

Frank Clearing Discussion
Seattle Union
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TANKCLEANING

Section I -- Report by Dr. Wm. Machle

Section II - Storage & Transportation of Leaded Gasoline

- I - 1. Relative toxicity of organic and inorganic lead.
Recommendation to refiners to follow our recommendations when cleaning treating tanks and separators.
- I - 2. It is my belief that there may be a probable error in correlation of findings by companies due to exchange agreements between refining companies.
- I - 3. Comment on paragraph 1 page 9.
In view of the two known cases of Gulf, Cleveland and Norfolk it is possible that data obtained from this source may be erroneous. Both cases showed poor cooperation, disregard of our regulations and in case of prior spiking at Norfolk shipments went forth without proper circulation.
- I - 4. Comment on paragraph 2 page 10.
I believe we have to accept wide variability as absence of control and our present practice of investigating all samples having a 0.3 cc variance between RRL and our Lab. findings as well as investigation of all samples above 3.0 cc/gal TEL will tend towards better blending control and decrease possibility of contamination of sludge with organic lead.
- I - 5. Comment on last part of page 19.
The total leaded gasoline tankage is believed to be far in excess of 2875. Our recent investigation in Seattle Division showed approximately 3650 tanks for this division alone.

A study of this while I was in the Baltimore Division showed 1039 tanks containing leaded gasoline in major oil company bulk plants not counting refineries, blending locations or jobbers.
- I - 6. Discussion on steaming of tanks (pps. 22-23)
It is accepted that the main purpose of steaming a tank is to gas-free same.

If steamed before cleaning sludge will pocket gas and upon breaking up of sludge when cleaning gas will be released and introduce an additional hazard as false sense of "gas-free security" has been given by steaming.

I believe the best way is to enter tank with fire hose and break up sludge and scale before steaming.

I - 7. Comment on Terminal and Bulk Plant Tanks

- p.28- However in the case of the organic lead, the form which has been responsible for the intoxications, we find no tendency toward decrease and in point of fact, the tendency is in the other direction.
- p.31- "----the knowledge that the hazard from organic lead does not diminish with increase in the distance from the refinery.
- p.30- "----suggests that a larger increment of the total lead is contributed by the organic lead in the case of storage tanks, than in the case of blending tanks. Referring to Table 20"----- one would assume that there would be less tendency for correlation between magnitude of organic and inorganic lead in the case of storage tanks. Since the opposite is true some factor is operating which is not apparent at this time.

Discussion--

Several investigations I have made lead me to believe that the TEL does not come off at the same rate at which gasoline evaporates or distills.

To my mind there is a similarity between steaming and terminal and bulk plant storage, in that both go thru a phase of having their Pb. content increased. - Bulk plant storage by weathering from the point of manufacture and steaming can be classified as accelerated weathering.

While in Baltimore I made a detailed study and rendered a report covering increase in Pb. concentrations due to storage and evaporation losses also pumping and transfer losses.

To review this briefly - it is accepted refinery practice to allow .2% to .3% for pumping and transfer loss and .3% to .4% storage and evaporation loss. $\frac{1}{2}$ of 1% loss being the maximum allowed by the auditors in both cases.

It is possible to concieve the point of manufacture as being somewhere in Texas where a 3.0 cc product is blended. The movement of this product may be from the refinery tank to a Gulf port by pipeline or tankcar-- shore tank to tanker--tanker from Gulf port to point in New England-- tanker to shore tank at terminal-- shore tank to shipping tank within terminal -- shipping tank to tankcar or transport to bulk plant tank -- bulk plant tank to tanktruck -- tanktruck to S/S tank -- S/S tank to S/S pump to car and ultimate consumer. With all of these movements a total loss of 5% is not inconcievable.

I - 7. Continued--

This would mean that the product delivered would not be 3.0 cc/gal but 3.00 divided by .95 or have a concentration of 3.16 cc/gal.

There may also be an increase in Pb. concentration due to temperature change as gasoline shrinks approximately 1% for each 14⁶F drop in temperature and most refineries blend using volume gallons rather than corrected gallons.

In the case cited above the temperature in Texas at the time of the blend might have been 82°F but when this product was received in New England the temperature might be 40°F which would increase the Pb. concentration due to this additional 3% shrinkage. Or we would find a total of 8% which would make the final product 3.00 divided by .92 or 3.26 cc/gal.

This case cited is probably maxima as to cause and effect but the fact remains that even with all the 3.00 cc blends now being made we do not find a large percentage going considerably over the maximum limit of 3.00 cc at the point of ultimate consumer.

Since there seems to be some balancing factor which counteracts this expected increase - I am wondering if this "weathering" (and this word is being used for the want of a better one) causes Ethyl Fluid to decrease in its sensitivity to solubility and throw down as an organic compound of the tertiary or some other form.

Further investigation of this phase may furnish an answer to paragraphs 6 and 7 of the conclusions given in Dr. Machle's paper.

II - 1. On page 2 of this manual it is stated that tanks that have once been cleaned under the supervision of an Ethyl Gasoline Corporation Safety Engineer and have not subsequently contained leaded gasoline need not be supervised at later cleanings.

- (a) What precautions, if any, should be taken with these tanks?
- (b) Discussion of Standard Oil Co. of Indiana recommended practices in this case.

II - 2. Warning signs - page 3.

- (a) Enamel signs - discussion.
Removed with manhead - strap around neck to hold sign.
Painted over when tank is painted.
- (b) Stencils - discussion.
Not satisfactory due to bleaching.
- (c) Recommendation.
Some refineries place a yellow ball or placard on stairways leading to roofs of sour crude tanks indicating that roof is not to be approached unless gas mask is worn.
As a warning sign for leaded gasoline tanks I would recommend that all manheads be painted red and instructions issued that these are not to be removed without explicit approval of the authority man.

II - 3. "Our Rules"

- (a) There has been recent conflict in paragraph 3 regarding boots - hip or knee.
- (b) No comment is now made as to the necessity of washing face and hands at lunch time. I also believe that the chewing of tobacco should be prohibited during tank cleaning.
- (c) I would recommend that the additional item be added to these rules, as follows:

When entering any tank that has contained leaded gasoline notify the following by mail if time permits, otherwise by phone or wire COLLECT.

Division Office

Harry Kuhe, Division Manager
1411 Fourth Ave.
Seattle, Wash.
Phone - Elliot 0540

Safety Engineer

As many additional lines as space permits for revisions.

II - 3. Continued.--

This addendum should be corrected for changes in personnel and will offer another possibility for contact and discussion.

II - 4. Disposal of sludge.

In many cases at refineries the sludge and water bottom are run to the refinery sewer. This means contamination in the separator and I believe the cleaning of these should be supervised, or recommendation made that our recommended practices be followed.

II - 5. Repairs.

The Standard Oil Co. of Indiana has instituted the practice of installing an air eductor at point in tank where hot work is being done to remove any vapors from vicinity of workman. I believe this is an excellent practice and should be included in our recommendations.

II - 6. Care of Equipment.

I would recommend that all Safety Engineers be supplied with canister time cards for use with our own equipment and these can be used for a sample to show refiners and recommend their adoption.

One refiner (S O N J Baltimore) test the air stream of airline hoses with a J-W Indicator to detect the presence of gas vapors and I believe this to be an excellent practice. This is done at intervals while on the job and as routine inspection of equipment in storehouse.