

From: LARNDG::WAGENER "Gerald Wagener, La. AS&TL, 504-389-1828" 20-FEB-19
92 16:00:22.66
To: GUM *Ethanolamines*
CC: *2-11-92*
Subj: Please file and list as a review conducted on Feb 11, 1992
From: LACSDC::MONROE "JOHN MONROE (504) 389-8169" 20-FEB-1992 15:42:30.8
To: SWIMS, HAMMOND, LARNDG::WAGENER
CC: U091893 !BARRY MARCHANT
Subj: AMINES REACTIVE PRESSURE RELIEF HAZARD ANALYSIS

February 20, 1992

ETHANOL AMINES
REACTIVE PRESSURE RELIEF HAZARD ANALYSIS

The purpose of this meeting was a review of reactive chemicals data to identify reactive hazards that threaten equipment over pressurization, list possible scenarios, and judge the credibility of these scenarios to decide which ones should be pursued with pressure relief design calculations. Priorities based on this analysis should be set defining which problem to address first if more than one case is chosen for further work.

Meeting participants were: John Swims, Carol Hammond, and John Monroe.

ARC data runs on several amines mixtures indicate gassy exotherms with detection temperatures in the range of 236 to 276 degrees C. Saturation temperatures of steam used to drive the reboilers range from 205 degrees C to 242 degrees C. This is sufficiently close decomposition detection in the ARC to merit further work. The ARC also suggests that the higher molecular weight amines (TEA) begin to decompose at a lower temperature than the lower molecular weight amines. Since TEA also requires the higher steam temperature for distillation, the TEA columns and the DEA column are the highest priority for reactive pressure relief analysis.

The samples for the ARC runs studied were synthetic, made up from pure products. The runs were stopped at 300 degrees C and therefore, a complete decomposition curve was not established. No run was made on a mixture representative of the TEA column bottoms. The team recommendation is to obtain additional ARC data for further study, obtain actual samples from the column bottoms product rather than mix synthetic samples, analyze the vapor space after the ARC run to identify decomposition products, and allow the run to continue to a higher temperature in an attempt to capture the entire decomposition curve.

A reactive pressure relief hazard analysis was completed for one of the systems in question, the DEA column, T-280. ARC run #92-0672 was selected for analysis, a 50/50 mixture of DEA and TEA. The column bottoms is nearly 100% TEA but no ARC data was available. The team judged heating the column bottoms to the point of significant decomposition a credible scenario that should be studied to determine if the pressure relief is adequate. A summary of the hazard analysis is attached.

The amines reactor, R-201, was also studied briefly. A pressure relief sign done in 1980 for the Michigan plant was reviewed. The conclusion reached in the Michigan study was a worse case based on overfeeding EO to the reactors. If a similar conclusion on credibility were reached for the LAD plant, the existing relief system would be significantly undersize. It was also noted that the discharge piping and vent knock out pot are too small to accommodate the flashing two phase flow expected in the event of a fire or reaction runaway. Further work is needed for this system. Contact

DO A 016957
CONFIDENTIAL

with Michigan to find out what action was taken based on the 1980 study will be the first step.

An action list for further work is attached.

Alan Monroe
Louisiana Technical Services

DO A 016958
CONFIDENTIAL