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Monsanto Chemical Company
Texas City, Texas

August 24, 1959

To: W. R. Nisbet

cc: Plant Manager's Safety Board:

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Subject: Fire in Department 4 on August 16, 1959SUMMARY:

On Sunday, August 16, 1959, a fire occurred at the sample tap on the discharge side of 4P5-1 as hot EB was being caught in a 5-gallon bucket. A fire alarm was turned in at 5:38 PM. The fire was extinguished by dry powder extinguishers. There was very slight equipment damage consisting mostly of blackening of paint and charring of insulation. EB production in department 4 was interrupted for about 30 minutes. An operator received minor burns to his right hand and forearm when the flash occurred. The all-clear was sounded at 5:47 PM.

The stream involved was the department 4 EB column (4D2) overhead, which is 99.7+ percent EB at about 100°C. This temperature is well below the EB autoignition temperature but above the EB flash point. All equipment and process temperatures appeared to be normal just before the fire.

DISCUSSION

The EB to be used for pump cleaning was being taken from a tap on the discharge of the 4P5-1. The valve is mounted vertically, approximately three feet above the pad. There was no nipple in the valve, so that the flow of EB was directly from the $\frac{1}{2}$ " valve body. The pipe and valve are steel.

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The EB was being caught in a 5-gallon steel, open top bucket, as has been normal practice. The bucket had a wooden hand protector on the steel handle. The bucket handle was looped over the valve stem. Exactly what parts of the bucket and piping were in contact is unknown, but subsequent tests showed it to be quite probable that the wooden protector was the only part of the bucket which was contacting any of the piping components. Without a nipple on the discharge of the valve, there was no contact of the piping with the side of the bucket, so that the liquid being sampled could have fallen freely into the bucket.

The operator opened the sample valve to start the EB flow, and almost immediately the EB flashed and started burning in the bucket. Since the sample valve handle was above the bucket, the operator's hand and arm were extended over the bucket as the flash occurred. The operator stopped the pump and reported the fire to the chief operator who turned in the fire alarm.

The fire continued to burn in the bucket and spread to the insulation and paint on the overhead piping in the immediate vicinity. The fire was put out by operating personnel by use of dry powder extinguishers. No action was required of the fire department.

The operator received minor burns to his forehead and right forearm when the flash occurred. One treatment at First Aid was sufficient. The operator was not wearing gloves nor was his clothing made of synthetic materials.

The fire and char damage to the insulation and paint on the surrounding piping was less than \$500. Production of EB in department 4 was interrupted for about 30 minutes.

CAUSE

The most probable combination which caused this fire was:

- 1) A flammable mixture of EB and air, and
- 2) A static spark caused by the free fall of EB into the ungrounded bucket.

ACTION TO BE TAKEN

- 1) The wooden protectors were removed from all buckets to be used in the sample-slop service. Instructions were issued to be certain that the sample tap nipple is in contact with the side of the pail when liquid is flowing.

- 2) Sample taps will be relocated such that the sample valves will not be above the sample container.
- 3) Operating supervision will study this problem of obtaining samples safely considering piping components, type of container, stream to be sampled, grounding required, etc., and will issue a revised sampling procedure by September 15, 1959.
- 4) The use of EB as a solvent for styrene polymer in cleaning equipment will be reviewed, versus use of other possible methods. A revised procedure for cleaning will be issued by operating supervision by September 15, 1959. In the interim, any EB collected for cleaning purposes will be taken from a stream near atmospheric temperature.
- 5) This incident will be made the subject of departmental safety meetings outlining the hazards of, and ways to prevent static generation in flowing streams, and otherwise.

RECOMMENDATIONS

- 1) All departments review procedures used in sampling flammable materials. This incident occurred even though this method of sampling EB has been recognized as standard for several years.
- 2) The Safety Department review what types of containers and sampling systems are available for sampling hot, flammable organics from process piping.


H. M. Keating

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