Safety Methods Utilized in Plant Operations

A Safety Audit is one approach to insuring that as many aspects as possible are covered to insure safe operation

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Monsanto's objective like all other companies is to cause no injuries to people while minimizing accidental loss of property and profit. While preparing for this presentation I reviewed some of the unfortunate events which have occurred at our Luling, La., location. I have served, as I'm sure many have, as a member of accident investigation teams to determine the exact cause of an accident and to make recommendations which, when completed, will hopefully prevent a recurrence. Although I have nothing but praise for the team concept, they will invariably uncover the little two letter word "IF". If you review your own experience following an accident or hopefully a near miss, you can probably recall the "IF'S". *IF* we had checked, *IF* we had known, *IF* we had only had indications, *IF* we had checked the line thickness, *IF* the trips had worked properly, and etc. To get the "IF" out of ammonia plant safety is a worthy goal for each of us.

The Ostroot article described one of the mechanisms that our engineering personnel utilize to assure a plant is built with safety considerations. Our design people have, even before the unit is a reality, taken action to rid ourselves of the "IF'S". I would like to continue this topic by discussing some of the methods the operating department uses to assure the safe operation of our units and again reduce the "IF'S" in safety. It is not my intent to reveal some new approach to ammonia plant safety but to discuss some of the concepts which we feel have been helpful.

The Safety Audit

Safety Audits are conducted for all units at our location and is accomplished by selected individuals from the various disciplines who are closely associated with the particular unit. This group typically includes the Production Supervisor, Maintenance Engineer, Production General Foreman, Tech Service Engineer, Shift Foreman, Safety Engineer and Maintenance Foreman. The first audit is conducted prior to the initial start-up of audit and is reviewed and updated every two years. The audit I will duscuss here pertains to our present Ammonia Plants.
The purpose of the audit is to:

(1) Examine all aspects of safety in the Ammonia process from raw materials to finished product.
(2) Expose any poor safety practices so that corrective action may be taken.
(3) Establish a text for the retention of the safety aspects of the process which can be utilized by existing and future personnel.
(4) Maintain a current training text which keeps safety a vital part of training.

The audit is sub-divided into sections which contain:

(1) An introduction and brief process summary with plant layout.
(2) Material handling described as to analysis of material, how received and stored, the safety equipment provided and procedures to be followed in handling the material.
(3) Materials in process and intermediate materials are described in detail. For example, sulfuric acid is described as to physical properties and hazards.
(4) All process equipment is listed in numerical order with description as to function, equations of any reactions, service, installed protection devices, design and operating conditions, potential hazards and any revisions or additions which have occurred.
(5) The emergency and fail safe systems are described in detail. All solenoid trip valves are tabulated and described along with a description of the relief valves.
(6) The handling of potential emergency operating conditions are described. It is obviously impossible to present detailed instructions that would apply to all situations. This fact serves to emphasize that there is no substitute for knowledge and understanding of the unit to safely and efficiently cope with unusual conditions.
(7) Fire protection and other services provided for the unit are described in detail.
(8) An area of great concern today is the environment. All effluents, atmospheric, liquid and solids, are described as to source, content, volume, temperature and treatment.
(9) A field inspection of the unit is conducted after the above sections have been completed.
(10) The final section contains recommendations and expected completion dates along with a status report of recommendations from the previous audit.
(11) The status of the recommendations is reviewed with the plant Central Safety Committee every 6 months.

Our completed audit, we feel provides current and valuable information readily available to operators to assist in the safe operation of their units.

Emergency Trip Check

An important safety procedure is the emergency trip check procedure. Prior to every start-up of an Ammonia unit all emergency trips are checked and results recorded by the operator. Once the plant is on-stream, the operator is required to verify that all trips are in normal operating condition. Trip checks, alarm checks, pressure checks, stroking of critical emergency valves and slow roll checks of spare pumps is done on a biweekly basis. Our new Ammonia plant, which is now under construction, will have full on-line trip testing capability.

Weekly Safety Equipment Check

Safety equipment is checked on a weekly basis. This includes all fire extinguishers, gas masks, air paks and safety showers. Their condition is recorded, and reported to the Safety Department.

Relief Valve Inspection Program

Our computerized safety relief valve inspection program has served to keep our relief valves inspections current. All relief valves checked at least every two years. A computer read-out of delinquent valves along with inspection tags is received by the unit each month. These valves are then scheduled for testing at the earliest opportunity. The inspection tag is completed at the time of testing and utilized to update the computer program.

Equipment Blind List

Blind lists are pre-prepared for each major piece of equipment. These lists assure proper blinding prior to maintenance work and blind removal when the work is complete.

Line Thickness Checks

Our Corrosion Engineer maintains a program of line thickness testing. These checks are made on piping and vessels which are subjected to service which might result in failure.

The Safety Audit, Emergency Trip Check Procedure, Weekly Safety Equipment Check, Relief Valve Inspection Program, Equipment Blind List and Line Thickness Checks are some of the techniques we use to maintain safe operating conditions in our Ammonia Plants. Safety is stressed with our people from the day of hiring and with training, safety meetings, literature and various other programs, we strive to keep safety equal to such items as production and cost control.

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