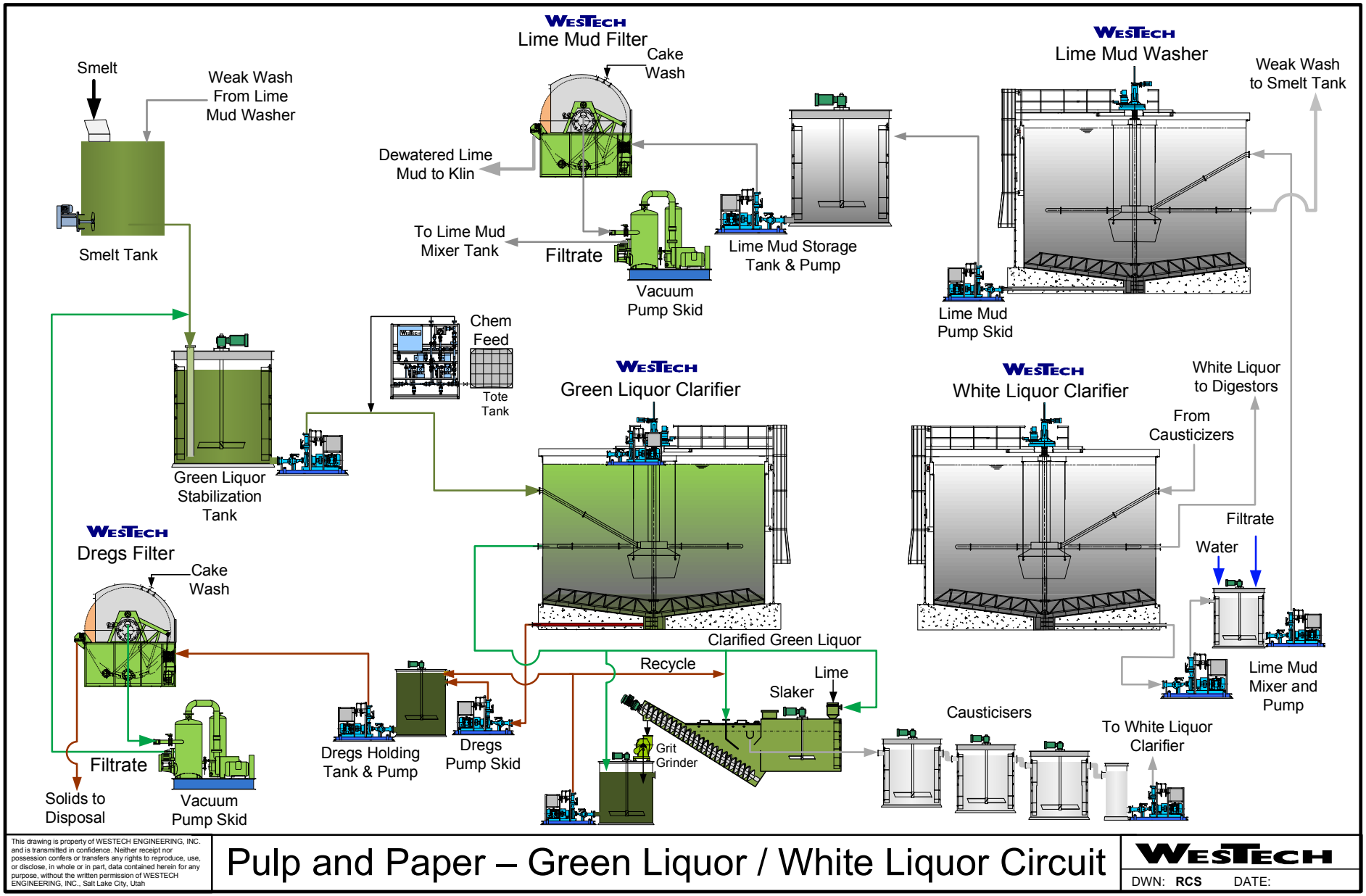

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Pulp and Paper – Green Liquor / White Liquor Circuit

WesTech

DWN: **RCS** DATE:

WesTech's ***Continuous Rotary Drum Filters*** provide a wide range of liquid-solids separation for many types of industrial processing flow sheets. They offer the operating flexibility to handle dewatering, washing, and filtration applications. Working with the customer, WesTech provides laboratory test data to assess process optimization, design, and sizing of the equipment supplied. WesTech Drum Filters are available up to 13.5 feet in diameter and 36 feet in length and are built for ease of operation as well as to meet demanding customer specifications.

Pulp and Paper

The most common process for making paper is called the Kraft or Kraft Mill process. In this process, wood chips are "cooked" at 150 - 165° C, under pressure in a liquid solution containing caustic (NaOH) and sodium sulphide (Na_2S) to pulp the wood.

White Liquor

The solution of caustic and sodium sulfide is referred to as "white liquor". These chemicals, along with heat and pressure, release the lignin from the fibers in the wood. The resulting "pulp" is washed, screened, and sent on to bleaching and becomes the feed stock for the paper-making process.

Black Liquor

The waste from the pulping washing step (residual chemicals, lignin, organics, etc.) are removed and become what is known as "black liquor." This black liquor is sent to multiple effect evaporators to be concentrated. From there it is burned in the recovery boiler.

The black liquor is burned in an oxygen-deficient atmosphere. This process forms a molten product consisting mostly of Na_2S and sodium carbonate (Na_2CO_3).

Green Liquor

This molten material is referred to as "smelt"It is sent to a tank where water is added. The resulting liquid is known as "green liquor." From the smelt tank the stream is sent to the green liquor stabilization tank.

The green liquor also contains small amounts of suspended solids, called "dregs." The dregs are hazardous and must be removed. This is typically done in the green liquor clarifier.

Dregs

The dregs from the green liquor clarifier are sent to a rotary vacuum filter called the "dregs filter." Here the dregs are washed to remove residual chemicals and are dewatered prior to disposal. The liquids are recycled to the green liquor stabilization tank.

Slaker

The clarified green liquor is fed to a "slaker" where NaOH is formed. The grit and unreacted lime settle to the bottom where they are removed by means of a screw conveyor.

The slurry flows through a series of agitated tanks in a process known as causticising. The main products of this process are calcium carbonate ($CaCO_3$) and NaOH. The effluent of this process is now referred to as "white liquor" and is pumped to the white liquor clarifier.

The overflow from this clarifier is returned to the pulp digestion process. The settled $CaCO_3$ precipitate is known as lime mud. This slurry is "washed" with a combination of fresh and recycled water.

Lime Mud Washer

This wash water is sent to the "lime mud washer." The overflow from this unit is sent back to the smelt tank. The underflow is dewatered on a rotary vacuum filter known as the "lime mud filter." The dewatered solids ($CaCO_3$) are sent to the lime kiln to be converted to burnt lime (CaO). The filtrate from these filters is returned to the lime mud mixer tank.

In this way, a very high percentage of all the chemicals used are recycled and there is much less impact on the environment from waste disposal.