A. T. COLWELL, President JOHN N. COLE, Vice President C. H. VAN HARTESVELDT, Vice President

Thompson Vita-Meter Corporation

A WHOLLY-OWNED SUBSIDIARY OF THOMPSON PRODUCTS, INC.

23555 EUCLID AVENUE

Cleveland 17, Ohio

PLEASE DIRECT REPLY TO
C. H. VAN HARTESVELDT
6402 CEDAR AVENUE
CLEVELAND, OHIO

February 23, 1950

Robert A. Kehoe, M. D.
University of Cincinnati
Kettering Laboratory of Applied Physiology
Eden Avenue
Cincinnati 19, Ohio

Dear Dr. Kehoe:

Attached is a copy of a memorandum on Vitane with 6 cc of T.E.L. per gallon showing the commercial advantage for increasing lead content. Also reported is our laboratory data on lead evaporation and minimum temperatures for solution of three lead concentrations.

The Vitane containing 6 cc of T.E.L. per gallon to be used in the Cincinnati Gas and Electric Fleet under Mr. Fred Heinlein's supervision will be in drums for reasons of quantity and storage facilities. It has occurred to us that experience with the 6 cc fluid could be broadened to include bulk use by having the 6 cc fluid supplied to Yellow Cab in Cleveland and Akron Transit in addition to the proposed Cincinnati application.

As you may know, the Canton Division of the Ashland Oil & Refining Co. leads Vitane with the same equipment used for their gasoline. Vitane is made up in batches up to six thousand gallons each. It will be convenient for them to make 6 cc Vitane for supplying the three fleets and also to make occasional batches of 3 cc Vitane for supplying our canner.

As I mentioned in my last discussion with you, we are prepared to support the effort necessary to determine the safety of Vitane containing 6 cc of T.E.L. and we would appreciate your estimate of the funds required for the coming year. We would like the estimate to cover all of the applications suggested above or whatever portion of them you feel justified initially.

I will return from a Caribbean trip in March and at that time I will get in touch with you to make final arrangements for the new test program.

With all best wishes,

Yours very truly,

C. H. Van Hartesveldt

CVH:ks
Encl:
cc: A. T. Colwell
J. N. Cole

A. T. Colwell VITANE CONTAINING 6 cc T.E.L.

C. H. Van Hartesveldt February 22, 1950

cc:J.N. Cole
E. L. Caswell
D. E. Anderson

1. A test program was recently completed on a Chevrolet engine mounted on a dynamometer test stand and General Motors Research Engine in the Thompson experimental Oldsmobile run on the chassis dynamometer. In this test program, Vitane (85% methyl, 15% water) was used to provide a constant increment of anti-knock quality for several gasolines. The Vitane used contained successively 0, 3, and 6 cc of T.E.L. per gallon. Complete details will follow in an engineering report. A summary of the results is attached.

2. Evaporation Rate of T.E.L. from Vitane.

In commercial use the first portion of material evaporation is the significant one when considering toxicity or inflammability problems. Strong commercial incentives to prevent wasteful evaporation are satisfactory curbs to excessive evaporation.

% Of Liquid Evaporated	% Of Lead Evaporated
Vitane Solution 1 (2.74 ml/gal.)	
5	6
10	9.5
20	15
30	20
Vitane Solution 2 (5.25 ml/gal.)	
5	5
10	11.5
20	25
30	41
Vitane Solution 3 (10.15 ml/gal.)	
5	16
10	26
20	42
30	54

In the above data, for the first 10% evaporated it can be seen that the T.E.L. evaporation problem does not vary significantly when increasing the lead content, from 2.74 to 5.25 cc per gallon. Even at 20% evaporated the hazard is of the same order for the two cases. The evaporation of T.E.L. from a 10 cc solution, however, is significantly more rapid.

3. Solubility of T.E.L. in Vitane.

The temperature at which T.E.L. will precipitate from Vitane for various concentrations is given below:

3 cc tetraethyl lead per gallon	below -50° C. (-58° F.)
6 cc tetraethyl lead per gallon	-44° C. (-47° F.)
9 cc tetraethyl lead per gallon	-36° C. (-32° F.).

The minus 47° F. temperature appears to be sufficiently low for all practical considerations.

4. Recommendation.

It is recommended that the safety of Vitane containing 6 cc T.E.L. per gallon be established by actual use of the material under the observation of Dr. Kehoe and his staff.

Very truly yours,

CVH:ks

C. H. Van Hartesveldt

VITANE CONTAINING 6 cc TETRAETHYL LEAD

	VITANE % INJECTION			% SAVING	% SAVING
	0 cc T.E.L.	3 cc T.E.L.	6 cc T.E.L.	6 Over 3 cc	6 Over 0 cc
Sohio X-70 (Reg. Grade; Approx. 1.5cc T.E.L.) Chevrolet	10.25 14.45 19.75	7.7 10.58 12.3	6.29 8.93 11.6	19.6 15.6 9.35	38.6 38.2 41.2
Sohio Supreme (Premium Grade; Approx. 2.6 cc T.E.L.) Chevrolet	9.86	7.83	7.14	9.4	27.6
Vitafuel (63 Octane; Approx. 0.4 cc T.E.L.) Chevrolet	9.72 13.81 19.2	6.93 8.62 15.7	5.36 6.95 12.55	22.6 19.4 20.0	44.8 49.7 34.6
Sun (Reg. Grade; 0 cc T.E.L.) Chevrolet	9.7 14.6 18.4	6.95 11.5 13.5	5.9 9.75 10.6	14.5 15.2 21.4	39.2 33.2 42.4
General Motors Research (95 Octane Blended; Approx. 3.0 cc T.E.L.) 10-1 Oldsmobile		9.87 14.57 19.2	8.23 12.95 17.0	16.6 10.9 11.6	
Sohio Supreme (Approx. 3.6 cc T.E.L.) 10-1 Oldsmobile		15.32 20.65	13.55 17.95	11.55 13.05	