

f-vc plant



DAK

Interoffice Communication

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To J. A. Debernardi

From D. V. Porchey and R. C. Lindberg

Date March 2, 1976

Subject Project Status--Catalytic Oxidation of VCM Containing Streams

A meeting was held January 20, 1976 between plant and R&D personnel to discuss the catalytic oxidation project. At this meeting, R&D agreed to provide information to assist in your decision regarding the applicability of catalytic oxidation for VCM removal from your vent streams. Following is a summary of the project status, speculative estimates of the relative economic value of reactor schemes operating outside the flammability limits, and an estimate of project charges if continuation of this work is judged appropriate.

Project development has led us to a point where most of our technical objectives have been achieved.

1. Free chlorine production was reduced to less than 1% of total chloride.
2. Oxidation temperatures were low enough to use available alloys (Inconel 600 or Incoloy 800) for the reactor material of construction.
3. VCM was reduced to less than 10 ppmv (usually 1 ppmv or less).
4. Commercially available catalysts were demonstrated to be effective.
5. Catalyst life of over 240 hours was demonstrated.

Nevertheless, the major barrier to continuation of our work on the present prototype concept in your plant is the fact that operation inside the estimated flammability limits is required. This is unacceptable. We have defined some potential reactor schemes that might allow oxidation of the vent streams either on the lean or rich sides of the flammability envelope. But, these options cannot be developed in time to fit into your decision schedule for EPA compliance. Based on that fact and the economics discussed below, we are winding down our VCM plant related work and will concentrate on PVC plant applications for the catalytic oxidation technology.

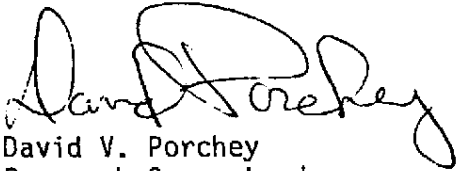
The table on the following page summarizes cost comparisons of the original PED Budget Design, and potential reactor options for operation outside the flammability envelope. Options include air, hot gas recycle, and steam dilution to allow lean gas oxidation, and a staged reactor to allow rich gas oxidation. Only in the Budget Design case does 600 psig steam recovery generate sufficient savings to make the extra investment attractive. The energy savings are still present. However, the reactor costs are significantly increased, relative to incineration, because the reactor design must insure

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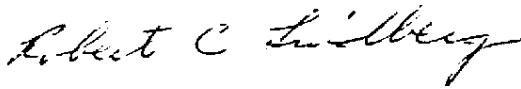
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operation outside the flammability envelope.

If the incineration concept would later be judged technically unacceptable or the relative economics would change, we are in a position to pick up work on this project at the prototype stage with any of the reactor options discussed. To proceed through prototype development, the time required would be 9 - 11 months at a cost of about \$155,000.



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TABLE I

COMPARISON OF REACTOR CONCEPTS

	PED BUDGET DESIGN		CURRENT "TYPICAL" VENT				
	<u>Incineration</u>	<u>Catalytic Oxidation</u>	<u>Incineration</u>	<u>Air Dilution</u>	<u>Nitrogen Dilution (Hot Gas Recycle)</u>	<u>Steam Dilution</u>	<u>Staged Reactor</u>
FEED RATES (SCFH)							
Air, N ₂ , Steam	282,000	282,000	854,000	1,366,000	1,192,300	1,023,400	721,600
Vents	<u>44,000</u>	<u>44,000</u>	<u>82,000</u>	<u>82,000</u>	<u>82,000</u>	<u>82,000</u>	<u>82,000</u>
TOTAL	326,000	326,000	936,000	1,448,000	1,274,300	1,105,400	803,600
INVESTMENT (\$MM)	3.5 ⁽¹⁾	3.8 ⁽¹⁾	1.21 ⁽²⁾	3.61 ⁽²⁾	3.44 ⁽²⁾	3.07 ⁽²⁾	4.09 ⁽²⁾
Increased Investment Over Incineration (\$MM)	---	0.3	----	2.40	2.23	1.86	2.88
HEAT RECOVERY							
Steam (lb/hr)	---	9,750	----	16,300	17,630	9,620	20,860
(\$/yr) ⁽³⁾	---	284,000	----	475,000	514,000	280,000	608,000

(1) Investments are for total system

(2) Reduced Investments are for incinerator or reactor only and are based on enlarged vent streams

(3) Steam (600 psig) valued at \$3.57/M lb.