

## Mill Operation - Back to Basics 1 Clarification Process

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### Did you know?

1. That for best separation of oil from sludge the temperature of crude oil should be raised as high as possible, preferably 90-95°C and this temperature must be maintained throughout the clarification process.
2. Viscosity of sludge layer increases as the concentration of non-oily solids (NOS) increases, making oil separation difficult unless diluted.
3. The NOS and unruptured oil cells, which forms a 'third layer' between oil and sludge layers could absorb oil reducing separation efficiency of oil from sludge.
4. The NOS concentration of crude oil would be the highest when digestion is intensive, and crude oil is drained off excessively from the digester and the mash is pressed by screw presses.
5. Dilution of crude oil is usually based on a final sludge output (ex-separator) of 50 to 55% to FFB, having NOS in the region of 5.5% to 6.0%.
6. If dilution water temperature is low say 70°C and later crude oil in clarification tank is heated to 90°C the oil content in underflow could be as high as 20% or more. It is not the same as diluting with water at 95°C, as in the latter case the oil content in underflow is not likely to exceed 15%.
7. Proper dilution of hot water at about 95°C at vibrating screen to maintain NOS at less than 7.5% at sludge phase has a marked influence on clarification efficiency coupled with high reduction of oil loss in sludge. The presses also would perform well.
8. Insufficient dilution could result in high percentage of oily tailings, reduction of press throughput and increased oil loss in press cake fibre.
9. Centrifugal pumps for pumping crude oil could emulsify oil and produce small oil droplets below 15 microns, which are lost. Slow positive displacement pumps are better suited for crude oil pumping.
10. For heating crude oil in clarification tank submerged heating coils cause deposition on the coils affecting heat transfer and oil quality. Direct heating by injecting steam into crude oil feed line to clarification tank is the best way to accomplish this.
11. The position of oil skimmer in relation to sludge riser outlet determines the oil layer thickness, higher the difference, thicker the oil layer. This position could be set for each mill based on the mill operating parameters, to obtain the best results. It usually ranges from 6" to 8".