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FOR INTERNAL CORRESPONDENCE

CARBIDE AND CARBON CHEMICALS COMPANY

UCC

INSTITUTE PLANT
P. O. BOX 2831, CHARLESTON, WEST VIRGINIA

MATERIALS OF CONSTRUCTION GROUP

5246

To (Name) Mr. J. C. Malone
Company Carbide and Carbon Chemicals Company
Location Institute, West Virginia

Date August 16, 1955

Originating Dept. Oxide-Glycol

Answering letter date

Copy to Mr. H. B. Coons

File Ethyl Oxide

ACH

Subject The Scope of the Ethylene Oxide Protective Program at the Institute Plant

MC-567-00

PLAINTIFF'S EXHIBIT

Dear Mr. Malone:

The program in progress has five primary objectives:

1. Eliminate asbestos, in any form, from contact with ethylene oxide liquid or vapor.

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2. Clean equipment on a periodic schedule in order to eliminate dangerous deposits.

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3. Insulate lines where fire exposure would allow detonations to propagate into process equipment or tanks.

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4. A systematic replacement of badly corroded equipment with more corrosion resistant alloys, essentially stainless steel of the 18-8 variety.

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5. Installation of fire water sprays on vulnerable equipment

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Due to the scope of the program, it is well to discuss each of the five objectives individually and to give our reasons for believing the changes are necessary.

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The Elimination of Asbestos, Primarily as a Gasket Material - Asbestos is known to promote the polymerization of ethylene oxide in the liquid state. From the stand-point of product quality, it would be well to eliminate one of the causes of suspended matter in our product.

Asbestos in sheet form has been widely used as a gasket material throughout the Corporation, but we have discovered that a one-inch face on a gasket will deteriorate at the rate of approximately 1/8-inch per year. This will cause gasket failures, and possible fires, after a line has been in service for 5 to 10 years. The gaskets that are now being used are the metal spiral wound type with a Teflon filler between the metal spirals, solid soft copper, or asbestos with copper wrapped all around it. It is hoped that even Teflon can be eliminated because we do not feel that Teflon will stand up under fire exposure. All-metal spiral wound gaskets are on order, at this time, for testing purposes.

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Gaskets are being replaced as follows:

a. Pipe lines - spiral wound or soft copper.
b. Motor valve bonnets - soft copper.
c. Pump heads - soft copper if casings will stand bolt stresses required to seal. Replacement of some pumps may be required.
d. Column flanges (purifying column - exhausting column) - copper clad asbestos on purifying column spiral wound or soft copper on exhausting column.
e. Valve bonnets - soft copper and steel valves only. Cast iron valves cannot be used.
f. Any safety valves having internal gaskets will have soft copper gaskets.

The regasketing program starts at the stripping still vapor line and continues up to the vent scrubber. All liquid and vapor oxide lines throughout the plant and the transfer line to South Charleston will be regasketed. This, of course, includes valve bonnet gaskets.

So far a suitable packing for valves in ethylene oxide service has not been found. This also applies to pump packing. Mr. Weber of our Maintenance Engineering Department is now testing a polyethylene pump packing that we hope will prove suitable for both pump and valve packing.

Cleaning Equipment to Remove Dangerous Deposits - We know that oil and corrosion deposits collect in the shell of the cycle gas heat exchangers and that they can ignite and burn. All heat exchanger shells will be mechanically cleaned and the shell "Insaluted". The chemical cleaning of the No. 17 Unit's shell did not appear to be very effective when it was done the week of August 10. After all the shells are cleaned, a 1-1/2 to 2 year cleaning schedule will probably be maintained.

Deposits removed from the No. 17 Oxide Unit's Recovery system on August 10 are now being tested by Carbide's Fire Research Laboratory to determine if they will lower the known detonation temperature of ethylene oxide. If the deposits do lower the detonation temperature, more equipment cleaning will be in order.

Insulation - All the ethylene oxide liquid and vent lines within the individual unit areas will be insulated to minimize the possibilities of detonations due to fire exposure. The oxide lines on the main piperacks will be considered after cost estimates are obtained.

Systematic Replacement of Corroded Equipment - The corrosion in the base section of No. 17 Unit's purifying column is 8 to 12 per cent general. The extent of corrosion on all the purifying columns is being investigated to determine the necessity of buying stainless steel replacement base sections, the top

part of these columns is in good shape in general.

The tubes in the cycle gas heat exchangers are corroding to the point where replacement of the tubes is necessary. A tube bundle with all stainless tubes is being ordered so that replacement of all the tube bundles can be accomplished without an excessive amount of down time (one day instead of 3-4 days per unit). The baffles in the new bundle and the retubed bundles will be stainless to minimize any catalytic effect of steel corrosion products.

The base sections of the No.'s 18 and 19 Units' stripping stills (steel) have been replaced once and nozzle replacements are again being made. Extensive repairs have also been made on the steel base sections of the No.'s 15, 16 and 17 Unit stripping stills. An investigation is being made to determine the necessity of replacing these base sections with stainless steel.

Extensive nozzle replacements and baffle replacements are being made on the stripping still heat exchanger shells of the No. 15, 16 and 17 Units. New shells will be required within the next 2-3 years.

The corrosion in the cycle water system of the No.'s 15, 16 and 17 Units appears to be more extensive than the other units in the plant. It is believed that this is due to using low pressure steam from the glycol evaporator system as live steam supply to these stripping stills.

Installation of Fire Water Sprays on Vulnerable Equipment - Fire exposure on the recovery systems of the oxide units would cause serious detonations within the equipment. Adequate spray protection will be installed on the following equipment:

a. Entrainment separator in suction of oxide compressors.
b. Purifying columns.
c. Exhausting columns.
d. Storage tanks already have spray protection.

Due to the large quantity of oxide that might be accumulated in the field storage tanks, it is planned to bury these two tanks so that there can be no possibility of fire exposure. The nozzles on the tanks will be altered so that there will be no flanges underground.

Very truly yours,

Robert K. Wilson

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