DOW CHEMICAL U.S.A.

February 23, 1982

P. O. BOX: MIDLAND, MICHIGAN 48640

PLAINTIFF'S EXHIBIT
BIR-939

Kenneth Sutton
Bird & Sons, Inc.
Technical Center
East Walpole, MA 02032

cc: J. Kent Colvin
Bird & Sons, Inc.
620 Aero Drive
Shreveport, LA 71161

Dear Ken:

Below you will find preliminary plans for a composite roofing trial at the Shreveport mill.

The production goal of the trial is approximately 26 tons of unsaturated felt with a basis weight of 55 lbs/480 ft.^{2} and approximately 10 tons of unsaturated felt with a basis weight of 42 lbs/480 ft.^{2}.

Regarding batch make-up, Ken Meath indicated your desire to size each pulper batch to one drum of latex. Based on the working capacity of the pulper, 6,375 gallons (53,000 lbs.), utilization of one full drum of latex (212 lbs. active) would result in a consistency of 10%. We feel this is too high. A better target would be 8%. Dow will supply a pump to transfer the latex.

From the pulper the stock will be transferred through the primary and secondary centrifflers, the Jonsson screen, by-bass the thickener to the stock chest. From the stock chest, the stock will be transferred through the stuff box, the Jordan refiners to the machine chest. From the machine chest through the fan pump, machine centrifflers, machine screen to the cylinder. Briefly, the stock will follow the normal flow with the exception of by-passing the thickener.

The flocculant, Betz® 1260, will be added in-line at the sample port located between the machine chest pump and the fan pump. Dow will supply a calibrated variable speed positive displacement pump for the flocculant addition. Betz Paper Chem, Inc. will supply a portable flocculant make-up unit, which includes two, one thousand (1,000) gallon tanks. What will be required by Bird are clean water and required plumbing. Clean water is necessary for flocculant make-up and for dilution in the pumping unit. Associated piping is required for connection of the flocculant tanks, clean water supply, flocculant pump and dilution unit, to the in-line addition point (sample port).

Regarding consistency regulators. The duration of the trial is probably insufficient to calibrate them. However, it is desirable to have the regulators engaged and reading on scale. If the readings are on scale (although incorrect) they will maintain uniform consistency of the stock; therefore, uniform basis weight on the machine and small adjustments of basis weight are easier.

On the machine. At start-up the vacuum and press pressures are best set at your normal pressures for the all organic production. Once start-up is completed, adjustments can be made if necessary. One problem that can occur at the presses is sticking. Placing a lightly soaked kerosene rag on the press roll will eliminate the sticking if it occurs. The use of a water jet to cut a tail is necessary to facilitate the threading through the dryers. Based on production of 42 and 55 lbs/480 ft.^{2} at a machine speed of approximately 150 feet per minute, our expectation is that the dryer cans should be maintained at your normal steam pressure. One of the production goals is to demonstrate increased production capability of the heavier basis weight felt rather than reduced energy consumption.

Dow will assist your Quality Control Personnel with testing during the trial. On the spot testing affords immediate adjustment of production conditions if necessary.

Attached you will find raw material specifications for the Shreveport trial. After you have reviewed the enclosed trial information, please contact me for further discussion of details and execution of the trial.

Sincerely,

Don Clarey

D. H. Clarey
Designed Products
2040 Dow Center
517,636-3280

Attachments

slk

BIRD & SONS, INC.

SHREVEPORT, LA MILL TRIAL

MACHINE SPECIFICATIONS

Width:	150 Inches
Trim:	144 Inches
Speed:	150 Feet Per Minute

TANKAGE

Pulper:	6,375 Gallons can this go up to 6951
Stock Chest:	18,000 Gallons
Machine Chest:	18,000 Gallons
Flocculant:	Two 1,000 Gallons

PRODUCTION DESCRIPTION

4 Hours at 55 lbs/480 ft.^{2}, approximately 51,550 lbs. ✓
2 Hours at 42 lbs/480 ft.^{2}, approximately 19,650 lbs. ✓

RAW MATERIAL REQUIREMENTS

Total Stock: 71,200 lbs.

Filler @ 60%:	42,720 lbs.
Fiber @ 36%:	25,630 lbs.
Latex @ 4%:	2,850 lbs.
Flocculant @ 5 lbs/ton:	178 lbs.

Latex @ 212 lbs. active per drum: 14 drums

DHC
2/82

BIRD & SONS, INC.

SHREVEPORT, LA MILL TRIAL

PULPER BATCH INFORMATION

A working volume of 6,375 gallons equates to approximately 53,170 pounds. At 8.0% consistency, the total solids per batch is 4,250 pounds.

Total solids per batch:	4,250 pounds
Filler @ 60%:	2,550 pounds; 51;50 lb. bags
Fiber @ 36%:	1,530 pounds
Latex @ 4%:	170 pounds; 42.5 gallons

FLOCCULANT BATCH INFORMATION

Total Stock: 71,200 lbs.
Total Flocculant @5 lbs/ton: 175 lbs.

Two 1,000 gallon tanks; assume 90% utilization for each tank, total volume is 1,800 gallons. A working volume of 1,800 gallons equates to approximately 15,000 pounds. At 1.0% active, the total dry flocculant required is 150 lbs. (75 pounds per tank). The flocculant usage will actually probably be about 2.5 lb. per ton. Making up the two 1000 gallon tanks of 1% material will most likely be sufficient for the entire trial.

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for FYI JK

DOW CHEMICAL U.S.A.

March 3, 1982 P. O. BOX: MIDLAND, MICHIGAN 48640

PLAINTIFF'S EXHIBIT
BIR-940

Kenneth Sutton
Bird & Sons, Inc.
Technical Center
East Walpole, MA 02032

Dear Ken:

According to our information the normal hydropulper batch size at Shreveport is 6,375 gallons. At 8% consistency this equates to 4,250 lbs. of solids. There would thus be 170 dry lbs. of latex required per batch at 4% addition level. A full drum of latex contains 212 lbs. of solids. To be able to use a full drum of latex per hydropulper batch would require a batch size of 7943 gallons and 5300 lbs. of solids. Your hydropulper, being 14 ft. in diameter has a capacity of 1152 gallons per foot of height. The added volume needed for utilizing a full drum of latex (7943 gallons - 6375 gallons = 1568 gallons) means an added 1 foot 4 inches to the normal batch height in the hydropulper. This probably would make it too full so I would not suggest doing it.

Your suggestion of possibly increasing the volume per batch enough to raise the height in the pulper by 6 inches would certainly help the timing problem and would appear to be practical. An additional 6 inches equates to 576 gallons, bringing the batch to 6951 gallons. This would be 4638 lbs. of solids, 186 dry lbs. of latex, 2783 lbs. of filler (56-50 lb. bags), and 1670 lbs. of waste corrugated fiber. This size pulper batch would last approximately 22 minutes running the 55 lb. material at 150 fpm. If the stock chest and machine chest plus the hydropulper were filled before the start of the trial there could be 6 batches prepared ahead. This would be 2 hours and 12 minutes of running time. There would then be 3 hours and 48 minutes to make-up the remaining 42,000 lbs. of solids. This is 9 batches and would allow 25 minutes per batch. This could probably be done. I'm basing my calculations on the fact that the last two hours would be run at 39 lbs/480 ft^2, instead of 42 lbs, and would require 18,245 lbs. of dry furnish.

The 25 minutes make-up time per pulper batch would be easier to accomplish if the required filler and fiber for each batch were set aside ahead of time. In other words put 56 bags of filler on a pallet and pre-weigh piles of fiber of 1670 lbs. each.

The hydropulper should be loaded with roughly 50% of the necessary water before the corrugated is added. As the corrugated is put in the operator should then use whatever water is required to obtain good pulping action. As soon as the fiber is in, the bags of filler should be split and thrown in. Latex is then pumped in and the volume brought to the proper level before dumping.

We will furnish a pump to handle the latex. It will require compressed air to operate.

Fresh water will be needed to fill the two 1000 gallon flocculant tanks plus at least a 1/2" line with good pressure is required at the funnel inductor used to disperse the Betz 1260 as it is added to the 1000 gallon tanks. Dow will furnish a dilution unit that will pump the flocculant from the tanks at the proper rate (about 3.2 gpm) and mix it with fresh water. The dilute flocculant will then be fed to the port at the outlet of the machine chest. The dilution unit will also require a fresh water line that will supply at least 30 gpm.

For the commercial operation at least a 10,000 gallon storage tank for latex storage would be required along with a minimum of 3" unloading line for tank trucks. No pump would be required for unloading the trucks if the trucks were specified for air pressurization and compressed air with a suitable regulator and pop-off valve was supplied to the unloading station. A small pump and meter would be required to supply latex to the pulper. Dow can supply you with specifics on bulk latex storage and handling when and if you commercialize the product.

A permanent installation would also include two 1000 gallon flocculant tanks. A metering pump and simple dilution unit would also be required.

A silo to receive the filler in bulk would be desirable. A front end loader with a scoop holding the required amount for a pulper load would handle the filler.

An accurate method to measure the amount of corrugated for each batch would be necessary. This could be done by using known constant sized bales, or weighing and breaking bales as necessary.

Please send us the sample of filler you intend to use as soon as possible for evaluation. We will call you with the results.

Sincerely,

Don Clarey

D. H. Clarey
Designed Products
2040 Dow Center

slk

DOW CHEMICAL U.S.A.

February 18, 1982

P. O. BOX: MIDLAND, MICHIGAN 48640

Kenneth Sutton
Technical Center
Bird & Son, Inc.
East Walpole, MA 02032

Dear Ken:

Enclosed you will find two handsheets of composite roofing paper. One was made with Glenwood rock and the other using Georgia Marble No. 9 NCS. The retention of the Glenwood rock was very poor. This is easily observed by looking at the screen side of the sheet. The screen used for the handsheets was 90 mesh and thus caught much of the material. In your mill this would not be the case and this unattached material would permeate and collect throughout the system. In addition this coarse material would quickly ruin felts, screens, pumps, press rolls, etc. The screen analysis of the Glenwood rock shows a high percentage retained on the 80 mesh and larger screens, this is the material causing the problem. Normally we would look for 0 retained on a 50 mesh and a distribution that would pass 70% or more through a 325 mesh. The Georgia Marble material works well, it passes about 93% through a 325 mesh.

Macrofil No. 4, produced by Calcium Carbonate Products Co., Div. of J. M. Huber, Marble Falls, Texas has been used successfully. There are probably other filler suppliers nearby that could furnish a finer filler. We would very much like to evaluate, before a mill trial, any filler that you find available and feasible to use.

A mill trial plan for the Shreveport mill is being developed. As soon as it is completed we will be in touch with you.

Sincerely,

Don Clarey

D. H. Clarey
Designed Products
2040 Dow Center
517/636-3280

Enclosures (2)

slk

BIRD 013940