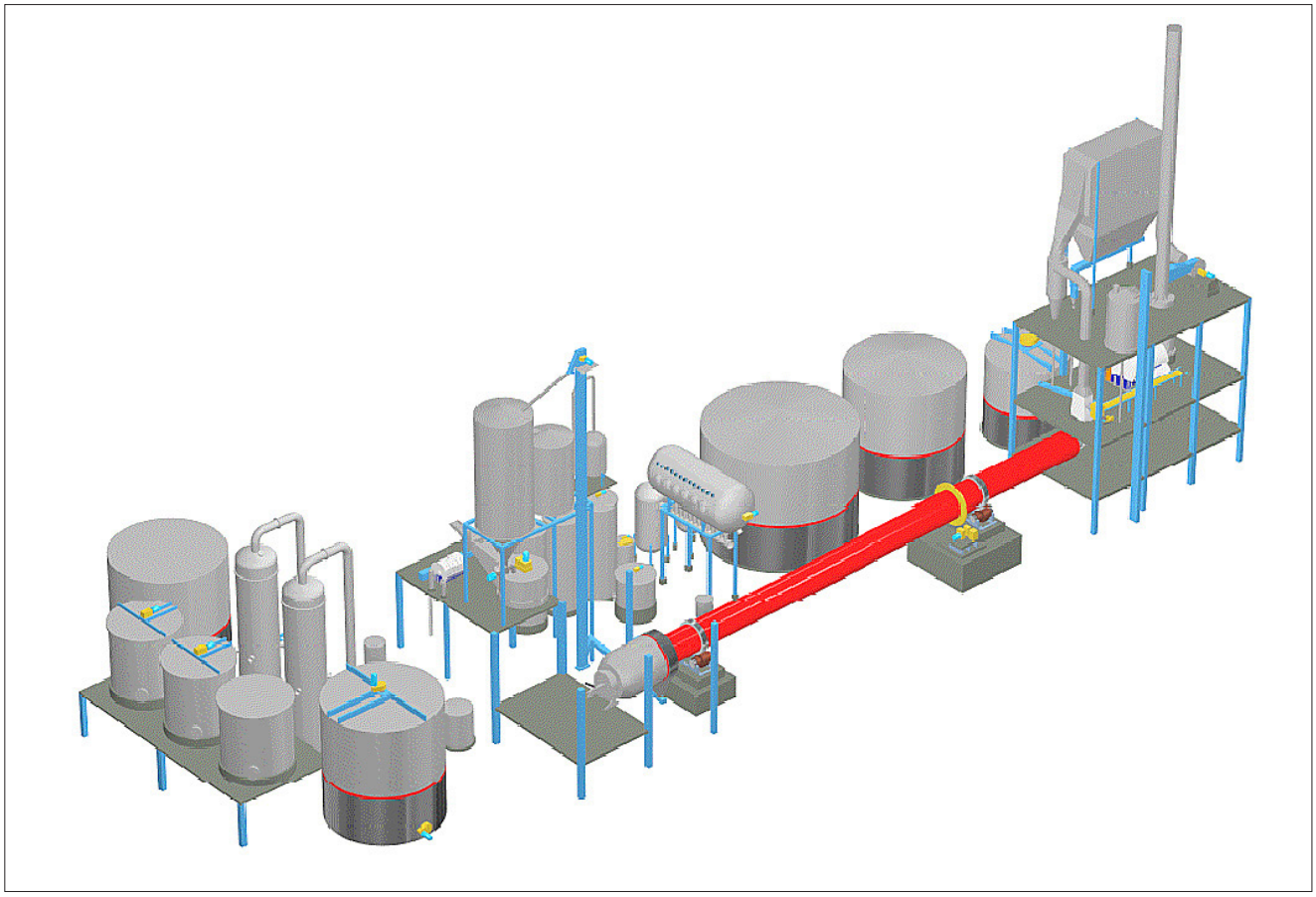
Recausticizing



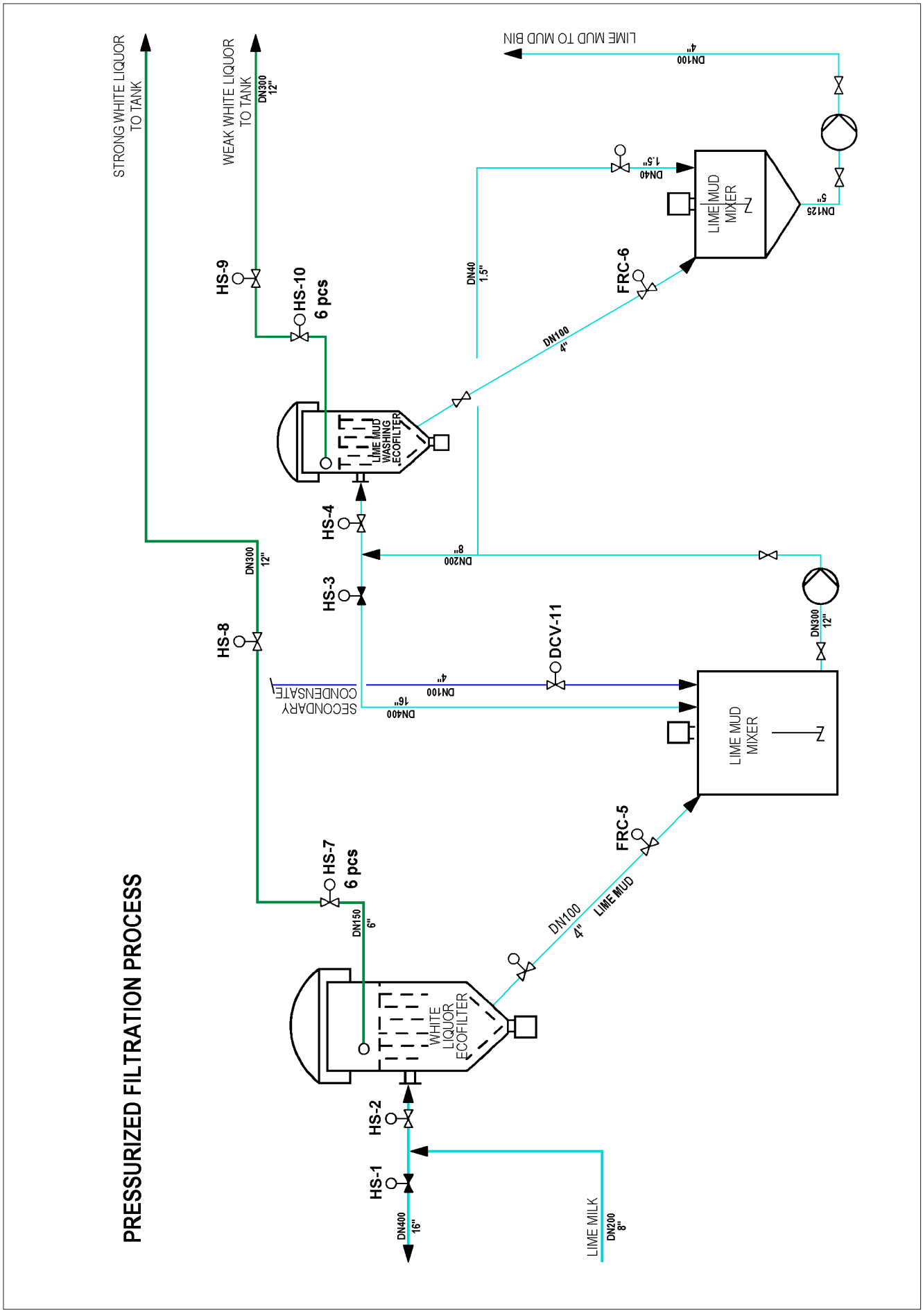
Overview of the process

The recausticizing (causticizing) stage completes the chemical recovery cycle converting green liquor to white liquor. In this process most of the Na_2CO_3 in the green liquor is turned back into NaOH in white liquor, which can then be used for cooking liquor. The aim of the process is to produce as much strong white liquor as possible.

The recausticizing plant has two primary objectives:

- The liquor circuit converts sodium carbonate Na_2CO_3) into active caustic soda (NaOH)
- the solids circuit converts lime mud ($CaCO_3$) into lime (CaO)

Because of erosion and scaling, this area requires careful valve selection.


PRESSURIZED FILTRATION PROCESS
STRONG WHITE LIQUOR TO TANK
WEAK WHITE LIQUOR TO TANK
DN300 12"
LIME MUD TO MUD BIN
DN100 4"
DN40 1.5"
DN125 5"
LIME MUD MIXER
HS-9
HS-10 6 pcs
FRC-6
DN100 4"
DN40 1.5"
LIME MUD WASHING ECOFILTER
HS-4
DN200 8"
HS-3
DN300 12"
HS-8
DCV-11
SECONDARY CONDENSATE
DN100 4"
DN400 16"
DN300 12"
LIME MUD MIXER
HS-7 6 pcs
DN150 6"
FRC-5
DN100 4"
LIME MUD
WHITE LIQUOR ECOFILTER
HS-2
HS-1
DN400 16"
LIME MILK
DN200 8"

The process

Green liquor is first clarified to remove dregs (insoluble matter). From clarified green liquor storage, it is pumped to a slaker together with lime (quicklime, CaO). Slaking produces calcium hydroxide (slaked lime, $Ca(OH)_2$), which then reacts with the sodium carbonate (Na_2CO_3) in the green liquor. Caustic soda (NaOH) is produced, calcium carbonate precipitates out - and is called lime mud.

The reaction from green to white liquor takes place in a number of sequential mixing tanks (causticizers or recausticizers). The reactant is called lime milk. The white liquor (active NaOH) is separated from the solids particles ($CaCO_3$) in pressure filters (other methods are also used).

Dissolved white liquor is fed back to the cooking process. Lime mud ($CaCO_3$) is converted to lime (CaO) in a kiln.

Valve selection

There are a number of different requirements on the valves in this application, and the problems to be solved are as follows.

Scaling

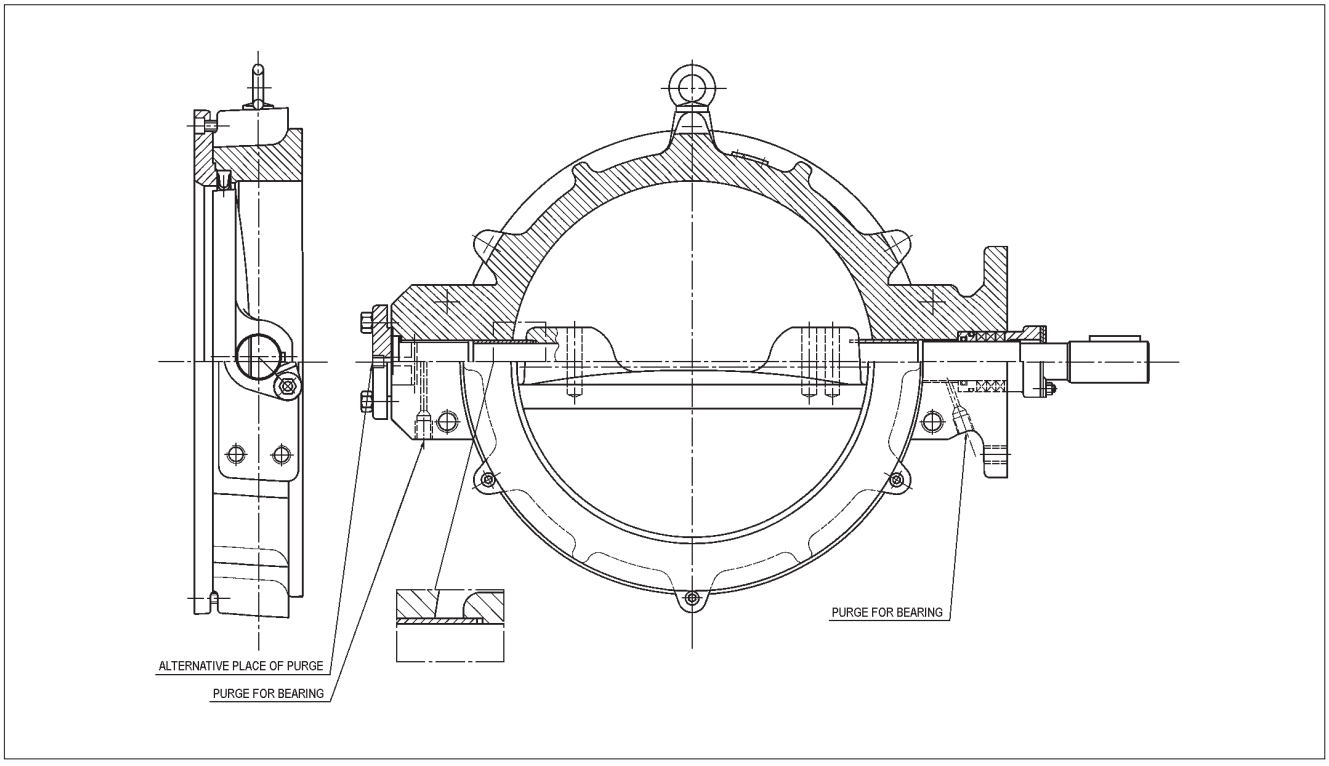
Where precipitation occurs, as in the lime milk, there is a tendency for scale to build up on the valve, which can lead to leakage through the valve. Heavy scaling could also seize the entire valve, making it inoperable. To address this, MBV ball valves with metal seats and scraping seat faces are required. Alternatively, metal seated Neldisc® butterfly valves can be utilized.

White liquor pressure filtration

In a pressure filtering process, the lime milk slurry is continuously pumped to a pressure filter. This slurry consists of about 15...20 % solids. In filtering, clear white liquor is produced. Also thick lime mud (40 % solids) is created. The lime mud is then washed prior to transporting to the lime kiln.

The washing of lime mud can also be done in a similar filtering system as the white liquor filtering. The Ecofilter™ is one of the filters used. A timer installed in the instrumentation executes the backwash sequences (see drawing below). The large valve HS-1 is normally closed during filtering and HS-2 is open. In order to backwash, valve HS-1 opens frequently (every 3 minutes) for a short time (two to six seconds) to backflush HS-1 then closes. The valves at the lime mud washing filter (HS-3 and HS-4) function identicaly. HS-1, HS-2, HS-3, HS-4 can be as large as DN600 (24”) and need a special design to protect the shaft and packing in this high cycle, erosive application. The Neldisc® butterfly valves designed for this service have special long stellite bearings and shafts as well as purge connections, and live loaded packing. The selection of actuators and solenoid valves is also critical in this high speed, frequent cycling application.

Lime mud flow control (FRC-5 and FRC-6) is also very demanding because of high erosion. A differential pressure of about 2 bar / 30 psi cannot be avoided. The E2 series ceramic ball valve is offered to minimize the effects of the erosion.



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