To: J. J. Hall

From: T. J. Bennett
Date: February 5, 1990

**Interoffice Communication**

Subject: **Aluminum Quench Solids Price**

VISTA

Per your request, I have estimated a sale price for aluminum quench solids cake based on available data. A price of $35/ton (at 20% solids) would result in a 25% IRR. This is based on an order of magnitude estimate of $700,000 for a belt press, 25,000 gallon storage tank, and peripheral equipment.

Major assumptions are summarized below:

1) Volume of slurry from quench reactor: 8.4MM lbs/yr @ 8% solids
2) Volume of quench solids after pressing: 3.4MM lbs/yr @ 20% solids
3) Disposal savings ($136/ton + $348/load): $261,000/yr
4) Operator cost - one operator (20 hrs/wk on overtime) to run press: $24,300/yr
5) Shipping cost (at $30/ton): $51,000/yr
6) A 20% solids cake would contain no free standing liquid.

These quantities and economics are preliminary and are subject to change as more data becomes available. Contact me at extension 5382 with questions or comments.

T. J. Bennett

tm
Attachment

cc: JF PDC MGH CRD DKW GLF JCS BMM BMDW CWT MLA ECG PEC(3)
A. Cruz - Houston

pete LCVCM (482)

**TO:** Distribution

**FROM:** P. Quinlan

**DATE:** December 12, 1989

**Interoffice Communication**

**SUBJECT:** VCM By-Product Streams

VISTA

One of the action steps from the VCM Strategic Plan calls for development and implementation of a plan to reduce Vista's dependence on outside sources to handle the VCM Plant's by-product streams (heavy ends, light ends, and muriatic acid). Due to the changing nature of the chlorinated solvents market (brought on by environmental regulations/concerns), this dependence is a potential threat to the continued economical operation of the VCM Plant.

Accordingly, I would like to form a project team to review available options and develop a plan to reduce/eliminate Vista's reliance on outside sources to handle the VCM Plant by-product streams. Representation from Manufacturing, R&D, PED, Environmental, and the Business Area is desired. I would propose the initial meeting of this team be held on January 10 in Lake Charles to coincide with the quarterly VCM Operations meeting. Please advise who your representative will be.

For reference, attached is a copy of a letter which summarizes the current status of the by-product streams.

Pat Quinlan

P. Quinlan

/baf

Attachment

Distribution: VEM, TGG - Houston
JTF - Austin
RAC - LCVCM

cc: RJA, RDG, RHG, THH, JCL, WLM - Houston
MGH - LCCP
MDB, JGC, DRB - LCVCM

BYPRODCT.IOC

VVV 000012771

**To:** Distribution

**From:** P. Quinlan

**Date:** October 4, 1989

Interoffice Communication

**Subject:** VCM PLANT BY-PRODUCT STREAMS

VISTA

The VCM Plant produces three by-product streams: Light Ends, Heavy Ends, and Incinerator Dilute Muriatic Acid. Following is background information, current status, and proposed action steps relating to each of these streams. Please review and forward your comments, suggestions, and ideas to me by November 3. Although these streams are relatively small in volume, they could have significant adverse impact on the overall business if changes in environmental regulations/sensitivities were to make current outlets obsolete.

## LIGHT ENDS

Annual production of Light Ends is approximately 1-2 MM lbs. This stream is composed of various chlorinated methanes and ethanes. Currently the entire production is sold, as it has been for several years, under contract to Vulcan. The material is transported in railcars to Vulcan's Wichita, Kansas plant. Vulcan exhaustively chlorinates the Light Ends to produce primarily carbon tetrachloride and chloroform (with smaller amounts of other chlorinated hydrocarbons). Vulcan then uses these products to supplement its merchant chlorinated solvents business.

Vulcan's long-term viability as an outlet for the Light Ends stream is somewhat suspect. Even though Vulcan is the world's second largest producer of the chlorinated solvents mentioned above (and is pleased with the quality/composition of the Light Ends stream), the provisions of the Montreal Protocol make the Light Ends stream less attractive to Vulcan. (The Montreal Protocol freezes production of CFC's at current levels for the next two years, with production of CFC's to go to zero by the year 2000. Carbon tetrachloride and chloroform are the precursors for CFC's. Replacements for CFC's will be based on two-carbon molecule chemistry versus the current one-carbon chemistry.) Vulcan has indicated that it can continue to utilize the Light Ends stream for the production of perchloroethylene (one of the precursors for the CFC replacement materials), but that the value of the stream to Vulcan will decrease since additional processing will be required. There are other companies interested in the stream (most notably Dow), but these other potential outlets have not been explored fully since Vulcan has continued to offer the best price.

Vista's fallback position for Light Ends (assuming no external customers were available) would be to incinerate the stream in the VCM Plant incinerator (Vista previously incinerated this stream). This would not be an immediate option, however, since a permit would be required, and would not be devoid of environmental impact if neutralization of the resultant muriatic acid stream were required.

**ACTION STEP:** Define/update other outlets (customers) for this stream--Marketing/Business Area

**ACTION STEP:** What steps can be taken to minimize production of Light Ends--Manufacturing

**ACTION STEP:** Can a permit be obtained (easily) to incinerate the Light Ends stream--Environmental

## HEAVY ENDS

Annual production of Heavy Ends is approximately 13-15 MM lbs. The stream is composed of various heavy (EDC and heavier) chlorinated hydrocarbons. The entire stream is currently being transferred, as it has been for over ten years, via truck to PPG's Lake Charles Plant. PPG processes this stream in its Per-Tri Plant to produce perchloroethylene and trichloroethane. The portion of the stream which is not "processable" is incinerated by PPG in its on-site incinerator. Vista pays PPG a fee to "dispose" of the Heavy Ends, with the amount of the fee dependent upon the EDC and trichloroethane content. (The typical annual fee is approximately $300M.) The contract with PPG is evergreen with a 12-month cancellation notice required. PPG can ratchet back its take of VCM Heavy Ends based on a decline in the operating rate of its Per-Tri Plant (which could result from either a Force Majeure occurrence or a downturn in business).

During the past several years, several alternatives to PPG have been investigated. They are as follows:

1. Establish a second outlet for the Heavy Ends.

   B. F. Goodrich (BFG), like PPG, also processes these type streams. BFG's process is quite different than PPG's, however. BFG uses its patented Catoxid process (which utilizes a catalyst based on Vista alumina) to convert chlorinated hydrocarbons into HCl. The HCl is then fed to an oxychlorination reactor for conversion to EDC. Because of the nature of the Catoxid process, streams processed are not classified as hazardous waste.

   Vista had numerous discussions with BFG several years ago with regard to sending Heavy Ends to BFG's LaPorte, Texas Catoxid unit, and BFG even successfully processed trial quantities of Vista Heavy Ends. Consideration was given to splitting the stream between PPG and BFG, but this did not occur for several reasons:

a. PPG indicated it would seek new customers for the incinerator time freed up by Vista sending a portion of the Heavy Ends to BFG. This would mean there would be no guarantee that PPG could resume taking all of Vista's Heavy Ends if the BFG option did not work out.
b. Concerns over moving the Heavy Ends a longer distance to BFG in LaPorte versus PPG in Lake Charles.
c. BFG's fee for "disposing" of Heavy Ends was slightly higher than PPG's.

2. **Incinerate the Heavy Ends.**

This was deemed not to be an attractive alternative for the following reasons:

a. High capital cost;
b. Permitting considerations;
c. Public perception associated with construction of a hazardous waste incinerator;
d. Vista would still need to find an outlet for the resulting muriatic acid stream.

3. **Build a Catoxid, or similar, unit to convert Heavy Ends to HCl for use in Oxychlorination Unit.**

To date, this option has not been vigorously pursued due to high capital requirements and insufficient revenues. Based on an engineering study of a similar technology offered by UOP, a unit sized to handle only VCM Plant Heavy Ends would be of such a scale to be uneconomical given Vista's current alternatives. BFG was, in part, able to justify its capital expenditures on Catoxid units by building larger units and then buying streams from other producers to allow full rate operation.

For the near term (1-2 years), continued movements of Heavy Ends to PPG would appear to be acceptable. (According to BFG, it no longer has room in its existing Catoxid Unit at LaPorte, but is considering building another unit and is very interested in talking to Vista about handling Vista's Heavy Ends in this new unit.) Longer term, however, alternative (3) merits further consideration. A properly designed unit could all but eliminate Vista's dependence on outside firms to move VCM Plant by-products (including Light Ends and Muriatic Acid). On an emergency basis, Vista's fallback position for the Heavy Ends stream (if PPG were to stop taking) is to have the stream incinerated at a commercial incinerator.

**ACTION STEP:** Review PPG Heavy Ends contract, and discuss with PPG its ongoing interest in the stream relative to the Montreal Protocol --Business Area/Marketing

**ACTION STEP:** Inform BFG regarding Vista's interest in providing feedstock for its new Catoxid Unit--Business Area

**ACTION STEP:** Determine if pursuit of a capital project to install a Catoxid, or similar, unit is warranted based on feedback from PPG and BFG, and Vista's corporate strategy relative to this type stream --Business Area.

**ACTION STEP:** What steps can be taken to minimize production of Heavy Ends --Manufacturing/R&D

## INCINERATOR DILUTE MURIATIC ACID

Annual production of Dilute Muriatic Acid from the VCM Plant incinerator is 7-11 MM lbs. (on a dry basis). The VCM Plant is currently neutralizing the stream. Until early 1989, however, this entire stream was sold to Texas United, a calcium chloride producer located in Lake Charles. In early 1989, Texas United sold its Lake Charles plant to Tetra Technologies. Tetra shut the plant down for a complete mechanical overhaul, and just recently restarted the plant. Tetra has not taken VCM Plant Dilute Muriatic Acid as Tetra would prefer to have all of its HCl supply meet food grade standards (Olin supplies anhydrous HCl to Tetra). Tetra has recently indicated it cannot afford to take and process the stream because of its low acid content and hydrocarbon contamination. Movement of the stream to Tetra may still be possible, but Vista will have to make it economically attractive (i.e., pay Tetra).

Neutralization of the Dilute Muriatic Acid stream is certainly not a good, and possibly not even an acceptable, long-term option. In addition to the cost of neutralization ($100M+/year), there are now concerns that the limestone rock used for neutralization may contain unacceptable levels of zinc and nickel. And, eventually, the calcium chloride itself may pose a serious environmental problem as it relates to biotoxicity of the VCM Plant wastewater effluent.

**ACTION STEP:** Determine Tetra's interest in taking the stream if Vista offers a financial incentive--Marketing

**ACTION STEP:** Determine if there are other potential customers (Encycle has been suggested) for the stream on an as-is basis--Business Area/Marketing

**ACTION STEP:** Determine what must be done to the stream to sell it into the merchant muriatic acid market--Manufacturing/Marketing/Business Area

**ACTION STEP:** What can be done to minimize production of Muriatic Acid--Manufacturing

**ACTION STEP:** Is there a relatively simple/inexpensive way to vaporize or otherwise treat this stream such that it could be processed in the Oxychlorination reactor--Manufacturing/Engineering

## SUMMARY

Of the three by-product streams, only the Dilute Muriatic Acid stream poses an immediate problem. However, changes in environmental regulations (i.e., the Montreal Protocol) can rapidly alter the value of these streams in the markets to which they are sold. Serious consideration must be given to investing the necessary capital to process these streams internally and reduce Vista's dependence on outside processors (much like PPG and BFG have done).

Pat Quinlan

P. Quinlan

Distribution: RJA JRB HLD PFF RDG RHG PCG TGG JAH THH BEAL JCL WLM GDS--Houston

RAC MDB JGC DRB--LCVCM

MGH--LCCP

JTF WLS--Austin