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ANALYSIS OF ENERGY, GRAIN & WATER STREAMS of a Steam Flaking Process

Compiled by, and the property of, Omega Ten Corporation

| 1 | <u>INPUTS</u> | units | CALCULATED | | units | | |
|----------|---------------|---|---|-----------|-----------|--|-------------------------|
| 2 | 25 | CTDLL | Floking Date | 19.750 | STPH | Day Matter Ctroom through Droops | |
| 3 4 | 13.0% | | Flaking Rate content of Grain From Storage | 2.951 | STPH | Dry Matter Stream through Process Water Stream from Storage | |
| | 21.0% | | content of Grain From Storage content-Grain going through Rolls | 22.701 | STPH | Total Stream from Storage = 811 BPH | |
| 5 | 50.0% | | d Moisture-by SOAKING | 2.299 | STPH | Water Stream Added = 9.2 GPM | Lbs/Hr |
| 6 7 | 30.076 | | ce 50% from Steam) | 4.60% | 1.149 | STPH Water Stream from SOAKING | 2,298.9 |
| | 85 | °F | Temp-Ambient of Grain & Water | 4.60% | 1.149 | STPH Water Stream from STEAM * | 2,298.9 |
| 8 | 210 | °F | Temp-Steamchest Exit | 25.000 | | Total Flaker Stream (H20+Dry Matter) | 4,597.7 |
| 10 | 80 | PSIG | Steam Pressure | 5.250 | STPH | Total Water Stream through Flaker | 4,597.7 |
| | 85% | 73IG % | Boiler Efficiency | 0.915 | STPH | Water Stream Removed in Cooling/Drying | |
| 11 12 | 56 | lbs/bu. | , | 4.335 | STPH | Residual Water Stream in Cooled/Dried Produc | .+ |
| 13 | 60 | HP | Electric Motors | 4.333 | этгп | Residual Water Stream in Cooled/Direct Floduc | ·L |
| 14 | 75% | ПF % | Electric Motors Electric Motor Loading | 323.9 | °F | Temperature of 80 PSIG Steam | |
| 15 | 1.48 | | Grain Spec.Heat **(1.48 default) | 1,186.2 | | Energy Content of 80 PSIG Steam | |
| 16 | 18.0% | Ū | e content of Cooled Grain | 1,180.2 | | Corn Specific Heat ** | |
| 17 | 1080 | | F Energy in Nat'l Gas (1,080) | 0.450 | | Corn Specific Heat, converted to English Units | MBTU's/Hr |
| 18 | | | F Natural Gas Cost | 81.4 | BHP | Energy to generate 1.15 STPH Steam @ 80 PS | |
| 19 | Ф 0.00 | /100001 | Natural Gas Cost | 76.2 | ВНР | Energy to raise temp of 22.7 STPH Corn by 125 | |
| 20 | 91.600 | RTI I/go | I Propane-Compressed | 8.6 | | Energy to raise temp of 1.15 STPH soak H2O b | |
| 21 | \$ 1.95 | - | Propane Cost | 166.1 | | Total before Boiler Efficiency DeRating | 5.568 |
| 22 | φ 1.55 | ψ/yai | Fiopane Cost | 195.4 | | Reg'd to Flake 25 STPH (33,520 BTU/hr/BHP) | |
| 23 | | | L | 195.4 | Bollel HF | [Req a to Flake 25 51FH (55,520 B10/111/BHF) | @ 65% Bullet Efficiency |
| 24 | \$ 0.12 | /KWH | Electricity Cost | 6,066 | CFH | Natural Gas Required @ 1080 BTU/CF | |
| 25 | \$ 0.74 | | Nat'l Gas Energy Cost | | | of Natural Gas @ 1080 BTU/CF | |
| 26 | \$ 2.13 | | Propane Energy Cost | 71.51 | gal/hr | Propane Required @91600 BTU/gallon & 85% | Roiler Efficiency |
| 27 | Ψ 2.13 | ψ/tileiii | | \$ 48.52 | \$/hr | Natural Gas Cost = \$ 1.94/sTon | Doller Efficiency |
| 28 | | | | \$ 139.45 | \$/hr | Propane Cost = \$5.58/sTon | |
| 29 | | • | | | \$/hr | Electricity Cost = \$0.16/sTon | |
| 30 | | \$ 52.5 | | | \$/hr | Nat'l Gas & Electricity Energy Cost*** = \$ 2.1/sTon of Flakes | |
| 31 | | · | | \$ 143.48 | \$/hr | Propane & Electricity Energy Cost*** = \$ 5.74/sTon of Flakes | |
| 32 | | | | ψ 1-0.40 | Ψ/111 | Tropano a Electrony Energy Cost = \$\psi 0.7473 | TOTI OF FIGROO |
| 33 | | | | | | *** 65.5 therms (either) gas & 33.6 kwh elect. | |
| 34 | | | | | | oo.o monno (omio) gas a oo.o kwii elect. | |
| 0-4 | | | | | | | |
| | | | | | | | |