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MANUFACTURING AND TRAFFIC DEPARTMENT

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August 12, 1937

Memorandum: Mr. O. B. Lewis

I acknowledge with thanks receipt of your circular letter M-232 of August 10 in reference to Mr. Colvin's report on the recent fire which occurred at Sinclair's East Chicago Refinery.

I feel that Mr. Colvin has made a very accurate analysis of the situation and has emphasized the most important aspects of the case, emphasizing the necessity of further education along the lines of fire protection and subsequent hazards involved in our mixing plants.

I note with much interest the comments with regard to the blistering on the side of the weigh tank exposed to the heat of the fire, and the stains occurring at gasket joints on certain flanged fittings, with the conclusion that probably a high pressure developed in the tank. I doubt this very much. From fire tests run here at the plant sometime ago, one tank was heated for four hours with an average outside flame temperature of 1240°F., the source being at a fair distance from the tank, and with a maximum average bulk temperature reaching 176°F. and only a free-board of 3.3% in the tank, the pressure rose to a maximum of 240 pounds per square inch. On another test, with an average outside flame temperature of 882°F., the maximum internal average bulk temperature was 185°F., and with duration of the test six and one-half hours maximum pressure indicated internally was 30 pounds per square inch but in this case the free-board was 5.0%. I doubt very much whether the free-board or outage of the tank at the East Chicago Refinery is as small as that given in our tests which were made in a thirty-four gallon tank, as normally the minimum encoun red in the field would be in the order of magnitude of 10%. It is interesting to note from the above data the influence outage has on internal pressures encountered, and it might be worth while to consider this in loading field weigh tanks, keeping the outage to as maximum a figure as is practicable. It might also be of pertinent information to ask Mr. Colvin to determine how much Fluid was in the tank, in order that we may have an idea of the outage involved in this particular case.

Also from certain other data which we ran following the above test, I cannot agree, without reservation, to the remark, "This definitely substantiated our previous story that though combustible and extremely dangerous, if the tank were ignited the weigh tanks are not readily exploded". While no casual blaze would set them off, if conditions were right on an unlagged tank, the chances are that within one-half to one hour at an internal temperature in the magnitude of 400°F., we might possibly have definite trouble.

I think from the observation made, it is quite evident that we need to consider four lines of approach for fire protection, two of which have been enumerated in the report, for not only future installations but for correction to present ones, inasmuch as presumably future plants will be in the minority of

the total in existence:

(1) A suitable foam or steam system should be installed in all plants, which will extinguish gasoline fires that might occur in the pit under the weight tank or in the building caused by leakage from the main gasoline lines or pump.

(2) Adequate water sprinkler system, or high pressure outside fire hydrants, placed in such a position as to permit ready access to play a very copious stream of water on the weigh tank to keep down the heat effect. I might add here that during the fire in the tetraethyl lead plant a few years ago, part of the contents of one large reservoir of tetraethyl lead, which is very inflammable, was saved, as well as some ethyl chloride reservoirs, by playing water in large quantities upon them even though the surrounding temperature was very high.

(3) Isolation as much as possible on new installations from adjacent fire exposures; and at certain present installations where the exposure is great, consideration of placing a fire-wall on that side of the building closest to the attending exposure, or if possible make some correction by alteration to diminish the exposure.

(4) Where a fire-wall may not be practicable, or possibly not sufficient, consider, as I have pointed out several times in the past, the insulation of weight tanks where exposure is great by a means comparable to that used on our tank cars; that is, a four-inch cork insulation with some suitable outside jacket for proper retention of the insulating material. On some other tests made here at the plant, we calculated that with a 3000-gallon bare tank subject to a 1000°F. fire directly against the tank, the internal temperature would go to about 356°F. in about one hour and forty minutes; whereas, if the tank were completely lagged with the above type of insulation it would require one hundred thirteen hours to approach the same internal temperature. This is a very good indication of the efficiency of insulation.

In conclusion, I would also like to state that I am in 100% concurrence with Mr. Colvin's recommendations as to future action in connection to fire protection, as outlined at the end of his report.

I am sending copies of this memorandum to members of the Safety Committee, but I should like to point out that the data which I have quoted above has always been kept strictly confidential, and I do not think therefore that the information disclosed should in fact be distributed. However, the thoughts concluded from the data can be used in shaping up our future program.

J. H. Schaefer

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