File: Pb-in-Air Reports

ETHYL HELLAS CHEMICAL COMPANY S.A.

CONFIDENTIAL

To : Mr. J.E. Rogers ✓ Thessaloniki

From : B.J. Lentz / S,B. Themelidis Thessaloniki

Subject: Lead-In-Air Audit Nov. 7, 1967

The first lead-in-air audit of the Ethyl Hellas Plant was made beginning on October 23 and ending November 3, 1967. The audit included:

1. An inspection of the sample stations (condition of equipment and adequacy of location).

2. A check of the lead-in-air meter calibration facilities.

3. A check of the laboratory procedure for handling lead-in-air samples. Analyses to check the scrubbers and separatory funnels for residual lead. Analyses of several known samples by laboratory personnel to check accuracy.

The details of the audit are first discussed followed by recommendations to improve the plant wide lead-in-air sampling and analysis program.

I. Inspection Tour

All thirteen lead-in-air stations were inspected and the following observations made.

a. Equipment.
The equipment (rubber tubing, charcoal scrubbers, iodine scrubbers) were generally in good condition. However, better maintenance is needed on some of the stations.

b. TEL vs TML Stations.
Air samplers are of the TEL and TML type. The TEL type consists of a single iodine scrubber. This type of scrubber collects virtually all of the TEL present in the air sample. The TML Sampler consists of two iodine scrubbe operated in series. The double scrubbers are required to efficiently collect TML from the air sample since TML is more difficult to absorb than is TEL. TML samplers are installed only in the 1st floor Blender Area, 2nd floor E&D Area, and 3rd floor E&D Area. For the supply air only a TEL type sampler is installed. However, there would appear to be an equal opportunity for TML to be present in the supply air. Also, in certain other areas we are not sure whether TML is present to a large extent, since in these areas only TEL samplers are installed.

c. Air Leakage of Samplers.
A leak check was performed by capping the air inlet connection of the iodine scrubbers, waiting five minutes for the system to reach equilibrium, and observing the flow indicator needle on the face of the dry test meter. A leak was indicated if the flow indicator needle continued to move. Twelve of the thirteen units leaked. It is probable that the leaks are a result of the rubber tubing connections not being tight.

d. Height of Station.
The height of all but two of the air intakes to the samplers was more than 150 cm above floor level. Some intakes were at a height of 180-190 cm which is above the normal air intake of the human body. Thus, the sampler does not sample the same air an average height person breathes. Also, more TEL and TML contamination would be expected to be found closer to floor level. It is not known how or why the original heights were selected.

e. Position.
Three samplers (1st floor Blender, 2nd floor E&D, 4th floor E&D) are located near a steady stream of fresh air from the ventilation system. Therefore the samples from these stations are not believed representative.

f. Inorganic Lead Samplers.
Only one inorganic lead sampler is located, in the Furnace Area. Samplers of this kind are not located in the Alloy Hopper and Flaker Areas. Samplers in these areas were installed at the beginning of the operation of the plant but little or no inorganic lead was found and they were eliminated.

II. Calibration of Meters

The meters are calibrated by using compressed air flowing through a Fisher-Porter rotameter (Model 10A17375). No special procedure is used during the calibration in order to reproduce conditions similar to plant conditions.

Also a scheduled calibration of the meters is not set up at the present time.

III. Laboratory Techniques for Lead-In-Air Samples.

The procedure used by laboratory personnel to handle the lead-in-air samples was reviewed. The techniques used in removing the samples from the scrubbers, the analyzing of the samples and the cleaning of the scrubbers prior to reuse appeared to be satisfactory. Blank solutions of the laboratory reagents and distilled water were being run routinely.

To check the cleanliness of the scrubbers and separatory funnels, two of each were taken at random and analyzed for residual lead. In all cases NIL Pb was found.

The accuracy of the analyses was checked by having laboratory personnel analyze samples containing quantities of lead known only to the person preparing the samples. The results obtained in analyzing these known samples are presented below:

Analysis of Known Samples

Sample	Actual		Found	
	Hellinge	Mg Pb/ft^{3}air	Hellinge	Mg Pb/ft^{3}air
1	3	0.001	8	0.002
2	5	0.001	4	0.001
3	15	0.004	15	0.004
4	8	0.002	8	0.002
5	10	0.002	8	0.002
6	13	0.003	12	0.002

In general, good agreement was reached between the lead found by the technician and the known amount. However, since the scale of the Hellinge numbers is 1,2,3,4,6,8,10,15,20 and some uncertainty exist in the determination of the Hellinge number in the intermediate ranges 10-15 and 15-20, (sample No.6), it is suggested that a great deal of care be taken in interpolating between readings in these reanges. It may even be necessary to split the sample when in the above intermediate ranges.

RECOMMENDATIONS

According to observations made during the audit the following items are recommended:

1. Install for short periods of time two sampling system (1 TEL and 1 TML) in parallel in all areas where only TEL sample stations are installed, to check whether there are any significant differences in the results of the analyses because of TML being present. In cases where a significant difference is found install the TML type sample station on a permanent basis. It was recommended that the Baton Rouge Plant install all TML type, but this substantially increases the laboratory work load.

2. Install a TML type sampler at the main supply air station in place of the TEL type now installed.

3. Install for short periods of time inorganic lead type samplers in the Hopper Booth and Flaker Areas. If inorganic lead is found to be present in substantial amounts install inorganic lead samplers in these two areas on a permanent basis.

4. Check the sampling trains for leaks periodically by capping the air inlet connection to the iodine scrubbers. This should be done about once a week.

5. Reduce the height of all sample intakes to 150 cm which would allow samples to be taken that more nearly represent the air normally breathed.

6. Relocate the samplers on the 1st floor of the Blender, 2nd floor of E&D and 4th floor of E&D to an area out of the direct path of a fresh air supply.

7. Establish a routine schedule for calibrating each meter on a 90 day interval. In order to reproduce conditions similar to that in the plant, use a vacuum pump at a rate of 4-5 scfh for 1 1/2 hours for TEL samplers and 2,5-3 scfh for TML samplers.

8. Require the laboratory technicians to analyze a known sample of lead periodically to maintain a check on the accuracy of their analytical techniques.

S.B.T

S.B. Themelidis

cc: Messrs. A.J. Carville
E.F. Diedrich
L.N. Georgiadis
M.C. Manolopoulos
J.D. Spearman

SBT/BJL/ek