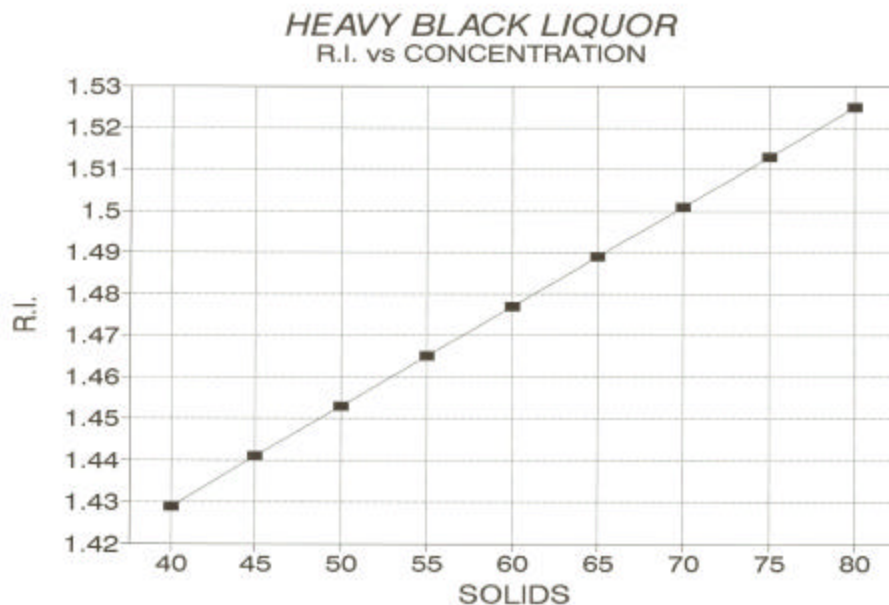


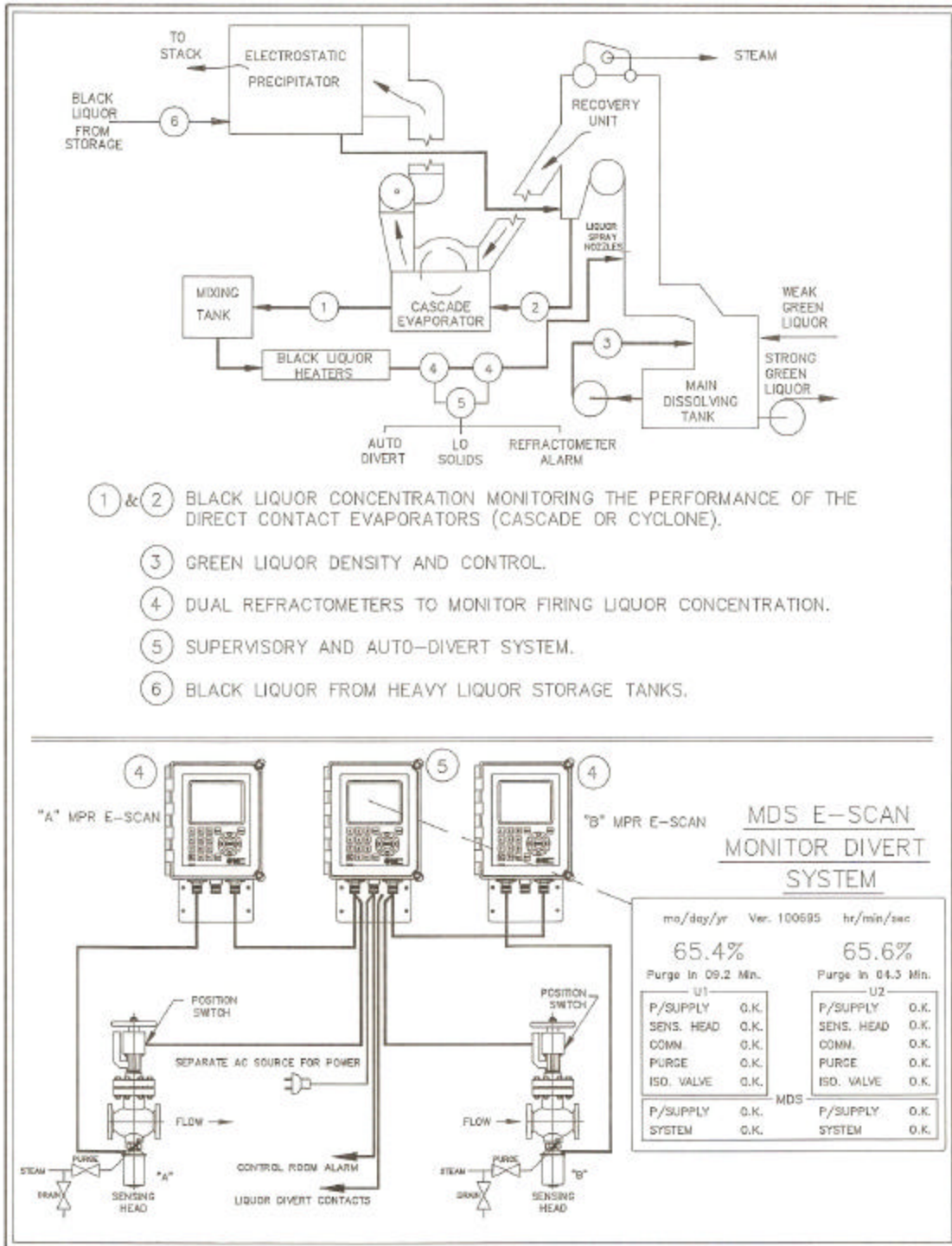
Refractometers are used in the recovery boiler area to measure heavy black liquor solids in the range of 50-80%. When used to monitor liquor solids to the spray nozzles they become so critical that the recovery boiler will not be operated without them.

As quoted from the Black Liquor Recovery Boiler Advisory Committee, "Refractometers have proven to be effective for black liquor recovery boiler service." Refractometers are a critical component of the black liquor safe firing system.

Monitoring the recovery boiler firing liquor concentration requires two refractometers in a redundant and specially supervised system. A "Monitor Divert System" employs supervisory circuitry to oversee the correct operation of the refractometer and perform certain logic functions if it detects a failure. The most important of these is the automatic diversion of the liquor from the furnace into a recirculation loop until the problems can be resolved.

Refractometers used elsewhere in this area include measuring the concentration of the heavy black liquor from storage as it enters the recovery area. They are also used extensively around the cascade or cyclone evaporators to monitor the performance of the direct contact evaporation system. When refractometers are used in the recovery area, the process can be tuned to operate efficiently and most importantly, more safely.





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