TENNECO CHEMICALS, INC.

TO	J. K. Jacob	AT	Piscataway	DATE	June 3, 1976
FROM	E. J. Schuetz	AT	Piscataway	COPY TO	W. Miringoff J. P. Sandstedt E. V. Schenke
SUBJECT	DEI-498: VCM ADSORPTION SYSTEM, FLEMINGTON DEI-509: VCM ADSORPTION SYSTEM, BURLINGTON				

Development of additional information and data by the Pilot Plant in the following areas will be useful and in a number of cases essential for completing the final design of the Flemington and Burlington VCM Adsorption Systems.

1) Determine bed capacities as a function of VCM concentration in the inlet stream for the 100 ppm - 1% range. R&D work in developing the original system for VCM removal dealt mainly with higher concentrations. Later work stressed the very low range in order to comply with OSHA requirements. We find, in preparing for the proposed EPA rules, that many of the plant streams fall into the 100 ppm - 1% category. For the preliminary design of the plant systems we have used — published Calgon data for these mid-range values. Development by our own people of data in this range or confirmation of the Calgon values would certainly be a preferred basis for the final design.

2) Determine the short and long term effect of vinyl acetate on bed capacities. Will any new regeneration techniques be required?

3) Determine the effect upon the system of water in the inlet streams, especially when handling low concentrations of VCM. I believe that the majority of the work by R&D to date has been with streams that are essentially moisture free, while the plant streams in most cases will be saturated with water. It is my understanding that the presence of water can have an adverse effect upon VCM recovery when working with very low concentrations. At what level does this become an important consideration? Is some pre-treatment to remove water indicated?

4) Determine the effect upon the system of residual moisture in the bed after regeneration. The pilot plant has been able to do a very complete and effective drying job on the carbon. Plant experience to date, however, has shown that it is not possible to match this performance within the alloted time using existing techniques.

It appears that on a plant scale a very pronounced heat effect will be noted when handling VCM rich streams in very dry carbon beds. The net result is an unstable mass transfer zone and poor VCM removal efficiencies. In this case, some residual moisture, acting as a heat sink, would appear to benefit the system.

Conversely, when handling very dilute VCM streams, residual moisture will have an adverse effect upon the system as noted in Section 3 above.

Since we must deal with both situations, what is the preferred condition of the carbon after regeneration?

5) The preliminary design of the units for Burlington and Flemington are based on providing a three adsorber system. Typically, a tower, after regeneration, would spend one cycle handling dilute VCM streams followed by one cycle on concentrated streams and then be switched back to regeneration. Several runs in the pilot plant, under similar conditions, to confirm the carbon loadings used in the preliminary design would be worthwhile.

6) Additional information on the regeneration technique would be useful. Among the items to be considered are: Rate of desorption; lbs. of steam/lb. VCM; lbs. of steam/lb. carbon; optimum steam temperature; optimum drying conditions; nitrogen rate - function of bed diameter - function of total carbon - total lbs. circulated - inlet temperature - outlet temperature, etc.

7) Determine the effect upon the system efficiency of very low velocities (less than 10 fpm).

8) Although not directly connected with the design of the carbon units, can we anticipate any process problems resulting from recycling recovered VCM back to the plant?

E. J. Schuetz

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EJS:vph

1742 STRIPPING TRIAL

BATCH	STRIP	INITIAL TEMP	FINAL TEMP	AVE. TEMP	PRESS. AT RECOV.	NITROGEN SPARGING MIN. VAC.	MAX. VAC.	AVE. VAC.	TIME, HRS	AT RECOV.	3HRS N_2	RESIDUAL VCM
822	1	—	—	~93	24.2	22.6	24.8	23.8	6 1/4			4092
823	2	117	114	113	26.2	23.6	26.5	24.8	5 1/2	6767	3152	2402
824	1	97	106	99	23.4	20.2	24.0	22.5	5 1/4			6565
825	2	87	101	93	23.0	22.2	26.4	24.4	5 3/4			8650
826	1	104	108	103.5	23.6	20.6	25.5	22.5	5 3/4			5154.
827	2	88	102	93.5	24.5	22.6	25.8	24.4	5 3/4			10638
828	1	100	112	103	24.0	4"	25.8	22.7	6	31122	19706	2734
829	2	87	101	92.5	24.8	23.6	26.4	24.6	6			4661
830	2											~~4661~~
831	1	82	102	91.5	23.4	21.5	23.9	22.7	6 1/2			4634
832	2	96	102	98.5	24.2	23.6	26.4	24.8	6 3/4			3799
833*	1	85	108	96.5	22.6	20.0	24.4	23.0	5 3/4	26234	9958	3075
S-1		94	107.2	97.8	23.5	21.0	24.7	22.9	5.9			4375
S-2		95	104	98.1	20.5	23.1	26.3	24.6	5.9			6030
OVERALL AVE:		94.5	105.6	97.9	22.1	22.0	25.4	23.7	5.9			5127

* HOT JACKET WATER - 150-155°F.

LAS 6/3/76

COLORITE 017572

HOT JACKET WATER STRIPPING

							NITROGEN SPARGING				RESIDUAL VCM		
BATCH	TYPE	STRIP	INIT. TEMP.	FINAL TEMP	AVE. TEMP.	VAC. AT RECOV.	MIN. VAC.	MAX VAC	AVE. VAC.	TIME, HRS.	END OF RECOV.	3 HRS. OF N_2	END
833[1]	1742	1	85	108	96.5	22.6	20.0	24.4	23.0	5 3/4	26,230	9960	3075
873[1]	1742	2	95	110	101.5	22.0	20.8	27.5	24.2	5 3/4	24,100	7339	2580
846[1]	1755	4	116	~117	116	~22	~21+	~24.0	~23.5	5 1/2	12,690	2,890	—

[1] JACKET WATER TEMPERATURE = 150-155°F.

LAS 6/3/76