

To Dr. Machile

This problem may be concerned
with that of sludge in blending tanks

ETHYL GASOLINE CORPORATION
CHRYSLER BUILDING

OK

New York, October 24, 1938

MEMORANDUM TO - Dr. R. A. Kehoe
Dr. G. Edgar
Mr. E. W. Kaley
Mr. J. H. Schaefer
Mr. R. Champlin

Gentlemen:

It has come to our attention more and more as we have worked in conjunction with the Manufacturing Department on tank cars and with weights of Fluid as received at the blending installations, that there is a persistent and continuing amount of sludge in Fluid. This has been brought to our attention through mechanical trouble encountered in unloading tank cars and in blending out of the weigh tanks. It appears now to be assuming larger proportions and it may not only be a mechanical difficulty but a big element in our safety work from a health standpoint.

Briefly, our investigations in collaboration with the Manufacturing Department have shown that there is a continuing build up of sludge in tank cars and as a conservative average, for example, we may assume that after 20 shipments, there is at least 200 pounds remaining in the tank car. We have noted that after washing an empty tank car twice with gasoline, when the tank car is returned to the plant, the residue still contains a very high percentage of Fluid (around 90%), which apparently comes out of the sludge in the sloshing and lixiviation which occurs in shipment. Even when the car is washed by filling it completely with gasoline, the residue still contains a high percentage of Fluid. Presumably, a large amount of sludge is carried over mechanically into the weigh tank and then last, but by no means least is finally blended into the gasoline and may settle out in the gasoline blending tank. In those tanks where shipment is made while gasoline is still in an agitated state from circulation or air blowing, it is conceivable sludge might be carried over and be found in the field storage tanks which would explain a matter that has been somewhat of a mystery.

I believe a great deal of thought has been given to this subject at the manufacturing plant but if our present study indicates the finished product is not very close to 100% pure Fluid, I believe we should continue to work for improvements. We wonder if Fluid, as manufactured in day to day production, can be guaranteed to be sludge free after having gone through the filters and into the tank car; whether sludge in tank cars is a matter of some chemical de-composition, oxidation, etc; or whether it is actually a settling out of fine particles which were carried through the filters in suspension in the Fluid. We are not sure what the purity tolerances are, but if they are as low as 1/10% for sludge, it is easy to see that an 80,000

KE 002281E

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pound car could be expected to carry along 80 pounds of sludge to give mechanical difficulty and cause apprehension from a safety standpoint for a long time to come. We are seeking information on the subject. Suggestions for increasing purity are that certain types of settling tanks be used and only sludge free Fluid be shipped in tank cars or that additional filters be used and sufficient samples taken from the run down lines to assure purity of product.

We are handicapped to get all the facts at the manufacturing plants ourselves, or to know exactly the conditions in blending tanks and gasoline storage tanks. Our reports, attached hereto, concern more the mechanical difficulties which our men have reported in their routine work the first nine months of 1938 and based on these, we are presuming the other statements made above to be true.

I bring up this subject as one you may choose to discuss at the coming Safety Meeting.

O. B. LEWIS

W:GCL
Enclosure

KE 0022816

RICHFIELD OIL CORPORATION, PHILADELPHIA, PENNSYLVANIA - A. J. Baldwin

The operator said that twice now they have had some trouble in making mixes. The fluid would stop coming out of the tank for an instant and then start up again; they do not know what the trouble may have been but I am wondering if it is possible that this amount of sludge in a 1000 gallon tank is plugging the suction pipe at times. Also, isn't this sludge going to soon cut down the capacity of the tank to the point where they will not be able to take a truck of fluid?

TIDE WATER OIL COMPANY, BAYONNE, NEW JERSEY - A. J. Baldwin

Watched unloading of car of fluid using top lubricant as eductor medium. Fluid stopped coming over with more than 5,000 pounds still in the car. After pulling for some time finally it started again very slowly but after several more minutes it approached normal rate.

STANDARD OIL CO. OF NEW JERSEY BALTIMORE, MARYLAND - J. Cole

When the truck was connected to the unloading line everything appeared to be in order with 125# on the high pressure side of the eductor and 16# on the low pressure side. At first the fluid would not come over and the No. 1 valve was closed and vacuum placed directly on the truck for about 5 seconds; this was then stopped and the No. 1 valve opened and the fluid came over at the rate of 600 pounds per minute. The bill of lading on the truck showed 12,732 pounds and at the completion of the unloading we were 60 pounds short which I believe, and so does Standard of New Jersey, came over at the start when the vacuum was placed directly on the truck.

STANDARD OIL CO. OF NEW JERSEY, BALTIMORE, MARYLAND - J. Cole

It appears that the truck was difficult to unload in that they could not get the fluid started over so air pressure was put on the truck to start it and it was finally unloaded.

TEXAS COMPANY, CASPER, WYOMING - B. G. Crane

I am of the opinion that sludge is stopping the pipe at times then pulling on through and that the weigh tank may have to be cleaned before the trouble is overcome.

GREAT LAKES PIPE LINE CO., FRANKLIN PARK, ILLINOIS - W. B. Heck

Starting with a vacuum of 11" as was their custom the car unloaded in just over 3 hours for an average flow of 425 pounds per minute. At 75 pounds short of the invoiced weight flow stopped and the vacuum built up from 14 to 16" but the last leg of fluid had to be secured with a direct pull.

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STANDARD OIL CO. (INDIANA), WHITING, INDIANA

- W. B. Heck

At 162 pounds short of the invoiced weight fluid flow stopped and was not regained in the normal manner with a tank reading of 16". The flow was re-established and the car was broken by a direct pull with an unknown quantity of fluid being carried direct to the circulating stock. Since the check started to air-flutter almost immediately, it is thought that this last portion of fluid would amount to no more than that required to fill the unloading line.

ANDERSON PRICHARD OIL CORPORATION, CYRIL, OKLAHOMA

- L. L. Huxtable

The superintendent called my home to advise me that during the middle of a blend the fluid ceased to flow and he was unable to complete the blend. The difficulty was apparently caused by sludge in the weigh tank choking up the riser in the tank. After washing gasoline past the check valve and cleaning it, I put a vacuum on the weigh tank and then vented the tank through the unloading line. This pulled the sludge back into the tank away from the standpipe and the blend was completed without further difficulty. Since a tank car was to be unloaded the following day, any sludge which might be lying around the riser should be swept away from it.

TEXAS COMPANY, TULSA, OKLAHOMA

- L. L. Huxtable

The superintendent called advising me that they had lost vacuum on their weigh tank in making a blend with the scale reading 1183# indicating that there was that much sludge in the tank. He was somewhat alarmed since that figure was only 380# about a year ago and wondered whether the tank should be cleaned. I suggested that we wash the tank with gasoline to see whether we could pick up any additional fluid and pointed out that as long as no operating difficulty was experienced, there was no justification in opening the tank for cleaning since this had to be done by a special crew from our manufacturing department, required special equipment, involved quite some expense, and entailed some hazard. The Texas Company only has a 3250 gallon installation at Tulsa and as they receive fluid in tank cars, glycerine has not been added to the tank.

GREAT LAKES PIPE LINE CO., DES MOINES, IOWA

- P. F. Johnson

At the request of Great Lakes, I was on hand at the unloading of car No. 632. It will be remembered that they have been having difficulty in the past with the fluid flow stopping before the car was completely unloaded.

SINCLAIR REFINING CO., ARGENTINE, KANSAS

- P. F. Johnson

Received information to the effect that Sinclair were having difficulty in unloading a small car of fluid. When I returned to Kansas City, Saturday morning, they still had the fluid car on hand with 1748# of fluid remaining in the car. Mr. Eversole, their blender, advised me that he had changed the unloading line to the other suction stub and still could not get any over. They had held up a blend pending my arrival so that I could check the scale reading before attempting to finish unloading the car that they had on hand.

KE 0022818

SINCLAIR REFINING CO., ARGENTINE, KANSAS (CONT.)

- P. F. Johnson

We were unable to unload the fluid with over 12" of vacuum on the weigh tank. We succeeded in starting the fluid over by putting the full force of the eductor pump on the gasoline wash back into the tank car for about four or five strokes of the pump, then lining the valves up for unloading. After a short time the fluid started over. Our final scale reading showed that we were 212# heavy over the billed weight of the car, which was probably the amount of gasoline that was backed into the car.

I wired Mr. Stover in accordance with Mr. Lewis' letter No. W 303.

The suction stub that we were lined up on on the car and backed the gasoline through was the suction stub away from the "B" or brake end of the car. As both suction stubs were plugged, I am of the opinion that the stub toward the "B" end of the car would still be plugged. After we completed unloading no difficulty whatever was experienced in flushing the car.

NATIONAL REFINING CO., COFFEYVILLE, KANSAS

- P. F. Johnson

To the National Refining Co. relative to their difficulty in drawing lead out of the weigh tank. They had accumulated a tank of gasoline to be blended by the time I arrived there and I found the maximum rate of flow they could get from the tank was 25# per minute. We proceeded to hook an airline on the end of the unloading line and opened the vent valve to the weigh tank. By putting two fast slugs of air into the weigh tank we succeeded in cleaning the line sufficiently to permit 45# of fluid to be educted from the weigh tank per minute. Mr. Fiebach is of the opinion that their weigh tank needs cleaning. About a year and a half ago when they changed the color of their fluid they emptied the weigh tank completely and flushed it with gasoline and the scale reading was 2,440#. He is satisfied with the present rate of flow of 45# per minute until such time that they unload another tank car which will be some time after the first of August. I expect to be on hand at this unloading. It is my opinion that there is sludge around the bottom of the suction stub and the unloading of a car will push some of it away. He is submitting isometric drawings this week of a conversion to a new type unloading and when these changes are made we will check the fluid lines for sludge accumulation from No. 1 valve to the eductor. I failed to mention that before backing the air into the weigh tank the check valve was removed and cleaned although it was found to be in good working order.

GREAT LAKES PIPE LINE CO., DES MOINES, IOWA

- P. F. Johnson

Mr. Trival, terminal foreman, advises me that they had difficulty unloading our tank car No. 630 which was received there March 10th. He advised me that when the fluid was about half over, the flow stopped and could not be started again using the maximum vacuum that they could get which was about 22". By disconnecting the car and hooking it on to the other stub, they were able to complete the unloading. The stub that they had trouble with would be the one nearest you if you were standing on the car platform and opened the dome cover to the left. Mr. Trival further informed me that the packing glands in this car were extremely dry.

KE 0022819

SKELLY OIL CO., EL DORADO, KANSAS

- P. F. Johnson

I was on hand when car 343 was hook up and started to unload with 18" of vacuum in the weigh tank. The fluid flow was 310# per minute shortly after starting and by the time 17,000# were over it had dropped back to a negligible rate.

We stopped operation, disconnecting the car and connecting the unloading line to the other unloading stub; maintaining our 18" of vacuum we were unable to draw anything at all from the other stub until we had taken direct suction closing off the weigh tank for a moment. The fluid then started over at a rate of about 340# per minute. Mr. Todd, chief chemist of the refinery, advised me that they had the same difficulty with the previous car received at this refinery.

GULF OIL CORPORATION, FORT WORTH, TEXAS

- C. F. Kautz

On Thursday, I was called back to Fort Worth, Mr. Taylor of Gulf calling and advising they were having trouble in the operation of their plant, and that they could not withdraw fluid from the weigh tank. I spent some time there Thursday afternoon and all day Friday. It appears the trouble is due to sludge in the weigh tank. I found that with about 18,000# fluid in the tank and a vacuum of 12", fluid would not come over. The check valve was opened, and found to be operating freely, and it was clean. 10" vacuum was then built up on the tank and air allowed to enter through the unloading line. This seemed to clear the line somewhat, and it was then possible to make an Ethyl blend, the fluid being transferred slowly however. After washing out the lines by circulating gasoline through them, #1 valve was opened, and examined. This valve is in poor shape, the lead seat being mashed out of shape, and partially closing the passages. This probably accounts for the slow flow. The valve also seemed to have some sludge in it. This valve is not a standard fitting, being a Vogt 2" ammonia valve, marked V 118 on the valve. Mr. Taylor is checking to see if a valve stem replacement can be obtained for this valve. After reassembling the valve, air was again sucked through the unloading line and through the tank, showing the line to be open.

RICHFIELD OIL CORPORATION, HARRIET, NEW YORK

- J. S. Krick

Truck at Richfield plant September 29th at the very end of unloading and during the washing out showed signs of sludge. However, was not necessary to change to other standpipe. Facing front of truck the standpipe on the left was one that caused trouble. This is a 1" plant. They use the second standpipe for pumping in gasoline. Recommend that truck be watched for further trouble.

PENNZOIL COMPANY, OIL CITY, PENNSYLVANIA

- J. S. Krick

It seems that about three weeks ago when they had 12,000# on hand, they started to make a mix and the fluid could not be pulled from the weigh tank. The check valve is okay as this has been making a clicking noise. The above is the first time they have had difficulty in removing the fluid from the tank.

KE 0022820

PENNZOIL COMPANY, OIL CITY, PENNSYLVANIA (CONT.)

- J. S. Krick

The blending operator climbed on the tank and tapped the flange below #1 valve. In doing so he evidently helped the situation as the fluid started coming over. I went over with Mr. Harvey the question of building a vacuum on the tank and then equalizing the vacuum by opening #1 and #5 valves to clear out around the standpipe. I expect to return to this plant this coming week when this will be done. As this is the first time that they have experienced trouble, a shorter standpipe will not be installed at this time. However, I explained the situation to him.

QUAKER STATE OIL REFINING CO., EMLENTON, PENNSYLVANIA

- J. S. Krick

On Wednesday afternoon I discussed with Quaker State the trouble which they experienced with the unloading of a tank truck of fluid on the day previous. It indicates to the writer that both standpipes must have been plugged or a pin hole condition must be present in both standpipes on the truck. Although it does seem peculiar that trouble should be experienced with both standpipes at the same time. The flow of fluid stopped when all but 450# was unloaded. By changing standpipes and building the vacuum up in the weigh tank to $18\frac{1}{2}$ " they were able to pull the fluid down to 100#, when the seal broke on the tank wagon. The writer checked the vent valve and this was found to be okay and according to the conditions the system appears to be tight.

IMPERIAL OIL LIMITED, IMPEROYAL, NOVA SCOTIA

- A. S. Olver

Received 'phone call from Harold Murch in Halifax in connection with trouble at the Imperial Oil bulk installation at Imperoyal due to a plugged standpipe in the weigh tank. He wondered if a tank cleaning crew could be sent down, or any other work done to improve the situation. They had had to remove the No. 1 valve and clean the standpipe with a brass rod as the flow had stopped during a blend. He reported extreme care had been taken in the operation. It was decided that Mr. Lewis would be written on the matter and he would be informed that we would call him Friday afternoon for advice. This was done so that our call would be made after there had been time to consider the situation. The standpipe was later removed and found plugged.

STANDARD OIL CO. OF TEXAS, EL PASO, TEXAS - Letter from E.H. Todd, Manager

A shipment of 16 drums of Aviation 1-T T.E.L. Fluid was received by us on September 1. 11 of these drums were emptied to the weigh drum on September 29. From the difficulty encountered it would appear that this delivery was made from stock which had been in storage for some time. The following was encountered:

1 - All outside bungs were rusted tight and were only removed with difficulty. 2 - Inside bungs were all heavily rusted and with a great deal of difficulty we were able to remove all but two. These two were so tight that the outside rim of the bung broke in attempting removal. These two barrels have had the outer bungs replaced and are being held for your attention as it will be necessary either to chisel them out or remove

KE 0022821

STD. OIL CO. OF TEXAS, EL PASO, TEXAS (CONT). Letter from E.H. Todd with approximately 200# of fluid remaining in the drum and on inspection the snifter showed stringy, sludgy material hanging from the suction end. When this was observed, emptying of further drums was discontinued and the drums in which sludge was found were gasoline washed to the gasoline blending tank.

We now have three full drums of 1-T mix on hand, two of which require mechanical work in removing the inner bungs. These five may or may not contain sludge similar to that reported on the two drums as mentioned above. It is also possible that sludge was present in more than two of the drums emptied as unloading was slow to the weigh drum. We are, however, unable to determine definitely if sludge is now present in the weigh drum.

Drum Nos. received on this shipment are as follows:

Drums emptied 9-29-38	Drums on hand full
27039 24543	16911 (Bung broken)
18828 24705	23943 (Bung broken)
27388 27490	16954
27152 30210	15119
17991 24343	31183
31197	

We will appreciate your checking into this matter and advising us what disposition is to be made of the drums from which the bung cannot be removed and what adjustment can be made for the sludge received. In the event that you may care to have your representative make a personal inspection of the fluid now on hand, we can arrange to delay emptying these drums for several weeks to suit your convenience in arranging the suggested inspection.

TEXAS COMPANY, EL PASO, TEXAS

- H. N. Peters

The following is a report on the tank car unloading difficulty encountered at the Texas Co. refinery, El Paso, Texas.

I arrived in El Paso, Wednesday morning and went directly to the Texas Company refinery where I found our fluid car EBAX 360 spotted on the unloading spur with the unloading line connections still made. The Texas Company had started unloading this car on Monday, October 10, in the usual manner and after approximately 30,000# of fluid had been pulled from the car, a stoppage apparently occurred and they were unable to pull any more fluid from the car.

The billed weight of this car was 40,165# of fluid. They had pulled over 29,988# and they were unable to get any more fluid into the weigh tank. This left 10,177# fluid in the car. Mr. Moon, the blender, had tried changing his connections on the unloading line to the second standpipe in the car but he was unable to move any fluid after the change-over. This was the only attempt they made to correct the difficulty and at that time we were notified.

KE 0022822

TEXAS COMPANY, EL PASO, TEXAS (CONT.)

- H. N. Peters

When I arrived at the plant Wednesday morning, I found that Mr. Moon had already built up vacuum on the tank. There was 12" of vacuum on the weigh tank and 18" of vacuum against a closed valve. The 18" of vacuum was held clear to the end of the unloading line against the closed valve there. I checked the swing joints on the unloading line and found that they were in good shape, no leak occurring here. The 18" of vacuum held up over a period of time on the unloading line.

I put the vacuum back on the weigh tank and the 12" here also held for some time. I then attempted to pull fluid again in the usual manner, but was unable to start it moving. I then closed all valves to the weigh tank and by-passed the weigh tank with No. 1 valve closed, pulling the fluid directly across into the circulating gasoline.

This solved the problem as the fluid started coming across. As soon as the fluid started over, we put it into the weigh tank itself and had no more difficulty removing the rest of fluid from the tank car into the weigh tank.

When the fluid started over, it was coming at the rate of approximately 500# per minute and it took 25 minutes to evacuate the rest of the fluid into the weigh tank. At the end of the 25 minutes, it was still coming over at the rate of 450# per minute. Mr. Moon reported that up until the time the stoppage occurred, he had pulled 20,000# of fluid over in 40 minutes. The fluid stopped coming over very suddenly.

Since Mr. Moon tried both standpipes in the tank car and could not move the fluid after the stoppage occurred, it appears to me that probably the sludge causing the stoppage was probably in the unloading line itself rather than in the standpipe, having been pulled to the unloading line from the standpipe during the first part of the unloading. However, by-passing the weigh tank with the fluid for just an instant seemed to pull the sludge, if this was what was causing the trouble, out of either the standpipe or the unloading line.

There was 3,880# of fluid in the weigh tank to start with and after finally unloading the tank car the weight showed 43,805#. Since the billed weight of the car was 40,165# and the total weight at the end of the unloading showed 43,805#, we unloaded into the weigh tank 39,935# with 240# going into the wash gasoline.

The lock on the dome of this car No. EBAX 360 was hard to unlock as some of the screws were missing, Mr. Moon reported, however, he experienced no difficulty in finally getting the lock out and opening the dome.

I have wired Mr. Stover of this unloading difficulty giving him the car number. I have not reported anything to Mr. Stover by mail, feeling that you will wish to forward copies of this letter to him.

KE 0022823

AETNA OIL SERVICE INC., LOUISVILLE, KENTUCKY

- N. D. Siebenthaler

I got the unloading line connected to the car and started to unload fluid about one o'clock. The vacuum was up to 20" which held with only a slight drop until the car was empty. The unloading time being about one hour and five minutes. I was certainly disappointed when the vacuum broke and the scale reading indicated we were 126# fluid short. I had Mr. Reardon check the scales several times at this point using the 2000# dead weight but found the scales accurate within 5 pounds. Not entirely satisfied that the car was empty I again built up vacuum on the weigh tank until 21" was reached and checked the car to see that it was level on the rails but was unable to pull over any more fluid. The car was then washed with gasoline using the prescribed amount in each wash and on the last wash we showed almost 5" of vacuum on the car before stopping and disconnecting. I instructed the men just how to use the equipment in blending and had them make a blend using 2891# of fluid. Assuming the 126# of fluid we were short was in the wash gasoline, that amount was deducted from the required 3,017# of fluid leaving 2891# to be used in the blend.

PURE OIL COMPANY, HEATH, OHIO

-* N. D. Siebenthaler

Mr. Frost stated that they had segregated the wash gasoline used for washing fluid cars after they were emptied and he found considerable sediment in this gasoline used on the last two cars received and he felt that our tank cars must have sludge in them and was concerned as to how much of this sludge was coming over into the weigh tank with the fluid.

IMPERIAL OIL LIMITED, IOCO, BRITISH COLUMBIA

- T. E. Zadra

As you know, they have been experiencing some trouble in not being able to discharge the entire contents of fluid from the tank car. In this case we were more successful than they have been in the past. At this time we discharged all but 360# of fluid which was picked up in the washing and run into the auxiliary tank. In the past they have had anywhere from 1000 to 2000# of fluid remaining in the tank car, which had to be picked up during the washing and pumped into the auxiliary tank.

W:GCL
10/21/38

KE 0022824