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RICHMOND, VIRGINIA

To: Mr. H. G. Daniel Date: February 26, 1979

From: C. H. Rowe

Subject: RL/BL/Process Model/Linear Program

C79-07430

Recently a group of outside consultants from Control Data Corporation were requested to prepare a proposal for a computer model of by-product utilization. A pre-design study has been submitted that proposes to use a linear program to find the "best" solution to any given problem involving by-product utilization and sheet production. This was accomplished by introducing various cost factors, the sum of which is minimized by the program. I have examined the features of the proposed model/program in light of the situations we have been asked in the past to explore using the Blends program.

While the proposed model has some desirable features, it is my conclusion that its cost (as I understand it $50,000-$85,000) would not be justified as a replacement for the Blends program. I cannot speak for other uses that Leaf or Engineering might have for the program.

I have reached this conclusion because I do not think that the information this program would make available to management for decision making, as far as those problems presented to R&D are concerned, would be any more inclusive or accurate than the information now being provided. Current methods, while somewhat more time-consuming than would be the case if we had this program, are not called upon frequently enough to justify the cost of the program on this basis alone.

In arriving at these conclusions, I have considered the uses made of the Blends program since it has been my responsibility.

One major study was requested because of the need to contract for natural gas for the BL Plant. At that time it was planned to operate the BL Plant, which has an annual capacity of 41 million pounds, at a rate of 28 million pounds over the next few years. By 1983, however, additional sheet production would be needed to maintain sheet inventories at desired levels. If Philip Morris contracted for and received federal permits to purchase only enough natural gas to operate at the lower production level over the next few years, we might be locked in to this reduced amount permanently and not be able to increase BL production to capacity when needed. This would mean that at such time we might have to build additional RL capacity even though we had idle BL capacity. It would be desirable therefore to try to maintain BL production at capacity throughout the planning period.

A Blends run assuming both sheet plants running at full capacity and ES being phased out at the then planned rate showed there would be a serious shortfall in by-products under such a plan.

One alternative explored involved an RL production curtailment in the first years of the plan. This was found to be a viable alternative from a sheet and by-product inventory standpoint.

A second alternative explored was an accelerated phase-out of ES with both RL and BL running at capacity through the planning period. This was also found to be a viable scheme.

Cost accounting then calculated the costs of the various alternatives and this information, along with other considerations involving changes in blend formulas, enabled management to arrive at the current plan.

I do not believe that the proposed model would have enhanced decision making in this instance. Had the program been operational at the time of the request, the needed information may have been available sooner. However, I do not think that timing was a critical factor.

In addition, the program would have had to have been flexible enough to have applied the constraint that BL production in any given year could not exceed BL production in the previous year. That could easily be done, of course, but I am not sure that this need could have been anticipated. I am equally unsure as to whether the model can be made flexible enough to take into consideration other presently unforeseen situations.

A more recent study concerned RL Plant capacity and yield as a function of recipe. It was desired to determine the effect of various assumptions regarding these relationships on the timing of RL Plant capacity expansion. This is the problem that initiated the consultants' study.

Several Blends program runs determined that the RL and BL recipes assumed were viable from a by-product inventory standpoint, given our current assumptions regarding by-product (stem, scrap and FBP) generations and purchases. Performance data is needed to know if the assumptions are correct. In this case the only economics applicable would be calculations of the benefit of delaying an RL expansion by one or more years, since the cost of implementing the recipe changes would be nil.

In summary, the proposed program would be able to handle the types of problems we have been asked in the past to investigate with the Blends program, and would do so by finding the "best" solution from an economic standpoint, based upon the assumptions provided. I believe that if the proposed model is built, we (R&D) would find it useful. I do not believe that we can justify it for our own purposes alone, however.

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