

April 26, 1977

Tenneco Corporation
Recovery of VCM from
Vent Gases
CR-77051

CONFERENCE NOTES NO. 1

A meeting was held at the Piscataway, New Jersey office of Tenneco to discuss recovery of VCM from vent gases. Present at this meeting were the following persons:

Tenneco

D. C. Coldiron
W. G. Hughes
J. Jacobs
F. D. Richardson
C. G. Thompson

C&R

W. Kerler
J. P. Leinroth
W. F. Schlegel
N. J. Sweeney

C&R is to make a proposal for a study of the recovery of VCM from miscellaneous streams in Tenneco plants at Burlington and Flemington, New Jersey. New environmental regulations require the VCM concentration in effluent vent streams to be reduced to 5 ppm. Facilities must be operation by October 15, 1978.

The C&R study would be completed in 6 - 8 weeks. Absorption and incineration would be compared and an optimum system designed. The study would be based on factored estimates. The purpose would be to define the project and make sure that an economical design of high reliability results. Probably a hybrid system with VCM in the absorber tail gas reduced to 500 - 1000 ppm being fed to an incinerator would be the best combination.

After completion of the study, work would probably continue towards the Definitive Estimate. This phase should be completed in approximately 4 months. Thus, engineering flow diagrams should be complete and major equipment should be ready for purchase by late August or early September. Field work must be ready to start by May in order to permit operation of the entire system by October 15, 1978.

Tenneco felt reasonably sure that they could get to 10 ppm VCM by use of carbon beds, and that possibly they could reach 5 ppm by this method. They felt certain that the economics of adsorption would not be as attractive as absorption, incineration, or a combination of both. There is no question that the VCM content of vent gases could be made nearly zero by incineration; however, incineration without first reducing the VCM content by absorption would probably not be attractive because of the high cost of caustic or lime for neutralization, the waste of valuable VCM, and attendant pollution problems due to disposal of chloride-containing salts.

Tenneco thought that the optimum arrangement might be to reduce the vinyl chloride content to 500 - 1000 ppm by scrubbing, and to feed this stream to an incinerator. For guidance of their management, however, the relative economics of absorption should be compared to incineration.

The study should be directed towards selecting the best solvent, the optimum concentration of VCM in the adsorber tail gas before feed to the incinerator, and to the best equipment arrangement to minimize investment and operating costs. In the study, vinyl chloride should be valued at \$0.15 per pound.

Tenneco emphasized that essentially 100% reliability was essential, because manufacturing facilities would undoubtedly have to be shut down if the clean-up system failed. For this reason, it is likely that two incinerators would be required, and that possibly two scrubbers might also be needed. The study should include the incineration devices (if it is decided they are needed), but C&R may or may not be asked to design the incineration facilities during the definitive estimate phase.

The study would probably be on a reimbursable basis. C&R would be asked to sign a secrecy agreement. The principal contact for Tenneco would be Mr. Jacobs; Dr. Leinroth would handle process work for C&R. Tenneco would be agreeable to having C&R representatives visit their plants if they felt this was desirable.

C&R indicated that some data were available for VCM in various solvents. Additional experimental data would probably not be required during the study phase; however, additional data may be needed for the definitive estimate. If such data do become necessary, arrangements should be made soon after the start of the study to obtain these data. The estimated cost of obtaining these data is of the order of \$3000.

Experience Of C&R In This Area

Although C&R has done extensive work on vinyl chloride, they have never put in a scrubber exactly like this. It was agreed that a saturated hydrocarbon would likely be used as the scrubber liquid. If a high-boiling scrubber liquid is used, steam stripping may be the way to go.

C&R indicated that the B. F. Goodrich Company currently operates a system for recovering VCM from miscellaneous vapor streams. Changes are now being made to reduce the VCM content to a target of 5 ppm. Goodrich indicated that they might license the process after they saw how it worked in the plant. They would not be in position to discuss licensing for three to four months. If Tenneco is interested, they should discuss the matter directly with B. F. Goodrich.

Tenneco's Burlington Plant

Two streams are involved: one from the vent condenser, and the second from nitrogen stripping. Conditions are summarized below.

Peak Load	
scfm	175
contained VCM, mole %	20.6
occurrence	Max. 20 minutes out of 8 hours
Daily Average Load	28% of peak load
VCM to be recovered	2550 lbs/day
Contained Oxygen, mole %	2
Contained Water	Sat'd at 35°F
Contained Vinyl Acetate	5 ppm
Pressure, psig	90
Temperature, °F	35

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Tenneco's Burlington Plant (cont'd)

Wherever the term ppm is used, it is understood that this means parts per million on a molal basis. Tenneco noted that the daily average VCM in the effluent gas is 3250 pounds per day, but 700 pounds per day is removed in a precondenser, thus the total load to the recovery system is 2550 pounds per day.

Vinyl acetate will accumulate and may plug the absorption column if the solvent is not periodically cleaned up, or a purge stream taken. The 5 ppm of vinyl acetate corresponds to 2.4 pounds per month.

Tenneco's Flemington Plant

Operating conditions in this plant are summarized below:

Peak Load Off Vent Condenser	
vent gas, scfm	50
contained VCM, mole %	18
Maintenance Evacuation	
vapor, scfm	50
contained VCM, mole %	10.
occurrence	Max. of once/shift
Stripper Evacuator	
vapor, scfm	300
contained VCM, ppm	100 - 1000
occurrence	8 minutes every hour
VCM to be recovered, lbs/day	900
Pressure, psig	70 - 85
Temperature, °F	20

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Tenneco's Flemington Plant (cont'd)

Tenneco noted that vapors from the stripper evacuator may advantageously go directly to the incinerator and bypass the absorber because of their low VCM content.

Miscellaneous

C&R noted that the absorber and the base of the stripper would probably be carbon steel; but that the top of the stripper might well be constructed of nickel or other corrosion resistant alloys. Probably a graphite condenser would be required. Selection of the proper materials would be part of the study.

Tenneco indicated that their existing compressors might have capacity to accept recovered VCM as a vapor; but they would prefer that the study be based on returning liquids, unless the additional cost would make the economics totally unreasonable. A decision could then be made at the end of the study as to whether liquid or vapor would be returned.



J. P. Leinroth

JPL/acz