

March 27, 1941

Mr. O. B. Lewis,

Dear Oscar:

This letter is to record the information given to you over long distance telephone this afternoon and to supplement this with details.

As explained to you over the telephone, Pan American Airways have been running into technical operating difficulties as a result of the very heavy deposits forming in the aviation Ethyl gasoline (Texaco) which they are and have been using exclusively for quite some time. These operating difficulties have reached a serious point during the last two months, although the first indications of the deposits showed up in January, 1941. This trouble was manifested in increased gum formation in the gasoline (by all methods of test) and the white deposits, sample of which was furnished to our New York office, forming in storage containers and in the plane fuel tanks.

From the safety and health standpoint, personnel contact with the dried deposits has caused noticeable symptoms of sneezing, headache, aching in the joints, eye burning and shortness of breath. This has occurred mainly with the personnel in the tank repair shop and in the control laboratory, both of these in Miami. The work which is carried out in the tank repair shop is mostly in the nature of rebuilding fuel tanks for the planes or using the sheets from tanks that have been condemned to make other units. Each one of the fuel tanks has a capacity of 170 gallons. This work is carried out in a room on the second floor of the plane overhaul shop. This room is approximately 25' x 60' and has windows on three sides. These windows are actually steel sash with ventilators approximately 5 feet from the floor. There is no

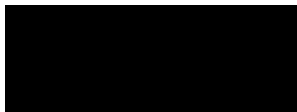
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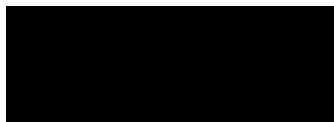
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mechanical ventilation.

Six men work in this room continuously, although only three of them are actually working on the fuel tanks from the planes. However, the three men who handle the fuel tank work are engaged in this activity exclusively. These men are listed hereafter:



The following three men work in the tank room, but their activities are not concerned with the fuel tanks:



After the sneezing manifested itself to a serious extent and was attributed to the dust from the deposits in the fuel tanks, instructions were issued to spray all inner surfaces of the tanks with a mixture of light lubricating oil and kerosene. This has reduced the amount of sneezing and other symptoms and it is only noticeable when the floor of the tank room is swept or when work is done on the tanks after the spray has dried.

The laboratory personnel has been subjected to the deposits with the resultant sneezing and eye-burn, due to the fact that gasoline samples sent in for analysis from points in Central and South America have been filtered to get this deposit out of the fuel. These deposits have been saved, in some instances, after having been dried and the filter papers containing the deposits have been thrown in open wastebaskets with the result that the dust of the deposits has been scattered over the laboratory.

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There are evidences of these deposits on the outside of sample cans which have contained the gasoline in question. This is due to the evaporation of the gasoline that has been spilled on the sides of the cans, and this would undoubtedly occur at any point where gasoline was wasted and permitted to evaporate to dryness.

Since the operating difficulties have been experienced with this gasoline due to the excessive deposits, it has been necessary to use chamois filters at each point where the planes are fueled in order that the deposits in the fuel tanks would be reduced to a minimum. I had an opportunity today to observe one of these chamois filters that had been forwarded to the Miami Control Laboratory of Pan Air for examination. This filter was completely covered with a layer of white deposit which caused immediate and intense sneezing as soon as the package was opened. These filters are being used at practically all fueling points in Central and South America, probably numbering between 25 and 40, and the personnel at these points are not cognizant with the hazard involved at the present time.

In order that you may have some idea of the fueling setup of Pan Air, the following is a brief account of the procedure involved. Gasoline is stored by the refining supplier at Port Arthur, Texas and two points on the Eastern Coast of South America. From these three points the fuel is dispatched in most cases in drum containers to the various intermediate points where the air lines have scheduled stops. Due to the inaccessibility of some of these points, considerable time and expense is involved in getting the fuel supplies to them. In some instances it is necessary to haul the drums by ox-cart. In view of

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these difficulties, it is necessary to store the fuel at some points for periods of eighteen months or more. In most instances storage is maintained in the drums in which it is shipped and under cover, although there are times when it is impossible to keep the drums under cover and then they are subjected to the intense heat of the sun. At some few points the gasoline is transferred from drums to underground storage tanks of approximately 2,000 gallons capacity, from whence it is pumped into the plane tanks.

The formation of these deposits has been tied in with increase of gum content of the gasoline by the head of the Pan Air laboratory. It is his contention that the supplying company has been shipping them since May of 1940 a fuel containing a fairly high percentage of alkylate, to which was added an inhibitor, which he told me was lecithin. Since this trouble showed up the first of this year, the supplying company has changed their inhibitor to UOP #4, which they claim will correct the trouble. However, there exists at the present time in field storage throughout the entire Pan Air operations considerable fuel that was shipped between May, 1940 and January 1, 1941.

We have endeavored to create as little disturbance as possible during the course of our investigation. The matter has only been discussed with Mr. Toomey, three department heads and the company doctor. All persons with whom we talked apparently are perfectly willing to do anything recommended from the standpoint of immediate correction and setting up procedures to prevent any future difficulties.

I should have mentioned that analyses of the deposits have been made by the Pan Air laboratory and laboratory of the supplying company. In the first instance the results showed 52% *leak* while

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the supplying company analysis showed 52% lead. The Pan Air Chemist seemed to feel rather definitely that some of this is organic, although he has no definite proof. The information given to him by the supplying company, was that this was largely in the form of carbonates.

I should also have mentioned that these deposits discolor the gasoline to a considerable extent and will settle out readily. In some of the samples which have been sent in from outlying points for analysis, there has been as much as 20 cubic centimeters, or more, of the deposit in three or four gallons of gasoline. I have obtained some of this deposit and also have arranged to hold the chamois which was sent in for inspection until someone from Cincinnati arrives.

In checking the disposition of fuel tanks taken from planes and condemned, it was found that in some instances this material is sold for junk. However, when the tanks are torn apart for a detailed inspection which would determine whether they are in condition that would permit further use as tank material or for building other parts or whether they are to be discarded entirely, all surfaces are thoroughly cleaned with a solvent material which is scrubbed on the surface to be cleaned with steel wool by a man wearing rubber gloves.

There are a number of other details on which I have made notes during the course of our investigation but believe that the information contained above is the most pertinent at the present time. I will make a later report which will cover all that we have found or may find later, that has not been covered in this letter.

Yours very truly,

*George P. Rosser*  
George P. Rosser.

Copy to:  
Mr. Mackle