

Interoffice
Communication

TO: R. D. Gamblin

FROM: T. G. Grumbles

DATE: March 20, 1990

SUBJ: BY-PRODUCT/WASTE STREAMS

~~IGG: JCL: EAT: MIN: AJO: RF~~

XF: None

VISTA

I've researched current activity on the following by-product streams.

LCCP-Ethanol

Queeh Solids

Spent Caustic

LCVCM-Light-Ends

Heavy Ends

HCL

Baltimore-HCL

ALCL₃ Liquor

Below is a summary of current activity in regards to market development, waste disposal, and in-plant treatment.

LCCP

1. Ethanol-Ethanol is currently burned for fuel. This activity does not affect current revenues but decreases variable costs. There is some activity to determine what can be done to upgrade the stream for "premium" sales. Currently we've identified four potential customers at a price of approximately .5 cents per gallon.

A fuel value for the ethanol when burning in the plant was not available. There are some fouling problems with the burners and small emission increases when burning in-plant that would be eliminated if markets were found.

There is little priority being put on marketing efforts due to the size of the stream and other priorities.

2. Quench Solids-This stream is currently mixed with other streams and sent to the LCCP press. Disposal costs are estimated at \$261,000 annually. Market development is actively searching for end use markets. The greatest potential is in the paper processing industry. Barriers to this market are the high metals content (Fe,Na,Ca) of the streams and the solids percentage. The current plant press cannot dewater the solids enough to be acceptable to paper customers.

To secure long term sales, Capital may be necessary at the plant to precipitate the metals and gain more efficient dewatering capability.

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Calculations (attached) indicate that a \$700,000 investment could result in a 25% IRR if sales were developed to the paper processing market.

3. Spent Caustic-This stream is currently sent directly to the wastewater treatment system at the LCCP. This will be unacceptable in the short-term due to TC regulatory changes and plans to consolidate streams to the LCVCM ASU. No viable options for in-plant treatment have been identified.

A team has been formed to develop end-use markets for the stream. Options have been identified, but the net result would be approximately \$500,000 negative per year, based on the pricing formula the customers would apply. Capital requirements at the plant to service any market with the stream as is total approximately \$250,000.

The biggest issue with the marketability of this stream is sulfur content. If this could be reduced, the market value could increase. The team is looking at the possible methods to amine treat the stream.

LCVCM-A VCM by-products team has been formed and is active in determining the best means, on a long-term basis, for handling light ends, heavy ends and Muriatic Acid. Currently the light ends are sold to Vulcan, the heavy ends stream is shipped to PPG for processing and the acid stream is neutralized. Vista pays a fee for the heavy ends transfer to PPG that averages \$300M annually. The cost for acid neutralization is estimated at \$100MT.

The heavy ends and light ends are processed to products that go to chlorinated solvents end-use markets. The markets are suspect in the future due to regulatory impact on chlorinated's in general and the Montreal Protocol limits on CFC production. There may be viable acid markets with some upgrading of the stream to reduce organics content and strengthen the acid.

There are multiple options on these three streams from in-plant treatment to forming partnerships in treatment units (BFG catoxid). The options are difficult to summarize, so I've attached a 12/12/89 status and options report that describes the options in detail.

Since December, additional meetings have been held with B. F. Goodrich regarding an equity position in a new catoxid unit. This possibility is promising.

Discussions with Pat Quinlan indicate that commercial incineration of the heavy ends and light ends could cost \$5-8MM/year in the near future. Based on technologies for in-plant treatment that have been reviewed, \$5-10MM in capital could give us the capability to treat

all three in-plant by-product streams and avoid the dependency on market development or external disposal.

Baltimore

1. HCL-We currently have HCL markets but these are highly variable in terms of volume and subject to a future acid glut on the marketplace due to the move from CFC's to HCFC's. This process change will result in excess acid by-product availability.

Acid neutralization at the plant is currently a problem due to wastewater permits and more acid destruction may not be possible without significant capital expenditures. Current estimates for this are in \$13MM range.

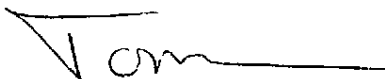
There are processes available to recover chlorine from HCL but the capital requirement is far in excess of the treatment improvement costs.

The tetralin issue is involved in this problem in that the solution to the tetralin content (Pacol unit) would solve the acid problem.

In any event, a decision is needed by mid-1991 as that is when the acid glut is anticipated. (The Surfactants Ggroup Q-Scorecard includes an item to make this decision.)

2. ALCL₃-A strong and growing market is available for this stream. It goes to the aluminum chlorohydrate market and is put into antiperspirant and water flocculent end uses. No efforts are being put into options for this stream.

I believe these are the major by-product streams potentially having a significant impact on the companies operations. The LCVCM and Baltimore streams are the most critical and the decision time-frames are relatively short. Teams are actively working in these areas. Both situations do involve speculation on the impact of anticipated regulations and the decisions cannot be totally data-based. This is a concern of team members and some influence external to the team should be helpful.



T. G. Grumbles

dlj

Attachment

VVV 000001038

VISTA CHEMICAL
RECEIVED

FEB 07 1990

To: J. J. Hall

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

Interoffice
Communication

Subject: Aluminum Quench Solids Price

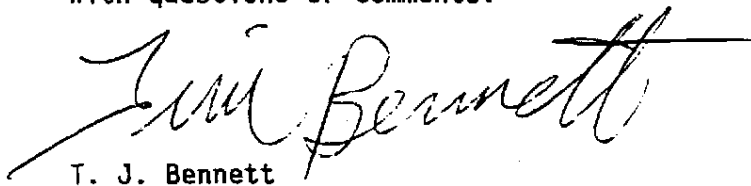
VISTA

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)
G. A. Cruz - Houston

VVV 000001039

Interoffice
Communication

To: Distribution
From: P. Quinlan
Date: October 4, 1989
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.

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Interoffice
Communication

TO: Distribution

FROM: P. Quinlan

DATE: December 12, 1989

SUBJECT: VCM By-Product Streams

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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

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VCM Plant By-product Streams

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- 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:

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- 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

VCM Plant By-product Streams

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- 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

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VCM Plant By-product Streams

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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

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